

# RESILIENCE AND RISK MITIGATION

## Land Use and Community Drought Resilience in the Great Plains: The Importance of Transdisciplinary Research



*Kenton, the Western Most Town in Oklahoma*

### INTRODUCTION

Drought is a familiar challenge in Cimarron County, Oklahoma and surrounding states. The region is dominated by agriculture, and different land uses such as irrigation or livestock grazing shape how people experience drought, affecting soil quality, biodiversity, and access to water resources. As climate change increases the frequency and severity of droughts, researchers, community members, and decision makers need to understand the impacts of human and land interactions. As land policies and practices change over the decades, socioeconomic factors shape drought resilience in rural agricultural communities. Ongoing transdisciplinary research efforts and strong relationships between researchers and community members expand opportunities to understand and address drought-related challenges.

### KEY ISSUES ADDRESSED

Since droughts are a slow-onset natural disaster, communities must continuously adapt. Even after historic extreme droughts, generations of agriculturalists still call drought-prone regions home. As communities adjust to changing conditions, both formal policies and informal practices shape how people interact with the land, though direct outcomes can be difficult to identify. Cimarron County borders four other states, so the effects of differing state policies on the land can be more easily observed. However, even when negative outcomes are recognized, long-standing policies or traditions are difficult to change. Research often falls short of addressing relevant community barriers to improve future drought resilience.

### PROJECT GOALS

- Explore how recurrent drought affects land management & people
- Incorporate land use and water data to identify the effects of formal and informal governance on drought experiences
- Connect people to pixels by applying research insights to address community needs



## PROJECT HIGHLIGHTS

**Combined Research Approaches Provide Insights into Adaptation and Resilience:** An oral history project about women Dust Bowl survivors led to new questions about how generational knowledge shapes drought response. Bringing together research perspectives from human-environmental geography, ethnography, biology, geospatial sciences, and other disciplines uncovered new insights about how communities adapt to cyclical drought.

**Land Use Analysis Shows Different Governance Outcomes Across State Lines:** Researchers compared land use/land cover data from the NASA Landsat program and the USGS National Agricultural Imagery Project to explore the outcomes of land and water policies in different states. Results showed clear differences in the growth of invasive plants and groundwater levels across state lines, highlighting the effects of variations in management policy.

**Community Deliverables Bridge Research and On-the-Ground Needs:** Lead researchers committed to assisting with community projects. Resulting collaborations include local well monitoring, grant writing, community mapping, and town museum exhibits. Small scale projects help researchers and community members build relationships, enhancing research applications.



Western Cimarron County is Characterized by Pastureland

## LESSONS LEARNED

Informal rules based on culture and tradition can shape day-to-day resource use more than statewide regulations. Research informs decision making, but when state policies adversely affect rural communities, advocacy and immediate change may be limited. Researchers can also provide information to shape planning, risk management, and community organizing, resulting in more immediate outcomes.

Transdisciplinary teams allow researchers to overcome limits of individual expertise. In this project, each researcher assists with tasks outside their area of focus. When land use experts sit in on community interviews and ethnographers help compile drought data, combined perspectives uncover new insights. This expands the overall scope of the project and balances workloads across the research team.

Working alongside communities allows researchers to form relationships and build social capital. Conversations and community projects help researchers establish trust and receive greater community support even when there are delays in research efforts or project deliverables. When researchers demonstrate long-term commitment to a community, reciprocity strengthens research relationships.

## NEXT STEPS

- Examine how accessible land and water use data changes community perceptions and behaviors
- Grow community adaptation capacity through NSF Research Coordination Network for increased resilience in the Great Plains
- Share successes from community projects

## PARTNERS

- See online for full list of partners
- For more information, contact Jackie Vadjunec: [jvadjunec@ou.edu](mailto:jvadjunec@ou.edu)

