Background
Water is a primary requirement for quality of life as drinking water, power generation, crop production, and industrial and municipal use. Fresh water from surface and underground sources is increasingly in short supply in the Ogallala region of western Kansas. However, this region leads Kansas in crop production and comprises the core of the U.S. beef cattle feeding industry. The top eight Kansas agricultural counties are located over the Ogallala Aquifer and represent $4.7 billion in crops and livestock, or one-third of Kansas' total agricultural revenue.

Developing more comprehensive understanding of the nexus of water, food, and society is crucial. As demand for water resources continues to increase, improved water management practices for crop and livestock production and water supply assurance for communities will be critical for sustaining economic viability and population base of the region. The latest tools and technologies are available to analyze the impacts of water-use policy decisions on economies and society and to engineer politically acceptable solutions.

Description
Communities, businesses and agricultural interests worldwide are struggling to address problems in efficient water-use for agriculture and industry. As demand for water resources continues to increase, improved water management practices for crop and livestock production and water supply assurance for communities will be critical for sustaining economic viability and population base of the region.

Aquifer and surface water depletion, limited precipitation, and population shifts to mid-sized communities in western Kansas have stretched community and regional water supplies. However, this region leads Kansas in crop production and comprises the core of the U.S. beef cattle feeding industry.

An interdisciplinary team of faculty members at Kansas State University studies risks and consequences of groundwater use and scarcity and develops new technologies to help citizens effectively manage water resources.

As a land grant university, KSU has water-related expertise in:
Research: Agricultural sciences, engineering and public policy dimensions of water and society to provide information critical to decision-quality actions.

Education: Curriculum in engineering, geography, water management, plant genetics, and computational models to train the next generation of water scientists and managers.
Extension and Outreach: Engagement with agencies and stakeholder organizations to identify alternative methods of minimizing groundwater scarcity challenges and assisting water managers to implement new practices.

Relevance
The K-State team:
1) Informs citizens, planning agencies and policy makers understand of technical aspects of water resource management and the economic, social and natural system impacts of policy strategies.
2) Develops more efficient irrigation technologies, improved scheduling procedures, and combined water and nutrient management. Research and extension efforts guide producers in efficient irrigation strategies for various types of irrigation systems, as well as transition towards limited irrigation and dryland practices.
3) Evaluates alternative food and feed grains, oil seeds, and energy crops for drought and heat tolerance, adaptation to no-till or strip-till production systems, and utility as feed for livestock or feedstock for liquid fuel production.
4) Develops and evaluates technology to utilize for wastewater-use from concentrated animal feeding operations. Technologies can decrease potential environmental impacts from wastewater re-use, such as runoff into streams and odor, while conserving fresh water.
5) Utilizes the latest engineering technologies and computational forecasting tools to quantify and understand interactions and feedbacks between available water resources and societal needs and values. Collectively, this computational infrastructure can provide the scientific basis to support sound planning, state, county, and local analysis and decision-making to development of equitable and fair water policies.

Western Kansas seeks long-term solutions to manage a depleting Ogallala and develop agricultural systems, engineering and policy solutions to sustain the aquifer for current and future generations.

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Summary: Water is a primary requirement for quality of life as drinking water, power generation, crop production, and industrial and municipal use. Fresh water from surface and underground sources is increasingly in short supply in the Ogallala region of western Kansas.

Opportunity: Communities, businesses and agricultural interests worldwide are struggling to address problems in efficient water-use for agriculture and industry. As demand for water resources continues to increase, improved water management practices for crop and livestock production and water supply assurance for communities will be critical for sustaining economic viability and population base of the region.

Solution: This program provides science-based research to guide management and policy. Well planned conservation of water resources is critical to the economic viability and stability of western Kansas. The latest tools and technologies are available to analyze the impacts of water-use policy decisions on economies and society and to engineer politically acceptable solutions.

Impact: Aquifer and surface water depletion, limited precipitation, and population shifts to mid-sized communities in western Kansas have stretched community and regional water supplies. However, this region leads Kansas in crop production and comprises the core of the U.S. beef cattle feeding industry. Water is a primary requirement for quality of life in drinking water, power generation, crop production, and industrial and municipal use). Without the water of the Ogallala Aquifer, Kansas communities will suffer.

Equipment & Expertise: An interdisciplinary team of faculty members at Kansas State University studies risks and consequences of groundwater use and scarcity and develops new technologies to help citizens effectively manage water resources. As a land grant university, KSU has water-related expertise in agricultural sciences, social demography, resource economics, agricultural systems analysis, water resources engineering, policy analysis, and computer science and technology.