

# Risk Analysis of Converting CRP Acres

Rich Llewelyn<sup>1</sup>  
 Jeffery Williams<sup>1</sup>  
 Dustin Pendell<sup>2</sup>  
 Alan Schlegel<sup>1</sup>  
 Troy Dumler<sup>1</sup>

Presented at the:  
 2010 Ag Profitability Conference  
 Dodge City, Kansas  
 January 26, 2010

<sup>1</sup>Kansas State University  
<sup>2</sup>Colorado State University



2010 Ag Profitability Conference



## Objectives of this research:

- Determine if CRP or a wheat-sorghum-fallow crop production strategy is preferred for a semi-arid region of the Great Plains.
- Determine if conventional, reduced or no-tillage is preferred for the W-S-F cropping system.

January 26, 2010



2010 Ag Profitability Conference



2

## Background and Rationale

- Between 2009-2012, 18.31 million acres of CRP contracts will expire nationally.
- In Kansas: 436,710 acres expire in 2009; 618,521 acres in 2010 and 532,000 acres in 2011.
- 70% of the expiring land is in the western one-third of the state.
- By 2012, 505,326 acres of CRP contracts will expire in Greeley County, KS and four surrounding counties in western Kansas and eastern Colorado.

January 26, 2010

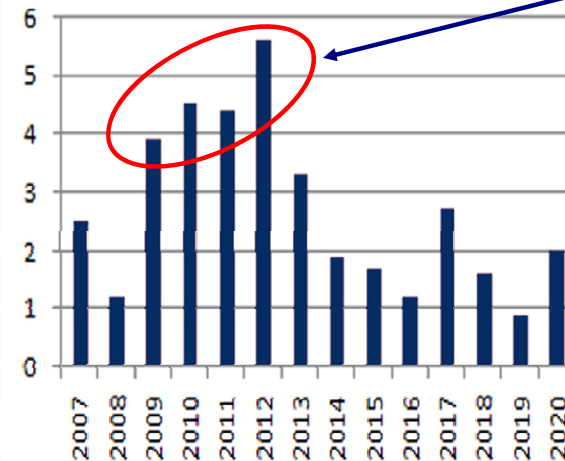


2010 Ag Profitability Conference



3

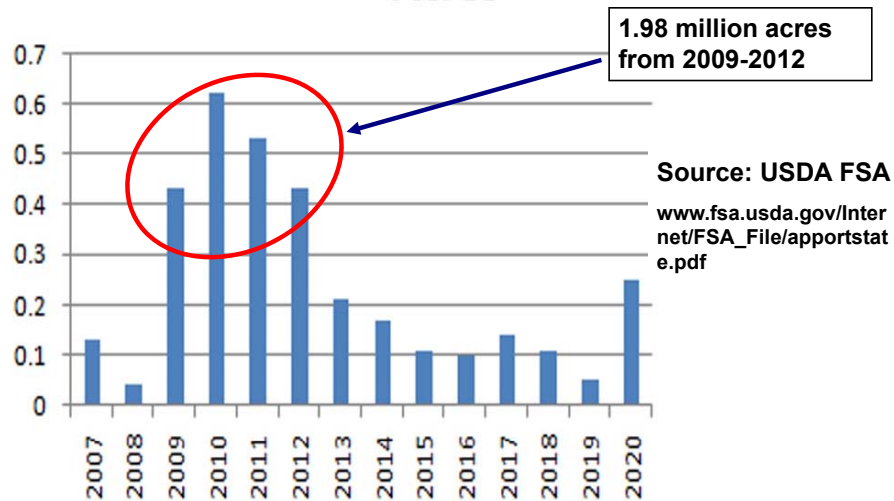
## U.S Contract Expirations in Million Acres



18.31 million acres from 2009-2012

Source: USDA FSA  
[www.fsa.usda.gov/Internet/FSA\\_File/apportstate.pdf](http://www.fsa.usda.gov/Internet/FSA_File/apportstate.pdf)

## Kansas Contract Expirations in Million Acres



## Background and Rationale (continued)

- Higher crop prices and net returns in 2008 increased interest in converting CRP to crop production.
- 2008 Farm Bill lowered CRP cap from 39.2 million acres to 32.0 million beginning in 2010, lower than 2009 33.7 million enrolled acres. 2010: 31.1 million acres.
- Kansas ranks 3<sup>rd</sup> in total CRP acreage: 3.098 million acres in 2009, dropping to 2.773 million acres in 2010.
- Half of Kansas' CRP acres will expire by 2012.

January 26, 2010



2010 Ag Profitability Conference



6

## Recent CRP News

- May, 2009: FSA announced 3-5 year extensions would be available for some of the expired CRP.
- Nationally, 40% of expiring contracts in 2009 were eligible for extension. In Kansas, only 28% were eligible.
- 118,416 acres eligible for the extension in Kansas in 2009.
- September, 2009: Of the 118,416 acres eligible for extension in Kansas, 79% or 94,395 acres, were extended.
- Nationally, 70% of eligible acres were extended.

January 26, 2010



2010 Ag Profitability Conference



7

## Previous Research Results:

- No research with CRP as one of the alternatives.
- Factors affecting conversion from CRP to crops:
  - Grain prices and rental payments (Kalaitzandonakes and Monson (1994).
- Presence of livestock operation & participation in government commodity programs (Johnson, et al, 1997)
- Expiring CRP contract acres, renewable energy (biofuels), rising (and volatile) grain prices, and advances in biotechnology (Stubbs, 2008).

January 26, 2010



2010 Ag Profitability Conference



8

## Previous Research Results:

- **When converting to crops from CRP:**
  - Disk tillage of CRP, followed by reduced till or no-till is best. (Unger, 1999). BUT, since 1999, NT has become more common and may be better now.
  - Reduced tillage or no-till cropping systems generally better than conventional tillage in this region (Bordovsky, et al., 1998; Shapiro, et. al. (2001); Williams, 1988; Williams et al., 1987. Again, NT more common than when these studies were done.
  - Wheat-grain sorghum-fallow rotation found to be better than wheat-fallow or continuous wheat or continuous grain sorghum for this area (Norwood, et al., 1990; Williams et al., 1987; Williams et al., 1989).

January 26, 2010



2010 Ag Profitability Conference



9

## Previous Research Results

- **When evaluating for risk analysis:**
  - A rotation of reduced-tillage grain sorghum and no-till wheat was preferred by moderately risk-averse producers, while more strongly risk-averse producers preferred a rotation of reduced-tillage grain sorghum and reduced-tillage wheat. (Williams, et al., 2000)
  - Wheat-sorghum-fallow rotations preferred by risk-averse producers (Williams et al., 1987; Williams et al., 1989).

January 26, 2010



2010 Ag Profitability Conference



10

## Summary of Previous Research:

- CRP never included as an alternative
- Disk-tillage previously found to be good for conversion in 1999, but should consider NT now if already doing it.
- Reduced or no-till systems better than conventional tillage
- Wheat-grain sorghum-fallow rotation generally better than continuous cropping, especially when considering risk.

January 26, 2010



2010 Ag Profitability Conference



11

## Methods

- Enterprise budgeting, with net returns to land and management, calculated by subtracting 2008 costs.
- Assumes that CRP acres returning to crop production will be eligible for commodity programs.
- Certainty Equivalents (CEs) for various degrees of risk aversion are calculated and used to rank the alternative production strategies and calculate risk premiums at each risk aversion level.
- The CE is the amount of money at which the decision-maker is indifferent between the certain dollar value and the expected value of the risky strategy.

January 26, 2010



2010 Ag Profitability Conference



12

## Methods (continued)

- A **risk premium** (RP) is calculated by subtracting the CE of a less preferred strategy from the preferred strategy.
- The RP reflects the minimum amount (\$/acre) that will have to be paid to a decision-maker to justify a switch from the preferred strategy to an alternative.

## Data

- Yields, input types and rates, and field operations are from eleven years (1991-2001) of data from an experiment station in Tribune, Kansas.
- Yields are from land converted to cropping from native grass in 1988.
- Production costs are based upon actual field operations and input rates. Costs of two disking operations included for conversion of native grass CRP to cropland. But in practice, could mow, burn, hay, then NT.
- Field operation costs are KAS 2008 custom rates.

## Yield Characteristics:

	Strategies		
	CT	RT	NT
<b>Mean Yield (bu./acre)</b>			
Wheat	36.0	42.2	45.0
Sorghum	41.5	67.0	75.2
<b>Std. Dev. Yield (bu./acre)</b>			
Wheat	19.3	20.3	20.4
Sorghum	30.7	30.4	34.8

Yields by tillage system not significantly different **statistically** but **NT and RT yields are higher with not much more variation.**

## Characteristics of Simulated Prices (\$/bu.)

	2006-2008		2007-2008	
	Grain		Grain	
	Wheat	Sorghum	Wheat	Sorghum
<b>Mean</b>	\$5.90	\$3.50	\$6.71	\$4.08
<b>Std. Dev.</b>	\$1.72	\$1.06	\$1.60	\$0.80
<b>Minimum</b>	\$3.59	\$1.95	\$4.56	\$2.90
<b>Maximum</b>	\$10.40	\$5.82	\$10.37	\$5.82

Prices are from the Kansas Agricultural Statistics Service west-central crop and livestock reporting district for January 2006 – December 2008.

## Simulated Net Return Characteristics (\$/acre)

	Strategies		
	CT	RT	NT
<b>Jan. 2006 through Dec. 2008 Prices</b>			
Mean	(\$6.59)	\$31.64	\$28.06
Std. Dev.	\$55.72	\$71.16	\$76.42
Minimum	(\$91.63)	(\$78.91)	(\$90.40)
Maximum	\$232.44	\$298.68	\$317.74
<b>Jan. 2007 through Dec. 2008 Prices</b>			
Mean	\$10.53	\$54.87	\$53.04
Std. Dev.	\$58.88	\$70.34	\$74.75
Minimum	(\$88.08)	(\$65.39)	(\$87.14)
Maximum	\$265.79	\$307.65	\$304.62

January 26, 2010



2010 Ag Profitability Conference



17

## Results: Average Net Returns

- Average net return is highest for RT. NT strategy has 2<sup>nd</sup> highest net return for cropping.
- NT has higher yields, but additional gross income does not offset the higher costs.
- Higher chemical costs outweigh lower field operation costs.
- Using 2006-2008 prices:
  - CRP typical payment is higher than CT, RT or NT tillages.
- Using 2007-2008 (higher) prices:
  - RT and NT have higher average net returns than the typical CRP payment.

January 26, 2010



2010 Ag Profitability Conference



18

## Results: Probability of Loss or Greater than CRP (2006-2008 prices)

### Probability of a loss (negative net return):

RT = 41%  
 NT = 43%  
 CT = 63%  
 CRP = 0%

### Probability of return above \$38/acre (typical CRP payment)

RT - 38%  
 NT - 36%  
 CT - 20%

January 26, 2010



2010 Ag Profitability Conference



19

## Results: Probability of Loss or Greater than CRP (2007-2008 prices)

### Probability of a loss (negative net return):

RT = 25%  
 NT = 28%  
 CT = 50%  
 CRP = 0%

### Probability of return above \$38/acre (typical CRP payment)

RT - 55%  
 NT - 54%  
 CT - 27%

January 26, 2010



2010 Ag Profitability Conference



20

## Results: Risk Analysis For 2006-2008 prices:

- CRP is preferred by risk-neutral and risk-averse decision-makers over all cropping systems.
- RT is preferred to NT, which is preferred to CT.

January 26, 2010



2010 Ag Profitability Conference



21

## Results: Risk Analysis 2007-2008 prices

- RT is preferred to NT and CT
- RT and NT are preferred to CRP by risk-neutral and slightly risk-averse decision-makers, with RT being preferred to NT
- CRP is preferred by moderately and strongly risk-averse decision-makers

January 26, 2010



2010 Ag Profitability Conference



22

## SERF Analysis–Risk Premiums: 2007-2008 prices

- The risk-neutral manager would need to receive \$16.87/A more for CRP to be equivalent to RT.
- The slightly risk-averse manager needs to be paid \$11.55/A to use RT or \$16.32/A to use NT, rather than CRP.
- Moderately and strongly risk-averse managers always prefer CRP

January 26, 2010



2010 Ag Profitability Conference



23

## Conclusions

- The RT system is preferred to the other tillage systems by risk-neutral and risk-averse decision-makers. NT is preferred to CT.
- With lower prices, CRP is preferred at all levels of risk-aversion.
- With relatively high prices, only risk-neutral or slightly risk-averse managers prefer RT system to CRP.
- Moderate or strongly risk-averse individuals prefer CRP to any of the tillage systems at any level of prices.

January 26, 2010



2010 Ag Profitability Conference



24

## Conclusions

- Haying or grazing options not considered. Much depends on land quality: good land → consider cropping; poor land → keep in grass?; in between → ??
- High net returns as in 2008 may entice producers to consider converting CRP land to crop production. But, be careful, since lower prices result in CRP being more preferred.
- **Bottom line:**
  - For risk-averse producers, if eligible for extension, keep it in CRP if possible.
  - If coming out of CRP, reduced or no-till rotation of wheat and grain sorghum.

January 26, 2010



2010 Ag Profitability Conference



25

# Thank you!

## Questions?

Rich Llewelyn

[rvl@ksu.edu](mailto:rvl@ksu.edu)

785.532.1504



January 26, 2010



2010 Ag Profitability Conference



26