

New Mexico State University Agricultural Experiment Station

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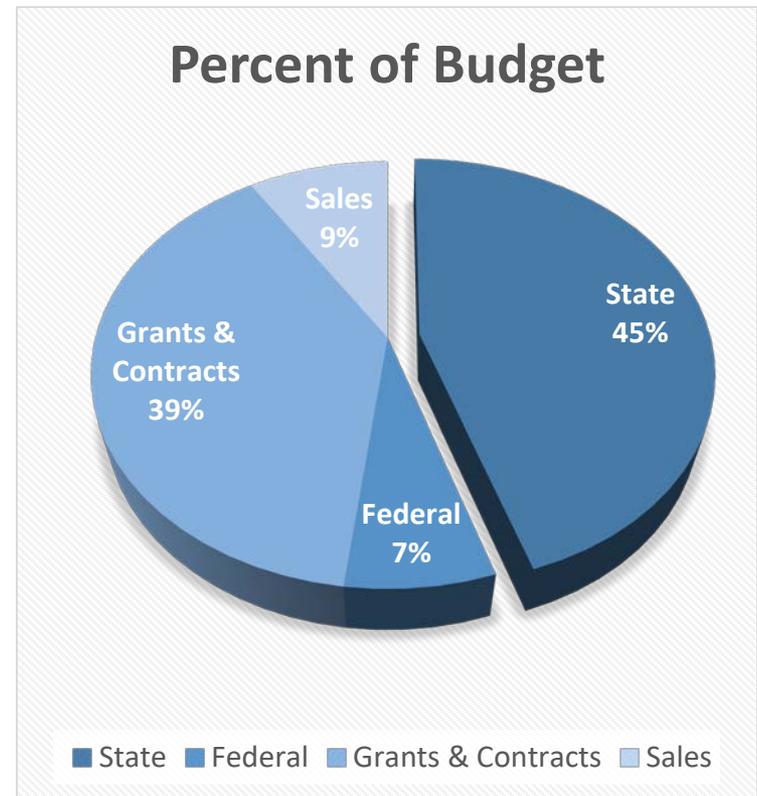
Agricultural Experiment Station Mission

- The Agricultural Experiment Station (AES) is the principal **research** unit of the College of Agricultural, Consumer and Environmental Sciences (ACES)
- The AES System supports fundamental and applied science and technology research to benefit New Mexico's citizens in economic, social, and cultural aspects of agriculture, natural resource management, and family issues
- AES was created by the federal Hatch Act of 1887 and was constitutionally mandated in New Mexico in 1915



Agricultural Experiment Station Budget

- Total FY20 AES budget = \$33.8 million (70% of budget is personnel service costs)
- State appropriations (\$14,948,600) constitute approximately 45% of the overall budget
- State's investment in AES is matched more than 1:1 through Federal appropriations, grants and contracts, and sales



Agricultural Experiment Station FY20 Legislative Funding for ASCs

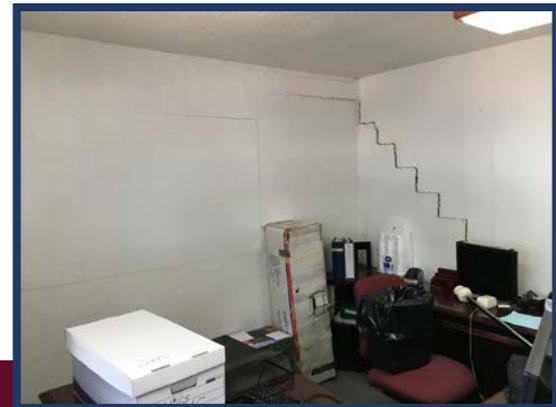
- The AES received \$3.15 Million in capital outlay plus an additional \$707,000 in non-recurring funds for critical repairs needs
- \$314,800 annual increase for maintenance
- A prioritized list of repairs has been established and have received estimated for repair costs.
- Projects are in the design phase with repairs expected to begin in 2020



THANK YOU

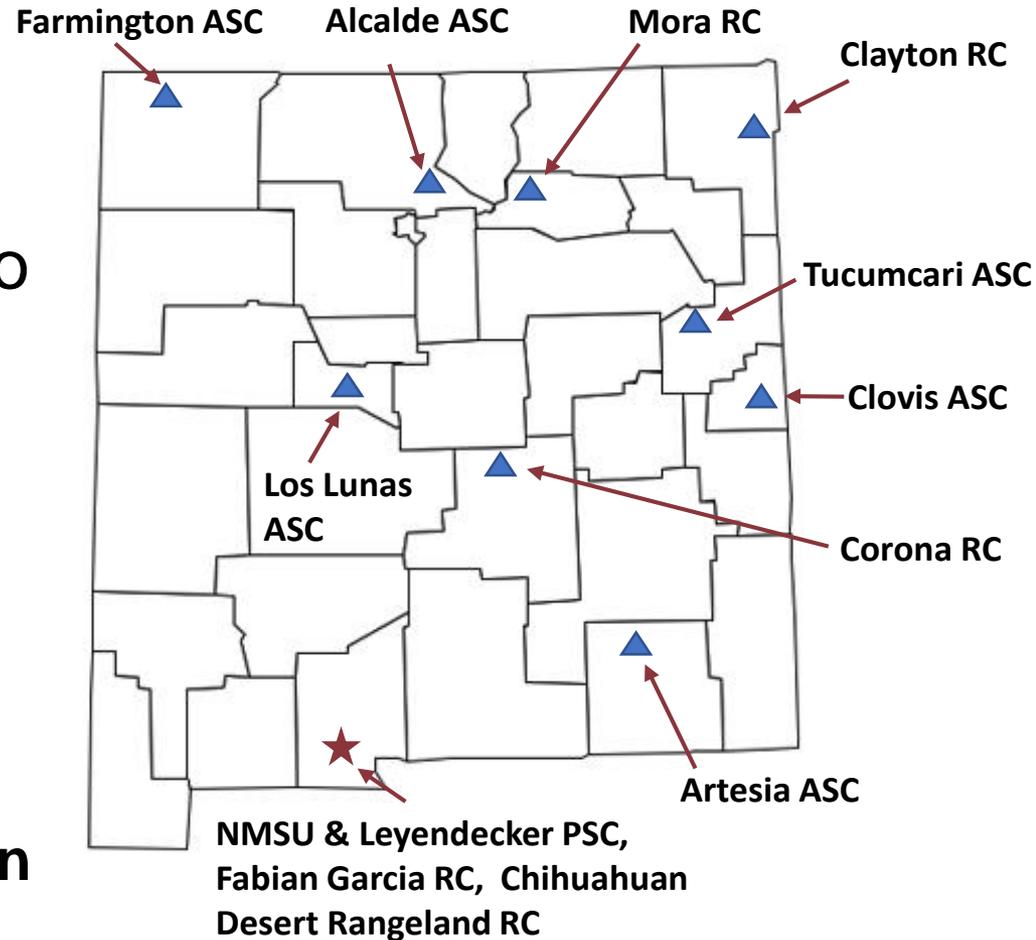
Agricultural Experiment Station FY21 Legislative Funding for ASCs

- Cost of current repair needs is approximately \$25 Million
- FY21 request is for an additional \$250,000 in operations for annual upkeep of the facilities at the ASCs
- \$3 Million Capital Outlay is also requested to complete additional critical needs.



Agricultural Experiment Station System Overview

- Agricultural Science Centers (ASCs) strategically located throughout New Mexico and the Las Cruces campus research facilities conduct research based on the needs of local stakeholders
- **Statewide impact:**
 - Research outcomes impact stakeholders in all counties



ASCs Address Diverse Agricultural Needs Statewide

- New Mexico is the 5th largest state in the country by area
- Land varies greatly in geography, climate, water resources, vegetation, soils, pests, land ownership, and land use
 - NM has 11 of the USDA's plant hardiness zones
 - NM has 3 crop production regions (only CA has as many)
 - NM has 5 USGS-defined watersheds (no other state has as many)
 - NM has 126 distinct soil types
- The challenges presented by this diversity are met through NMSU's research facilities that are strategically located throughout the state

Agricultural Experiment Station Advisory Groups

- The AES ensures that research remains current and relevant to NM through the use of advisory groups (ASC Advisory Committees, commodity groups and associations, etc.)
- These advisory groups:
 - ✓ Represent diverse interests of various stakeholders
 - ✓ Identify current research needs
 - ✓ Help to prioritize research efforts
 - ✓ Help in the planning of outreach efforts



Agricultural Experiment Station

“Training Tomorrow’s Scientists and Developing Work-Force Ready Graduates”

AES faculty train the next generation of agricultural professionals, providing hands-on learning and research opportunities for high school students undergraduates and graduate students



AES Research Efforts

- Approx. 9,500 acres of research sites (1,300 irrigated acres), plus campus-based laboratories
- Addresses diverse subject matter issues across the ACES pillars for economic and community development
- Includes short-, medium- and long-range collaborative, interdisciplinary research projects addressing immediate needs and providing solutions for agriculture's greatest challenges

ACES RESEARCH AREAS & FUNDING PRIORITIES



FOOD AND FIBER PRODUCTION AND MARKETING

- Plant and Animal Production and Health, including Biomedical Research
- Food Safety, Food Technology, and Value-Added Bioprocessing
- Nutraceuticals and Functional and Healthy Foods
- Plant and Animal Improvement using Genetic and Bioinformatics Tools
- Integrated and Novel Cropping Systems to Improve Resource Use Efficiency and Productivity
- Bioeconomy and Development and Marketing of Value-Added Products
- Integrated Pest Management in Crop and Urban Ecosystems
- Development of Alternative Crops and Mechanization Systems
- Economic Impact of Gastro-Tourism Events
- Organic and Specialty Crop Production and Marketing

WATER USE AND CONSERVATION

- Water Conservation in Cropping and Urban Ecosystems
- Water Quality and Availability, Development of Alternative Water Sources
- Irrigation Design and Efficiency
- Development and Use of Drought-Tolerant Plants

FAMILY DEVELOPMENT AND HEALTH OF NEW MEXICANS

- Nutrition and Chronic Disease Management
- Building Resilience in People (Physical, Emotional, and Financial Well-being)
- Parenting Education and Prevention of Adverse Childhood Experiences
- Health-Promoting Foods and Behaviors
- Alternatives to Synthetic Pesticides

ENVIRONMENTAL STEWARDSHIP

- Geospatial and Modeling Tools for Water, Soil, Wildlife, and Environmental Management
- Soil Health Assessment and Management
- Natural Resource, Water, and Environmental Economics and Policy
- Interconnection between Humans, Food, Energy and Water
- Food Waste Reduction Programs in the Hospitality Industry
- Invasive Species and wildlife conservation
- Climate Variability and Desertification

FOUNDATIONAL EDUCATION AND TRAINING

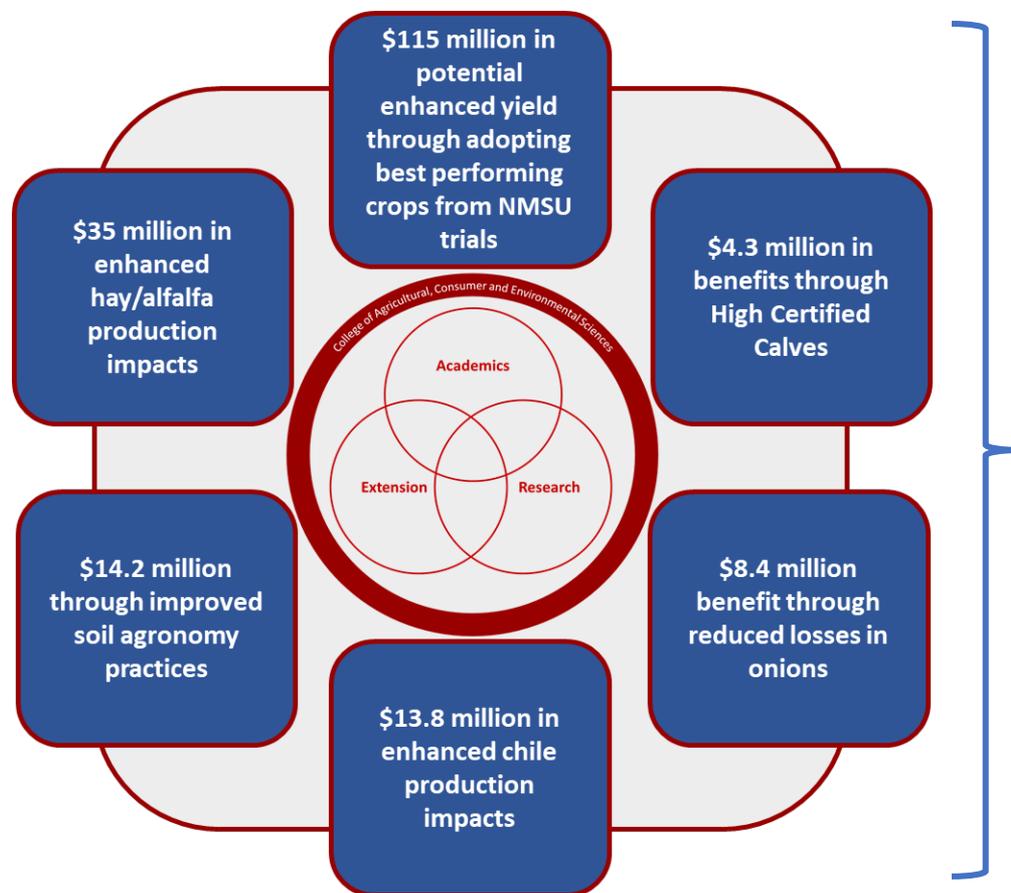
- STEM and Agricultural Education and Training (critical thinking and analysis of complex information)
- Agriculture Literacy Education for Teachers, Students, and Consumers
- Research-Based Design and Development of Educational Tools (e.g. Apps, Games, Video Animations and Virtual Labs)
- Research on the Effectiveness of Innovative Educational Media
- Volunteer Development and Management
- Leadership Development
- Improved Research Capacity for Underserved Populations

Agricultural Experiment Station • aces.nmsu.edu/aces

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Annual Impact from 6 selected Agricultural Programs*

Case Studies in ACES Impacts – Examples of Agricultural Program Impacts in New Mexico



Just six programs result in annual impact benefits estimated at over *\$190 million*

*Total impact of our work to the state's agricultural economy exceeds \$266 Million annually

Research Impacts Web Resources

- Faculty Impact Stories:
<https://aces.nmsu.edu/impacts/>
- Expanded impacts from long-term projects are being posted in the National Land-Grant University Database:
<https://landgrantimpacts.org/>
- TEConomy Report:
<https://aces.nmsu.edu/economicimpact/documents/teconomy-impact-report-for-nmsu-aces---final-reportr2.pdf>



Selected Agricultural Experiment Station (AES) Impacts

Find more ACES impact stories at aces.nmsu.edu/impacts.

- NMSU researchers are investigating ways to **improve cattle performance** via fetal programming, in which dams are provided unique feeds to enhance how progeny develop during pregnancy. Results demonstrated that arginine supplemented during early pregnancy can increase the progeny's ability to gain weight during the winter months when forage quality is low and can improve longevity of these offspring.
- High tunnels offer **season extension for high-value specialty crops** and have been shown to reduce water usage. NMSU researchers developed an intercropping growing system of kale, spinach, and blackberries that provides farmers with high-value crops year-round.
- Using cover crops has many direct and indirect benefits, including **reduced soil erosion, improved soil quality, and enhanced soil water retention**. Recent studies show the annual benefit of reducing soil erosion alone can be worth more than \$20/acre. If 20% of the field crop growers in New Mexico planted cover crops, the benefit would be more than \$20 million/year.
- NMSU researchers explored the potential **fiscal impact that retirees** could have in New Mexico. The analysis showed that in five years, one retiree household would generate almost \$36,000 in new tax revenue, suggesting a retiree attraction program could have a significant impact on the state's budget.
- NMSU researchers are developing a sugarcane aphid management program based on biological control, cultural controls, and host plant resistance. Implementing the program **will improve yields and reduce pesticide use**, increasing profitability by \$4.6 million/year in New Mexico and \$20 million/year in adjacent Texas counties.
- NMSU researchers, in collaboration with the U.S. Forest Service, have developed **new ponderosa pine seed transfer guidelines** that incorporate genetics, morphology, physiology, and climate to maximize survival and growth while limiting issues with insects and diseases. These new seed zones are being used by both public and private organizations involved in **reforestation programs**.
- **Guar is a low-water-use crop**, and guar gum has many uses in the food, bioenergy, and gas and oil industries. The demand for gum has increased exponentially, and the U.S. imports \$1 billion worth of guar gum annually. NMSU researchers are developing guar for rainfed and limited irrigation conditions. This crop will provide a profitable alternative for growers and will help sustain the Ogallala Aquifer.
- Irrigated agriculture, food production, and drinking water compete for surface and groundwater resources. NMSU researchers collaborating with Elephant Butte Irrigation District developed groundwater-surface water ratio of application (GSRA) as a metric for system resilience, and found storage was more correlated with surface water than groundwater use. Resilience can now be determined for managed and natural systems, with GSRA being a novel planning metric to support **water sustainability**.
- Recreational hunting and fishing creates over 7,900 jobs and contributes over \$450 million to New Mexico's economy. NMSU researchers are estimating the density and abundance of black bears and mountain lions in the state. The NM Department of Game and Fish can use this information in setting harvest levels, thereby balancing the beneficial economic impact of this industry with **wildlife species conservation**.
- NMSU researchers have shown that leafy spurge, an **invasive rangeland weed** in New Mexico, can be managed without herbicides using a small flea beetle that eats only the weed. Studies show that flea beetles reduce weed densities by more than 95%.

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The Center of Excellence in Sustainable Food and Agricultural Systems (CESFAS)

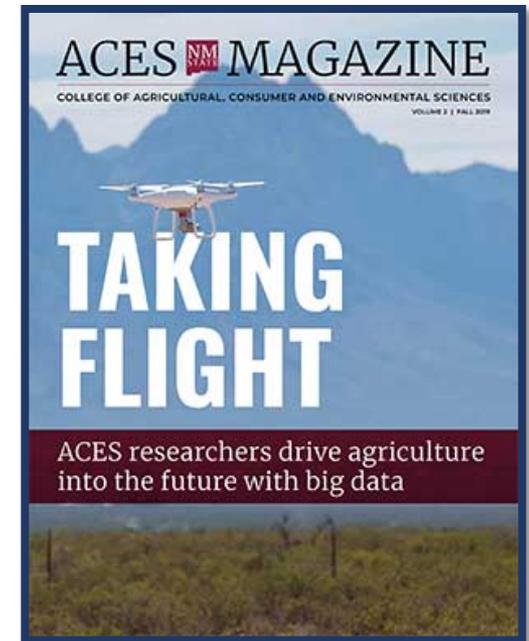
An Interdisciplinary Program at NMSU

- Established during the 2019 legislative session
- The CESFAS will be the leader in building a vibrant agricultural economy by conducting innovative, transdisciplinary, collaborative research that facilitates and develops strong food and value-added agricultural businesses
- The CESFAS will provide interdisciplinary training and education to students to give industries work-force ready employees
- In partnership with industry, the CESFAS will help meet the complex challenge of feeding a growing global population using fewer natural resources

The Center of Excellence in Sustainable Food and Agricultural Systems (CESFAS)

An Interdisciplinary Program at NMSU

- Funding has been leveraged with other NMSU funding and Industry support to create three new faculty positions:
 - ✓ Microbial Food Safety (Industry support)
 - ✓ Food Bioprocessing (joint appointment in the College of Engineering)
 - ✓ Sustainable Water Systems
- College of Business is developing a position in Value-Added Ag Supply Chain Entrepreneurship
- Funding is also being used for:
 - Administrative support
 - Program area faculty working groups



The Center of Excellence in Sustainable Food and Agricultural Systems (CESFAS)

An Interdisciplinary Program at NMSU

- FY21 expansion request (\$250,000) is for two additional faculty positions needed to fill critical gaps in current expertise:
 - ✓ Value-added Agribusiness Entrepreneurship
 - ✓ Ag and Food Law and Policy
- These positions will have spilt appointments in both research and Extension.
- Remaining funding will be used to support summer internships for undergraduates and for a competitive post-doc/ graduate student program



The Center of Excellence in Sustainable Food and Agricultural Systems (CESFAS)

Proposed Areas of Work

- Food safety
- Food security
- Nutraceuticals and functional foods
- Specialty markets for meat and produce
- Hemp Industrialization
- Sustainable Water Systems
- Soil Health
- Agricultural adaptability to climate variability
- Artificial Intelligence and Big Data Science
- Value-added agribusiness and ag supply chain entrepreneurship
- Food, Agriculture and Natural Resources Law and Policy
- Science and Agriculture Literacy and Consumer Education
- Agricultural and culinary tourism



The Center of Excellence in Sustainable Food and Agricultural Systems (CESFAS)

Potential Impacts

- Sustain human communities and the environments in which they live through food and agricultural systems that are environmentally sound, economically viable and socially responsible
- Develop and expand value-added agribusinesses in New Mexico
- Create jobs association with value-added agribusinesses
- Develop work-force ready graduates for wide-ranging careers



Thank you

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