

Monitoring the Impacts of Sheridan County 6 Local Enhanced Management Area

Interim Report for 2013 – 2016
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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

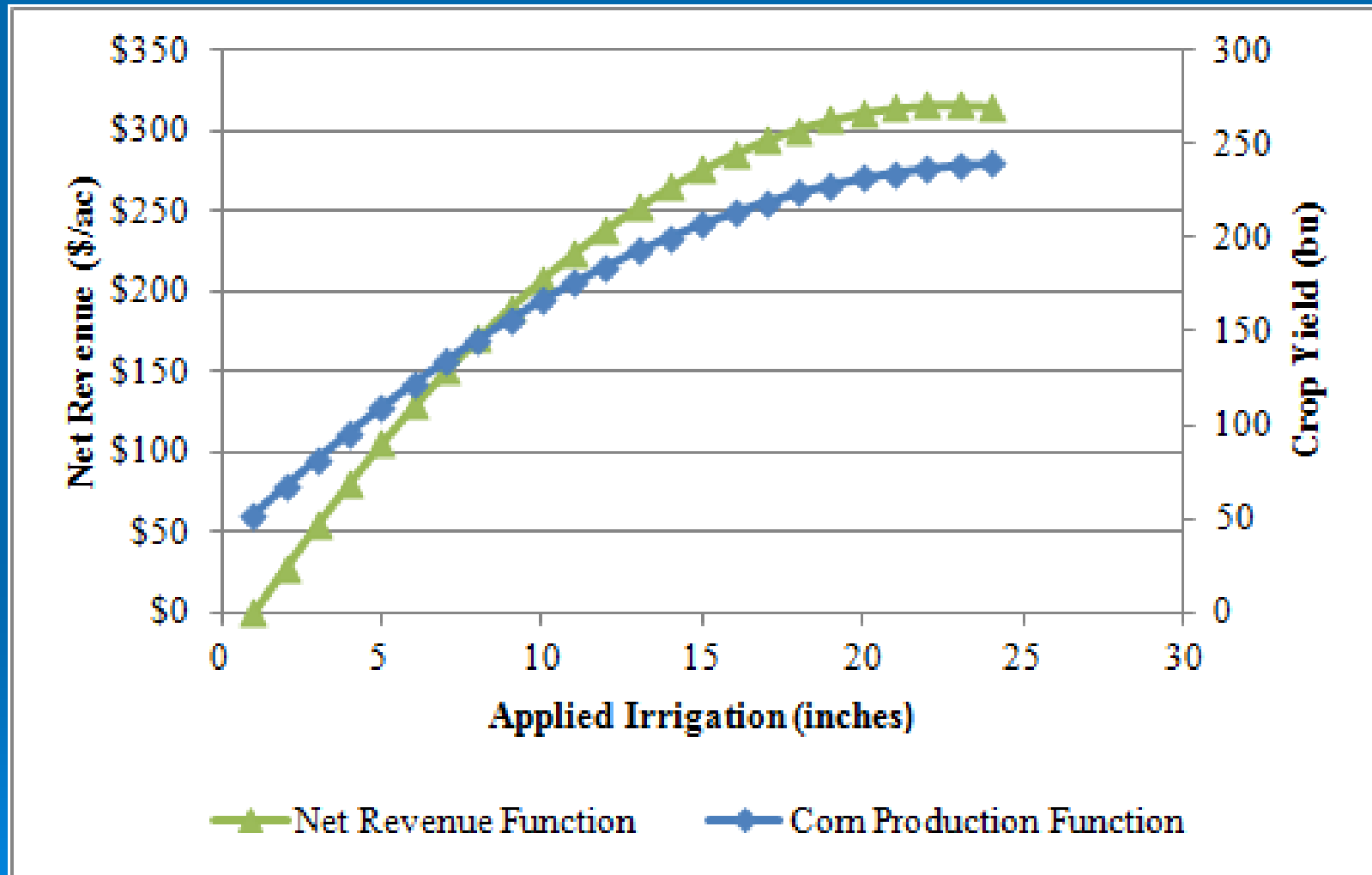
LEMAs

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

Big Question

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

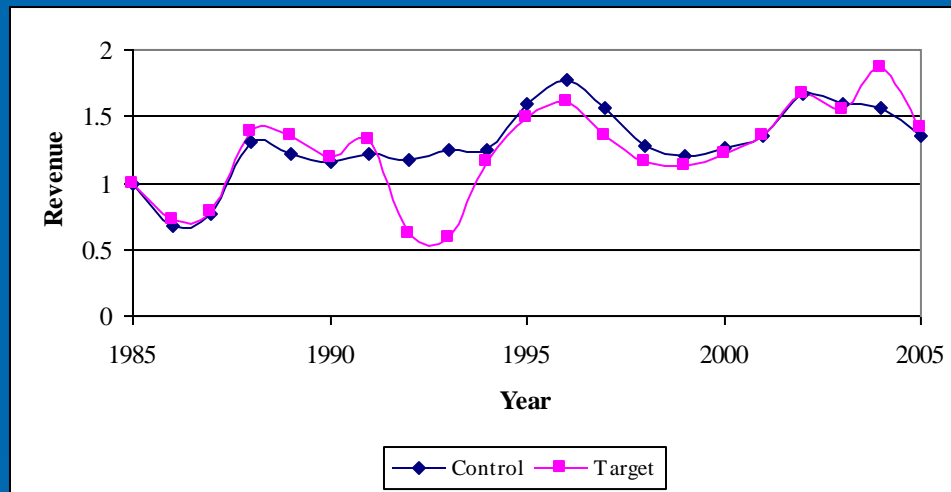
What We Think We Know



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

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.

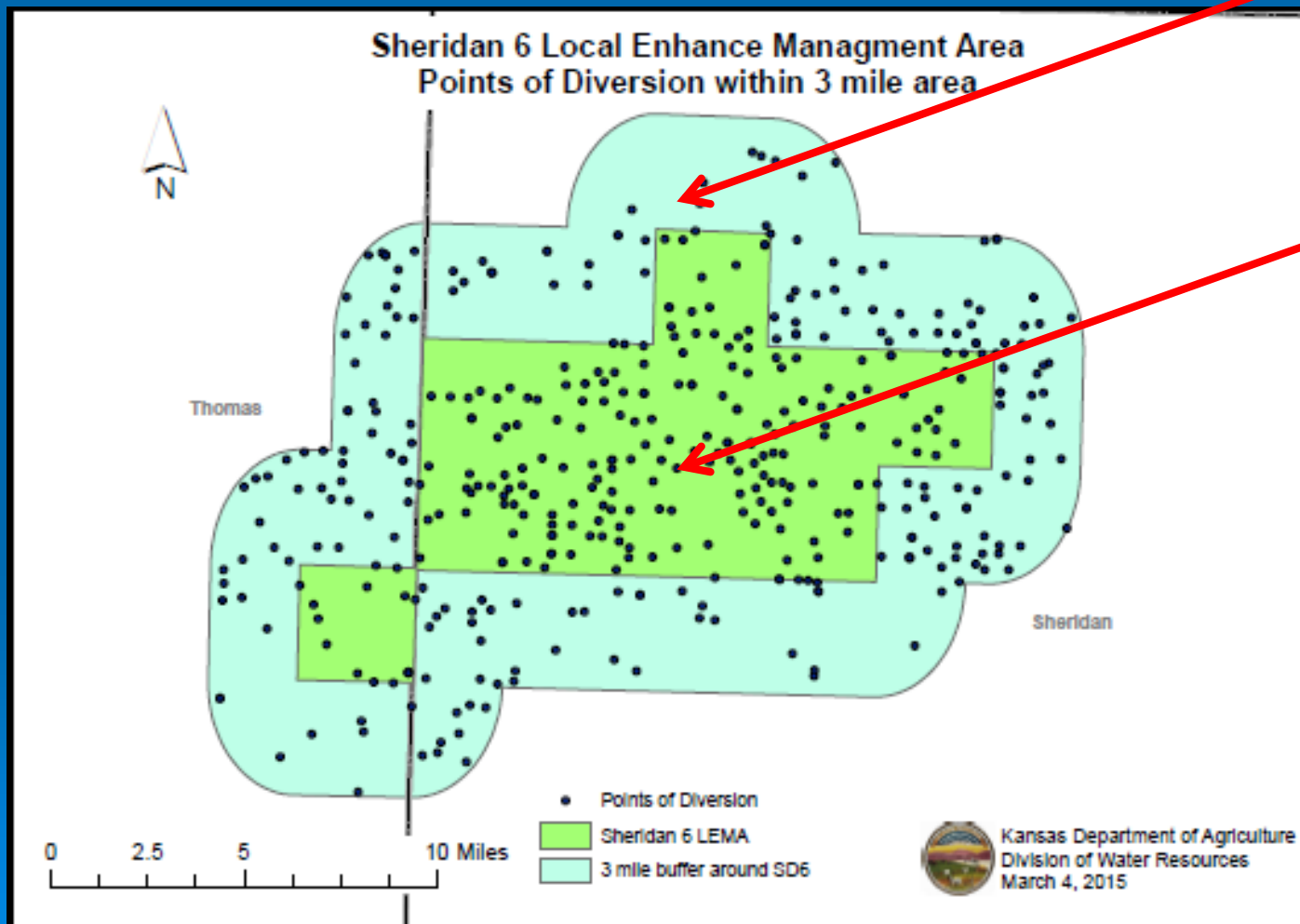
Since the Evidence is Not Consistent

- We need to monitor irrigated acreage and water use in Sheridan #6 LEMA 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 4 years of data.

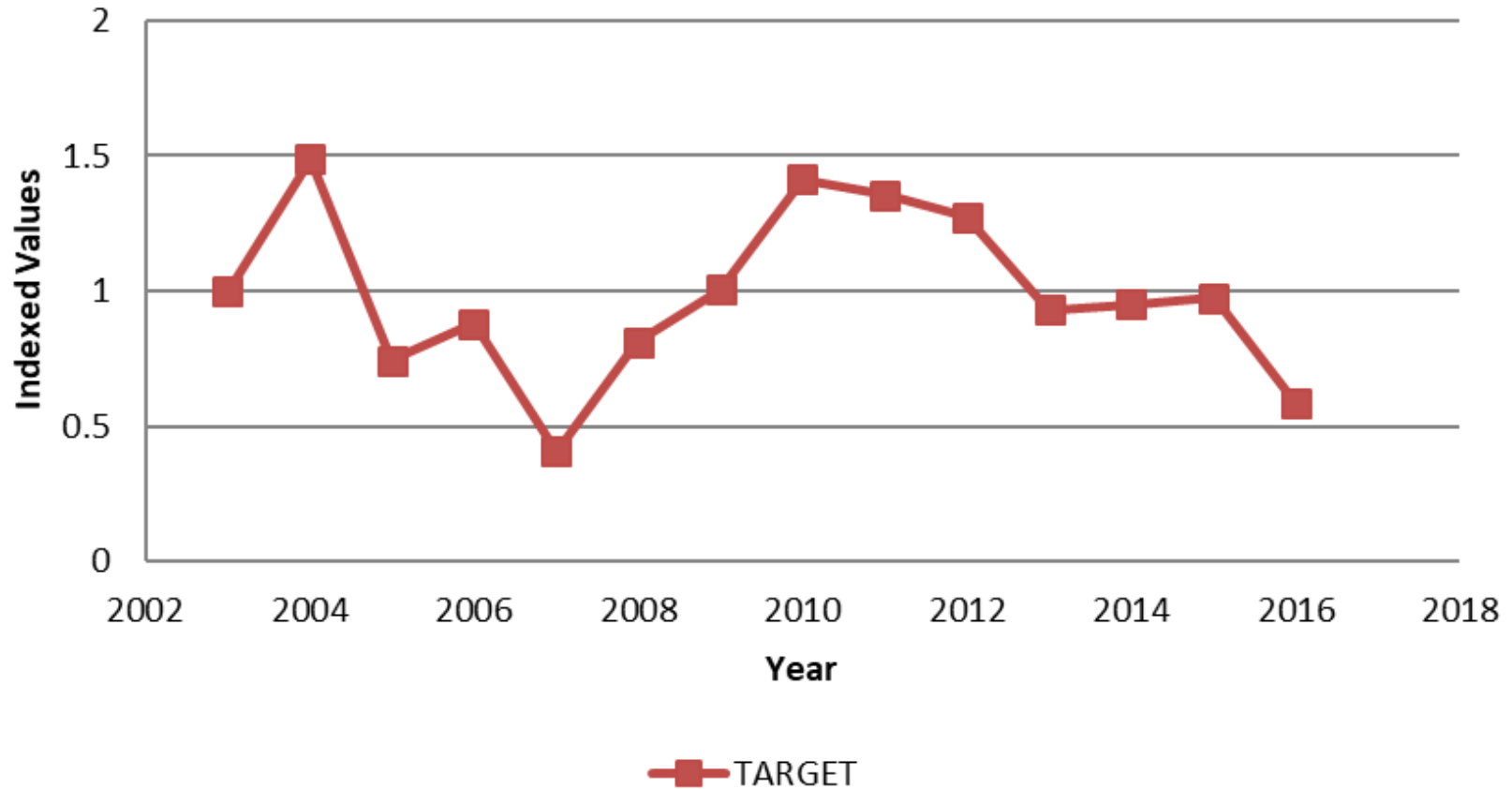
Sheridan #6 LEMA



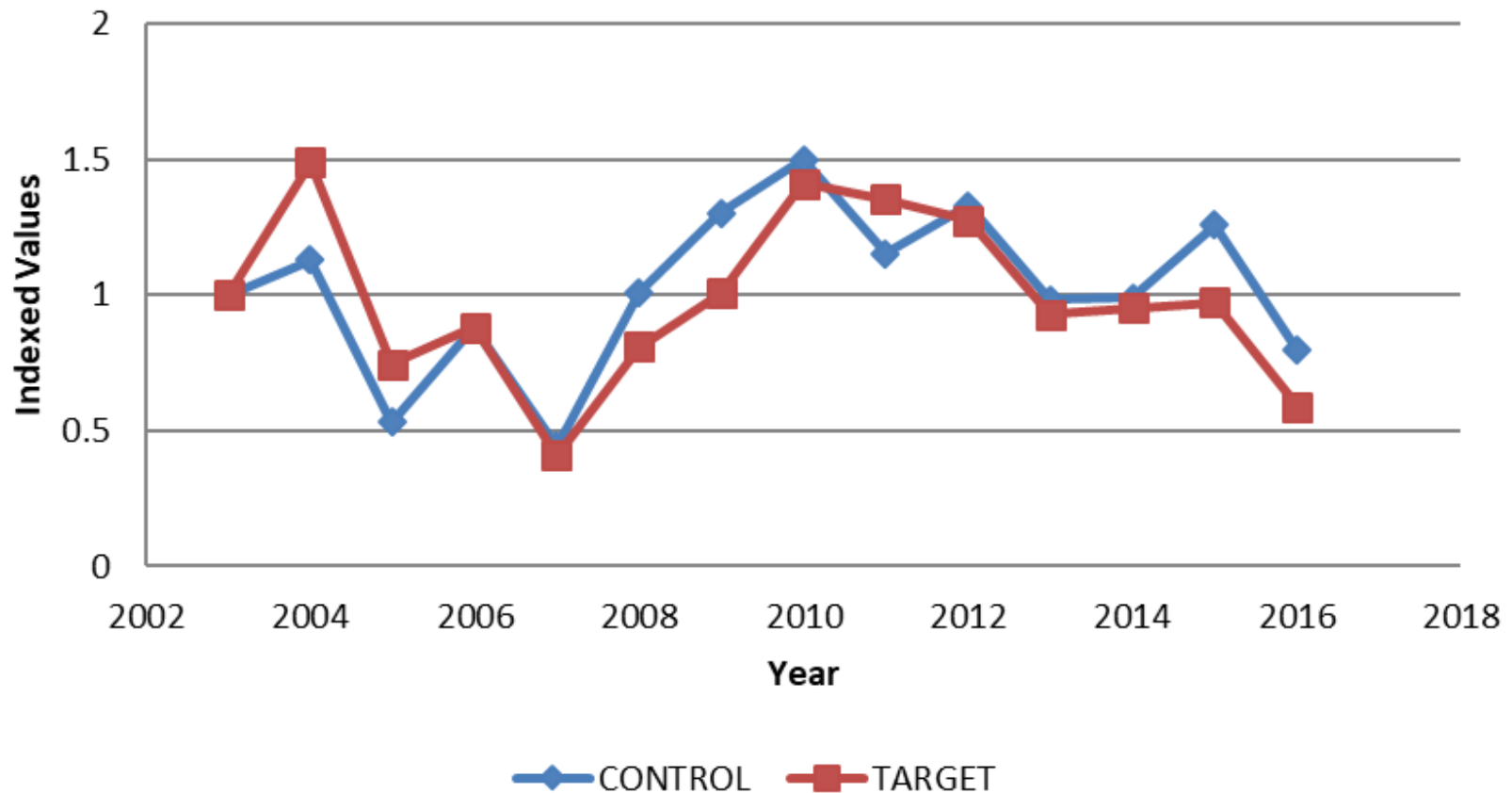
Control Area

Target Area

Why Do We Compare Decisions ?

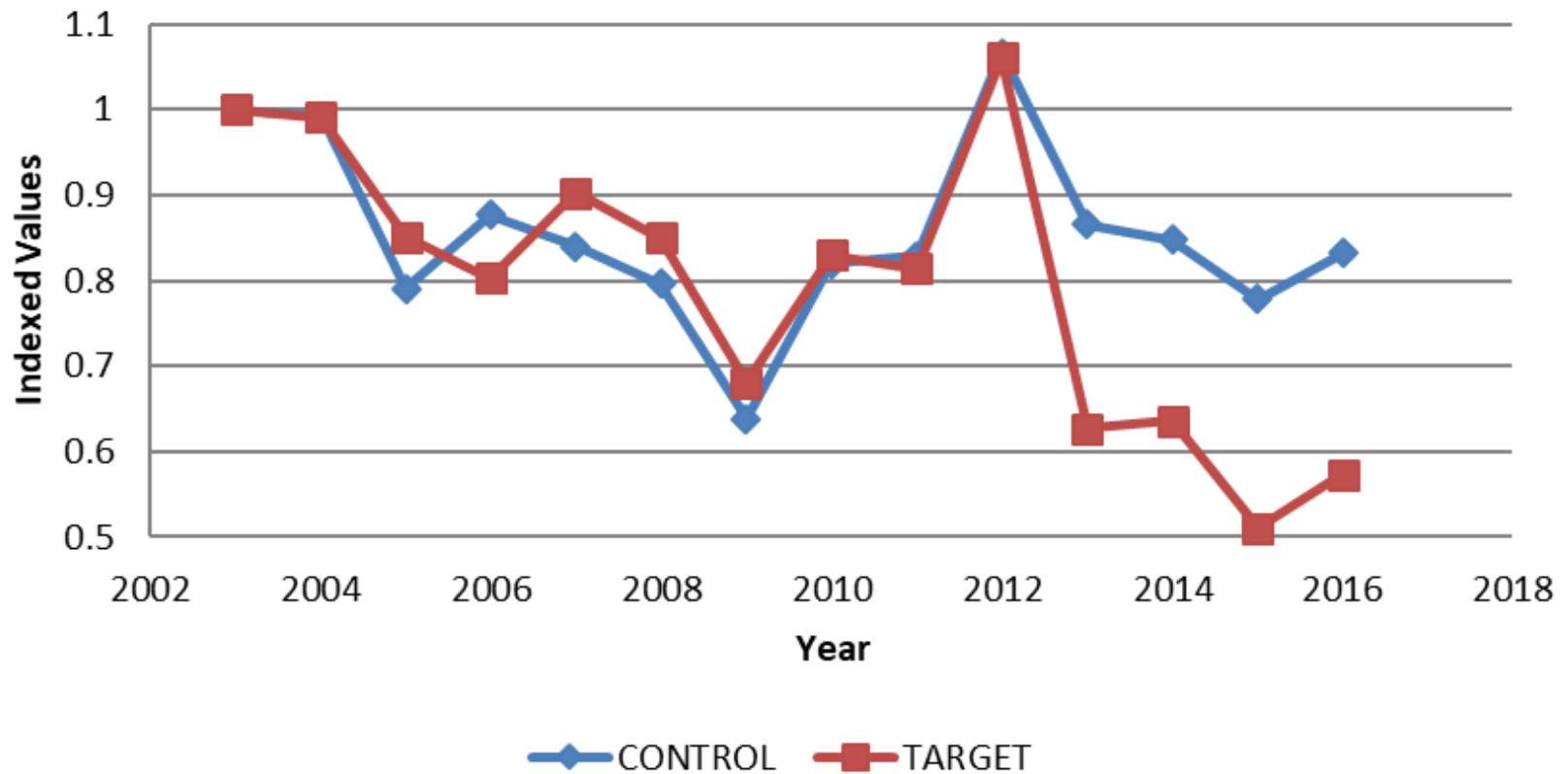


Why Do We Compare Decisions ?



Results

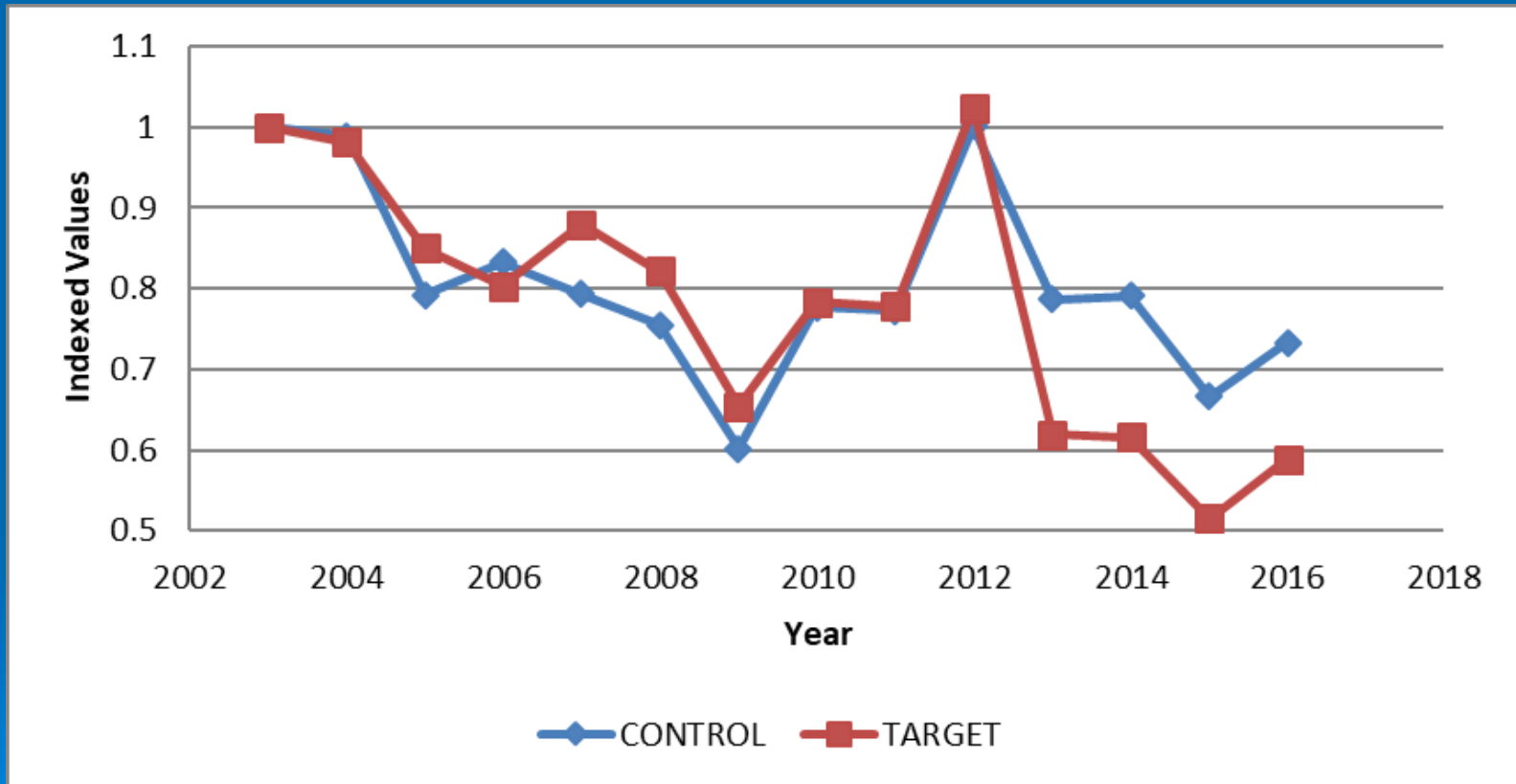
Total Water Use (all crops)



Approximately 25.7% reduction; statistically significant
Based on KDA water use reports

Results

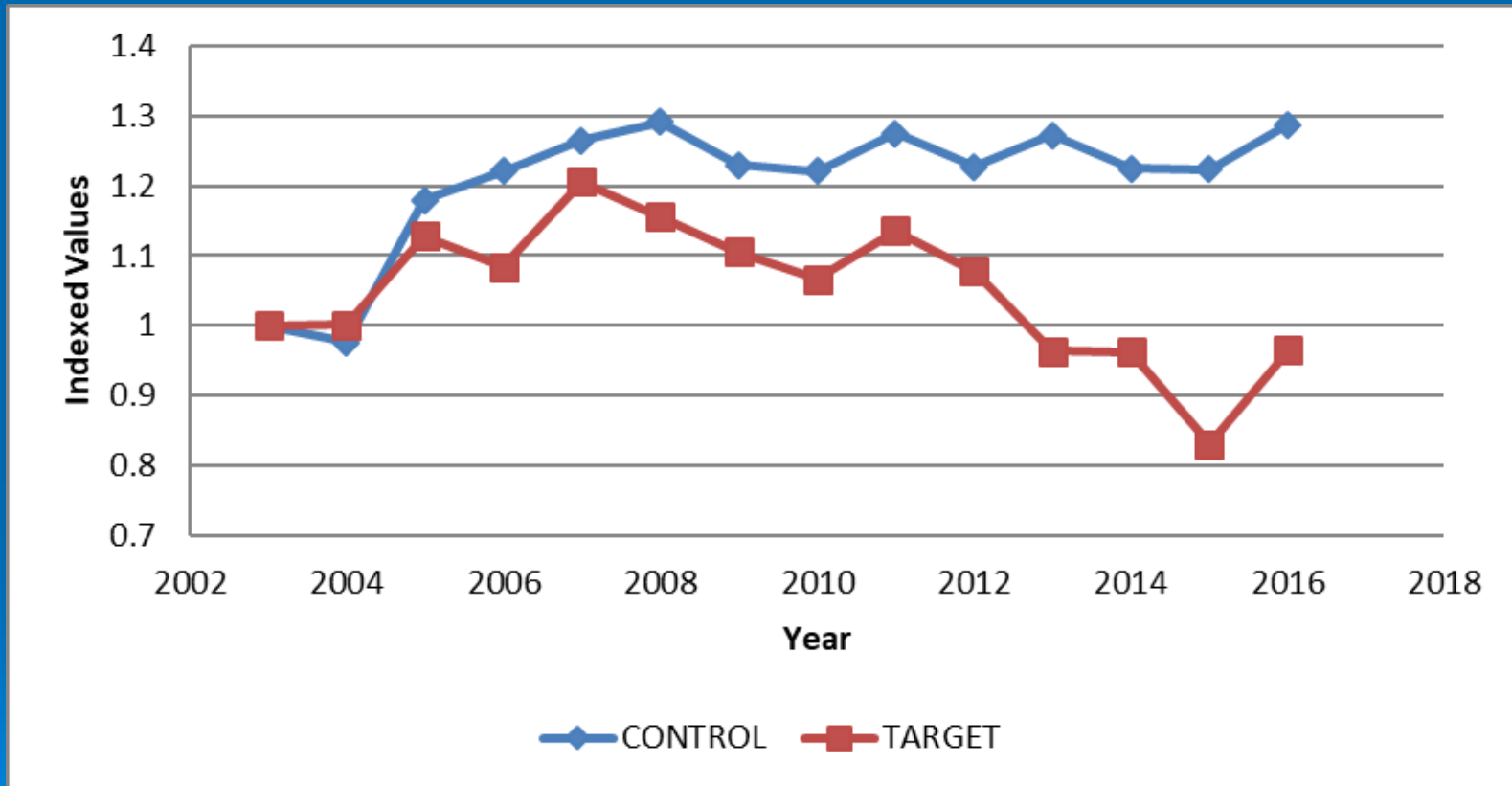
Average Water Use per Acre (all crops)



Approximately 18.5% reduction; statistically significant
Based on KDA water use reports

Results

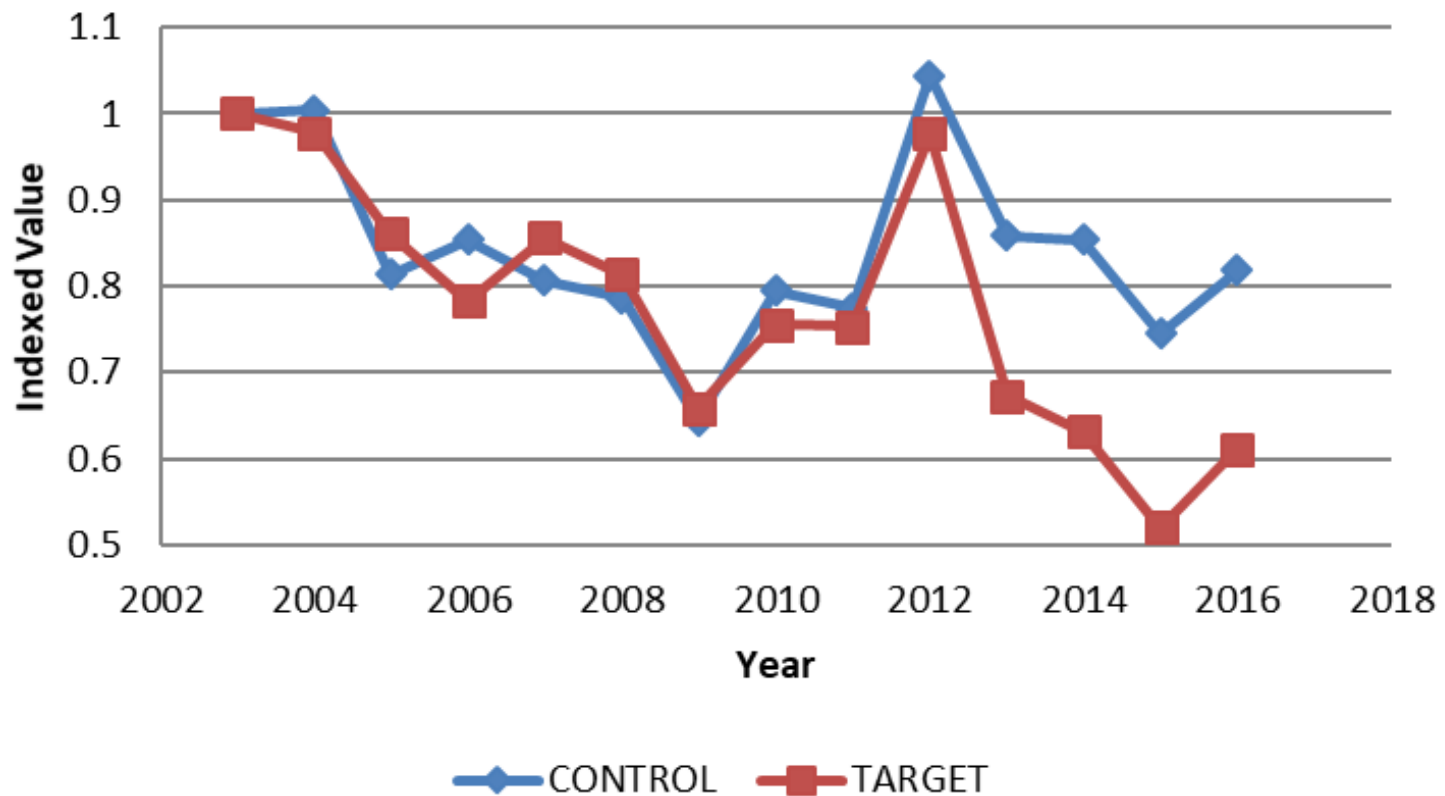
Total Irrigated Corn Acreage



Approximately 22.9% reduction; statistically significant
Based on KDA water use reports

Results

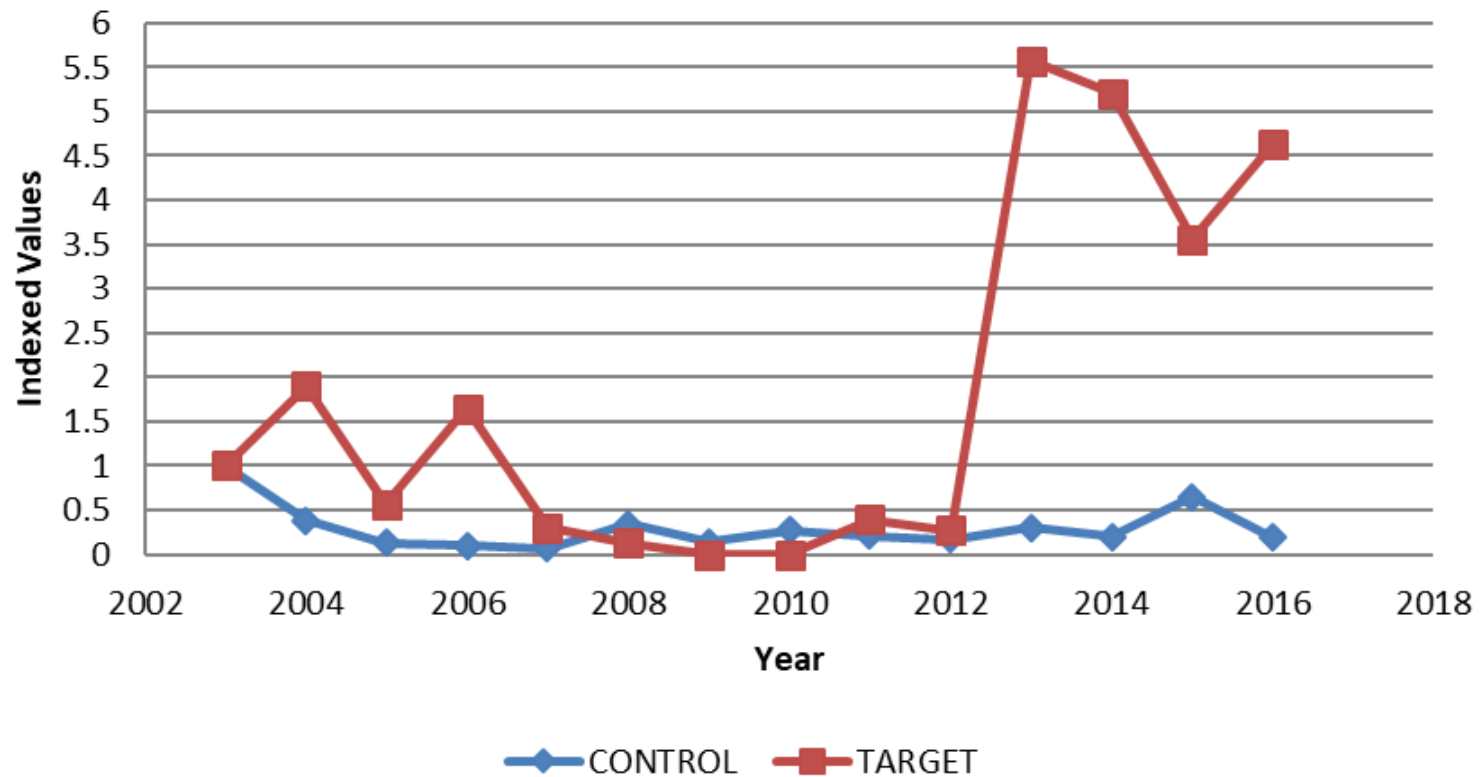
Irrigated Corn Acreage Water Use



Approximately 20.1% reduction; statistically significant
Based on KDA water use reports

Results

Total Irrigated Sorghum Acreage



Approximately 407.0% reduction; statistically significant
Based on KDA water use reports

2013-2016 Producer Reported Economic Data

| Item | Observations | Water Use (in/ac) | Yield (bu/ac) | Cash Flow (\$/ac) | Cash Flow (\$/in) |
|--|--------------|-------------------|---------------|-------------------|-------------------|
| Corn Weighted Average - Inside LEMA | 20 | 10.3 | 218.0 | \$375 | \$36 |
| Corn Weighted Average - Outside LEMA | 11 | 13.4 | 220.6 | \$360 | \$27 |
| Sorghum Weighted Average - Inside LEMA | 4 | 4.3 | 152.6 | \$361 | \$83 |
| Sorghum Weighted Average - Outside LEMA | 1 | 11.0 | 177.0 | \$226 | \$21 |
| Soybeans Weighted Average - Inside LEMA | 5 | 9.5 | 59.6 | \$315 | \$33 |
| Soybeans Weighted Average - Outside LEMA | 4 | 9.7 | 70.0 | \$358 | \$37 |
| Sunflowers Weighted Average - Inside LEMA | 0 | NA | NA | NA | NA |
| Sunflowers Weighted Average - Outside LEMA | 1 | 6.0 | 2818 | \$788 | \$131 |
| Wheat Weighted Average - Inside LEMA | 5 | 5.7 | 76.3 | \$219 | \$38 |
| Wheat Weighted Average - Outside LEMA | 3 | 7.4 | 81.8 | \$178 | \$24 |
| | | | | | |
| | | | | | |

- Cash Flow = Revenue less variable expenses less land rent
- This is not a statistically valid sample
- This table may change as new producer financial data is obtained

Questions



- The full report will be posted at <http://agmanager.info/>