

Capital Improvement and One-time Requests North Dakota Agricultural Experiment Station

Final Ranking by SBARE - Updated October 2021

NDSU NORTH DAKOTA AGRICULTURAL
EXPERIMENT STATION

Capital Improvement Requests

1. Agronomic, Pathology and Soils Field Lab Facility

REQUEST: \$70,000,000

Agriculture in N.D. generates \$8 to \$10 billion annually in gross receipts. The substantial majority (over 75%) of the gross agricultural receipts in N.D. are a result of crop production. Principle crops include spring wheat, soybeans,



(NDSU photo)

corn, sunflowers, canola, sugar beets and potatoes. Farmers, input suppliers, crop advisors and agribusinesses rely on research from the N.D. Agricultural Experiment Station (AES) to inform their decision making in a variety of areas including plant variety selection, disease management, soil fertility and health, along with many other aspects.

The current building (Waldron Hall) houses the field crops research laboratory on the Main Station and includes field and wet laboratories, seed dryers and cleaners and seed storage for more than 45 scientists, research support staff and graduate students from the Departments of Plant Pathology, Plant Sciences, Agricultural and Biosystems Engineering; and the School of Natural Resource Sciences. The current building was built in phases in the 1950's and 1960's field research efforts related to agronomy, soils and plant pathology. The current building was not built to house the number of scientists and support staff currently assigned to the building. The seed drying, cleaning and storage facilities in Waldron Hall are grossly insufficient because of the expanded number of research projects located in the building. The lack of dust handling in the seed cleaning areas poses a health hazard from mycotoxins and allergens to those working in the facility.

Expected benefits to the state of N.D. from this building include:

- Enhanced varietal development and plant breeding efforts to support varieties specifically suited for N.D. growing conditions.
- Enhanced use of proteins from pulse crops in a variety of applications in the food industry through improved protein content. The potential impact of fortifying just 5% of bakery goods with pulse proteins could mean a \$300 to \$600 million economic boost for pulse farmers.
- Improved response to crop disease threats which cost N.D. farmers hundreds of millions of dollars annually. Emerging disease threats identified in the past decade include clubroot of canola (2013), Goss' wilt of corn (2011), bacterial leaf streak of wheat and barley (2015), sudden death of soybean (2018) and frogeye of soybean (2020). Improved ability to manage saline and sodic soils which cost the state hundreds of millions of dollars in lost productivity annually.
- Enhanced ability to respond to and manage threats such as soybean cyst nematode which is the most economically important soybean disease worldwide. This pathogen costs N.D. farmers \$100 million annually in yield losses.

- Enhanced ability to manage fungicide resistance in plant pathogen populations. This is becoming an increasingly important problem for a variety of plant pathogens in the state including Cercospora leaf spot in sugar beets, frogeye in soybeans, Septoria in soybeans and Ascochyta blight in field pea, along with a variety of pathogens in potatoes.
- Improved nutrient use efficiency and better fertilizer and nutrient management. This has direct economic benefits to farmers through cost savings related to input purchases but also has far reaching effects for improved natural resource management and conservation.
- Enhanced economic opportunities for farms and ranches participating in carbon markets through a better understanding of carbon cycles in N.D. soils.

2. Livestock Facilities

TOTAL REQUEST: \$6,372,000

Carrington Research Extension Center (CREC)

Feedlot Research Support

Facility: Construction of a multi-use Feedlot Research Support Facility at the livestock unit would improve feedlot research operational capability, assist in sustaining Institutional Animal Care and Use Committee (IACUC) compliance, attain worker protection standards and reduce maintenance costs for equipment. The CREC has a critical need for



(NDSU photo)

a facility at the livestock unit that would combine a dispensary for processing and storing pharmaceuticals and animal health supplies; laboratory space for feeds, blood, fecal and tissue processing; inside tempered storage for daily use feeding equipment; and a shop area for tools, equipment and equipment maintenance and minor repairs. This facility has been a longtime priority project for the CREC. The CREC livestock program is the primary outstate program for beef feedlot research and evaluation of feeds and feedstuffs for beef production.

Feedlot Pen Expansion with Waste Containment: Meeting the expanding demands for feedlot research is partially limited by available pens. Current pens are fully utilized. The CREC is continually challenged to do more livestock nutrition research. However, feedlot pen availability is a clear limitation. The addition of a minimum of 12 pens that would hold up to 240 head of cattle would allow the CREC to conduct at least one additional experiment per feed-out period. Further, the additional pens will allow more treatments and replications within other feedlot studies, which would improve statistical confidence and precision. Any feedlot pen expansion must include the associated waste containment facilities to remain compliant with state law. The CREC livestock program is the primary outstate program with the mission for

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beef feedlot research and evaluation of feeds and feedstuffs for beef production. Beyond the ability to conduct additional experiments or evaluate more treatments with greater replication, the additional feedlot pens would be developed to expand the depth and speed of the ability to evaluate other factors that impact feeding livestock in N.D. These factors include minimizing animal stress, mitigating winter stress, managing influences on environmental concerns, beef animal efficiency and other issues that ultimately impact the viability of beef cattle production and feeding in the state.

Bulk Feed Commodity Storage Structure: A major program research responsibility of the CREC is to conduct research that evaluates how N.D.-derived feedstuffs may be most appropriately utilized in livestock feeding rations with focus on beef production. The research program utilizes many different types of feedstuffs including those that must be stored in bulk. Presently, feedstuffs such as distiller's grains, soybean hulls, ground hay/straw, etc. are stored outside on the ground, which exposes the products to the weather elements, soil contamination and mixture with adjacent products. Animal nutrition research is compromised when the feed products become degraded or contaminated. This addition will enable the research program to expand the variety and number of commodities utilized in feeding studies, improve precision of mixed rations and reduce feed product waste, lowering costs to both the CREC and farmers and ranchers who consign cattle to the studies.

Covered Feeding (Hoop barn or Mono-slope): The expansion of feedlot pens would be implemented in a manner that is conducive to future construction of a covered facility either in the form of a hoop barn or mono-slope. This would allow research to evaluate mitigation of winter and summer extremes on animal performance when compared to open lot production. Covered pens also will provide research data on changes to the waste and environmental issues that often challenge livestock agriculture.

Smart Feed Technology System: These systems allow for more intensive data collection and individual animal application of treatment rations. Feed intake is one of the main drivers of livestock performance. By increasing the abilities of CREC and collaborating researchers to more accurately measure intake and expand the depth of treatments applied within studies, more detailed information can be provided to area farmers and ranchers. Smart feed systems would increase opportunities to study issues to a greater scope and depth, thereby increasing competitiveness for grant funds to support the broader research program.

CREC Request: \$1,188,000

Central Grasslands Research Extension Center (CGREC)

The CGREC livestock facilities are in dire need of replacement. The existing space used as a support lab is small and inadequate to handle, prepare and test blood and tissue samples, particularly as the research portfolio at this center has increased recently. This proposed facility would complement the research activities that will be carried out in the new agronomy laboratory, thereby enhancing the two major research foci of this center. Livestock holding pens and sheds also are inadequate to address the research and outreach needs for the Coteau region of the state. Specifically, the development of replicated dry lot research pens would allow scientists to answer a broader range of questions relating to beef cow and calf management; a feed handling facility would improve the Center's ability to ensure diet accuracy and improve overall feed management; and a nutrient management/wastewater containment system is lacking and is needed to address possible health and pollution issues.

CGREC Request: \$2,017,440

Hettinger Research Extension Center (HREC)

HREC Livestock Processing and Research Support Facility: The HREC Southwest Feeders Feedlot cattle and sheep feedlot (24 pens with a capacity of 192 calves or 960 lambs) has provided significant research and outreach to support livestock agriculture in the state and region. Feedlot research results are annually published in refereed journals, the N.D. Beef Cattle Research Report and the N.D. Sheep Research Report, in addition to being the centerpiece for research-related livestock outreach efforts at the HREC. The current feedlot has a small (512 square foot) facility that does not support current research or outreach activities. The facility does not provide a secure area to store and administer veterinary supplies, an area for sorting animals into treatments and pens, an area to hold animals indoors for observation and sample collection or office space for the herdsman and has no restroom facilities. A multi-species processing and research support facility would greatly enhance the livestock research conducted at the HREC and expand AES research capabilities in beef cattle and lamb feedlot nutrition and management.

HREC Request: \$1,415,880

HREC Sheep Feed Efficiency Research Facility: Traditionally, high grain prices and volatile commodity prices have raised interest and emphasis on increasing the efficiency of sheep production during all phases of production (rams, ewes and feedlot performance). No facility exists in the northern Great Plains to evaluate feed efficiency in sheep production, but the HREC is well situated and established in the sheep industry to expand its research capabilities through a new facility that can monitor individual animal intake in a pen setting. Research would evaluate genetic potential of breeding stock (rams and ewes) that measures feed intake in relation to performance, as well as feedlot research to complement and provide additional replication to the large-scale trials conducted at the Southwest Feeders Feedlot at the HREC.

HREC Request: \$1,750,680

3. Equipment Storage Sheds

TOTAL REQUEST: \$2,450,000

Request: 7 Equipment Storage Sheds at the following locations: Main Station (Fargo), Dickinson REC, Williston REC, North Central REC, Langdon REC, Carrington REC and Central Grasslands REC.

Agricultural equipment is becoming more and more reliant on electronic and computer applications, sensor technology and other complex and sensitive devices which are embedded in the equipment. Proper storage of this equipment to protect it from the environment is vital to having it function properly and maintaining its' value. Investment in proper storage sheds ensures that the equipment lasts to the end of its' projected lifespan, reduces maintenance and repair costs and improves reliability.

Request: \$350,000 per shed