Agricultural science research is a global investment in protecting the future of our state. Agriculture in New Mexico accounts for approximately $4 billion in direct sales and 42,000 jobs. Challenges to growers and ranchers are constant and evolving. Invasive pests, a decline in species diversity, pollinator health, resistance to pesticides, and limited water are needs that are being addressed by New Mexico State University's Agricultural Sciences Centers. The wide diversity of both growing conditions and cultures means solutions must be developed locally in conditions that reflect those faced by New Mexicans.



### REX E. KIRKSEY AGRICULTURAL SCIENCE CENTER AT TUCUMCARI

**E**stablished in 1912, the Rex E. Kirksey Agricultural Science Center (REK ASC) at Tucumcari exists to discover, develop, and deliver information about globally applicable innovative solutions for crop and livestock systems in irrigated and dry-land agriculture with specific application locally and throughout New Mexico. Research and outreach programs focus on semiarid cropping systems, irrigated forage crops and grazing management, genetic improvement of beef cattle through feed efficiency testing, and reuse of treated municipal wastewater for agricultural irrigation.

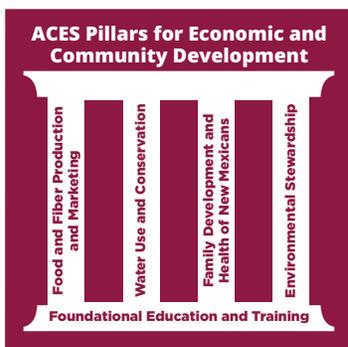

### UNDERSTANDING THE NEED FOR RESEARCH

**T**he REK ASC has a vast span of research from the past 100 years. All research projects are driven by input from stakeholders, including an Advisory Committee consisting of regional farmers, ranchers, and business people. This advisory committee meets with center personnel in the spring and autumn to review ongoing projects and provide direction for future research.

### HISTORY OF RESEARCH

**B**efore 1950, the research concentrated on dry-land crop and livestock production, plantings for windbreaks and farmsteads with a small emphasis on horticultural crops. Later, when surface water for irrigation became available focus shifted to irrigated crops. Although the forage research component has been in place since 1912, it has been driven by stakeholder input and, in the past 20 years, it has evaluated alternative forage crops, irrigated perennial and annual summer and winter pastures and stored forage options for the re-surging livestock industry, including the beef cattle herd increase over the past 7 years and the dairy industry.



In 1960, the center's mission, in conjunction with the New Mexico Beef Cattle Performance Association (NMBCPA) has included performance bull testing for statewide herd improvement on a sire basis. In 2015, a subgroup of the NMBCPA formed the Tucumcari Feed Efficiency Test, LLC (TFET) to upgrade the feed efficiency testing facility with technology for individual animal feed efficiency testing (pen feed efficiency was the previous option), with continued expansion in 2017 of that technology and the addition of infrastructure to measure individual animal water intake in 2018 and 2019, making the ASC the only facility in the United States, and possibly in the world, capable of measuring individual animal feed and water intake for genetic improvement of beef cattle. This is being applied to beef cattle in New Mexico and the surrounding region. In addition, to respond to more than a decade of drought the REK ASC began soil sampling in 2012 to compare the effect of wastewater irrigation on the establishment and production of alfalfa, New Mexico's #1 economic field crop and 2nd most important cash crop as well as other field and horticultural crops.



**ACES Pillars for Economic and Community Development**

Food and Fiber Production and Marketing

Water Use and Conservation

Family Development and Health of New Mexicans

Environmental Stewardship

Foundational Education and Training

# Rex E. Kirksey Agricultural Science Center at Tucumcari

## RESEARCH IMPACTS:

- Corn tillage provides significant economic advantage. Tillage research in corn has a potential impact on various aspects of soil and environmental quality, sustainability, economics, and crop production in more than 120,000 acres (about 17% of New Mexico's crop area) across the New Mexico. Based on a two-year study conducted at Tucumcari, strip tillage yield advantage in corn is estimated to be $12.9 million in value (based on 2017 New Mexico's acreage and price) over conventional tillage, in addition to the considerable energy savings. Additionally, conservation tillage has relative advantages of controlling soil erosion and improving water and nutrient use efficiency in the production systems.

- Proper alfalfa variety selection could provide $38 million industry increase in one year. Choosing a good alfalfa variety is a key step in establishing a highly productive stand of alfalfa. Differences between the highest- and lowest-yielding varieties in established irrigated alfalfa tests statewide ranged from 0.99 to 2.41 tons per acre in 2018. If sold as hay, this translates to a potential difference in returns of $213 to $518 per acre due to variety, or an increase of at least $38 million for the industry in 2018 alone.

- Manure application costs can be cut by up to 60% by applying manure only in the strip-till zone. Additionally, three years after a single 10 tons /A manure application, with or without incorporation, grain sorghum biomass continues to be greater by no-till planting into the original strip-till zone.

## UNIQUE CHARACTERISTICS

- The REK ASC at Tucumcari is the only NMSU facility with infrastructure and staff expertise to conduct both crop and livestock research, as well as outreach programs. This is important to accommodate the research needs of the resident and campus-based faculty who conduct research programs at Tucumcari and to meet the mission statement of serving New Mexicans.

- This is the only NMSU facility with staff training, infrastructure and permits to reuse treated municipal wastewater for irrigation as a partnership with the City of Tucumcari and the NM Water Trust Board. Of 84 acres under sprinkler, 36 acres are connected to the Tucumcari Irrigation Project, allowing for a comparison of the water sources.