



AGRICULTURAL SCIENCE CENTER AT CLOVIS

The mission of the Agricultural Science Center at Clovis is to conduct crop research and disseminate viable strategies that benefit New Mexico's citizens and agricultural production. We anticipate challenges, solve problems, build relationships, and secure funding.



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SELECTED PROGRAM IMPACTS

CROP-LIVESTOCK INTEGRATION FOR SOIL HEALTH AND SUSTAINABILITY:

Agriculture in the semiarid U.S. Southwest is facing challenges due to soil degradation, drought, climate variability, and high wind and water erosion. Agricultural management practices that maintain crop yields while improving nutrient and water use efficiency, increasing soil carbon sequestration, and mitigating greenhouse gas emissions can increase sustainability and profitability. A study conducted in eastern New Mexico grasslands and croplands revealed that conservation tillage systems could reduce soil erosion by 27%. Livestock-integrated crop systems had 12% more soil organic carbon and 40% more soil microbial biomass than ungrazed cropland.

COVER CROPS IN LIMITED-IRRIGATION WINTER WHEAT-SORGHUM FALLOW:

The western U.S. has lost more than 50% of native biodiversity since we started cultivation, substantially reducing agronomic and ecosystem services. Crop diversification and cover crop research at ASC-Clovis revealed improvements in efficiency, profitability, and environmental quality in dryland and limited-irrigation cropping systems, which in the long-term could increase water use efficiency by up to 25% and improve the response of selected soil health indicators by up to 17%.

WEED MANAGEMENT PROGRAM: Focuses on identifying and developing methods that enhance weed control and reduce crop yield losses due to weed competition. Several studies are being conducted at the Center to evaluate weed control and crop response to several herbicides. Results show that, depending on the weed species and density, controlling weeds early in the season could reduce crop yield losses by 50 to 75%. Growers are using this information to increase their income and reduce weed infestations in their fields.

CROP DIVERSIFICATION FOR SUSTAINABILITY: Developed low-water-use, deep-rooted alternative crops like winter canola and safflower to reduce irrigation applications by 40%, improve crop diversity, scavenge water and other resources from deeper soil profiles, and improve system resiliency and economic viability for the region. Examined potential of these oilseed crops to improve local production of protein for the cattle industry, which is currently imported from Canada.

NOVEL CROPPING SYSTEMS FOR ECOSYSTEM SERVICES: A novel concept of using underutilized parts of an irrigation mechanism to grow native perennial grass mixtures in concentric circles of buffer strips was developed to improve the

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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

The College of Agricultural, Consumer and Environmental Sciences is an engine for economic and community development in New Mexico, improving the lives of New Mexicans through academic, research, and Extension programs. New Mexico State University is an affirmative action/equal opportunity employer and educator. NMSU and the U.S. Department of Agriculture cooperating.

water cycle of center-pivot irrigation, improve water use efficiency, and reduce irrigation withdrawal from the Ogallala Aquifer. At the same time, it improves natural resource conservation, biodiversity, soil quality, carbon sequestration, and net primary productivity, and provides other management benefits.

DEFICIT IRRIGATION MANAGEMENT FOR IMPROVING WATER USE EFFICIENCY:

Understanding water use patterns of alternative crops under a range of water availabilities is essential to improve diversified cropping systems. Research on deficit irrigation management is focusing on rooting patterns, water extraction, and seed yield formation of different alternative crops under deficit irrigation strategies that can reduce competition with traditional crops for limited water and still improve adoption of water-efficient alternative crops.

PEANUT BREEDING: NuMex-01, a high-yielding, a high-oleic cultivar developed and released by NMSU's peanut breeding program, has a 13 % higher pod yield compared to existing cultivars, which could benefit the New Mexico peanut industry by more than \$500,000 per year.

THE U.S. DAIRY EDUCATION & TRAINING CONSORTIUM: The USDETC has proven to be a positive alternative or complementary education opportunity for students who have limited or no access to dairy courses or related learning experiences at their home universities. When asked "What impact did attending the consortium have on your current status," 92% replied important, very important, or extremely important. When asked about the impact the classes and experiential learning had on their course work and subsequent careers, 44% replied extremely helpful, 35% very helpful, and 15% helpful. When asked to rank the consortium classes as compared to other courses taken, 55% gave the consortium an A+ and 36% an A.



SELECTED PARTNERSHIPS AND COLLABORATORS

- Bayer Crop Science
- New Mexico State University Agricultural Experiment Station
- New Mexico Peanut Research Board
- National Peanut Research Board
- USAID–Peanut and Mycotoxin Innovation Laboratory (PMIL)
- USDA–ARS National Peanut Research Laboratory
- USDA–ARS Cropping Systems Laboratory
- USDA Natural Resources Conservation Services
- Seed Companies
- USDA–NIFA
- South Central SunGrant

- Ogallala Aquifer Program
- USDA–NRCS–CIG
- USDA–ARS, Bushland, TX
- USDA–ARS, El Reno, OK
- Other universities, including Kansas State University, Texas A&M University, Texas Tech University, and University of Florida
- International universities, including Northwest University of China, China Agricultural University, Nepal Agriculture and Forestry University, Malawi Chitedze Research Station, Thailand Khon Kaen University, and Zambia Agriculture Research Institute
- Instituto de Investigação Agrária de Moçambique (IIAM), Mozambique
- International Crops Research Institute for the Semi-Arid Tropics (ICRISAT), India

Faculty and Expertise

- **Abdel Mesbah**, Superintendent, EPPWS Dept.
- **Naveen Puppala**, Peanut Breeder, PES Dept.
- **Sangu Angadi**, Crop Physiologist, PES Dept.
- **Rajan Ghimire**, Cropping Systems Specialist, PES Dept.
- **Robert Hagevoort**, Extension Dairy Specialist, EAS Dept.

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Agricultural Experiment Station System