KSU estimated Agriculture Risk Coverage (ARC) Payments for All USA Counties

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Note from Art. I debated if KSU should release the corn, grain sorghum, and soybean estimates because NASS will not release any NASS yields for these crops until February 18. As a result, we will not be able to calibrate our model until some of the 2015 NASS yields are released. Also, the NASS January monthly price will not be released until the end of February and the January price normally carries a large weight for these spring planted crops. We decided to release the estimates because if the projected county yield is either far out of the money or deep in the money, then the model will provide a useful estimate. Those county yields that are near the money are the problem because our model may estimate a yield too low and show payments when there will be none. We have some NASS 2015 wheat county yields and 6 months of marketing prices to calibrate our wheat model, so any errors are smaller for wheat. Any errors in the estimates are Art’s, but the other authors performed necessary functions to make the model operational on Agmanager.info.

Links to ARC Payment Maps: Kansas
Corn: http://www.agmanager.info/policy/commodity/maps/Kansas_Corn.asp
Soybeans: http://www.agmanager.info/policy/commodity/maps/Kansas_Soybeans.asp

Links to ARC Payment Maps: National Maps with All States
Corn: http://www.agmanager.info/policy/commodity/maps/USA_Corn.asp
Soybeans: http://www.agmanager.info/policy/commodity/maps/USA_Soybeans.asp
Sorghum: http://www.agmanager.info/policy/commodity/maps/USA_Sorghum.asp

Introduction. This is the first KSU estimate of the expected Agriculture Risk Coverage-County (ARC-CO; hereafter shortened to ARC) payments. These estimated ARC payments, which will be paid in October of 2016, are expected to help farmers plan their cash flow budgets. It is expected that many ag lenders will also utilize these numbers when evaluating operating loan requests.

The estimated ARC payments are presented in a map and cover wheat, corn, grain sorghum, and soybeans for Kansas and the other states. Once you click on the link and bring up the map, users will need to select their state and practice located in the upper left corner of the map. In the upper left corner of the map is a plus sign that users will need to click on to make the map larger, zooming in on their area of interest. Left-click and hold to re-center the map as you zoom. Hover your cursor over your county and the map will provide a pop-up message with more important information (more operating instructions are provided below).

1Prepared by G. A. (Art) Barnaby, Jr., Professor, Robin Reid, Extension Associate, and Rich Llewelyn, Extension Assistant, Department of Agricultural Economics, K-State Research and Extension, Kansas State University, Manhattan, KS 66506, January 19, 2016.
These estimated payments are subject to risk because the estimates are based on forecasted county yields and Marketing Year Average (MYA) prices. However, if the estimated county yield is more than 15% below the maximum allowable yield that will be required to generate the maximum payment, then it is extremely likely farmers in that county will receive the maximum payment this fall. The reverse is also true, if the yield that will start payments is more than 15% higher than the trigger yield then it is extremely likely that farmers in those counties will receive no payments. In those counties, lenders and farmers will have solid numbers for the fall ARC payment to be used in their cash flow budgets. When the forecasted county yield falls in between these two extremes, it becomes very difficult to give a definitive answer. It is then an estimated government payment, but there are also many estimated costs, prices, and yields in a cash flow budget that are subject to change too. The estimated ARC payment error will decrease through the marketing year because more of the final yields and prices will be published by USDA and will no longer need to be forecasted. KSU will update the model with the latest USDA published numbers each month.

Estimated ARC payments for 2015/2016 were derived from KSU estimated Marketing Year Average (MYA) Prices found HERE and KSU estimated or National Agricultural Statistical Service’s (NASS) county yields. Estimated ARC payments will be updated each month as more of NASS’s county yields and prices are released. Users will need to check back as new future estimates will have a smaller error. KSU county yield estimates are being driven by publicly available aggregated crop insurance data and historical county yields from the Farm Service Agency (FSA). The model assumes that if a county has large crop insurance losses, then likely the average county yield will be low too. However, because it is aggregated data, the crop insurance losses also includes losses caused by price losses.

KSU will only estimate county yields for counties-crops where NASS has not published a county yield. NASS has published only selected county wheat yields as of this date, so there are many missing NASS county yields. NASS has not published any county yields for corn, grain sorghum, and soybeans, but it is expected to publish selected counties for those crops on February 18. Therefore all the ARC payment estimates for corn, sorghum and soybeans are based on KSU estimated yields that will have a much larger error than the NASS county yield.

Clearly, the NASS county yield, if available, is preferred over the KSU estimate and the maps will be updated with NASS yields when they are released. However, it is the expectation that NASS will not publish yields for all counties, so the KSU estimate will be the only available yield until FSA releases the approved county yields, expected to be released next fall.

For estimates, the NASS county yields are preferred. However, it will not be the final approved yield by FSA. FSA’s calculated county yield equals the total NASS bushels harvested in the county divided by the county harvested acres plus failed acres. NASS will have missing data and FSA will utilize crop insurance data to fill in the blanks. FSA has access to less aggregated crop insurance data that is not available to the public. In the past, FSA has gone to the Risk Management Agency (RMA) to get the failed acre number. The reason FSA divides by harvested acres plus failed acres rather than planted acres is because the crop may not have failed. For example, some farmers plant wheat to graze out and they never planned to take those acres to harvest, so dividing by planted acres would make the county yield lower than is really the case. The same issues apply to corn planted for silage. If all fails and there
is no data anywhere for FSA to set the county yield used to determine the ARC payment, then the FSA State Committee will set the yield.

The MYA price is the other estimated variable that is used to determine the ARC payments. The model is using the KSU estimated price, but there are other estimates by other authors that are available. The final MYA price is determined by NASS and FSA uses that price without any change to determine the approved ARC and PLC payments.

The KSU price is updated monthly, and the estimate will improve as estimated monthly prices are replaced by NASS approved prices. Because the price is weighted, the KSU estimated price is normally “near” the final price by March 1. The exception is grain sorghum, because the basis on sorghum has been crazy for the past 12 months, and now appears to be weaker than normal. A few months ago, the sorghum basis was running as much as a dollar over corn. A year ago on March 1, the wheat and soybean price estimates were off by 1 penny from the final number. The KSU corn price estimate published on March 1 missed the final number by 11 cents and sorghum by 16 cents (Table 1). We kept expecting the positive sorghum basis to go negative, but that didn’t happen until the new crop was being harvested.

**Brief Review of the Commodity Program.** At signup last April, farmers had to choose between two programs (three, if one counts the ARC-individual a separate program). The individual program is separate, but few farmers choose this option. Farmers could select either Price Loss Coverage (PLC) or Agriculture Risk Coverage based on county yields (ARC). Few farmers selected the ARC based on individual yields because it cut the percent of revenue guaranteed and greatly increased the “paperwork” requirement.

PLC pays the difference between the MYA price and Reference Price X a farm’s approved FSA program yield X base acres X 85%. For example, if the 2015/16 MYA wheat price is $5, then the payment is $5.50 Reference price - $5.00 MYA price X 40 bu. FSA approved farm program yield X 100 ac base X 85% = $1,700.

ARC pays the difference between the (5-year Olympic average MYA Price (OAP) X 5-year Olympic average county yield (OACY) X 86%) - MYA price X actual county yield. For example, $6.70 wheat OAP X 35 bu. OACY X 86% = $201.67) - $5.00 MYA price X 38 bu. actual county yield = $190 = $11.67 per payment ac. X 100 base ac. X 85% = $991.95

Subject to: Stop loss equal to 10% of gross guarantee or 10% X ($6.70 OAP X 35 bu. OACY) = $23.45 X 100 base ac. X 85% = $1,993. In this example, the payment is less than the maximum payment of $1,993, so FSA would pay $991.95 to the farmer.

There is a payment limit of $125,000 on the ARC and PLC payments. There is also a means test of $900,000 Adjusted Gross Income (AGI) that farmers must meet to be eligible for payments.

The payment being estimated on the map is per payment acre. There is no payment on 15% of the base acres, so the average payment across all base acres will be lower than the payment per acre that is being estimated and the payment rate the FSA released to the press. In addition, planted acres that have no base will receive no FSA payments, but those acres in nearly all cases are insurable. The ARC and PLC
payments are also subject to sequestration cuts too, while crop insurance payments are not subject to sequestration. The FSA payments are tied to the base crop and not the crop that is planted on the base unless it is the same crop. Crop insurance is based on the crop planted.

**Estimated Payments are Posted by County on Maps.** Click on the link below for one’s crop by either the Kansas map or national (USA) map. If users click on the link for the national map then users can select any state including Kansas. The map as shown in Figure 1 will be displayed on your screen.

User will need to click on the drop-down menu on the left side of the map to select State’s Name and Yield Type. Figure 2 shows where to click on the drop-down menu to find a list of the crops by practice, by state if using the national map. The drop-down menu works the same for the Kansas map but there are only three choices for practice. Once users have selected their state, they will want to click on the plus (+) key to increase the size of the map.

Use the zoom options on the map to focus in on the state you have selected. The controls are in the upper left corner of the map as shown in Figure 2. This will generate a full size state map as shown in Figure 3. Figure 4 shows the location of the controls. Missing counties, as shown in the southwest corner of the Kansas map in Figure 4, are likely counties that are split between irrigated and non-irrigated. Users will need to return the national map and select their state and then select the crop by irrigated or non-irrigated. Counties can also be missing because KSU currently doesn’t have a payment estimate for that county. There are a few counties where the FSA divides the county into two parts and administers it as if it were a separate county and the resulting payments can differ. The commercial mapping software does not know how to interpret a state with “two” counties with the same name. Users can check with us if your county is missing. We can email you the results if they exist for your county.

**Highlighting Method for Increasing Map Size.** An alternative method for enlarging the map is to click on the arrow located on the control menu and the adjoining menu pops up (Figure 5). Click on the little square box inside the adjoining pop-up menu (Figure 5). After clicking on the little square box, move the cursor over your selected state in green and highlight it by holding down the left-click on the mouse. The state will show up in blue after being highlighted (Figure 6). After releasing the mouse key, the program will expand the selected state map so you can pick your county. Repeat the procedure if you want to expand the size of a county or a part of a state (Figure 7).

**Explanation of Details.** Additional detail besides the estimated payment is provided in a pop-up message that appears when you hover the cursor over a county. Those details include:

**Yield Type:** Counties were divided into separate crop practices for non-irrigated and irrigated designations if over 25% of the acres were in one of the practices that is different from most of the acres. Therefore, yield type may be “Irrigated” or “Non-Irrigated”, or “ALL” if a designation was not made in that county. Use the dropdown under “Yield Type” to change between these three options. For example, Thomas County, KS isn’t split between irrigated and non-irrigated, so “all” acres are combined. In the pop-up that is shown in Figure 4, yield type is listed as “ALL”.
**Est Pymt**: Estimated ARC payment per acre is based on KSU estimated MYA prices and NASS County yields for 2015, if available. Otherwise a KSU estimated county yield was used to estimate payments. This estimated payment does **NOT** take into account acres without base or base acres that do not receive payment (by law only 85% of base acres are eligible for payment). The estimated payment on the map also is prior to any sequestration cuts, which are always possible. The estimated ARC payment for Thomas County, Kansas wheat is currently $27.69. This value could (will) change because FSA sets the final county yield, not NASS, and of course, the price could change. If there is no NASS yield, then it is a KSU estimated county yield, which is expected to have a larger error.

**Max Pymt**: Maximum Payment that a county can receive is by law defined as 10% of the Benchmark County Revenue. Based on current estimates, Thomas County, Kansas wheat will receive the maximum payment. The current NASS yield, which has been a good estimate of the FSA final approved yield, is 2.2 bushels below the maximum allowable yield that will generate the maximum payment. However these yield numbers are not absolute because if the MYA price is higher than the estimate, it could reduce the payment with no change in the NASS yield.

**Est Yield**: Estimated County Yield for 2015 are based on reported NASS county yields, if available (designated with a “-NASS”). Note that these are not final yields, but must be approved by FSA for calculating payments. FSA may adjust the NASS yield for failed acres or other factors, such as corn harvested for silage. If a NASS yield is not available, then a KSU estimated yield based on publicly available crop insurance data was used to estimate the payment. These county yield estimates are designated with a “-KSU”. Using NASS yields for estimating payments is clearly preferred, but in many counties, only the KSU estimated yield will be available.

**Max Pymt Yd**: Maximum Payment Yield is the county yield that is the threshold for triggering the maximum ARC payment. The county yield must be at or below the maximum payment yield, otherwise the payment will be less than the maximum limit. The maximum allowable yield that will generate the maximum payment is 42.6 bushels for Thomas County Kansas wheat. The NASS yield is at 40.4 bushels in the pop-up in Figure 8. Either the final yield or final price will need to be higher to reduce ARC payments that are currently at the maximum for Thomas County wheat.

**Trigger Yd**: Trigger Yield is the county yield that will trigger an ARC payment and is included in the pop-up message. Holding the price estimate constant, any yield above the trigger yield will cause the actual revenue to exceed the guarantee, resulting in no payment. That is unlikely for Thomas County wheat because the final approved FSA yield will need to be 7.8 bushels higher to eliminate all of the ARC payment. It is extremely unlikely that the Thomas County wheat ARC payment will be zero.

**How Confident is KSU in the Estimates?** That will depend on the county and crop. The authors are more comfortable with the wheat estimates because we are further along in the Marketing Year, so more of the NASS monthly prices have been published, leaving fewer prices to forecast. In addition NASS has published county wheat yields for some counties. This also improves the KSU estimated county yields because we can calibrate our model with known values for 2015-2016 marketing year. NASS will release county yields for the spring crop on February 18 and then KSU will run similar tests on the model. There will also be additional final monthly prices from NASS that will improve the MYA price forecast.
In spite of the fact that these are estimates, there will be some counties where we are nearly 100% certain we have the right answer. For example, in Clark County the NASS county wheat yield is 41.4 bushels. The payment trigger yield is 26.4 bushels (Figure 9). That means the final FSA approved yield will need to be 15 bushels lower than the NASS yield. FSA would need to cut the NASS yield by more than 36% to trigger any payments. There will be no ARC wheat payment in Clark County, and you can take that to the bank! Zero is the answer, period! Remember the estimated county yield is for the crops that farmers harvested last summer or fall. So even if it is a good 2016 crop, it will have no real impact on these ARC payments for 2015/16.

By contrast the estimated ARC wheat payment for Rawlins County is at the maximum of $27.47. The NASS yield is 35.4 bushels, which is 6.9 bushels in the money. Holding prices constant, it would require FSA to cut the NASS yield by 6.9 bushels, nearly a 16% reduction, to reduce the ARC payment that is currently at the maximum (Figure 10). If a user’s county yield is more than 10% below the maximum allowable yield necessary to trigger the maximum payment, then it is extremely likely that one will collect the maximum payment. For the spring crops, one wants to be more than 10% into the yield limit to trigger a maximum payment. It is suggested farmers should be 15% to 20% into the maximum yield trigger to feel safe with the estimate, for spring crops. However one can tighten that margin down after NASS releases county yields for the spring crops and the January monthly NASS prices are published at the end of February.

County yields that are within the extremes of the above yield examples will have much larger errors in their payment estimates. The estimated wheat ARC payment for Ellis County, Kansas is currently at the maximum based on current prices and a NASS yield of 32.9 bushels. The NASS yield only needs to be 0.4 bushels higher to reduce the ARC payment, or small price increase could also reduce the payment (Figure 11). It is very likely that Ellis will receive some wheat ARC payments, but it may not be a maximum payment.

Rush County, Kansas borders Ellis county (which is currently expecting a maximum payment), while the expected ARC wheat payment for Rush is zero. The current Rush county NASS yield is 35.1 and is above the payment trigger yield of 35.0 bushels by about 0.2% (Figure 12). It is possible that FSA will adjust the yield down by 0.1 of bushel and trigger payments. So there is a real possibility that there may be a very small payment, but extremely unlikely the payment will be at the maximum. There is also a possibility that the price will be high enough to eliminate any payment, even if the yield is lowered. The KSU price estimate is a little lower than USDA, so if one were to use the USDA prices, it will put this county further out of the payment.

When there are two bordering counties with one receiving a maximum payment and the other none, this always raises questions by farmers. If this were to happen, there will be cases where a farmer is being administrated in Rush county, but also has land in Ellis county. In this case, he would receive no payments, but it is our understanding that he can do a one-time move to have his Ellis county land paid based on Ellis county yields. Farmers in this situation need to check with their county FSA office for the most current rules. The reverse is also true. A farmer with her administrative office in Ellis county can receive payment for her wheat base in Rush county too, even though Rush did not trigger a payment.
**Conclusions.** It is our objective to provide the best possible and most current estimates of the ARC payments that will be paid this fall. We will continue to update the model with the most current market and NASS yields. We expect these estimates will be useful for farmers and lenders to develop cash flow budgets for their next operating loan.

**Disclaimer: No warranty is given or implied by the authors or Kansas State University.** These estimated values have large errors and the Farm Service Agency will determine all final and official numbers that determine ARC payments. Questions may be directed to Robin Reid, 785.532.0964, or robinreid@ksu.edu, Art Barnaby: barnaby@ksu.edu, or Rich Llewelyn: rvl@ksu.edu.
Table 1. 2014/15 History of KSU Estimated MYA Prices

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USDA FINAL 5.99 3.70 4.03 10.10

Figure 1. User will see this screen once one selects state-crop-practice
Figure 2. The map controls to select state-crop-practice and to increase map size are pointed out in the upper left corner of the map.

Click on the down arrow for a drop down menu and select State and crop. There are 3 practice options, ALL, IRRIGATED and NONIRRIGATED

Click on the Plus Sign to increase size of map.

Click on the Map and hold the key down to drag the map to the center of your screen.

Figure 3. Size of map after it was blown up.

Click outside of the map to unconnect from the map. There is also a little “house” or home to click on to return to the original position.
An alternative method for enlarging the map is to click on the error on the control menu and the adjoining menu pops up.
Figure 6. Highlighting the Selected State will Increase Size of Map

After clicking on the little square box, move the cursor over the user selected state in green and highlighted it. It will show up in blue after being highlighted.

Figure 7. Increased KSU Map Size after Applying Highlighting Method

After you release your mouse key the map will expand the selected state map equal to this size. Repeat the procedure if one wants to expand the size of a county or a part of a state.
Figure 8. Move your cursor on top of the county to display popup message with additional information.

Figure 9. Clark County NASS Yield is 36% above trigger yield, and payment is likely zero.
Figure 10. NASS yield is 16% lower than Maximum Payment Yield, extremely likely ARC payment will be at maximum

Figure 11. NASS yield is -0.4 Bu. lower than Maximum Payment Yield, A “Small” Increase in Yield or Price will Reduce ARC from the maximum, but some payment is likely.
Figure 12. NASS yield is 0.1 Bu. higher than Trigger Yield, a “small” decline in yield or price will be required to Trigger an ARC payment.