

# K-STATE AG INNOVATION PUTTING FARMERS FIRST

*From protecting Kansas wheat to reimagining regenerative systems, K-State's Agricultural Experiment Station is committed to research that begins and ends with the producer—helping farmers, families, and rural communities thrive.*

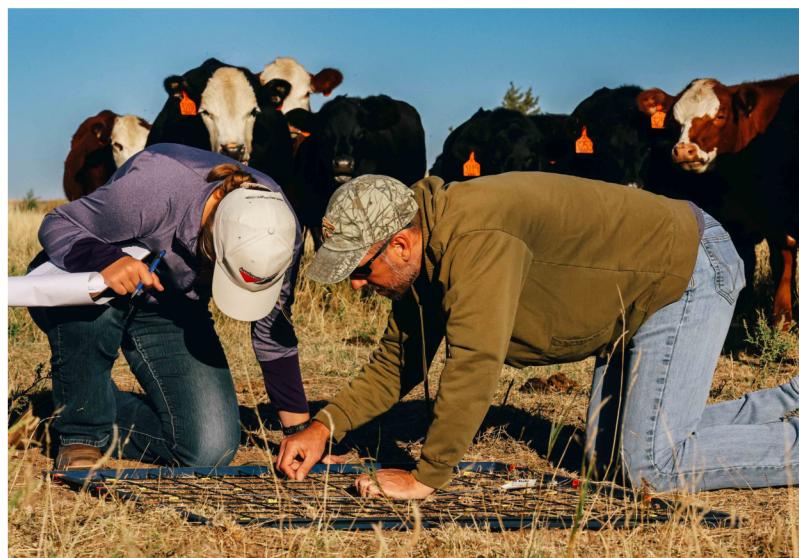
## Driving Beef Innovation Through Producer-Guided Science

### Grassland Stewardship and Invasive Species Control

Kansas rangelands are the foundation of cow-calf production across the central U.S., but invasive grasses like Caucasian bluestem threaten forage quality, stocking rates, and long-term carrying capacity. KAES research demonstrated that late-summer prescribed fire—when timed to coincide with the invasive grass's regrowth cycle—significantly reduces invasive basal cover while maintaining native grass species richness and soil ground cover. This approach requires no added herbicides, infrastructure, or major operational changes, making it cost-effective and widely adoptable across the Great Plains and other grazing regions.

### Maintaining Beef Quality and Consumer Trust

Consistent eating quality drives consumer confidence and supports access to high-value export markets. K-State meat science research identifies optimal aging windows, color stability limits, and spoilage thresholds, giving processors and retailers clear, science-based standards for tenderness, shelf life, and product appeal. With U.S. beef exports exceeding \$10 billion annually, maintaining dependable quality is central to protecting market share and value. These benchmarks help uphold the reputation of U.S. beef throughout the global supply chain.



### Rapid Response. Real Impact.

When one of the most severe wheat streak mosaic outbreaks in recent history hit western Kansas, K-State scientists mobilized to help farmers protect their yields. A cross-disciplinary team in agronomy, plant pathology, entomology, and wheat breeding worked together to:

- Identify virus and vector dynamics and improve early detection.
- Refine management practices such as volunteer wheat control and planting dates.
- Evaluate and advance genetic resistance within the K-State breeding program.

This systemwide effort provided rapid, science-based solutions that helped producers reduce losses and build long-term resilience, protecting Kansas' \$1.69 billion industry.

### Building a Circular Bioeconomy

K-State's Farm of the Future is a 100-acre regenerative agriculture model farm testing how producers can sustain resources, stay profitable, and feed a growing population.

Researchers across agronomy, engineering, economics, and marketing are evaluating:

- Minimal tillage, cover crops, and integrated grazing systems
- Real-time soil, water, and greenhouse-gas monitoring
- Links between soil health and farm profitability

Early work with 600+ Kansas farmers found that higher soil health scores correlate with greater profitability.



Learn more at [www.ag.k-state.edu](http://www.ag.k-state.edu) to explore how K-State Ag Innovation strengthens agricultural sustainability and resilience.

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At the Kansas Agricultural Experiment Station (KAES), producer-led research is shaping the future of agriculture on the High Plains. Kansas agriculture is the state's largest economic engine, and much of that value depends on the Ogallala Aquifer—now under increasing pressure from declining water levels. K-State economists estimate groundwater access contributes billions in land and production value each year, making water management a core economic priority for western Kansas. KAES scientists and producers are working together to adapt cropping systems, irrigation practices, and soil-water management to keep farms profitable as water becomes more limited. The solutions developed here are informing water-smart agriculture across the Great Plains and beyond.

## Testing Ag Performance Solutions (TAPS)

Farmers lead on-farm research trials to compare irrigation strategies, input management practices, and emerging technologies under real-world conditions. The results are transparent, producer-led, and inform operational decision-making and risk reduction. In past competitions, 86% of participating producers adopted a new management practice at home after TAPS.



## Precision Irrigation Research

Drones, remote sensing, soil moisture probes, and satellite-based evapotranspiration models help producers apply water where and when it's needed most. These tools reduce pumping costs, extend the useful life of wells, and maintain crop yields under tightening water availability.uses data to create food security solutions for the future.



## Alternative Crop Systems

Rotating in crops like canola, millet, cotton, and cowpeas diversifies income and can lower seasonal water demand. K-State is one of the few universities in the U.S. with a canola breeding program, supporting varieties adapted to Great Plains conditions.

## Wastewater Resource Recovery

Livestock wastewater is being converted into usable irrigation water, plant-available nutrients, and value-added bioproducts, decreasing fresh-water withdrawals and closing nutrient loops within livestock systems.



## Soil Microbiology, Organic Matter, and Biochar Research

Microbial activity, biochar amendments, and residue management improve soil moisture retention and nutrient cycling under drought and heat stress. A current \$6 million NSF-supported initiative is evaluating soil amendments that extend moisture availability.

## Deficit Irrigation & Soil Health Trials

Research on limited irrigation, no-till systems, and crop rotations demonstrates how producers can maintain yields while reducing groundwater use. K-State research has shown that optimizing irrigation management can cut water waste by up to 25% while sustaining crop performance.