

STRATEGIC PLAN FOR THE AGRICULTURAL SCIENCE CENTERS OF THE NEW MEXICO AGRICULTURAL EXPERIMENT STATION SYSTEM

College of Agricultural, Consumer and Environmental Sciences New Mexico State University 2020–2025

Introduction

The Agricultural Experiment Station (AES) system is the research arm of New Mexico State University's (NMSU) College of Agricultural, Consumer, and Environmental Sciences (ACES), consisting of scientists on the main campus and at agricultural science centers (ASCs) throughout New Mexico. The 12 off-campus centers support fundamental and 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. ASCs consist of two types: 1) facilities without resident faculty, which serve as research support field laboratories for campus-based faculty, and 2) off-campus facilities with faculty stationed at the centers that also serve, in part, as research support field laboratories for campus-based faculty.

Meeting the AES Mission

The AES system supports fundamental and applied science and technology research to benefit the economic and community development of New Mexico's citizens in the economic, social, health, and cultural aspects of agriculture, natural resources management, and family issues, which are represented in the ACES Four Pillars: 1) food and fiber production and marketing, 2) water use and conservation, 3) family development and health of New Mexicans, and 4) environmental stewardship. Faculty support the AES mission through work done at the science centers, NMSU Main Campus, and collaborative work with people and institutions across the state and beyond. While the ASCs were established to conduct research under the AES, community needs have prompted a broader approach over the years. Some faculty at ASCs now have majority Extension appointments. Several ASCs note Extension/outreach efforts in their mission statements, regardless of whether any faculty have formal Extension appointments. Recent investments and incentives also promote increased engagement of ASC faculty in teaching and advising graduate students.

AGRICULTURAL SCIENCE CENTER SYSTEM RESPONSE TO NMSU LEADS 2025 STRATEGIC PRIORITIES

GOAL 1: ENHANCE STUDENT SUCCESS AND SOCIAL MOBILITY

Supporting the College Teaching Mission

In addition to supporting research, Extension, and outreach, all ASCs should have influential roles supporting the teaching mission of ACES. Currently, some faculty at ASCs are members of the Graduate Faculty and serve as members of graduate student committees and/or as advisors to

M.S. and Ph.D. students. Many of the ASCs host student tours and support graduate student research projects at the centers. There is potential for more ASC faculty to serve as guest speakers in undergraduate and graduate courses, and more ASC faculty should be encouraged to teach courses via distance to both students on campus and perhaps at other ASCs, provided there are additional Instruction and General (I&G) funds to support this effort and to upgrade the internet capabilities. There also is potential for increased summer internships and undergraduate student mentoring, which potentially could increase the recruitment of graduate students interested in working with ASC faculty. ASC faculty are also well-positioned geographically to extend the reach of ACES undergraduate student recruiting efforts and should be included in the College recruiting strategy. Additionally, there is an opportunity to expand the ASCs into certificate learning (e.g., new and beginning farming and ranching) that are non-traditional student-based learning tracks).

Objective 1.1: Maintain and enhance the existing structure that supports student success.

Actions:

- Pursue extramural grants and fellowships that target research opportunities and professional training for students.
- Collaborate with campus and other ASC faculty on grants that support graduate student research.

Objective 1.2: Increase recruitment and retention of undergraduate and graduate students in programs of the College of ACES.

Actions:

- Use stakeholder advisory committees in student recruitment and support activities.
- Provide immersion-based learning opportunities for students.
- Promote and market the academic programs in ACES and NMSU, and inform our constituents of the career opportunities an ACES degree provides.
- Include ASC faculty on departmental and college recruitment committees.

Goal 1 Key Performance Indicators (KPIs)

- Graduate students mentored by ASC faculty.
- Formal classes taught by ASC faculty (on-campus or by distance).
- Guest lectures by ASC faculty.
- Outreach events at ASCs with a recruiting component.
- Undergraduate student hires at ASCs.
- Internships offered/internships conducted.
- Graduate research activity.

GOAL 2: ELEVATE RESEARCH AND CREATIVITY

Active collaboration occurs among ASCs and with main campus. All ASCs are involved in graduate education either by ASC faculty having their own graduate students or through collaboration with faculty on NMSU's main campus. Increasing these efforts will enhance the overall impact of the work of the AES.

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.
- Investigate 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.
- Test genetic improvements of crop plants.
- Develop urban and small landholder horticulture programs to assist small-scale 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.
- Maintain and enhance existing infrastructure and capability that supports innovative applied research.
- Bring avant-garde technologies in agriculture to New Mexico to improve economic development.
- Assess coping strategies, decision-making and communication skills, and consumer behavior for producers.
- Support research for the development of crops and cropping systems that are resilient to water scarcity, pests, and disease.
- Support interdisciplinary initiatives that enhance the 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 2.2: 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 of the impacts of using alternative water sources for irrigated agriculture.
- 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.
- Assess and understand the impacts of prolonged drought, climate change, and increasing aridity on available water supply, agricultural water utilization, and ecological sustainability.

- Increase water quality and quantity through improved water use, use of alternative water sources, treatment, and conservation.

Objective 2.3: 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:

- Develop and enhance collaboration with other units at NMSU, other universities, federal agencies, and private industry involved in research.
- Develop research collaborations through consortia and international programs.
- Identify and target public-private relationships and partnerships.

Objective 2.4: Address critical environmental issues in New Mexico and beyond.

Actions:

- Advance our understanding of controlling processes and mechanisms influencing soil quality resiliency through alternative 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 to assess dust, soil erosion, and industrial release impacts on air pollution.
- Determine the role of livestock in the control of wildfire and invasive plant species.
- Support programs that seek to understand how microbial community diversity and ecosystem functionality impact desertification and rangeland management, as well as soil health in cultivated systems.
- 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 the environmental impacts of renewable energy (e.g., biofuels) within desert environments.
- Investigate forest management practices that improve forest health and water values in connection to climate change and fire risk.
- Investigate multiple land use options for rural communities that include ecosystem service markets.

Goal 2 Key Performance Indicators (KPIs)

- Research and development expenditures
- Contributions to intellectual property and technology innovation and transfer
- In-kind funding
- Number of graduate students associated with ASCs
- Proposals submitted (total \$ requested)
- Research funding (total \$ awarded and sources [Federal, State, Industry, Foundation, Other])
- Number of researchers (FTE)
- Publications (refereed journals, plus AES and Extension publications)
- Intellectual property

- Number of joint/collaborative projects between ASCs
- Number of joint/collaborative projects between ASCs and main campus
- Number of joint/collaborative projects between ASC AES faculty and CES faculty
- Number of joint/collaborative projects between ASCs and governmental and other agencies (e.g., national labs, USGS, NRCS)
- Number of collaborative projects between ASCs and local communities/community organizations
- Number of workshops/presentations/field tours
- Stakeholder events with scientists in attendance
- Number of advisory board meetings
- Student employment (# undergraduate and graduate students employed)
- Gift revenue (total \$)
- Main Campus Faculty contacts and encouragement

The following are provided as suggestions to encourage and increase collaboration with and between off-campus ASCs.

- On-campus faculty should be encouraged to collaborate with ASCs. Off-campus faculty normally have been expected to take the initiative to seek collaboration with on-campus faculty. With more involvement of faculty at ASCs, increased graduate student involvement at ASCs should follow. A recent example of an incentive for graduate students and their advisors was the internal ACES graduate student grants that gave additional funds for awarded projects occurring at off-campus centers.
- Graduate student housing should be available at all off-campus ASCs. Also, graduate courses, whenever possible, should be online so students can take them while living at/near the ASC where they are carrying out their research. Off-campus ASCs should have high-speed internet to allow for distance learning opportunities and participation in other activities conducted on the main campus (e.g., department and college meetings, research collaboration meetings, seminars, trainings, etc.).
- ASCs need better facilities to attract collaborators (such as USDA-ARS, other universities, and industry). Research facilities (lab, equipment, greenhouses) are either lacking or out of date. Funding for improvements to our current ASC infrastructure is needed for our faculty to be successful in garnering resources through the competitive grant process.
- The ASCs need sufficient staff/help to be able to collaborate effectively. Even with grant monies, ASCs might not be able to hire the people with the needed skills and knowledge to carry out the planned research, because the pay scales are too low to attract and retain personnel. A review of the job categories, classifications, and pay scales available for agricultural staff by NMSU's Central Administration and the development of greater diversity in positions is needed.

- Off-campus faculty should have the same resources available to them as on-campus faculty. For example, NMSU's Teaching Academy provides training on grant writing but does not put the training online.
- Indirect Cost (IDC) will be returned to the ASCs where the research was performed, regardless of which unit a researcher's Banner Org Number is assigned.

To keep the ASCs viable in the future, they must continue to build on their long history of researching innovations that enable our agricultural stakeholders to advance their business enterprises. In this capacity, the centers need to be visionary in planning for the future research needs of their clientele. Input from advisory boards and local stakeholders is an essential part of the process of developing future research plans. Maintaining agricultural relevancy through innovative research plans will sustain the growth of the agricultural industries, thereby enhancing the socioeconomic resilience of rural communities. Additionally, incentivizing public/private partnerships will help foster research that provides economic benefits to rural communities.

GOAL 3. AMPLIFY EXTENSION, OUTREACH, AND ECONOMIC AND COMMUNITY DEVELOPMENT

Extension consists of 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 presentations, connections with communities and families, multigenerational engagement, economic development and entrepreneurship, and collaborative efforts with industry and corporations.

Communication and Dissemination of Research Impacts at ASCs

Many valuable research projects that provide both short-term and long-term benefits to citizens of NM are conducted at NMSU's ASCs; ensuring that state clientele are familiar with ASC activities is key to continuing support of the facilities. Increasing awareness of the ASCs can be accomplished by creating or increasing existing partnerships with county Cooperative Extension Service personnel, increasing social media presence, and hosting events that encourage local partnerships. Increased collaboration with NMSU Marketing and Communications Services is necessary for improved publicity and marketing. Partnerships between ASC researchers and communications specialists have resulted in YouTube clips that have widely spread information on projects to state clientele as well as national and international audiences. These productive connections further research connections that increase external funding opportunities.

Increasing role of Cooperative Extension: Although there is not an ASC in every NM county, there is a Cooperative Extension office with at least one county agent intimately knowledgeable of the local challenges and concerns, as well as the community leaders and politically-connected individuals. To take advantage of these connections, the county's agent (or agent from an adjoining county) should be a member of the ASC Advisory Board and should also be consulted regarding soliciting other members. ASCs will provide updates semi-annually to county agents and the advisory committee. Agents will be engaged to spread information regarding ASC

activities to their county clientele. Some ASCs are already heavily involved with the Cooperative Extension Service because of an increase in the number of faculty positions at off-campus centers with official appointments in both research and Extension. Increasing joint research and Extension appointments would increase collaborative efforts across the college and could foster increased public outreach conducted by ASC employees.

A joint AES-Extension session when Extension personnel meet at their annual Extension in-service training would help alert Extension personnel to opportunities for collaboration.

Increasing Social Media and Web-based Communication: Social media is increasingly important as a conduit for information to and between people. While all the ASCs have a website and many exploit Facebook, Twitter, and other social media platforms, these activities should increase. At least one person at each station should be tasked with providing regular posts highlighting research impacts, activities, and events at the ASC as well as ensuring website information is up-to-date.

Community Events to Foster Connections: Traditional field days raise the profile of ASCs and are conducted regularly at most sites, but increasing the number of events with hands-on activities and connections to local schools, community organizations, and other clientele can create partnerships with the ASCs. NMSU researchers without Extension appointments should have a small allocation of effort in outreach to ensure that their research results are disseminated to stakeholders. Likewise, the ASC Superintendents should maintain an outreach allocation to facilitate the outreach efforts of their station. This could include serving on school boards and participating in service organizations, as well as providing opportunities to ensure that research occurring at each ASC is disseminated to the public.

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

Actions:

- Produce materials that can be delivered through mass media outlets – publications, news items, social media content, and different languages.
- Initiate faculty lines to provide expertise in areas identified by stakeholder advisory committees.

Objective 3.2: Connect current research with the community.

Actions:

- Hold workshops and field days.
- Improve websites that describe the results of current research.
- Increase social media presence to highlight research and creativity activities.
- Demonstrate the importance of natural resource conservation and management practices.
- Help the Cooperative Extension Service disseminate research-based information to the citizens of NM, including co-authoring Extension publications based on research conducted at the ASCs.

Goal 3 Key Performance Indicators (KPIs)

- Evaluation of impacts of programs.
- Financial investment in research programs and centers.
- Outreach expenditures.
- Outreach programs related to community and economic development.
- Clientele contacts, workshops, courses, and field days.
- Number of collaborative industry, agency, and community activities.
- Number of public programs hosted at ASCs.
- Number of youth, students, faculty, and staff engaged in programs at the ASCs.
- Number of general publications and media releases.
- Number of invited presentations.
- Number of stakeholder events, meetings, and tradeshow attended.
- Number of community, stakeholder, state, or national events attended.

GOAL 4. BUILD A ROBUST UNIVERSITY BY IMPLEMENTING AGRICULTURAL SCIENCE CENTER SYSTEM-WIDE, MISSION-SUPPORTING STRATEGIC INITIATIVES

Unique ASC elements can promote learning, inquiry, diversity and inclusion, social mobility, and Extension by integrating across and between disciplines throughout ACES, extended to K–12 and lifelong learners both locally and internationally.

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 to recruit students interested in food and fiber production and marketing, water use and conservation, family development and health of New Mexicans, and environmental stewardship.
- Work with Native American communities to identify candidates for training programs as well as undergraduate and graduate education.
- Build and enhance relationships with international schools, institutions, and partnerships to identify potential graduate students and enhance research scholarship.
- Provide ACES support for educational outreach efforts that serve high schools with high proportions of students from underrepresented groups.
- When possible, assist with the development of programs to enhance transitions of underrepresented undergraduate students to graduate programs within ACES and NMSU.

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:

- Assist with the Cooperative Extension Service and other institutions with coordination of the development and expansion of summer and year-round ACES programs for youth, including those from underrepresented groups.

- Develop memorandums of understanding (MOUs) with community colleges to recruit their students into four-year programs at NMSU.

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:

- Encourage interdisciplinary and integrated initiatives to promote collaborations across different university entities.

Objective 4.4: Elevate and promote the impacts and visibility of the AES and ASCs.

Actions:

- Maintain and enhance existing infrastructure and capability that supports research.
- Develop information that can be used to communicate the broad and high-quality activities of the ASCs.
- Inform the people of New Mexico about accomplishments, areas of excellence, and the impacts of the ASCs' accomplishments.
- Inform ACES and other colleges across NMSU of how the ASCs are helping them solve key problems for the people they represent.
- Continue communication and cooperative efforts with family and agricultural commodity groups, and trade, business, and educational associations.
- Give high priority to improving classrooms, online distance education capabilities, and other educational facilities (hands-on/experiential) for students so that the experience of ASC faculty and staff can be leveraged in academic settings.

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

Actions:

- Encourage and reward multistate, regional, and international programs, as appropriate to each ASC.
- 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 participation with constituency and lay groups within cooperative ventures and coalition-building with the College of ACES.
- Use Advisory Committees and other key constituents to expand and refine ACES legislative initiatives.
- Foster engagement with industry through internships, externships, and work experiences for students.

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

Actions:

- 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.
- Recognize faculty and staff excellence in service and research support.

Goal 4 Key Performance Indicators (KPIs)

- Number of stakeholder-identified concerns addressed through research, Extension, or outreach activities.
- Number of collaborative efforts across departments, colleges, and scientific organizations across the region and nation to address the critical problems affecting New Mexico's agriculture and rural areas.
- Number of public communications and news stories regarding research, Extension, and outreach efforts taking place at ASCs.
- Number of stakeholders who participate in cooperative ventures and coalition-building to increase resource support for the college.
- Establishment of a system of incentives for excellence in research and external grantsmanship.
- Number of ASC-related news stories, accomplishments, and areas of excellence presented to New Mexico legislators and New Mexico citizens.
- Development of transdisciplinary initiatives for digital and prescriptive agriculture, New Mexico agriculture value chain enhancement, agriculture literacy initiative, and youth development via online learning.
- Economic sustainability (grants, sales, services, etc.).
- Increased number of collaborative/new research projects fostered by communication with stakeholders.
- Novel research support by the ASCs for preliminary data to gain grant access.
- Number of personnel development programming opportunities afforded to staff.

Effective Use of Advisory Boards

Effective ASC advisory boards are key to the mission of individual ASCs. The board membership should reflect the client base of the ASC, but including non-traditional clients will help bring insight from differing perspectives. Boards should be developed to be independent bodies that advocate for the essential work performed at the ASCs. Boards should be advisory in nature and not dictate research; they should be a sounding board to keep relevant research grounded to address key issues of our constituents while understanding the role of relevant and preliminary research that may not be popular or immediately address current needs of our clientele. All ASCs currently have advisory boards, but all should review their organizational structure on a regular schedule, and if not in place, all should develop advisory board bylaws. Additionally, an annual meeting of individual ASC advisory board chairs could share successes and issues to help individual boards achieve goals more effectively, as well as highlight common issues that might be addressed collaboratively. This initiative also could result in a statewide

advisory board being developed to allow unified advocacy for the AES/ASCs and could include all the chairs, past-chairs, or designated member from each individual board.