AGRICULTURAL MODERNIZATION & EDUCATIONAL FACILITIES

Core Priority for **GO Bond 2018** and beyond

NM STATE UNIVERSITY

All About Discovery!™

College of Agricultural, Consumer and Environmental Sciences

All About Discovery!™

College of Agricultural, Consumer and Environmental Sciences

The College of Agricultural, Consumer and Environmental Sciences is an engine for economic and community development in New Mexico, improving the lives of New Mexicans through academic, research, and Extension programs.

College of
Agricultural, Consumer and Environmental Sciences

DRIVING NEW MEXICO'S FUTURE

As an engine for economic and community development, NMSU's College of Agricultural, Consumer and Environmental Sciences will increase its performance and help drive New Mexico to a better future with the upcoming GO Bond enhancements.

This publication features the three facilities targeted for the 2018 GO Bond, as well as a glimpse at priorities for 2020.

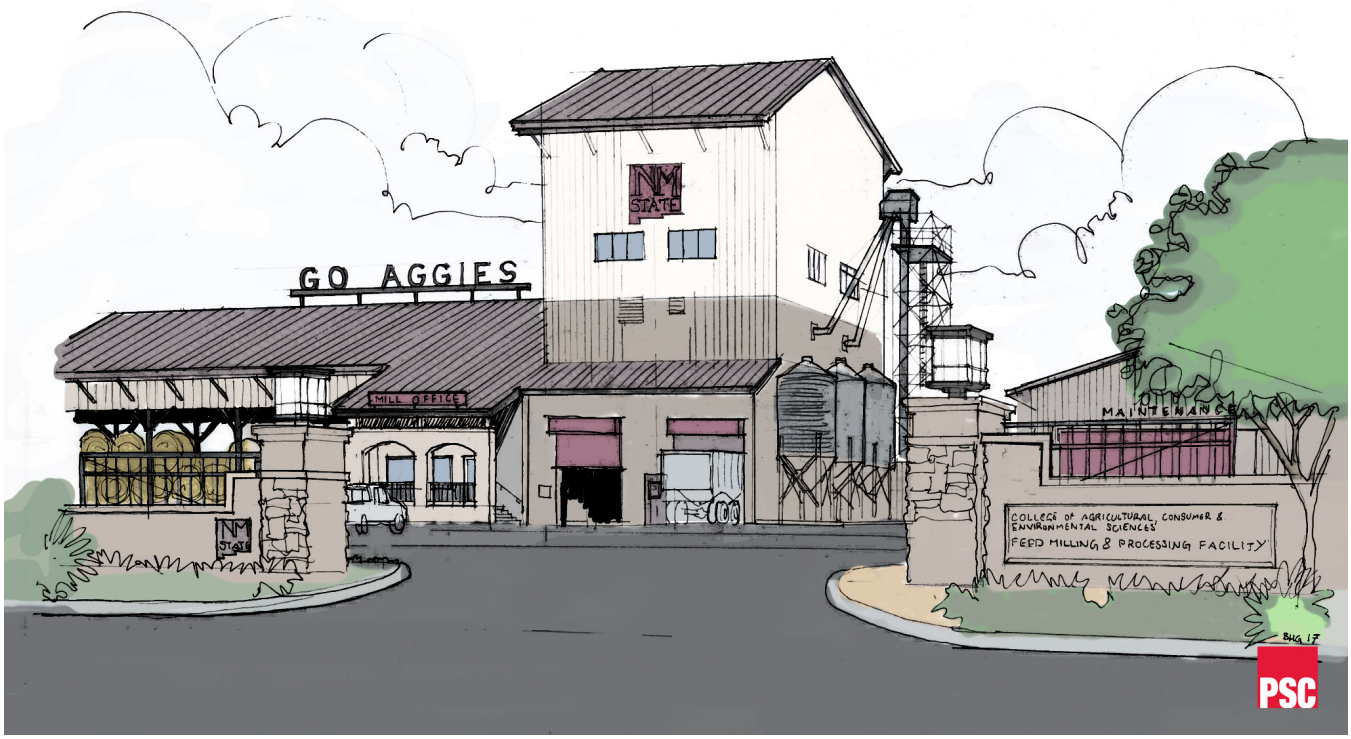
College of **Agricultural**, **Consumer**, and **Environmental Sciences**

Feed Milling & Processing Facility

A new Feed Milling & Processing Facility strengthens the ability of the College of ACES to improve lives through its academic, research and Extension programs. The design features:

- Space to investigate new feed processes and blends.
- Safety and efficiency improvements for all users through consolidation and technology upgrades.

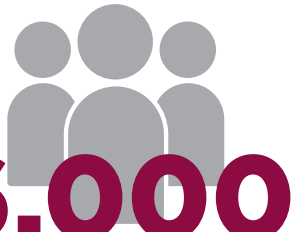
Building cost: $3,128,500 • Naming rights: $1 million.



Rendering courtesy of Parkhill, Smith & Cooper

$11 billion & 51,000 jobs

Agriculture and food processing industries generated nearly **$11 billion** and **51,000 jobs** for the New Mexico economy, according to a recent study.



6,000
4-H and FFA
STUDENTS

6,000 4-H and FFA students and families visit the **Animal and Range Sciences Campus Livestock Center** each year.

MORE THAN
80%
OF COURSES
BENEFIT

More than **80 percent** of courses in Animal and Range Science will benefit from a new facility.

Every week, the current facility mixes **25 tons** of feed — to support the research and teaching mission as well as 4-H and FFA programs. With upgraded capacity and safety the facility's stakeholders will be better served.

FEED MILLING AND PROCESSING FACILITY

Feed processing and storage at NMSU's Campus Livestock Education and Research Center (CLERC) is currently spread across multiple locations making feed production inefficient, time-consuming and expensive. A modern, well-thought out feed mill will provide capabilities to investigate novel feeds, differing methods of feed processing and combinations of ingredients that would benefit research efforts, student training and stakeholders in New Mexico. Additionally, it will enhance efficiencies, reduce dust emission on campus and provide a safer environment.

USERS:

- This facility will benefit research, teaching and the Extension mission of ACES.
- It will be used to manufacture diets to be used by the faculty in the Animal and Range Sciences *(ANRS)* department as well as the Vivarium and outlying AES facilities such as the Chihuahuan Desert Rangeland Research Center, Corona Range Livestock Research Center, Clayton Livestock Research Center, USDA-ARS Jornada, and the CLERC.

IMPACT:

- The ANRS department is home to 495 undergraduates, 37 graduate students and 27 faculty, and all of them could use this facility for teaching, research and outreach.
- It is estimated that more than 80 percent of the courses offered in ANRS will benefit from access to this type of facility.
- Every week, the current facility mixes 25 tons of feed to support the research and teaching mission as well as 4-H and FFA programs. With upgraded capacity and safety the facility's stakeholders will be better served.

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

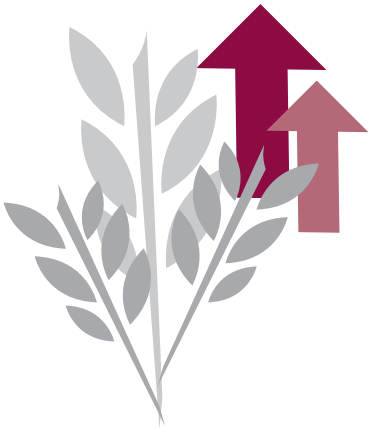
Food Science Learning and Safety Facility

The new Food Science Learning and Safety Facility will strengthen the capabilities of the College of ACES to serve the needs of the state and region through teaching, research, and outreach activities. The design features the following state of the art facilities:

- Meat and Food Science Laboratory
- Dairy Technology Laboratory
- Fermentation Technology Laboratory/Distillery
- Food Chemistry/Quality Assurance/Quality Control Laboratory
- Food Safety Laboratory
- Sensory Analysis laboratory
- Value-Added Foods Laboratory (Pilot plant for new product development.)
- Extension and Outreach Center

Building cost: $8,207,000 • Naming rights: $2 million.

Rendering courtesy of Parkhill, Smith & Cooper



By providing an in-state option to process **New Mexico** agricultural products, this facility can help **grow our economy**.

600
STUDENTS

An estimated **600 students** every year would use the facility, along with **hundreds of people** who will be there participating in outreach — such as 4-H, FFA and industry workshops.

$66,000
MEDIAN
SALARY

Median salary, according to the Bureau of Labor Statistics, in the food science and technology field. **The new facility allows NMSU to better prepare students for this path.**

The new Food Science Learning and Safety Facility will **foster international collaboration** with Mexico in the biosafety and food contaminant fields.

FOOD SCIENCE LEARNING AND SAFETY FACILITY

This facility will become an international food safety and security hub in the border region. Laboratories will support emerging research areas key to New Mexico's future including functional foods, nutraceuticals and the minimization of water usage in food production, among others. The facility will also provide food testing, as well as other services needed by the food industry through the provision of a pilot plant for scale-up of technological developments (extraction, extrusion, microencapsulation technology for active food ingredients, spray-drying, milling technology, pasteurization, high-pressure technology). The combined food science laboratories could represent a significant new revenue stream for the university, while fueling economic development in the state.

FACILITY USERS:

- The facility will support the teaching, research and Extension mission of NMSU across multiple departments and colleges.
- The food industry at the regional, national and international levels will use the services provided through the center.

FACILITY IMPACTS:

- Increase capability to work in the area of value-added foods.
- Enhance partnerships with industry, including those through the Arrowhead Center.
- Fuel economic development in the state through the development of more value-added products.
- Increase capacity to provide training in federal, state and other regulations related to the Food Safety Modernization Act, positioning NMSU as a leader in the training of food producers in the border region.
- Creation of an additional revenue stream through services provided.
- Enhance opportunities for interdisciplinary and innovative research, teaching and outreach activities.
- Due to hands-on experiences, graduates will be more competitive in the job market.
- Increase student enrollment and graduation rates at the graduate and undergraduate levels.
- Increase research collaboration and student mobility with other domestic and international institutions.
- Increase scientific productivity such as journal articles, books, conference presentations, and patents.

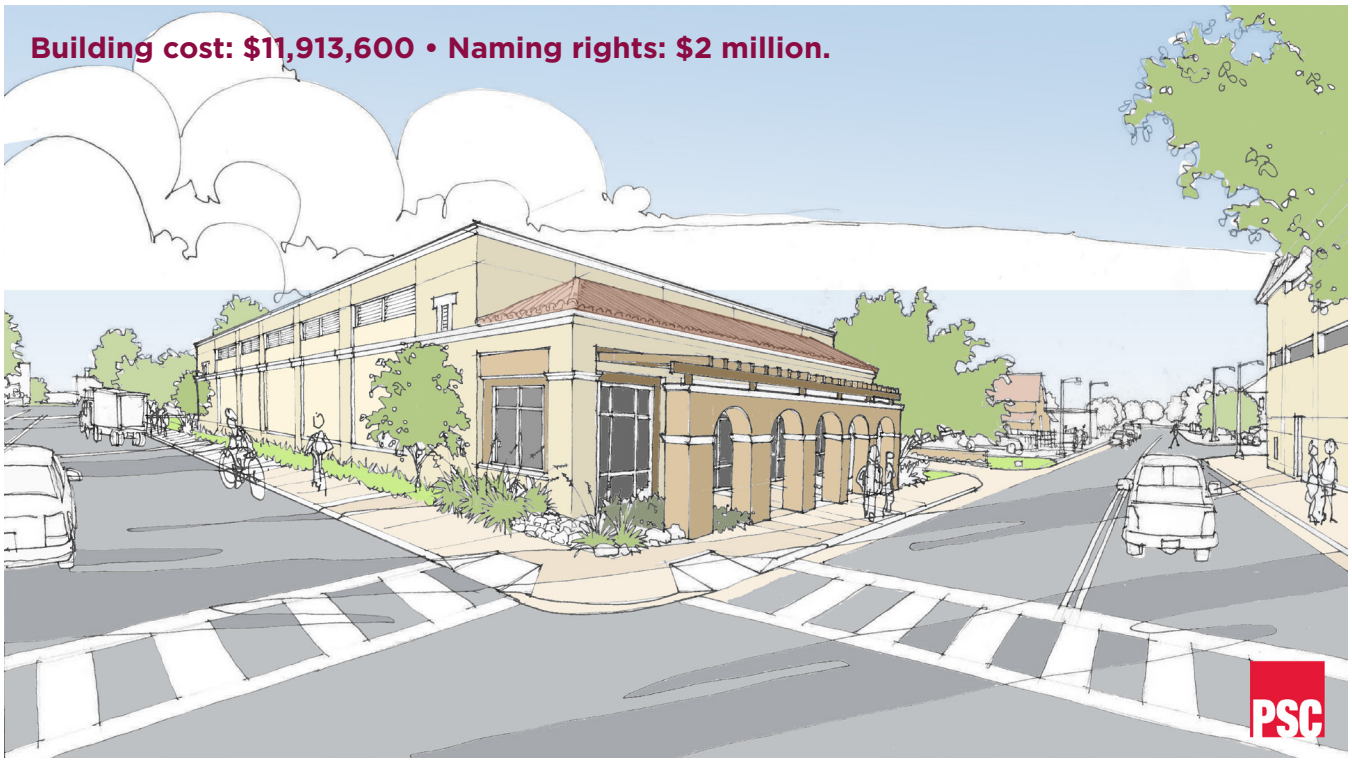

CAUTION
HOT
SURFACES
CHAMBER PRESSURE
CYCLONE DIFFERENTIAL
PRESSURE
FEED PRESSURE
INLET FAN
EXHAUST FAN
FEED PUMP
ON
HEATER CONTROL
OFF

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

Biomedical Research Building

A new Biomedical Research Building strengthens the ability of the College of Agricultural, Consumer and Environmental Sciences *(ACES)* to improve lives of students and New Mexicans across the state through its academic, research and Extension programs. The design features:

- Accommodations for students and researchers in diverse fields across campus — the facility will support programs in half of NMSU's colleges, and allow students more active involvement with research and teaching.
- Facilities that support research of West Nile disease, dengue fever and Zika virus, which are public health concerns in New Mexico and beyond.
- The ability to test cancer fighting molecules by improving research productivity.



Rendering courtesy of Parkhill, Smith & Cooper

3 COLLEGES & 7 DEPARTMENTS

NMSU researchers in **three colleges** and **seven departments** will be served by the new Biomedical Research Building.

NMSU is ideally situated to address key border population health problems, such as **mosquito borne viruses**, **cancer**, and **obesity**.

Increased capacity to conduct biomedical research will lead to a **greater number** of grants from the National Institutes of Health, United States Department of Agriculture and National Science Foundation.

BIOMEDICAL RESEARCH BUILDING

Animal research and animal research facilities are critical to the biomedical research enterprise. Animal species are used in every stage of the research and development effort — from discovery, to development and safety testing, to clinical trials, and to manufacture — because their biological systems, genetic structures and immunological responses, in various ways, closely mirror ours as a species.

For NMSU, to elevate in regard to biomedical research, this facility is critical to our success. Biomedical research at NMSU is currently valued at $2.9 million in grants and contracts and is well-known nationally and internationally.

This facility is envisioned to be a multi-user facility that will also benefit many of the research activities that occur across several departments and colleges at NMSU. The research conducted here will work to offer solutions to epidemiological issues such as West Nile disease, dengue fever, and Zika virus. Additionally, cancer fighting molecules could be tested in animal models whereas they are currently tested in invertebrate models and partnering institutions are needed to thoroughly evaluate these compounds slowing research productivity. Livestock species including sheep and swine are traditionally thought of as livestock but these species can also be used in this type of facility where variations in environment could be controlled. This facility will also be used for teaching and training undergraduate and graduate students in biomedical research. In addition to animal housing this building will also contain surgery areas that would be capable of handling all types of animals housed in this facility.

USERS:

The facility is interdisciplinary in nature and would serve researchers in three colleges and seven different departments. The three colleges include Agricultural, Consumer, and Environmental Sciences; Arts and Sciences; and Health and Social Sciences. In addition to PI's using the facility, graduate and undergraduate students will be an integral component, thus increasing their active involvement in research and teaching.

IMPACT:

With our current limitations, approximately 5 percent of the graduate students enrolled in departments that are proposed to be the main users of this facility are involved in biomedical research. Annual grants and contracts at NMSU relating to biomedical research total approximately $2.9 million out of the total $216 million in grants and contracts at

NMSU. This new facility will strengthen and complement the extramural grants submitted by NMSU PI's as well as increase the number of proposals submitted. The increased capacity to conduct biomedical research will lead to greater number of NIH, USDA, and NSF grants awarded. Because of NMSU's location, we are ideally situated to address health problems that affect the border populations such as mosquito borne viruses, cancer and obesity. The increased collaborations will aid our college and university in conducting research that addresses health disparities affecting the New Mexico population. In addition, the number of graduate students trained in ACES, A&S, and HSS will increase which aligns with our university's Vision 20/20 Strategic Plan.

LOOKING AHEAD:
CORE PRIORITY FACILITIES FOR GO BOND 2020

PAVILION AND HUMAN/ANIMAL INTERACTION FACILITY

This facility is proposed to replace the Livestock Judging Pavilion and will provide a central location for various events ranging from youth events to Therapeutic Riding sessions. This is a facility that is lacking in this geographical area and could represent a profit center for the university as well as experiential learning in facility and event management for students in ACES. It is proposed that this facility will be a central location to teach and conduct research in the field of companion animals. Human Animal Interactions (HAI) with companion animals is a rapidly expanding area of teaching, research and outreach in ACES.

- It is envisioned that this facility will also have an arena suitable for equestrian, canine and livestock events such as dog, horse and livestock shows, rodeos, judging contests, and clinics.
- New Mexico State University is located in area with two major interstates making it readily accessible for these types of events. In the overall plan, this will be a centerpiece of ACES facilities and it is proposed to bring people to the NMSU campus that otherwise might not have visited thereby increasing the visibility of NMSU and its programs.
- This facility will also be available to the Therapeutic Riding program, their partners and clients.

COMPARATIVE ANIMAL PHYSIOLOGY/METABOLISM FACILITY

The world population is expected to reach 9 billion by 2050, which begs the question: How will we feed 9 billion people? Meat consumption is projected to rise nearly 73 percent by 2050. The World Health Organization estimates annual meat production from livestock will need to increase to 376 million tons by 2030, necessitating improved efficiency of animal production. The research and teaching conducted in this facility will work to enhance livestock production through improvements in reproduction and nutrition. This facility will also be used for teaching and training undergraduate and graduate students. In addition to animal housing this building will also contain surgery areas that would be capable of handling all types of animals housed in this facility.

WATER CONSERVATION/RANGELAND ECOLOGY FACILITY

Among the top environmental concerns of New Mexico's urban and rural communities are water and rangeland conservation — this new facility will support teaching, research and outreach to address these issues. The growth of the Range and Water Sciences programs is currently limited by the lack of such facilities. Despite these limitations, the Water and Range Science programs have been highly successful obtaining extramural funding (approx $4.0 million/year) to conduct research and teaching that serves a broad constituency of students, public land managers, ranchers and policy makers at the state, national and international levels. This facility would allow the Water and Range programs to grow and better serve our clientele. It would greatly boost the ability to improve the learning experience of undergraduate and graduate students, and substantially grow the enrollment in these programs. We anticipate better serving 4H and FFA student contests and expanding outreach capabilities to statewide extension and land management agency constituencies.

FARM ANIMAL WELFARE AND BEHAVIOR TEACHING AND RESEARCH FACILITY

This area will allow for the development of an animal welfare and well-being training program that will encompass teaching, research and outreach. Currently there is limited focus on range beef cattle handling and welfare so this could be a landmark program. Areas of emphasis will include low-stress handling, animal welfare and behavior.

PROGRESSING AGRICULTURE AND LIFE SCIENCES FORWARD AT **NEW MEXICO STATE UNIVERSITY**

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and

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College of Agricultural, Consumer and Environmental Sciences

JUSTIFICATION, SUMMARY OF FACILITY NEEDS AND USES

Facilities proposed will significantly benefit at least three Colleges and 16 departments in addressing the Land Grant Mission and the Vision 2020 Strategic Plan of NMSU. The GO bond will enhance teaching, research and outreach while increasing student recruitment, retention and advancing STEM education. Each facility is unique and will benefit NMSU and the people of New Mexico. For the full fruition and impacts to be realized both phases of this project (i.e. GO Bond 2018 and 2020) need to be accomplished.

VISION 2020 GOALS AND AREAS OF SYNERGY WITH GO BOND 2018 AND 2020 PROPOSED FACILITIES:

1. ACADEMICS AND GRADUATION – The strategies to achieve this goal include recruitment and learning assessment. The new facilities proposed will aid in recruitment by upgrading the appearance of the west end of NMSU main campus. NMSU is among the last Land Grant Universities to maintain livestock and horses on campus, yet the facilities are in desperate need of renovation, modernization and replacement. ***Current facilities are outdated to the point that safety of students, employees and animals may become an issue.*** The College of ACES is recognized for excellence in student advising and we are eager to continue this tradition. There is also documented evidence and a university-wide effort to increase experiential learning by NMSU students. The proposed 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. According to a report released by the USDA's National Institute of Food and Agriculture and Purdue University, employers have 57,900 job openings in agriculture and related fields each year. However, just 35,400 students graduate annually with a bachelor's degree or higher in agriculture which adds up to a shortage of 22,500 agriculture graduates compared to the industry's needs.

2. DIVERSITY AND INTERNATIONALIZATION – The proposed meat and food science center will play a key role in supporting this goal on the outreach side of this equation. The Southwest Border Food Protection and Emergency Preparedness Center is working to develop an international food protection center promoting food safety and food defense principles and practices with Mexico while also serving New Mexico. Given the close proximity of NMSU to Mexico and the development of the Integrated Food Safety System in coordination with the Food Safety Modernization Act; we are well poised to be a leader in training of food producers in Mexico and the US. There will also be opportunities for dual degrees in food science, animal science and range science with collaborators in Mexico.

3. RESEARCH AND CREATIVE ACTIVITY – The three strategies to accomplish this goal are research collaboration, research capabilities and student research. All of the facilities proposed for the GO Bond 2018 and 2020 fully support this goal. The proposed biomedical research building and expansion of the animal physiology and metabolism capabilities will benefit NMSU. Animal research and animal research facilities are critical to the biomedical research enterprise. Animal species are used in every stage of the research and development effort — from discovery, to development and safety testing, to clinical trials, and to manufacture — because their biological systems, genetic structures and immunological responses, in various ways, closely mirror ours as a species. For NMSU, to elevate in regard to biomedical research this facility is critical to our success. Biomedical research at NMSU is currently valued at $2.9 million in grants and contracts and is well-known nationally and internationally. The addition of new and updated facilities with allow for greater success in proposal funding and an expansion of our research enterprise.

4. ECONOMIC DEVELOPMENT AND COMMUNITY ENGAGEMENT - Each year ~6,000 4-H and FFA students and their parents visit our college. Most weekends, numerous visitors walk through the campus farm looking at animals. These interactions serve as recruitment opportunities. Our facilities do not present the best university image to the community. Therefore, renovation/replacement of main campus livestock and animal care facilities should be included in the university request for the 2018 and 2020 GO Bond. The new proposed facilities specifically the Pavilion will increase our ability to engage the community of Las Cruces and also our stakeholders in New Mexico. The Pavilion is proposed to replace the Livestock Judging Pavilion and will provide a central location for various events ranging from youth events to Therapeutic Riding

(Continued on Page 18)

sessions. This is a facility that is lacking in this geographical area and could represent a profit center for the university as well as experiential learning in facility and event management for students in ACES. In addition to meeting the goals of NMSU the new facilities are also critical to economic development for the state of New Mexico.

Agriculture and agriculture products represent a significant portion of the state income and also represent an area with tremendous growth potential. According to Diemer et al. (2014), the combination of agriculture and food processing is an important part of New Mexico's economy. Together the two broad industries accounted for $10.6 billion (roughly 12.3 percent) of New Mexico's $86.5 billion gross state product (GSP) in 2012. In addition, the two industries directly created 32,578 jobs and 18,308 jobs in related support activities for a total of 50,886 jobs statewide. Agriculture alone accounted for $3.9 billion in sales at the farm/ranch level and an additional $2.1 billion in value-adding processing/distribution, marketing, financing and supporting services. Agriculture was responsible for a total of 41,961 jobs in New Mexico in 2012, including 26,924 jobs in production-related activities and an additional 15,037 jobs in processing/distribution, marketing, financing and supporting activities. Food processing alone accounted for $2.9 billion in products and an additional $1.7 billion in value-adding processing/distribution, marketing, financing and supporting services. Food processing was responsible for 8,924 jobs in New Mexico in 2012, including 5,654 jobs in production-related activities and an additional 3,270 jobs in processing/distribution, marketing, financing and supporting activities.

5. RESOURCE STEWARDSHIP – Improvements in proposed facilities will allow for greater capacity to generate revenue from a variety of options. For example, a modern, well-thought out feed mill will enhance efficiencies, reduce dust emission on campus and provide a safe environment. It will support not only livestock research but also the larger animals such as swine and sheep in biomedical research. Additionally, it will provide capabilities to investigate novel feeds, differing methods of feed processing and combinations of ingredients that would benefit research efforts, student training, and stakeholders in New Mexico. This facility will also serve the community by providing complete manufactured diets and supplements for use in 4-H and FFA projects as well as local production of livestock.

DISCOVER THE FUTURE

Together, the proposed facilities will enhance NMSU's teaching, research and outreach. These enhancements will advance STEM education, particularly within three colleges and 16 departments, while increasing student recruitment and retention. Each unique facility not only benefit NMSU, but also the people of New Mexico.

Rendering courtesy of Parkhill, Smith & Cooper

1 **Food Science Learning & Safety Facility**

2 **Feed Milling & Processing Facility**

3 **Biomedical Research Building - Phase 1**

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