



2024

KANSAS

2021 OGALLALA (VIRTUAL) SUMMIT-INSPIRED ACTIVITIES

During the 2018 Ogallala Summit, Kansas attendees were inspired by a presentation from the North Plains Groundwater Conservation District (NPGCD) in Texas regarding the success of their **Master Irrigator** (MI) program. It has spurred conversations from the local Groundwater Water Management Districts (GMDs) and Regional Advisory Committees (RACs), to state universities (Kansas State University (KSU), University of Kansas (KU)) and agencies (Kansas Department of Agriculture (KDA), Kansas Water Office (KWO)), and federal agencies (USDA– Natural Resources Conservation Service (NRCS), Risk Management Agency (RMA)). Since the first Summit, the MI program has expanded to Oklahoma and Colorado. Kansas is working to adapt the successful model of the MI program to provide effective training, enhance access to tools and technical guidance, and catalyze broader water conservation practices.

Following the 2021 Ogallala Summit, Kansas launched a new initiative to build on the **Water Technology Farms** initiated in 2012. This new initiative, **Water Innovation Systems and Education (WISE)**, is a public/private partnership program that focuses

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on fostering the implementation of field practices, technology and management strategies for industrial, agricultural and municipal water applications; with the goal resulting in measurable and scalable ground water conservation, improved water quality and overall soil and ecological health. The program is an expansion of our legacy WT and Purchase of Agricultural Conservation Easement (PACE) Farm programs, and includes the development of a state-wide Master Irrigator and innovative farm cost-share program.

Resulting from the 2021 Ogallala Summit, Kansas is working to adapt the Testing Ag Performance Solutions (TAPS) program to the state. Initiated in Nebraska, the TAPS program employs an innovative approach that combines interactive, "citizen-science" learning with interdisciplinary research. The program centers around annual farm management competitions where producers make real-time decisions such as crop cultivar and seeding rate, irrigation and nitrogen amount, timing and method, crop insurance, and marketing. These decisions are then implemented side-by-side in replicated plots on the same field, enabling direct comparison and evaluation of their influence on production, efficiency, and economic outcomes. A key benefit of the program is that it provides producers with the opportunity to try new and emerging technologies and management strategies before purchasing and adopting them on their own farm, thereby mitigating adoption risk. Burbach et al. (2023) interviewed producer alumni of the Nebraska TAPS Farm Management Competitions and found that 75% have adopted new ag technology on at least a trial basis on their operation as a result of participating in TAPS. Furthermore, they found that 68% agreed that participating in TAPS reduced the risk associated with adopting new agricultural technologies.

Focus on sustainable feed and forage, supply chain approach

Kansas State University research on low water-use crops, better crop water management, and improved irrigation systems to assist farmers as they transition to less available irrigation water. Economic models have provided guidance on transitions to less water use cropping systems that have the least impact at the farm level profits and the regional economy.

The Ogallala Aquifer Program (OAP) has provided permanent federal funding to a research consortium for numerous research projects on water conservation. The program includes the U.S. Department of Agriculture's [Agricultural Research Service](#) (ARS), Kansas State University, Texas A&M AgriLife Research and Texas A&M AgriLife Extension Service, Texas Tech University and West Texas A&M University. In the

Cotton acreage, a low water-use and highly profitable crop, has increased substantially in Kansas over the last four years. Several reasons for the expansion include the availability of improved short-season varieties, reduced water availability, better weed management options, and potential profitability of the crop. Cotton production could generate several positive benefits for the producers, the rural community, and the Ogallala Aquifer. As a result, the OAP has provided funding for a project titled “Collaborative Research on Cotton Production in Thermo-limited Regions of the High Plains.”

OTHER KEY ACTIVITIES UNDERWAY, POLICY SHIFTS, NEW/CORE INITIATIVES

Kansas has excellent data on water use, with all water right owners required to submit an annual water use report that includes groundwater use and cropping system. These data have allowed the Kansas Geological Survey (KGS) to develop hydrologic models for most of the Ogallala-High Plains aquifer in the state. The hydrologic models help define the current water budget, and allow future management scenarios to be projected. These models have allowed the development and implementation of Local Enhanced Management Plans.

A Local Enhanced Management Area (LEMA) Plan is a tool that allows Kansas GMDs to set goals and control measures to aid in water conservation, at the approval of the Chief Engineer. In 2022 the Northwest Kansas GMD No. 4 sought and received approval, from the Chief Engineer of Kansas, to extend their district wide LEMA from January 1, 2023 through December 31 2027. Testimony given in support of the extension stated that both groundwater level decline and groundwater use had both been reduced by the previous LEMA. In 2020 Wichita County in west-central Kansas initiated a LEMA that started January 1, 2021 and will end on December 31, 2025. The stated purpose was to extend the life of the Ogallala Aquifer in light of past excessive declines in the aquifer. In 2022 the Western Kansas GMD No.1 initiated a LEMA for the portions of Greeley, Lane, Scott and Wallace counties. The five-year period began on January 1st, 2023 and will end on December 31st, 2027. The purpose was to conserve groundwater resources and the prevention of economic deterioration of the District, by limiting use in order to extend the useful life of the local aquifer.

Garden City, Kansas Reuse Project

The City of Garden City, Kansas is pursuing a water reuse project that will play a key role in preserving the existing industry and population in Garden City and assist with continued economic expansion. Addressing declining aquifer supply and water quality issues is key to ensuring continued economic growth in the City and Southwest Kansas. Current growth trends show that the City will need to develop new water resources by 2025. The City has adequate water rights to convert for municipal use, but we are focused on the long-term security of the declining groundwater supply.

Managed Aquifer Recharge (MAR) is one strategy that will contribute to the community's sustainable water production. The MAR project will take reclaimed water from the City and DFA Wastewater Treatment Plants and transmit reclaimed water to the vicinity of the City's Sandhills Well Field to recharge the aquifer. The MAR concept is similar to the Aquifer Storage and Recharge (ASR) project that the City of Wichita uses.

Garden City has been working actively with the Kansas Department of Wildlife and Parks to utilize portions of the Sandsage Bison Range and Wildlife Area to apply reclaimed water to the range and recharge the aquifer. The City is also exploring additional opportunities to provide reclaimed water to nearby irrigation users in exchange for curtailing the use of groundwater resources during the growing season. This opportunity would allow continued agricultural production while reducing the aquifer demand in the area to the City's water supply, highlighting the MAR concept's flexibility.

Q-Stable Analysis

The same groundwater data have paved the way to a unique approach in quantifying the response of the groundwater level to local initiatives and industries. Important efforts are already underway involving the KGS sharing its water balance approach called "Q-Stable" (Butler et al., 2018) with feedyard operators. Q-Stable uses reported water use and data on aquifer level changes and precipitation to identify the impact of pumping reductions in normal or drought weather years on stabilizing aquifer levels on a well-by well basis. KGS is conducting local Q-Stable assessments for individual feedyards and dairies throughout the Ogallala-High Plains Aquifer region in Kansas.

Sustainable Livestock Initiatives

While water use associated with irrigated crops dwarfs the water directly used in livestock, the beef and dairy industry are undoubtedly two of the major consumers of the irrigated produce particularly corn and grain sorghum in the region. The first Ogallala Summit marked the start of significant participation of the livestock industry in the conversations around water conservation. Several sustainable livestock initiatives were proposed such as the shift from irrigated grain to silage production, improved feedyard watering systems, preference to suppliers of grains with better water use efficiency, and alternative feeding practices.

Policy Shifts and Legislative Action

In mid-December 2022, the Kansas Water Authority (KWA) voted to recommend to the governor and 2023 Legislature that Kansas abandon a philosophy of "planned depletion" of the Ogallala Aquifer. This messaging kicked off a legislative session resulting in several key water-related funding and policy outcomes.

Senate Substitute for House Bill (HB) 2302 expanded funding for the State Water Plan Fund and created two additional funds for water infrastructure projects and technical assistance. Beginning in July 2023, \$35 million was transferred from the State General Fund to the State Water Plan Fund, a \$27 million increase from the historic annual transfer. This legislation authorized the \$35 million transfer for the next five years.

Significant to the Ogallala-High Plains Aquifer, HB 2279 requires each of the five GMDs to submit annual reports to the Legislature outlining their budget, finances, and activities. The legislation also required that each GMD provide reports to the KDA – Division of Water Resources their plans to identify priority areas and action plans for water conservation.

KEY CHALLENGES

A recent survey of producers from 206 counties across the Ogallala aquifer was done to examine the producers' perceptions of groundwater, its conservation, their perceived role in its use, and their more general worldviews and values associated with conservation. The results showed that producers view groundwater as important for their own agricultural businesses and their communities. Further, producers clearly believe groundwater should be conserved for the use of future generations

and in case of drought in the future. However, the majority of producers do not feel personally responsible for groundwater depletion and do not believe they need to minimize or reduce their groundwater use or they are already doing all they can to conserve groundwater. This perception is a major challenge to further technology adoption and water conservation since many producers think they are already doing something in their current operations.

The economic results from several studies on the Sheridan #6 LEMA suggests that, given the certainty of groundwater use reductions, producers are able to implement strategies to maintain returns and apply less groundwater. Multiple studies reveal that irrigators surpassed the initial water use reduction goal, primarily by improving water use efficiency. Producers in the area report that they improved irrigation efficiency by a heavier reliance on rain water and adopting new technologies such as soil water sensors. This implies that the main factor needed to truly conserve groundwater is coupling irrigation efficiency improvements with legally binding reductions in total groundwater use.

PARTNERSHIPS, INTERSTATE INTERACTIONS, AND COLLABORATIVE EFFORTS

State representatives from Kansas and Colorado are working on water quality issues impacting the Arkansas River in southeast Colorado and southwest Kansas. This includes a collaboration of water quality experts, water quantity administrators and most importantly producers to promote best management practices with the potential to improve water quality issues while ensuring the associated return flows are maintained to keep the river system whole in quantity. The two states have held Arkansas River Water Quality Summit events in 2022 and 2023, with another Summit scheduled to take place this coming April 18-19 in southwest Kansas.

K-State and the University of Kansas, Kansas Geological Survey have a growing partnership with the NASA Earth Sciences Division leading to the exploration of new ways OpenET, a satellite-based evapotranspiration (ET) modeling, data visualization, and access tool, can support producers with data-driven management tools. OpenET may play a crucial role in enabling innovative approaches to irrigation planning and scheduling decisions by producers, and identifying areas of transition from irrigated to dryland production, using both field-scale and historical data.

As described in an accompanying whitepaper to the 2024 Ogallala Summit, crop insurance plays an important role in risk management for producers. Kansas partners

have recently convened workshops engaging producers, scientists, and agency representatives to identify the research, education, data, and policy needs that could facilitate agricultural water conservation efforts aligned with current or potentially modified crop insurance programs. The individuals engaged in these workshop discussions represent an important partnership to support improved water management, community, and environmental outcomes.

REFERENCES AND IMPORTANT LINKS

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