11. Update on the Economic Impact of the Sheridan #6 LEMA

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Past economic studies differ in the calculated economic impact associated with groundwater use restrictions. One high priority subarea in northwest Kansas has recently mandated a reduction in groundwater use. Monitoring the Sheridan #6 Local Enhanced Management Area (LEMA) in real time will allow us to observe producer innovation aimed at maintaining revenues and disseminate these data to producers and stakeholders in other areas. The knowledge of how irrigated crop producers react to conservation policies will provide guidance on what is expected to happen in the future as groundwater supplies are diminished and/or conservation policies are implemented. While this research is ongoing, this presentation will review the observed impacts which occurred in the first two years of the five year LEMA.

Abstract/Summary

Bill Golden assists farmers, policy makers, and other stakeholders throughout Kansas in developing and implementing policies associated with the State's natural resources. He also works extensively with land-water-related issues such as valuing irrigation water rights. Current research and extension efforts are evaluating producer and community impacts associated with alternative water conservation policies and the impacts of climate change.

Monitoring the Impacts of Sheridan County 6 Local Enhanced Management Area

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Risk & Profit Conference
Manhattan, Kansas
August 20 & 21, 2015

Kansas Water Office

This research was funded in part by the Kansas Water Office under Contract # 15-0112.

Governor´s Ogallala Aquifer Initiative #2

2. Support legislation to provide a process for proactive conservation plans (called Local Enhancement Management Plans, or LEMAs).

LEMAs are to be:

- Proactive
- Supported by the Groundwater Management District (GMD)
- Have corrective measures that address conservation needs
- May include mandatory water use reductions; and
- Approved by the Chief Engineer

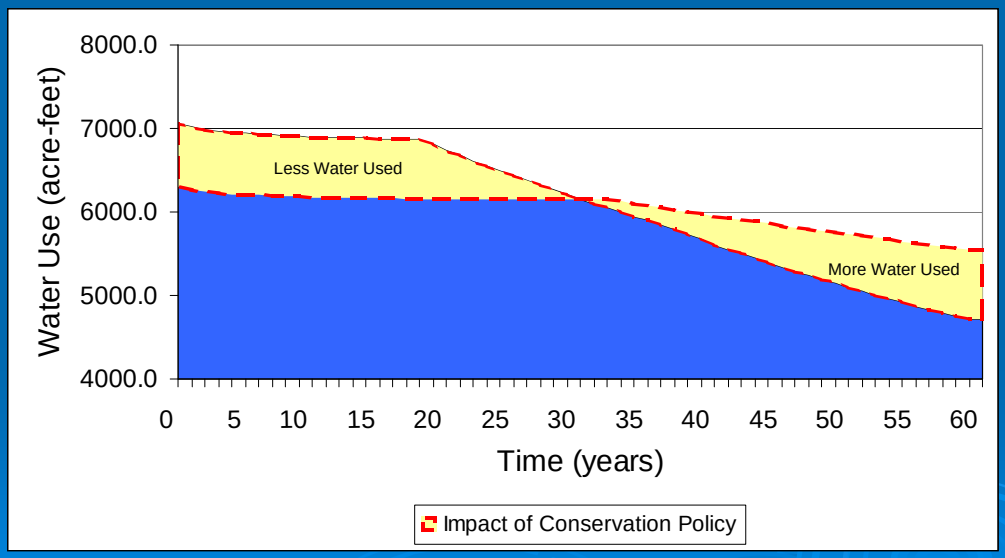
LEMAs

- LEMA's are initiated by local producers – but after enactment carry the weight of law
- LEMA's are voluntary
- LEMA's set their own rules
- LEMA's are reversible
- Sheridan #6: 5 year 55" allocation => about a 20% reduction

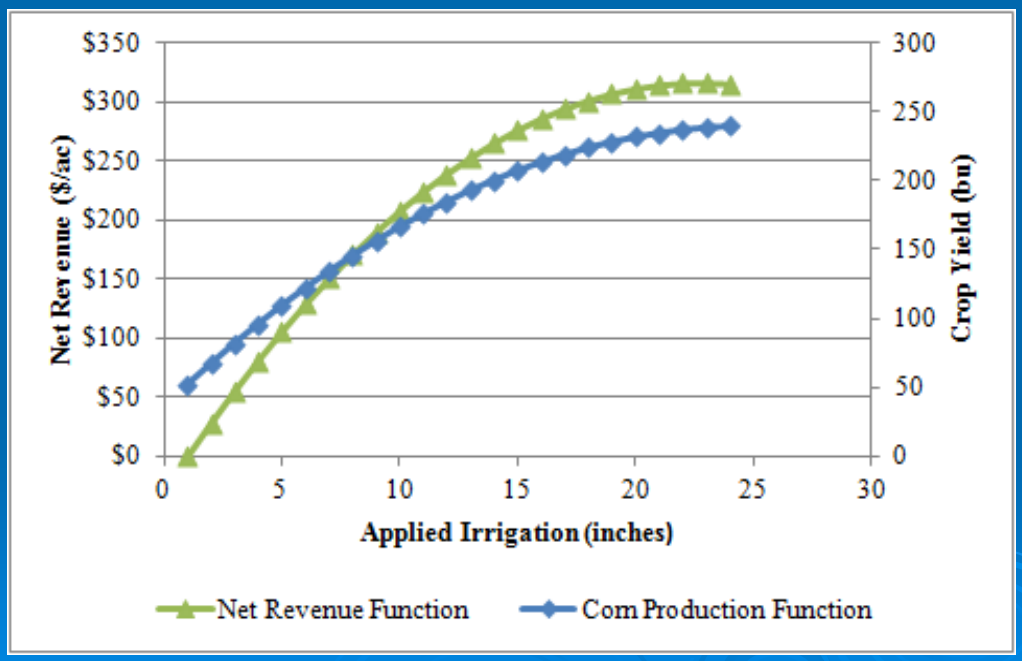
Big Question

- What happens to the economy as we reduce groundwater usage?
- Past evidence is not consistent !!!

Conventional Water Use Constraint



What We Think We Know

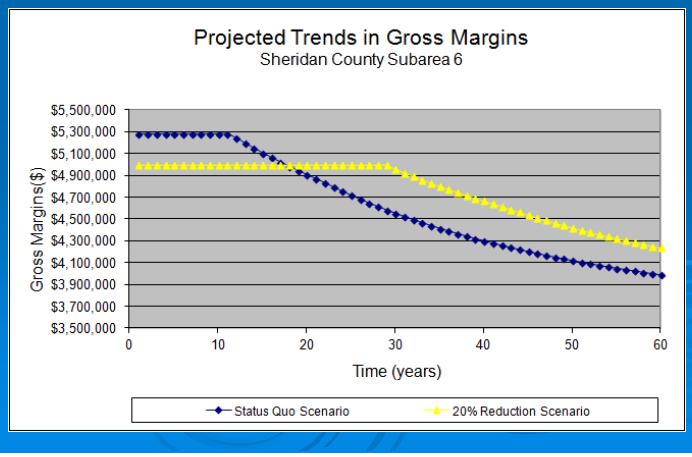


Example from Southwest Kansas. Both curves exhibit diminishing marginal returns to applied groundwater. Curves vary by crop, location, precipitation, and time

Future Projections for Sheridan #6 LEMA

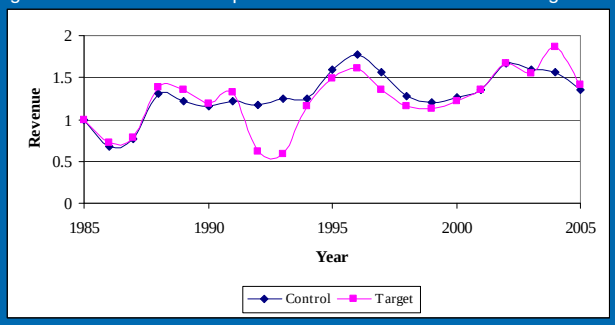
- 20% Reduction by Limiting Water Use

Discount Rate	Status Quo	20% Reduction	Difference
-5.00%	$1,776,655,690	$1,884,890,069	$108,234,379
-2.50%	$633,322,787	$664,525,199	$31,202,412
0.00%	$277,433,415	$286,059,253	$8,625,838
2.50%	$148,725,231	$150,258,264	$1,533,032
5.00%	$93,979,870	$93,204,691	-$775,180



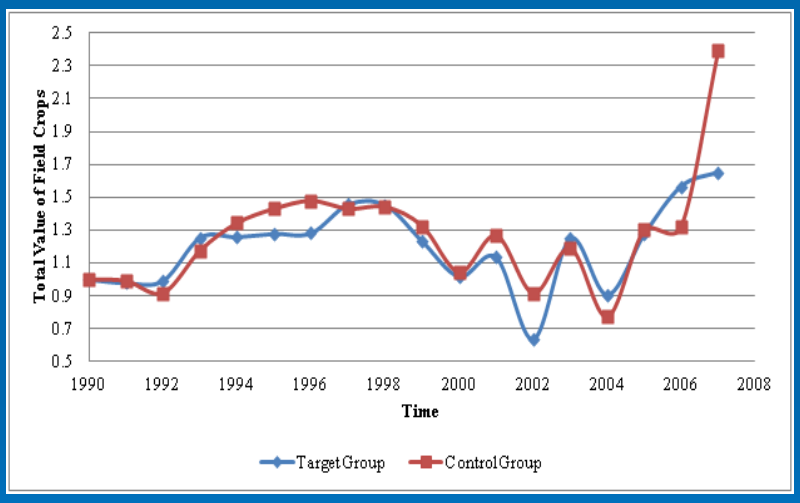
What We Have Observed: Wet Walnut Creek IGUCA: Irrigated Crop Revenue

Figure 6. Time Series Comparison of the Indexed Values of Irrigated Crop Revenue



- Statistically significant short-run and a statistically insignificant long-run reduction in annual irrigated crop revenue.

Total Value of All Crops



- No statistically significant reduction in the annual total value of all crops.

Source: www.ipsr.ku.edu

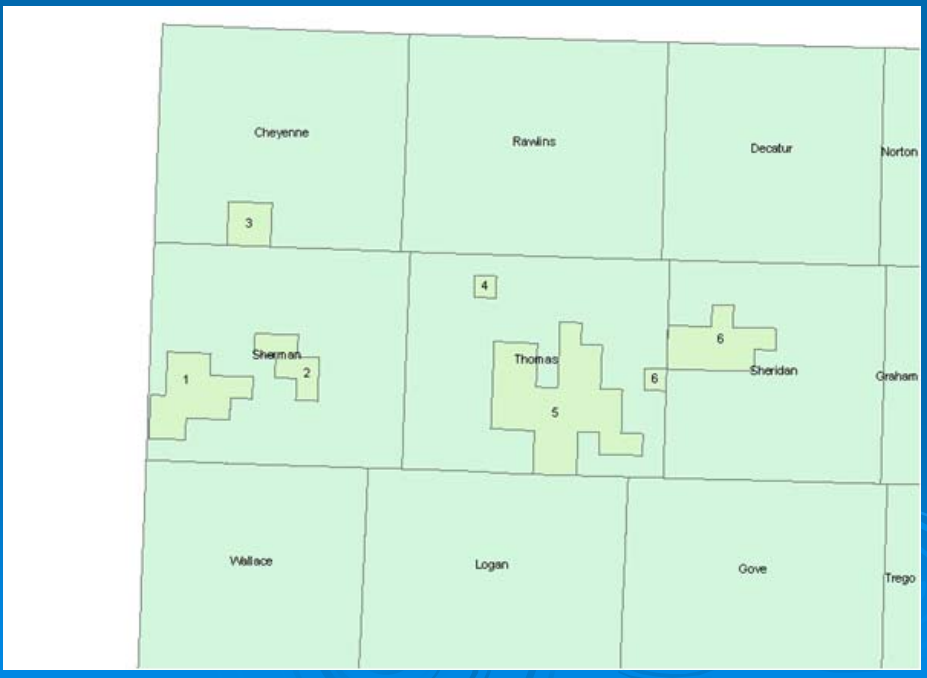
Since the Evidence is Not Consistent

- We need to monitor irrigated acreage and water use in LEMA #6 in real time. Will producers:
  - Shift acres to dryland production
  - Maintain crop mix and reduce water use per acre
  - Shift to crops that require less water
- What are the economic consequences of these changes

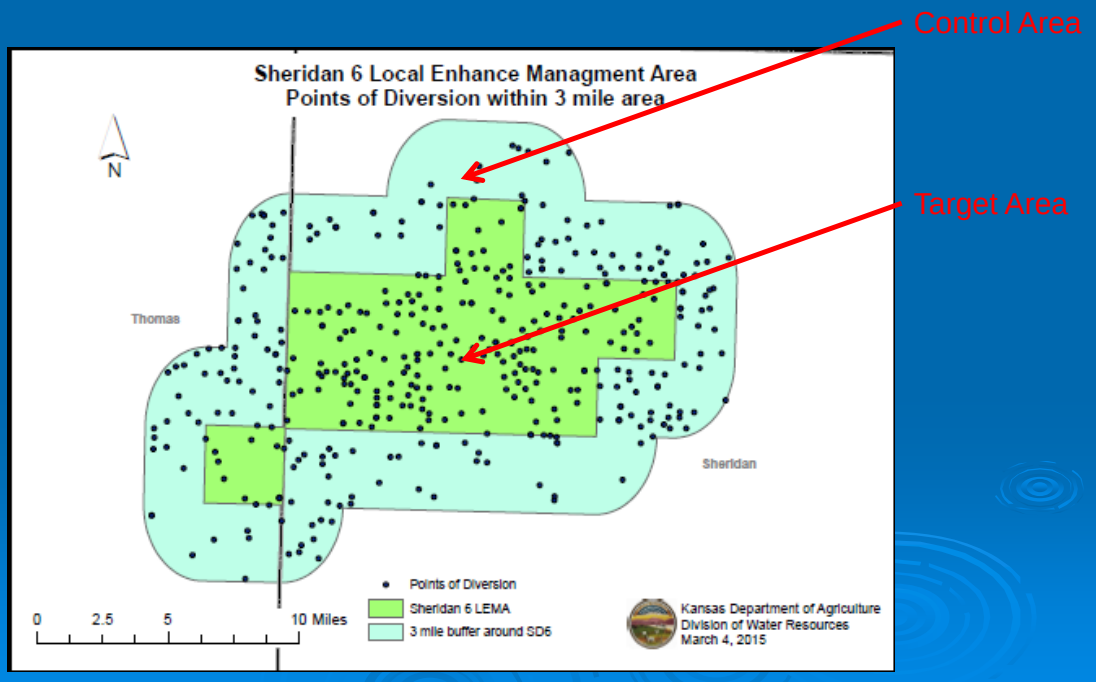
Research Question

- How did the production decisions the producers inside the LEMA made compare to the production decisions the producers outside the LEMA made
- This is a 5 year study. We have 2 years of data.

Sheridan #6 LEMA

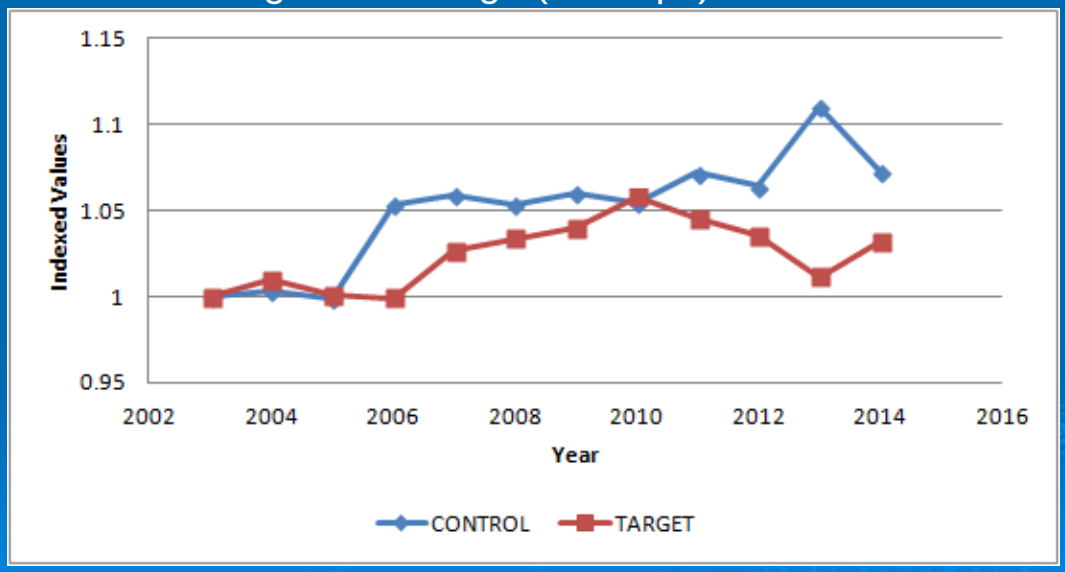


Sheridan #6 LEMA



Results

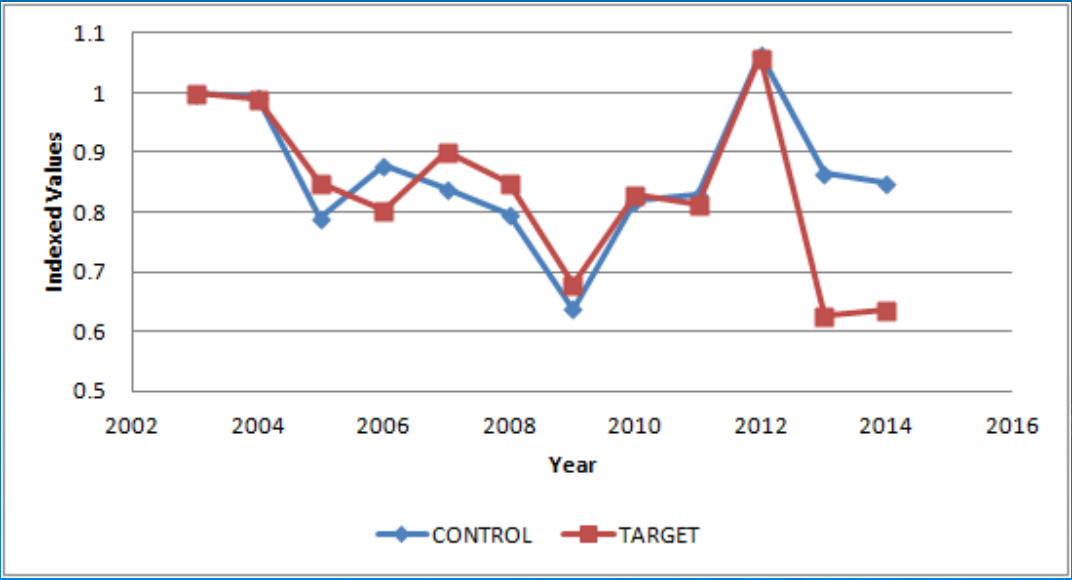
Total Irrigated Acreage (all crops)



Approximately 3.5% reduction; statistically significant
Based on KDA water use reports

Results

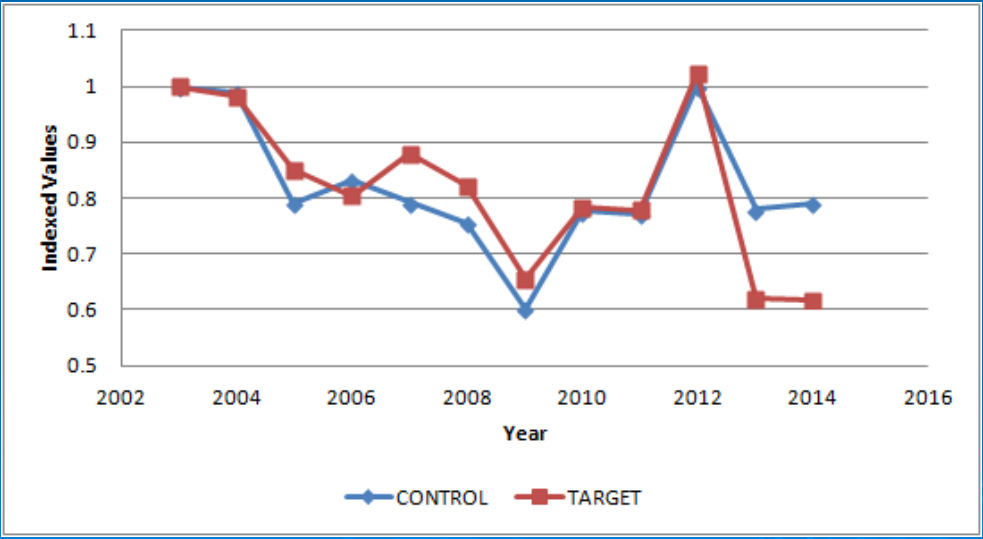
Total Water Use (all crops)



Approximately 25.2% reduction; statistically significant
Based on KDA water use reports

Results

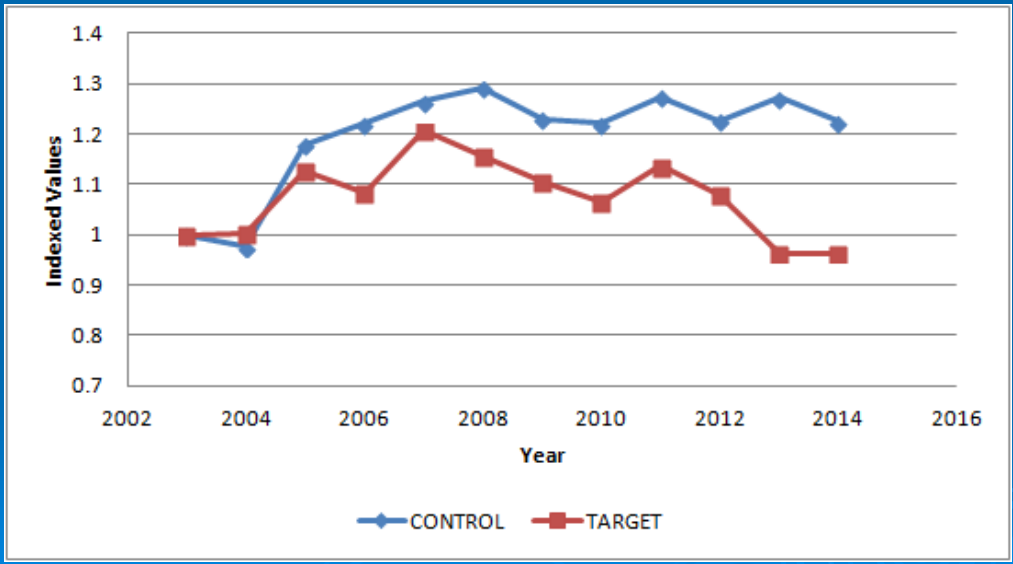
Average Water Use per Acre (all crops)



Approximately 22.0% reduction; statistically significant
Based on KDA water use reports

Results

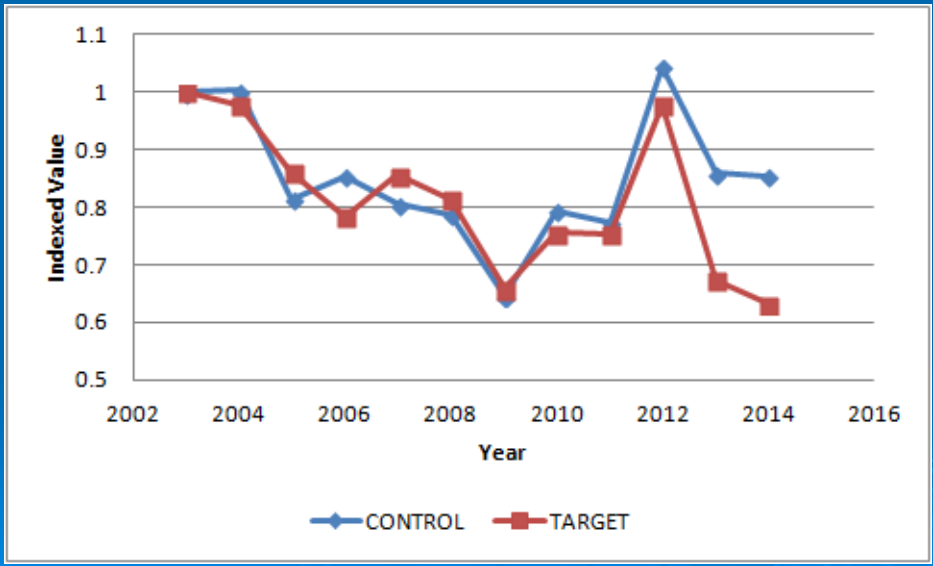
Total Irrigated Corn Acreage



Approximately 10.0% reduction; statistically significant
Based on KDA water use reports

Results

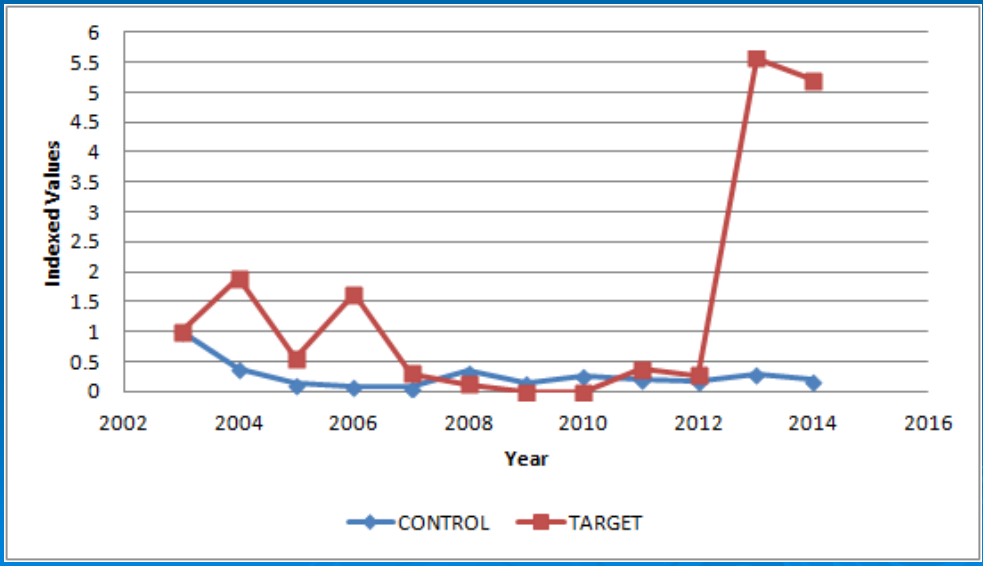
Irrigated Corn Acreage Water Use



Approximately 18.6% reduction; statistically significant
Based on KDA water use reports

Results

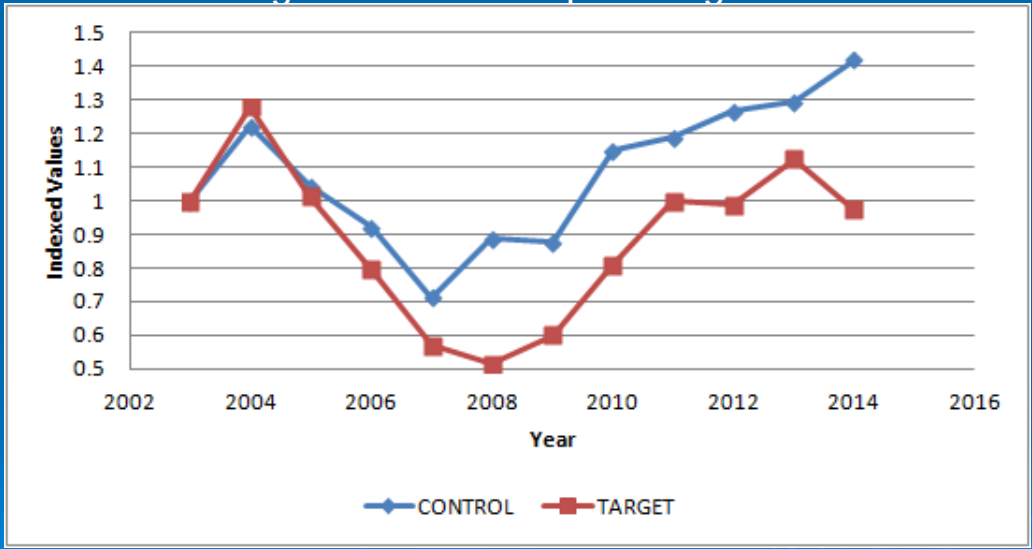
Total Irrigated Sorghum Acreage



Approximately 446.7% reduction; statistically significant
Based on KDA water use reports

Results

Total Irrigated Mixed Crop Acreage



Approximately 3.2% reduction; statistically significant
Based on KDA water use reports

Preliminary 2013 Economic Results

Item	Water Use (in/ac)	Yield (bu/ac)	Cash Flow ($/ac)	Cash Flow ($/in)
Corn Weighted Average - Inside LEMA	11.1	198.0	$403	$36
Corn Weighted Average - Outside LEMA	13.8	211.6	$397	$29
Sorghum Weighted Average - Inside LEMA	4.1	152	$434	$107
Sorghum Weighted Average - Outside LEMA	NA	NA	NA	NA
Soybeans Weighted Average - Inside LEMA	10.3	63.8	$418	$41
Soybeans Weighted Average - Outside LEMA	11.3	68	$412	$36

- Cash Flow = Revenue less variable expenses less land rent
- Not all 2013 data has been received from producers
- There was no irrigated sorghum reported outside the LEMA boundary
- This is not a statistically valid sample

Questions