

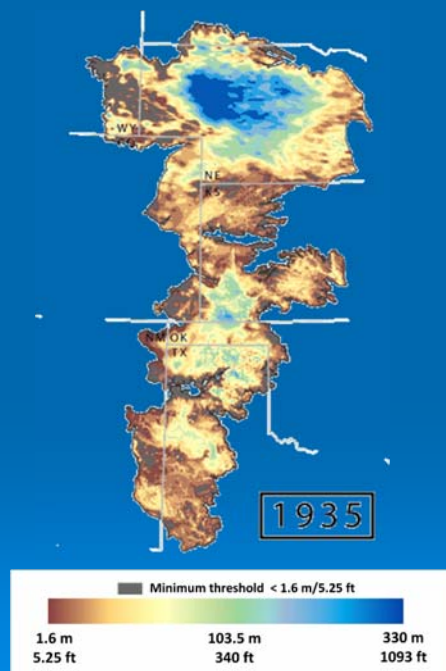
Using OpenET to Determine the Impact of Groundwater Conservation

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2026 Risk & Profit Conference
Manhattan, Kansas
August 20, 2026

This research was funded by AFRI Sustainable Agricultural Systems (SAS) grant no. 2025-68012-44235 titled Sustainable Irrigation and Climate Adaptation in Southern High Plains: A Satellite-Enabled and Peer-Led Model, from the USDA National Institute of Food and Agriculture.

The Problem

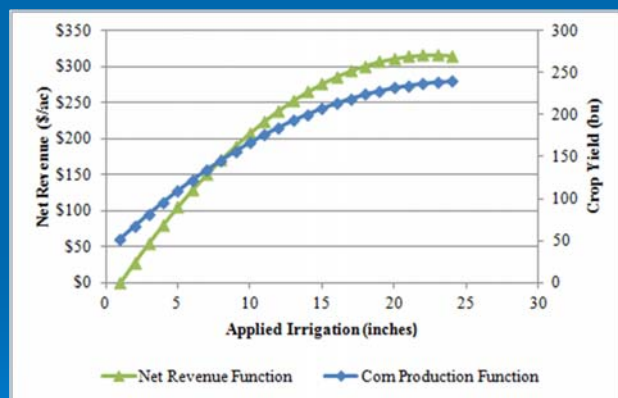


The Solution

- Reduce Groundwater Use for Irrigation

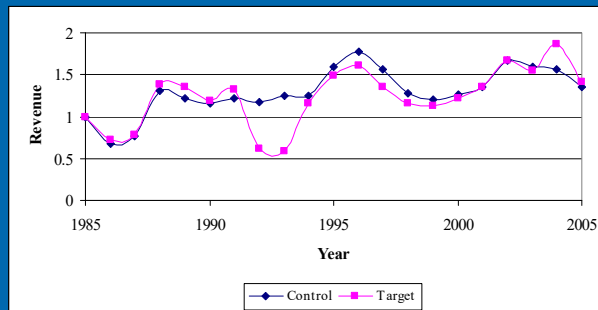
Big Question

- What happens to producer income and production risk as we reduce groundwater usage?



- But – are we as efficient as we think we are?

What We Have Observed: Wet Walnut Creek IGUCA



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

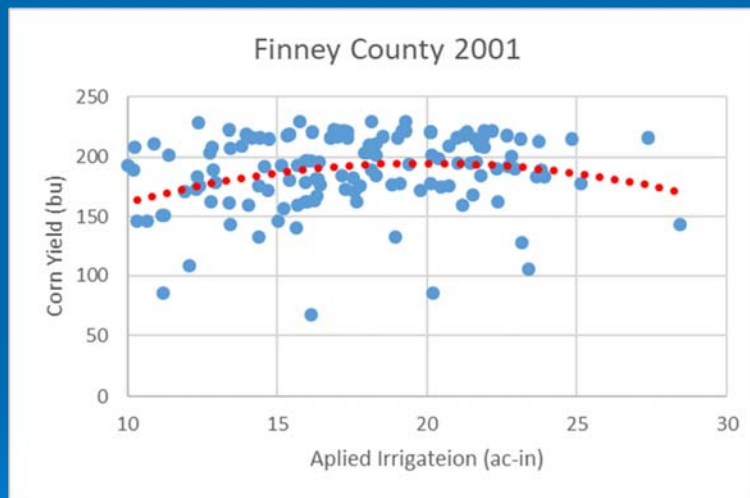
What We Have Observed: Sheridan #6 LEMA

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

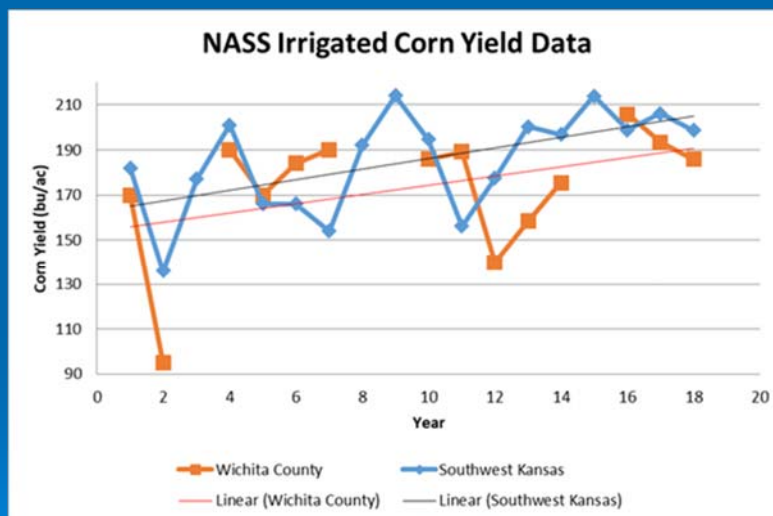


- Cash Flow = Revenue less variable expenses less land rent
- This is not a statistically valid sample

What We Have Observed: RMA- WRIS Analysis



What We Have Observed: Wichita County LEMA Study



Where Do We Go From Here

- Current USDA SAS Grant titled “Sustainable Irrigation and Climate Adaptation in Southern High Plains: A Satellite-Enabled and Peer-Led Model”. Referenced as SatRAP
- Coordinated research: Kansas State University, Oklahoma State University, West Texas A&M, Texas Tech University, and Open ET. Multidisciplinary research.
- Goal: Use OpenET to help irrigated crop producers to better manage their groundwater resource.

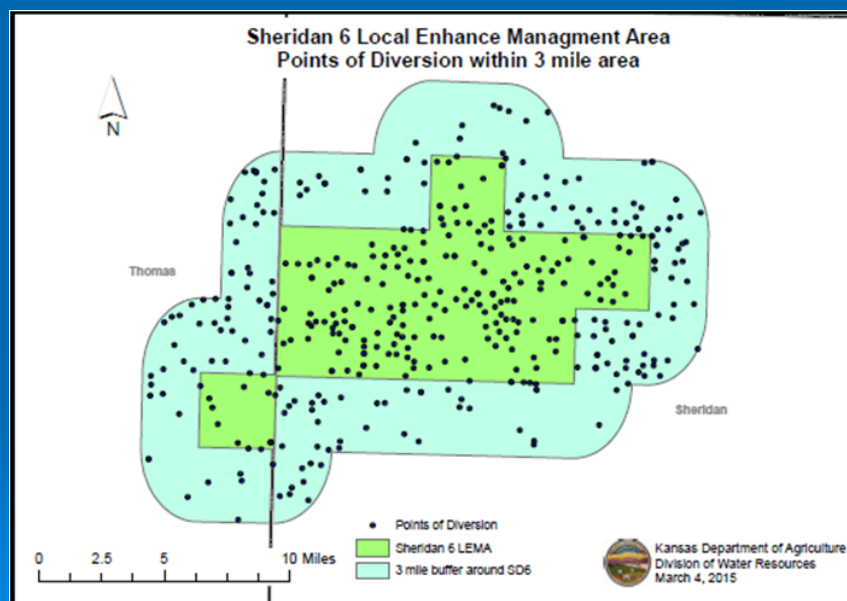
What is OpenET

- **OpenET** is a science-based, open-source web platform that uses satellite imagery and weather data to track and calculate evapotranspiration (ET)
- Developed through a collaboration led by NASA, Google Earth Engine, and environmental groups, it provides field-scale water consumption data.

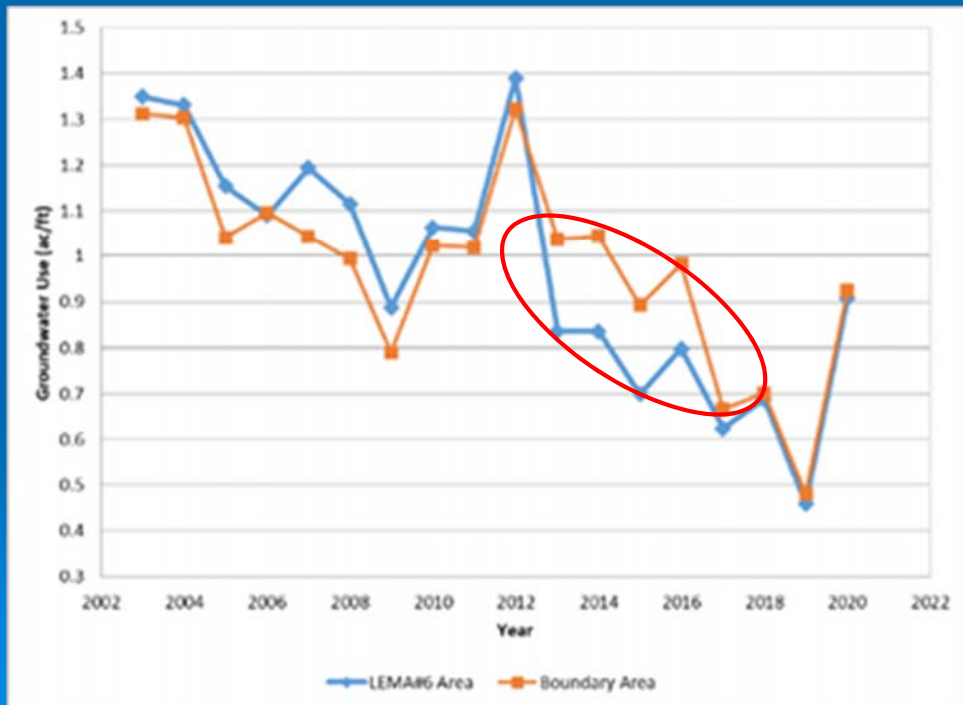
Test Area: Sheridan 6 Local Enhanced Management Area

- The Local Enhanced Management Area (LEMA) started in 2013.
- Producers voluntarily reduced groundwater use by 20% and received a 5-year allocation of 55"
- The 'Technology Team' provided the data for this research
- We can convert ET to Yield: $Yield = -184 + 16.85 * ET$
- We can estimate impacts on yield and risk

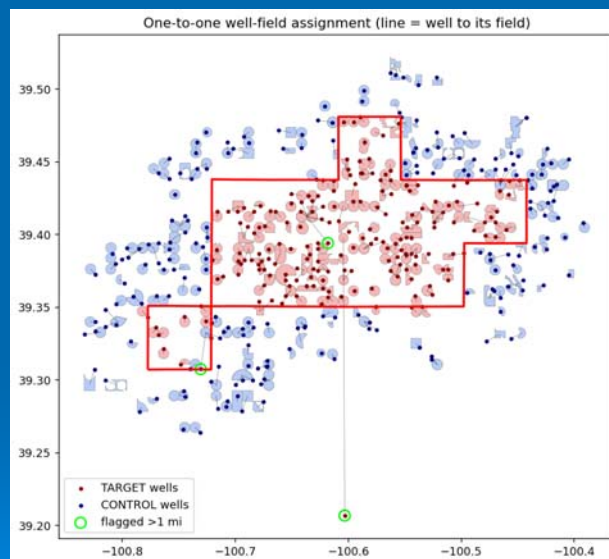
Test Area: Sheridan 6 Local Enhanced Management Area



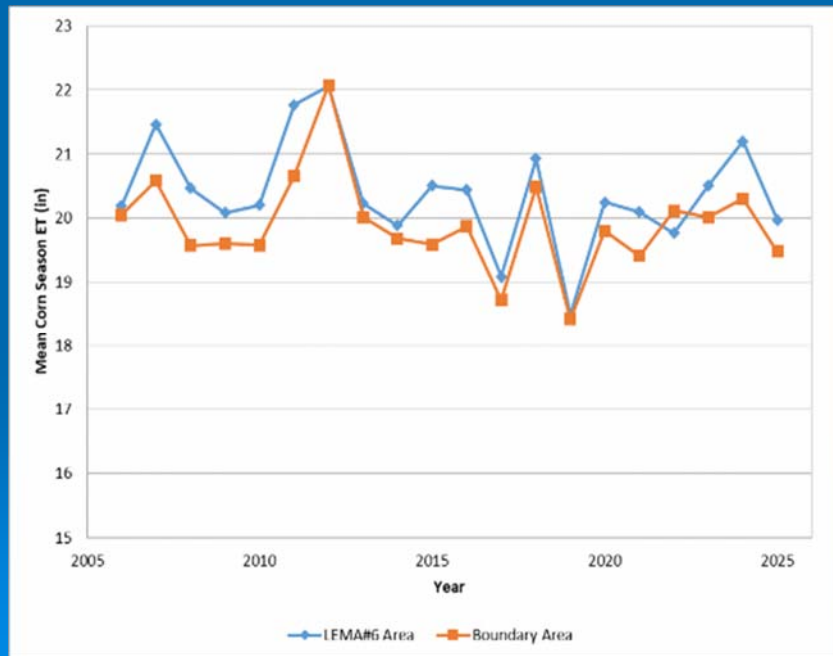
The Change in Groundwater Use on Corn



The SatRAP 'Technology Team' provided the data for this research



Mean 'Corn Season ET' for the 'LEMA#6 Area' and the 'Boundary Area'



Mean 'Corn Season CV' for the 'LEMA#6 Area' and the 'Boundary Area'



Conclusions

Preliminary Results

- Results indicate that producers substantially reduced groundwater use while maintaining average crop productivity and without statistically significant increases in production risk. These findings suggest that when groundwater reductions are gradual and predictable, producers adapt by improving irrigation management and production practices to preserve economic performance. The study further highlights the value of satellite-derived ET products for evaluating groundwater conservation policies in regions where direct measurements of field-level water use are unavailable.

Conclusions

Preliminary Results

- No statistically significant impact on corn yield
 - But should we use yield or ET as the comparison.
 - Need to confirm yield estimate with RMA data
- Statistically significant reduction on the CV of corn yield
 - But is CV the correct measure.

Questions

