

# Farm Programs and Crop Insurance Design and Risk Management Implications

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# Farm Bill Safety Net

## Commodity Program Proposals

Component	Senate Bill (S954)		House Bill (HR2642)	
	Farm/County ARC	AMP (part of ARC)	RLC	PLC
Guarantee	Farm/county revenue	National price	County revenue	National price
Benchmark	5-yr Oly average yield x 5-yr Oly average national price	55% of 5-year Oly average national price; fixed reference prices for rice and peanuts	5-yr Oly average yield x 5-yr Oly average national price	Fixed reference prices
Payment trigger	Revenue < 88% of benchmark	National price < reference price	Revenue < 85% of benchmark	National price < reference price
Payment coverage	78 - 88% of benchmark	Reference price – national price	75 - 85% of benchmark	Reference price – national price
Payment acres	65/80% of planted acres (45% of prevent-plant)	85% of base acres	85% of planted acres (30% of prevent-plant)	85% of planted acres (30% of prevent-plant)
Loan rate	Same as 2008 for most commodities; formula for upland cotton			

# Farm Bill Safety Net Crop Insurance Proposals

Provision	Senate Bill (S954)		House Bill (HR1947)	
	ARC participants	Non-ARC participants	RLC participants	PLC participants
SCO				
deductible	22%	10%	N.A.	10%
subsidy rate		65%		65%
STAX (cotton only)				
coverage band		70-90%		70-90%
subsidy rate		80%		80%

# The Farm Income Safety Net

“A Multiplicity of Confused Concepts”

Scope of Risk Protection	Farm Level	Area Level	National Level
Price		<div style="border: 1px solid black; padding: 2px; display: inline-block;">Hedging</div>	CCP AMP PLC
Revenue	RP/HPE    AGR  DP    ARCF <div style="border: 1px solid black; padding: 2px; display: inline-block; margin: 0 auto;">RP</div>	GRIP    SCO  ACRE ARCC    RLC <div style="border: 1px solid black; padding: 2px; display: inline-block; margin: 0 auto;">GRIP/H</div>	
Production	YP    CAT    NAP	GRP    PRF	

# Understanding the Safety Net Proposals

## Senate Options

	Farm ARC	County ARC	No ARC
Exp Revenue			
Avg Revenue			
Revenue	Producer Loss	Producer Loss	Producer Loss
	Farm ARC	County ARC	SCO
Crop Ins	SCO	SCO	
Guarantee			
Reference Price	Crop Ins Guar	Crop Ins Guar	Crop Ins Guarantee
	AMP	AMP	
Loan Rate			

## House Options

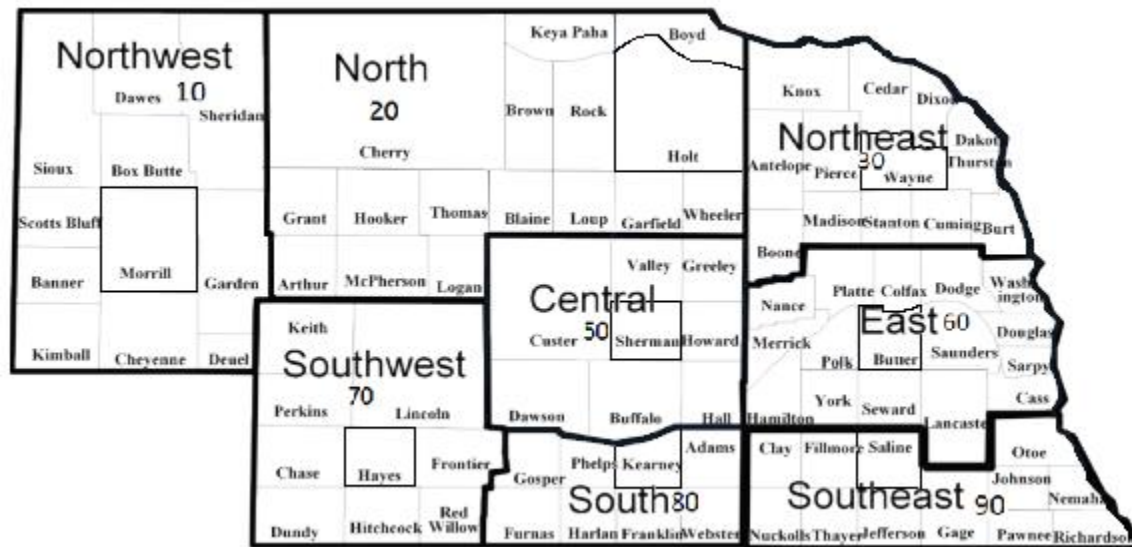
	RLC	PLC	No RLC/PLC
Exp Revenue			
Avg Revenue			
Revenue	Producer Loss	Producer Loss	Producer Loss
	County RLC	SCO	SCO
Crop Ins			
Guarantee			
Reference Price	Crop Ins Guarantee	Crop Ins Guar	Crop Ins Guarantee
		PLC	
Loan Rate			

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# Objectives

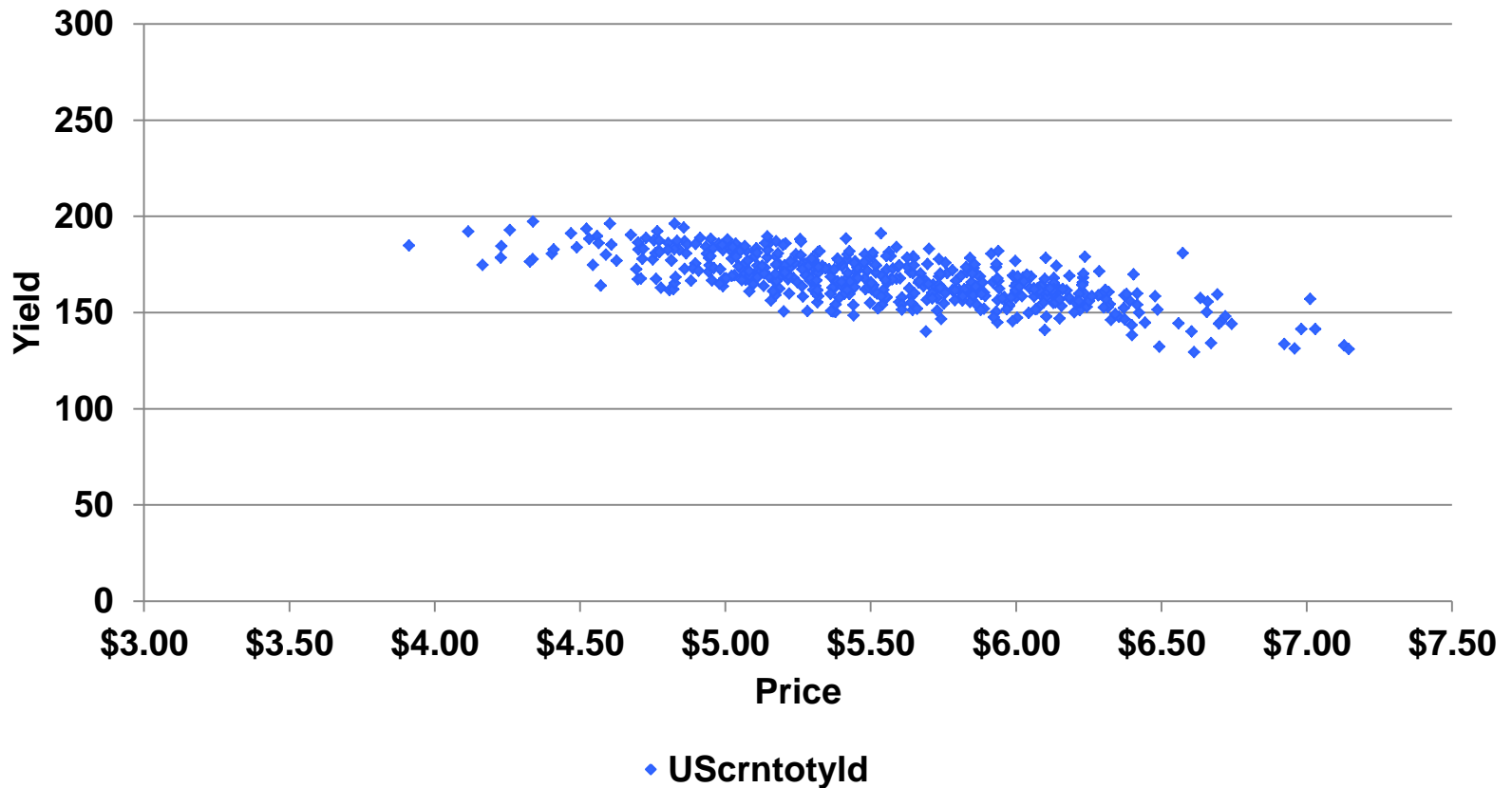
- ◆ Maintain and extend a **farm-level model of representative Nebraska farms** to produce **real-time farm income projections** and **evaluation of risk management strategies** under policy, production, and market price variability
- ◆ Evaluate the **impact of farm program changes** on farm-level risk management decisions
- ◆ Develop and disseminate a **risk management decision model** to assist producers with integrated risk management decisions and strategies

# Nebraska Farm Income and Risk Model (N-FIRM)



# Understanding Risk

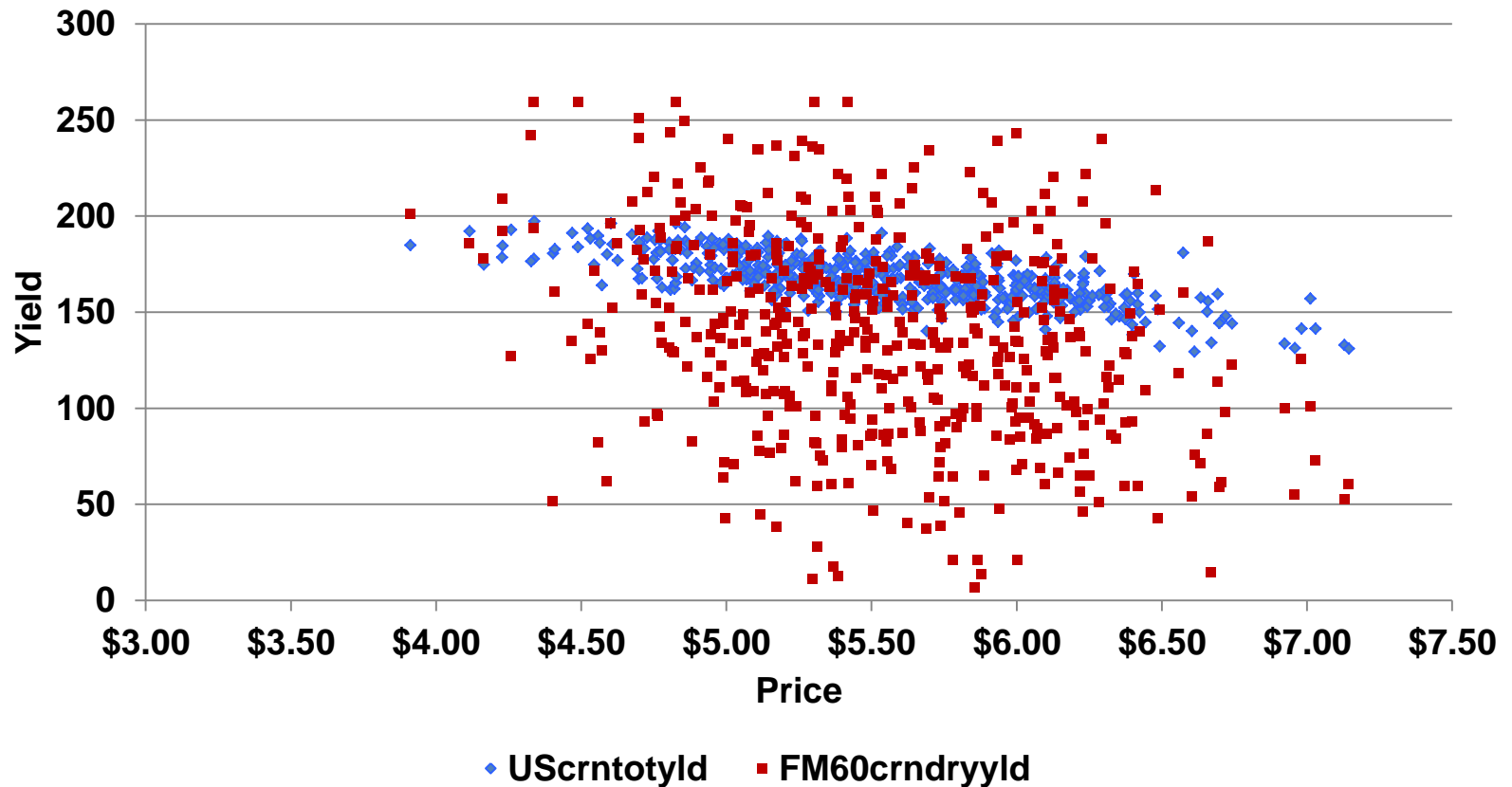
## Statistical Distributions and Correlations





# Understanding Risk

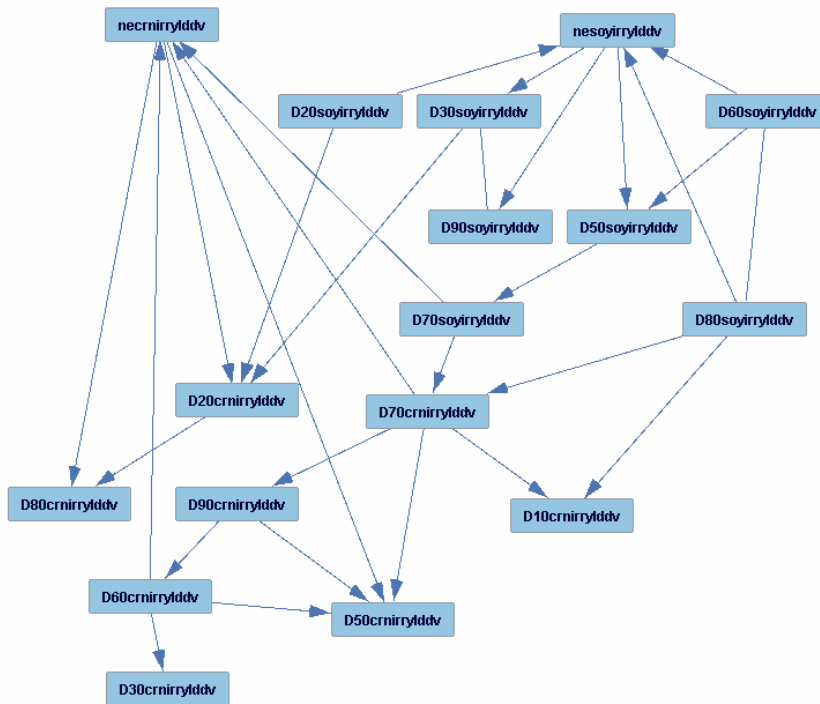
## Statistical Distributions and Correlations



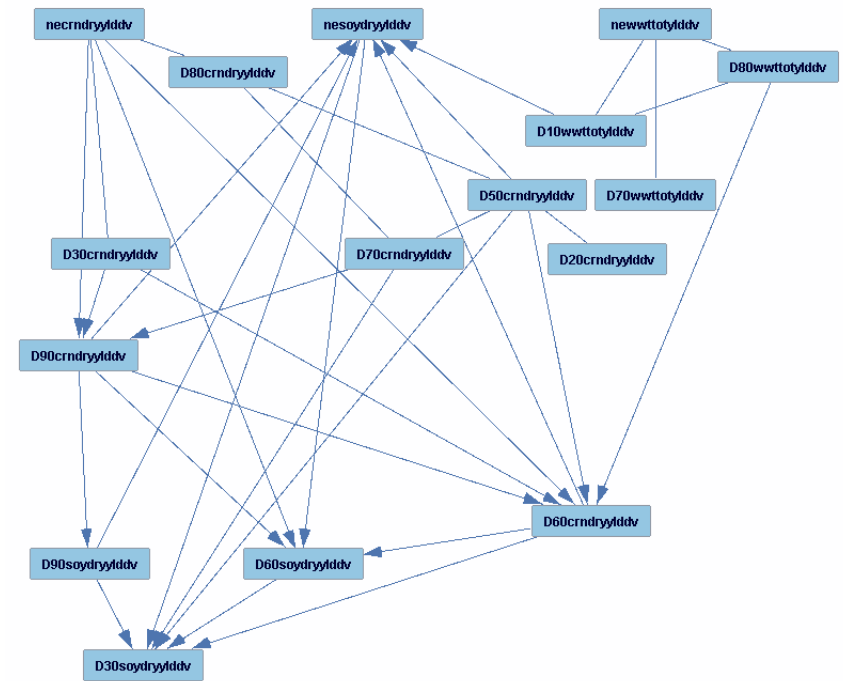
# Understanding Risk

## Statistical Distributions and Correlations

### Irrigated Yields



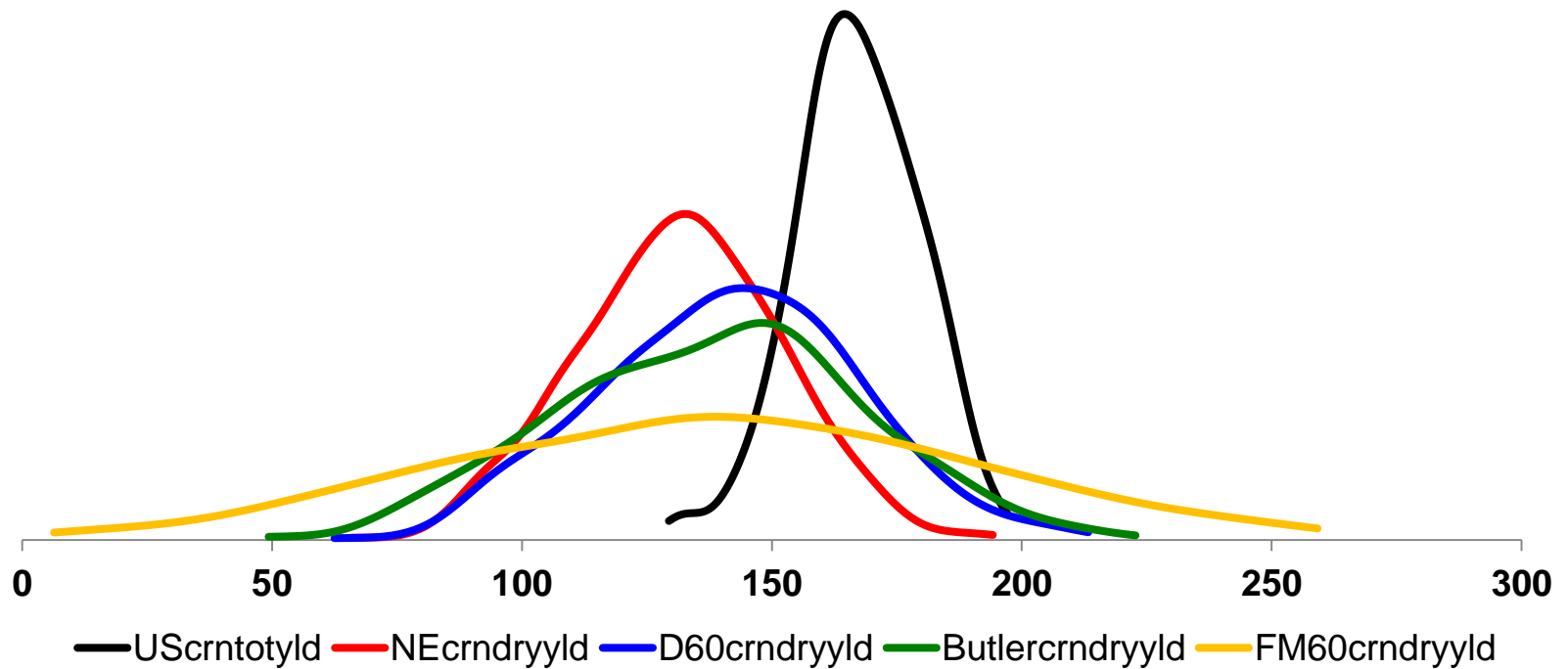
### Dryland Yields



# Understanding Risk

## Statistical Distributions and Correlations

PDF Approximations



# Nebraska Farm Income and Risk Model (N-FIRM)

	District 10	District 20	District 30	District 50	District 60	District 70	District 80	District 90
<i>Cropland Acres</i>	<u>Farm</u>	<u>Farm</u>	<u>Farm</u>	<u>Farm</u>	<u>Farm</u>	<u>Farm</u>	<u>Farm</u>	<u>Farm</u>
Corn Irrigated	372.9	891.0	230.1	794.7	318.9	702.6	558.6	280.4
Corn Dryland	0.0	157.2	380.2	126.8	273.4	282.6	171.5	377.7
Soybeans Irrigated	0.0	329.1	147.7	206.0	173.7	96.9	303.7	173.8
Soybeans Dryland	0.0	0.0	303.9	0.0	259.8	0.0	0.0	377.5
Winter Wheat	874.4	0.0	0.0	0.0	0.0	522.3	167.0	0.0
<b>Total</b>	<b>1247.3</b>	<b>1377.3</b>	<b>1062.0</b>	<b>1127.5</b>	<b>1025.8</b>	<b>1604.3</b>	<b>1200.8</b>	<b>1209.3</b>
<i>Expected Yields</i>								
<i>2011 (bu./acre)</i>								
Corn Irrigated	166.0	188.1	205.7	194.9	190.5	193.4	204.6	195.8
Corn Dryland	0.0	76.5	155.5	94.0	129.9	71.1	112.5	111.3
Soybeans Irrigated	0.0	58.0	56.0	60.0	60.0	58.6	63.0	58.7
Soybeans Dryland	0.0	0.0	47.5	0.0	42.7	0.0	0.0	39.3
Winter Wheat	42.0	0.0	0.0	0.0	0.0	41.0	48.1	0.0
<i>Actual Production History</i>								
<i>2001-2010 (bu./acre)</i>								
Corn Irrigated	156.9	175.0	185.4	181.8	183.2	183.0	193.0	186.2
Corn Dryland	0.0	71.5	131.9	81.4	123.4	68.4	89.2	111.5
Soybeans Irrigated	0.0	51.6	53.3	55.9	56.6	55.6	59.0	56.6
Soybeans Dryland	0.0	0.0	42.1	0.0	42.1	0.0	0.0	38.7
Winter Wheat	35.4	0.0	0.0	0.0	0.0	43.0	46.7	0.0

Credit: Research results from farm income, policy, and risk management research funded originally by the Nebraska Soybean Board and continued by the Nebraska Corn Board.

# Farm Bill Safety Net Comparison Policy Alternatives

- ◆ 6 farm program alternatives
  - No program
  - ACRE – modified based on 5-year Olympic average price
  - ARCF
  - ARCC
  - RLC
  - PLC
- ◆ 4 crop insurance alternatives
  - No crop insurance
  - 65% RP
  - 75% RP
  - 85% RP
- ◆ Complementary SCO coverage
  - No program, PLC
    - 0-90%, 65-90%, 75-90%, 85-90%
  - ARCF, ARCC
    - 0-78%, 65-78%, 75-78%
  - ACRE, RLC
    - No SCO

# Farm Bill Safety Net Comparison

Average Farm Program Payments per Acre for Nonirrigated Corn  
Butler County (District 60 – East) (March 2013 Baseline)

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<b>Farm Program</b>	<b>None</b>	<b>ACRE</b>	<b>ARCF</b>	<b>ARCC</b>	<b>RLC</b>	<b>PLC</b>
Mean	\$0.00	\$5.31	\$15.87	\$12.77	\$10.81	\$0.00
StDev	0.00	19.90	20.53	21.61	20.89	0.00
CV	0.00	374.81	129.40	169.20	193.25	0.00
Min	0.00	0.00	0.00	0.00	0.00	0.00
Max	0.00	148.69	44.47	54.73	56.17	0.00

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Credit: Research results from farm income, policy, and risk management research funded originally by the Nebraska Soybean Board and continued by the Nebraska Corn Board.

# Farm Bill Safety Net Comparison

Average Farm Program and SCO Payments per Acre for Nonirrigated Corn,  
Butler County (District 60 – East) (March 2013 Baseline)

<b>Farm Program/SCO Band</b>	<b>No Program/90-0</b>	<b>No Program/90-65</b>	<b>No Program/90-75</b>	<b>No Program/90-85</b>
Mean	\$15.63	\$14.57	\$11.77	\$5.25
<b>Farm Program/SCO Band</b>	<b>ACRE/ -</b>	<b>ACRE/ -</b>	<b>ACRE/ -</b>	<b>ACRE/ -</b>
Mean	\$5.31	\$5.31	\$5.31	\$5.31
<b>Farm Program/SCO Band</b>	<b>ARCF/78-0</b>	<b>ARCF/78-65</b>	<b>ARCF/78-75</b>	<b>ARCF/ -</b>
Mean	\$20.59	\$19.48	\$17.17	\$15.87
<b>Farm Program/SCO Band</b>	<b>ARCC/78-0</b>	<b>ARCC/78-65</b>	<b>ARCC/78-75</b>	<b>ARCC/ -</b>
Mean	\$17.49	\$16.38	\$14.08	\$12.77
<b>Farm Program/SCO Band</b>	<b>RLC/ -</b>	<b>RLC/ -</b>	<b>RLC/ -</b>	<b>RLC/ -</b>
Mean	\$10.81	\$10.81	\$10.81	\$10.81
<b>Farm Program/SCO Band</b>	<b>PLC/90-0</b>	<b>PLC/90-65</b>	<b>PLC/90-75</b>	<b>PLC/90-85</b>
Mean	\$15.63	\$14.57	\$11.77	\$5.25

Credit: Research results from farm income, policy, and risk management research funded originally by the Nebraska Soybean Board and continued by the Nebraska Corn Board.

# Farm Bill Safety Net Comparison

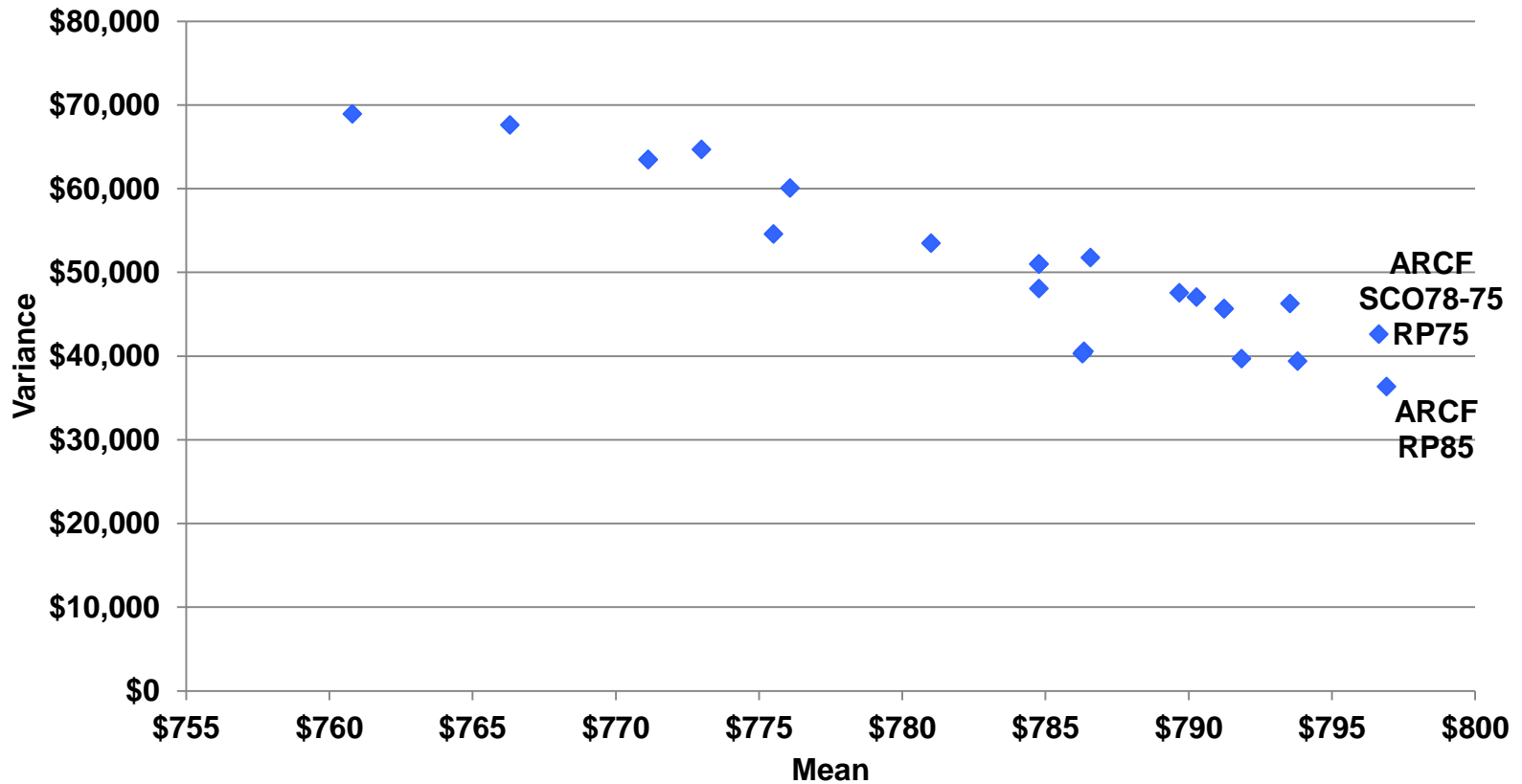
Average Total Revenue per Acre for Nonirrigated Corn  
Butler County (District 60 – East) (March 2013 Baseline)

<b>Farm Prog/SCO Band/RP Band</b>	<b>No Program/90-0/0</b>	<b>No Program/90-65/65</b>	<b>No Program/90-75/75</b>	<b>No Program/90-85/85</b>
Mean	\$771.14	\$784.77	\$791.24	\$786.30
<b>Farm Prog/SCO Band/RP Band</b>	<b>ACRE/ - /0</b>	<b>ACRE/ - /65</b>	<b>ACRE/ - /75</b>	<b>ACRE/ - /85</b>
Mean	\$760.81	\$775.51	\$784.78	\$786.35
<b>Farm Prog/SCO Band/RP Band</b>	<b>ARCF/78-0/0</b>	<b>ARCF/78-65/65</b>	<b>ARCF/78-75/75</b>	<b>ARCF/ - /85</b>
Mean	\$776.09	\$789.67	\$796.64	\$796.91
<b>Farm Prog/SCO Band/RP Band</b>	<b>ARCC/78-0/0</b>	<b>ARCC/78-65/65</b>	<b>ARCC/78-75/75</b>	<b>ARCC/ - /85</b>
Mean	\$772.99	\$786.58	\$793.54	\$793.81
<b>Farm Prog/SCO Band/RP Band</b>	<b>RLC/ - /0</b>	<b>RLC/ - /64</b>	<b>RLC/ - /75</b>	<b>RLC/ - 85</b>
Mean	\$766.31	\$781.01	\$790.28	\$791.85
<b>Farm Prog/SCO Band/RP Band</b>	<b>PLC/90-0/0</b>	<b>PLC/90-65/65</b>	<b>PLC/90-75/75</b>	<b>PLC/90-85/85</b>
Mean	\$771.14	\$784.77	\$791.24	\$786.30

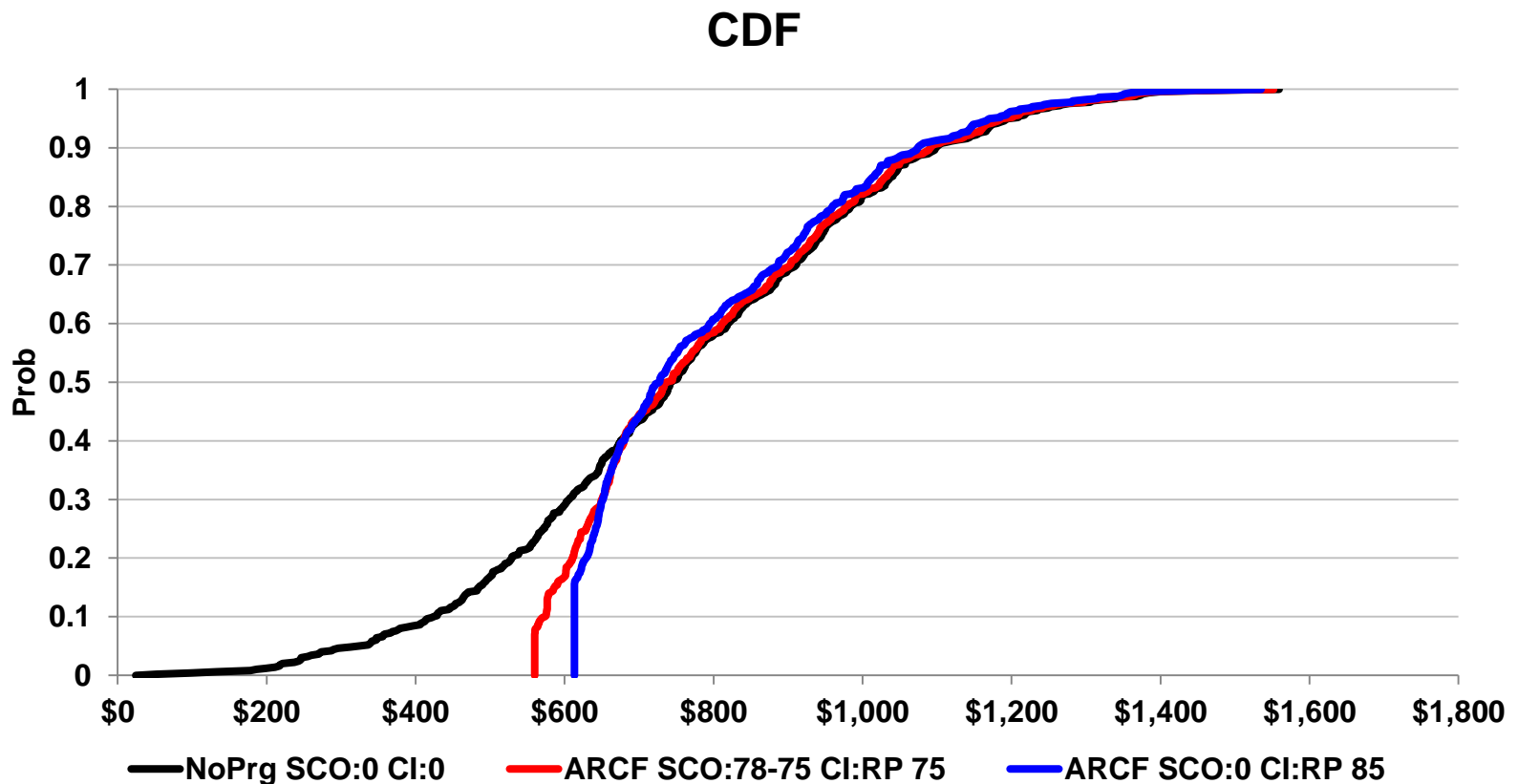
Credit: Research results from farm income, policy, and risk management research funded originally by the Nebraska Soybean Board and continued by the Nebraska Corn Board.



# Mean-Variance Analysis of Risk Management Strategies for Representative Farm in Butler County (District 60) in 2013



# Distribution of Gross Revenue of Risk Management Strategies for Representative Farm in Butler County (District 60) in 2013



# Percent of Times Safety Net Payments Exceed Loss for Representative Farm in Butler County (District 60) in 2013

Risk Management Scenario	Safety Net Payments		
	ARCF	ARCF	ARCF
<b>Farm Program</b>	ARCF	ARCF	ARCF
<b>SCO Band</b>	78-65	78-75	0
<b>Crop Insurance</b>	RP 65	RP 75	RP 85
CR $\geq$ E[CR]	2.90%	2.49%	0.00%
CR < E[CR]	0.39%	0.39%	0.00%
CR < 90%*E[CR]	5.91%	0.39%	0.000%
<b>Farm Program</b>	PLC	PLC	PLC
<b>SCO Band</b>	90-65	90-75	90-85
<b>Crop Insurance</b>	RP 65	RP 75	RP 85
CR $\geq$ E[CR]	11.20%	9.96%	7.88%
CR < E[CR]	6.18%	2.70%	1.16%
CR < 90%*E[CR]	11.33%	2.70%	1.16%

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# Conclusions

- ◆ Federal farm income safety net has evolved over time
  - Price support and supply control
  - Income support tied to price and revenue
  - Risk management
- ◆ Farm income safety net is complex
  - Farm programs integrate with, complement, and substitute for crop insurance
  - Potential for program overlap exists, but is more an issue with farm- vs. county-level protection, not overlapping protection on the farm

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# Conclusions

- ◆ Risk management decisions are complex
  - Risk management decisions need to be based on portfolio analysis, not program-by-program decisions
  - Simulation modeling provides a means of analyzing complex risk management decisions and portfolios
  - Producer decision tools and education are a critical need