Figure 1. The College of Agricultural, Consumer, and Environmental Sciences pillars for economic development
Land-Grant Colleges

A land-grant college is an institution of higher education in the United States designated by its State Legislature or Congress to receive the benefits of the Morrill Acts of 1862, 1890, or 1994. The original mission of a land-grant university, as set forth in the first Morrill Act, was to teach agriculture and mechanical arts to a broader segment of the US population.

While the 1862 Morrill Act gave the land-grant college the mandate to educate; the research function was added in 1887 through the Hatch Act. This legislation funded a system of state Agricultural Experiment Stations (AES) to address the need for original research to support teaching and the development of agricultural innovations. Faculty with an AES appointment have potential access to “Hatch” research funds. These funds are administered and distributed by USDA to Agricultural Experiment Stations based on a formula calculation that includes population and the number of farms and ranches. The McIntire-Stennis Act of 1962 provided an additional funding source to increase forestry research and education in the production, utilization and protection of forestlands.

The Smith-Lever Act of 1914 enacted the college’s third function, “extension,” which was designed to disseminate knowledge generated by agricultural research at land-grant colleges beyond campus to farms and consumers. Extension was designed to be a cooperative effort between federal, state and county governments by a network of county extension agents.

Mission of the University

The mission of the New Mexico State University (NMSU) system is to serve the diverse needs of the state through comprehensive programs of education, research, extension and outreach, and public service. As the state’s land-grant and space-grant university, and as a Hispanic-Serving Institution, NMSU fosters learning, inquiry, diversity and inclusion, social mobility, and service to the broader community. The vision of NMSU is based on the NMSU LEADS 2025 Strategic Plan and is: By 2025, the NMSU system will excel in promoting social mobility for our diverse student populations, achieve the highest Carnegie research status (R1), and maintain our Carnegie Community Engagement classification.

Mission of the College

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 research, teaching and, extension.

About the College of Agricultural, Consumer and Environmental Sciences

The College of Agricultural, Consumer, and Environmental Sciences (ACES) at New Mexico State University (NMSU) consists of three major units (Academic Programs, the Agricultural Experiment Station System, and the Cooperative Extension Service). Based on both the college and university missions, the collaboration among these units and support services help to create
positive impacts on water usage and conservation, food/fiber production and marketing, environmental stewardship, family development, and the overall health of New Mexicans.

**Academic Programs**

Academic Programs provides leadership for the College’s academic instruction. Its primary mission is to prepare educated professionals for leadership roles in agriculture and natural resources, as well as professionals who contribute to the well-being of New Mexico’s citizens and New Mexico’s economic and community development.

Students have the opportunity to practice critical thinking, experience practical learning in and outside traditional classrooms and laboratories, work in group environments, and learn to communicate effectively. Graduate education, which includes research, is a link between Academic Programs and the Agricultural Experiment Station System.

**Agricultural Experiment Station System**

The Agricultural Experiment Station System is the research arm of the College. The Agricultural Experiment Station System interacts with all academic and extension departments of the College by supporting fundamental and applied research programs. The Agricultural Experiment Station System also cooperates with other research units at NMSU and with various state and federal agencies to provide opportunities for research that benefits New Mexico residents.

The Agricultural Experiment Station System is made up of scientists on the main campus and at the 12 agricultural science centers and research centers throughout New Mexico. The off-campus centers support applied research under New Mexico’s varied environmental conditions to meet the agricultural and natural resource management needs of communities in every part of the state.

**Cooperative Extension Service**

The Cooperative Extension Service is a partnership between federal, state, county, and local community governments; each partner contributes financial support to extension programs. The Cooperative Extension Service performs the organized service function of the land-grant institution by providing state and community-based outreach and education activities of the College. Its mission is to provide New Mexico with practical, research-based knowledge and programs to improve their quality of life. The base programs of the Cooperative Extension Service are agriculture and natural resource management, consumer and family issues, youth development, and community economic development.

Some Cooperative Extension Service faculty hold joint appointments in the Agricultural Experiment Station System and Academic Programs, strengthening cooperation and collaboration among the units. All college faculty, including state and county faculty, work closely together to bring research-based information to the residents of New Mexico.
College of ACES Research and Extension Pillars

In ACES, research and extension programs are based on four pillars that promote economic and community development: 1) food and fiber production and marketing, 2) water use and conservation, 3) family development and health of New Mexicans, and 4) environmental stewardship. The foundation to these four pillars is the educational and training programs within the college.

Food and Fiber Production and Marketing
Become the lead institution in the Southwest U.S. for research, teaching, and extension in agricultural production and marketing. Become a worldwide leader in subjects such as agricultural production, value added products, and marketing in semi-arid climates.

Water Use and Conservation
Become a leader in innovative water science and conservation research, effective outreach, and foundational education to promote water use or management and water conservation in semi-arid environments.

Family Development and Health of New Mexicans
Become the premier institution to promoting family development and health of New Mexicans.

Environmental Stewardship
Become the leader in innovative research, education, and effective outreach to promote environmental stewardship in semi-arid environments.

STRATEGIC PRIORITIES

GOAL 1: ENHANCE STUDENT SUCCESS AND SOCIAL MOBILITY

Goal: Create a program that effectively grows and shapes diverse enrollment, supports program demand, student retention and timely graduation, and produces highly qualified graduates with value added career outcomes.

Objective 1.1: Maintain and enhance a structure that supports student success

Actions:
- Initiate faculty lines to provide instruction in needed or emerging fields related to programs in ACES.
- Continue to identify and develop areas of excellence to attract quality students and faculty to ACES.
- Encourage and support faculty and staff training, development, and recognition.
- Pursue extramural grants and fellowships that target instruction, research opportunities, and professional training for students.
- Establish stakeholder advisory committees at the department level to align teaching, research, and activities that meet New Mexico’s needs.
- Use stakeholder advisory committees in student recruitment and support activities.
- Provide immersion-based learning opportunities for students.
• Provide students with opportunities for entrepreneurship training.
• Increase student work opportunities within the College, industry, and internationally.
• Expand job placement activities within the College.
• Create programs that enhance the social mobility of students.
• Foster a culture that expands student entrepreneurship opportunities.
• Support pathways for students to transition directly from ACES into careers.
• Increase and enhance support and success for the Faculty Led International Program (FLiP)

Objective 1.2: Regularly review and revise curricula to keep current and thereby increase student enrollment, retention, and learning.

Actions:
• Restructure curriculum to emphasize important career opportunities.
• Improve instructional efficiency by consolidating course and curricula offerings.
• Develop distance education opportunities that engage faculty and students with agricultural science centers and Extension programs across New Mexico.
• Develop hands-on instruction in all ACES programs.
• Develop new courses and/or modules to address common skill and knowledge deficiencies among some students and that addresses the needs of underserved and underrepresented groups.
• Develop additional PhD programs that include Applied Ecology and Natural Resource Management and Food Science and Human Nutrition.
• Establish a new degree in Food Industry Management.
• Develop new lower-division education courses that would fit into the general education common core.
• Continue to train students for careers
• Develop curriculum demonstrating the interdependent nature and interplay of culture, society, technology, economics, and the environment in shaping the economic development of communities.
• Require departments to regularly review their curriculum to incorporate changes in technology and emerging ACES subjects to improve learning and student preparedness for careers

Objective 1.3: Increase recruitment and retention as well as graduation rates of undergraduate and graduate students in ACES programs.

Actions:
• Implement a coordinated ACES undergraduate and graduate recruitment and retention plan aimed at traditional, nontraditional students, domestic and international students.
• Build a formal pipeline of students from K-12, community colleges and other universities to programs in ACES.
• Use our proximity to the border to enhance opportunities for international students.
• Increase online options for applicable courses and degrees.
• Encourage leadership development across the university by promoting participation in student clubs and university extracurricular activities.
• Broaden peer-to-peer student recruitment and mentoring opportunities in ACES.
• Forge connections between Extension youth programs and ACES recruitment programs and formalize credit options for non-credit ACES courses that are offered to the public.
• Provide ACES students with an opportunity to have an inspiring international experience.
• Promote internships, exchanges, and other opportunities to all students.
• Develop and coordinate dual-credit, lower division courses to be delivered to high schools via distance technologies.
• Facilitate the effective use of scholarships as a recruitment tool.
• Continue efforts to include K-12 teachers and Extension in cultivating and recruiting high-quality students.

**GOAL 1 Key Performance Indicators (KPIs)**

1. Enrollment growth

2. Enrollment growth that includes diverse groups

3. Graduation rates

4. Retention rates

5. Student satisfaction

6. Internships

7. Course enrollment

8. Employment rate, income, upward mobility rank

**Leading indicators**

Job, fellowship and internship placement rates

Enrollment of domestic and international students, as well as students from underrepresented groups, in undergraduate and graduate programs

Student enrollment in ACES interdisciplinary courses, ACES courses with an international focus, and ACES courses that include faculty with Agricultural Science Centers and Extension programs across New Mexico

Four, five, and six-year graduation rates of undergraduate students

Student participation and success in local, regional, national, and international meetings and competitions.

Number of faculty participating in training programs and seminars for teaching improvement
Frequency of meetings with stakeholder advisory committees to align teaching, and activities with New Mexico’s needs

Student satisfaction ratings from exit surveys

**GOAL 2: ELEVATE RESEARCH AND CREATIVITY**

This strategic priority identifies research and creative strength, engages students and strategically builds capacity, funding, and good reputation. In ACES, research and creativity are defined through four pillars for economic and community development: 1) food and fiber production and marketing, 2) water use and conservation, 3) family development and health of New Mexicans, 4) environmental stewardship, and foundational education and training

**Objective 2.1:** Conduct research, teaching, and extension programs on emerging issues.

**Actions:**
- Identify strategies to promote New Mexico’s food supply chain activities (transportation/distribution, warehousing, storage, and processing) that link farm and ranch production with consumers.
- Expand programs in molecular biology, nutritional toxicology, and microbiology.
- Create new economically viable uses for various plant and animal species.
- Develop management and mitigation strategies to combat pesticide resistance.
- Build value-added programs in crop, animal, and range sciences.
- Emphasize genetic improvement of crop plants.
- Study strategies to market products more efficiently and profitably.
- Develop urban horticulture programs to assist small agricultural efforts and the green industry.
- Identify and develop niche markets and products (e.g., animal products, medicinal plants, local foods, alternate crops, organic crops, community gardens, and farmers’ markets).
- Identify and develop value-added opportunities for farmers, ranchers, and other producers.
- Conduct research related to food science, food technology, and post-harvest handling and processing of value-added agricultural products.
- Maintain and enhance existing infrastructure and capability that supports research, teaching, outreach, and Extension.
- Bring avant-garde technologies in agriculture to New Mexico to improve economic development.
- Assess coping strategies, decision-making and communication skills, and consumer-behavior.
- Increase our understanding of the language, customs, values, and needs of New Mexico’s diverse citizenry.
- Conduct research to help young people acquire knowledge, develop life skills, and form attitudes that enable them to become self-directing, productive, and contributing members of society.
- Conduct research on industries that benefit the economy of New Mexico.
- Expand and enhance efforts in biomedical research.
• Support discovery research for the development of crops and cropping systems that are resilient to water scarcity, pests, and disease.
• Support interdisciplinary initiatives that enhance production of alternative and specialty crops.
• Increase research on organic and conventional crop production.
• Foster collaborative research projects with other agricultural research institutions, industry and farmers.

**Objective 2.3:** Address critical water use and conservation issues in New Mexico and beyond (national/international) using a science-based approach.

**Actions:**
• Discover and develop methods for characterizing water supply and water quality, especially in semi-arid environments.
• Advance our understanding and ability to characterize aquatic ecology over a range of scales especially in semi-arid areas with ephemeral surface flows that disconnect, contract, and expand aquatic habitats.
• Advance our understanding of impacts of using alternative water sources for irrigated agriculture.
• Characterize groundwater and/or surface water resources to understand water availability.
• Discover requirements for water resource sustainability within the fragile environment of semi-arid systems.
• Optimize agricultural water resources including ground and surface water through water allocation, water conservation, and water management to provide safe and secure food systems while ensuring ecosystem services.
• Develop management approaches for watershed, riparian, and aquatic systems.
• Develop analysis of water focused on economics and policy to examine the valuation/demand for water through various uses, and water-related policies.
• Advance methods/technologies for water informatics including the collection, classification, manipulation, storage, retrieval and especially the dissemination of water information.
• Develop novel remote sensing data collection and analysis methods to improve water availability, fluxes, storage, and water use efficiency across scales from the field plot to the global scale.
• Assess and understand the impacts of prolonged drought, climate change, increasing aridity on available water supply, agricultural water utilization, and ecological sustainability.
• Increase water quality and quantity through improved water use, treatment, and conservation.

**Objective 2.4:** Encourage and reward interdisciplinary and integrated relationships with other research efforts across the university and external partners, emphasizing both applied and fundamental methods for developing comprehensive solutions to relevant issues.
Actions:

- Establish a Center of Excellence on Sustainable Food and Agricultural Systems that integrates transdisciplinary research across diverse departments within NMSU colleges and creates partnerships with industry stakeholders.
- Develop and enhance collaboration with other universities, federal agencies, private industry involved in research.
- Continue and develop research collaboration through consortia and international programs.
- Forge research linkages with other units at NMSU to achieve comprehensive excellence in research and creative activity.

Objective 2.5: Address critical environmental issues in New Mexico and beyond

Actions:

- Discover and develop methods for characterization of contaminants of emerging concern (CEC).
- Discover innovative water treatment technologies to remove a suite of these CECs that are recalcitrant to many treatment methods (e.g., biodegradation).
- Advance our understanding of controlling processes and mechanisms influencing soil quality resiliency through alternative brine water irrigation and soil salinization.
- Develop novel methods for characterization of soil erosion with consideration of both wind erosion and ephemeral storm-flood events.
- Use novel methods assess dust, soil erosion, and industrial release impacts on air pollution.
- Study desert and rangeland ecosystems.
- Determine the role of livestock in the control of wildfire and invasive plant species.
- Support programs that seek to understand how microbial community diversity characterization and ecosystem functionality impact desertification and rangeland management.
- Discover requirements for natural resource sustainability within the fragile environment of desert systems.
- Assess and understand the impacts of prolonged drought, climate change, increasing aridity on natural resource, environmental, and ecological sustainability.
- Investigate the natural environmental system and agricultural industrial controls over nutrient fluxes, utilization, and cycling/recycling.
- Develop novel utilization approaches and advance our understanding of environmental impact of renewable energy (e.g., biofuels) within desert environments.
- Explore new markets to promote forest industry and related forest health.
- Investigate forest management practices that improve forest health and water values in connection to climate change and fire risk.
- Conduct research to improve wildlife habitat needs with special attention to endangered and threatened species.
- Explore the impacts of recreation and tourism activities on ecosystem structure and function.
- Investigate multiple land use options for rural communities that includes ecosystem service markets.

**GOAL 2 KPIs**

9. Externally-funded research and creative activities

10. Research productivity

11. Number of proposals submitted

**Leading indicators**

Amount of grant funding

Number of facility investment projects

Research and development expenditures

Contributions to intellectual property and technology innovation and transfer

Number of publications in top tier journals within disciplines

Number of faculty research awards and recognitions for research accomplishments

Number of faculty serving on proposal review panels

Journal service, conference presentations/organization

In kind funding

Number of graduate students

Proposals submitted (total $ requested)

Research funding (total $ awarded)

Number of researchers (FTE)

Publications (AES and refereed journals)
GOAL 3. AMPLIFY EXTENSION, OUTREACH, AND ECONOMIC AND COMMUNITY DEVELOPMENT

Extension is the deliberate programmatic activities for transferring university scientific knowledge and advancements to relevant external audiences through open-access information resources, presentations, events training programs and individual consultations. Outreach activities include research, connections with communities and families, multigenerational engagement, economic development and entrepreneurship, and collaborative efforts with industry and corporations.

Objective 3.1: Develop innovative, multidisciplinary educational programming addressing issues that are relevant to New Mexico and expand the clientele base.

Actions:
- Conduct needs assessment with advisory committees and other stakeholders to guide extension and outreach program development.
- Develop programs that encompass Extension program areas and engage traditional and new audiences across rural and urban New Mexico.
- Develop effective program delivery methods.
- Produce materials that can be delivered through mass media outlets – publications, news items, social media, and different languages.
- Initiate faculty lines to provide additional expertise in areas identified by stakeholder advisory committees.
- Support New Mexico business development and management by facilitating community and business planning activities.

Objective 3.2: Connect current research with the community.

Actions:
- Hold workshops and field days on campus and at off-campus.
- Improve websites that offer results for current research.
- Empower producers to further develop and diversify production practices based on current research.
• Demonstrate the importance of natural resource conservation and management practices.

**Objective 3.3:** Seize new opportunities to effectively raise awareness of Extension resources, programs, and successes.

**Actions:**
• Measure and report the impact of Extension programming using innovative approaches that capture the ways Extension is making a positive difference.
• Define uniform messaging and branding.
• Showcase success stories of Extension Agents and Specialists to establish relevance to stakeholders.
• Utilize the full breath of media (e.g. print, video, audio, digital), including social media to raise awareness of Extension.
• Develop branded materials that are easily adapted for use with county-level programs.
• Optimize use of resources by developing coordinated applied research plans among ACES faculty.

**Objective 3.4:** Increase recruitment and retention of youth involved in Extension and outreach programs to broaden access to the NMSU experience.

**Actions:**
• Inspire confidence and conviction among New Mexico’s youth to become tomorrow’s leaders by strengthening educational programs both on and off campus.
• Develop pathway to connect 4-H youth to NMSU community.
• Provide opportunities for NMSU students to gain insights into Extension programming efforts.

**Objective 3.5:** Collaborate with small- and large-scale industry, tribal communities, and community organizations to address enhancements to food and fiber production and marketing, water use and conservation, family development and health of New Mexicans, environmental stewardship.

**Actions:**
• Establish an agricultural business development and rural Communities Research and Extension Center to meet the agriculture and food industry’s research and applied business training needs.
• Work with Tribal communities throughout New Mexico to share knowledge on environmental stewardship and health and wellness efforts across the state and region.
• Hold workshops to address specific environmental, health, wellness, and youth needs determined by Tribal and other communities.
• Connect Tribal youth to undergraduate and graduate degrees in ACES.

**Objective 3.6.** Support faculty, staff, and students from various colleges and departments across the university in field-based community and economic development research, educational activities and international development programs.

**Actions:**
• Build relationships with research programs in other countries.
Increase collaboration with counterparts in Mexico to address related environmental issues, health, wellness, youth development, and border issues.

- Build college and department partnerships with private and public sector community and economic development organizations and entities to support ACES’ mission.
- Establish a self-supported International Extension Training Center.

**GOAL 3 KPIs**

12. Evaluation of impacts of programs
13. Financial investment in programs
14. Outreach and extension expenditures
15. Extension and outreach programs related to community and economic development
16. Extension clientele contacts, workshops, and courses

**Leading indicators**

Number of collaborative industry, agency, and community activities

Student, faculty, and staff service to communities

Business, individuals, or communities assisted

Number of stakeholder-driven educational and certificate training programs

Number of youth and students engaged

Number of Youth: Provide development opportunities and preparation for college and career readiness for NM youth

Faculty and Staff numbers: Maintain a diverse faculty and staff to address educational needs of NM citizens

Number publications and media releases: Educate and inform clientele through publications and media distributions

Clientele contacts: Disseminate research-based information and community development activities to the citizens of NM

Amount federal and county appropriations: Secure other funding by leveraging State Dollars

Dollar amount proposals submitted: Secure other funding by leveraging State Dollars

**GOAL 4. BUILD A ROBUST UNIVERSITY BY IMPLEMENTING COLLEGE-WIDE, MISSION-SUPPORTING STRATEGIC INITIATIVES**
ACES unique elements promote learning, inquiry, diversity and inclusion, social mobility, and extension by integrating across and between disciplines throughout NMSU extended to K-12 and lifelong learners both locally and internationally. These ACES initiatives provide a diverse academic environment that is reflective of a global society.

Objective 4.1: Recruit undergraduate and graduate students and faculty globally and increase the recruitment from underrepresented groups

Actions:
- Collaborate with the ACES Global Initiatives Program to identify opportunities for recruiting students interested in food and fiber production and marketing, water use and conservation, family development and health of New Mexicans, and environmental stewardship.
- Provide ACES support for educational outreach efforts that serve high schools with high percentages of students from underrepresented groups.
- Develop a program to enhance transition of underrepresented undergraduates to graduate programs within ACES.

Objective 4.2: Expand a K-20 outreach program, inclusive of 4-H, focused on increasing participation and underrepresented groups to increase student awareness and participation in ACES programs and associated careers.

Actions:
- Develop and expand summer and year-round ACES programs for youth including underrepresented groups.

Objective 4.3: Encourage interdisciplinary and integrated management approaches in planning and implementing programs, emphasizing both applied and fundamental methods for developing comprehensive solutions to important issues.

Actions:
- Develop a transdisciplinary initiative for digital and prescriptive agriculture, New Mexico agri value-chain enhancement, agricultural literacy initiative, and for youth development via online learning and STEM programming.
- Expand collaborative efforts across the university, including the USDA Jornada Experimental Range and the USGS Fish and Wildlife Cooperative Research Unit, emphasizing both applied and fundamental methods for developing comprehensive solutions to important issues.

Objective 4.4: Elevate and promote the impacts and visibility of the College

Actions:
- Develop information that can be used to communicate the broad and high-quality services of the College.
- Inform the people of New Mexico about accomplishments, areas of excellence, and the impacts of ACES accomplishments.
- Inform legislators of how the College is helping them solve key problems for the people they represent.
• Continue communication and cooperative efforts with family and agricultural commodity groups, trade, business, and educational associations.
• Promote and market the academic programs in ACES and inform our constituents of the career opportunities an ACES degree provides.
• Continue to improve the functional and esthetic quality of the on and off-campus infrastructure of ACES.
• Continue technological development and improvement of classes and facilities.
• Give high priority to improving classrooms and other educational facilities for students.
• Expand efforts to organize alumni, retirees, and constituents as advocates of ACES.

**Objective 4.5:** Continue a targeted involvement in multistate, regional, and international programs  
**Actions:**

• Encourage and reward multistate, regional, and international research, teaching, and extension activities, when appropriate.
• Participate in NMSU’s effort to internationalize its courses of study.
• Work with industry to develop workforce opportunities for students.
• Communicate the importance of regional and international activities to New Mexico citizenry and legislators.

**Objective 4.6:** Increase the level of support for ACES from the citizens of New Mexico, local, state, and federal governments and agencies, private corporations, foundations, and alumni.  
**Actions:**

• Continue participating with constituency and lay groups within cooperative ventures and coalition-building activities with the College.
• Use key constituents to expand and refine the College’s legislative initiatives.
• Foster engagement with industry through internships, externships, and work experiences for students.

**Objective 4.7:** Encourage, cultivate faculty and staff excellence and support faculty and staff training, development, and recognition.  
**Actions:**

• Increase the number of endowed chairs, fellows, professorships, post docs and centers of research excellence.
• Establish a system of incentives for excellence in teach, research, and Extension at the faculty, staff, and unit level.
• Strengthen initiatives in leadership development.
• Provide faculty and staff with training opportunities that will empower them to identify and implement processes that enhance system efficiency.

**GOAL 4 KPIs**
17. Number of collaborative efforts across departments to address the critical problems affecting New Mexico’s agriculture and rural areas
18. Number of training modules developed and utilized

19. Number of public communications and news stories regarding research, extension and outreach efforts taking place within ACES

20. Number of successful tenure and promotion applications

21. Number of research and outreach collaborative activities across departments and colleges, and scientific organizations across the region and nation

22. Number of stakeholders that participate in cooperative ventures and coalition-building to increase resource support for the college

23. Increased number of endowed chairs, fellows, professorships, post docs, and centers of excellence

**Leading indicators**

Establishment of a system of incentives for excellence in teaching, research, extension, external grantsmanship

Number of ACES news stories, ACES accomplishments, and areas of excellence presented to New Mexico legislators and other New Mexicans

Development of transdisciplinary initiatives for digital and prescriptive agriculture, New Mexico agriculture value chain enhancement, agriculture literacy initiative, and youth development via online learning and STEM programming.