Update on the Economic Impact of the Sheridan #6 LEMA

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Manhattan, Kansas
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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
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

![Graph showing the impact of conservation policy on water use over time. The graph compares water use under conventional methods with water use after implementing a conservation policy. The x-axis represents time in years, and the y-axis represents water use in acre-feet. The area under the curve for less water used is shaded yellow, while the area under the curve for more water used is shaded blue. There is a clear decrease in water use over time, indicating the effectiveness of the conservation policy.]
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

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

Projected Trends in Gross Margins
Sheridan County Subarea 6

- Status Quo Scenario
- 20% Reduction Scenario
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.
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
Sheridan #6 LEMA
Preliminary 2013 Results

Total Irrigated Acreage (all crops)

Based on KDA 2013 water use reports
Preliminary 2013 Results

Total Water Use (all crops)

Based on KDA 2013 water use reports
Preliminary 2013 Results

Average Water Use per Acre (all crops)

Based on KDA 2013 water use reports
Preliminary 2013 Results

Total Irrigated Corn Acreage

Based on KDA 2013 water use reports
Preliminary 2013 Results

Irrigated Corn Acreage Water Use

Based on KDA 2013 water use reports
Preliminary 2013 Results

Sorghum and Soybean Acres Within the Target Area

Based on KDA 2013 water use reports
Very Preliminary 2013 Economic Results

- Cash Flow = Revenue less variable expenses
- Not all 2013 data has been received from producers
- There was no irrigated sorghum reported outside the LEMA boundary

<table>
<thead>
<tr>
<th>Item</th>
<th>Water Use (in/ac)</th>
<th>Yield (bu/ac)</th>
<th>Cash Flow ($/ac)</th>
<th>Cash Flow ($/in)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Corn Weighted Average - Inside LEMA</td>
<td>10.7</td>
<td>194.0</td>
<td>$463</td>
<td>$43</td>
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<tr>
<td>Corn Weighted Average - Outside LEMA</td>
<td>13.2</td>
<td>197.0</td>
<td>$476</td>
<td>$36</td>
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<tr>
<td>Sorghum Weighted Average - Inside LEMA</td>
<td>4.1</td>
<td>152</td>
<td>$446</td>
<td>$110</td>
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