

Ogallala Water Coordinated Agriculture Project: *Lessons learned across state lines*



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*Idaho Water Users Association
Annual Convention
February 2021*



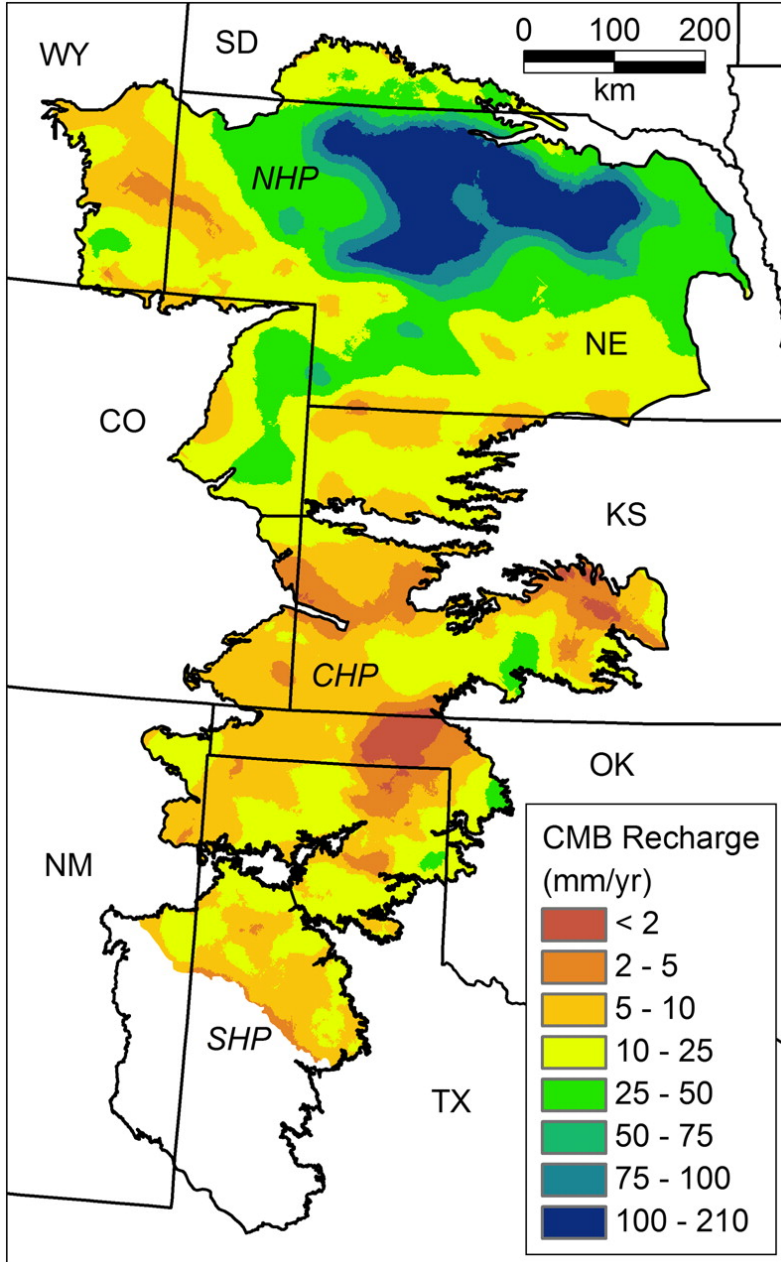
OgallalaWater.org

OPTIMIZING WATER USE TO SUSTAIN FOOD SYSTEMS

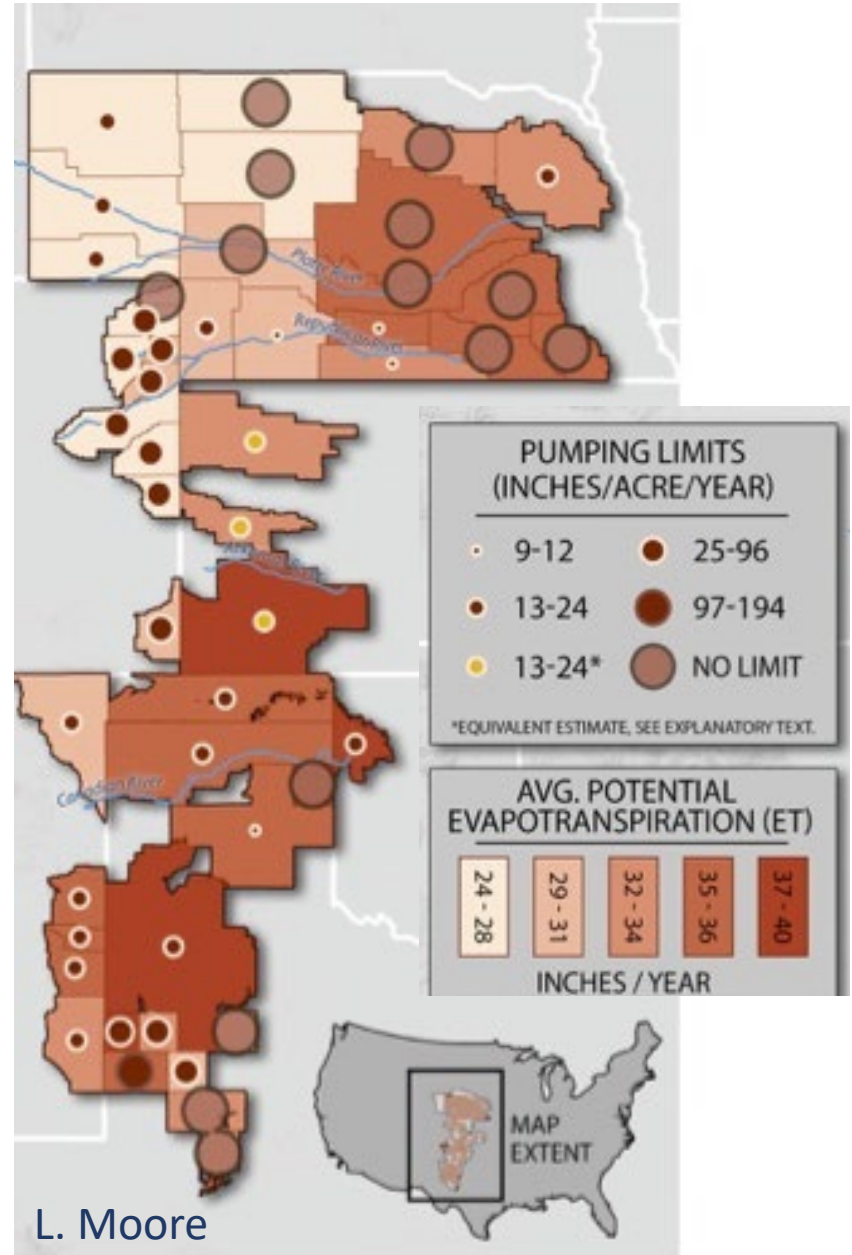


- USDA-NIFA funded "Coordinated Agriculture Project" (2016-2021)
- ~70 people: faculty, post-docs, grad students, techs, staff
- 10 institutions in 6 of 8 Ogallala region states
- Stakeholder Advisory Board grounds our science & conversations

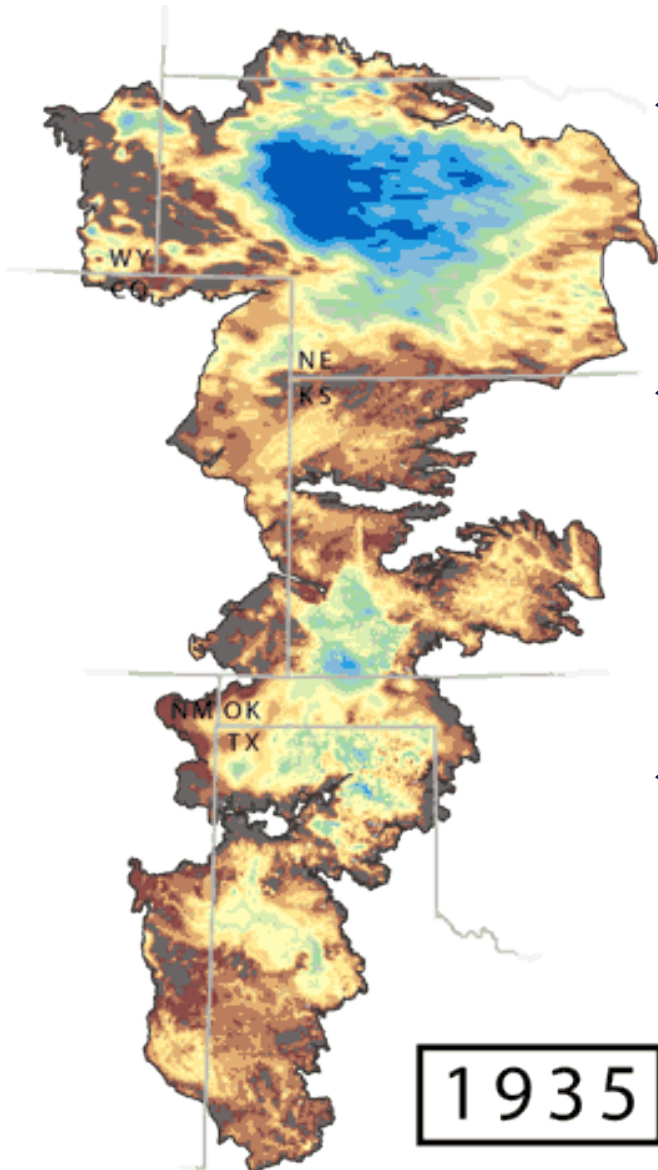
Estimated recharge



State water districts/policies



Our approach



- ✓ Each state is different, yet most are grappling with similar issues
- ✓ Management is local: work from the ground up with producers and groundwater management groups
- ✓ Foster partnerships & communities of practice for innovation, adoption, adaptation, conservation

Part 1.

Why conserve groundwater?

What is the value of the groundwater today & tomorrow?

What are we conserving?



- Surveys mailed out to 227 counties in 6 states, January – July, 2018
- Survey goal: representative sample of producers; 7,712 eligible
- 1,226 responses = 15.9% response rate

“How serious of a problem is groundwater decline?”

Generally not serious

Generally serious

CO 23.1% / 66.47%

NE 39.0% / 42.1%

KS 14.5% / 74.4%

OK 14.3% / 79.6%

NM 8.8% / 85.3%

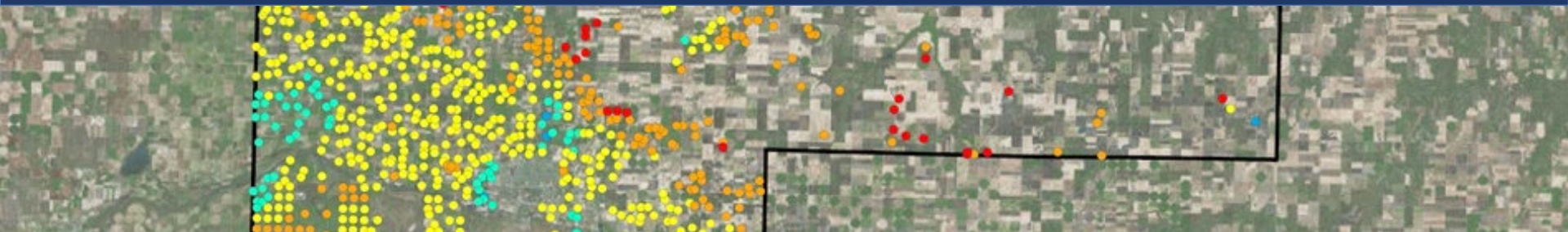
TX 11.8% / 83.5%

1935

Key Barrier: People are resistant to change

“People are wary until new methods and equipment are proven”

– 2018 Ogallala Summit participant

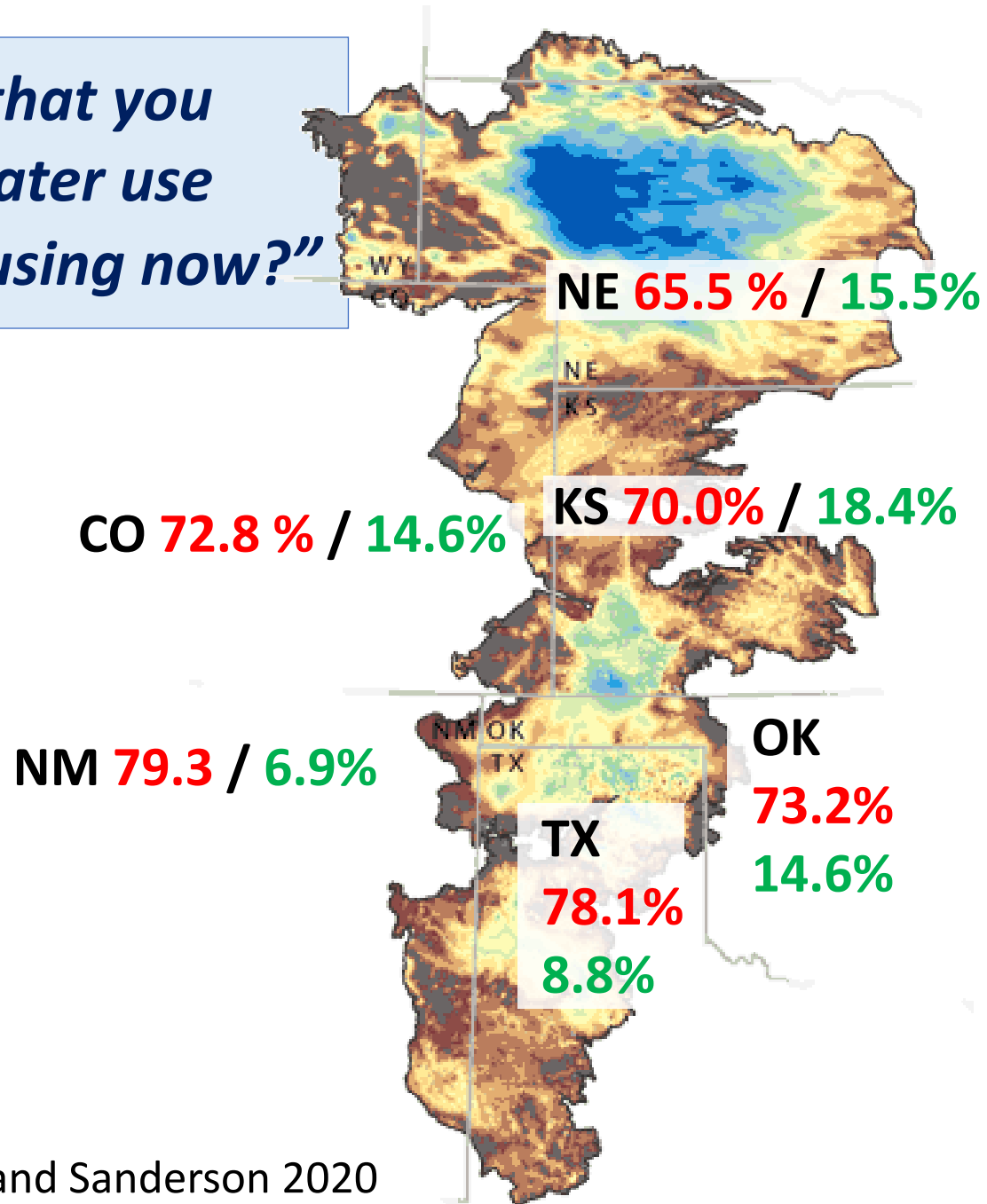


Most people do not save more groundwater because...β	Generally disagree	Generally agree
...it would decrease their production.	2.7%	85.6%
...they do not want to change their irrigation practices	12.9%	64.7%
...it takes too much effort to conserve groundwater.	48.7%	21.1%
...if they do not pump the water, someone else will.	21.9%	48.6%
...they are self-interested/greedy	16.6%	52.3%

Data: M. Sanderson (KSU)

“How certain are you that you could reduce groundwater use beyond what you are using now?”

Probably cannot do
Probably can do



Groundwater should be conserved today so that...

Generally agree

...it is available to farmers if future **drought** becomes more frequent.

73%

...**jobs and business** opportunities continue to be available in my **community** in the future.

66%

...**my children and grandchildren** can enjoy the benefits I have experienced.

86%

...**future generations in my area** can enjoy the benefits I have experienced.

85%



So, if there is a desire to extend the life of the aquifer, what can be done from a management perspective and a policy perspective?

Part 2. Evaluating policies and practice options



Field research



Integrated modeling



**Stakeholder
engagement**

**Sociology &
Economics**



[Ogallalawater.org/resources/publications](https://ogallalawater.org/resources/publications)

[Ogallalawater.org/our-work/](https://ogallalawater.org/our-work/)



NEW! In the Roth Water Tech Farm, Dwayne Roth has adopted many new irrigation technologies in recent years and wants to show others how they work.



Koeps raise soil fertility with liquid manure
Page 20



Passing on the ranch to a new generation
Page 54

The water monitor



Multitasking PheNode at Garden City Water Tech Farm

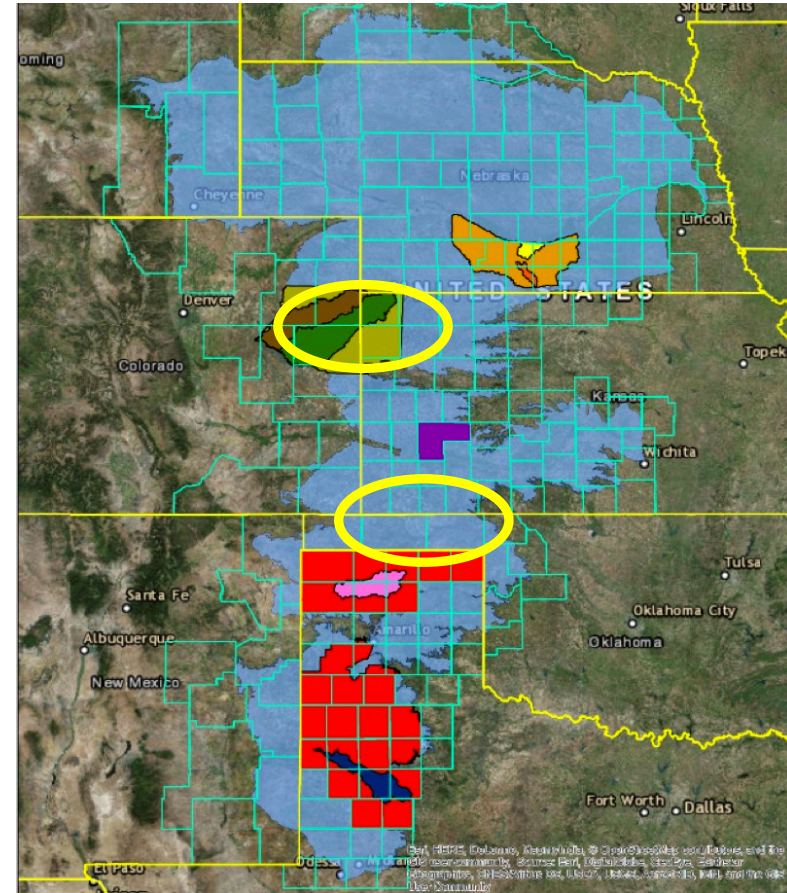
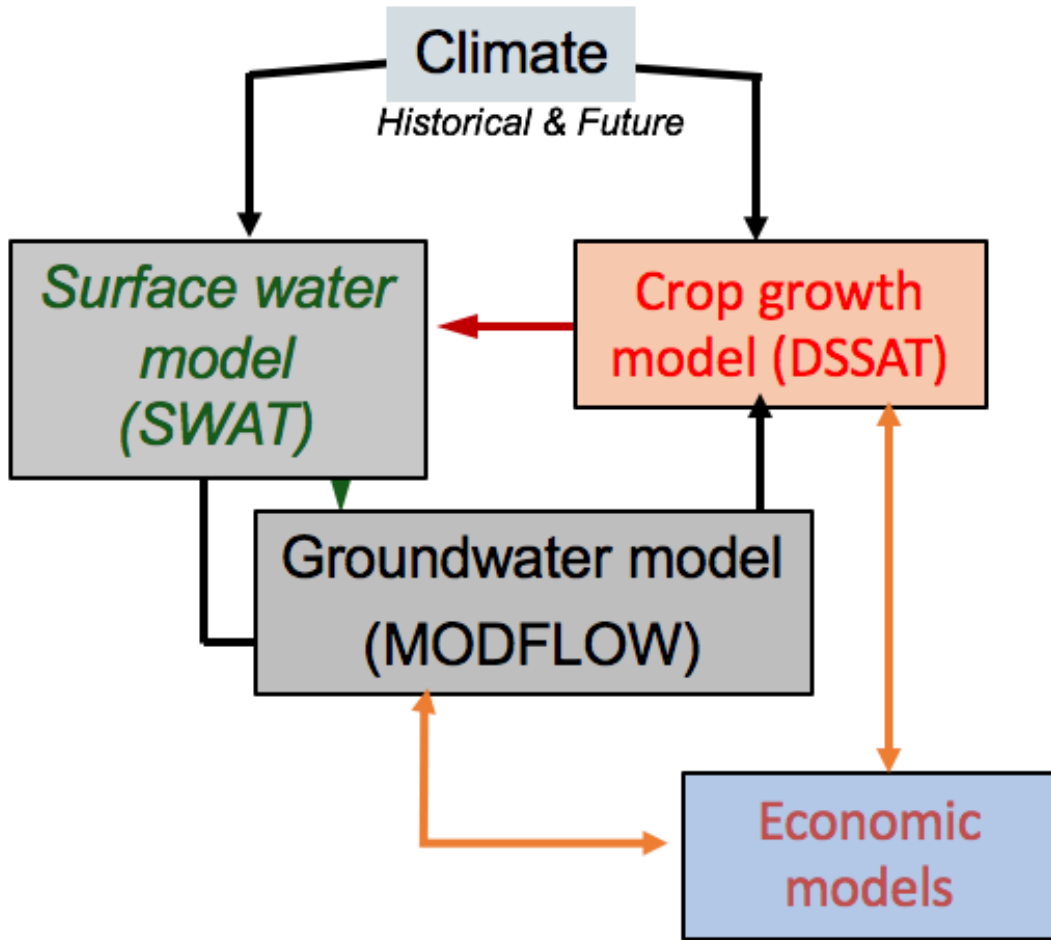


▲ HIDE CAPTION

Nadia Shakoor discusses the PheNode with Dwane Roth and others during a field day at the Roth Water Technology Farm near Garden City. [Chance Hoener/KansasAgland]

- Recognize & reward producer conservation leaders
- Publicize multiple viable pathways. “No blame”, no “one-size fits-all” approach
- Involve researchers/data, producers, & others (e.g. tech dealers, local business units like energy coops) all together to drive advances in water mgmt and create new opportunities

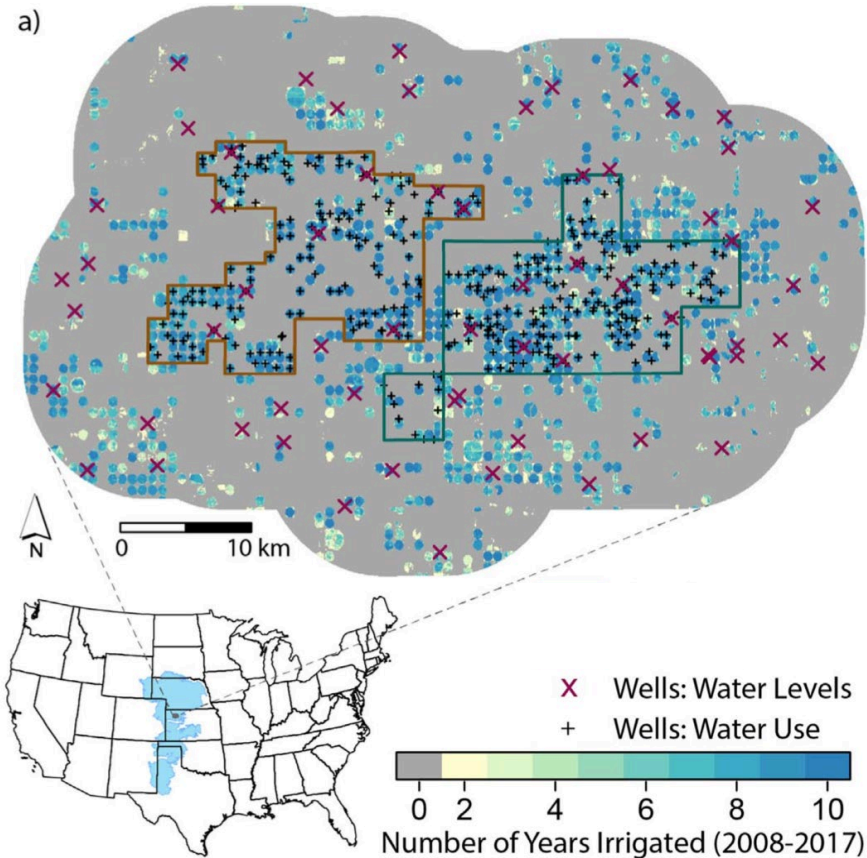
Evaluating relative impacts of management & policy



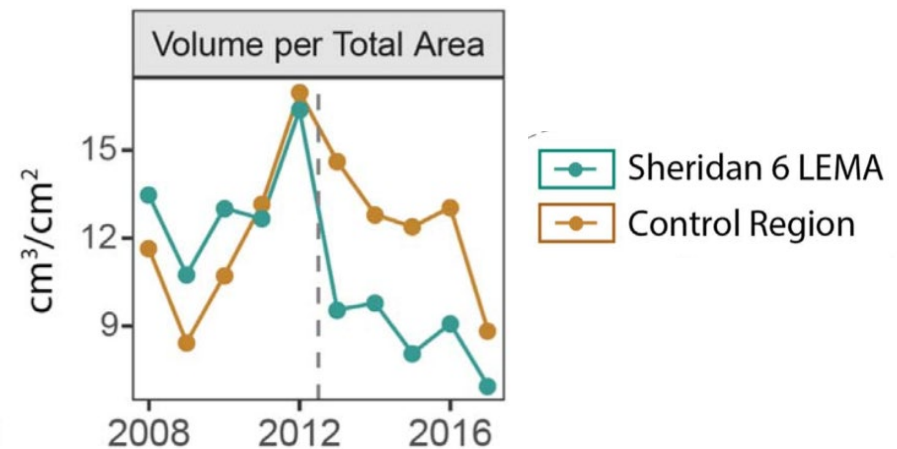
Rouhi Rad, M., E.M.K. Haacker, V. Sharda, S. Nozari, Z. Xiang, A. Araya, V. Uddameri, J.F. Suter, P. Gowda. **MOD\$AT: A hydro-economic modeling framework for aquifer management in irrigated agricultural regions.** *Agricultural Water Management*, Volume 238 <https://doi.org/10.1016/j.agwat.2020.106194>

Policy scenario example: Voluntary, collective pumping restrictions in Kansas: 55 acre-in over 5 years

Sheridan 6-Local Enhanced Management Area (LEMA)



- 31% ↓ in groundwater use
- 11% ↓ in irrigated area
- ↑ irrigation efficiency
- ↓ corn, ↑ grain sorghum, ↑ irrigated wheat
- Minimal impact on cash flow
- Renewed for 2nd 5-year period





2020 class cohort: 22 participants, 20,000+ irrigated acres located within all Republican River Basin counties
New programs launching in NW KS and OK in 2021

“I have been challenged to think outside of my comfortable box. I am excited to evaluate what I do currently, and where I can save \$, water, resources with what I am learning.”

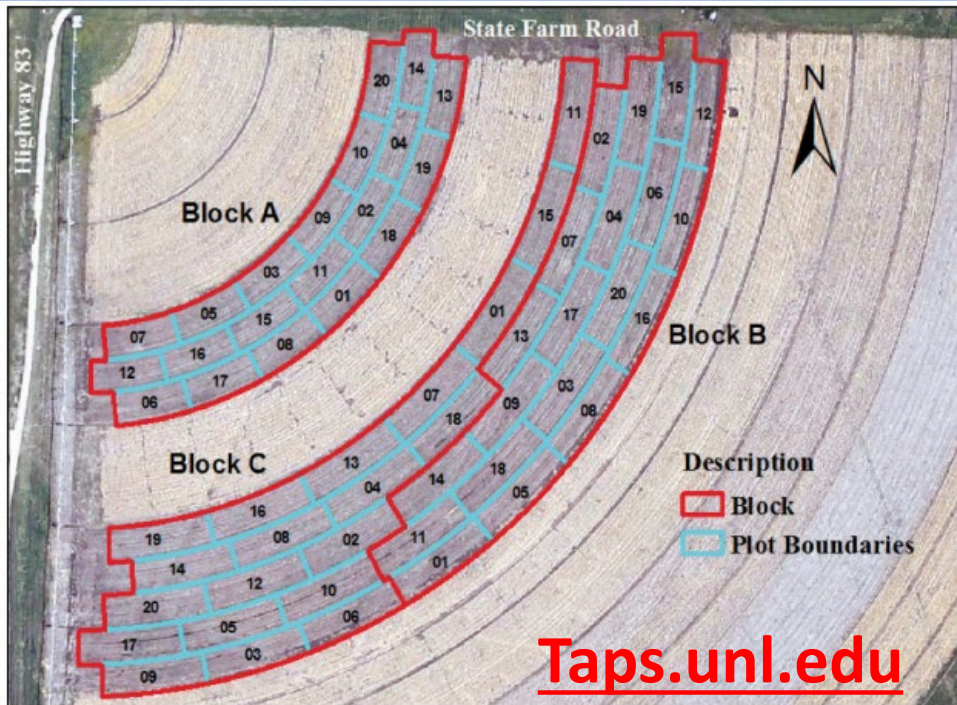
Interstate exchange example:
 New “LEMA,” change to use it or lose it” being explored in CO
 New Master Irrigator program in NW KS



Managing water & inputs for profit, efficiency & return on investment



Competitors have control over these parameters:

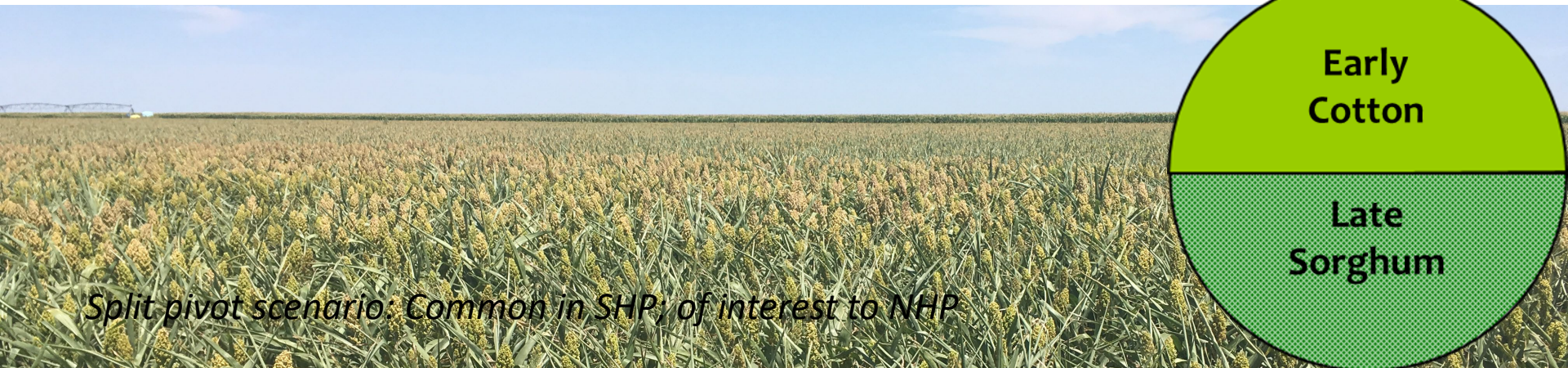


1. Irrigation & nitrogen application amount/timing
2. Hybrid selection
3. Seeding rate
4. Grain marketing
5. Crop insurance

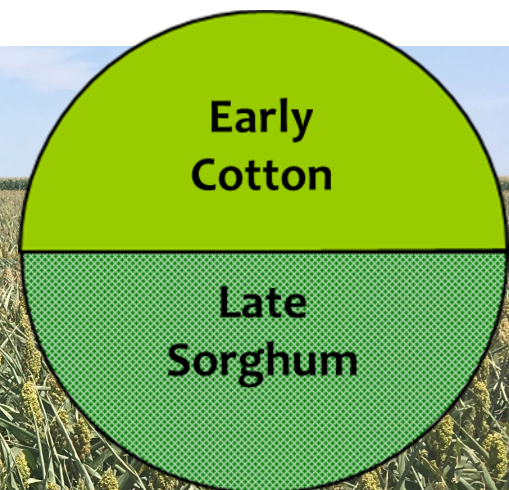
Management and marketing = as if for a 3000 ac operation

Key Barrier: Adoptability of tech & other mgmt practices

- **Wide range of price points exist** to make mgmt shifts [*system maintenance matters*]
- **Prioritize ROI** (inputs used) over maximizing yield [*Water, N, energy costs, seed, pest control, etc.*]
- **Incentivize** conservation-oriented ag water management [*Using local/state/federal sources, driven/directed to locally led activities*]
- **Enlist allies** [*lenders, absentee landowners, crop consultants*]
- **Dynamic, staggered irrigation scheduling** can save time, water, \$ [*weather data, wheel track management*]



Split pivot scenario: Common in SHP, of interest to NHP



Today's decisions = Investing in future returns

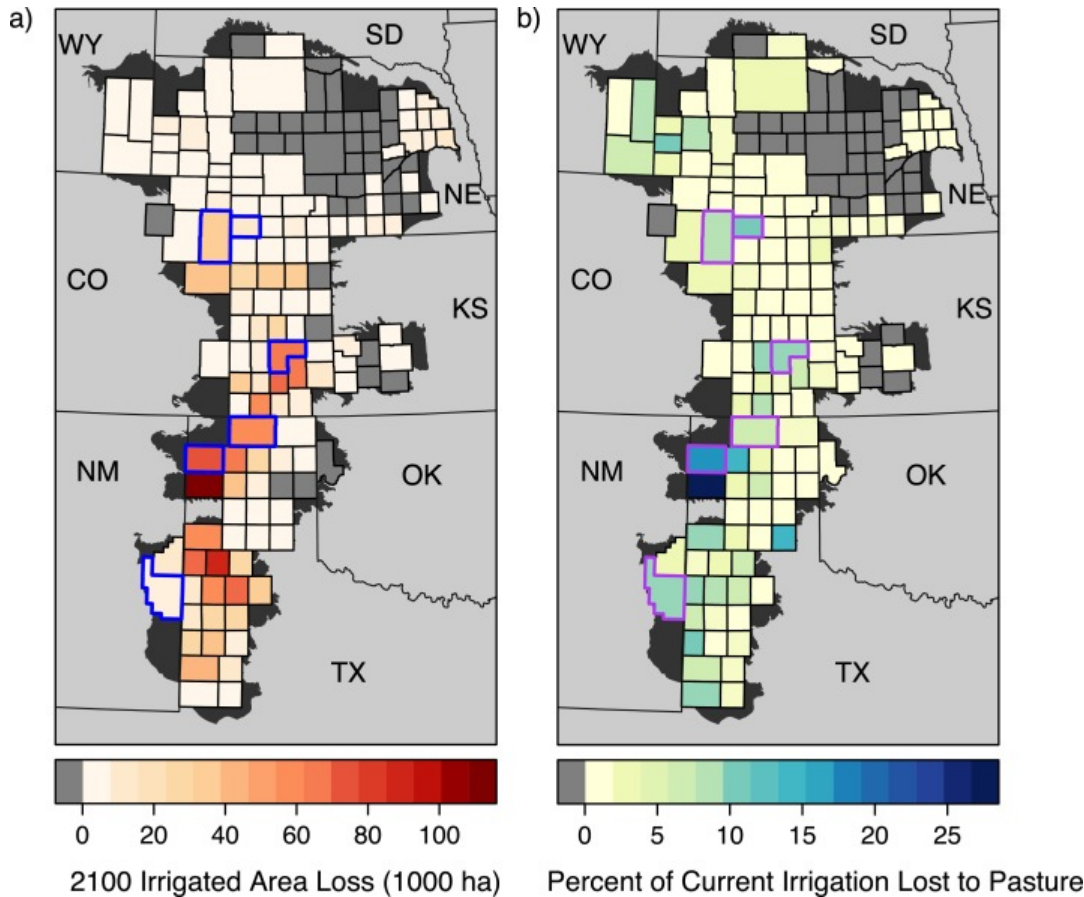


**4" not used this year on 5 pivots =
enough for 20" on 1 full pivot another year
(or 10" on 2 pivots)**

In 2022 (hypothetically): 235 bu/acre, sold at \$4/bu →
net return of \$300/ac* from using water ***not yet pumped***

**Production costs (land excepted) have been
subtracted from this net return value*

Implications of land transitions for irrigated to non-irrigated management



Not all currently irrigated land is suitable for dryland crop production

Transitions to pasture management can reduce erosion risks on vulnerable soils, but with reduced profits returned to the community

Key Barrier:
Lack of visibility, common vocabulary
& (cross discipline) professional development opportunities



- More stakeholder education/engagement re: the value of water
- Expand/replicate programs that emphasize peer-to-peer exchange, interstate/disc. research & engagement
- Tech alone “will not save us”: improved ag water mgmt requires ***practice + policy***

“As soil health declines, we cover many of those mistakes with water. As soil health improves, water holding capacity improves.”
– 2018 Summit producer panelist R.N. Hopper (TX)

“Most people do not save more groundwater because water use regulations are not strict enough.”

Survey data: M. Sanderson (KSU)

Disagree

Agree

CO 29.0% / 38.3%

NM 26.7% / 36.7%

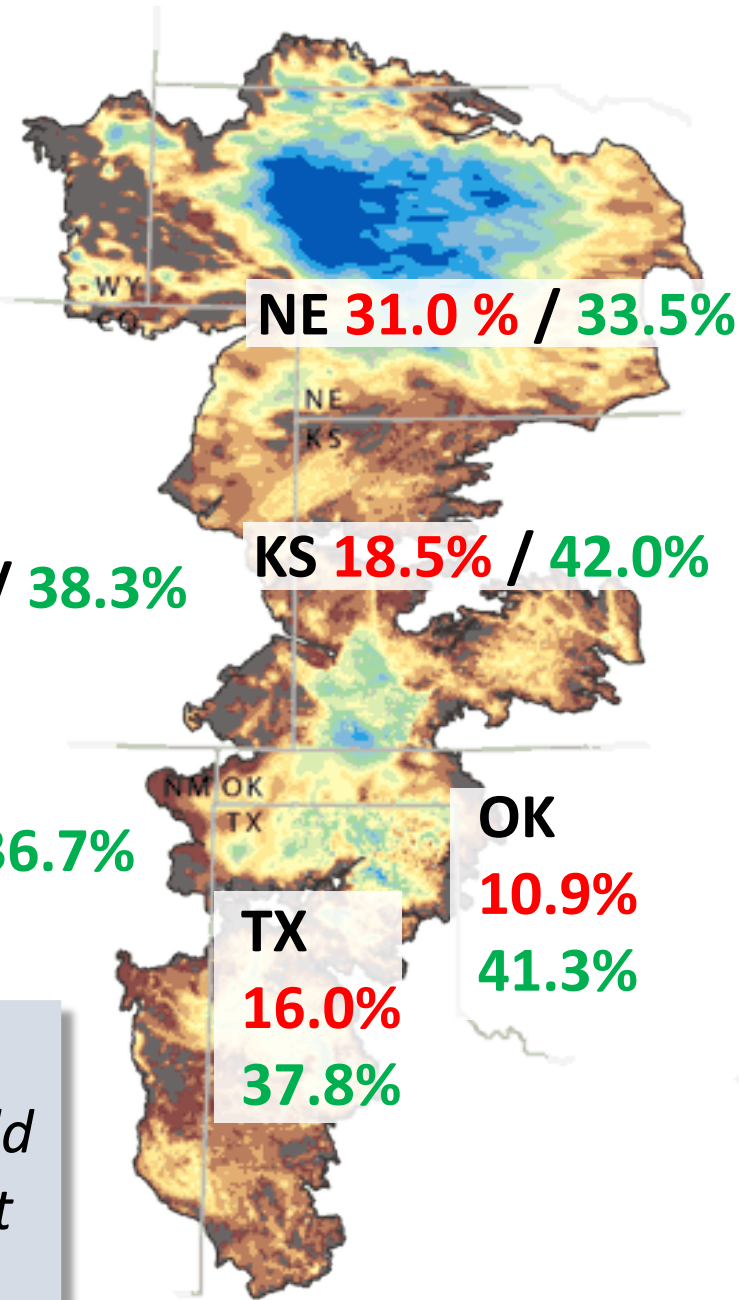
NE 31.0% / 33.5%

KS 18.5% / 42.0%

**TX
16.0%
37.8%**

**OK
10.9%
41.3%**

*“How do you make someone change?
Set a groundwater production limit and hold
their feet to the fire. And, show them that it
pencils out.” -2018 Summit participant*



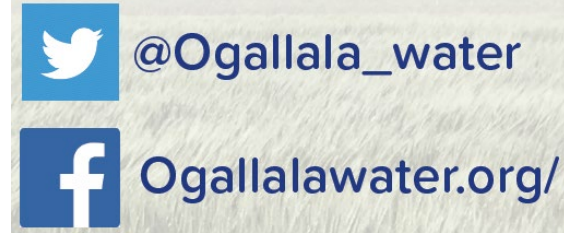
OGALLALA AQUIFER SUMMIT

FEBRUARY 24-25, 2021 TACKLING TOUGH QUESTIONS

What is groundwater's value? If we conserve groundwater, what is gained?
How can cross-state cooperation sustain Ogallala region rural communities?

Join others from all 8 Ogallala states for 2 days of interactive discussion
at the 2021 Ogallala Aquifer Virtual Summit!





**Quarterly newsletter sign-up:
Ogallalawater.org**

Email:
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