

# Historical Analysis of ARC, PLC, and SCO Payouts for KS Producers

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## Outline

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- Introduction and PLC/ARC/SCO refresher
- Payouts
  - Aggregate by crop
  - Over space
  - Over time
- Conclusion



# Introduction

- Since 2020,\* producers with base acres make an *annual* selection between Agricultural Risk Coverage (ARC) or Price Loss Coverage (PLC)
  - Several tools on AgManager inform this choice: <https://agmanager.info/ag-policy>
- Producers using PLC (**not** ARC\*\*) can *purchase* SCO (Supplemental Coverage Option) insurance.



## Objective

- Producers typically compare ARC and PLC instead of ARC and (PLC + SCO)
- SCO use has been low, but is growing
- This study considers
  - Historic payouts of these programs
  - Historic price guarantee



## PLC and ARC Refresher

- PLC provides payouts when prices are lower than the *effective reference price*.
- ARC provides payouts when actual revenue is lower than the revenue guarantee.
  - Types: Individual (ARC-IC) or County (ARC-CO).
  - This study focuses on ARC-CO *only*



## PLC Refresher

- A PLC payout is triggered when the effective price or marketing year average (MYA) price\* is lower than the *effective reference price*:
  - PLC "payout rate" =  $\text{effective reference price} - \text{MYA price}$
  - Effective reference price<sup>1</sup> = prices for covered commodities set in the Farm Bill<sup>2</sup>



## PLC Refresher

- If triggered
  - $\text{PLC payout} = 85\% \times \text{base acres} \times \text{payment yield} \times \text{payout rate}$
  - Payment yield = the farm's established yield



## ARC Refresher

- ARC-CO payout is triggered when actual county revenue is lower than the county guarantee.
  - ARC County Guarantee =  $86\% \times \text{benchmark revenue}$ 
    - Benchmark revenue =  $\text{Olympic average}^* \text{ price} \times \text{Olympic average}^* \text{ yield}$
  - Actual revenue =  $\text{MYA price}^{**} \times \text{actual county yield}$
  - ARC maximum payout (max) = 10% of benchmark revenue



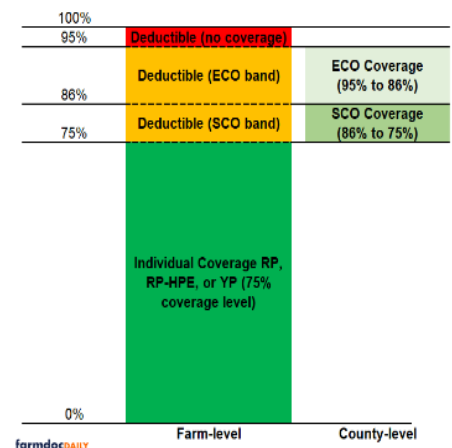
# ARC Refresher

- When ARC-CO payout is triggered
  - ARC payout rate = **county guarantee** - **actual revenue**, up to the maximum payment\*
  - ARC payout = **85%** X **base acres** X **payout rate**
- Some counties have both irrigated and non-irrigated payouts, while others have combined (all) payouts.



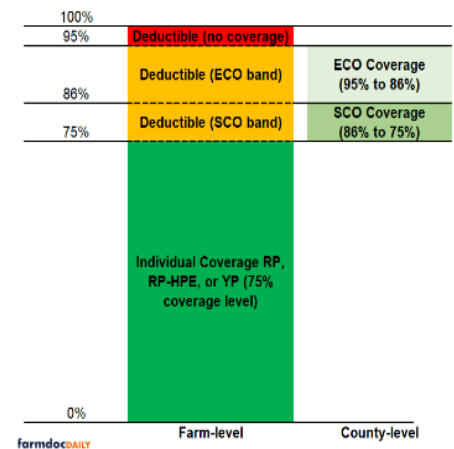
# SCO Refresher

- Producers who choose PLC can purchase SCO:
  - SCO increases coverage to 86% of expected revenue
  - This study focuses on producers with underlying RP insurance
- SCO expected revenue = **county/area expected yield** X the higher of (1) **pre-planting futures price** or (2) **harvest price**



# Introduction (SCO)

- SCO payment triggers if  
Actual county revenue < 86% of expected county revenue
- Actual county revenue = actual county/area yield X harvest price



## Approach

- Compare SCO, ARC, and PLC payouts from 2015-2022 for corn, grain sorghum, soybeans, and wheat
- PLC based on actual payment rates
- ARC payouts are computed using FSA formulas
  - 2022 ARC irrigation-status designations applied to all previous years
  - Payouts for counties with different prior (2015-2021) designations are computed using:
    - Insured acres and yields for counties with combined ARC.
    - Irrigated and non-irrigated SCO yields for counties without combined ARC.
- Net SCO payouts are also estimates based on
  - 75% underlying coverage level for Revenue Protection (RP) insurance, which is commonly used in KS and makes SCO more comparable to ARC
  - Assuming a representative producer has yields (APH) equivalent to county yields
  - RMA formulas for premium rates
  - Net SCO = net indemnities or payouts = estimated indemnities minus estimated premium

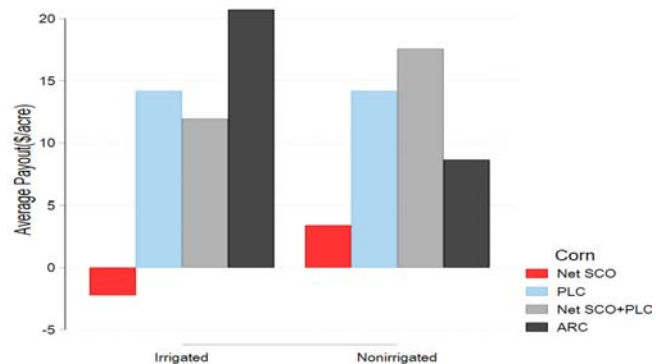
# ARC Yield-Reporting by Irrigation Status

Commodity	Number of Counties with Irrigated/Non-Irrigated ARC Payouts*
Corn	79
Sorghum	48
Soybeans	53
Wheat	54

## ARC payouts were higher than PLC for irrigated corn and lower for non-irrigated corn

- On average, ARC payouts were larger for irrigated corn than to Net SCO+PLC.
- For non-irrigated corn ARC\* payouts for corn were the highest for combination SCO and PLC

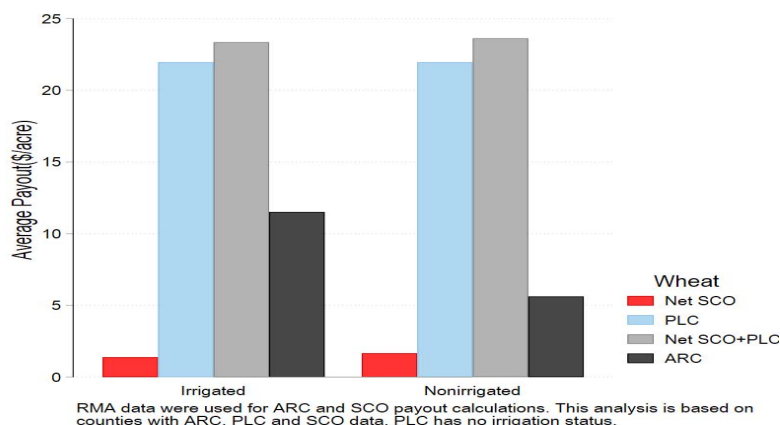
**Average Annual Corn Payouts for 79 Kansas counties, 2015-2022**



RMA data were used for ARC and SCO payout calculations. This analysis is based on counties with ARC, PLC and SCO data. PLC has no irrigation status.



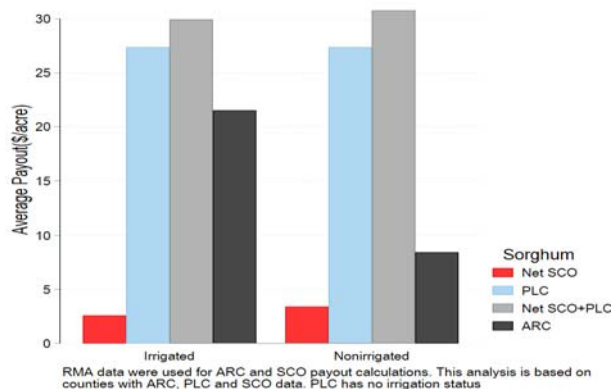
## Average wheat PLC payouts much larger than ARC in 54 counties



## Sorghum had high average PLC payouts

### Average Sorghum Payouts for 48 Kansas counties, 2015-2022

- On average, net SCO + PLC offered larger payouts for both irrigated and non-irrigated sorghum
  - Driven by large PLC payouts.

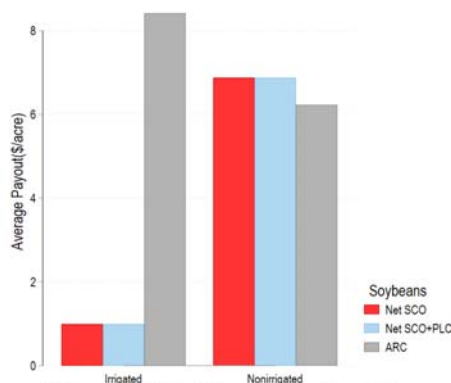




## ARC paid more than SCO for irrigated soybeans and less for non-irrigated soybeans

- There were no PLC payouts in this period.
- For irrigated soybeans, ARC\* payouts were higher than net SCO+PLC
- For non-irrigated soybeans, SCO payouts were slightly higher than ARC payouts.

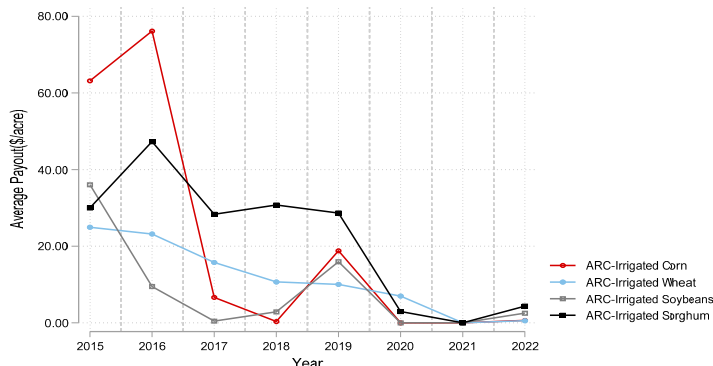
**Average Annual Soybeans Payouts for 53 Kansas counties, 2015-2022**



RMA data were used for ARC and SCO payout calculations. This analysis is based on counties with ARC, PLC and SCO data. PLC has no irrigation status and payouts.

## Average ARC payouts in 2015 higher than 2022 for irrigated Crops

**Average ARC Payouts by Crop for selected Kansas counties, 2015-2022**

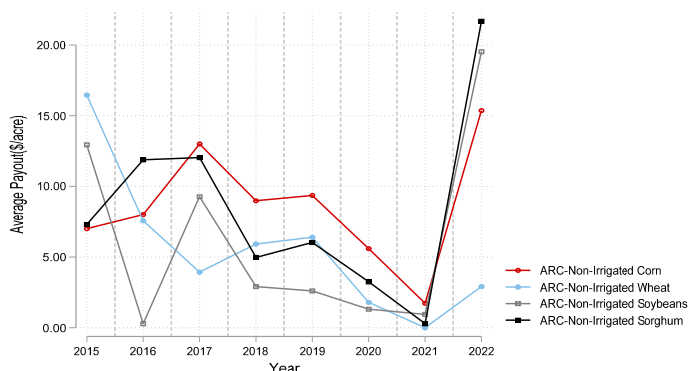


Source: USDA FSA and RMA

We estimate annual per acre ARC payouts by county and then average all selected KS counties. This approach may overweight payouts in counties with lower acreage of a particular commodity.

## Average ARC payouts varied greatly for non-irrigated crops

Average ARC Payouts by Crop for selected Kansas counties, 2015-2022

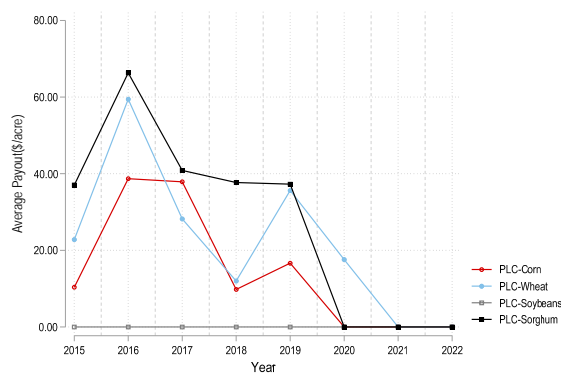


We estimate annual per acre ARC payouts by county and then average for all selected KS counties. This approach may overweight payouts in counties with lower acreage of a particular commodity.

## Average PLC payouts for sorghum were the largest until 2020

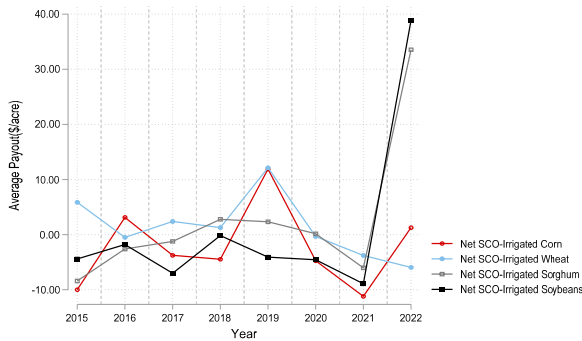
- Average PLC payouts for all commodities except soybeans peaked in 2016 for selected counties.
- There were no PLC payouts for soybeans from 2015-2022

Average PLC Payouts by Crop for selected Kansas counties, 2015-2022



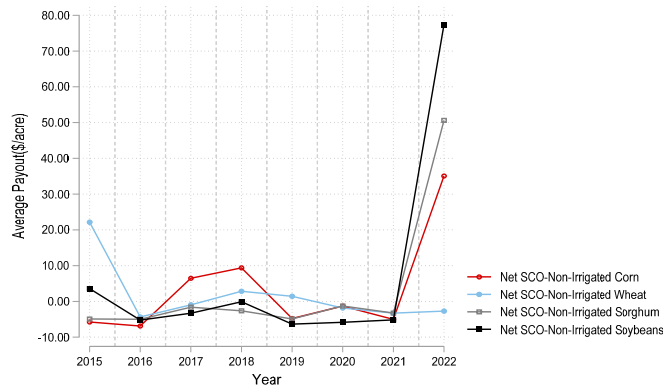
# Irrigated soybeans & sorghum producers received largest average SCO payouts in 2022

Average Net SCO by Crop and Irrigation Status for all selected Kansas counties\*, 2015-2022



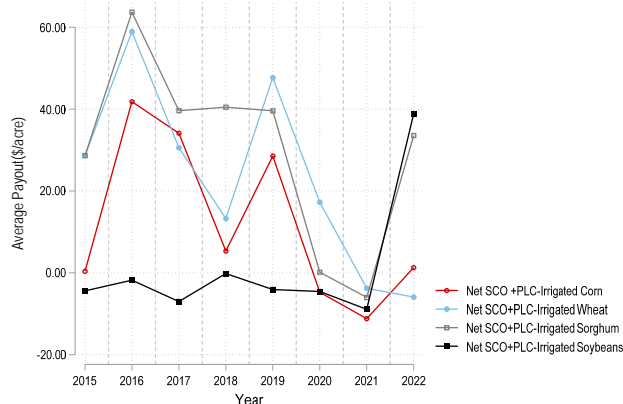
# Average net SCO net payouts were high for most crops in 2022

Average Net SCO by Crop and Irrigation Status for all selected Kansas counties\*, 2015-2022



## Average SCO + PLC net payouts were positive in most years for most irrigated crops

Average Net SCO and PLC Payouts by Crop and Irrigation Status for all selected Kansas counties, 2015-2022



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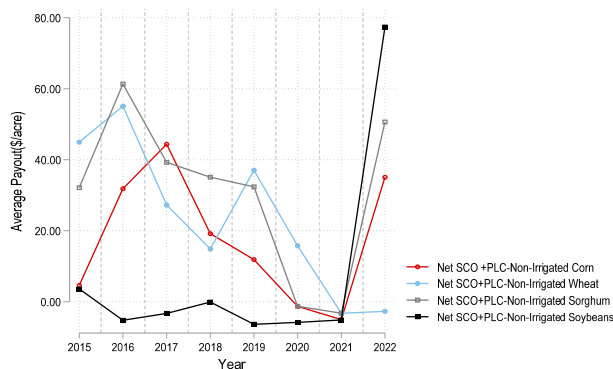
Average Net payouts are obtained for crop and irrigation status for counties with irrigated/non-irrigated ARC.

Source: USDA FSA and RMA



## Average SCO + PLC net payouts were positive for most years, excluding soybeans

Average Net SCO and PLC Payouts by Crop and Irrigation Status for all selected Kansas counties, 2015-2022



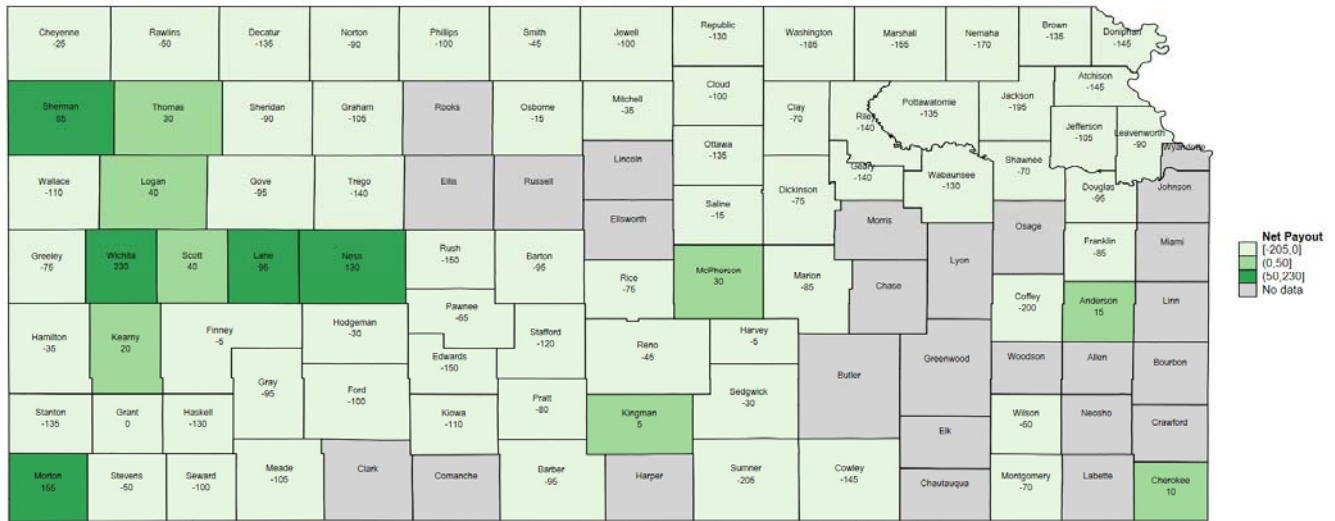
KANSAS STATE UNIVERSITY Agricultural Economics

Average Net payouts are obtained for crop and irrigation status for counties with irrigated/non-irrigated ARC.

Source: USDA FSA and RMA



## Irrigated Corn: Difference between Net SCO + PLC and ARC from 2015-22



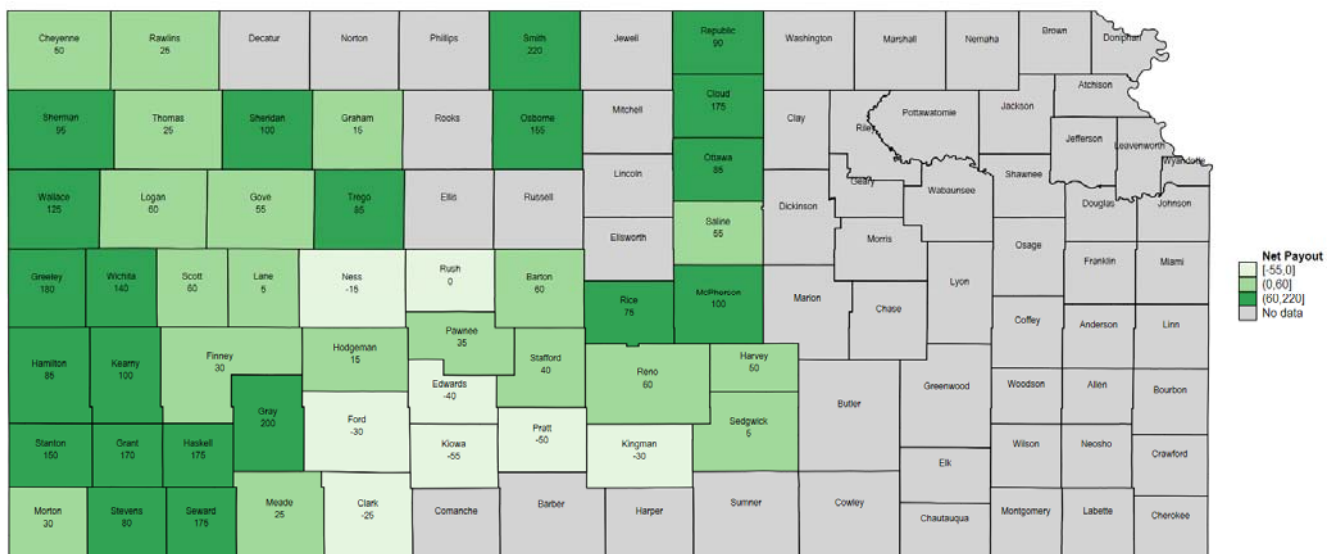
Source: USDA FSA and RMA.

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Net annual per acre payouts (Net SCO + PLC - ARC) for each county were summed from 2015-2022. Positive numbers imply SCO + PLC paid out more than ARC, zero would be the same payout. Negative means ARC would have paid out more. Net SCO is SCO indemnities less SCO premiums. Combined ARC counties are excluded and examined later.



## Irrigated Sorghum: Difference between Net SCO + PLC and ARC from 2015-22



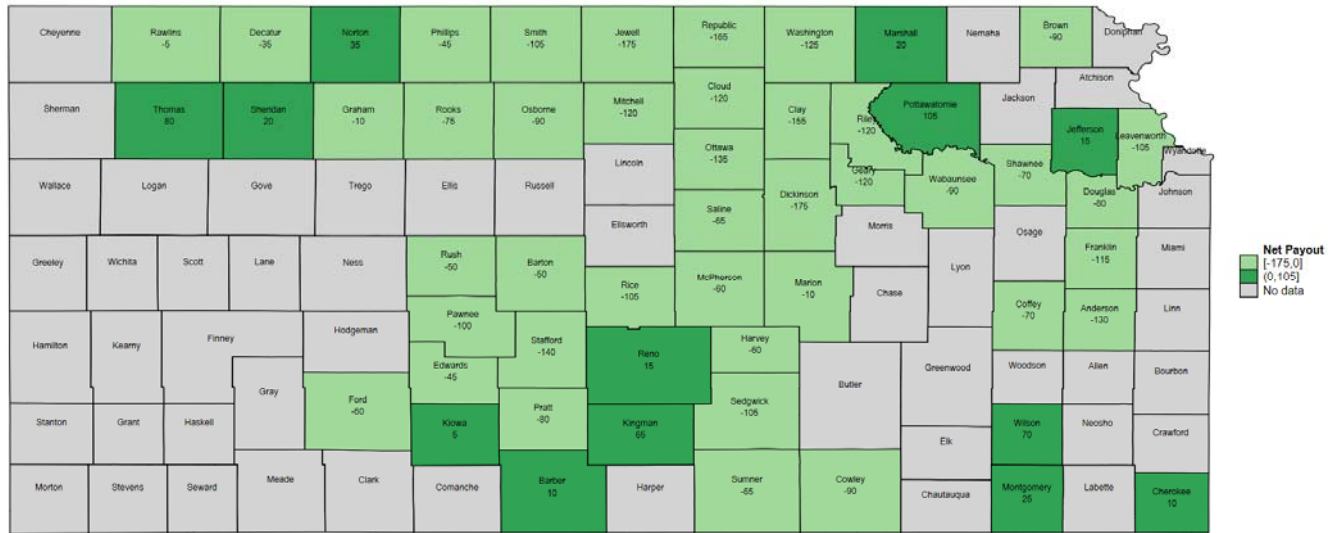
Source: USDA FSA and RMA.

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Net annual per acre payouts (Net SCO + PLC - ARC) for each county were summed from 2015-2022. Positive numbers imply SCO + PLC paid out more than ARC, zero would be the same payout. Negative means ARC would have paid out more. Net SCO is SCO indemnities less SCO premiums. Combined ARC counties are excluded and examined later.



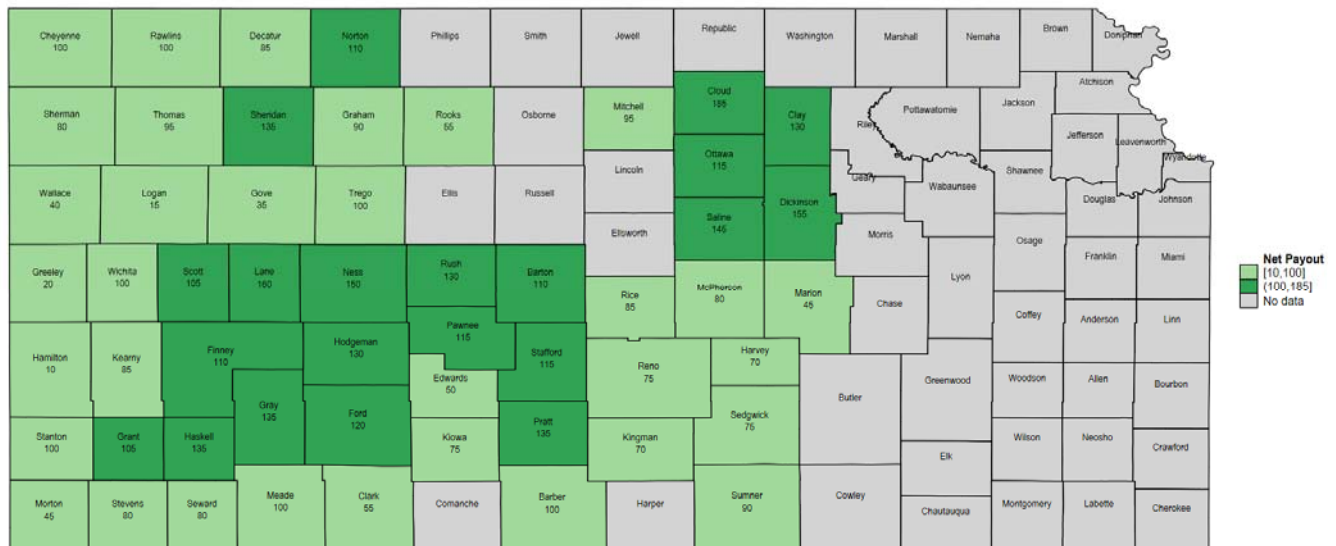
## Irrigated Soybeans: Difference between Net SCO + PLC and ARC from 2015-22



Source: USDA FSA and RMA.

Net annual payouts (Net SCO + PLC - ARC) for each county were summed from 2015-2022. Positive numbers imply SCO + PLC paid out more than ARC, zero would be the same payout. Negative means ARC would have paid out more. Net SCO is SCO indemnities less SCO premiums. Combined ARC counties are excluded and examined later.

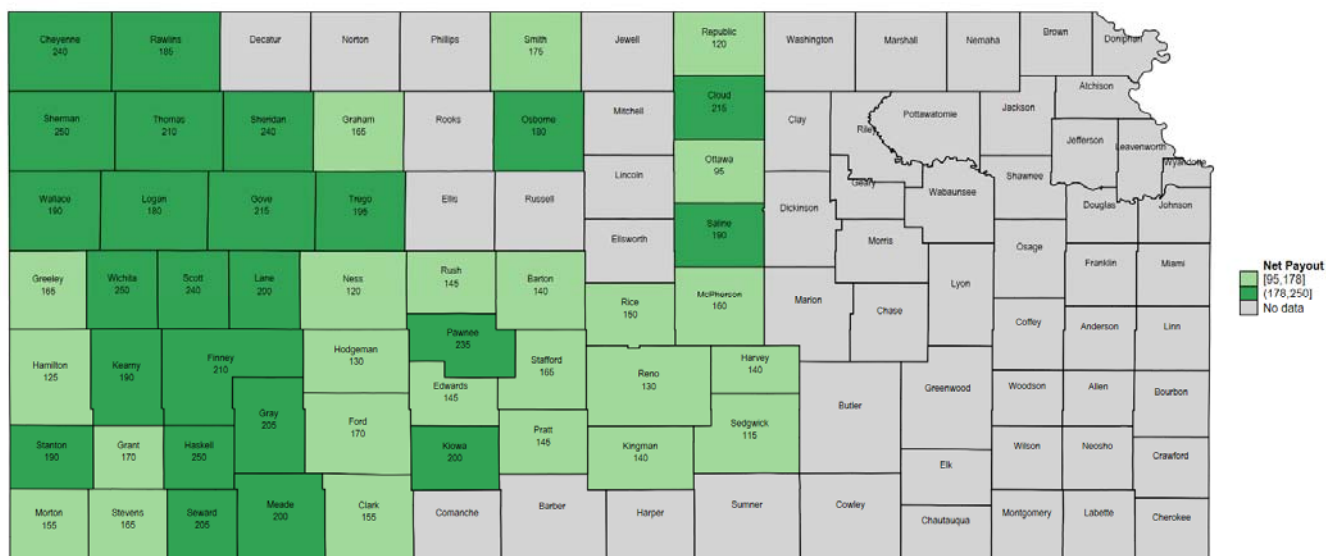
## Irrigated Wheat: Difference between Net SCO + PLC and ARC from 2015-22



Source: USDA FSA and RMA.

Net annual payouts (Net SCO + PLC - ARC) for each county were summed from 2015-2022. Positive numbers imply SCO + PLC paid out more than ARC, zero would be the same payout. Negative means ARC would have paid out more. Net SCO is SCO indemnities less SCO premiums. Combined ARC counties are excluded and examined later.

## Non-Irrigated Sorghum: Difference between Net SCO + PLC and ARC from 2015-22



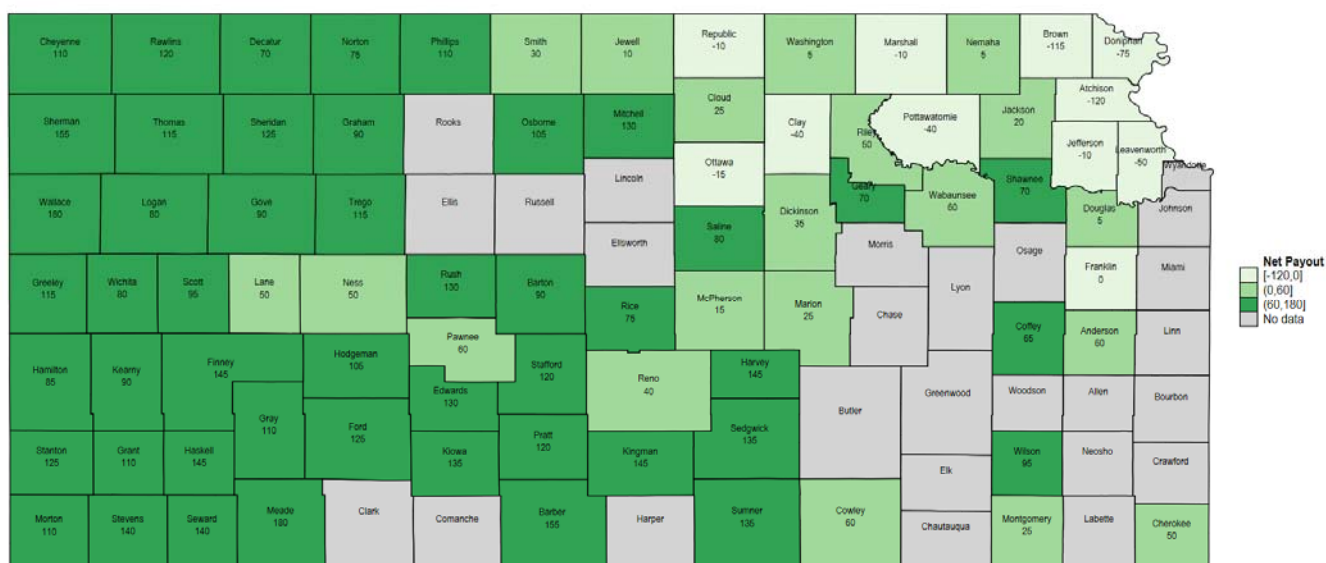
Source: USDA FSA and RMA.



Net annual payouts (Net SCO + PLC - ARC) for each county were summed from 2015-2022. Positive numbers imply SCO + PLC paid out more than ARC, zero would be the same payout. Negative means ARC would have paid out more. Net SCO is SCO indemnities less SCO premiums. Combined ARC counties are excluded and examined later.



## Non-Irrigated Corn: Difference between Net SCO + PLC and ARC from 2015-22



Source: USDA FSA and RMA.

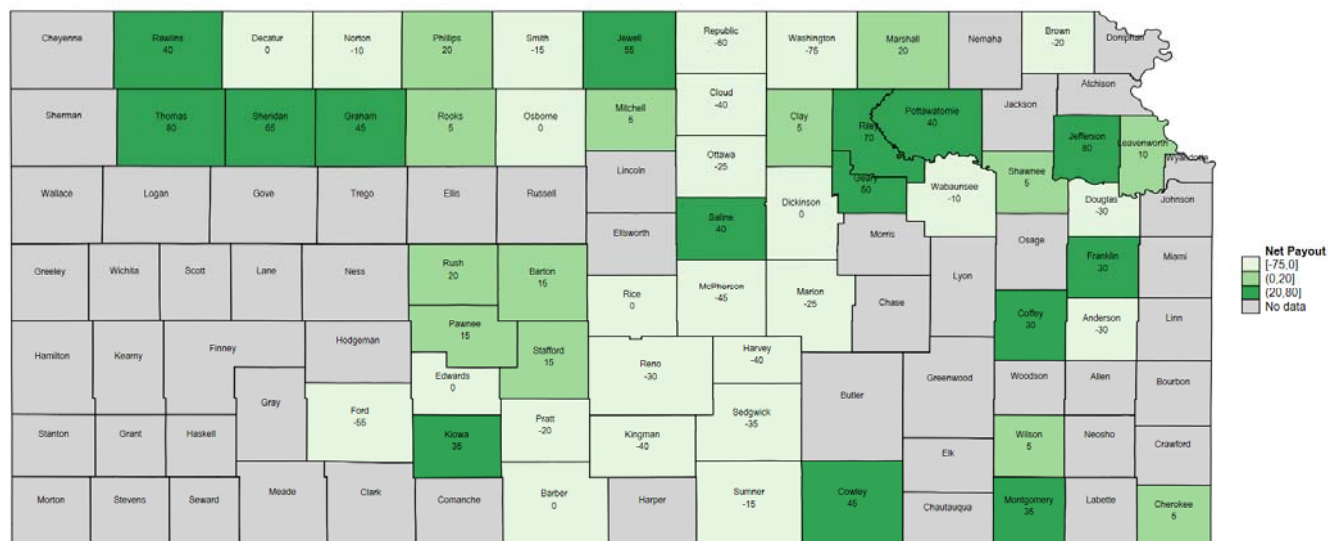


Net annual payouts (Net SCO + PLC - ARC) for each county were summed from 2015-2022. Positive numbers imply SCO + PLC paid out more than ARC, zero would be the same payout. Negative means ARC would have paid out more. Net SCO is SCO indemnities less SCO premiums. Combined ARC counties are excluded and examined later.





### Non-Irrigated Soybeans: Difference between Net SCO + PLC and ARC from 2015-22



Source: USDA FSA and RMA

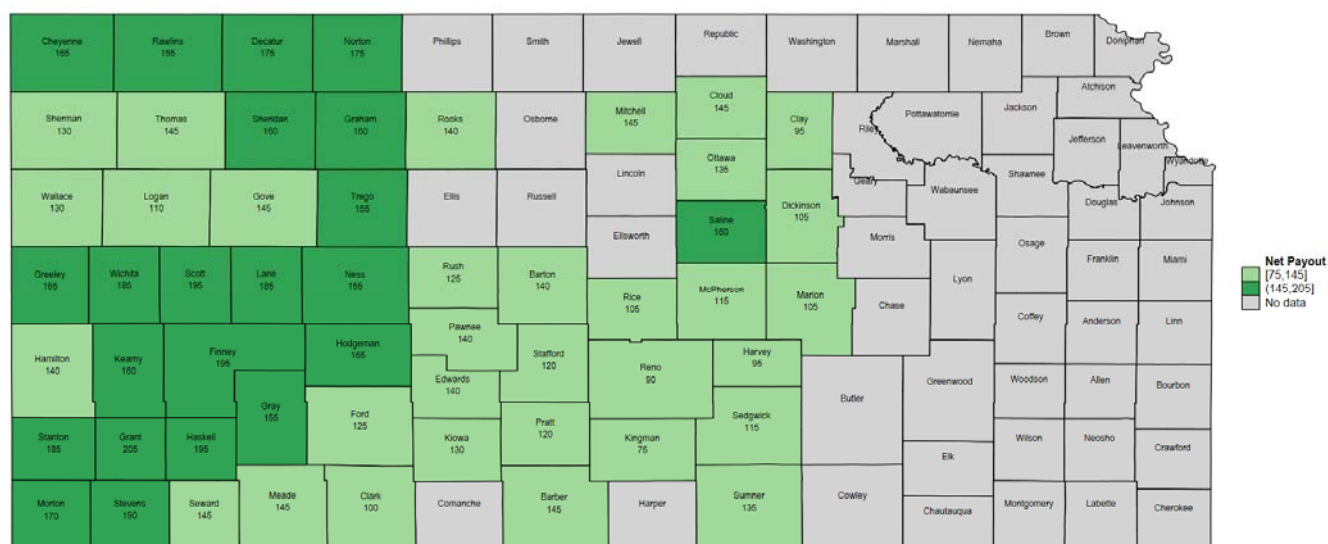


## Agricultural Economics

Net annual payouts (Net SCO + PLC – ARC) for each county were summed from 2015-2022 . Positive numbers imply SCO + PLC paid out more than ARC, zero would be the same payout. Negative means ARC would have paid out more. Net SCO is SCO indemnities less SCO premiums . Combined ARC counties are excluded and examined later.



### Non-Irrigated Wheat: Difference between Net SCO + PLC and ARC from 2015-22



Source: USDA FSA and RMA.

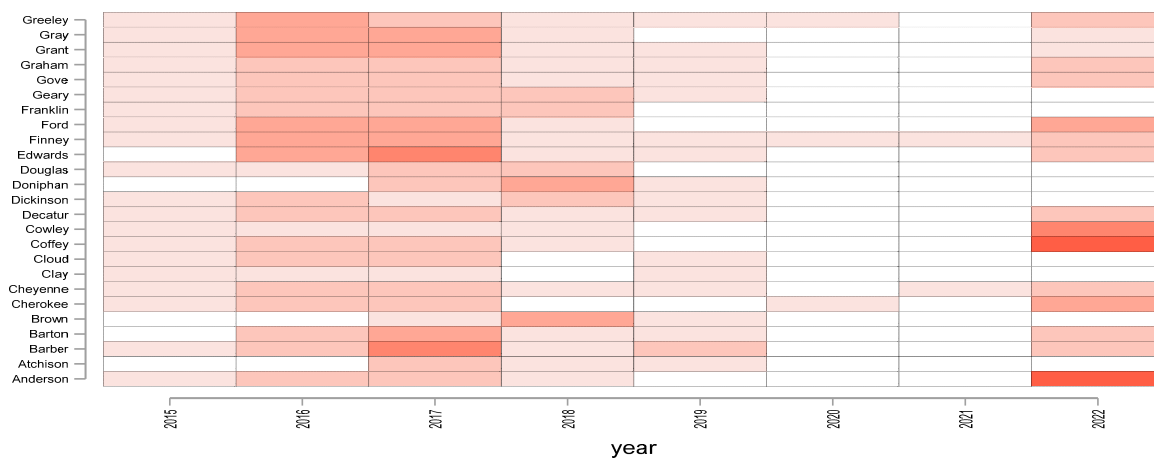


## Agricultural Economics

Net annual payouts (Net SCO + PLC – ARC) for each county were summed from 2015-2022 . Positive numbers imply SCO + PLC paid out more than ARC, zero would be the same payout. Negative means ARC would have paid out more. Net SCO is SCO indemnities less SCO premiums . Combined ARC counties are excluded and examined later.



## Non-Irrigated Corn: Net payouts across 25 Kansas counties, 2015-2022



Net SCO+PLC(Non-Irrigated)-ARC  
-95 0 20 40 60 80 100 120

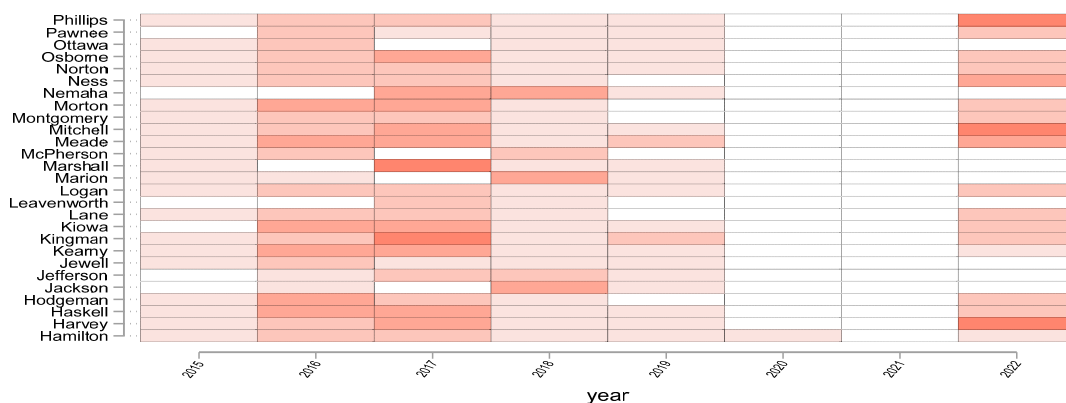
**KANSAS STATE UNIVERSITY** Agricultural Economics

Source: USDA FSA and RMA



Net Payout=Net SCO+PLC-ARC. This is for counties with both irrigated and non-irrigated ARC.

## Non-Irrigated Corn: Net payouts across 27 Kansas counties, 2015-2022



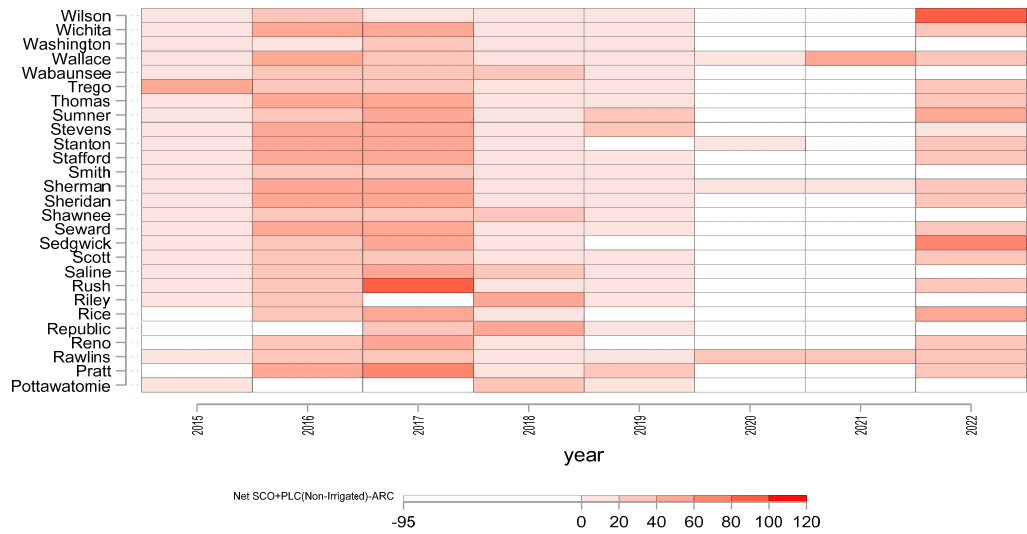
Net SCO+PLC(Non-Irrigated)-ARC  
-95 0 20 40 60 80 100 120

**KANSAS STATE UNIVERSITY** Agricultural Economics  
Net Payout=Net SCO+PLC-ARC. This is for counties with both irrigated and non-irrigated ARC.

Source: USDA FSA and RMA



## Non-Irrigated Corn: Net payouts across for 27 Kansas counties, 2015-22



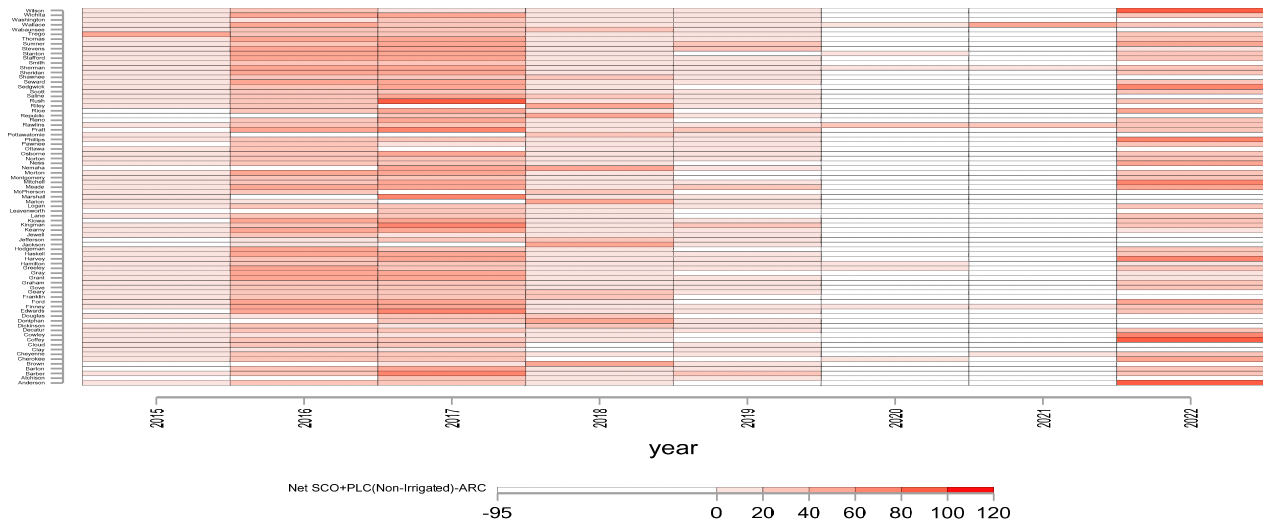
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Net Payout=Net SCO+PLC-ARC. This is for counties with both irrigated and non-irrigated ARC

Source: USDA FSA and RMA



## Net payouts for non-irrigated corn varied greatly across 79 counties from 2015 to 2022.



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Net Payout=Net SCO+PLC-ARC. This is for counties with both irrigated and non-irrigated ARC

Source: USDA FSA and RMA



# Combined ARC Distribution

Commodity	Number of counties with Combined ARC Payouts
Corn	25
Sorghum	57
Soybeans (Non-irrigated/Irrigated)	39/41*
Wheat	51



Agricultural Economics

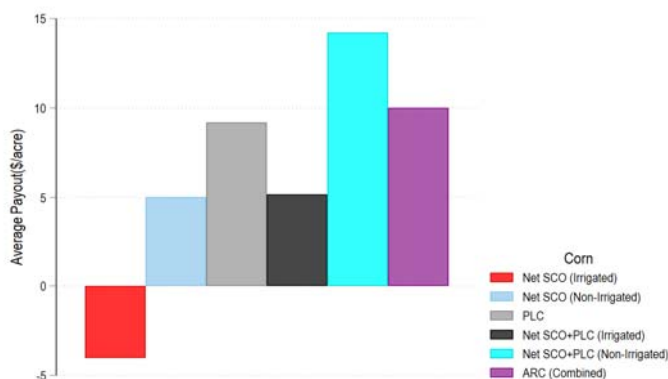
Some counties do not have data in all years. For example, Chautauqua County has 7 years data. \* The frequency difference is influenced by SCO: Non-Irrigated SCO estimates are missing for Southwestern Kansas, resulting in fewer frequencies than Irrigated SCO.



## Average annual PLC and ARC for corn were similar for combined ARC counties

- Net SCO payouts for irrigated corn were negative
- On average, net SCO + PLC offered the largest payouts to non-irrigated corn
- ARC had marginally higher payouts than PLC, but SCO + PLC had higher payouts than ARC

Average Annual Corn Pavouts for 25 Kansas counties, 2015-2022



RMA data were used for ARC and SCO payout calculations. This analysis is based on counties with ARC, PLC and SCO data. PLC has no irrigation status.



Agricultural Economics

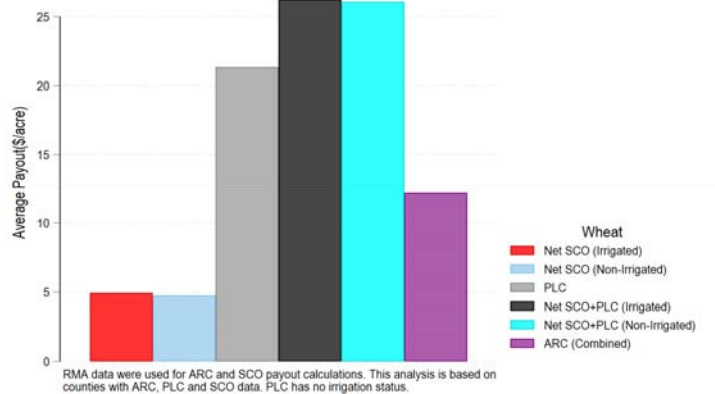
Annual per acre payouts for each county and commodity were averaged for the study period.



## SCO+PLC offered the highest average annual net payouts for wheat

- Net SCO + PLC offered larger the largest payouts for irrigated and non-irrigated wheat, largely due to PLC payouts being much higher than ARC payouts

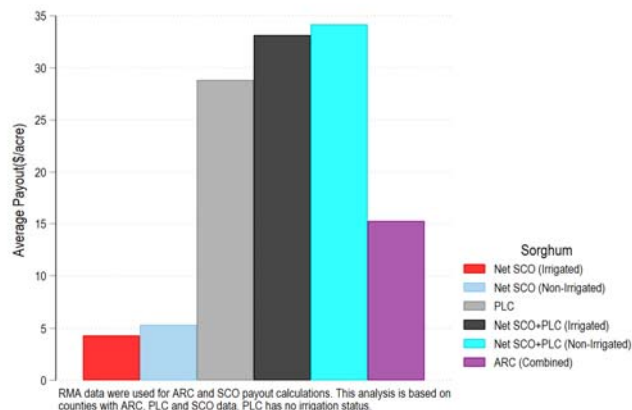
Average Annual Wheat Payouts for 51 Kansas counties, 2015-2022



## Sorghum average PLC payouts much larger than combined ARC

- Net SCO + PLC offered larger payouts for irrigated and non-irrigated sorghum from 2015 to 2022.
  - Driven by large PLC payouts.

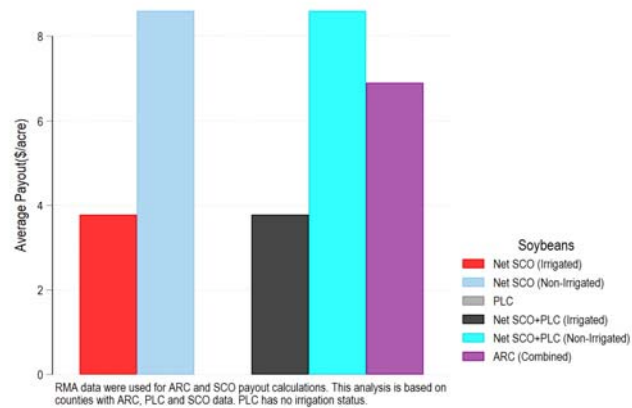
Average Annual Sorghum Payouts for 57 Kansas counties, 2015-2022



## Net SCO payouts higher than ARC for non-irrigated soybeans in combined ARC counties

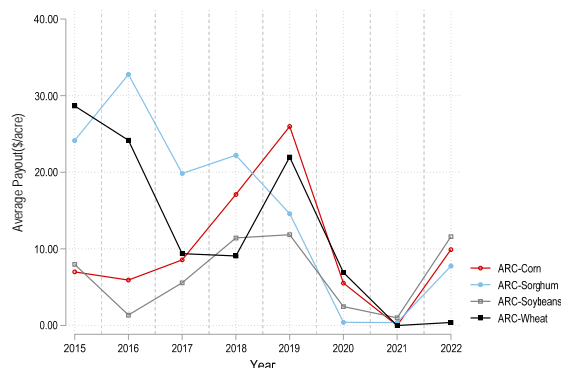
- Net SCO + PLC were larger than ARC for *non-irrigated* soybeans, due to higher SCO payouts (zero PLC payouts)
- ARC payouts were larger than Net SCO+PLC for *irrigated* soybeans

Average Annual Soybeans Payouts for 41 Kansas counties, 2015-2022\*



## Combined ARC payments for the 2022 drought were lower than many payments from 2015-2019

Average combined ARC Payouts by Crop for Selected Kansas counties, 2015-2022



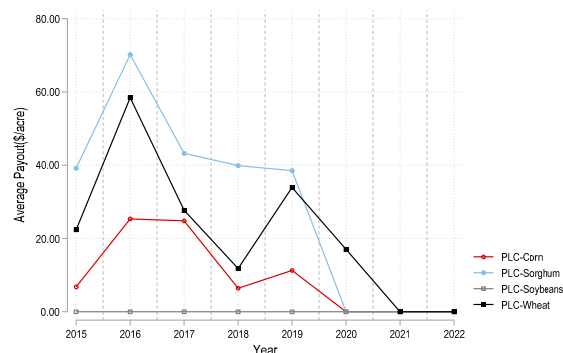
Source: USDA FSA and RMA

We estimate annual per acre combined ARC payouts by county and then average all (selected) KS counties. This approach may overweight payouts in counties with lower acreage of a particular commodity.

## Average PLC payouts peaked in 2016

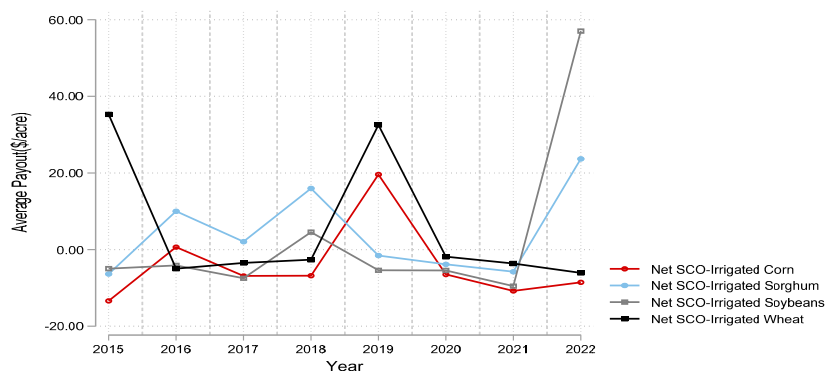
- Average PLC payouts peaked in 2016 for all commodities except Soybeans.
- There were no PLC payouts for Soybeans from 2015-2022

**Average PLC Payouts by Crop for Selected Kansas counties, 2015-2022\***



## Average net SCO payouts vary over time for irrigated crops

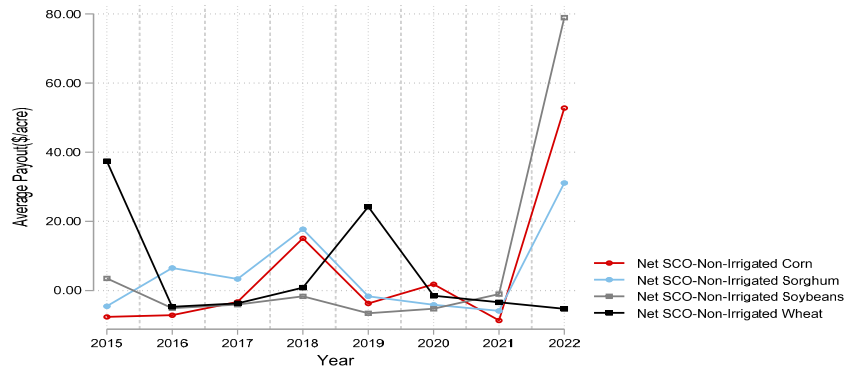
**Average Net SCO by Irrigated Crop for Selected Kansas counties\*, 2015-2022**





## Net SCO payouts peaked during the 2022 drought for most crops

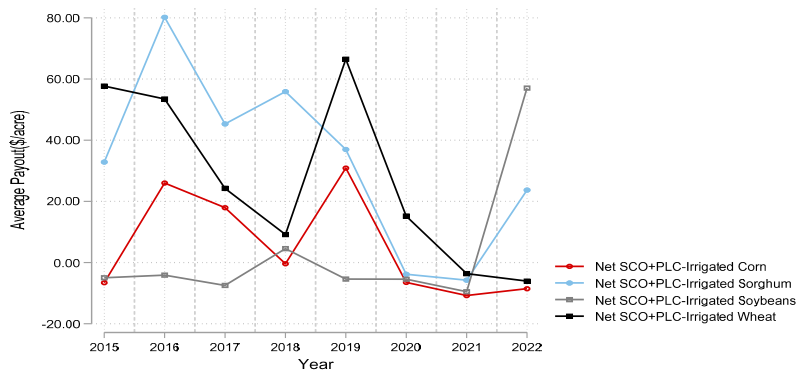
**Average Net SCO by Non-Irrigated Crops for Selected Kansas counties\*, 2015-2022**



Source: USDA FSA and RMA

## Average SCO + PLC net payouts vary over time for irrigated crops

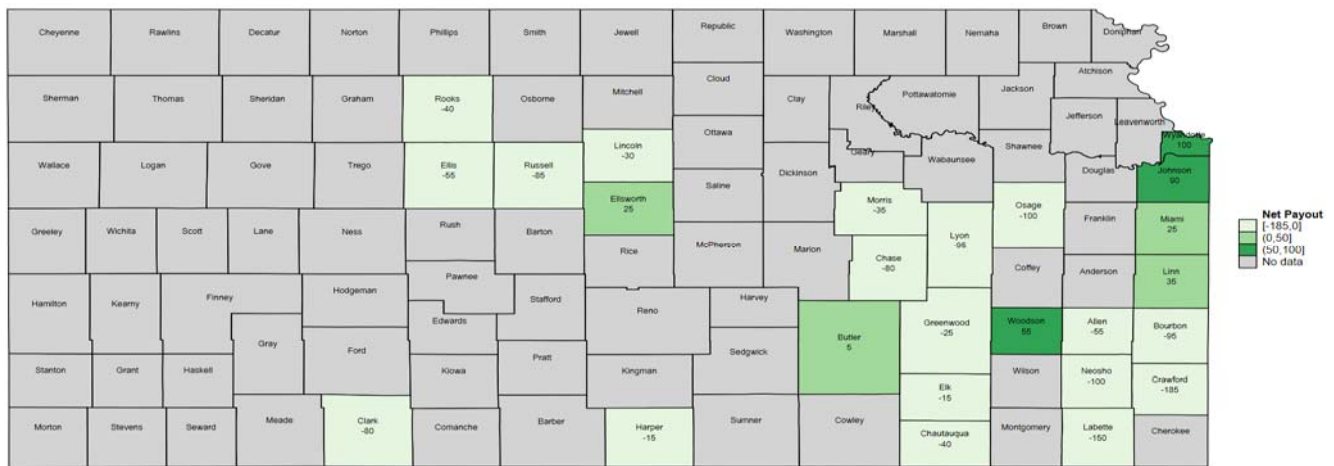
**Average Net SCO and PLC Payouts by Irrigated Crop for Selected Kansas counties\*, 2015-2022**



Source: USDA FSA and RMA



## Corn: Irrigated SCO+PLC – Combined ARC



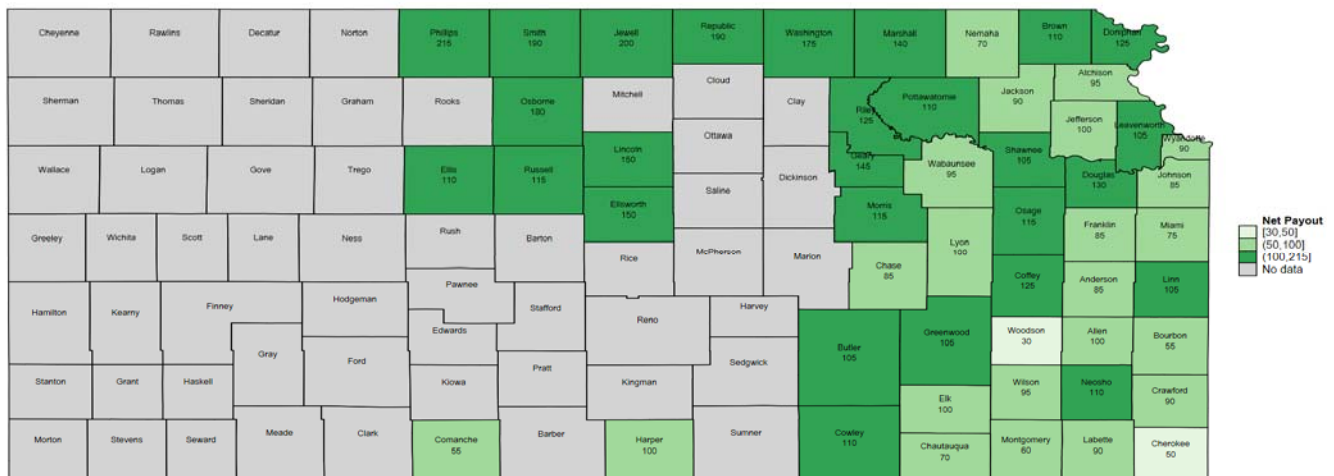
Source: USDA FSA and RMA.



Net annual payouts (Net SCO + PLC – Combined ARC) for each county were summed from 2015-2022. Positive numbers imply SCO + PLC paid out more than ARC, zero would be the same payout. Negative means Combined ARC would have paid out more. Net SCO is SCO indemnities less SCO premiums.



## Wheat: Irrigated SCO+PLC – Combined ARC



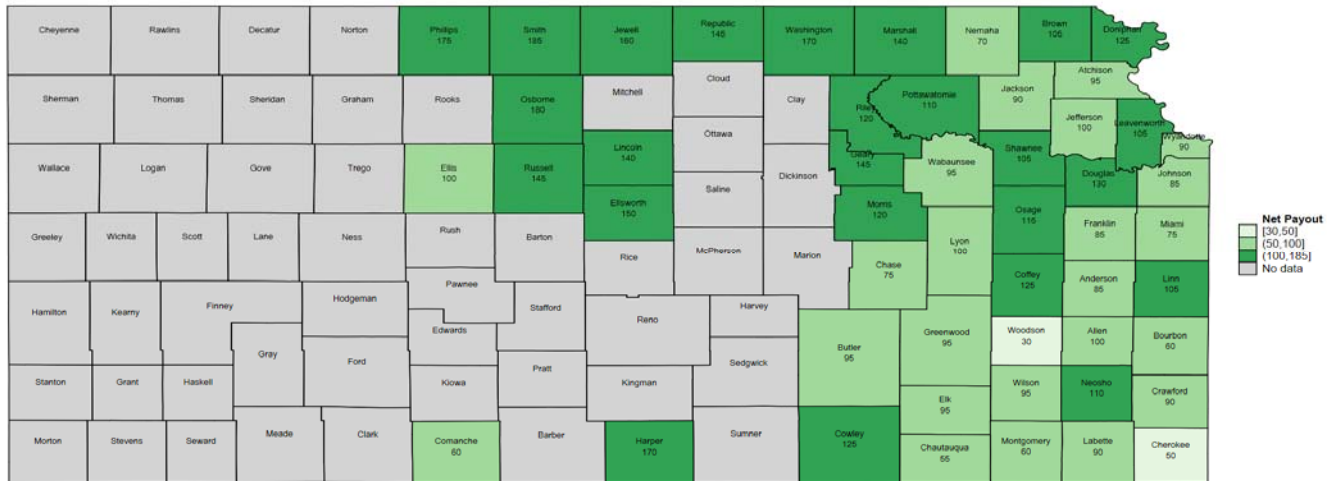
Source: USDA FSA and RMA.



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## Wheat: Non-Irrigated SCO+PLC – Combined ARC



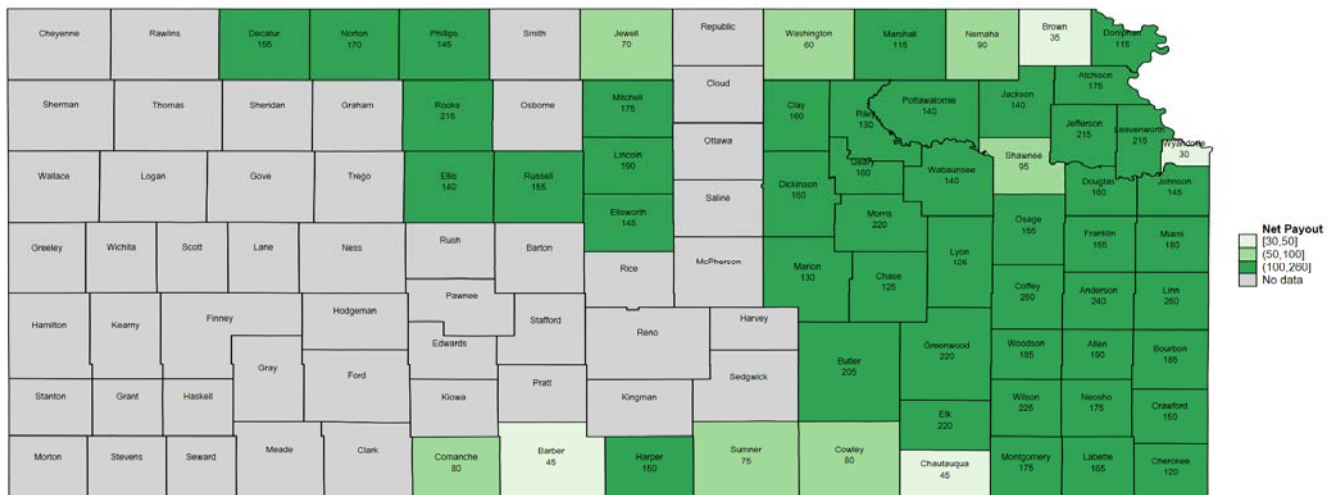
Source: USDA FSA and RMA.



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## Sorghum: Non-Irrigated SCO+PLC – Combined ARC



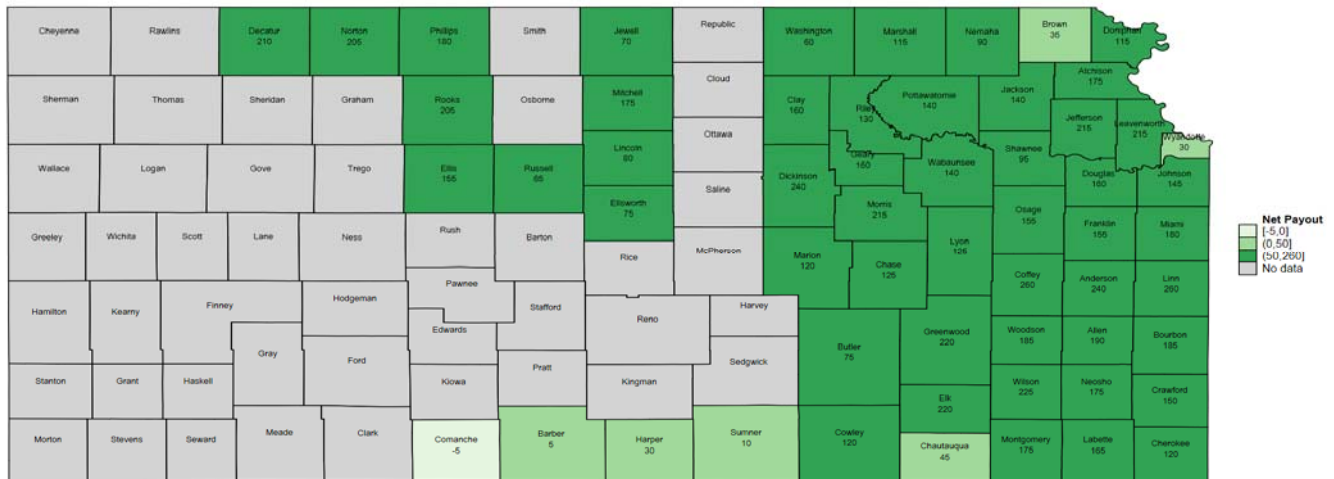
Source: USDA FSA and RMA.



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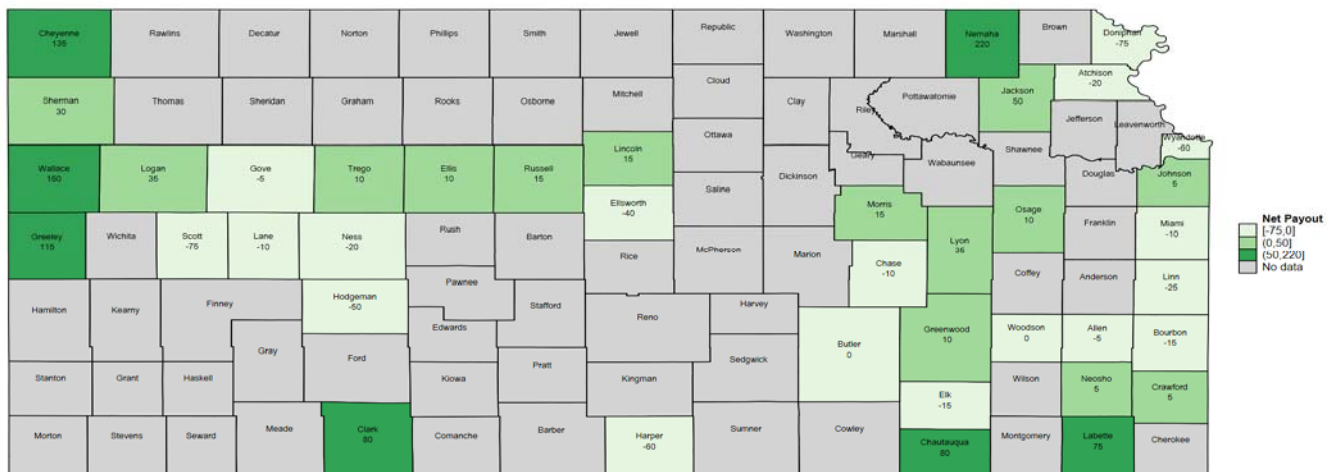


## Sorghum: Irrigated SCO+PLC – Combined ARC



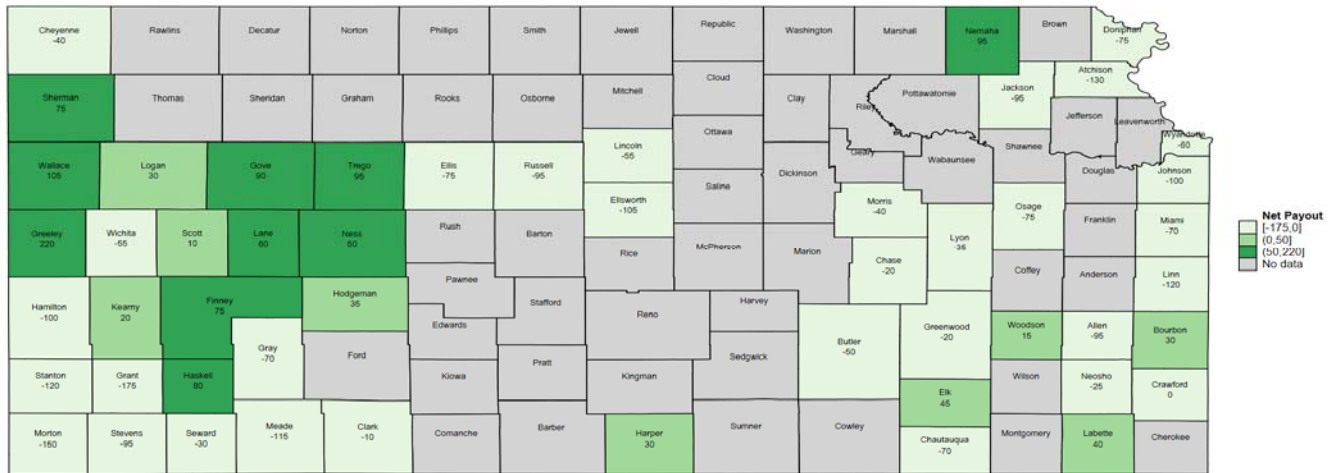
Source: USDA FSA and RMA.

## Soybeans: Non-Irrigated SCO+PLC – Combined ARC



Source: USDA FSA and RMA.

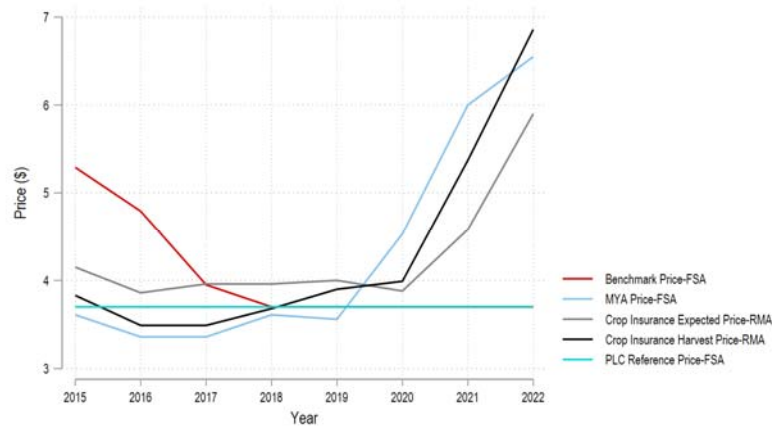
## Soybeans: Irrigated SCO+PLC – Combined ARC



Source: USDA FSA and RMA.

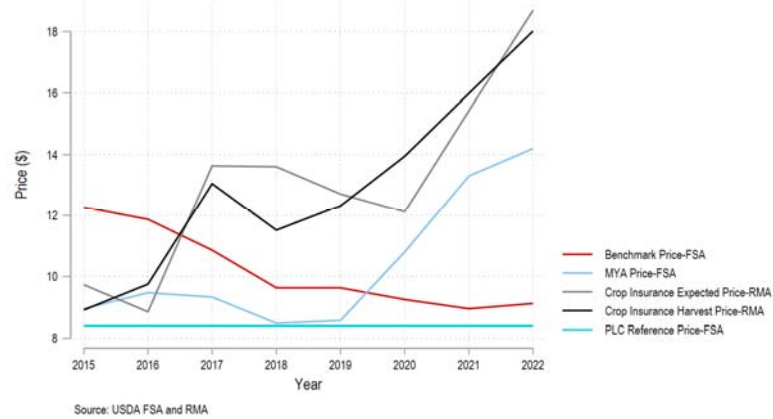
Net annual payouts (Net SCO + PLC – Combined ARC) for each county were summed from 2015-2022. Positive numbers imply SCO + PLC paid out more than ARC, zero would be the same payout. Negative means Combined ARC would have paid out more. Net SCO is SCO indemnities less SCO premiums.

## Corn Guarantee Prices by Program

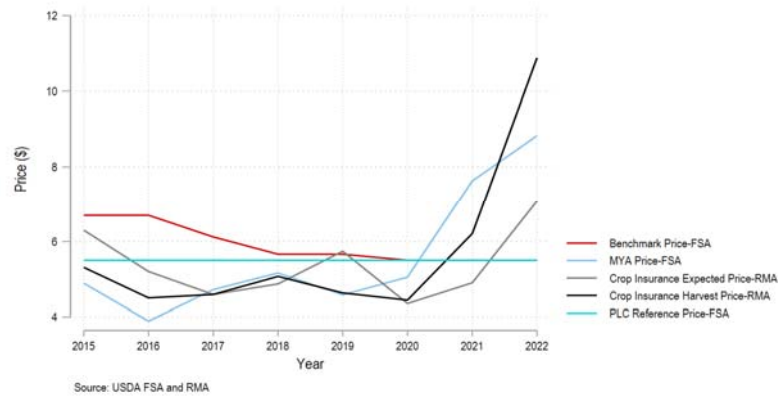


Source: USDA FSA and RMA

## Soybeans Guarantee Prices by Program

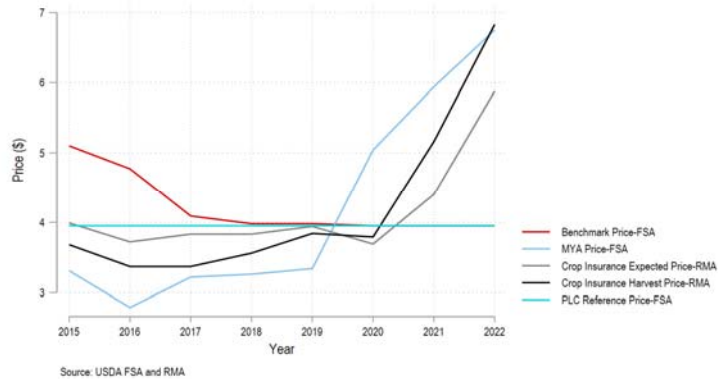


## Wheat Guarantee Prices by Program





## Sorghum Guarantee Prices by Program



## Conclusion

- Average net SCO payouts for Kansas from 2015-2022 were positive, except for irrigated corn
  - Net SCO payouts were highest in 2022 due to extreme drought conditions
  - Net SCO payouts were higher than ARC in 2022
- PLC never paid out for soybeans
- PLC paid out the most in initial years when prices were lower
  - PLC was more favorable than ARC for wheat and sorghum
- The difference between average ARC and PLC was typically *larger than* SCO net payouts
  - Non-irrigated corn in counties with combined ARC yields was one exception

# Caveats

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- Current year guarantee and a producer's risk tolerance may also play a role in ARC, PLC, and SCO decisions.
- This study does not consider average payouts for producers who switched between policies or otherwise considered current guarantees and market conditions when selecting between ARC and PLC

# Implications

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- The difference between the current SCO and ARC guarantee is an important consideration in the ARC vs PLC decision
  - Price and revenue protection provided by each product will vary over time
- Historic performance doesn't determine future performance
  - Provides information on payouts during different market and yield conditions

# Looking forward

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Analyze difference in yield guarantee, triggers, and prices in determining difference in SCO vs ARC payouts

Assuming no major changes in Title 1 programs, add SCO analysis to existing Agmanager.info ARC and PLC comparison tools

**Questions?**  
**Comments?**  
**Thank you!**

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# Formula Sheet

- $SCO/acre = RMA \text{ formula}$
- $PLC/acre = 0.85 * [\text{Reference price} - \max(\text{Annual National average market price}, \text{Market Assistance loan rate})]$

## ARC Payouts per acre

ARC guarantee =  $0.86 * \text{benchmark revenue}$ ; difference = ARC guarantee - actual revenue; maximum =  $10\% * \text{benchmark revenue}$

If difference  $\leq 0$  then payout = 0

If  $0 < \text{difference} \leq \text{maximum}$ , then  
payout = difference \* 0.85

If  $0 < \text{maximum} \leq \text{difference}$ , then  
payout = maximum \* 0.85

## Distribution by ARC Type

Commodity	Number of Counties with Irrigated/Non-Irrigated ARC Payouts	Number of counties with Combined ARC Payouts	Total
Corn	79	25	104
Sorghum	48*	57	105
Soybeans (Nonirrigated/Irrigated)	53	39/41*	94*
Wheat	54	51	105