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Program
Evaluation
Unit

Program Evaluation: The Modern-day Role
of the Agricultural Experiment Station and
Cooperative Extension Service

March 23, 2018

Report #18-02

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March 23, 2018

Dr. Garrey Carruthers, Chancellor, and President
New Mexico State University
MSC 3Z, P.O. Box 30001
Las Cruces, New Mexico 88003-8001

Dear Chancellor Carruthers:

On behalf of the Legislative Finance Committee, I am pleased to transmit the evaluation, *The Modern-day Role of the Agricultural Experiment Station and Cooperative Extension Service*. The evaluation reviews the structure and spending patterns of the Agricultural Experiment Station and Cooperative Extension Service, as well as assess mission, research and programming alignment with current state needs.

This report will be presented to the Legislative Finance Committee on March 23, 2018. An exit conference to discuss the contents of the report was conducted with Dean Flores and Drs. Boren and Goldberg on March 13, 2018. The Committee would like a plan to address the recommendations within this report within 30 days from the date of the hearing.

I believe this report addresses issues the Committee asked us to review and hope New Mexico State University's Agricultural Experiment Station and Cooperative Extension Service will benefit from our efforts. We very much appreciate the cooperation and assistance we received from you and your staff.

Sincerely,

A handwritten signature in cursive script that reads "David Abbey".

David Abbey, Director

Cc: Representative Patricia Lundstrom, Chairwoman, Legislative Finance Committee
Senator John Arthur Smith, Vice-Chairman, Legislative Finance Committee
Dr. Barbara Damron, Secretary, Higher Education Department
Dr. Rolando A. Flores, Dean, New Mexico State University College of Agricultural, Consumer and Environmental Sciences
Dr. Jon C. Boren, Associate Dean and Director, NMSU CES
Dr. Natalie Goldberg, Associate Dean and Interim Director, NMSU AES
Debra P. Hicks, Chair, New Mexico State University Board of Regents

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Common goals and strategies are needed to enhance the relevance and impact of the Cooperative Extension Service and Agricultural Experiment Station

Since the turn of the 20th century, the Agricultural Experiment Station (AES) and Cooperative Extension Service (CES) of New Mexico State University (NMSU) have been the structures through which practical research is funded and shared with the public. Although the roots of both organizations are strongly tied to agriculture and improving rural people's quality of life, the state's changing demographics, economic structure, and emerging social and environmental issues create a need to reexamine the modern-day role and structure of each organization.

While each organization was created by federal legislation and further mandated in the state constitution, AES and CES, with combined annual revenues of \$67.9 million in FY17, have significant freedom in prioritizing the subjects of their research, their programming, and the populations they serve. The state reinforces this freedom by contributing the largest portion of unrestricted and of total funding to AES and CES (\$26.2 million combined in FY17).

As a result of their long-standing investment in local communities, the trust they enjoy from stakeholders, and their affiliation with a research university, AES and CES are well positioned to both articulate many of the problems most acutely affecting New Mexicans and develop and implement solutions to those problems. These problems could include decreasing water availability, sluggish economic growth, and declining rural quality of life. However, to play a meaningful role in solving these statewide problems, CES and AES need to first seize opportunities to better understand and serve communities beyond their traditional stakeholders. Further, renewed strategic leadership from NMSU's College of Agricultural, Consumer, and Environmental Sciences will ensure the efforts between CES and AES are coordinated, focused, and yield measurable impact.

The directors of AES and CES have recognized these challenges and are taking initial steps to hone the direction of their organizations' research and extension work and better articulate the impacts of that work. Moving ahead, AES and CES's parent College of Agricultural, Consumer, and Environmental Sciences should provide leadership in articulating a few, interdisciplinary, statewide problems and in developing an overarching strategic plan to coordinate and regularly evaluate the work of CES and AES in addressing those problems. As research and extension are key parts of the university's mission, NMSU's administration should also commit to providing support for the work of AES and CES in their long-term facilities and strategic planning.



KEY FINDINGS AND RECOMMENDATIONS

New Mexico's funding of AES and CES is proportional to other states, but both organizations should grow and diversify nongovernment revenues

The state of New Mexico funds its Agricultural Experiment Station (AES) and Cooperative Extension Service (CES) at levels proportional to funding in benchmark states based on the number of farms and ranches and value of agricultural output for AES and on a per capita basis for CES. However, CES and AES have not kept other revenue sources in balance with peer states. County funding levels to CES vary widely, and CES does not account for the value of counties' in-kind contributions. Within AES, faculty have been more successful in securing federal grant dollars than their peers at other land-grant universities; however, they have significantly underperformed in securing nongovernment (e.g., agricultural industry) funding to support research at the College of Agricultural, Consumer, and Environmental Sciences (ACES). Beyond grants, both organizations could be growing and diversifying annual revenues by collecting fees for services (CES) and increasing agricultural product sales (AES).

Expenditures at CES and AES are often inconsistent with objective goals, metrics, and benchmarks

With approximately half of revenues coming from unrestricted sources, both CES and AES have considerable flexibility to prioritize research and programming expenditures. However, both organizations often fund projects based on historic funding levels rather than objectively measured needs or performance. For example, CES divides revenue among counties in ways inconsistent with population levels. AES supports 12 off-campus agricultural science centers that are little used by faculty, not prioritized by the university for capital expenditures, and yet need at least \$20 million to offset deferred maintenance costs. Finally, the staffing structure at CES and pay bands at both AES and CES are likely limiting effectiveness.

Goals and objectives of AES and CES are not well defined, and evaluation of impact is inconsistent

Current reporting from AES and CES relies heavily on the use of short-term, output-based metrics, making it difficult to gauge the larger impacts of state appropriations. CES and AES administration has recognized the need to improve impact evaluation and better demonstrate extension's outcomes. However, both organizations are currently lacking clear, tangible goals and strategic direction from their parent college. This lack of articulated goals is a major impediment to CES' and AES' ability to address New Mexico's most sweeping, interdisciplinary challenges.

CES and AES can better align programming and research with current and future state needs

To continue to meet local needs, CES and AES need to be more responsive to the changing needs of all of New Mexicans, not just their traditional stakeholder communities. CES, in particular, needs to ensure relevancy of the programming it is delivering. Both institutions could do better at gathering input on research and program offerings from a more diverse and representative swath of the state's population. To do this, CES and AES will need to improve how they communicate and market their services and overcome CES's self-imposed "best-kept secret" moniker.

Key Recommendations

New Mexico State University administrators should

Consider how to strengthen relationships between CES and other Colleges outside of the College of Agricultural, Consumer, and Environmental Sciences to improve outreach and action on local economic development and other interdisciplinary issues.

Incorporate the capital needs of agricultural science centers into university master facilities planning and, where necessary, include improvements for centers in capital outlay requests.

College of Agricultural, Consumer, and Environmental Sciences administrators should

Develop a new strategic plan that sets goals and measurable objectives and assigns responsibility for those goals to better define the purpose and expectations to AES and CES administration, faculty, and staff.

Agricultural Experiment Station administrators should

Encourage and track nongovernmental funds received to support research.

Consider eliminating up to one-third of their agricultural science centers, bringing the university closer to the median of their peer institutions.

Consider conducting less agricultural research on established agricultural industries if associated commodity groups are unable to contribute monetary support for the research. Instead, AES should focus its research agenda on emerging industries.

Ensure that each agricultural science center produces and distributes an annual summary of the research and findings to regional farming and ranching communities and other stakeholders.

Cooperative Extension Service administrators should

Consider centralizing administrative functions, where feasible, at a regional or statewide level, bringing administrative ratios closer to university average.

Consider more equitable ways of allocating resources to counties, such as needs-based assessment of population, poverty rates, availability of other services, etc.

Explore the appropriateness and feasibility of shifting some extension programming to a regional level.

Consider rebalancing specialist levels over time to better align with needs of state population and county extension activities.

Develop more rigorous needs assessment tools to gauge current and emerging county needs and ensure that assessment includes a representative sample of county residents.



Federal laws passed in the late 1800s and early 1900s created the core of the land-grant university system.

Three key pieces of federal legislation still define the land-grant university mission of teaching, research, and extension services. Recognizing the importance of college as a public good, in 1862 President Lincoln signed the Morrill Act (7 U.S.C. § 343), gifting each state and territory 30 thousand acres to be sold to create a land-grant university. The purpose of these new institutions was to teach “such branches of learning as are related to agriculture and the mechanic arts, in such manner as the legislatures of the States may respectively prescribe, in order to promote the liberal and practical education of the industrial classes in the several pursuits and professions in life.” Importantly, the agricultural and mechanical arts focus was to occur “without excluding other scientific and classical studies,” meaning that while the colleges were to provide practical sciences to aid those who chose agriculture as a vocation, the colleges were not allowed to focus on these agricultural studies exclusively.

Twenty-five years after the Morrill Act, in 1887, the federal Hatch Act (7 U.S.C. § 361a), was signed into law, giving each land-grant university annual funding to establish an Agricultural Experiment Station (AES) to conduct original research and verify experiments bearing directly on the agricultural industry. Indicating this agricultural research was intended to be applied and shared, the original Hatch Act text also mandated that “bulletins or reports of progress” be produced by the station at least once quarterly and shared in each of the state’s newspapers.

The calls for a federally funded Cooperative Extension Service (CES) by the national 1909 Country Life Commission, along with the increasing popularity of the already-established university agricultural experiment stations culminated in the Smith-Lever Act of 1914. The Smith-Lever Act formalized and provided federal funding for CES, providing for an “extension” of the work of the agricultural colleges to state residents. Specifically, the act stated that cooperative agricultural extension work would consist of “the giving of instruction and practical demonstrations in agriculture and home economics to persons not attending or resident in said colleges in the several communities, and imparting to such persons information on said subjects through field demonstrations, publications, and otherwise.” (Smith-Lever Act, 7 U.S.C § 343 (1914).)

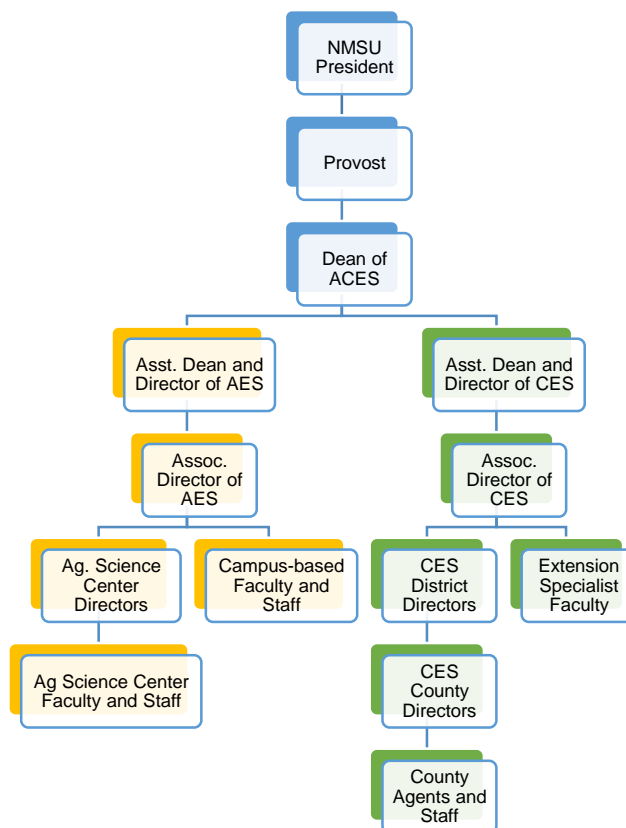
A direct outgrowth of the Agricultural Experiment Station, the origins of the Cooperative Extension Service were the university-based agricultural clubs and associations active in many states, including New Mexico, at the turn of the century. The work of these “farmers’ institutes” was much the same in scope as CES. In some ways, however, *farmers’* institute was a misnomer. Although most of the participants were male farmers and their wives, these institutes not only provided education on agricultural and home-economics subjects, but also were the center of community discussions on

“improvement of rural schools, good roads and how to make them, how to keep young people on the farm, recreation in the rural community, and the importance of keeping good books and papers in the farm home.”ⁱ

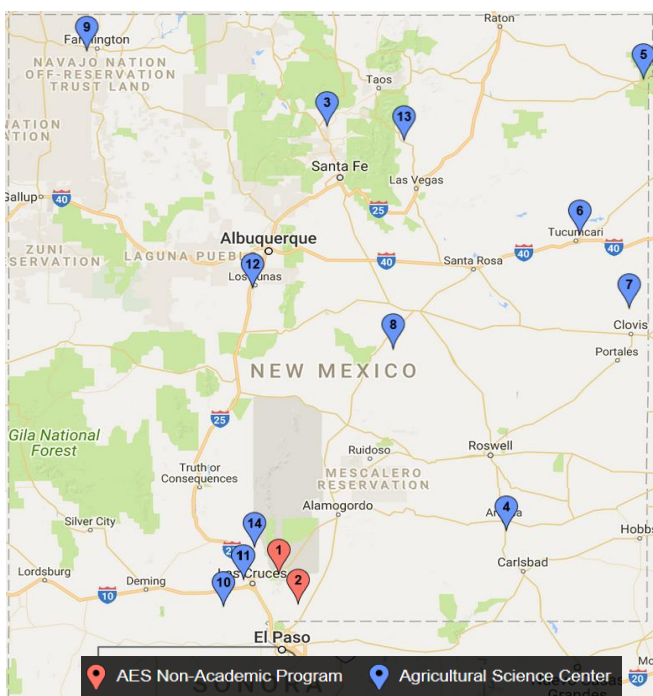
New Mexico State University, then named the New Mexico College of Agriculture and Mechanic Arts, and its associated experiment station opened in 1889 and became the state’s land-grant institution and beneficiary of the Morrill and Hatch Acts for teaching and research and, after passage, the Smith-Lever Act for extension work. Today, NMSU’s AES and CES are organized under the supervision of the Dean of the College of Agricultural, Consumer, and Environmental Sciences (ACES).

AES provides funding for the salary and research activities of over 100 full-time-equivalent faculty within the university’s College of ACES as well as the operations of 12 off-campus agricultural science centers (ASCs). AES researchers are all faculty in one of eight ACES academic departments. AES funding is also used to support two non-instructional departments at ACES and the administration of AES.

Figure 1. Simplified AES and CES Organizational Chart



NMSU AES Agricultural Science Centers, Departments and Centers



No.	Site
1	Future Farmers of America
2	Southwest Border Food Protection and Emergency Preparedness Center
3	Alcalde Agricultural Science Center
4	Artesia Agricultural Science Center
5	Clayton Livestock Research Center
6	Tucumcari Agricultural Science Center
7	Clovis Agricultural Science Center
8	Corona Range and Livestock Research Center
9	Farmington Agricultural Science Center
10	Fabian Garcia Research Center
11	Leyendecker Plant Science Research Center
12	Los Lunas Agricultural Science Center
13	John T. Harrington Forestry Research Center
14	Jornada Experimental Range/Chihuahuan Desert Rangeland Research Center

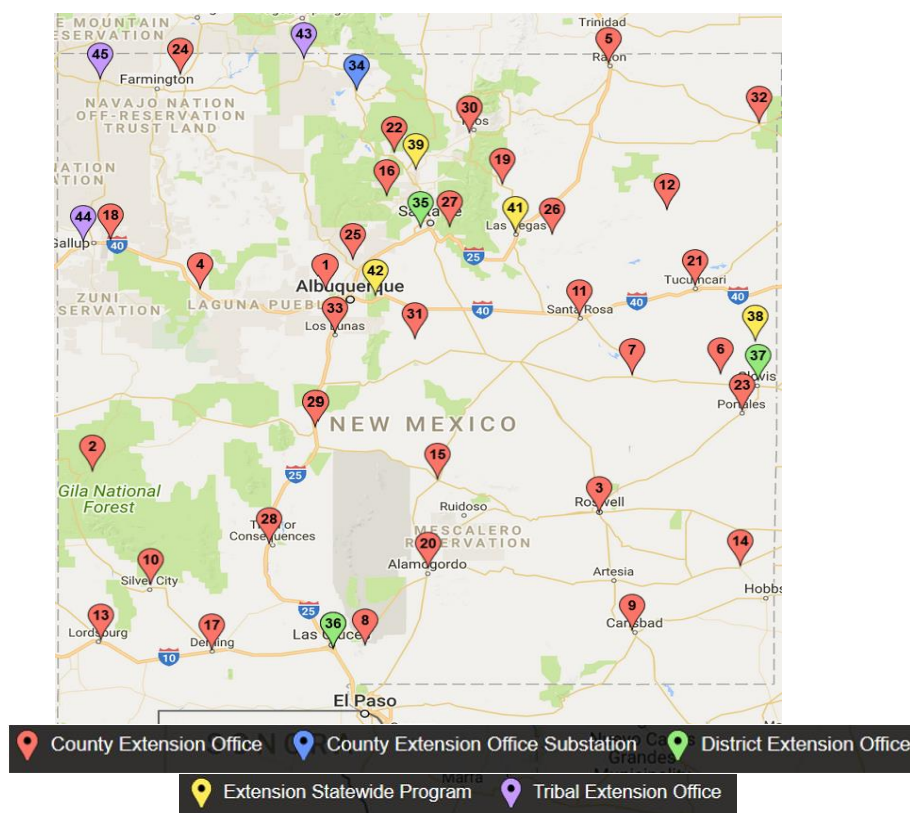
AES Campus-based Departments and Centers
Plant and Environmental Sciences
Animal and Range Sciences
Entomology Plant Pathology, and Weed Science
Fish, Wildlife, and Conservation Ecology
Agricultural Economics and Agricultural Business
Bio-Security and Food Safety Center
Family and Consumer Sciences
Hotel, Restaurant, and Tourism Management
Media Productions
Agricultural and Extension Education

Source: NMSU

NMSU Cooperative Extension Service County, Tribal, District Office and Statewide Programs

No.	Site
1	Bernalillo County Office
2	Catron County Office
3	Chaves County Office
4	Cibola County Office
5	Colfax County Office
6	Curry County Office
7	De Baca County Office
8	Dona Ana County Office
9	Eddy County Office
10	Grant County Office
11	Guadalupe County Office
12	Harding County Office
13	Hidalgo County Office
14	Lea County Office
15	Lincoln County Office
16	Los Alamos County Office
17	Luna County Office
18	McKinley County Office
19	Mora County Office
20	Otero County Office
21	Quay County Office
22	Rio Arriba County Office
23	Roosevelt County Office
24	San Juan County Office
25	Sandoval County Office
26	San Miguel County Office
27	Santa Fe County Office
28	Sierra County Office
29	Socorro County Office
30	Taos County Office
31	Torrance County Office
32	Union County Office
33	Valencia County Office
34	Rio Arriba County Office Substation
35	Northern District Office
36	Southwestern District Office
37	Eastern District Office
38	Dairy
39	Rural Agricultural Improvement and Public Affairs Project
40	Center for Animal Health and Food Safety
41	Memorial Middle School Agricultural and Education Center
42	NM EDGE
43	Jicarilla Service
44	Gallup Tribal Office
45	Shiprock Tribal Office

Source: NMSU



Research from ACES faculty is disseminated to the public through CES. CES does this through a network of county-based extension agents, campus- and ASC-based specialists, and through several statewide initiatives. County agents and staff are largely responsible for gauging local needs and implementing – and in some cases, designing – programming. This means CES offers a multitude of programs and services, including ongoing classes, one-off events and workshops, individual consultations with agents, and collaborations with other organizations. The programming mix can differ significantly among counties and changes from year to year.

Table 1. Overview of CES Departments and Major Programs and Services*Asterisks indicate programs managed primarily at the statewide level; other programs are managed at the county level*

Department	County agent focus	Number of county agents	Major programs and services
4-H and Youth Development	4-H	23	<ul style="list-style-type: none"> 4-H (includes clubs and school enrichment programs)
Family and Consumer Sciences	Family and Consumer Sciences	29	<ul style="list-style-type: none"> Food and nutrition <ul style="list-style-type: none"> ICAN – federally-funded SNAP-Ed nutrition classes Cooking with Kids Kitchen Creations – cooking for diabetics Health and wellness <ul style="list-style-type: none"> Diabetes prevention and management StrongWomen – nutrition and exercise program for women Family life and child development <ul style="list-style-type: none"> Just Be It! – nutrition and exercise program for children Classes and workshops on food preservation, sewing, and other home-based skills In-person visits and phone consultations on nutrition, food safety, and other topics Personal financial management training*
Plant Sciences	Agriculture	40	<ul style="list-style-type: none"> Master Gardeners program Classes and workshops on production agriculture and home gardening topics Soil and water testing In-person visits and phone consultations on animal and plant health, pest management, home gardening, farm and ranch production, and other topics Southwest Border Food Protection and Emergency Preparedness Center (SWBFPEPC) – provides training on food safety and security*
Animal Science and Natural Resources			
Economics (community economic development and agricultural economics)	No agents in this area	n/a	<ul style="list-style-type: none"> Stronger Economies Together (SET) – federal program to develop and implement regional development strategies* Rural Agricultural Improvement and Public Affairs Project (RAIPAP) – technical and educational support for small producers in Northern NM* Entrepreneurship training* Financial, management, and marketing support and training for producers* Climate change education* NM Edge – training and certification program for NM elected officials and public sector employees*

Note: This list does not include all CES programs and services; rather, it is intended to provide an overview of major activities by area. There are 3 joint ag/4-H agents and 2 joint FCS/4-H agents; these agents were counted in both categories.

Although the potential subject matter of both AES research and CES programming is wide and varied, broadly speaking, extension programming in New Mexico falls under six departments – 4-H and Youth Development, Family and Consumer Sciences, Economics, Plant Sciences, Animal Sciences, and natural resources. In the field, agents cover 4-H, agriculture (plant science, animal science, and natural resources), or family and consumer science. Some agents cover multiple areas. There are no economics agents.

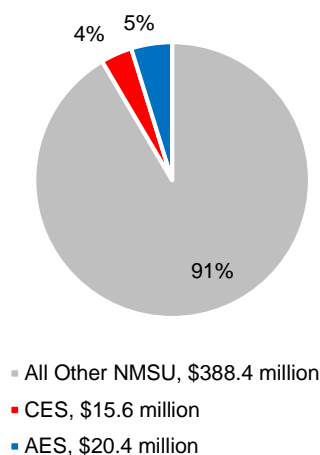
Past tensions make it difficult for CES and AES to prioritize work between rural versus urban communities and issues.

Three other federal laws significantly expanded the scope of, and provided additional funding for, both the Agricultural Experiment Station and Cooperative Extension Service systems. The Purnell Act in 1925 and the Bankhead-Jones Act in 1935 provided both systems with additional funding, some specifically for research and education on nutrition and home economics, as well as conservation and the development and recreational use of land and water. The McIntire-Stennis Forestry Research Act in 1962 further expanded the purview of the Agricultural Experiment Station to include forestry research and funded land-grant institutions to do so.

These laws, while giving CES and AES relative flexibility in choosing their subjects of research and the specific communities they serve, also created tension in allocating resources among those research topic areas and specific extension programs. For example, while extension services are often best known for their focus on agriculture and other rural needs, the congressional authorization that established CES does not restrict programs to particular groups or geographic locations.

As the United States has become increasingly urban, CES has developed more programs to address the needs of urban dwellers. Beginning in the 1940s, extension services in some states started piloting programs in cities, meeting pushback over the decades from agricultural organizations that advocated for a near-exclusive focus on agricultural and rural programs. Partially related to this pushback, in the three decades spanning the 1940s to the 1960s, the Smith-Lever Act and Hatch Act were amended to allocate funding to states based on their level of agricultural and rural populations. These amendments signaled a turning point in the federal perception that agriculture was as important a priority as all other rural issues combined.

**Chart 1. NMSU
Unrestricted
Expenditures, FY17**
(including transfers and
balances)



Source: NMSU Report of Actuals

As a land-grant university, NMSU has both a research and extension mission, yet these areas make up a relatively small portion of the university's budget.

The Morrill Act, Hatch Act, and Smith-Lever Act gave land-grant universities their now ubiquitous, tripartite charge of teaching, research, and extension. Accordingly, New Mexico's land-grant university, NMSU, incorporates these three tasks into its modern university mission statement: *The New Mexico State University System is the state's land-grant university, serving the educational needs of New Mexico's diverse population through comprehensive programs of education, research, extension education, and public service.* Although given equal standing in the university's mission, today extension and agricultural research make up only a small portion of NMSU's annual budget (9 percent or \$36 million in FY17).

Although NMSU has a university-wide mission of extension, the university confines CES to the College of Agricultural, Consumer, and Environmental Sciences. This narrow locale may limit the ability of some extension specialists and agents to deliver research-based knowledge from other sectors of the university. As the population in all states has become more urban and economies have become less reliant on agricultural output, some universities have moved their extension operations outside of their respective colleges of agriculture and into a broader outreach department. For example, at Oregon State University, extension operations are combined with larger

university outreach and OSU's "extended campus" (online degree programs) into a separate body outside of the college of agriculture and under the university's provost office.

Moving CES to a broader, university-wide focus is not a new idea. The National Research Council formed a Committee on the Future of the Colleges of Agriculture in the Land Grant University System in 1996, which recommended that land-grant universities "embrace the mandate of outreach and extension and to ensure that the entire university is accessible and responsive as the research base for farm and nonfarm extension programs. To accomplish this, administrative structures, incentives, and reward recognition must be generated within the university to promote the commitment and involvement of faculty, staff, and administrators across the university to actively participate in outreach, extension, and public service."ⁱⁱⁱ

State appropriations and federal grants and contracts are the largest sources of revenue for both AES and CES.

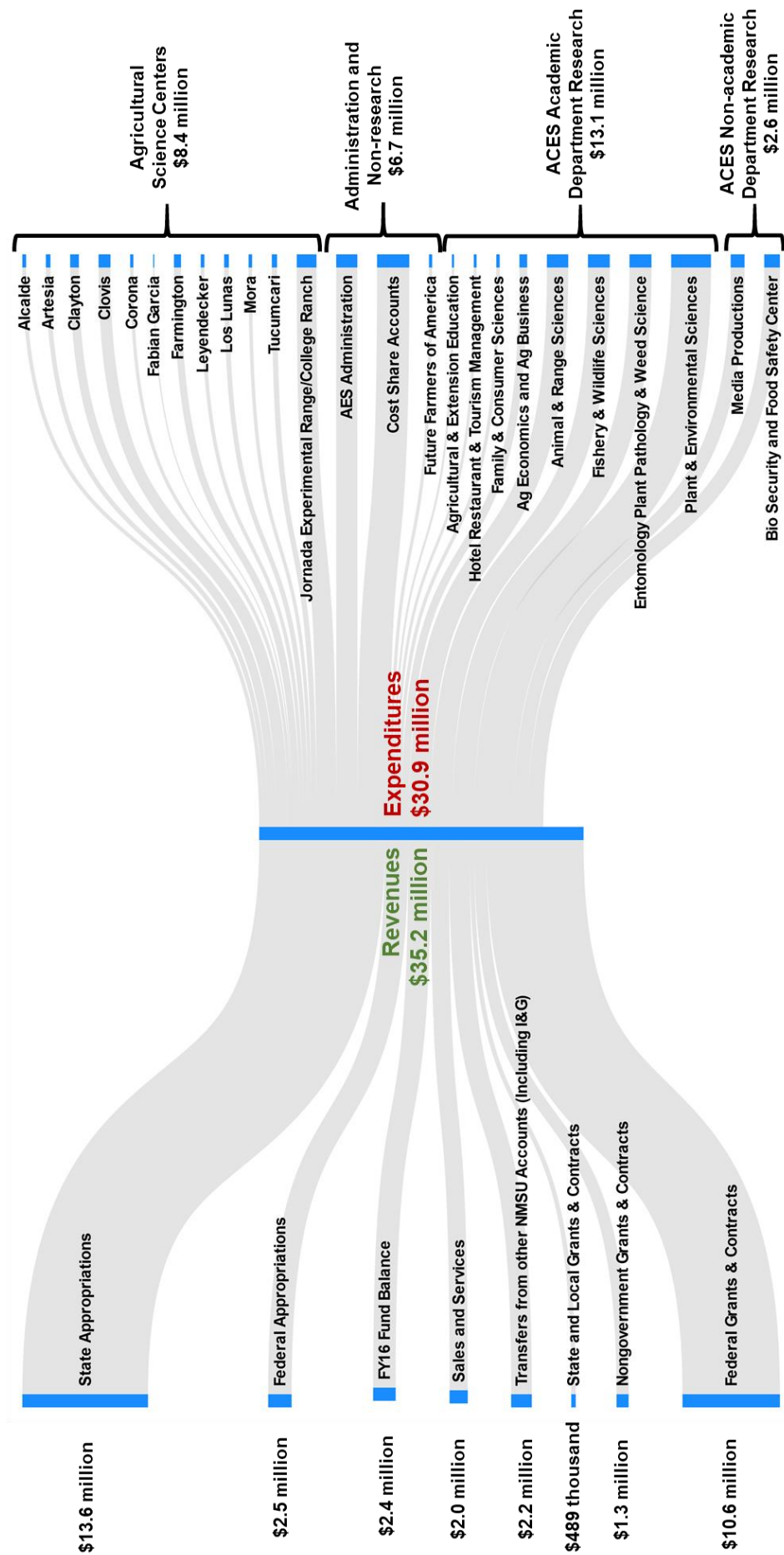
The Smith-Lever Act (extension) and Hatch Act (research) require one-to-one matching of non-federal funds as a condition of their federal appropriations. However, for both organizations, federal appropriations account for only a small portion of annual operating revenue. Instead, federal competitive grants and contracts, and state appropriations make up the majority of revenue for AES and CES (69 percent and 60 percent, respectively.) Figures 2 and 3 on the following pages show FY17 revenues and expenditures for AES and CES. Charts showing revenues for each organization from FY08 to FY17 are in Appendix B.

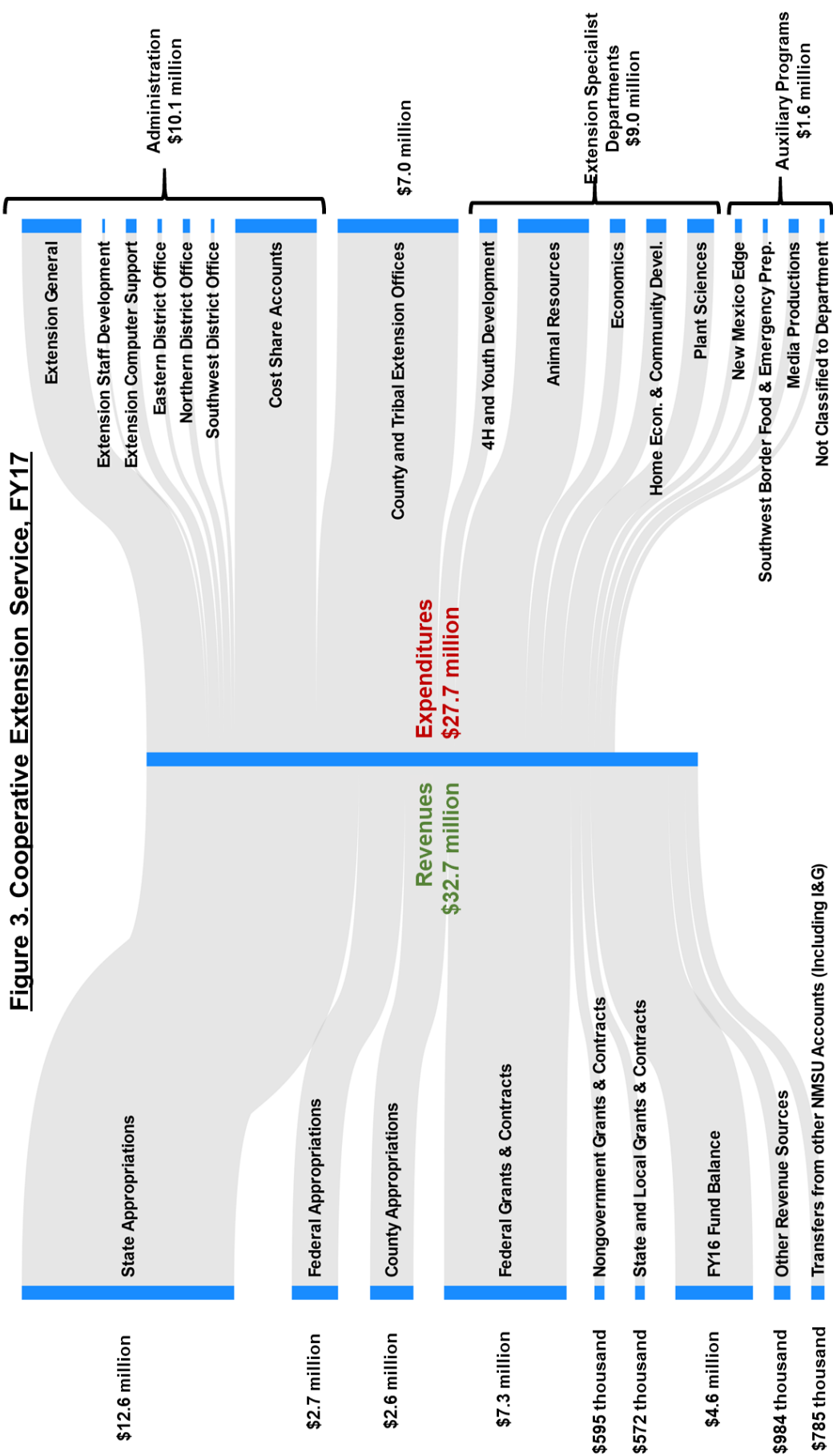
AES and CES both have relatively high proportions of expenditures on administrative functions. In part this is due to the relatively large "cost share accounts" that each agency keeps. AES and CES directors report these accounts are used to provide matching funds for grants and contracts that require them. However, another reason for relatively high administration costs could be that NMSU's charges to AES and CES for institutional support increased more than five times between FY08 and FY17, while university expenditures in institutional support remained flat.

AES and CES payments to NMSU for institutional support have grown approximately 500 percent between FY08 and FY17.

Between FY08 and FY17, AES payments for institutional support from unrestricted (mostly state appropriations) funds grew from \$110 thousand to \$756 thousand – a 583 percent increase, or an average of 27 percent year-over-year. Over the same period, unrestricted expenditures by the university on institutional support remained relatively flat at \$22 million to \$22.2 million. For CES, institutional support expenditures grew by 456 percent, from \$123 thousand to \$681 thousand over the same period.

Figure 2. Agricultural Experiment Station, FY17





Source: NMSU

FINDINGS AND RECOMMENDATIONS

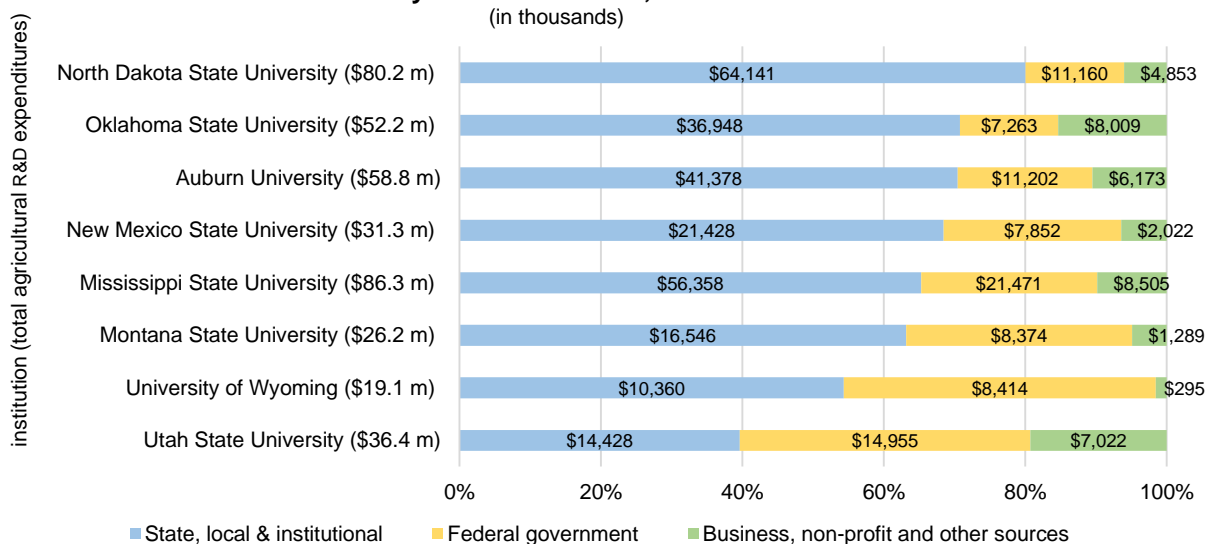
LEGISLATIVE FINANCE COMMITTEE

New Mexico's funding to AES and CES is proportional to other states

New Mexico's state appropriations to AES and CES are in line with benchmark states, but both can grow and diversify nongovernment revenues.

The National Science Foundation (NSF) tracks spending on research and development in agricultural sciences at public universities, both within their AES systems and throughout the institution. Using NSF data from 2016 (the latest year available) LFC staff compared funding sources for agricultural research between NMSU and seven of its peer, 1862 land-grant universities (those within the same basic Carnegie classification.) The NSF data shows NMSU in the middle of the pack on absolute expenditures on agricultural research and the proportion of revenue coming from state, federal, and other sources to fund that research. NMSU retains this middle of the pack ranking among its peers when expenditures for agricultural research are compared with the number of farms and ranches in each state, as well as when compared to the value of agricultural production in each state. See Appendix C for more details.

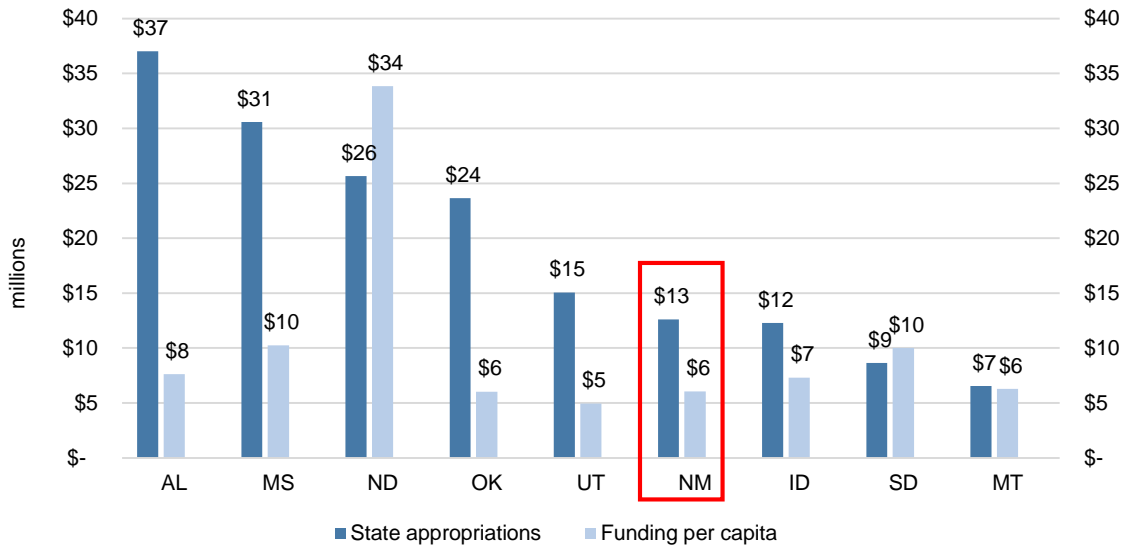
Chart 2. Research and Development Expenditures in Agricultural Sciences by Source of Funds, 2016



Source: National Science Foundation

New Mexico's state appropriations to CES are also in line with benchmark states' funding of extension services. Although the state spends less overall than several benchmark states, its spending per capita is similar to other states. The outlier of the peer group is North Dakota, which spends \$34 per capita on its extension service. North Dakota excluded, the peer group spends \$7 per capita on average on extension, while New Mexico spends \$6.

Chart 3. State Appropriations to CES



Source: State CES information

Note: All numbers are for FY17, except Utah (FY18) and North Dakota (biennial budget for 2017-2019)

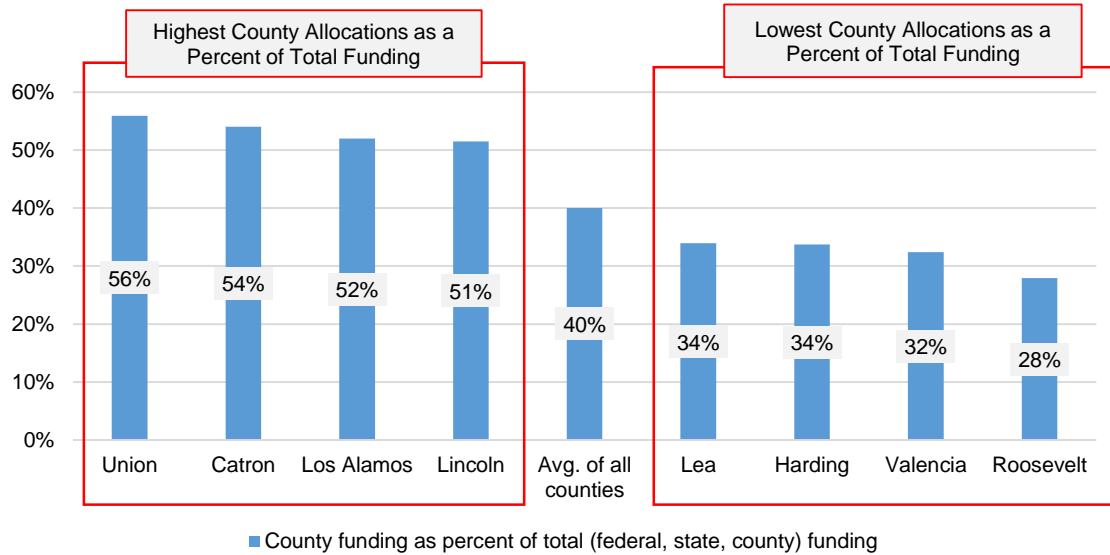
Compared with the number of farm operators, New Mexico falls slightly below average in state funding, spending \$339 per farm operator, as compared with a benchmark average of \$381. While state extension services are designed to serve state populations as a whole, not just farm or rural populations, the U.S. Department of Agriculture allocates federal funding in part based on states' farm populations.

County funding levels to CES vary widely, and CES does not account for the value of counties' in-kind contributions.

New Mexico counties allocate varying levels of funding to their local extension offices. Although an Attorney General opinion from 1917 (No. 17-2008) found that it was optional for counties to appropriate funds for extension work, county funding has traditionally been a core part of the extension funding model, both in New Mexico and across the country. Arguably, counties receive significant services and support from extension, and thus are expected to contribute financially. However, in recent years, some states have moved away from a county-funded model.

In FY17, county funding ranged from \$300 thousand in Bernalillo County (including a one-time, \$100 thousand appropriation for a special program) to \$35 thousand in San Miguel County. See Appendix D for details. Similarly, county funding on a per capita basis varies significantly. While counties with larger populations tend to allocate more funding to extension offices, rural counties generally allocate more on a per capita basis (see Table 5 on page 33). On average, counties in the CES Eastern district allocate significantly more per capita – \$12 – than counties in the Southwest and Northern districts, which allocate \$5 and \$3 per capita.

Chart 4. Share of CES Expenditures Covered by County Funding, FY17



Source: NMSU CES

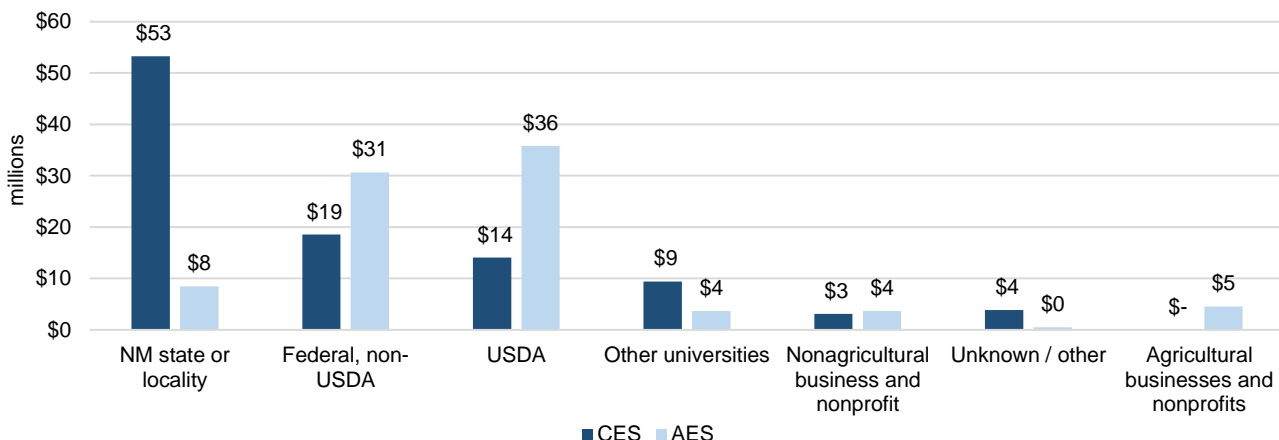
Note: Represents county share of revenues including federal, state, and county; does not include grants, contracts, sales, and other revenue sources

Between FY08 and FY17, most county extension offices saw an increase in funding from their counties. However, seven counties (Los Alamos, Rio Arriba, Eddy, Lea, Roosevelt, Grant, and Hidalgo) experienced a decline in county funding during that time. Roosevelt, Grant, and Hidalgo counties all decreased their extension funding by over 20 percent. In Roosevelt County, financial difficulties limited the amount the county was able to provide to extension from \$122 thousand in FY15 to just \$25 thousand in FY16. Extension administration worked with the county to make up the shortfall, and county funding increased to \$61 thousand in FY17.

Federal grants and contracts are one of the largest and most volatile sources of revenue.

Federal grants and contracts have been and will likely continue to be significant sources of program and research funding for both AES and CES. Grants and contracts, especially from federal sources, are major funding sources for both AES and CES, but they are also quite volatile and dependent

Chart 5. CES and AES Grants and Contracts Awarded by Source, FY09-FY17



Source: NMSU

Note: Over \$30 million of the \$53 million of NM state or locality grant funding to CES was a sub-grant of federal monies, mostly for SNAP-Ed programming

on federal priorities. To illustrate, revenue generated from federal grants and contracts has varied, from a high of \$21 million in FY10 to a low of \$5.8 million in FY09 for CES and a high of \$14.9 million in FY10 to a low of \$7.2 million in FY08 for AES.

Certain programs and departments are responsible for generating the majority of grants and contracts for AES and CES. Within CES, from FY09 to FY17, the family and consumer sciences program, animal and range sciences program, and CES administration combined received over 70 percent of all grant and contract funding. Over half of CES revenues from grants and contracts between FY09 and FY17 came from state or local entities, but most were sub-grants of federal dollars. New Mexico’s Department of Health (DOH), Human Services Department (HSD), and Children, Youth and Families Department (CYFD) accounted for 84 percent of state and local grant funding sources. This suggests that state and local agencies and other entities are using extension to extend the reach of programs and services like chronic disease management (DOH), Supplemental Nutrition Assistance Program Education (HSD), and Healthy Transitions (CYFD), which makes mental health treatment and support services available to at-risk youth.

Similarly, three of AES’s 21 departments and agricultural science centers – Fish, Wildlife, and Conservation Ecology, Plant and Environmental Sciences, and faculty based at the Jornada Experimental Range – accounted for 59 percent of all grant and contract revenues generated between FY09 and FY17.

Some extension staff indicated to LFC staff that given their day-to-day job responsibilities, they have limited capacity to write grants. Incentives to secure grants may also be misaligned – staff who receive grants for programming add to their workload without seeing any corresponding pay increase. However, according to NMSU’s tenure guidelines for county extension faculty, securing and maintaining grants is a consideration in tenure review.

Chart 6. CES Grants and Contracts by Department, FY09-FY17

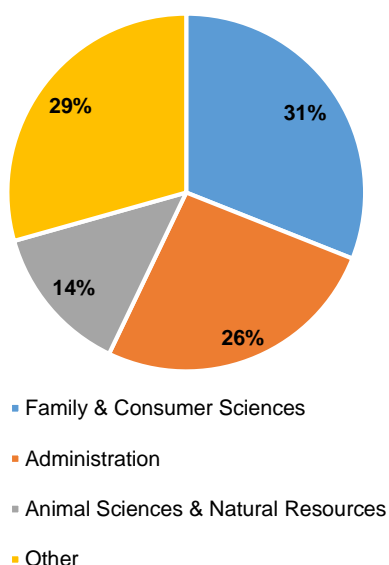
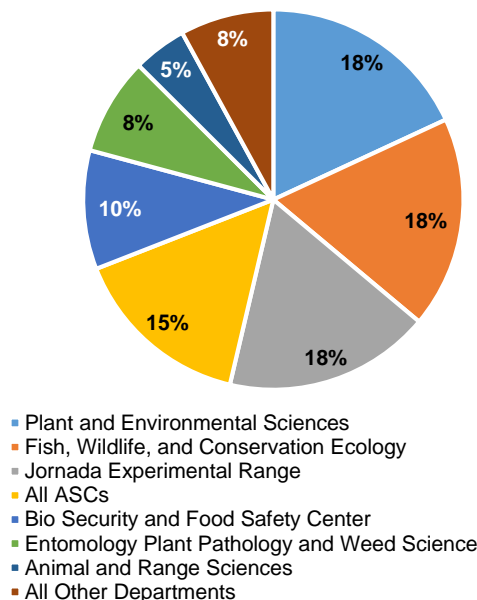


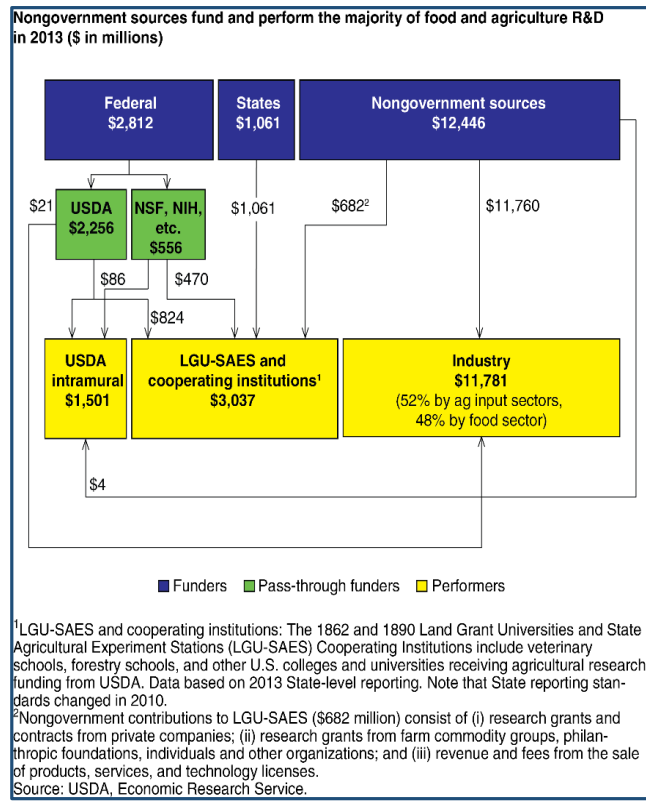
Chart 7. AES Grants and Contracts by Department, FY09-FY17



Nongovernment revenues are one of the least significant sources of funding for both AES and CES but also hold the most potential for growth.

Two important sources of funding to AES and CES, federal formula funds and state appropriations, are unlikely to change over the next decades. Federal formula funds for AES and CES have been set for over five decades and are unlikely to be altered. State appropriations are the largest source of revenue for both AES and CES, but are proportional to state funding for agricultural research and extension at NMSU's peer land-grant universities.

Figure 4. 2013 USDA Chart Illustrating Nongovernment Funding for Agricultural Research



Compared with land-grant universities nationwide, NMSU relies more on state funding and less on private funding for agricultural research. The U.S. Department of Agriculture (USDA), land-grant universities, and private food and agricultural companies perform the majority of research and development in U.S. agriculture. In 2013, USDA estimated that, across land-grant universities and their Agricultural Experiment Stations, three sources of funding were fueling most agricultural research and development:

- 42 percent (\$1.3 billion) by USDA and other federal funds,
- 35 percent (\$1.1 billion) by state-derived funds, and
- 22 percent (\$682 million) nongovernmental funds.

Similarly, AES's FY17 report of actuals shows that the station derived 41 percent of that year's revenue from federal sources. Outside of federal funding, however, AES derived a disproportionately large amount of revenue from state-based sources and a disproportionately small amount of revenue from private grants, sales, industry contracts, and other nongovernmental sources:

- 41 percent (\$13.1 million) by USDA and other federal funds,
- 49 percent (\$15.7 million) by state and locality-derived funds,¹ and
- 10 percent (\$3.3 million) by nongovernmental funds.²

While nongovernment funding for agricultural research is low, a few industries contribute much more than others. AES most often sources nongovernmental funds from research grants and contracts from private companies, farm commodity groups, philanthropic foundations, individuals or other organizations. AES also receives nongovernment funds from the sale of products, services, and technology licenses.

Although private research funds can be difficult to secure, NMSU could be raising more AES revenue from certain agricultural industries. In the ten years

¹ Includes a \$1.6 million transfer from NMSU's instruction and general account.

² Includes \$2 million of income from sales and services.

between FY08 and FY17, researchers at NMSU's AES secured \$6.7 million in grants from agricultural businesses, agricultural commodity groups, and agriculturally-focused pharmaceutical companies – approximately 8 percent of the total AES grant funding over that decade and only approximately 1 percent of the total combined federal and private grants and contracts awarded to NMSU annually.³ Three organizations alone, however, accounted for 60 percent (\$4 million) of that private research funding: Cotton Incorporated, the San Simon Agricultural Research Group, LLC (for pecan-related research), and Bayer HealthCare LLC (for pharmaceutical research on livestock parasite prevention.)

Notably absent from these top funders are groups representing dairy and beef cattle producers and forage crop producers, though all have supported research with small grants over the years. In 2016, dairy was the largest sector of agriculture by value in New Mexico with \$1.2 billion in milk sales, yet the dairy industry only appears to have sponsored two research grants through NMSU's AES in the past decade for a total of \$146 thousand.⁴

NMSU AES faculty, like their peers at other land-grant universities, rarely pursue commercialization of research outcomes. A 2015 survey of all tenure-track faculty in agricultural and life science departments at all land-grant universities showed that “engagement with commercialization activities, such as inventions and patents, remains relatively low, with 60 percent of respondents reporting none over the previous five years and most of the rest reporting low levels. Correspondingly, only one in 12 scientists reported a patent issued in the past five years, and one in 20 received any royalty income from previous inventions or patents. Overall, royalty income accounts for less than 1 percent of research budgets in our sample, while public support accounts for more than 75 percent of research budgets.”^{viii}

Similarly, NMSU's 145 AES faculty developed only 29 patents, cultivar releases, and trademarks between 2009 and 2017 (between one and five annually). According to the Arrowhead Center, NMSU's entrepreneur and business development center, AES has room for growth in the level of intellectual property development and Arrowhead staff are actively working with AES faculty to better recognize future commercialization opportunities.

Similar to faculty at other land-grants, little intellectual property is developed by AES faculty.

Beyond grants, CES could be collecting additional fees for services and AES could increase sales from agricultural science centers.

Both moves, however, would be contentious and may distract from CES's and AES's missions. For example, charging fees for CES programming could offset declining revenues, but may limit access to programming for low-income citizens. Although almost all agricultural science centers produce some amount of agricultural product in the course of their research, boosting nongovernmental revenues through sales may inappropriately position the university as a market competitor with its farmer and rancher stakeholders.

³ Assuming an average of \$670 thousand annually from agricultural businesses, agricultural commodity groups, and agriculturally focused pharmaceutical companies and using NMSU's latest three-year average of private grants and contracts and federal (non-financial aid) awards at \$121.5 million.

⁴ NMSU has a dairy extension faculty member sponsored by a 2010 endowed chair funded by a one-time, \$1 million grant from the Dairy Producers of New Mexico. However, the grant for that chair does not directly support research through AES.

While other states have increased the amount they charge for certain activities, New Mexico county extension offices rely very little on fee-for-service revenues to offset costs. Offices typically charge only minimal fees to cover one-off costs; for example, the cost of lunch at an event or workshop.

Figure 5. Considerations for Extension Revenue Generation

1. Public vs. private good. Does the service provide individual private value or broader public value?
2. Current program support. Will fees be charged for something that is already covered by a targeted allocation, grant, or contract?
3. Funder appreciation. Will charging fees send a message to the state or counties that their funding is no longer needed?
4. Revenue sharing and strategic direction. Are new fees in support of activities aligned with strategic goals of extension?
5. Distribution of revenues and contribution. How will fees be shared with other extension units that helped to develop programming (where applicable)?
6. Inability to pay. How will services be made available to those who cannot afford the fees?

Source: Adapted from Washington State University Extension Service Revenue Generation Handbook

The exceptions are Master Gardener courses, for which participant costs range from \$85 in Otero County to \$195 in Doña Ana County. This fee covers textbooks and other course materials. A statewide extension program that supports local government employees and elected officials, NM Edge, also charges a fee of \$75 per class. While the Smith-Lever Act prohibits charging fees to cover ongoing salary or operational costs of educational programs, extension may charge fees for incidental costs, as well as for noneducational services (such as soil and water testing).^{iv} As such, some states' extension services have implemented more fees for programs and services to offset declining federal and state revenues. 4-H is perhaps the most common area where CES in other states charge fees and providing 4-H for free is becoming less common. See Appendix E for more information.

In a 2017 SWOT analysis, a strategic planning technique used to identify the *Strengths*, *Weaknesses*, *Opportunities*, and *Threats* related to a project, CES identified a number of programs for which it could potentially implement fees or increase existing fees, with the goal of full or partial cost recovery. These programs include Master Gardener programs, pesticide applicator and Food Safety Modernization Act training courses, and master food preserver programs. Individual county agents may determine fees, but common guidelines and policies should be in place. For example, Washington's extension service makes available a revenue generation handbook that outlines considerations and recommendations for extension offices in determining when and whether to charge fees. It also sets standard fee rates for expenses such as travel, IT, and printing services.

Recommendations

Agricultural Experiment Station and Cooperative Extension Service administrators should

- Encourage and track nongovernmental funds received to support research and extension activities.

Cooperative Extension Service administrators should

- Conduct a feasibility study on potential fees for 4-H and other programming and develop clear guidelines for county offices on charging fees.

CES and AES can better align programming and research with state needs.

Solving New Mexico's most sweeping challenges (such as water availability, economic development, and rural quality of life) should be the new, collaborative focus of AES and CES.

Both CES and AES are significant assets to the state and to local communities. Their extensive presence and the deep trust that both organizations enjoy in many communities offer an opportunity to extend much-needed programs and services across the state to meet local needs and serve as a unifying force for community development – especially in rural areas. However, to do this, CES, in particular, will need to be more responsive to the changing needs of New Mexicans. In tandem, AES will need to reevaluate and refocus its efforts to ensure it is providing research and evidence to support CES specialists and county agents to meet community needs.

CES program development should rely more on objective needs assessments.

Because of its grassroots nature, much of the development of local CES programming is bottom-up, rather than top-down. County CES agents rely largely on their advisory committees, as well as surveys and discussions with community members, to gauge needs and develop new programs or modify existing ones. While these are all valid methods to assess needs, they may be over-sampling individuals and groups already involved with extension, rather than identifying overall community needs and gaps in services. Advisory committees are generally self-selecting, and agents often administer surveys at events or locations where respondents are more likely to participate in extension programming, such as county fairs or extension-sponsored events. There is limited use of county-level data to inform programming, and limited goal-setting.

NMSU CES is taking steps toward more robust program planning. Its recent internal statewide training on impact evaluation included guidance on developing program pre-planning worksheets, which staff are encouraged to fill out before launching new programs. It asks staff to identify

- What issue or need the program addresses;
- How the need or issue was identified;
- The intended audience for the program;
- How the program will address the issue or need;
- Targeted changes in knowledge, attitude, behavior, and condition as a result of the program;
- How changes will be measured;
- Measurable goals and objectives.

This type of planning exercise is valuable, and could be made more robust with the inclusion of the following elements:

- A projected budget to estimate program costs, and
- Development of a basic outreach and marketing strategy.

An example of a strong program planning and development process can be found in Minnesota, where CES requires its staff to develop annual business

Minnesota CES requires staff to develop annual business plans before launching new programming.

plans before launching new programming. Statewide Minnesota CES program teams consider elements including target audience and needs; inputs, outputs, outcomes, and logic model; implementation plan; and promotion and marketing plan. In subsequent years of the program, teams also consider the public and private value of the program and its financial plan. Plans are made public, and the CES administration ties \$750 thousand in annual state funding to CES regions to plan development.

AES and CES should improve communication and relationships with a wider variety of New Mexicans.

In certain communities, CES and AES are well known and used, and these communities, (for example, active 4-H parents, Master Gardeners, commercial funders of AES research, ASC-adjacent agricultural producers, etc.) tend to be avid supporters of both organizations. For many New Mexicans, however, the two organizations remain unknown, and this anonymity means that the communities that most use CES programming are often not representative of the larger state population. For instance, LFC staff conducted an informal survey of county managers and found that several were not well aware of the services that CES offered in their counties.

This relative obscurity threatens the reach of both organizations. Perhaps just as troublesome is that the statewide relevancy of CES programming cannot be objectively measured if it is only offered to, and used by, relatively small and exclusive communities.

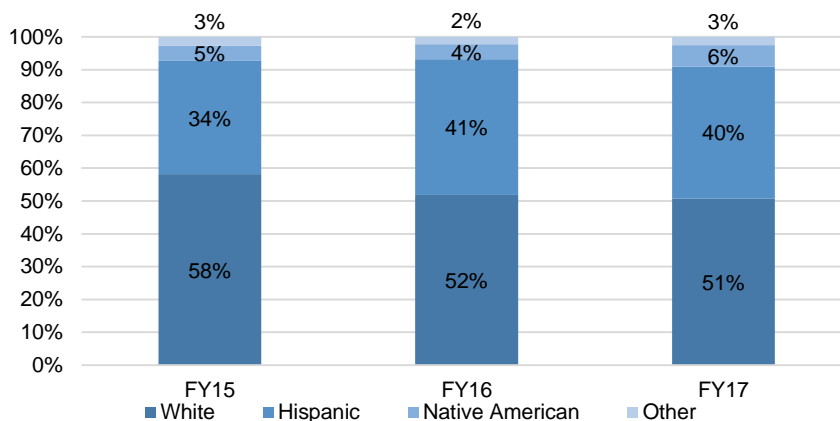
Advisory boards currently guide the work of AES and CES and provide important local perspectives. County extension offices, most ASCs, and some academic departments within ACES use citizen advisory boards to guide their work. These boards often consist of local farmers or ranchers, business people, subject matter experts, and interested citizens who identify local issues needing research or extension attention.

Having these advisory boards staffed with local leaders can help ensure that CES and AES are effectively serving the public. However, the role of these boards is to provide input to AES researchers and CES extension professionals to meet local needs. The boards are not designed to more broadly recognize statewide needs or goals of the college. As discussed later in this evaluation, the College of ACES has not delineated strong statewide goals for AES or CES yet and, as a result, the work of AES and CES is often not part of any cohesive, university-wide effort. While local input and leadership is critical, without statewide guidance from leadership, it is difficult to believe the current structure of AES and CES will allow the two agencies to effectively tackle the larger, statewide problems facing New Mexicans.

Advisory boards of county offices, ACSs and ACES academic departments are also, for the most part, operating without bylaws that specify stakeholder representation and term limits for membership. Both CES and AES administration noted this issue to LFC staff and are working to formalize such bylaws. This is a welcome action because, without rotation of members over time, the advisory boards risk becoming echo chambers, without input from outsiders or others with diverse perspectives. Further, advisory board members can act as *de facto* promoters of the work of the county extension offices and ASCs. However, without regular rotation of members to include representation from diverse communities, communication of AES' and CES' work may remain limited to communities already familiar with the organizations' activities.

CES should ensure programming is reaching diverse and representative populations. Contacts with Hispanic and Native American populations are low relative to overall state populations. While a small majority of CES contacts are white, this number has declined since FY15, while the number of Hispanic contacts has risen. However, CES contacts with both Hispanic and Native American residents are still low relative to the overall proportion of these groups among the state's population.

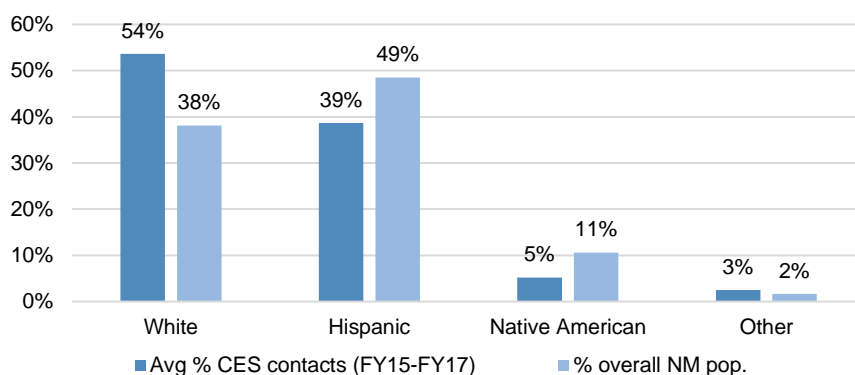
Chart 8. CES Contacts by Race/Ethnicity, FY15-FY17



Source: NMSU CES

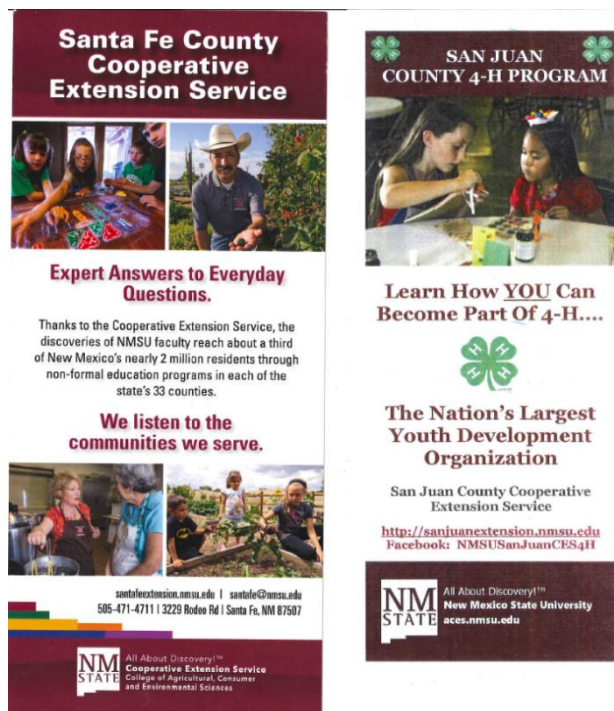
ACES provides a number of its resources in Spanish, and county extension staff indicated to LFC they are working on translating additional materials and curriculums. Many counties offer programs in Spanish. Extension offices located in or near Native American communities often provide culturally relevant programming. For example, the 4-H programming at the tribal extension office in Shiprock includes native foods, weaving, and braiding, and the agriculture agent runs sheep shearing demonstrations.

Chart 9. CES Contacts Compared with State Race/Ethnicity Breakdown



Source: NMSU CES; US Census Bureau (2016 population estimates)

Figure 6. Promotional Flyers for Santa Fe County CES and San Juan County 4-H



Source: Santa Fe and San Juan County extension offices

CES would benefit from a coordinated marketing and outreach strategy. Extension is often referred to as a “well-kept secret.” As a 2009 article from the *Journal of Extension* points out, extension historically had a clear and well-defined audience and mission, and information about services was mostly spread by word-of-mouth among farmers familiar with extension and its mission. Today, however, both the potential audience and the range of services have expanded. The same article argues that because extension has, in the past, not had to promote itself or its programs, it does not know how to do so effectively. Thus, many potential beneficiaries of extension services may be largely unaware of what it offers. A report from one county extension office highlighting recent activities indicated that one of the biggest challenges that the [family and consumer science] agent has faced is the fact that [...] residents [...] don’t know what a [family and consumer science] agent does.

Among county extension offices in New Mexico, advertising and promotion of services and programs is a mix of word-of-mouth, social media and email outreach, and more traditional forms of outreach (such as newsletters, flyers, and radio coverage). There is no dedicated budget, nor a formal marketing or outreach strategy.

Few faculty stationed at the agricultural science centers have the directive or support to publicize the results of research occurring at their centers. Since its inception, the work of the Agricultural Experiment Station has been to conduct original research or verify agricultural experiments and then make public the results of that research to the state’s farming and ranching communities. Yet, in FY17, nine research faculty members were stationed at six science centers with no CES appointment, and the College of ACES does not seem to have a formal policy about how researchers in AES are expected to make the results of their research available.

Perhaps as a result of this lacking extension support, when LFC staff requested the latest annual reports of work from each ASC, the documentation provided was uneven. Reports ranged from bound publications that included research summaries and findings (Tucumcari, Farmington), to simple presentations likely for annual advisory board meetings (Clayton, Artesia, Mora, Clovis, Corona), to one-page summaries of research topics prepared by AES (Alcalde, Chihuahuan Desert Rangeland Research Center, Farmington, Leyendecker, Los Lunas, Mora, Tucumcari), to no reports at all (Fabian Garcia center). Of these documents, only the full publications, such as those from Tucumcari and Farmington, provided practical results of research that farmers and ranchers might use, and only Farmington published this report on their website.

AES and CES should consider how to best apply their capacity and capabilities to provide public value at local and statewide levels.

A 2012 *Journal of Extension* article points to areas, like 4-H, where extension across all states tend to offer more services than most consumers need or want. In the case of 4-H, extension offers a long list of projects and activities “on the

assumption that more services are better...than meeting the specific needs of today's families.”^v Both the Cooperative Extension Service and the Agricultural Experiment Station must consider how best to focus limited resources and evolve to stay relevant and reach new and diverse audiences. For example, CES offers a broad range of programs and services, but choosing to strategically focus on fewer areas may be a better use of resources, ensuring CES is concentrating on areas of the most need, and where it can be most effective. The same principle should be applied to AES – focusing research and staffing priorities to those that best support CES in serving community needs.

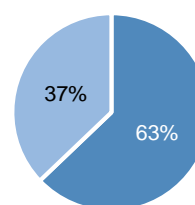
Some extension programs in health and wellness already address local and state needs well. Many CES programs already address critical issues in New Mexico, like poverty, food insecurity, and diabetes. ICAN, the shortened name for the Ideas for Cooking and Nutrition program, is a good example of this. The program, run by NMSU as a USDA Supplemental Nutrition Assistance Program Education (SNAP-Ed) implementing agency, teaches adults and families how to prepare easy and nutritious meals, save money on food, and maintain a healthy weight. As a SNAP-Ed program, ICAN is available to low-income individuals eligible for SNAP or other means-tested federal assistance programs. ICAN is offered in 21 counties and accounted for almost two-thirds of family and consumer sciences-related contacts in FY17, and almost a quarter of all extension contacts. The focus on nutrition, food budgets, and other health issues meets the needs of many New Mexicans, where 71 percent of residents fall below the SNAP poverty threshold.^{vi} The state ranks 12th nationally for highest rates of adult diabetes and has the second-highest household poverty rate in the nation.^{vii} Given these statistics, ICAN, as well as other nutrition-focused programs like Kitchen Creations (focused on cooking for diabetes) and JustBeIt! (focused on children's nutrition and physical activity) are well-placed to address critical needs in the state.

Extension should ensure that programming keeps up with modern needs of New Mexicans. More traditional family and consumer sciences programming, such as food preservation and sewing, may not meet modern needs as directly. While undoubtedly important components of home economics and household management in previous decades, they are now not necessarily a core skill for managing a household.

The organization should also ensure it is keeping up with shifts in populations, economies, and public needs. For example, extension still focuses a significant portion of its financial resources and human capital on agriculture. Agriculture-related programming remains a core focus area of extension's work (accounting for 37 percent of agents and 68 percent of specialists), despite only accounting for 2.6 percent of total state employment,^{viii} and approximately 1.3 percent of gross state product.^{ix} This is a significant shift from the early 1900s when extension was created and over 40 percent of Americans were employed in agriculture.

A 2009 article from the *Journal of Extension* argues that failure to move beyond traditional agricultural education is a “recipe for irrelevance,” pointing out that not only do farmers represent a small share of the public, but agricultural producers no longer have the same needs for basic agricultural training, often relying on information from private companies, consultants,

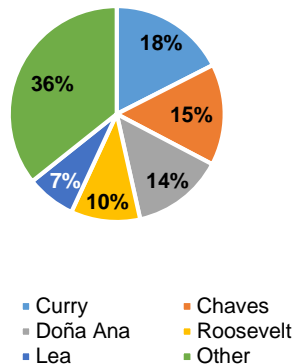
Chart 10. FCS Contacts by Type, FY17



■ ICAN
■ Other FCS

Source: NMSU CES

Chart 11. Share of State Agricultural Sales by County, 2012



Source: USDA Census of Agriculture

and free or low-cost online resources. ^x Today, there are approximately 37 thousand farm operators in the state, according to the 2012 USDA Census of Agriculture. This compares with the 470 thousand individuals who participated in SNAP on a monthly basis in 2016 and thus would be eligible for ICAN programming.

However, the role of agriculture varies widely across counties and plays a key economic and cultural role in many counties, especially more rural ones. Fourteen counties are over 50 percent rural, and in 2012, five counties accounted for almost two-thirds of agriculture sales in New Mexico. Thus, a strong agricultural focus of extension programming may be more appropriate and relevant in certain counties and communities.

CES and AES possess the knowledge and human capital to address statewide problems but opportunities for coordinated efforts remain.

LFC staff found the professional relationships between campus-based AES faculty, CES specialists, ASC-based faculty, and county extension agents varied among departments and individuals, with collaboration usually occurring as a result of happenstance and individual interest rather than as part of a coordinated effort or articulated plan of work. However, collaborative activities between CES and AES projects were most pronounced where either extension specialists worked out of the same ASC (e.g., with CES's Rural Agricultural Improvement and Public Affairs Project based at Alcalde) or where ASC-based faculty had significant extension responsibilities (e.g., at the Los Lunas ASC).

With other project areas, research and extension activity was high but with surprisingly little coordination between CES and AES faculty and staff. For example, each science center visited by LFC staff was researching water use and efficiency, and most county agricultural agents mentioned it as either a current or emerging challenge in their counties. Yet, when asked how the AES faculty conducting this research were working with colleagues to a common purpose, they often had stronger examples of collaborative efforts outside of the university than within it.

Extension could expand its role in community and economic development by enhancing field expertise and creating a more coherent, coordinated focus on these activities. While much of extension's work in local communities falls under the broad umbrella of community and economic development – such as programming directly or indirectly focused on skill-building, community health, youth development, and farm and ranch profitably – there is limited explicit focus on or coordination of economic development at the county level, with no dedicated agents in this area.

At the university level, economics is the smallest of the extension academic departments, with just four full-time faculty members. The department covers economic development, agricultural economics, and agricultural business. Specialists work with producers to strengthen business and financial practices, as well as with communities to support economic and community development efforts. For example, Stronger Economies Together (SET), is a USDA program that brings together regional stakeholders to create and implement regional development strategies. This process is guided by extension specialists, with participation from a multitude of local actors, including county extension agents. As with most extension programming, the involvement and role of agents in this type of work varies significantly from county to county.

While extension is already performing important work at the county level related to community and economic development, more coherent and coordinated strategic focus, as well as more support for extension economics from the institutional level, could create greater impact. Extension could better leverage its on-the-ground presence to serve as a unifying force for community and economic development. For example, extension could assess community needs, identify priorities, and coordinate activities of local and state-level stakeholders. Extension is already doing this to some extent through the SET program. Hiring more economics specialists, especially ones located off-campus, may also be beneficial.

NMSU could better use its economic development professionals and resources to build markets for the new or niche agricultural products studied at the ASCs. NMSU has economic development resources in both extension specialists and faculty in their agricultural economics and agricultural business department, as well as NMSU's entire College of Business that includes the Arrowhead Center that offers services to help researchers, start-ups, and entrepreneurs pioneer new technologies, businesses, and partnerships. However, interviews with ASC faculty and superintendents revealed that very little work at the ASCs included these professionals. These relationships are likely further strained as the ACES Department of Agricultural Economics and Agricultural Business has been cut from over 20 faculty to seven over the last 15 years, and no economics faculty apart from the specialists have CES appointments.

Several new or niche agricultural products studied at the various ASCs could likely benefit from some market development. These products include jujubes (a date-like fruit grown on hardy trees from China), hops and winter barley for beer brewing, grapes for winemaking, and dryland biofuel crops. Although these crops may be more sustainable, disease resistant, or productive, without subsequent market development, production will likely stay limited to the science centers. Hybrid poplar production research at the Farmington agricultural science center provides an illustrative example of the need for market development in tandem with more basic agricultural research.

In the early 2000s, Farmington ASC faculty connected with Western Excelsior Corporation, a sawmill in Mancos, Colorado. At the time, Western Excelsior was searching for a sustainably farmed substitute for the aspen trees it was harvesting from surrounding national forests. The Farmington ASC's neighbor, Navajo Agricultural Products Industry, previously completed a transition to center pivot irrigation on much of its farmland, leaving behind several thousand hectares of rectangular fields that ASC faculty believed could be rehabilitated into drip-irrigated poplar production. In response to these opportunities, Farmington ASC faculty began planting and researching production of hybrid poplar trees in 2002 to determine their suitability for regional production. Since then, Farmington ASC faculty have found a well-adapted poplar varietal that would theoretically yield better returns than traditional irrigated crops.

Unfortunately, the Western Excelsior plant in Colorado suffered a major fire in May 2017, and the company might not resume operations in the region. As a result of this fire, the market for hybrid poplars in the Four Corners region has mostly disappeared. Further, although the ASC now has approximately 12 acres in poplars and over 15 years of research on the trees, area landowners have little incentive to plant the hybrid poplars until a new market can be found



Figure 7. A grove of hybrid poplars at NMSU's Farmington Agricultural Science Center

or built. Rather than let decades of work languish, extension economic development specialists and NMSU Agricultural Economics and Agricultural Business faculty should prioritize finding or developing new markets for hybrid poplars, in addition to other new or niche agricultural products developed at the science centers.

Recommendations

New Mexico State University administrators should

- Consider how to strengthen relationships between CES and other colleges outside of ACES to improve outreach and action on local economic development and other interdisciplinary issues.

Agricultural Experiment Station administrators should

- Encourage faculty to, wherever possible, incorporate the perspective of economists or management faculty to discover and amplify the potential results of research.
- Consider conducting less agricultural research on established agricultural industries (e.g., forage crops, beef cattle) if associated commodity groups are unable to contribute meaningful monetary support for said research, and instead, focus its research agenda on nascent and emerging industries.
- Ensure that each agricultural science center produce and distribute an annual summary of the research and findings to regional farming communities.

Cooperative Extension Service administrators should

- Based on ACES' strategic plan, identify core focus areas for extension programming that meet current and future critical statewide and local needs.
- Develop more rigorous needs assessment tools to gauge current and emerging county needs and ensure assessment includes a representative sample of county residents.
- Develop outreach strategies to reach under-represented groups, including Hispanic and Native American residents, as well as develop programming to meet the needs of new and diverse groups.
- Consider hiring agents with expertise in community and economic development.
- Consider housing county extension agents at an ASC in counties that have them and giving faculty housed at ASCs significant extension appointments.

AES and CES goals are not well-defined, and evaluation of impact is inconsistent

Better direction from ACES, coupled with rigorous goal setting and measurement, could help ensure CES programming and AES research feed into broader strategic plans.

NMSU's College of ACES has a basic strategic plan posted on its website that was last updated in April 2015. The plan lists the college's mission-related priorities and related objectives, although none of the objectives follow the commonly accepted SMART method of writing objectives (they should be specific, measurable, attainable, realistic, and time-bound). The objectives are also not assigned to any individual or department, and there is no clear direction as to how AES, CES, and the parent college should coordinate (or not) to achieve these objectives. Without this sort of clear directive from their parent college, CES and AES administration and faculty instead report on general metrics (number of faculty, projects) to gauge success rather than progressing toward larger, tangible goals. See Appendix F for the full 2015 ACES strategic plan.

Each of the ACES priority areas in the strategic plan also has a number of performance indicators, however, most are short-term outputs (e.g., number of programs or publications, expenditures) and the plan is missing key components that explain how short-term outputs eventually lead to success in reaching targeted objectives.

NMSU ACES's Mission-Related Priorities As Outlined in the 2015 Strategic Plan

- Foster technological innovation and technology transfer to enhance competitiveness and security of New Mexico agriculture while maintaining the natural resource base,
- Support economic and community development,
- Expand natural resources conservation and management and environmental sciences programs,
- Enhance the quality of life for the people of New Mexico,
- Continue a targeted involvement in multistate, regional, and international programs.

In addition to its strategic plan, ACES has developed a framework that includes four pillars of economic and community development: food and fiber production and marketing, water use and conservation, health of New Mexicans, and environmental stewardship. While these may be worthwhile focus areas, the framework lacks goals and targets, does not clearly translate the pillars into efforts in the field (either CES programming or AES research), and does not inform resource allocation. Thus, these focus areas do not clearly guide the work of CES and AES.

Figure 8. ACES' 4 Pillars of Economic and Community Development



More useful than ACES' current strategic plan and four pillars would be a revised strategic plan that both sets high level (but measurable) goals and articulates a logic model for how the day-to-day activities of AES, CES, and all other components of the college will contribute to meeting those goals.

In 2014, Hanover Research released a report^{xi} detailing best practices in developing strategic plans for institutions of higher education that included helpful information: "The plan should answer the questions '*How will we know if we reach this goal, and how will we prove it?*'" A comprehensive implementation plan describes action steps for each objective and the anticipated outcomes. It will also include a timeline, criteria for success, assessment methods, the necessary resources, and the person or sub-unit responsible for each part." ACES could use Hanover's report as a guide in updating their own plan.

Current impact reporting relies heavily on the use of short-term, output-based metrics, making it difficult to gauge the larger impact of state appropriations.

AES and CES report annual measures of impact in two formal reports: first, to the USDA National Institute of Food and Agriculture (NIFA), the federal agency that administers AES and CES funding, via annual reporting on a rolling, five year plan of work; and second, as part of CES and AES's annual non-instruction and general funding request to the New Mexico Higher Education Department.

AES and CES reporting to NIFA outline some useful metrics, but neither AES nor CES has measured or reported on those metrics. The NIFA report is useful in illustrating how AES and CES administration divide their annual Hatch Act and Smith-Lever federal funds among different research topic areas, which may or may not correlate to AES and CES's allocation of state appropriated funds. The report outlines some AES and CES impacts through mostly output-type metrics:

- Number of peer-reviewed publications,
- Number of extension publications,
- Number of trained professionals,
- Number of students trained,
- Numbers of adult and youth direct and indirect contacts,
- Number of patents submitted,
- Number of improved animal varieties,
- Number of research publications.

The USDA report also contains three more *outcome* type metrics that speak to the adoption of programs:

- Number of methods, technologies, and animal varieties adopted by public and private sectors;
- Percent of food processors using NMSU for their food product development;
- Percent of diabetics adopting NMSU recommendations regarding nutrition.

These outcome measures could be particularly telling of research and extension impact and utility. Unfortunately, NMSU has chosen not to report data for any of the metrics in their annual reports. Interestingly enough, there are some measurable goals in the NIFA plans of work, although success toward meeting these goals is not explicitly measured or reported in the annual NIFA reports. Examples of the measurable goals:

- [Number of] profitable [...] cattle, dairy and sheep enterprises,
- Increased [...] economic and community development,
- Reduced incidences of food-borne diseases in New Mexico,
- Reduction of diabetes in New Mexico.

CES and AES also fail to provide meaningful measures in their budget request to the Higher Education Department (HED), the other avenue in which NMSU reports on the impact of the AES and CES. A 2008 LFC evaluation, *Review of Selected Research and Public Service Projects*, found, “Section 6-3A-1 to 6-3A-8 NMSA 1978 states that performance measures should be developed for evaluating performance and assessing progress in achieving goals and objectives, and those measures should be integrated into the planning and budgeting process and maintained on an ongoing basis. Also, it dictates accountability for the services and products delivered in accordance with clearly defined missions, goals and objectives. The lack of performance measures, quality indicators, and targets make it difficult to assess whether the RPSP [research and public service project] is effective and whether the program costs outweigh the benefits.”

While goals in AES’s and CES’s FY19 AES’s non-instruction and general funding request have numerical metrics and targets, they are still largely output-type measures. Further, these outputs do not clearly communicate a return on investment or the measure for progress toward fulfilling the CES and AES missions.

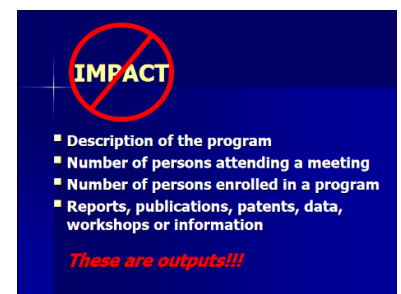


Figure 9. Slide from a 2007 presentation by H. Michael Harrington, Executive Director of the Western Association of Agricultural Experiment Station Directors.

Table 2. NMSU's Agricultural Experiment Station Goals and Performance

Goals	FY19 (target)	FY18 (actual)
The total FTE of faculty employed by AES	150	146
The total FTE of staff employed by AES	200	206
Number of graduate students supported by AES funds	155	149
Number of master's and doctoral students graduating from AES-funded programs	84	96
Number of undergraduate students employed by AES funds	300	261
Number of publications produced	110	103
Number of animal and/or plant varieties released	4	2
Number of commodity and advisory board meetings held during the year	10	14
Number of agricultural science center field days held during the year	10	8
Total dollars of grants and contracts leveraged with state funds	\$15,000,000	\$14,428,000
Number of individual sponsored research projects	120	125
Total dollars of grants and contracts proposals submitted by AES faculty and researchers during the year	\$50,000,000	\$55,412,000

Source: NMSU

Table 3. NMSU's Cooperative Extension Service Goals and Performance

Goals	FY19 (target)	FY18 (target)	FY17 (actual)
Disseminate research-based information and community development activities to the citizens of NM (number of contacts)	5000,000	500,000	525,292
Provide development opportunities and preparation for NM youth (number of 4-H youth contacts)	60,000	60,000	185,308
Educate and inform clientele through publications and media distributions (number of "mass media" events)	300	300	1,438
Submit funding proposals to secure additional dollars	\$11,000,000	\$10,500,000	\$36,990,000
Secure other funding by leveraging state dollars	\$12,500,000	\$12,500,000	\$12,617,000
Maintain a diverse faculty and staff to address educational needs of NM citizens (number of FTE)	300	300	258

Source: NMSU

CES and AES administration recognize the need to improve impact evaluation and better demonstrate outcomes. The focus of CES' January 2018 in-service workshops was impact evaluation and needs assessment. The in-service agenda included sessions on evaluating and documenting impacts by subject area.

Additionally, in a 2017 SWOT analysis, CES identified as a priority hiring a program accountability and evaluation specialist who would be charged with developing program evaluation tools, and provide training on needs assessment and impact evaluation. Likewise, AES's 2017 SWOT analysis identified improved impact reporting as a system-wide priority and AES administration is planning a faculty training on impact reporting in spring 2018.

Tennessee's extension service provides a good example of meaningful impact evaluation, which requires agents to consider multiple types of target outcomes – learning, action, and conditions – that build on each other, when developing new programming. CES used Tennessee as an example in some of its in-

service training materials, including examples of needs assessments and impact statements from that state’s extension service.

Table 4. Example of Tennessee CES Planned Outcomes for Extension Program Development

Issue	Learning	Action	Conditions
Parenting education	<ul style="list-style-type: none"> Parents increase knowledge of child development. Parents learn new ways to discipline. Parents become aware of community resources that will help them. 	<ul style="list-style-type: none"> Parents practice improved parenting skills. Parents use the local Parenting Resource Center, and use of other services also increases. 	Reduced rates of child abuse and neglect.

Source: Tennessee State University Extension Program Planning, Evaluation and Accountability handbook

A few simple modifications to CES’s and AES’s non-instruction and general funding request could better convey impact of state funding. Enhanced or new metrics could include

Economic impacts: AES faculty conducting applied research should be required to conduct and report simple benefit-to-cost ratios to justify their research projects. Two ACES professors, in the AES research report *Estimating Economic Value of Applied Research Projects*, demonstrated a way to set up a simple Excel calculator to determine standard benefit-to-cost ratios. If collected on aggregate, NMSU could use these benefit-to-cost ratios as a meaningful metric of impact that, if reported along with the balance of applied to basic research conducted in ACES, would provide a better picture of the outcomes of annual state AES appropriations.

Academic scholarship: The number of peer-reviewed articles are not reported to the state Legislature but likely should be. In the FY19 non-instruction and general funding request, AES administrators noted that “peer-reviewed publications are not a great measure of state AES funding because much of the research is presented to constituents as hands-on demonstrations.” However, developing peer-reviewed articles and nonacademic papers or demonstrations should not be mutually exclusive – faculty should be able to easily translate their research for the potential beneficiaries of that research. Further, producing peer-reviewed publications is important to ensure the rigor and quality of research occurring at the college. As such, NMSU should be reporting on the number of peer-reviewed publications produced by AES faculty, not just with federal AES funds, but as a result of all AES funding.

Grants awarded and trends in grant sourcing: In their annual non-instruction and general funding requests, both CES and AES report on the total amount of grants and contracts proposals submitted (\$55.4 million for AES and \$37 million for CES in FY17.) A more appropriate, outcome-based goal would relate to both the source and amount of grant and contract funding awarded. For AES, that was \$12.4 million in FY17, \$1.3 million of which was from nongovernment sources; for CES, it was \$8.4 million, of which \$595 thousand was from nongovernment sources. Further, as NMSU lags behind many of its peer land-grant universities in securing funding from nongovernment sources for agricultural research, it would be prudent for NMSU to also track and report on trends in nongovernment research funding for AES.

Recommendations

College of Agricultural, Consumer, and Environmental Sciences administrators should

- Develop a new strategic plan that sets goals, and measurable objectives, and assigns responsibility for those goals to better define the purpose and expectations to AES and CES administration, faculty and staff.
- Provide new, outcome-based metrics in their annual non-instruction and general funding request. AES and CES should also justify how those metrics tie back to achieving the goals of AES, CES, and ACES.

Cooperative Extension Service administrators should

- Conduct smaller, pilot programs to assess impact and identify the effects of changes to programs.
- Use extension specialists in program evaluation efforts.

Expenditures are often inconsistent with objective goals, metrics, and benchmarks

CES and AES have flexibility to prioritize research and programming expenditures.

Despite this flexibility, expenditures at CES and AES are often based on historic levels and are not necessarily consistent with the research and extension needs of New Mexico communities. As a result, funding is now allocated among counties unevenly, agricultural science centers are facing millions of dollars of deferred maintenance, and pay for some CES and AES employees remains below national or regional averages.

CES distribution of revenue among counties is inconsistent with community population levels.

While state appropriations account for 32 percent of overall CES revenue, this percentage varies in how it is distributed across counties. For example, over 40 percent of total appropriations in Roosevelt, Taos, and San Juan counties are state funds, but state funds make up less than a quarter of total funds in Socorro, Colfax, and Los Alamos counties. Similarly, the amount allocated by the state on a per-capita basis varies widely and is roughly correlated with population, with the state spending more per capita in small population counties. At the high end is Harding County, with just 695 people, where the state allocates \$49 per inhabitant. This compares with Bernalillo and San Miguel counties, which each receive 24 cents per capita. See Table 5 for per capita appropriations to counties, and Appendix D for a full list of federal, state, and county appropriations by county.

The 12 agricultural science centers are seldom used by faculty, are not adequately funded, and are largely ignored in facilities planning.

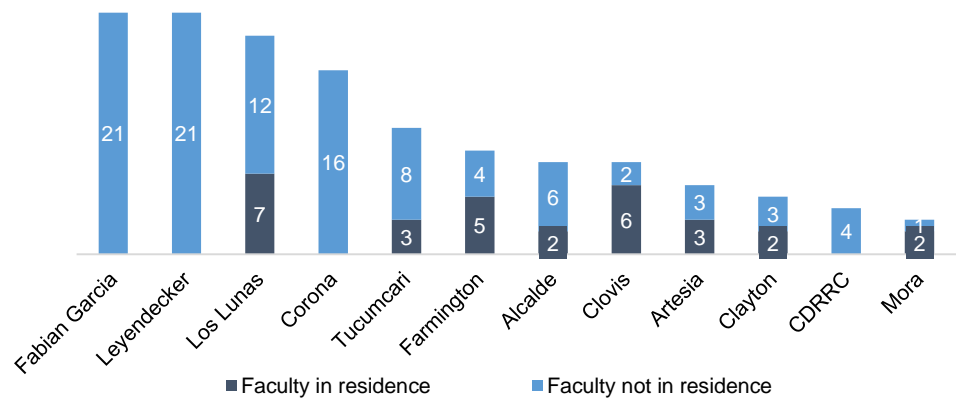
Like almost all land-grant universities, NMSU maintains several farm- and ranch-type operations where faculty of the College of Agricultural, Consumer, and Environmental Sciences might conduct applied research. Despite annual operating expenditures, and faculty and staff salaries of approximately \$8.4 million, these science centers are not evenly, nor heavily used by ACES faculty. There are over 140 faculty members in ACES, yet even the two ASCs located in Doña Ana County (Leyendecker and Fabian Garcia) were only used by 21 individual faculty members over the decade spanning FY08 to FY17 – an average of two per year. Over half the other ASCs have utilization of less than 10 faculty members over the same decade, including those faculty in residence at an ASC.

Table 5. State Expenditures on County Extension Offices per Capita

County	Population	State allocation per capita
Harding	695	\$49
De Baca	2,022	\$16
Catron	3,725	\$11
Union	4,549	\$9
Quay	9,041	\$9
Guadalupe	4,687	\$8
Mora	4,881	\$7
Hidalgo	4,894	\$7
Roosevelt	19,846	\$5
Torrance	16,383	\$3
Colfax	13,750	\$3
Sandoval	29,393	\$3
Sierra	11,988	\$3
Rio Arriba	40,246	\$2
Lincoln	20,497	\$2
Luna	25,095	\$2
Los Alamos	17,950	\$2
Curry	48,376	\$2
Grant	29,514	\$2
Eddy	53,829	\$2
Taos	32,937	\$2
Chaves	65,645	\$2
Cibola	27,213	\$2
Socorro	17,866	\$2
Lea	64,727	\$2
Otero	63,799	\$1
Valencia	76,569	\$1
San Juan	131,561	\$1
Santa Fe	144,170	\$1
McKinley	71,492	\$1
Dona Ana	209,233	\$1
San Miguel	130,044	\$0.24
Bernalillo	662,564	\$0.24
AVERAGE		\$5.0

Source: NMSU

Chart 12. Faculty Researchers Utilizing ASCs, FY08 - FY17



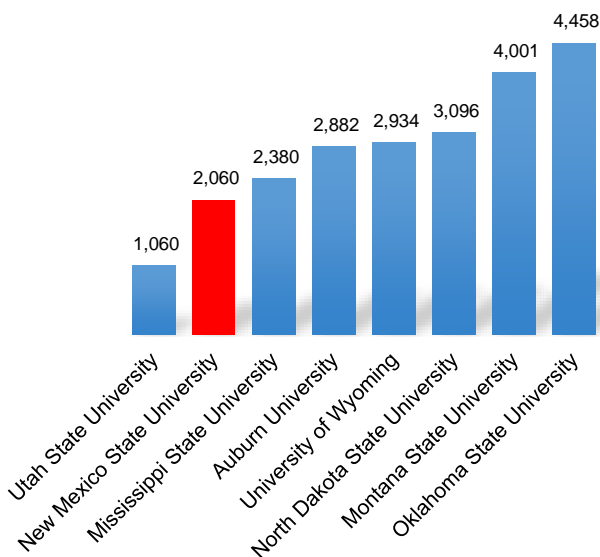
Source: AES

Based on the number of farms and value of agricultural output, New Mexico has more agricultural science centers than most of its peers.

NMSU is in the midst of evaluating its ASCs to determine if the university has an appropriate number of centers, as well as review operations and funding of those centers. See Appendix G for more information on this review.

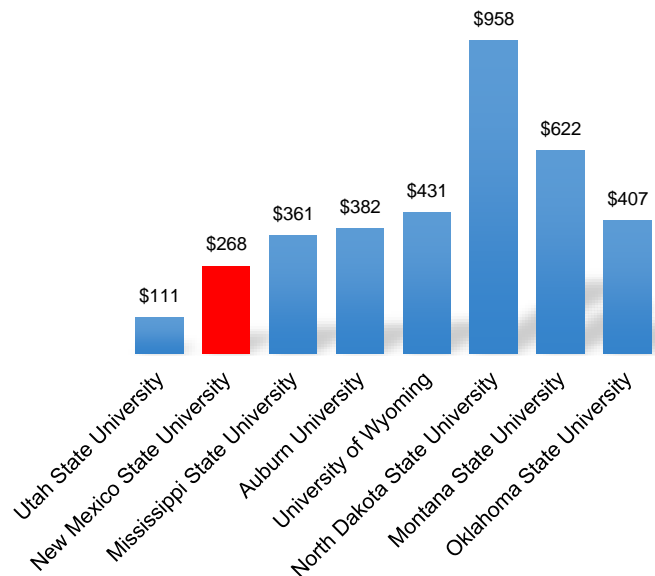
Regarding the number of ASCs NMSU has, one member of the NMSU evaluation team noted that: “The size of the states in the Western U.S. provides a challenge in conducting relevant research for stakeholders. The distance between facilities can be great, and the environmental and geographical differences across the state can be quite variable. This creates a need in these large states for more ASCs.” However, when compared with peer land-grant universities, including several in the West, NMSU has a relatively high number of agricultural science centers in relation to both the number of farms

Chart 13. Number of In-State Farms per ASC (2012)



Source: USDA, university websites

Chart 14. Value of State Agricultural Output per ASC (2016, in millions)



and ranches in the state as well as the economic value of New Mexico's agricultural output.

Rather than continuing to support all 12 off-campus ASCs, AES administration may want to encourage faculty to instead lease private land and animals for experiments. The type of research experiments that can occur on private land is limited and determining legal liability can be challenging. Still, these hurdles are not insurmountable; AES administrators and ACES department heads reported some faculty already are conducting research on private land and animals.

NMSU has one agricultural science center in Mora for forestry research, yet NMSU does not have an academic forestry department, nor any main-campus faculty dedicated to forestry research. The John T. Harrington Forestry Research Center in Mora has a mission “to conduct research and outreach throughout New Mexico and beyond in the areas of forest biology, native plant production, and reforestation biology.” NMSU receives annual federal capacity funds from USDA to conduct forestry research under the McIntire-Stennis Act of 1962. In FY17, NMSU received \$269,851 federal McIntire-Stennis funds with a required, one-to-one state match. The purpose of the McIntire-Stennis funds is to assist states in carrying out a program of forestry research at state forestry schools and colleges and in developing a trained pool of forest scientists capable of conducting needed forestry research. USDA, which administers McIntire-Stennis funds, requires that McIntire-Stennis funds be used for mandated forestry research areas.

The Mora center is one of NMSU's least utilized agricultural science centers, with only three NMSU faculty conducting research at the center since FY08. This low number is likely because NMSU does not have an academic forestry department, nor do they have any Las Cruces-based faculty who have a specific forestry research focus. Nevertheless, the center has an FY17 operating budget of \$72 thousand and staffing the center costs the Agricultural Experiment Station \$274 thousand annually. This amount, however, is well short of the \$539,702 NMSU should dedicate to forestry research with its McIntire-Stennis funds and required state match.

New Mexico Highlands University is the only institution of higher education in New Mexico with an academic forestry program. In 2017, NMSU developed a memorandum of understanding with Highlands to transfer \$5,000 from NMSU to Highlands for the development of a forestry laboratory at the Mora center. AES administrators reported to LFC staff that NMSU is planning to more formally partner with Highlands in the future to create a collaborative partnership using McIntire-Stennis funds that will be mutually beneficial to both institutions.

Low pay hinders the ability of NMSU to attract and retain farm and ranch laborers at its agricultural science centers. Each off-campus agricultural science center operates as a working farm or ranch and, as such, requires significant labor for daily operations. However, in meetings with LFC staff, ASC superintendents noted that low pay and limited advancement opportunities have made it difficult for them to attract and retain farm and ranch laborers. Corroborating the superintendents' observations, NMSU's personnel salary records indicate that seven out of the 35 laborer positions at the ASC's either were or became vacant during FY17.

Table 6. Average Annual Salary for Laborers at NMSU's Agricultural Science Centers, FY17

Position Title	Average Annual Salary	Hourly Wage*	Percent of 2017 Federal Poverty Line**
Groundskeeper, Senior	\$24,497	\$11.74	203%
Laborer	\$17,868	\$8.56	148%
Laborer, Senior	\$19,212	\$9.21	159%
Manager, Farm/Ranch	\$50,987	\$24.43	423%
Supervisor, Farm/Ranch	\$38,058	\$18.24	316%

* Calculated as annual salary / 2,087 hours

Source: NMSU

** 2017 FPL for a household of 1 person is \$12,060

Further, the May 2016 U.S. Bureau of Labor Statistics data for the state of New Mexico indicates NMSU is paying below-average wages for its non-manager and non-supervisory laborer positions.

Table 7. New Mexico Wage Estimates for Select Occupations, May 2016

Occupation	Mean Hourly Wage
Landscaping and Groundskeeping Worker	\$12.16
Farmworkers and Laborers: Crop, Nursery, and Greenhouse	\$10.41
Farmworkers and Laborers: Farm, Ranch and Aquaculture Animals	\$12.95
Agricultural Equipment Operator	\$12.03

Source: U.S. Bureau of Labor Statistics

NMSU's 12 ASCs had combined restricted and unrestricted expenditures in FY17 of \$8.4 million. Salaries for laborers at the agricultural science centers accounted for \$973 thousand of that \$8.4 million. To bring the salaries of laborers to a minimum of \$12 per hour would cost AES slightly less than \$125 thousand annually – money that NMSU could pull from the more than \$2 million it has carried in its fund balance annually since FY15.

NMSU has inadequately funded ASCs, resulting in at least \$20 million in deferred maintenance costs. NMSU's draft 2017-2027 facilities master plan notes that "funding and deferred maintenance at remote sites continue to be problematic and challenging." In 2012, NMSU's facilities department calculated the maintenance needs at six of the ASCs (Alcalde, Artesia, Clayton, Clovis, Mora and Tucumcari) at over \$20 million. In October 2017, superintendents of all ASCs estimated major repair needs totaled \$2 million. NMSU's draft master plan does not delineate specific plans to address any of these ASC maintenance concerns beyond one sentence: "Several assessments were completed on remote sites, and these will be used to foster efforts to maximize the use of funds." Low operating budgets and inadequate allocations of building renewal and replacement (BR&R) funds are the likely culprits of rising deferred maintenance costs. Annual BR&R funds for the entire AES system over the past 10 years have been less than \$155 thousand and the operating budget for most agricultural science centers, even those that span hundreds or thousands of acres and house expensive agricultural and scientific equipment, are less than \$100 thousand annually.

In addition to annual state appropriations, eight of the 12 agricultural science centers received special legislative appropriations for capital costs, totaling \$5.8 million between 2007 and 2017. Each agricultural science center has its own volunteer advisory boards, and all superintendents interviewed by LFC staff noted their advisory board members advocate for state funding for their respective ASC apart from NMSU governmental relations staff. While the support these advisory board members demonstrate for their local centers is admirable, the result of their advocacy has been

Table 8. FY17 Operating Budget of NMSU's Agricultural Science Centers

ASC	Operating Budget	Acres
Clovis	\$308,501	156
Farmington	\$109,448	254
Artesia	\$94,640	151
Los Lunas	\$88,148	202
Alcalde	\$85,745	65
Tucumcari	\$84,550	464
Mora	\$71,798	137
Clayton	\$70,844	120
Leyendecker	\$28,665	203
Fabian Garcia	\$14,333	41
Corona	\$9,555	27,886
Chihuahuan Desert Rangeland Research Center (CDRRC)	Not Reported	60,800

Source: October 12, 2017 ASC advisory team meeting

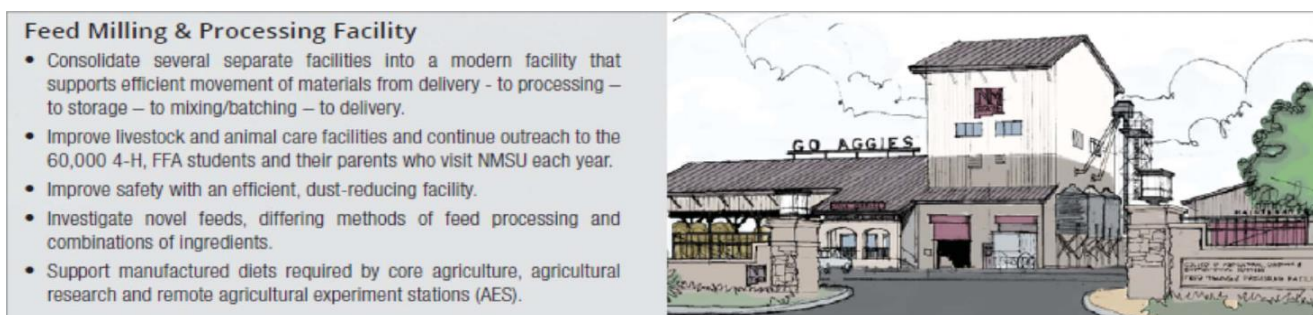
uneven funding of ASCs outside of any long-term strategy for agricultural research at NMSU. See Appendix H for a complete listing of capital appropriations for NMSU's Agricultural Science Centers from 2007 to 2017.

Some of the proposed on-campus construction recommended in the 2015 master plan is duplicative of facilities NMSU already has at off-campus agricultural science centers. For example, before publishing the 2015 master plan, Parkhill Smith & Cooper held a two-day meeting to discuss the proposed plan and published the minutes of that meeting as an appendix to the 2015 plan. One comment made by Greg Walke, NMSU's architect, was particularly pertinent: "Someone is sure to ask why we have a feed mill in Clayton [agricultural science center] and another one here [on campus] ... I don't know the answer to that, but we should be ready with one."^{xii} Nevertheless, during the summer 2017 higher education capital hearings, NMSU proposed construction of a new, on-campus feed milling and processing facility as part of its total, \$25 million agricultural building capital outlay request. In its revised 2017 master plan, NMSU noted that \$3.1 million of that \$25 million was dedicated to the new feed mill. This amount is 41 percent more than the \$2.2 million NMSU previously estimated in its FY18 justification for the \$25 million general obligation bond request.



Figure 10. A Feed Truck Sits Near the Feed Mill at Clayton ASC

Figure 11. Proposed Feed Mill Presented at NMSU's 2017 Capital Hearing



CES staffing imbalances may limit effectiveness.

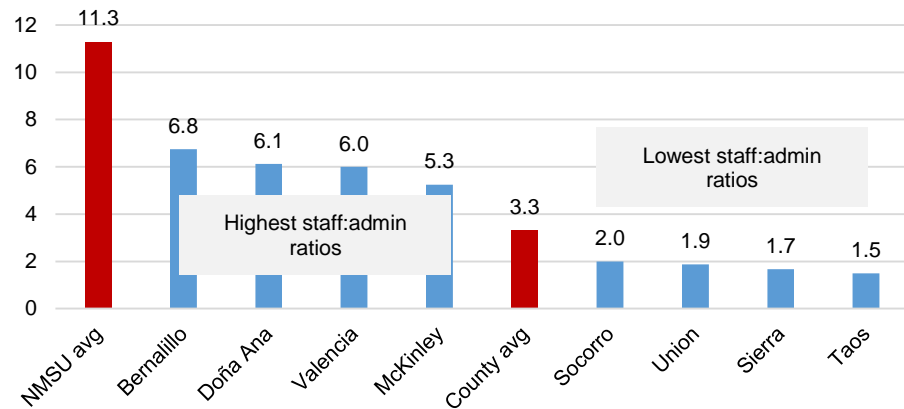
LFC staff found several examples where CES and AES could rethink the staffing patterns and, in some cases, employee pay bands to increase the efficiency and effectiveness of the organizations, and to encourage retention of high-performing employees.

CES has a high number of administrative staff relative to overall program staff. LFC staff analysis of CES salary data indicates the ratio of program staff to administrative staff is 4.2 to 1. A 2015 staffing study by the business analytics firm Deloitte found an even lower ratio of 3.5 to 1, although that analysis appears to have counted staff positions, rather than FTE. The university average was 11.3 to 1.

Within county extension offices, the overall staff-to-administrative staff ratio is 3.3 to 1. All counties have at least one administrative FTE, and all have lower ratios than the university average. While administrative staff play an important role in local offices, often providing in-person support to clients while agents are in the field, some administrative functions – such as payroll and human resources – may be able to be better consolidated at a regional or

statewide level. For example, the University of Wisconsin recently reorganized its extension service, retaining an extension office in every county, while establishing multi-county areas to consolidate administration.

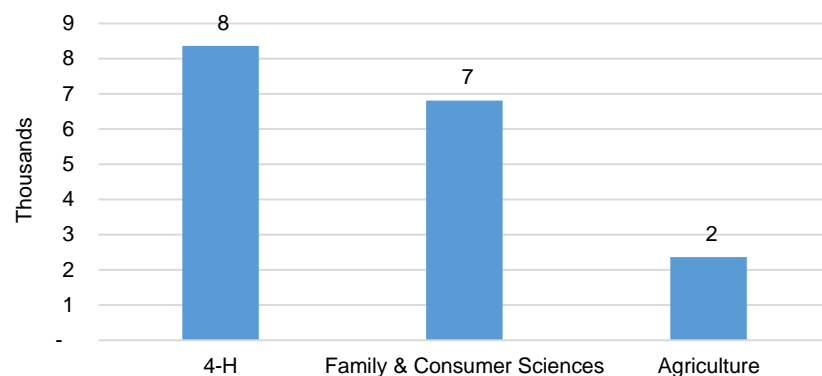
**Chart 15. Ratio of All Staff to Admin Staff by CES Office
(Number of Total Staff per One Admin Staff FTE)**



Source: NMSU CES

The balance of extension agents by program area may not align with program participation. CES data showing the number of personal contacts made by staff members in different program areas indicate that, in FY17, 37 percent of contacts were for family and consumer sciences programming, and another 37 percent were for 4-H and youth development programming. Agriculture-related programming accounted for 17 percent of contacts. Personal contacts are those where staff members interacted with people in person, by email, or over the phone.

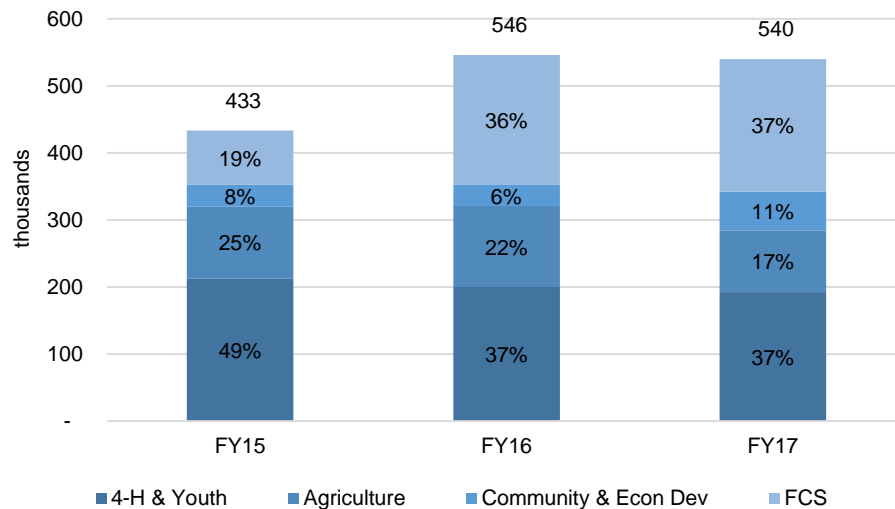
Chart 16. Annual Contacts per Program Area, FY17



Source: NMSU CES

Given the lower numbers of 4-H and family and consumer science agents relative to agriculture agents and the higher number of contacts in these areas, the number of contacts made by the different types of agents varied significantly. These figures suggest CES may need to reconsider appropriate agent balance. All counties but one – San Miguel – have an agriculture agent, including agents who work across two program areas, but several counties do not have 4-H or family and consumer science agents.

Chart 17. CES Contacts by Program Area, FY15-FY17



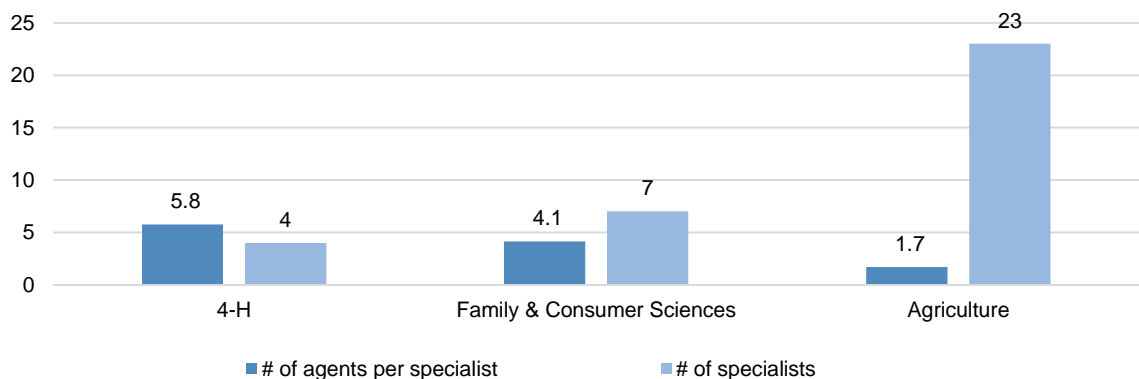
Source: NMSU CES

Note: ICAN contact data was not captured in CES' contact reporting system prior to FY16, so FCS contacts for FY15 likely appear lower than they were

Contact reporting is a weak metric to gauge participation. It does not offer meaningful information about the nature or results of a contact, and has the potential to “over count” in some areas. For example, a 4-H visit to a classroom will appear as multiple contacts (one for each child in the room), while a farm visit will only appear as one. Also, contacts made by agriculture agents may be more time-intensive in some cases, for example, visiting far-flung farms and ranches.

The family and consumer sciences and 4-H program areas do not have the same level of specialist support as agriculture programming. The number of CES specialists varies across the three program areas – 4-H, family and consumer science, and agriculture. There were 23 agriculture specialists as of the beginning of FY17, seven family and consumer sciences specialists, and four 4-H specialists. This was one agriculture specialist for every 1.7 agriculture agents, but just one family and consumer sciences specialist per 4.1 agents, and one 4-H specialist per 5.8 agents.

Chart 18. Ratio of CES Agents to Specialists



Source: NMSU CES (LFC categorized agents and specialists by area based on job titles, departments, and web search)

Note: There are 3 joint ag/4-H agents and 2 joint FCS/4-H agents; these agents were counted in both categories

As a result, county agents in 4-H and family and consumer sciences may not receive the same levels of support from NMSU faculty as agriculture agents. While county agents who spoke to LFC staff generally spoke favorably of the support they received from specialists, some family and consumer sciences agents indicated they could benefit from more specialist capacity in their program area. However, the larger number of agriculture specialists partly reflects the breadth of that field. For example, a range management specialist and a plant pathologist have very different areas of expertise and are called on to respond to very different needs, while 4-H and youth development specialists likely address more similar issues and needs.

Figure 12. Examples of Staffing Models at Other Land-grant University Extension Services

South Dakota: Hybrid regional and county-level staffing

Staffing for the state's extension service has largely shifted from the county level to a regional hub model. In FY2000, South Dakota had 110 county FTE and 51 statewide FTE. By FY17, this balance had reversed, with just 31 county FTE and 122 statewide FTE. 4-H agents have remained at the county level, with the 4-H program becoming the primary mechanism for local extension outreach. Other program area staff are now concentrated at regional hubs.

West Virginia: Needs-based staffing allocation

The state CES allocates county agents in two ways. It begins by assigning one, two, or three agents to each county, based on the county's population and average property values (meant to represent a county's ability to contribute resources for salaries, work space, etc). Extension administration then identifies an optimal agent profile based on county needs, which are determined by relevant indicators. For example, need for 4-H programs was determined by counties' rankings on the size of youth populations, poverty levels, juvenile delinquency, college-going rates, and other indicators. In this example, any available 4-H agents would be assigned to counties with the greatest needs, as determined by these indicators.

Minnesota: Focus on regional specialists

Minnesota reorganized its CES structure from 589 field staff in 87 county offices to 130 specialized extension educators in 18 regional offices, with a director for each office. CES guarantees each county a basic level of extension programming, but counties are no longer guaranteed dedicated county extension educators. Instead, counties are now given the option to "purchase" local program coordinators for programs of their choice such as 4-H or certain agricultural specialties. Counties are also encouraged to collaboratively fund positions, as appropriate. This reorganization moved the state's CES from a service comprised mainly of generalist educators to a system of specialists, selected for each region based on needs. The relationship between on-campus faculty and field educators has also changed – campus faculty now supervise field educators in their same discipline (e.g., dairy management or food safety).

Shifts in extension staffing models in other states prioritize greater specialization and regionalization.

In recent years, extension services at other land-grant universities have changed their staffing models to better address state and local needs, and/or to adapt to reductions in funding levels (see Figure 12 for examples). Some states have moved to a regional staffing model, with specialist expertise concentrated in regional hubs. NMSU's extension service already houses some specialists at a regional level. For example, extension's Rural Agricultural Improvement and Public Affairs Project (RAIPAP), which serves Northern New Mexico, is located at the Alcalde ASC, dairy extension specialists are housed in the Clovis ASC, and several horticulture and plant sciences specialists work out of the Los Lunas ASC. Expansion of this model in New Mexico has potential to be more cost-effective and better leverage specialist knowledge across the state.

However, in a large, sparsely populated state like New Mexico, regionalization of nonspecialist county agents could mean significantly less community access to extension agents and other staff, especially in rural areas. Regionalization may also reduce the incentive for counties to contribute funds. South Dakota has adopted a hybrid model, keeping 4-H agents at the county level.

A more nuanced approach to staffing is to base agent allocation on counties' relative needs for certain types of programming, as West Virginia has done. Some systems have also begun to require counties to contribute more to local staffing. West Virginia bases agent allocation partially on a county's ability to contribute resources, in addition to county needs, and Minnesota counties must now "purchase" local extension staff positions for programs of their choice. These approaches have the benefit of ensuring that scarce resources are allocated efficiently, but may also disadvantage poorer counties, which cannot afford to contribute as much despite greater needs.

NMSU should consider how extension staffing can best meet local needs and use resources efficiently. While moving to an exclusively regional model may not be the most effective approach for New Mexico, given the size of counties, some roles and functions may be better housed at a regional level. Further, by potentially downsizing and regionalizing agents and staff, CES administrators may be able to raise the pay of county agents, many of whom are being paid considerably less than their peers

nationwide. See Appendix I for a more detailed analysis of extension agent pay. Incorporating data-driven needs assessments could help extension administration in determining optimal county staffing levels and mix.

Extension should consider how to best use digital tools to extend its reach and effectiveness. NMSU’s extension service should also take into account how digital tools can better facilitate its mission. Several extension offices indicated to LFC that their Internet connections were often not good enough to reliably use these tools. They also indicated that many community members are not accustomed to online learning, preferring in-person interactions with agents. However, for areas with acceptable Internet access and audiences with necessary computer literacy skills, distance learning and other web-based resources can extend extension’s reach at a minimal cost. For example, the national eXtension resource provides a range of online tools for extension professionals. NMSU is a “premium member” of eXtension, meaning it pays an annual fee to be able to access an “online campus” that offers 425 online courses across all extension focus areas. Extension professionals can use the online campus to deliver classes and webinars to local populations, as well as access professional development coursework.

In a SWOT analysis CES conducted in 2017, increasing the use of distance delivery for extension programs was identified as a priority area. CES indicated greater use of distance learning tools could result in operational savings and reach more clientele, which could lead to increased revenue. Specifically, extension identified Master Gardeners and NM Edge as revenue-generating programs whose reach could be extended through distance learning.

Recommendations

Agricultural Experiment Station administrators should

- Consider raising pay rates for ACS laborers to attract and retain quality staff at living-wages.
- Consider eliminating up to one-third of ASCs to bring the university closer to the median of its peer institutions.
- Where possible, locate more extension specialists and faculty and graduate students at the remaining ASCs.
- Where appropriate, consider leasing land from farmers and ranchers for faculty research.
- Prohibit ASCs keeping separate sales accounts to subsidize their operating budgets.

Cooperative Extension Service administrators should

- Consider centralizing administrative functions, where feasible, at a regional or statewide level to bring administrative ratios closer to university average.
- Conduct a feasibility study on increasing use of web-based learning and other tools to extend the reach of extension programming.
- Consider removing the requirement for agents to have a master’s degree, where appropriate.
- Consider more equitable ways of allocating resources to counties, such as needs-based assessment of population, poverty rates, availability of other services, etc.

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- Explore the appropriateness and feasibility of shifting some extension programming to a regional level.
 - Consider rebalancing specialist levels over time to better align with needs of state population and county extension activities.

New Mexico State University should

- Incorporate the capital needs of agricultural science centers into university master facilities planning and, where necessary, include improvements for centers in capital outlay requests.
- Review regional models from other states and consider whether adopting this type of model would enable extension to provide programming and services efficiently.



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**College of Agricultural, Consumer
and Environmental Sciences**

Response to LFC Evaluation of the Agricultural Experiment Station and Cooperative Extension Service March 2018

The College of Agricultural, Consumer and Environmental Sciences, and in particular the Agricultural Experiment Station and Cooperative Extension Service, recognize and appreciate the time and effort given by the LFC staff to conduct the external evaluation of our activities. We have read the document carefully and with an open mind, and now take this opportunity to respond to the analysis and conclusions drawn by the LFC staff. This document presents the responses the College has prepared in regards to the overall strategic planning process, the Cooperative Extension Service, and the Agricultural Experiment Station by addressing findings and recommendations in groups, as appropriate, rather than providing a page-by-page response.¹

College-wide Strategic Process

Strategic planning in the College of Agricultural, Consumer and Environmental Sciences (ACES) began in 1996 as a faculty-driven process. The College has completed four iterations of this dynamic document since 1996, and is preparing for a fifth.

Beginning in August of 2016, the College has taken several steps that are foundational to revising the last plan published in 2015. The first step in the strategic process was to conduct Strengths, Weaknesses, Opportunities, and Threats (SWOT) analyses for each one of the units with input from stakeholders, faculty, staff, and administrators. Other tools used to support the planning process have been defining common topic areas, known in the College as "Pillars," driving the overall mission of the College as an engine for economic and community development of New Mexico; summarizing recruitment and retention strategies; inventorying experiential learning opportunities offered by all units of the college; and others related to international efforts, graduate programs, grant writing, and distance learning.

In the second half of 2018, the College will begin the process of revising the 2015 strategic plan to incorporate the goals and plans defined by the departments in the areas of teaching, research, and Extension. The LFC evaluation will be one more tool for the College to engage in the revision of its strategic plan, specifically related to areas where the Agricultural Experiment Station (AES) and Cooperative Extension Service (CES) can grow and be strengthened, and how

¹ Underlined text in the document indicates the College of ACES follow up items.

that fits within the NMSU Vision 2020 strategic plan. CES and AES address some of the findings and recommendations below.

Cooperative Extension Service

In this document, the term Extension refers to the CES rather than to outreach done by other NMSU units. The CES was designed to link land-grant college programs and grass-roots needs. Its implementation completed the tripartite mission of the land-grant college system, which is a unique concept in higher education. The three-way partnership among federal government, the state, and local communities was established to enable the delivery of research-based information to improve the citizen's quality of life. Today Extension delivers programs that are applicable in both rural and urban areas. Included programs focused on food production, youth, family and leadership development as well as nutrition, diet, and health education. Extension programs evolve in response to local needs and issues. Each community in New Mexico has unique culture and customs and has vastly different needs and issues.

Structure & Revenue

The number of agents in a county varies from one in small rural counties to seven in larger, more metropolitan counties. All agents have 4-H and community development responsibilities. The number of agents in each county office is first based on having at least one agent in each county, then using county population of one agent per 18,000 residents, with the exception of Bernalillo, Santa Fe, Sandoval and Doña Ana. Additional resources would be required to increase agents in these urban counties. Most of CES state appropriations are tied to personnel service costs. Operations for each county office are based on the number of agents (\$8,000 for one agent, \$7,000/Full Time Equivalent (FTE) for two agents, \$6,900/FTE for three agents, and \$3,450/FTE Program Assistants). Specialists are allocated \$11,275/FTE. Following the 20% reduction (\$2.8M) in state appropriations between FY09 and FY12, coupled with the federal reduction of 8.12% (\$215,729) FY12 sequester, we rightsized the system to cope with the reductions. At that time, other system structures for CES were considered and evaluated. Ultimately, input at local and political levels supported maintaining CES offices in each county. The downsize resulted in five Specialist positions and ten agent positions (two Ag Agents, two Family and Consumer Science Agents, six 4-H Agents) being eliminated. Several counties chose to contribute additional resources to maintain Extension Associate or Program Assistant positions paid for by the county. This resulted in the misalignment of the 3-way funding split between state, county and federal appropriations in some counties. We agree with the LFC report that it is important to track county in-kind contributions. We are currently developing a system to accomplish this.

Unlike some states, given the size of the 33 New Mexico counties, it is critical to maintain the administrative structure in County Extension offices. This is why CES has a higher administrative assistant ratio than the rest of the University. County Administrative Assistants are critical, even in single agent offices, to help deliver services provided in the counties and to meet the overall mission of the CES. Additionally, County CES Administrative Assistants are funded two-thirds by federal and county appropriations. Therefore, the local elected officials expect to see a face and get assistance at each county office even when the Agent is in the field.

The majority of State Specialists are in the Agriculture and Natural Resource disciplines, followed by Specialists in Family & Consumer Sciences and 4-H Youth Development disciplines. Although the LFC report suggests shifting Specialist levels over time to better align with county program activities, the large number of Agriculture and Natural Resources Specialists is necessary because of the diverse specializations of these fields. Additionally, agriculture contributes three billion dollars to New Mexico's economy so addressing the needs of this industry is in the best interest of New Mexico. Because of the CES statewide initiative related to health, additional resources have been provided to increase the number of Specialists and Program Assistants in the Extension Family & Consumer Sciences Department, which is currently filling these positions.

We agree with the LFC report that we need to continue working toward increasing salaries of State Specialists, County Faculty, and staff. This year is the first legislative increase in salary in four years and is greatly appreciated. If averaged from 2010 to 2018, state-appropriated salary increases were 0.5%. During this same time, Social Security cost of living adjustments averaged 1.3%. Additional resources, along with support from NMSU's Central Administration, will be needed for performance-based salary increases. As discussed in the LFC report, the significant increase in institutional support, even though this is consistent with other university entities, strains the budget to implement several suggested actions in the LFC report, including faculty raises.

CES administration agrees with the LFC report that CES can grow and diversify annual revenues through fees for specific CES programs to offset operational costs (travel & other costs to putting on programs). Given that CES is publically funded, the fees should not and will not be used to cover salaries budgeted on state, federal, or county appropriations. Potential programs for a fee structure largely are training programs that include Master Gardeners Program, Pesticide Applicator Training, Food Safety Modernization Act Trainings, Food Handlers/Food Managers Programs, Corporate Nutrition Program, and Master Food Preserver Program. We are currently evaluating a fee structure for each of these programs. We already have a fee associated with our Education Designed to Generate Excellence in the Public Sector (EDGE) Program, which is a specialized statewide program for elected officials and public-sector employees. Because we are the second poorest state in the US, we do not plan to implement a fee for 4-H because of the importance of equal access and equality and development of all our youth.

Goals and Program Development

The overall mission of the New Mexico Cooperative Extension Service is to *"provide the people of New Mexico with practical, research-based knowledge and programs to improve their quality of life."* This statement is in line with the original intent of the Smith-Lever Act. Additionally, each county office and specialist department is responsible for conducting needs assessments through advisory committees and other methods and develop the goals and objectives for the work in the county and state. All programs are expected to address the four pillars of work of the College of Agricultural, Consumer and Environmental Sciences.

As pointed out in the LFC report, needs assessments are critical for emerging needs that include representation of communities. To strengthen this, training was held this year for all Extension faculty to increase understanding of advisory boards, needs assessments, evaluation, and how to write impact statements. Needs assessment tools and advisory board structures/bylaws are being developed to ensure broad community representation of traditional and non-traditional clientele members. As described in the LFC report, the CES system has identified a priority need for a Program Accountability Specialist to coordinate statewide needs assessment and impact documentation. We are at a point where annual needs assessments can better be conducted, goals and objectives can be established, programs will be conducted and evaluated, and then impact statements can be written. This has been an ongoing process over the past years and of utmost importance to ACES and Extension administration.

Beginning with the evaluation year 2017, faculty are required to write concise impact statements for their work in each area of allocated effort (research, Extension and teaching, as appropriate to each faculty member). These impact statements will be available to the public on an impacts webpage hosted by the college of ACES. Additionally, programs with long term impacts are expanded and posted to the Land-Grant University Impacts Database (<https://landgrantimpacts.tamu.edu/>).

Responsiveness to New Mexicans

CES has been responsive to the changing needs of New Mexicans while also focusing on improving the economy, reaching approximately 1/3 of the state population annually. Following are examples of how CES has responded to the needs of New Mexicans.

- Extension-led Stronger Economies Together (SET) enables communities and counties in rural America to work together developing and implementing an economic development blueprint for their multi-county region. New Mexico's nine SET multi-county regions encompass all of the state's 33 counties. Through SET, over 600 New Mexican leaders and community members, representing various sectors (business/industry, economic development, government, education, healthcare, faith-based, non-profits, and residents) are engaged in exploring and designing the economic development goals for their communities and region. Those goals include promoting regional tourism; agriculture and agribusiness; renewable energy and forest products. CES also supports arts and entertainment by expanding opportunities for the movie industry; health care and social assistance services to attract retirees and take care of aging population; broadband and technology infrastructure upgrades to grow remote and freelance-employment; and workforce skills development to attract and retain industry.
- The use of Integrated Pest Management (IPM) strategies is integral to environmentally-sustainable pest suppression, reducing pesticide use, and increasing conservation of beneficial insects. The Extension-led IPM program reached over 10,000 people. Education on the principles of IPM and habitat management for beneficial insects was provided to growers, land managers and homeowners. Approximately 94% indicated they learned a new IPM principle they could apply to their system. The Plant Diagnostic

Clinic provides over 2,000 disease diagnoses and identifies, on average, five new diseases in New Mexico annually. Proper identification of pest problems enables Specialists and Agents to assist clientele in developing effective and cost-efficient pest management plans.

- Cooperative Extension Service developed a trichomoniasis control program for New Mexico, resulting in more testing, control measures, and producer awareness of the disease. Currently, trichomoniasis incidence in New Mexico has been reduced to 1.5% in over 16,000 tested bulls. Reducing the occurrence of trichomoniasis in New Mexico will increase producer profitability by increasing the number of calves born.
- The Extension Dairy program leads a consortium of universities to provide a practical dairy course in a six-week intensive summer training program. In ten years, 427 students from 48 universities have been trained; four out of five students are employed in agriculture, two out of three students are employed in the dairy industry, and one out of three students works on or manages a dairy. This program received the 2017 Dairy Sustainability Award in Community Partnerships.
- Fit Families is a twelve-week nutrition program delivered to families with children between 5 and 12 years of age. Benefits shown are increased knowledge about healthy food choices, physical activity, and coping with psychological challenges. Instruction includes a cooking demonstration and nutritious meals.
- Extension's debt elimination program focuses on helping individuals and families understand their spending patterns, stop going deeper into debt, and begin the process of eliminating their debt. Impacts show that 100% of participants improved their knowledge, attitudes, and skills regarding debt elimination, 93% intended to pay off their debt as soon as possible, and 93% planned to create a debt-elimination plan to accelerate paying off their debt.
- A study in *Diabetes Care* estimated diabetes/prediabetes costs the state \$2 billion a year. Extension partnered with the NM Department of Health Diabetes Prevention and Control Program and 21 other organizations to provide 29 Kitchen Creations cooking schools. Participants learned how to plan meals/snacks that manage carbohydrates and promote heart health. A total of 470 adults participated with 100% reporting they understand the strategies to plan and prepare healthy meals and 79% reported that they were following three or more of the recommended eating practices. Over 55,000 New Mexicans participate in the CES Nutrition Education programs, which have improved participants' nutrition practices by 85%, improved diet quality by 75%, improved physical activity by 32%, and saved the state \$6.6 million in health-related expenses.
- Over the past three years, 513 Navajo cattle and sheep producers participated in 23 Extension Navajo Ranchers Sustainability Project workshops to improve their rangeland and herd management practices, and 161 producers completed Bureau of Indian

Affairs resource conservation plans, which is a grazing permit requirement. Most (98%) Pueblo Beginning Farmers and Ranchers (BFR) had never conducted soil tests on their farms. After participating in Extension programs, 45% used new strategies like cover cropping and rotational legume planting to improve soil fertility and increase crop yields by 20%, while 20% of participants adopted practices that have decreased crop loss by 20%. Pueblo BFRs were taught to build inexpensive hoop houses, using them to start temperature-sensitive plants like green chile earlier in the season for transplanting in the late spring, increasing farm income by 20%.

- The Extension and Research Youth Agricultural Science Center program at Las Vegas enhances educational opportunities for 750 youth annually in agricultural science and related STEM programs, agricultural literacy, and the production of fresh food. It has been demonstrated that the program significantly closes the achievement gap for students performing below their grade level. Youth exposed to the program score significantly higher in agriscience and have significantly higher science scores on state-mandated assessments compared to a control school.

We agree that Extension must strive to reach all New Mexicans, including under-represented groups such as Hispanic and Native American. As a recipient of Federal dollars, CES has a civil rights obligation and continually works towards reaching parity. Parity occurs when participation of groups in a program is 80% or more of a potential audience. Using 2016 NM census data, parity thresholds can be calculated for Hispanic at 38% and Native American at 8%. As reported, CES contacts from 2015-2017, we conclude that we reached parity for the Hispanic population (39%) and are slightly below parity for Native Americans (5%). Nonetheless, we will be relentless at increasing our strategies to reach more underrepresented New Mexicans with our programs.

We are exploring new stakeholder groups as society's needs change. For example, we have developed new partnerships with the Department of Health, UNM Health Science Center, Burrell College of Osteopathic Medicine, and New Mexico health insurance providers to expand our Extension health programs to better meet the complex health needs of New Mexicans. Further, several statewide and/or regional initiatives have been implemented by CES. These initiatives include EDGE, which will launch an Economic Development Curriculum for Public Officials Program in Summer 2018, Southwest Border Protection and Emergency Preparedness Center, Nutrition Education, Farm Safety Program, Water Conservation Program, Small Farm Task Force, Range Improvement Task Force, and the Ag Literacy Program.

The CES is also strengthening partnerships with other Colleges outside of ACES. In an effort to expand our EDGE Program, CES administration is coordinating activities with faculty in the College of Business and NMSU Government Department in the College of Arts and Sciences. We are working closely with the College of Education, College of Engineering, and College of Health and Social Services to use the existing Extension structure to enhance and diversify Extension programming for the citizens of the state. CES administration has partnered with the VP for Economic Development to develop the Community Engagement Council to better coordinate engagement efforts across the University system. The CES is also currently working with the

Graduate College to provide student internships and service-learning opportunities for graduate students in all six NMSU Academic Colleges. This is in addition to 30 CES internships provided to undergraduate and graduate students in the College of ACES. All these efforts will be increased in the months to come.

We agree with the LFC report that we must continue improving the marketing efforts for CES. The College of ACES once had an Agricultural Communications Department that served both CES and AES marketing and news needs. However, the ACES Agricultural Communications Department was moved into the Marketing and Communications (MARCOM) Department to serve all NMSU. CES and AES provide \$800,000 annually to MARCOM and are working, under the ACES leadership, to develop new marketing materials, unified branding, and marketing of upcoming programs and events.

Agricultural Experiment Station

We agree that increased partnerships with industry is an area for potential revenue growth for the Agricultural Experiment Station. These funds can be especially valuable for our ability to leverage funding with other agencies and for grants and contracts. We also recognize the need to appropriately track industry funding and in-kind contributions and in the coming year we will institute better tracking procedures. Understanding agriculture in New Mexico is important in assessing the potential growth in this area. Unlike many Western states, New Mexico agriculture is relatively diverse and small in absolute scale. The commodity growers likewise are diverse and small compared to other states, and are unable to provide significant research funding to the AES. Industries already support AES through state taxes; while they are happy to speak to state legislators on behalf of the AES off-campus agricultural science centers (ASCs), they feel it is the state's responsibility to adequately fund and maintain AES research facilities. One example of how we garner industry support for the ASCs on an annual basis is through variety trials, which are conducted for the dual purpose of research and demonstration. Private companies provide seed and pay an "entry fee" for their varieties to be evaluated. This provides a valued service to the companies as they can see how their varieties perform in different environments and provides growers with information on which varieties are most appropriate for their farms.

The mission of the ASCs is to conduct research that addresses the needs of our stakeholders. It is not to sell crops. Research, therefore, has to be the highest priority at all ASCs. Any lands not used for research, including non-governmentally-funded, are eligible to grow products for sale on the open market. Funds received from sales are used to supplement operations funds at the ASC that produced the products, as that center incurred the costs associated with producing the crops. For this reason, individual sales accounts are established for each ASC. As correctly noted in the LFC staff report, ASCs run the risk of competing with private growers, even at prevailing market prices, which we do not want to do. In some cases, we have given away crops rather than adversely affect local growers.

We agree that measurable objectives often are lacking. AES administration is providing training to AES faculty as to what constitutes impacts and results. At our invitation, Sarah Lupis,

Assistant Director of the Western Association of Agricultural Experiment Station Directors, will be on campus this May to conduct at least two 2-1/2 hour workshops on how to write good impact statements; in the past two years, she has successfully presented this workshop to land-grant institutions across the nation. With research, impacts often take years to identify, and researchers, by training, are hesitant to claim specific impacts or overstate potential impacts. Research program impacts are long-term retrospectives; rarely can a research project or program (especially fundamental research) point to a short-term or immediate impact. With research there always is an inherent risk of failure—its deliverables and audience are not closely tied with economic return, but provide understanding to build deliverables, such as policy, procedures, and technology. Patents, like the number of peer-reviewed publications, are metrics that are important for faculty promotion and tenure at the university, but are not necessarily a good indicator of impact; AES will provide the number of peer-reviewed publications to the state legislature, as suggested on page 31 of the LFC report, if that is desired. Where feasible, faculty are encouraged to evaluate and incorporate the economic impact of their research. Below are a few examples from our 2017 annual report of research programs that have provided, or have the potential to provide, direct economic impact to New Mexico producers. In each case, the research findings have been delivered to New Mexico stakeholders and industry through the assistance of CES personnel.

- A stale seedbed is a set of practices that first stimulates weed seed germination through tillage and irrigation and then eliminates subsequent seedlings with non-selective control. A multi-year field study on stale seedbeds for chile pepper production has been completed. These analyses included comprehensive cost-benefit evaluations that indicated (1) stale seedbeds cost \$21 to \$33 per acre to implement in southern New Mexico, and (2) stale seedbeds reduced hand-hoeing expenses in chile pepper by \$291 to \$462 per acre. Accordingly, the net effect of stale seedbeds on production expense was a savings of \$258 to \$440 per acre. Providing growers information on the effects of stale seedbeds on labor expenses for chile pepper production should promote adoption of such strategies because: 1) costs and availability of labor are primary constraints on chile pepper production in New Mexico, and 2) adoption of an integrated weed management practice is generally influenced by grower perceptions of the practice's economic value in the context of the local cropping system.
- Turfgrass represents the largest irrigated crop in the US and plays important economic and ecological roles in urban environments. To reduce water needed for irrigation to sustain public parks, New Mexico State University's Turfgrass Research and Extension team works with the City of Albuquerque to compare water use in a park half irrigated with subsurface drip, half with standard sprinklers. First year data indicated that the drip-irrigated part used 30% less water, with no drop in visual appearance. The City hopes to install subsurface systems in other parks over the next 3 to 5 years, which could save up to \$1 million annually in water costs.
- New Mexico produces over 1.2 million tons of hay on over 300,000 acres, and 2.4 million tons of silage on approximately 100,000 acres. The value of these combined forage industries is greater than \$365M/year. Improved farm efficiencies of 25% or

more have been shown, through research, are the result of selecting the proper crop species and variety, fertilizer and seed inputs, and improved water management strategies. These improvements can result in as much as \$100/acre savings to forage producers, with an overall potential impact exceeding \$35M in the state of NM.

- Stem and Bulb Nematode of Garlic (*Ditylenchus dipsaci*) – In April of 2015, garlic bulbs were found to be infested with stem and bulb nematode. The infested plants were from one particular cultivar in an extensive garden of many cultivars and over 1,200 plants. This was the first confirmed occurrence of *D. dipsaci* on any host in New Mexico. This nematode is known to cause serious disease losses in onions, garlic and alfalfa, and is a regulatory pest worldwide. If this nematode were to infect onions in New Mexico, it could result in 100% crop loss with an estimated value of over \$100 million annually. Following this discovery, researchers surveyed nematodes in 54 commercial onion fields in New Mexico, and confirmed that, to date, this devastating nematode is not established in primary onion producing counties. This work protects New Mexico's onion industry by maintaining the ability to market onions outside of New Mexico.
- Ruminant animals typically are born with a non-functional rumen devoid of microorganisms. The succession of the microbial population in the rumen from birth to animal maturity is of interest due to the key roles that the rumen microbial population plays in the overall health and productivity of the host animal. AES researchers hypothesized that calves raised in different environments will alter rumen bacterial population development. Results show environmental effects of diet quality and composition on the succession of the bacterial population in nursing beef calves. The impact of this research is that producers have options with their cattle that had not been suspected. The functionality of the rumen at an early age opens up the opportunity to wean calves early and enhance the reproductive performance of the cow herd. Increases as small as 10 % can equate to thousands of dollars in revenue to cattle producers.
- The U.S. Forest Service spent over \$2 billion in 2017 suppressing wildfires, the most expensive year on record. These uncharacteristically large and severe wildfires threatened lives, property, wildlife habitat, and watersheds. However, fire historically acted as a natural thinning agent by reducing fuel build-up, burning small trees, and thinning ladder fuels. Today's forest managers are seeking solutions to these problems using silvicultural techniques, including prescribed fire. New Mexico State University's forestry and fire research program is providing managers with a demonstration area with over 10 years of data where managers can see first-hand how thinning and burning fire-adapted forests builds resilience to insects, disease and wildfire.

We also recognize the need to do a better job communicating our impacts. While some ASCs continue to write annual reports, this general practice was suspended in recent years. This practice will be reinstated in 2018. In addition, all ASC will develop, on an annual basis, an

impact flyer highlighting their most significant accomplishments and impacts. All faculty, in addition to writing peer-reviewed journal articles, are encouraged to write peer-reviewed experiment station publications, which provide stakeholders with research results in a usable manner. Beginning with the evaluation year 2017, faculty are required to write concise impact statements for their work in each area of allocated effort (research, extension and teaching, as appropriate to each faculty member). As like with CES, these impact statements will be available to the public on an impacts webpage hosted by the college of ACES. Additionally, programs with long term impacts are expanded and posted to the Land-Grant University Impacts Database (<https://landgrantimpacts.tamu.edu/>).

In 2017, the Dean of the College of Agricultural, Consumer and Environmental Sciences established an AES Advisory Team to evaluate the ASCs and recommend our research priorities. This team has six external members representing key stakeholder groups and 11 NMSU employees. This team is assessing the needs of the state with respect to number and location of ASCs. This includes a review and assessment of the financial and human resources at each of the facilities. They are assessing the needs of all our stakeholders, including traditional agricultural industries and emerging industries, in order to provide input into our future research plans.

We understand, from a financial standpoint, the recommendation to reduce the number of ASCs. However, the assessment used by the LFC evaluators does not provide a complete picture of our ASCs in comparison to other states. The LFC evaluators used agricultural outputs and number of farms per ASC to compare NMSU to peer institutions. For these two metrics, NMSU is near the bottom (see table 1). However, if New Mexico is compared to peer institutions based on geographic area² (http://www.statemaster.com/graph/geo_lan_are-geography-land-area) or the number of acres farmed, (https://www.nass.usda.gov/Statistics_by_State/) NMSU is in the middle of the group (see table 2).

University	ASC/ Research Farms & Ranches	2016 Value of State Agricultural Output	Annual State Agricultural Output / ASC	Geographic Area (Land acres)	Geographic Area / ASC	Number of Farms	Number of Farms / ASC	Farmed Acreage	Farmed Acreage / ASC
Auburn	15	\$5,727,981,000	\$381,865,400	50,744	3,383	43,600	2,907	8,900,000	593,333
Mississippi St	16	\$5,779,477,000	\$361,217,313	46,907	2,932	35,800	2,238	10,700,000	668,750
Montana St	7	\$4,352,787,000	\$621,826,714	145,552	20,793	27,100	3,871	59,800,000	8,542,857
NDSU	10	\$9,579,954,000	\$957,995,400	68,976	6,898	29,900	2,920	39,100,000	3,910,000
Oklahoma St	18	\$7,333,074,000	\$407,393,000	68,667	3,815	77,200	4,289	34,000,000	1,888,889
Utah State	17	\$1,880,069,000	\$110,592,294	82,144	4,832	18,200	1,071	11,000,000	647,059
Wyoming	4	\$1,723,735,000	\$430,933,750	97,100	24,275	11,400	2,850	30,200,000	7,550,000
NMSU	12	\$3,216,021,000	\$268,001,750	121,355	10,113	24,700	2,058	43,300,000	3,608,333

Table 1. Comparison of university by agricultural output and by number of farms.

² Geographical area is really land mass since it does not include water.

University	ASC/ Research Farms & Ranches	Geographic Area (Land acres)	Geographic Area / ASC	Rank by Geographic Area / ASC	Farmed Acreage	Farmed Acreage / ASC	Rank by Farmed Acreage/ASC
Auburn	15	50,744	3,383	7	8,900,000	593,333	8
Mississippi St	16	46,907	2,932	8	10,700,000	668,750	6
Montana St	7	145,552	20,793	2	59,800,000	8,542,857	1
NDSU	10	68,976	6,898	4	39,100,000	3,910,000	3
Oklahoma St	18	68,667	3,815	6	34,000,000	1,888,889	5
Utah State	17	82,144	4,832	5	11,000,000	647,059	7
Wyoming	4	97,100	24,275	1	30,200,000	7,550,000	2
NMSU	12	121,355	10,113	3	43,300,000	3,608,333	4

Table 2. Comparison of universities by geographic area and number of acres farmed.

We suggest a different approach. A more significant comparison is made when looking at climate variability and natural resources among states. New Mexico has the 2nd highest number of USDA plant hardiness zones (which describe what plants can grow where) (<http://planthardiness.ars.usda.gov/PHZMWeb/>), the most US crop production regions (<http://ir4.rutgers.edu/FoodUse/regions.pdf>), and the most USGS watersheds (https://water.usgs.gov/wsc/map_index.html) (Table 3). Only California has as many as three crop production regions, and no other state in the U.S. has as many as five watersheds. These parameters speak to the significant climate and natural resource variability in New Mexico, issues that are critical considerations affecting agricultural production. It is critically important to have agricultural science centers strategically located in areas that are able to address the needs of crop and animal production unique to these different zones and regions.

Climate Variability and Water Resources by State

University	Number of USDA Plant Hardiness Zones	Number of US Crop Production Regions	Number of USGS Watersheds
Auburn (Alabama)	5	1	2
Miss State (Mississippi)	4	1	3
MT State (Montana)	7	2	2
NDSU (North Dakota)	4	2	2
OK State (Oklahoma)	5	2	1
Utah State (Utah)	11	1	3
Uni WY (Wyoming)	7	2	4
NMSU (New Mexico)	10	3*	5**

* The only other state to have 3 crop production regions is CA (all others 2 or less)

**No other state in the US has more than 4 Watersheds

Table 3. Comparison of climate and water resources among peer-institution states.

Ultimately, input from the AES Advisory Team will be critical in the decision to maintain or reduce the number of ASCs.

The AES Advisory team is also assessing how ASCs develop and manage advisory boards. These boards are critical to the success of the ASCs, and we recognize the need to avoid the advisory board pitfalls mentioned in the LFC report. At an ASC Superintendent's meeting in September of 2017, the need to reevaluate and renew our advisory boards was discussed. The superintendents were asked to review and revise or establish by-laws, set criteria for board membership and establish terms for board members. They were also asked to increase the number of board meetings to a minimum of two per year and to structure meetings to ensure that strategic input on research goals and objects is provided.

The low use of the nine distant off-campus ASCs by NMSU faculty is noted as a concern in the LFC evaluation report. The cost of doing business (e.g., travel costs, time, etc.) at the ASCs is great. In many cases, it may be fiscally prohibitive to use one of these facilities. It also is important to recognize that the faculty that have research programs that could use the off-campus ASCs are housed in three departments, Plant and Environmental Sciences (PES), Animal and Range Sciences (ANRS), and Entomology, Plant Pathology and Weed Science (EPPWS). These three departments have 62 NMSU campus-based faculty of which 33 (53%) have used at least one of the off-campus agricultural sciences centers over the past five years; this does not include faculty research conducted at the three near-campus ASCs. Another 10 researchers from other ACES departments have conducted research at the nine distant ASCs during the past five years. At least 11 additional faculty have given outreach presentations at these ASCs. Additionally, 65% of graduate students in these three departments have worked at ASCs in the past 10 years. Faculty stationed at the ASCs frequently collaborate with and conduct research at other ASCs (for example, Dr. Yao of Alcalde has research plots at Los Lunas, Tucumcari, and Leyendecker in Las Cruces). We wish to see our ASCs more utilized by campus-based faculty and graduate students so we are looking at ways to provide incentives to do this. For example, one department provides small travel stipends to their faculty who are working at off-campus facilities outside the Las Cruces area. This helps to offset the added expense of conducting research in these remote locations. The LFC evaluation report also mentions the possibility for research to be conducted on stakeholders farms and ranches and notes that we have some faculty that do this. In some cases, this can be a workable solution to the need to meet location specific needs. Conducting research in this manner does present additional challenges as noted in the report. However, not all research programs are able to do this. For example, in most cases, pest management research will require a destruction of research subjects (crop plants), which most stakeholders are unwilling to do.

We agree that deferred maintenance at off-campus ASCs and low staff salaries are a grave concern. These are not things that ACES or AES can correct on our own, but are issues within the NMSU system. Off-campus science centers are not considered part of the NMSU campus, and do not share in the campus BR&R (building renewal & replacement) funding. NMSU administration has not made funding off-campus ASCs a university priority. Consequently, each ASC advisory board advocates for its own center, some more successfully than others, which results in uneven facilities support. AES and ACES administrators have sought system-wide

funding and will continue to advocate for this with upper NMSU Administration, but without such funding being a university priority, legislators prefer to support centers in their own districts and serve their constituents.

Similarly, pay scale is set by the university, not by ACES or AES. We are not allowed to pay more than the pay scale. We have informed the NMSU Human Resources Department of the difficulty in finding employees for remote locations, especially with a rate of pay below what other industries and agencies pay. It also should be noted that while we are willing to pay increased wages for staff at the off-campus ASCs, it will create a budget issue for AES. In the LFC report, a statement is made that we can easily afford the increase in pay from our fund balance. The fund balance referred to, however, is a combination of our designated and undesignated fund balance. The designated fund balance, which is the vast majority of the overall fund balance, is encumbered primarily for start-up funds for our new faculty and these funds are not available to be used in other ways. The undesignated fund balance, which was just over \$5,000 at the end of FY17, is not sufficient to increase the salaries of our off-campus staff.

Common issues to CES and AES

Three topics common to CES and AES are discussed under this section: cost share funds, institutional support, and collaborative work.

Cost Share

A clarification needs to be made related to the statement found in the Background section of the LFC report (page 9) and that reads: "AES and CES both have relatively high proportions of expenditures on administrative functions."

Cost share or matching funds are not administrative in nature. They are programmatic for both CES and AES. Many grants and contracts require a match from unrestricted sources from sponsoring agencies, in order to be considered for funding. When requested by LFC to break out expenditures by department, college staff relied upon a departmentalized expenditure report that excludes cost share or matching funds. To retrieve that detailed breakdown, the university would have to have performed lengthy programing modifications. In response to the request, the cost share expense was isolated and reported as one line for CES and one line for AES.

Institutional Support

The institutional support charges for CES and AES are at the same rate as those for other units at the university, including the community college campuses. However, it is important to note that 25% of CES administrative costs and 50% of AES administrative costs are from the institutional support fees. CES & AES have adjusted budget allocations to comply with the institutional support assessed at 5% of the general appropriation from the state. The assessment is capped at 5% by legislative ruling and makes up a major contributing cause of inflated administrative expenditures. The only way to fund this sizable increase in administrative costs was to reduce allocations of funds for program delivery.

Collaborative Work

Also identified in the LFC evaluation report is the need for CES and AES to work more collaboratively with each other. Additionally, it is noted that collaboration is haphazard and driven by individuals with common interests. It is suggested that locating more faculty with Extension appointments at the ASCs and increasing the number of faculty with joint appointments (CES and AES) would enhance CES and AES collaboration. We agree that the missions of CES and AES are interconnected and that to fully accomplish the mission of ACES, we need extensive collaboration between these two entities. There is already a fair amount of CES and AES collaboration through efforts surrounding the four pillars of community and economic development within ACES. For example, CES and AES faculty recently collaborated on a GMO-related educational publication; jointly addressed environmental impacts related to the Gold King Mine spill; work together to respond to pest outbreaks statewide; and collectively address issues related to farming and ranching through drought, including research and extension programs on plant and animal selection as well as irrigation design and management. However, we agree that improvement can be made in this area. While collaborations may appear haphazard, they are not. They evolve out of shared interests and complementary expertise that allows the development and completion of comprehensive research and extension projects.

ACES is helping to foster collaborations through recognition of these efforts in annual performance evaluations, in the promotion and tenure process, and by being intentional with joint appointments. Currently, four of the eight academic/research departments in the college are joined administratively with a CES department because the academic/research Department Heads also serve as Extension Department Heads. Additionally, it may be possible over time to change the official appointments of faculty both on-campus and at the ASCs. This will depend on open and/or new positions and will be tied to CES and AES budget availability. Nonetheless, it is one of ACES goals to strengthen the collaboration and efforts of CES and AES in benefit of New Mexico by exploring new avenues, pilot programs and projects.

General Obligation Bond – Feedmill

The location of a new feedmill in Las Cruces campus is not a duplication with the feedmill in Clayton, 417 miles away. Using the feedmill in Clayton to supply the needs in Las Cruces would have an estimated additional cost of \$2,919 a week to supply the needs of feed in campus. The impetus for a modern feedmill on the main campus of NMSU is focused on student training. The Animal and Range Sciences Department (ANRS) at NMSU is home to 495 undergraduates, 37 graduate students and 27 faculty who will all potentially use this facility for teaching, research and outreach. It is estimated that greater than 80% of the courses offered in ANRS will benefit from having access to this type of facility. Feedmill education is a crucial part of our training program for students, as a large percentage of our students go into the feeding industry and the new feedmill will help prepare them for the future. Maintaining and modernizing our facilities will allow for a path to increase student involvement in research and also allow for training in day-to-day operation of livestock facilities. This will help with student placement upon graduation as well as with recruitment of new students.

Closing

The purpose of this document was to provide additional information and begin addressing the LFC findings and recommendations. Many of the recommendations are currently being worked on and we will continue to address needs assessments, reaching under-represented groups, working on strategic planning, strengthening our communities, as well as looking into other platforms like web-based learning and distance education, to make the services and opportunities more accessible to people in New Mexico. The College, CES, and AES will use the study over the next several months to evaluate appropriate changes with the goal of being more effective in various aspects of the operation and administration.

We reiterate the College's appreciation of the contribution the NM Legislative Finance Committee has made to the ACES strategic planning process by providing an outside review.

Appendix A: Evaluation scope and methodology

Evaluation Objectives.

- Review the organizational structure and spending patterns of New Mexico State University's (NMSU's) Cooperative Extension Service (CES) and Agricultural Experiment Station (AES.)
- Assess how well CES' and AES' mission, including program offerings, and target beneficiaries, aligns with current and future state needs.
- Assess the impact and cost-effectiveness of CES programming and AES research.

Scope and Methodology.

- Interviewed NMSU, ACES, CES and AES administration.
- Visited and interviewed staff at five county and one tribal cooperative extension office.
- Visited and interviewed faculty at five agricultural science centers.
- Visited and interviewed AES and CES stakeholders, including county managers, community leaders, agricultural non-profit and commodity group leaders, and other national experts.
- Reviewed state and federal laws, regulations, and policies.
- Reviewed existing research on changing mission and structure of AES and CES.
- Reviewed best practices in CES and AES funding and structure from peer land-grant universities.
- Reviewed and analyzed fiscal data from NMSU and other national entities.

Evaluation Team.

Micaela Fischer, Program Evaluator
Alison Nichols, Program Evaluator

Authority for Evaluation. LFC is authorized under the provisions of Section 2-5-3 NMSA 1978 to examine laws governing the finances and operations of departments, agencies, and institutions of New Mexico and all of its political subdivisions; the effects of laws on the proper functioning of these governmental units; and the policies and costs. LFC is also authorized to make recommendations for change to the Legislature. In furtherance of its statutory responsibility, LFC may conduct inquiries into specific transactions affecting the operating policies and cost of governmental units and their compliance with state laws.

Exit Conferences. The contents of this report were discussed with the Dean of NMSU's College of Agricultural, Consumer, and Environmental Sciences, the Director of CES and the Interim Director of AES on March 13, 2018.

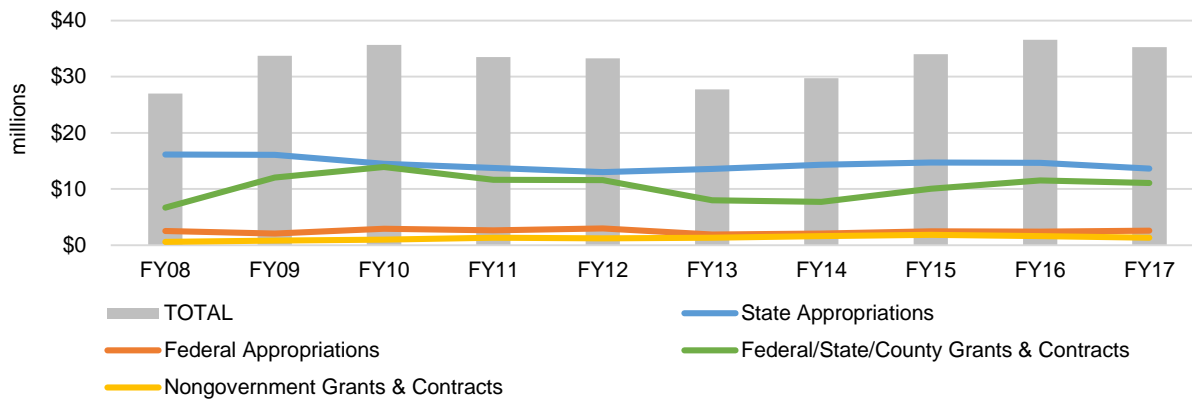
Report Distribution. This report is intended for the information of the Office of the Governor, the Higher Education Department, the administration of New Mexico State University and its College of Agricultural, Consumer, and Environmental Sciences, the Office of the State Auditor, and the Legislative Finance Committee. This restriction is not intended to limit distribution of this report, which is a matter of public record.



Charles Sallee
Deputy Director for Program Evaluation

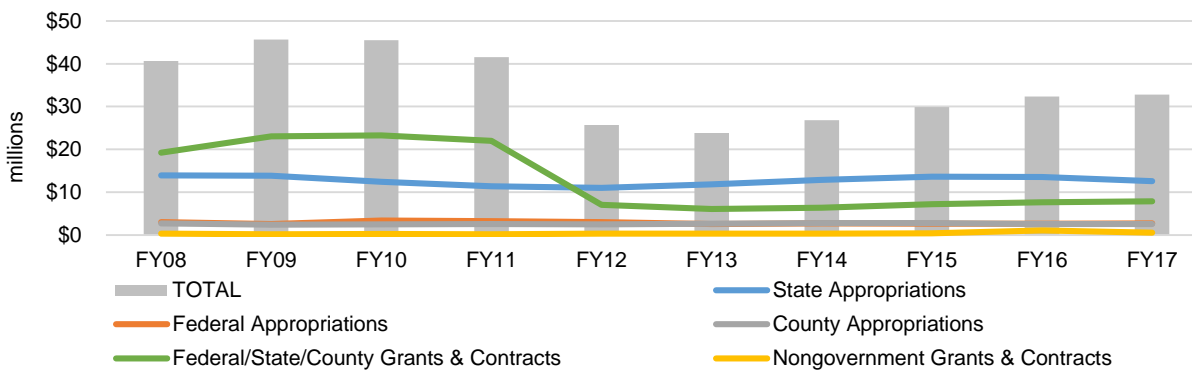
Appendix B. AES and CES revenues, FY08 to FY17

Major AES Revenue Sources, FY08 to FY17



Source: NMSU

Major CES Revenue Sources, FY08 to FY17



Source: NMSU

Appendix C. NMSU expenditures of state, local and institutional funds per farm and value of agricultural production

University	State, Local and Institutional Research Funding per Farm or Ranch	2016 Value of Agricultural Output / State, Local and Institutional Research Funding
Oklahoma State University	\$460	\$198
Montana State University	\$591	\$263
Utah State University	\$800	\$130
New Mexico State University	\$867	\$150
University of Wyoming	\$883	\$166
Auburn University	\$957	\$138
Mississippi State University	\$1,480	\$103
North Dakota State University	\$2,072	\$149

Source: NSF, USDA

Notes: State, local and institutional funding figures pulled in December 2017 from the National Science Foundation's National Center for Science and Engineering Statistics, Academic Institution Profiles. <https://ncesdata.nsf.gov/profiles/site?method=reportsall&fice=8773>. The 2016 value of agricultural output pulled in December 2017 from USDA's Economic Research Service's 2016 State fact Sheets <https://www.ers.usda.gov/data-products/state-fact-sheets/>. The number of farms and ranches are as reported in USDA's 2012 Census of Agriculture.

Appendix D. Federal, state, and county appropriations by county extension office

Federal, State, and County Appropriations by County Extension Office (FY17)

County	FY17 Federal Allocation	FY17 State Allocation	FY17 County Appropriation	FY17 TOTAL (Federal + State + County)
Bernalillo	\$169,986	\$161,291	\$299,926	\$631,203
Santa Fe	\$106,566	\$127,189	\$143,122	\$376,877
Dona Ana	\$113,012	\$120,506	\$130,000	\$363,518
San Juan	\$84,707	\$141,964	\$127,836	\$354,507
Chaves	\$93,846	\$120,128	\$116,752	\$330,726
Rio Arriba	\$105,912	\$99,387	\$113,732	\$319,031
Curry	\$108,123	\$95,220	\$112,460	\$315,803
Sandoval	\$85,404	\$88,372	\$127,959	\$301,735
Eddy	\$79,760	\$99,064	\$106,400	\$285,224
Lea	\$83,089	\$101,979	\$95,000	\$280,068
Valencia	\$97,770	\$90,540	\$90,161	\$278,471
Otero	\$72,096	\$91,176	\$89,093	\$252,365
Roosevelt	\$65,900	\$92,014	\$61,089	\$219,003
Quay	\$37,898	\$79,097	\$100,400	\$217,395
Torrance	\$61,083	\$54,803	\$90,366	\$206,252
McKinley	\$60,583	\$63,022	\$75,077	\$198,682
Colfax	\$50,725	\$44,124	\$100,585	\$195,434
Grant	\$58,448	\$55,686	\$68,000	\$182,134
Los Alamos	\$38,027	\$36,150	\$92,202	\$166,379
Luna	\$56,418	\$51,280	\$58,263	\$165,961
Cibola	\$56,262	\$48,435	\$55,905	\$160,602
Taos	\$32,696	\$60,375	\$52,060	\$145,131
Lincoln	\$21,486	\$47,223	\$72,951	\$141,660
Union	\$17,578	\$41,631	\$75,000	\$134,209
Guadalupe	\$40,638	\$37,062	\$50,128	\$127,828
Socorro	\$36,221	\$30,808	\$58,500	\$125,529
Catron	\$16,664	\$40,355	\$67,000	\$124,019
Sierra	\$34,491	\$31,483	\$56,652	\$122,626
Harding	\$39,184	\$34,020	\$37,249	\$110,453
Mora	\$35,889	\$32,301	\$38,393	\$106,583
Hidalgo	\$34,476	\$32,072	\$38,803	\$105,351
DeBaca	\$34,341	\$31,349	\$37,400	\$103,090
San Miguel	\$34,721	\$31,689	\$35,056	\$101,466

Source: NMSU CES

Appendix E. Fees for 4-H in other states

Some states' extension services have taken an approach of implementing more fees for programs and services to offset declining federal and state revenues. 4-H is perhaps the most common area where CES in other states apply fees, and providing 4-H for free is becoming less common. A 2016 survey by Kansas State University extension showed that 25 of 38 responding states charge some fee for 4-H, ranging from \$3 to \$50 annually.^{xiii} Kansas' extension service used this survey to inform their move to a \$15 annual 4-H fee in 2017. Other examples of 4-H fees: Florida and Oklahoma 4-H charge a \$20 annual membership fee per youth (\$60 per family maximum.) Missouri also charges \$20, and Utah charges a base fee of \$10 per youth with additional fees for livestock or horse projects. With approximately 34 thousand youth involved in New Mexico 4-H in FY17, CES could collect \$510 thousand per year by charging a modest \$15 annual fee per participant. A year membership to the Boy Scouts Great Southwest Council is \$24, and membership for the Girl Scouts of New Mexico Trails is \$15 annually. Extension county programs currently do not collect fees for their 4-H programming; however, Doña Ana County plans to charge a \$5 annual participation fee.

**College of Agricultural, Consumer and
Environmental Sciences**

Strategic Plan as of 4/10/2015

Agriculture is the service of producing, distributing, marketing, and consuming food and fiber.

The agricultural sector includes

- *Production of agricultural commodities*
- *Processing and distribution of agricultural products*
- *Supply and service functions with agricultural inputs*
- *Sustainable use, conservation, development, and management of air, land, water, and wildlife resources*
- *Development and maintenance of rural recreational and aesthetic resources*
- *Related economic, sociological, political, environmental, and behavioral functions*

Family and consumer sciences concern the production and dissemination of scholarly information in the areas of family relations and human development, family management, food and nutrition, food technology, and health.

Land-Grant Colleges

The history of land-grant colleges of agriculture is intertwined with the history of higher education for U.S. citizens of ordinary means. The land-grant system began in 1862 with the Morrill Act. This law gave states public lands provided the lands be sold or used for profit and the proceeds used to establish at least one college—hence, land-grant colleges—that would teach agriculture and the mechanical arts. Land grants for the establishment of colleges of agriculture and mechanical arts were also later given to U.S. territories and the District of Columbia. The legislative mandate for these land-grant colleges helped extend higher education to broad segments of the U.S. population. Legislation in 1890 and 1994 created other land-grant colleges around the country, historically Black colleges and Native American colleges, respectively.

The 1862 Morrill Act gave the land-grant colleges their mandate to teach. The colleges acquired a research function in 1887 through the Hatch Act, which recognized the need for original research to support the teaching of agriculture and help develop agricultural innovations. The legislation funded a system of state Agricultural Experiment Station Systems, most of which were established under the direction of the 1862 land-grant colleges. Faculty with Agricultural Experiment Station System appointments have potential access to “Hatch” research funds, which are administered by the USDA and distributed to the state Agricultural Experiment Station Systems according to a formula based on population and number of farms and ranches. The Agricultural Experiment Station was constitutionally mandated and statutorily established in New Mexico in 1889.

With the 1914 Smith-Lever Act, the colleges took on a third function, called “extension,” which was designed to disseminate knowledge generated by agricultural research at land-grant colleges beyond the campus to farms and consumers. Extension was to be a cooperative activity between the federal government (through the USDA), the states (through the land-grant colleges), and county governments, through a network of county extension agents. The Cooperative Extension Service was constitutionally mandated in New Mexico in 1915.

Mission

The College of Agricultural, Consumer and Environmental Sciences at New Mexico State University is the land-grant college that provides comprehensive programs to New Mexicans in agriculture, family and consumer sciences, wildlife and natural resources conservation and management, community economic development, and hotel, restaurant, and tourism. These programs are delivered through statewide, integrated efforts in teaching, research, and extension.

About the College of Agricultural, Consumer and Environmental Sciences

The College of Agricultural, Consumer and Environmental Sciences implements the land-grant mission in New Mexico. As the core component of New Mexico's land-grant institution, New Mexico State University (NMSU), the College of Agricultural, Consumer and Environmental Sciences contributes to the well-being of New Mexico's citizens and to the economic vitality of the state. The College of Agricultural, Consumer and Environmental Sciences represents and conveys NMSU's mission, presence, and impacts statewide; it is the face of the university.

The College of Agricultural, Consumer and Environmental Sciences consists of three major units—Academic Programs, the Agricultural Experiment Station System, and the Cooperative Extension Service—and three important College-wide support services: the Department of Media Productions and the Office of Business and Resource Planning. These units encompass the activities of the College's academic departments, nonacademic departments, agricultural science and research centers, extension program departments, and county extension offices.

Distinctive Features

The College of Agricultural, Consumer and Environmental Sciences differs in several important respects from other colleges of New Mexico State University. The College receives appropriations through a three-way partnership with federal, state, and local governments. The research and extension arms of the College are funded through a federal system and, on the state level, as separate line items within the NMSU budget. Partnerships with every New Mexico county result from county government contributions to extension programs.

The College also maintains close ties with agriculture, consumer sciences, rural and urban industry leaders, members of state and federal agencies, and the general public through state, county, departmental, and commodity advisory committees that help guide academic research and extension programs. The College has evolved into a New Mexico public research and development organization, maintaining a strong commitment to conduct fundamental, applied, and mission-oriented research and to disseminate the results to the public.

Because research and extension are major, integral parts of faculty responsibilities, most faculty members are employed on a 12-month contract, rather than the 9-month academic appointment common in the rest of the University. Many faculty and staff are assigned to off-campus research facilities, extension offices, and agricultural science centers where they can effectively address the College's statewide mission.

Academic Programs

Academic Programs provides leadership for the College's academic instruction. Its primary mission is to prepare educated professionals for leadership roles in all facets of the food and fiber industries and natural resource conservation and management, as well as professionals who contribute to the well-being of New Mexico's citizens.

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 the fundamental and applied research programs of the College faculty and graduate students. 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 will benefit New Mexico's citizens.

The Agricultural Experiment Station System is made up of scientists on the main campus and at agricultural science centers and research centers throughout New Mexico. The 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.

Cooperative Extension Service

The Cooperative Extension Service performs the organized service function of the land-grant institution by providing the state and community-based outreach and educational activities of the College. Its mission is to provide the citizens of 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 resources management, consumer and family issues, youth development, and community economic development.

The Cooperative Extension Service is a partnership between federal, state, county, and local community governments; each partner contributes financial support to extension programs. All Cooperative Extension Service personnel, including county agents and state specialists, are faculty and staff of NMSU.

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 people of New Mexico in communities where they live and work.

Office of Business and Resource Planning

The Office of Business and Resource Planning coordinates College fiscal and human resource activities with NMSU administrative offices. The Office of Business and Resource Planning is responsible for coordinating the pre-award activities for all accounts in the College of Agricultural, Consumer and Environmental Sciences, provides guidance to faculty and staff on pre-award contract issues, and coordinates all post-award activities, including billing, reporting, and closing of completed grant and contract accounts.

Recommendations for Future Directions

Priorities in five broad, mission-related areas and three College-wide mission-supporting areas have been identified. Each priority area involves activities of the three units of the College of Agricultural, Consumer and Environmental Sciences: Academic Programs, Agricultural Experiment Station System, and Cooperative Extension Service. The mission-related priority areas are:

1. Agricultural competitiveness and food security
2. Economic and community development
3. Natural resource conservation/management and environmental science
4. Quality of life of New Mexicans
5. Multistate, regional, and international involvement

These priorities guide the formulation of curricular directions, the development of research themes, and the organization of extension programs. Most intersect several departments and units in the College. Existing programs of high value to specific groups continue, but the focus will be on priority program areas. These mission-related priorities address the mission-oriented goals of NMSU's *Vision 2020*.

The following College-wide mission-supporting pursuits, in alphabetical order, are designed to enhance the effectiveness of all College programs:

- Image and visibility of the College
- Increased level of support
- Increased student and employer satisfaction with the College's academic programs

All of the above are essential for the College to prosper and accomplish its mission.

Mission-Related Priorities for the Future

The five mission-related priority areas for the College of Agricultural, Consumer and Environmental Sciences and the strategies to achieve these goals are described below.

1. **Foster technological innovation and technology transfer to enhance competitiveness and security of New Mexico agriculture while maintaining the natural resource base**

This goal aligns with NMSU *Vision 2020* goal #3 *Research and Creative Activity* and goal #4 *Economic Development and Community Engagement*.

New Mexico agriculture must remain competitive in U.S. and world markets. This requires a continuous flow of appropriate technology addressing local needs within New Mexico. It is critical that the College maintains and strengthens programs that address these needs. The College recognizes that agricultural competitiveness and efficiency should take into account social and environmental costs. Determining these factors requires a coordinated, team approach within the College.

Water is the most limiting resource for New Mexico. All aspects of water use affect agricultural efficiency, profitability, and human wellness. Water quality and availability are critical for all agricultural and nonagricultural uses. Water management will become more critical as water demands for urbanization and industrialization increase. Consequently, it is crucial for research, extension, and teaching programs to generate technological innovation and transfer that knowledge from the College to the public to enhance agricultural profitability and sustainability as it relates to water.

Agricultural needs are complex and can best be addressed by teams employing expertise from various disciplines, including both research and extension. Long-term, viable agriculture is dependent on sustainable systems and environmental safety.

More than 70 percent of New Mexico agricultural gross receipts are livestock related. Forage conversion by livestock into meat, milk, wool, and hair products continues to be a principal economic use of rangeland, irrigated pastures, and stored forages. Research, extension, and teaching programs on grazing and animal production are essential. Multiple-use concerns associated with economic uses of rangelands continue to be an important component of these programs, as do ecosystem services provided by domesticated forage production and rangeland.

New and improved plant varieties are a highly visible result of agricultural research. Plant breeding should be complemented with research in molecular biology. Together, these two fields can make major contributions to agriculture through the development of new genetic material for plant and animal production.

Insect pests, weeds, and plant diseases are often the primary factors limiting productivity of agricultural systems. Pests tend to adapt to technologies used to control them, and fewer pest management technologies are emerging from private research. New tools and integrated

approaches are needed to manage pests in the present, while new strategies are needed to steward the use of these technologies to prolong their usefulness.

Uses of agricultural chemicals and other technologies, how well they work, and how they affect food safety and environmental quality are becoming more acute problems. Research on new approaches to integrated pest management, pest resistance to pesticides, waste management, and remediation of disturbed land and polluted waters is a continuing critical need.

Objectives

- Encourage and reward interdisciplinary and integrated management approaches in planning and implementing research and extension programs, emphasizing both applied and fundamental methods for developing comprehensive solutions to important issues.
- Conduct research, teaching, and extension programs on emerging critical issues, including:
 - water-related research, teaching, and extension programs that generate technological innovation and transfer to enhance agricultural competitiveness and maintenance of water quality
 - programs in molecular biology, nutritional toxicology, and microbiology
 - value-added programs in food processing, marketing, and food technology
 - new economically viable uses for various plant and animal species
 - management of pest resistance to management tools
- Continue to conduct research and extension programs in:
 - crop, animal, and range management, including value-added programs
 - plant science, with significant emphasis on genetic improvement of crop plants
 - integrated approaches to pest management that combine cultural and biological approaches with stringent use of pesticides
 - strategies to market products more efficiently and profitably
 - urban horticulture programs to assist in small agricultural efforts, gardens, landscaping, and nurseries
 - niche markets and products (e.g., medicinal plants, local foods, organic crops, community gardens, and farmers markets)
- Broaden the scope of what and how we communicate the full spectrum of research results to the public and scientific communities.
- Encourage departments to regularly review their curriculum to improve their training of students for careers in agriculture, conservation and management of natural resources, and related disciplines.

Performance Indicators

Progress toward the listed objectives will be measured by such indicators as:

- faculty evaluation procedures that encourage and reward interdisciplinary activities
- number of research and extension programs employing interdisciplinary and integrated management approaches, as reported to the U.S. Department of Agriculture
- number of pesticide operators certified by extension training programs
- number of research and extension programs related to marketing
- contributions to technology innovation and transfer (for example, publications for scientific and lay audiences, patents, cultivars released, grants obtained, etc.)
- competitiveness of students in the job market
- number of publications
- number of proposals
- research expenditures

2. Support economic and community development

This goal aligns with NMSU's *Vision 2020* goal #4 *Economic Development and Community Engagement*.

Industries allied with agriculture, family and consumer sciences, food, fiber, tourism, and natural resource management are major components of New Mexico's economy. The agricultural and natural resources industries alone contribute several billion dollars annually, directly and indirectly, to the state's economy, and provide approximately one-fifth of the jobs.

New Mexico's economic growth requires strong development efforts and decisive action. The College's role is the education of community and state leaders to help them design, develop, and implement economic strategies to improve the vitality of New Mexico's economy and facilitate community planning for development.

The College has significantly affected economic development in the past, and it continues to do so. The economic benefits of some programs are short-term and visible. Others involve research that addresses fundamental biological, economic, or sociological processes or concepts, and offers extensive long-term benefits to agriculture and society in general.

Objectives

- Encourage and reward interdisciplinary activities and cooperation with industries and communities, emphasizing both applied and fundamental methods for developing comprehensive solutions to important issues.
- Conduct research, teaching, and extension programs on emerging critical issues, including:
 - supporting New Mexico business development and management
 - pursuing alternative crops and value-added opportunities for farmers
 - assessing actual and potential impact of College programs on economic development
- Continue to conduct research and extension programs that:
 - facilitate community and business planning activities, including activities of ranches, farms, and local and regional agribusinesses
 - emphasize existing programs and encourage the development of new programs that lead to the use of natural and human resources in a manner that provides greatest economic benefits, taking into consideration ecological, biological, social, and cultural values
 - emphasize food science, food technology, and post-harvest handling and processing of value-added agricultural products
 - emphasize practical aspects of agricultural marketing, help identify marketing and promotional opportunities for specific agricultural and fiber products, and include team approaches to solving marketing problems
- Encourage departments to regularly review their curriculum to improve their training of students for careers in agricultural economics, agricultural business, marketing and development.
 - Broaden the scope of what and how we communicate the full spectrum of research results to the public and scientific communities and increase efforts to inform the public and members of government about the College's economic development activities

Performance Indicators

Progress toward the listed objectives will be measured by such indicators as:

- number of research and extension programs relating to economic development of rural and urban communities, regions statewide, including tourism and hospitality businesses
- conducting market impact studies and industry surveys to measure economic impact of programs
- number of contacts and courses conducted by extension for government units, private industry, communities, and individuals

- amount of resources spent on food technology and other processing issues
- number of students participating in co-ops and internships
- competitiveness of students in the job market

3. Expand natural resources conservation/management and environmental sciences programs

This goal aligns, in part, with NMSU's *Vision 2020* goal #3 *Research and Creative Activity*.

Rural and urban human activities affect land, water, and air. Through teaching, research, and extension programs, the College is committed to furthering our understanding, using science-based knowledge, of human impacts on the environment, and to supporting environmentally-sound agricultural and natural resource practices. The College will continue its efforts to understand the interaction between the environment and production agriculture.

New Mexico has a rich and diverse land and natural resource base that is arid and semiarid. This natural resource base is a major contributor to the economic well-being of the state's residents. Its economic uses result in demands for various resources. In addition to direct demands for land and water, there is increasing pressure for recreation-related activities that represent a growing economic opportunity. Activities related to the state's natural beauty and wildlife make a major contribution to the economy.

Objectives

- Encourage and reward interdisciplinary and integrated relationships with other research and outreach 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.
- Conduct research, teaching, and extension programs on emerging critical issues, including:
 - the conservation of endangered and threatened wildlife in New Mexico
 - the impact of humans on wildlife and aquatic resources
 - sustainable use of natural resources
 - the impact of urbanization on rural environments
 - the effects of recreational and tourism activities on natural resources
 - policies resulting from the influx of new residents
 - cultural and social issues related to demographic shifts and agricultural transformation
 - the information and technology needs of natural resources managers
- Continue to conduct research and extension programs that:

- address multiple uses of land
 - investigate alternative enterprises based on utilization of natural resources
 - develop natural resource management practices to ensure that socially and environmentally optimal resource uses are achieved
 - address water quality issues and identify efficient uses of existing water resources, including marginal and wastewaters
 - address soil and food contamination, waste management, watershed, and erosion problems
 - address wildlife habitat needs, economic value of wildlife, and maintenance of biodiversity
 - address the effectiveness of recreational and sustainable hospitality and tourism practices
 - identify the physical and economic trade-offs that would result from modifying existing management practices
 - address preparedness and response to natural disasters, such as drought and fire
 - assist land management agencies in developing standards and guidelines for land use and conservation
 - Broaden the scope of what and how we communicate the full spectrum of research results to the public and scientific communities.
 - provide data and other information to the public, to government agencies, to private industry, and to legislators on environmental issues
 - educate users of public lands about wildlife and land use standards and the monitoring of wildlife land condition
- Encourage departments to regularly review their curriculum to improve their training of students for careers in environmental science, natural resources management, and related disciplines.

Performance Indicators

Progress toward the listed objectives will be measured by such indicators as:

- number and impacts of research and extension programs concerning natural resources or environmental issues
- number of times information provided to governmental units, private industry, communities, and individuals regarding environmental and natural resource management issues
- competitiveness of students in the job market
- number of publications
- number of proposals submitted
- research expenditures

4. Enhance the quality of life for the people of New Mexico

This goal aligns, in part, with NMSU's *Vision 2020* goal #3 *Research and Creative Activity* and goal #4 *Economic Development and Community Engagement*.

The family is the fundamental institution of society. In a rapidly changing world, the challenges facing individuals and families are great. With the problem-solving philosophy of the College of Agricultural, Consumer and Environmental Sciences and its teaching, research, and extension education capability, responses can be developed to deal with complex issues facing New Mexico families.

Population changes create new challenges in New Mexico. Progressive urbanization, an increasing percentage of multiple-income families, and an increasingly multicultural society are some of the trends that create needs and opportunities for the College of Agricultural, Consumer and Environmental Sciences. A better understanding of how to meet the needs of new groups, while continuing strong existing programs for the people of New Mexico, is needed. Special emphasis should be given to the needs of rural health, food safety, and nutrition issues. Continued research is called for in human behavior, child and adolescent development, human nutrition and food science, clothing and textiles, and family resource management.

The College's research and extension programs on human nutrition and wellness are aimed at keeping people from getting sick. As such, these programs might be considered "*preventive medicine*" programs.

Objectives

- Encourage and reward interdisciplinary activities and cooperation with private organizations, government units, and communities.
- Conduct research, teaching, and extension programs on emerging critical issues in family and consumer sciences, and tourism services to enhance the socioeconomic well-being of New Mexicans.
- Continue to improve and strengthen current research and extension programs that:
 - address coping strategies, decision-making skill, communication skills, and consumer behavior
 - increase our understanding of the language, customs, values, and needs of New Mexico's diverse citizenry
 - teach family resource management skills to the citizens of New Mexico
 - help young people acquire knowledge, develop life skills, and form attitudes that enable them to become self-directing, productive, and contributing members of society
- Broaden the scope of what and how we communicate the full spectrum of research results to the public and scientific communities.

- Encourage departments to regularly review their curriculum to improve their training of students for careers in human nutrition, food science, family science, child development, consumer science, clothing, textiles, and fashion merchandising, tourism management, hotel management, and restaurant and food service management, and related disciplines.

Performance Indicators

Progress toward the listed objectives will be measured by such indicators as:

- number of programs presented to governmental and private organizations
- competitiveness of students in the job market
- number of times information is provided to governmental units, private industry, communities, and individuals on family, consumer, and tourism issues

5. Continue a targeted involvement in multistate, regional, and international programs

This goal aligns with NMSU's *Vision 2020* goal #2 *Diversity and Internationalization*.

New Mexico's future is increasingly tied to regional environments and a global economy. Clearly defined regional and international perspectives are essential for the programs of the College. Regional and international involvement lead to program enrichment valuable to our state and its people. Research today requires an expanded geographic base of operations because of the worldwide spread of information, data, expertise, and funding sources, and the demand for graduate education. The University's traditional programs can be enriched by regional and international components and thereby better achieve their full potential. International activities enhance global understanding by incorporating international dimensions into the ongoing instruction, research, and extension efforts of the College.

Graduates of the College need an education that will allow them to achieve success in a global economy. They must have the skills necessary to keep New Mexico a supplier of food and fiber throughout the world and keep New Mexico a destination for tourists from around the world.

Objectives

- Encourage and reward multistate, regional, and international research, teaching, and extension activities, when appropriate, including:
 - working with industry to develop an international trade center or related institution to enhance the value of New Mexico products for export
 - participating with the University in its effort to internationalize its courses of study
 - working with industry to develop educational, work-related opportunities for students

- Communicate the importance of regional and international activities to New Mexico citizenry and legislators.
- Continue to recruit international students, especially from Mexico and Latin America.

Performance Indicators

Progress toward the listed objectives will be measured by such indicators as:

- number of multistate, regional, and international projects, especially in arid areas, Mexico, and Latin America
- number of internships and cooperative opportunities for students
- number of international students enrolled in and graduated from the College
- activity in courses with an international focus and participation in the University's "Viewing a Wider World" program
- number and types of courses cross-listed for interdisciplinary purposes
- competitiveness of students in the job market

College-Wide, Mission-Supporting Initiatives

♦ Improve the image and visibility of the College

This initiative aligns with NMSU's *Vision 2020* goal #4 Economic Development and Community Engagement.

To grow and prosper, the College must broaden the image of Agricultural, Consumer and Environmental Sciences and communicate that image to the public. Most people are aware of our contributions to production agriculture, but few appreciate the broad spectrum of activities supported by the College of Agricultural, Consumer and Environmental Sciences. Agriculture includes many kinds of business enterprises like handling, transportation, processing, marketing, and a broad range of businesses in the service sector. Natural resource management is a major concern of the College because of the demand for natural resources and the potential impacts that human activities have on them. Family and consumer-related issues are important components of programs in family and consumer sciences. The College has the responsibility to create a public awareness of, and an accurate perspective about, the nature and extent of contemporary agriculture, family and consumer sciences, and natural resources studies.

Objectives

- Broaden the scope of what and how we communicate the full spectrum of research results to the public and scientific communities by blending traditional communication methods with telecommunication and other high-tech approaches to project a well-defined image of the College.
 - 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 College accomplishments
 - communicate with legislators to inform them 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
 - promote and market the academic programs in NMSU's College of Agricultural, Consumer and Environmental Sciences
 - inform people about the types of jobs available in agriculture and family and consumer sciences
- Continue to improve the functional and esthetic quality of the classrooms, laboratories, buildings, and grounds of the College.
- Expand efforts to organize alumni, retirees, and constituents as a political, financial, and recruiting support group.

- ◆ **Increase the level of support for the College of Agricultural, Consumer and Environmental Sciences from the citizens of New Mexico, local, state, and federal governments and agencies, private corporations, foundations, and alumni**

This initiative aligns, in part, with NMSU's *Vision 2020* goal #4 *Economic Development and Community Engagement* and goal #5 *Resource Stewardship*.

Strengthening ties with citizens, alumni, legislators, and government agencies, and with business and industry leaders helps ensure adequate support for the development and maintenance of high-priority programs. The College strongly supports commercial production agriculture, and also has a responsibility to help the public understand the food and fiber production process. Increasing public education about agriculture and family and consumer sciences ultimately increases support for College research and development efforts and helps safeguard programs that are essential to the citizens of New Mexico.

Objectives

- Explore approaches to educating the public about the importance of College programs to the quality of life.
- Continue participating with constituency and lay groups within cooperative ventures and coalition-building activities with the College. Sustain working relationships with constituency groups to build a strong support base, and elicit assistance in developing and marketing priority programs.
- Continue to expand and refine the College's legislative liaison initiative. Expand the involvement of agricultural industry and human services agencies personnel, and work throughout the year in building legislative support.
- Continue to identify and develop alternative resources (funding sources, personnel, organizations) achieving the College's mission.
- Increase cooperation and collaboration with industry by, for example, providing professional, field-based experience (internships, externships, industry experience) for students

- ◆ **Increase graduation rates and employer satisfaction with the relevance of our academic programs**

This initiative aligns, in part, with NMSU's *Vision 2020* goal #1 *Graduation Academics* and Goal #2 *Diversity and Internationalization*.

Today's students are tomorrow's leaders. The College should address the need for leadership by recruiting and educating outstanding students. By being aware of market developments, the College of Agricultural, Consumer and Environmental Sciences needs to recruit students and

provide them with relevant curricula to meet the demand for graduates and provide tomorrow's leaders.

- Develop and implement a coordinated College recruitment and retention plan aimed at both traditional and nontraditional students.
 - continue to identify and develop areas of excellence to attract quality students at both the undergraduate and graduate levels, making special efforts to develop and maintain diversity
 - facilitate the effective use of scholarships as a recruitment tool
 - facilitate the enrollment of transfer students, especially those from other New Mexico colleges and from adjacent states by continuing to establish articulation agreements with other educational institutions for transfer of course credits
 - continue efforts to include secondary school teachers and extension agents in recruiting quality students
 - increase scholarship opportunities within the College
 - increase work-study job opportunities within the College
 - expand job placement activities within the College
- Encourage and support faculty and staff training, development, and recognition.
- Continue technological development and improvement of classes and facilities.
 - give high priority to improving classrooms and other educational facilities for students
 - develop effective, high-quality distance education processes
 - provide training and resource materials to facilitate recruiting and retention efforts that portray a progressive image of the College so that the College becomes associated, in the minds of potential students, industry, and the public with the high-tech, science-oriented sectors of the economy it serves

Appendix G: NMSU's ongoing internal review of agricultural science centers

In May 2017, ACES Dean Flores began an internal review of the college's 12 agricultural science centers.

Dean Flores formed a 17-person advisory team and tasked them with conducting “a comprehensive review of the Agricultural Experiment Station (AES) and the Agricultural Science Centers (ASCs), including funding, staffing, facilities, research activities, and community/industry partnerships.” At the October meeting of the ASC advisory team, the team decided to break into subcommittees to each review a small group of ASCs concerning the following:

1. **Mission** - What is the mission of the ASCs and how well are they connected to the mission of ACES and NMSU. How successful is each center in fulfilling their mission? Are their research and outreach goals and objects appropriately aligned with stakeholder needs?
2. **Resources** - Are the resources (faculty, staff, operations, facilities, equipment, supplies, land, etc.) of each center sufficient for the center to successfully fulfill their goals and objectives? What are additional resources needed for each center, including consideration of infrastructure needs and improvements?
3. **ASC Advisory Committees** - How have the Advisory Boards developed over time? Who are the members? How does the advisory board function at each of the centers? Are they effective in providing valued input into the research activities of the center?
4. **Communications** - How are each of the ASCs communicating the impact of their research programs to stakeholders, legislators, the public, potential research partners and funding agencies, and within NMSU?

NMSU ASC Advisory Team

Natalie Goldberg, Interim Associate Dean and AES Director | Co-Chair
Steve Loring, AES Associate Director | Co-Chair/Facilitator
Bruce Davis, Rancher, member of the Advisory Board at Clayton
Roland Sanchez, Medical Doctor from Belen
Dino Cervantes, Chile Processor, Las Cruces
Blake Curtis, Seed Producer, Clovis
Dina Chacón-Reitzel, New Mexico Beef Council
Craig Ogden, New Mexico Farm and Livestock Bureau
Shad Cox, Superintendent Corona
Steve Guldán, Superintendent Alcalde ASC
Jane Pierce, Associate Professor Artesia ASC
Shengrui Yao, Associate Professor Alcalde ASC
Dave Lowry, Farm Manager Leyendecker ASC
Aaron Scott, Farm Manager Clovis ASC
Stephanie Walker, Associate Professor, Plant, and Environmental Science
Clint Loest, Professor, Animal and Range Science
Jerry Sims, Department Head, Entomology, Plant Pathology, and Weed Science

Appendix H. Capital appropriations for agricultural science centers, 2007-2017

Capital Appropriations for NMSU's Agricultural Science Centers, 2007-2017

Year	Agricultural Science Center	Fund	Amount
2007	Clayton	General Fund	\$10,000
2007	Clayton	General Fund	\$160,000
2007	Clovis	General Fund	\$60,000
2007	Clovis*	General Fund	\$50,000
2007	Corona	General Fund	\$525,000
2007	Farmington**	General Fund	\$100,000
2008	Clovis	General Fund	\$74,000
2008	Corona	Severance Tax Bond	\$1,000,000
2008	Tucumcari	General Fund	\$25,000
2009	Clayton	Severance Tax Bond	\$160,000
2009	Farmington***	General Fund	\$100,000
2010	Corona	Severance Tax Bond	\$289,286
2013	Corona	Severance Tax Bond	\$250,000
2013	Corona	Severance Tax Bond	\$160,000
2014	Fabian Garcia	Severance Tax Bond	\$70,000
2014	Tucumcari	Severance Tax Bond	\$75,000
2016	Alcalde	Severance Tax Bond	\$200,000
2017	Alcalde	Severance Tax Bond	\$63,723

Source: DFA's Capital Projects Monitoring System

* \$29,475 was reverted to the general fund

** \$84,644 was reverted to the general fund

*** \$100,000 was reverted to the general fund

Appendix I. Extension agent salaries

Extension agent salaries fall below national averages, and the tenure system may not provide sufficient incentives. Market research conducted by NMSU on average salaries for extension roles indicates that extension agents in the state earn considerably less than peers nationwide. For example, according to NMSU's market research, entry-level agents (instructor level) earn on average \$46.6 thousand per year, while the average salary for entry-level NMSU agents (classified as extension Associate I level) is \$38.1 thousand. While NMSU salary data does not always specify agents' position levels (some agents are classified under their program area, while others are listed by level), the average annual salary for all agents is \$53.5 thousand. This falls below average salaries for assistant professor, associate professor, and professor level agent roles in the market data. US Census Bureau data indicates that the New Mexico average annual salary for an individual with a graduate or professional degree was \$56.6 thousand in 2016. Occasionally, agents receive merit pay based on performance evaluations, when it is made available from the university. Merit pay has only been distributed one year out of the past ten.

NMSU Extension Agent Salaries, Compared to Market Averages

Agent level	NMSU CES avg. salary	Market avg. salary
Instructor/Ext I	\$38,164	\$46,569
Asst Prof/Ext II	\$47,835	\$55,520
Asst Prof	Unknown	\$65,996
Professor	Unknown	\$76,471
All agents	\$53,479	\$61,139

Source: NMSU CES, NMSU HR Services

Note: The average salary for NMSU agents is based on an average of all salaries, while the market average for all agents is an average of salaries for each position level

Agents are required to have Masters' degrees, and as faculty, are eligible for tenure after five years, except Instructor-level agents. The degree requirement, coupled with the relatively low salary, may make it more difficult for CES to find and retain qualified agents. In the past, agents could be hired with a Bachelor's degree and had five years to obtain a Master's degree, but the NMSU provost's office decided to remove this option, based on a review of peer institutions. While tenure offers additional job stability and a modest raise, an agent's job is unlikely to change significantly, as it might for university-based faculty (e.g., shifting to more research). Recently, the University of Wisconsin made some organizational changes to its extension service, including removing the requirement for a Master's degree for many extension educator positions, to widen the pool of potential candidates, and target younger candidates.

Appendix J. Citations

- ⁱ True, A.C. (October 1928). "A history of agricultural extension work in the United States, 1785-1923." U.S. Department of Agriculture Miscellaneous Publication No. 15.
<https://archive.org/stream/historyofagricul00true#page/n3/mode/2up>.
- ⁱⁱ National Research Council. (1996). Page 101. Colleges of agriculture at the land grant universities: Public service and public policy. National Academies Press. <https://www.nap.edu/read/5133/chapter/7#101>
- ⁱⁱⁱ Barham, B. L., Foltz, J. D., Agnes, M. I. R., & van Rijn, J. (2017). Modern agricultural science in transition: A survey of US land-grant agricultural and life scientists (No. 585). University of Wisconsin, Agricultural and Applied Economics.
- ^{iv} Washington State University Extension. (2014). County Revenue Generation Handbook.
<http://cahnrs.wsu.edu/fs/wp-content/uploads/sites/4/2014/10/Revenue-Generation-Handbook.pdf>
- ^v Franz, N. K., & Cox, R. A. (2012). Extension's future: Time for disruptive innovation. *Journal of Extension*, 50(2), 2COM1. <https://www.joe.org/joe/2012april/comm1.php>
- ^{vi} Food Insecurity in New Mexico. (n.d.). Retrieved December, 2017, from
<http://map.feedingamerica.org/county/2015/overall/new-mexico>
- ^{vii} Poverty by State - New Mexico. (2016). Retrieved December, 2017, from <https://talkpoverty.org/state-year-report/new-mexico-2016-report/>
- ^{viii} New Mexico Agricultural data. Retrieved December, 2017, from Headwaters Economics,
<https://headwaterseconomics.org/tools/economic-profile-system/>
- ^{ix} U.S. Bureau of Economic Analysis 2016 Gross domestic product (GDP) by state (millions of current dollars).
<https://www.bea.gov/itable/iTable.cfm?ReqID=70&step=1#reqid=70&step=10&isuri=1&7003=200&7035=-1&7004=naics&7005=-1&7006=35000&7036=-1&7001=1200&7002=1&7090=70&7007=2016&7093=levels>
- ^x Cruz, T., PhD. (2015). New Mexico SNAP-Ed Evaluation Report (Rep.).
- ^{xi} Hanover Research. May 2014. Best Practices in Strategic Planning.
https://intranet.ecu.edu.au/__data/assets/pdf_file/0004/711499/Hanover-Research,-Best-Practices-in-Strategic-Planning,-May-2014.pdf
- ^{xii} New Mexico State University Agricultural Education Facilities Master Plan Report. February 2015. Last Accessed February 26, 2018 at <https://facilities.nmsu.edu/wp-content/uploads/sites/57/2017/12/NMSU-Agricultural-Education-Facilities-Master-Plan-Final-2015-1-of-2.pdf>.
- ^{xiii} K-State Research and Extension. Investing in the future of Kansas 4-H: A guide to the 4-H Program Fee.
<http://www.kansas4-h.org/resources/docs/Investing%20in%204-H-Program%20Fee%20Guide.pdf>