

2021 Crop Insurance Choices with SCO and ECO

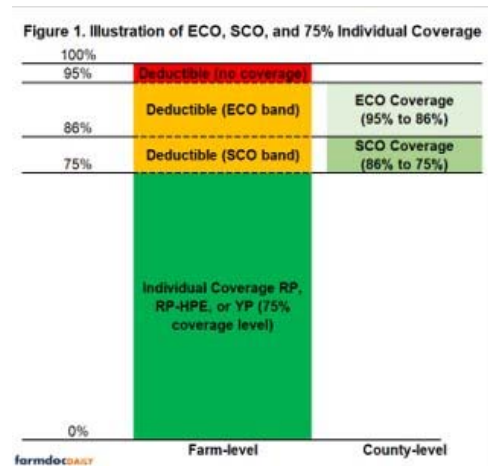
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Managing Risk and Marketing Grain in 2021

Outline

- Introduction
- How do high coverage policies work?
 - Cost
 - Protection
 - Value
 - Investment

Overall concept

- County-based trigger*
 - Sometimes multi-county
- Two coverage choices
 - 86 to 90% **OR**
 - 86 to 95%
- ECO can be used with YP or RP
 - SCO optional
 - Higher premium subsidy for YP
 - Price election
- ECO can be used with ARC, *cannot* be used with ARP or AYP or MPP



What do SCO & ECO not cover?

- Your own yield declines (assuming revenue losses)
- Price decline *if* no revenue loss (high county yields)
- Forward contracting crops with positive basis (sorghum)

Crop insurance decision making: costs

Minimize costs

How can I keep crop insurance costs at a “manageable” level?

What to consider?

- Premium costs

Crop insurance decision making: guarantee

Mitigate impact of low revenue

Will I be able to repay my operating loan, make new investments, etc. under any price or yield outcome?

What to consider?

- Liability – revenue guaranteed by policy
- County vs farm correlation
- Payment timing

Crop insurance decision making: value

Maximize
value of
policy

How can I get the best deal out
of my crop insurance?

What to consider

- Premium subsidy
- Premium subsidy share
- Premium to liability

Crop insurance decision making: return

Investment
(maximize
net benefit)

How can I get the largest return from crop
insurance (in the long run)?

What to consider

- Expected returns
 - Likelihood and amount of indemnity
 - Net returns under different yield and price outcomes

Corn examples

Finney County

- Irrigated corn
- 220 APH yield
- Enterprise units
- Implied volatility = 0.23
- Example farm expected revenue
 - 220 APH yield X
 - \$4.58 price =
 - \$1,008
- ECO & SCO expected yield = 202.2 bu/acre

Marion County

- Non-irrigated corn
- 110 APH yield
- Enterprise units
- Implied volatility = 0.23
- Expected revenue =
 - 110 APH yield X
 - \$4.58 price =
 - \$504
- ECO & SCO expected yield = 88.6 bu/acre

Sorghum and soybean examples

Scott County

- Non-irrigated sorghum
- 81 APH yield
- Enterprise units
- Implied volatility = 0.23
- Example farm expected revenue
 - 81 APH yield X
 - \$4.40 price =
 - \$356
- ECO & SCO expected yield = 86.4 bu/acre

Saline County

- Non-irrigated soybeans (NFAC)
- 41 APH yield
- Enterprise units
- Implied volatility = 0.19
- Expected revenue =
 - 41 APH yield X
 - \$11.87 price =
 - \$487
- ECO & SCO expected yield = 34.1 bu/acre

Policy cost – per acre

	Finney County –irrigated corn 220 bu/acre	Marion County – non-irrigated corn 110 bu/acre
75% RP	\$26 (optional) or \$11 (enterprise)	\$37 (optional) or \$14 (enterprise)
SCO (75% RP)	\$10 or total (10 + 11) = \$21	\$9 or total (\$9 + 14) = \$23
95% ECO + 75% RP	\$30 or total (30 + 11) = \$41	\$16 or total (\$16 + 14) = \$30
95% ECO + SCO + 75% RP	\$30 or total (30+10+11) = \$51	\$16 or total (\$16 + 9 + 14) = \$39

Policy cost – per acre

	Scott County – nonirrigated sorghum 81 bu/acre	Saline County – nonirrigated beans 41 bu/acre
75% RP	\$25 (optional) or \$11 (enterprise)	\$24 (optional) or \$9 (enterprise)
SCO (75% RP)	\$7 or total (7 + 11) = \$18	\$8 or total (\$8 + 9) = \$17
95% ECO + 75% RP	\$11 or total (11 + 11) = \$22	\$15 or total (\$15 + 9) = \$24
95% ECO + SCO + 75% RP	\$11 or total (11 + 7 + 11) = \$29	\$15 or total (\$15 + 8 + 9) = \$32

Crop insurance can become major cost

Corn

- SW KS –irrigated corn
 - Total variable/direct expense: \$454 per acre
 - Fertilizer (\$94), Herbicide (\$61), Seed (\$119)
 - Crop insurance: \$11-\$51: **-2-9% of variable costs**
- SC KS – nonirrigated corn
 - Total variable/direct expense: \$222 per acre
 - Fertilizer (\$46), Herbicide (\$48), Seed (\$55)
 - Crop insurance: \$14-\$39: **-6-18% of variable costs**

Sorghum + soybeans

- SW KS –nonirrigated grain sorghum
 - Total variable/direct expense: \$169 per acre
 - Fertilizer (\$34), Herbicide (\$69), Seed (\$7)
 - Crop insurance: \$11-\$29: **-6-17% of variable costs**
- NC KS – nonirrigated soybeans
 - Total variable/direct expense: \$160 per acre
 - Fertilizer (\$17), Herbicide (\$55), Seed (\$35)
 - Crop insurance: \$9-\$32: **-6-20% of variable costs**

Crop insurance guarantee

	Finney County –irrigated corn 220 bu/acre	Marion County – nonirrigated corn 110 bu/acre
75% RP	\$756 (2020: \$658)	\$378 (2020: \$329)
SCO (75% RP)	\$867 (2020: \$754)	\$433 (2020: \$377)
95% ECO + 75% RP	\$846 (2020: \$737)	\$423 (2020: \$368)
95% ECO + SCO + 75% RP	\$957 (2020: \$834)	\$479 (2020: \$416)

2020 corn harvest price was \$3.99/bushel

Crop insurance guarantee

	Scott County – nonirrigated sorghum 81 bu/acre	Saline County – nonirrigated beans 41 bu/acre
75% RP	\$268 (2020: \$230)	\$365 (2020: \$324)
SCO (75% RP)	\$307 (2020: \$264)	\$418 (2020: \$372)
95% ECO + 75% RP	\$299 (2020: \$258)	\$408 (2020: \$363)
95% ECO + SCO + 75% RP	\$339 (2020: \$292)	\$462 (2020: \$411)

2020 sorghum harvest price was \$3.79/bushel, soybeans \$10.55

High coverage policies insure profits

Corn

- SW KS –irrigated corn
 - Expenses: direct + fixed = \$783
 - Crop insurance guarantee
 - Individual RP: \$756
 - County RP: up to \$957
- SC KS – nonirrigated corn
 - Expenses: direct + fixed = \$321
 - Crop insurance guarantee
 - Individual RP: \$378
 - County RP: up to \$479

Grain sorghum and soybeans

- SW KS –nonirrigated sorghum
 - Expenses: direct + fixed = \$264
 - Crop insurance guarantee
 - Individual RP: \$268
 - County RP: up to \$339
- NC KS – nonirrigated soybeans
 - Expenses: direct + fixed = \$268
 - Crop insurance guarantee
 - Individual RP: \$365
 - County RP: up to \$462

Premium subsidy

	Finney County – irrigated corn 220 bu/acre	Marion County – nonirrigated corn 110 bu/acre
75% RP	0.77 (\$32)	0.77 (\$47)
SCO (75% RP)	0.65 (\$19)	0.65 (\$18)
95% ECO	0.44 (\$24)	0.44 (\$13)
95% ECO + 75% RP	0.58 (\$56)	0.67 (\$60)
95% ECO + SCO + 75% RP	0.60 (\$75)	0.67 (\$78)

Premium subsidy

	Scott County – nonirrigated sorghum 81 bu/acre	Saline County – nonirrigated soybeans 41 bu/acre
75% RP	0.77 (\$35)	0.77 (\$32)
SCO (75% RP)	0.65 (\$12)	0.65 (\$16)
95% ECO	0.44 (\$9)	0.44 (\$11)
95% ECO + 75% RP	0.67 (\$44)	0.64 (\$43)
95% ECO + SCO + 75% RP	0.66 (\$56)	0.65 (\$59)

Premium to Liability ratio

	Finney County – irrigated corn 220 bu/acre	Marion County – nonirrigated corn 110 bu/acre
75% RP	0.01 (\$11/\$756)	0.04 (\$14/\$378)
SCO (75% RP)	0.09 (\$10/\$111)	0.16 (\$9/\$55)
95% ECO	0.33 (\$30/\$91)	0.35 (\$16/\$45)
95% ECO + 75% RP	0.05 (\$41/\$846)	0.07 (\$30/\$423)
95% ECO + SCO + 75% RP	0.05 (\$51/\$957)	0.08 (\$39/\$479)

Premium to Liability ratio

	Scott County – nonirrigated sorghum 81 bu/acre	Saline County – nonirrigated soybeans 41 bu/acre
75% RP	0.04 (\$11/\$268)	0.02 (\$9/\$365)
SCO (75% RP)	0.18 (\$7/\$39)	0.15 (\$8/\$54)
95% ECO	0.34 (\$11/\$32)	0.34 (\$15/\$44)
95% ECO + 75% RP	0.07 (\$22/\$299)	0.06 (\$24/\$408)
95% ECO + SCO + 75% RP	0.09 (\$29/\$339)	0.07 (\$32/\$462)

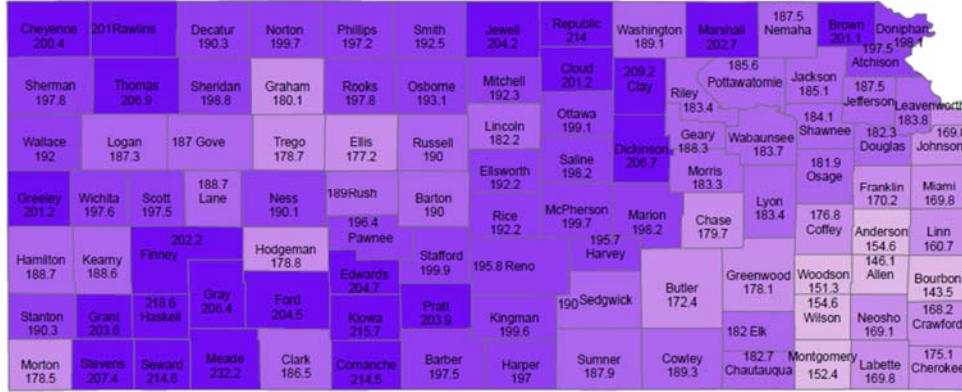
“Value” of crop insurance

- \$ Premium subsidy
- Share premium subsidy
- Premium to liability

THE BIG QUESTION: WILL IT PAY?

(1) What does history tell us?

Corn expected yield (irrigated)

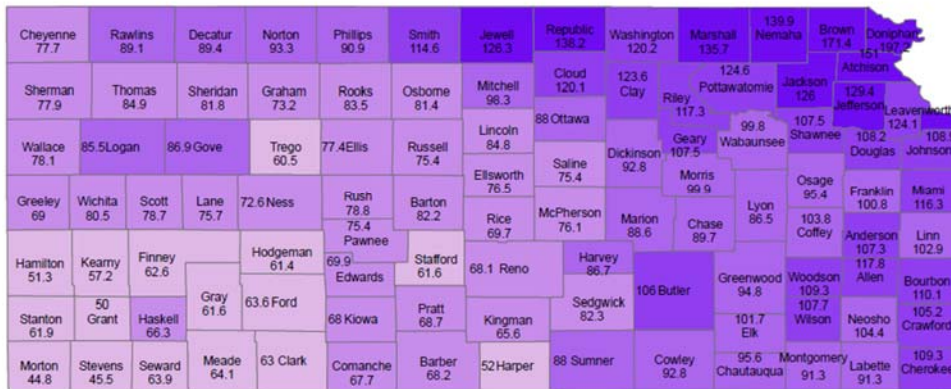


Agricultural Economics

Additional maps including historic yields available at <https://agmanager.info/crop-insurance/kansas-crop-insurance-maps>



Corn expected yield (nonirrigated)

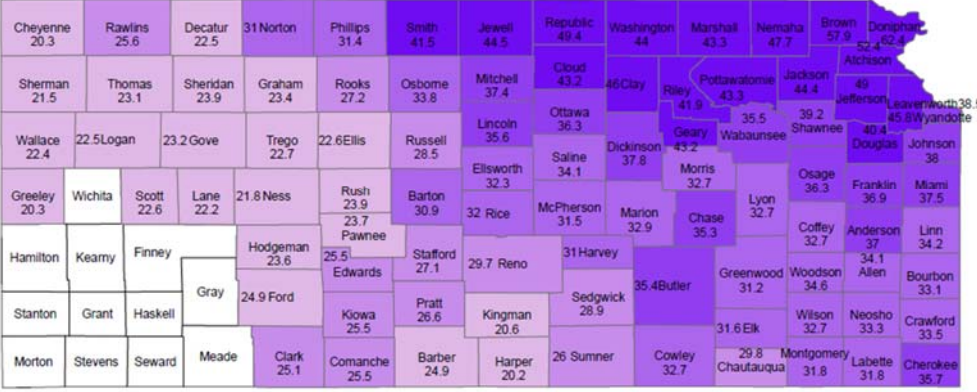


Agricultural Economics

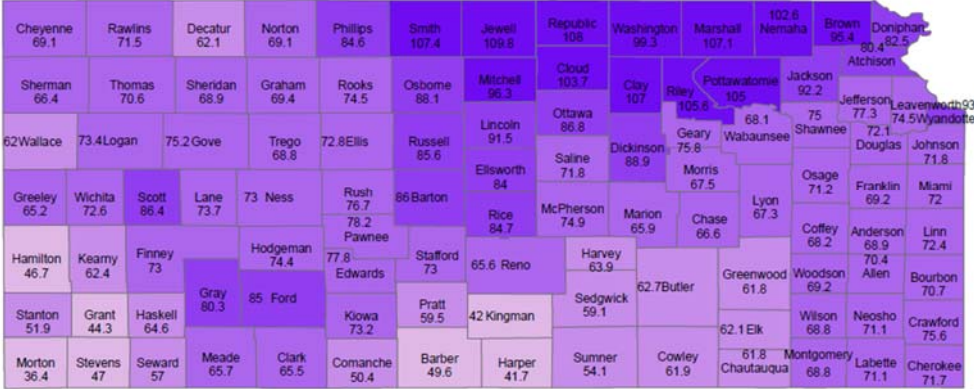
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Soybeans expected yield (non-irrigated)

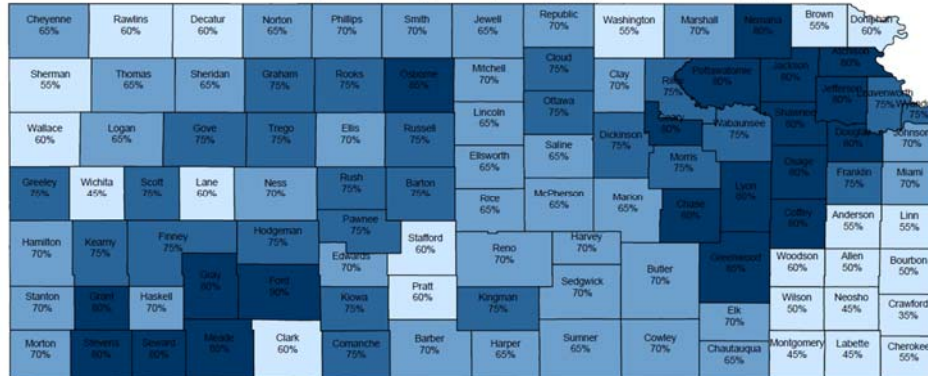


Grain sorghum expected yield (non-irrigated)



Irrigated Corn ECO 95% triggers often but varies by region and county

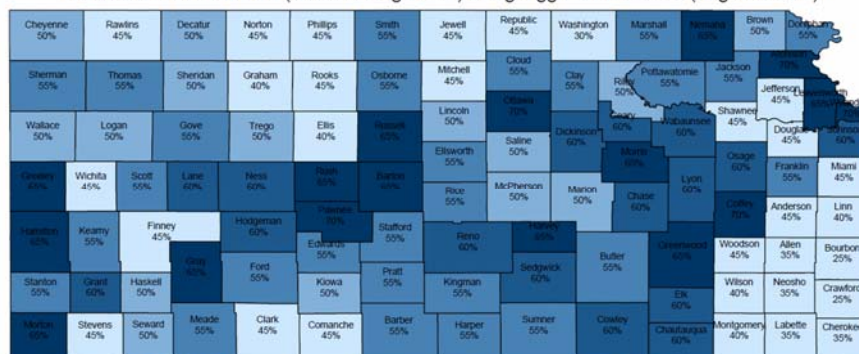
Historic likelihood of ECO (95% coverage level) being triggered in Kansas (Irrigated Corn)



Note: We show % of years from 2000-2019 that ECO with an underlying RP (HPO) policy would pay some indemnity in a particular county. We use RMA trend yields instead of ECO expected yields, as trend yields are available for all years. Trend yields are not equivalent to current expected yields but are very similar. Historic payouts are not a guarantee of future payouts, but can be used to understand county production history and how the program works.

Irrigated Corn ECO 90% triggers at least 25% of time historically

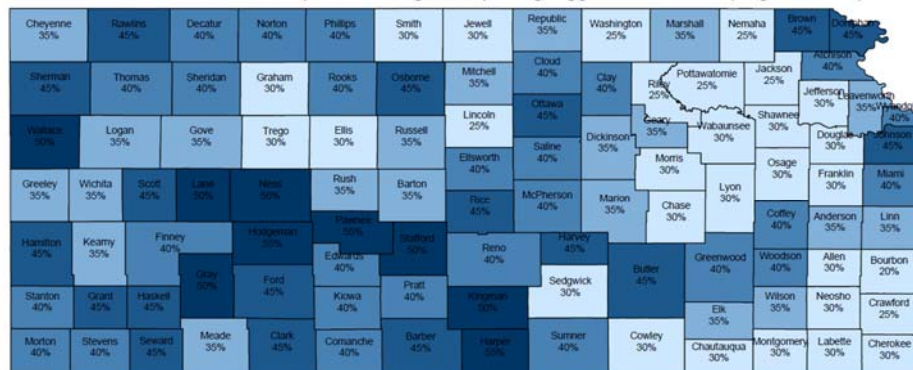
Historic likelihood of ECO (90% coverage level) being triggered in Kansas (Irrigated Corn)



Note: We show % of years from 2000-2019 that ECO with an underlying RP (HPO) policy would pay some indemnity in a particular county. We use RMA trend yields instead of ECO expected yields, as trend yields are available for all years. Trend yields are not equivalent to current expected yields but are very similar. Historic payouts are not a guarantee of future payouts, but can be used to understand county production history and how the program works.

Irrigated Corn SCO – 86%

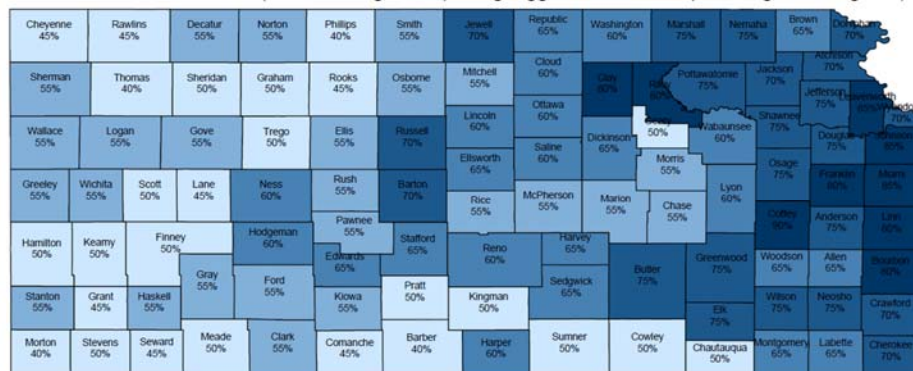
Historic likelihood of SCO (86% coverage level) being triggered in Kansas (Irrigated Corn)



Note: We show % of years from 2000-2019 that SCO with an underlying RP (HPO) policy would pay some indemnity in a particular county. We use RMA trend yields instead of SCO expected yields, as trend yields are available for all years. Trend yields are not equivalent to current expected yields but are very similar. Historic payouts are not a guarantee of future payouts, but can be used to understand county production history and how the program works.

Nonirrigated sorghum – 95% ECO triggers 40% of time or more

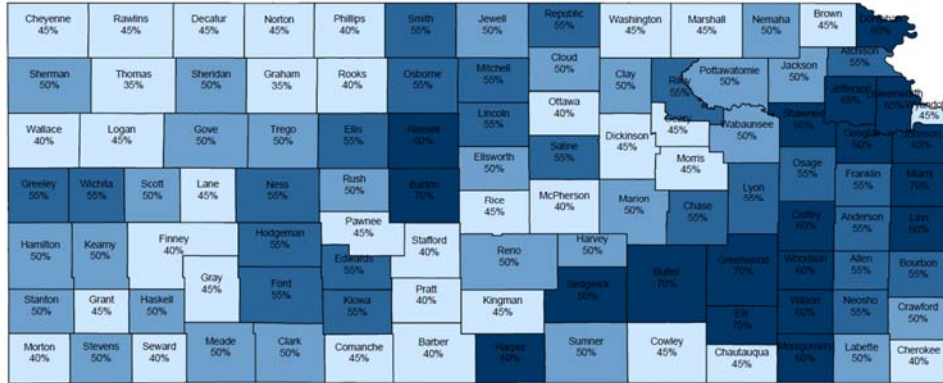
Historic likelihood of ECO (95% coverage level) being triggered in Kansas (Non-Irrigated Sorghum)



Note: We show % of years from 2000-2019 that ECO with an underlying RP (HPO) policy would pay some indemnity in a particular county. We use RMA trend yields instead of ECO expected yields, as trend yields are available for all years. Trend yields are not equivalent to current expected yields but are very similar. Historic payouts are not a guarantee of future payouts, but can be used to understand county production history and how the program works.

Nonirrigated sorghum – 90% ECO triggers in at least 1 out of 3 years historically

Historic likelihood of ECO (90% coverage level) being triggered in Kansas (Non-Irrigated Sorghum)



Note: We show % of years from 2000-2019 that ECO with an underlying RP (HPO) policy would pay some indemnity in a particular county. We use RMA trend yields instead of ECO expected yields, as trend yields are available for all years. Trend yields are not equivalent to current expected yields but are very similar. Historic payouts are not a guarantee of future payouts, but can be used to understand county production history and how the program works.



Agricultural Economics

Additional maps available at

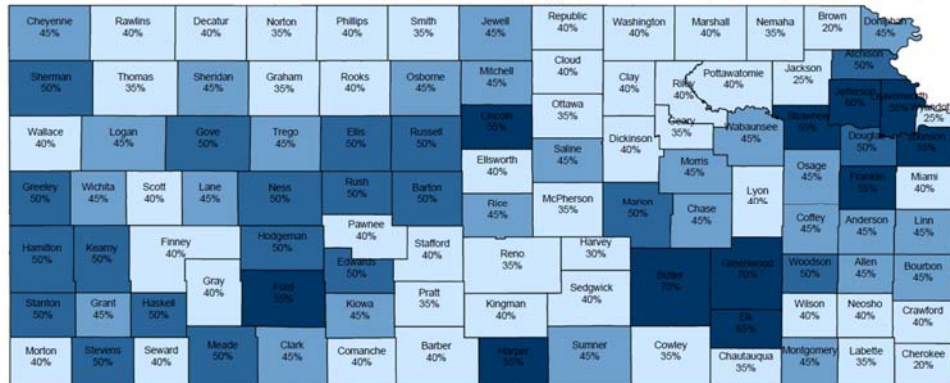
<https://agmanager.info/crop-insurance/kansas-crop-insurance-maps>

NOTE: maps are most accurate for commonly-grown crops



Nonirrigated sorghum SCO triggers in about 25% - 50% of years historically

Historic likelihood of SCO (86% coverage level) being triggered in Kansas (Non-Irrigated Sorghum)



Note: We show % of years from 2000-2019 that SCO with an underlying RP (HPO) policy would pay some indemnity in a particular county. We use RMA trend yields instead of SCO expected yields, as trend yields are available for all years. Trend yields are not equivalent to current expected yields but are very similar. Historic payouts are not a guarantee of future payouts, but can be used to understand county production history and how the program works.



Agricultural Economics

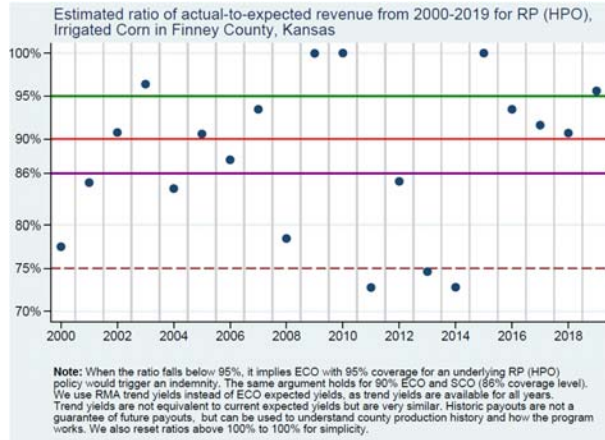
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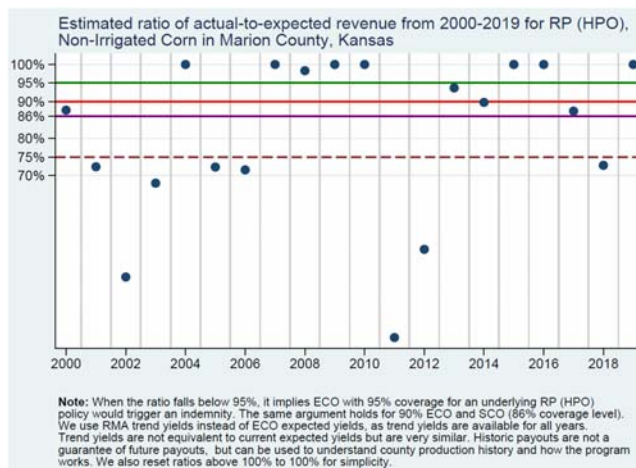
NOTE: maps are most accurate for commonly-grown crops



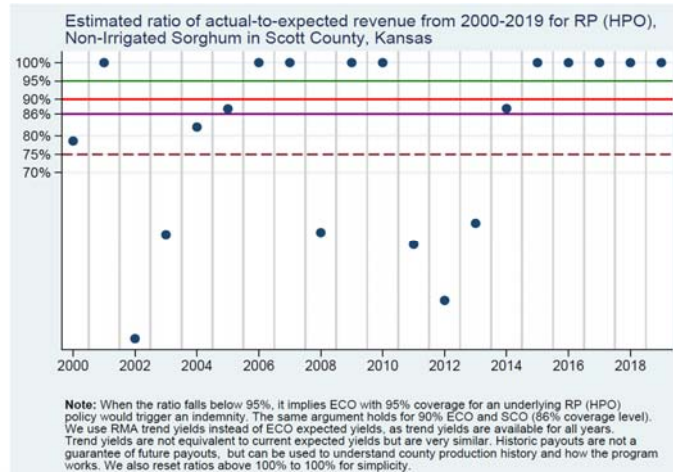
Corn loss experience: Finney Co - Irrigated



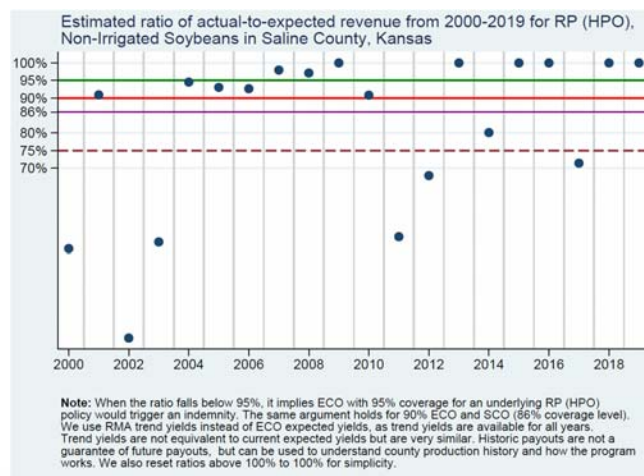
Corn loss experience: Marion Co Nonirrigated



Sorghum loss experience: Scott Co nonirrigated



Soybean loss experience: Saline Co Nonirrigated



THE BIG QUESTION: WILL IT PAY?

(2) How big are indemnities?

Scenario 1: price drops to \$3.41 (25% decrease), average yields

	Finney County –irrigated corn 220 bu/acre	Marion County – nonirrigated corn 110 bu/acre
75% RP	0 (net benefit = -\$11)	0 (net benefit = -\$14)
SCO (75% RP)	\$111 (net benefit = \$101)	\$55 (net benefit = \$46)
95% ECO	\$91 (net benefit = \$61)	\$45 (net benefit = \$29)

Note: Estimates only

Scenario 1: price drops to \$3.41 (25% decrease), average yields

	Scott County – non-irrigated sorghum 81 bu/acre	Saline County – nonirrigated soybeans 41 bu/acre
75% RP	0 (net benefit = -\$11)	0 (net benefit = -\$9)
SCO (75% RP)	\$39 (net benefit = \$32)	\$54 (net benefit = \$46)
95% ECO	\$32 (net benefit = \$21)	\$44 (net benefit = \$29)

Scenario 2: price drops to \$4.09 (10% decrease), expected yield

	Finney County –irrigated corn 220 bu/acre	Marion County – nonirrigated corn 110 bu/acre
75% RP	0 (net benefit = -\$6)	0 (net benefit = -\$14)
SCO (75% RP)	0 (net benefit = -\$10)	0 (net benefit = -\$9)
95% ECO	\$50 (net benefit = \$20)	\$25 (net benefit = \$9)

Scenario 2: price drops to \$4.09 (10% decrease), expected yield

	Scott County – non-irrigated sorghum 81 bu/acre	Saline County – nonirrigated soybeans 41 bu/acre
75% RP	0 (net benefit = -\$11)	0 (net benefit = -\$9)
SCO (75% RP)	0 (net benefit = -\$7)	0 (net benefit = -\$8)
95% ECO	\$18 (net benefit = \$9)	\$24 (net benefit = \$9)

Scenario 3: Shallow county (14%), deeper local (30%) yield losses, expected price

	Finney County – irrigated corn 220 bu/acre	Marion County – nonirrigated corn 110 bu/acre
75% RP	\$50 (net benefit = \$39)	\$25 (net benefit = \$11)
SCO (75% RP)	0 (net benefit = -\$10)	0 (net benefit = -\$9)
95% ECO	\$91 (net benefit = \$61)	\$45 (net benefit = \$29)

Scenario 3: Shallow county (14%), deeper local (30%) yield losses, expected price

	Scott County – non-irrigated sorghum 81 bu/acre	Saline County – nonirrigated soybeans 41 bu/acre
75% RP	\$18 (net benefit = \$7)	\$24 (net benefit = \$14)
SCO (75% RP)	0 (net benefit = -\$7)	0 (net benefit = -\$8)
95% ECO	\$32 (net benefit = \$21)	\$44 (net benefit = \$29)

Scenario 4: 20% widespread higher yields, 25% price decline (10% revenue decline)

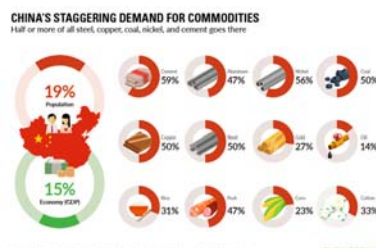
See scenario 2: ECO/SCO provides protection against revenue declines: price drop may be mitigated by above average county yields

SCO & ECO over the long run

- How often do they need to trigger to **based on 2021 prices*** to break even on producer premium (producer premium = indemnity)?
- 95% ECO
 - Actual revenue 92-91.8% of expected county revenue every year
 - Full payout (actual revenue \leq 86% expected) received in more than 3 years out of 10
- 90% ECO
 - Actual revenue 89-88.7% of expected county revenue every year
 - Full payout (actual revenue \leq 86% expected) received in about 2.6-3.3 years out of 10
- SCO (86% with underlying 75%)
 - Actual revenue 84-85% of expected county revenue every year
 - Full payout (actual revenue $<$ 75% expected) received in 1-2 years out ten

Some additional considerations

- Opportunity cost of premiums – alternative uses?
- What about the current and expected weather?
 - Dry conditions
 - La Niña
- Positive sorghum basis – private products may help when forward contracting
- Other price risk mgt
 - Futures
 - Options



Takeaway: the details

- Cost
 - SCO/ECO participation will double or triple premiums – or more
 - Cost could become comparable to major inputs in some cases
- Protection
 - SCO/ECO guarantee levels correspond to profit margin
 - Correlation w/county yields + delayed may be an issue
 - Protection better for larger farms with widespread production over an individual county
- Value
 - Depends how you define value (\$ vs %)
- Return
 - Larger, more frequent indemnities, although could go several years without a payment
 - *Should* come out ahead in the long run

Takeaway: the big picture

- Not one correct way to manage risk
- High coverage policies:
 - You have to pay more to get more coverage
 - Frequent payouts, but can go several years without
 - RP: protection against price declines *except* during high yield years
 - Caution:
 - Individual vs county yield history
 - Delayed payment
 - Potential disappointment
 - County differences (see maps...)
 - Premium costs during average revenue years

Resources

- Agmanager.info
 - <https://agmanager.info/crop-insurance/kansas-crop-insurance-maps>
 - <https://agmanager.info/crop-insurance/crop-insurance-papers-and-information>
 - https://agmanager.info/sites/default/files/pdf/Barnaby_YieldPriceSplit_2.pdf
- Farmdoc: <https://farmdocdaily.illinois.edu/2021/03/rp-eco-and-sco-tradeoffs.html>
- ISU: <https://www.extension.iastate.edu/agdm/crops/html/a1-44.html>

Potential future work

- Analysis of ARC/PLC decision with crop insurance implications
- Excel tool to measure correlation of farm/fields with county
- Correlation between March 1 (ish) soil moisture with fall yields for spring planted crops
 - Same for winter wheat?

Questions?
Comments?
Thank you!



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