

House Bill 1020 Testimony

January 16, 2023

North Dakota Agricultural Experiment Station

Greg Lardy, Director

Good morning Chairman Monson and members of the Government Operations Division of the House Appropriations Committee.

My name is Greg Lardy, and I have the privilege of serving as the director of the North Dakota Agricultural Experiment Station.

The North Dakota Agricultural Experiment Station is the research and development agency of North Dakota agriculture. The scientists employed by our agency develop the solutions that meet the short and long term challenges faced by our state's agriculture through innovative and creative partnerships with a variety of entities. We seek to develop the technologies that help our farmers and ranchers adjust to changing market conditions, consumer preferences, disease threats, and a changing landscape of production scenarios. We work to provide things like more cost-effective feeding and grazing strategies for livestock, release plant varieties that are specifically suited for our unique growing conditions, and research-based solutions for a myriad of technological challenges faced by our farmers and ranchers. Our scientists help identify new uses for agricultural commodities, enhance marketing opportunities, and bring local solutions through our network of our seven Research Extension Centers that are located strategically throughout the state.

In December, we released the results of a study that quantified the contributions of agriculture to the state's overall economy and the

impact is significant. Agriculture contributes over \$30 billion annually to the state's economy. One in five jobs are directly tied to agriculture.

This morning, in addition to my testimony, you will hear from a number of grassroots users of our research programs. They will provide examples of how they are using our research daily, and how our research is leading to a brighter future for them, their families, their communities, and the state.

Agriculture touches every corner of the state of North Dakota. The impact is felt by businesses across the state, whether you are talking about a local elevator in Oakes, a livestock auction barn in Bowman, a soybean crush plant in Casselton, a precision agriculture software company in Fargo, or an insurance agency in Minot.

As Chairwoman Lovas mentioned, SBARE has listened carefully to the needs of the state's citizens through a series of listening sessions and dialog regarding the programmatic and capital improvement priorities for the North Dakota Agricultural Experiment Station.

SBARE had lengthy discussions about state employee compensation and how vital this is to recruiting and retaining top talent. An adequate compensation package will help recruit and retain the highly skilled educational staff needed to deliver highly effective and impactful educational programs to our state's citizens. The competition for labor, skills, and talents is fierce. We need your assistance in ensuring we have a compensation package that helps attract personnel to our career opportunities and one that helps retain the top talent that works tirelessly in our organization.

SBARE's responsibilities in Century Code include setting the programmatic and budgetary priorities for the agency. They have identified several critical needs including:

Agency Needs

1. Plant Production and Protection Initiative. Crops and cropping systems account for more than 80% of the gross agricultural receipts in North Dakota. Each year, new challenges and research questions emerge, especially related to crop rotations, agronomic practices, varietal selection and disease. Crop rotations in North Dakota are diverse and complex, and new and emerging diseases continually arise. These needs include:
 - a. Research that addresses agronomic conditions in western North Dakota at the Dickinson Research Extension Center (REC).
 - b. More emphasis on plant breeding, especially with pulse crops, is needed as pulses have become an increasingly important part of crop rotations throughout the state.
 - c. Over the past 20 years, over 20 new plant diseases have arrived in North Dakota. Several are caused by bacterial plant pathogens that are now major diseases on the crops they affect.
 - d. Request: Seven FTEs total. One agronomist at the Dickinson REC, one plant bacteriologist and one plant bacteriologist technician, one plant virologist and one plant virologist technician, one pulse breeding technician, and one technician for clubroot fungus at the Langdon REC. \$120,000 in operating support. Total: \$1,580,000
2. Operating Support.
 - a. Operating support is requested for the Oakes Irrigation Research Site (OIRS), which provides important research on irrigation strategies, high-value crops, and farming practices

in southeast North Dakota. The additional operating support will ensure the OIRS maintains its critical research activities.

- b. Scientists have become progressively more reliant on grant funds to conduct research. Administrative support staff dedicated to assisting scientists to identify sources of grant funds, navigate complex submission requirements and gather paperwork would improve efficiency and increase the ability of our scientists to identify, submit and compete successfully for grant funds.
 - c. Graduate students enhance research programs by providing key labor to complete research activities, collect field data and conduct various analyses associated with research projects. Graduate students also enhance collaborations between the main campus, and the REC network by providing a vital link between scientists.
 - d. Request: Three FTEs total. Three FTEs will provide administrative support for grant development work, \$594,000. Graduate student funding to hire graduate research assistants (no FTEs), \$720,000. Operating support for Main Station and RECs, \$480,000. Operating support for the Oakes Irrigation Research Site, \$400,000. Total: \$2,194,000
3. Big Data Initiative. This initiative was partially funded by the 67th Legislative Assembly. Thank you for your support of this initiative. Agricultural research activities have become much more data intensive.
- a. The demand for data storage, management and analysis within agriculture and food production is greatly needed to provide farmers and ranchers with meaningful management outputs.

- b. The North Dakota Agricultural Weather Network (NDAWN) is a mesonet of more than 150 stations and generates a tremendous amount of data multiple times per hour. Additional resources are needed to modernize the IT network for NDAWN and make it more functional.
 - c. Request: Three FTEs total. One-and-a-half FTEs to support research related to data analytics, management and curation; one-and-a-half FTEs to support enhancements to NDAWN. \$200,000 in operating. Total: \$838,000
- 4. Climate Smart Agriculture. There is little room for error in producing a crop during a “typical” North Dakotan growing season, and extreme variability exasperates this challenge of producing a successful crop. For example, the harvest of 2019 was the wettest autumn since 1895 and resulted in prevent plant enrollment of 3.7 million acres in 2020. This record wetness was then followed by one of the worst droughts experienced in North Dakota during the 2021 growing season. Climate Smart Agricultural (CSA) practices provide land management strategies to help deal with such extremes, and research is needed to implement strategies that enhance resiliency for North Dakota farmers and ranchers.
 - a. Farmers need science-based information that helps them realize the benefits of Climate Smart Agriculture practices and the potential economic benefit from private sector carbon markets.
 - b. Request: Two FTEs total. One climate smart agricultural scientist, and one climate smart agricultural technician. \$40,000 in operating. Total: \$458,200.
- 5. (Tie) Bee and Apiary Research. North Dakota is the number one producer of honey in the United States. As a state, the total

number of bee colonies is 495,000 or 18% of all colonies in the United States. These colonies contribute to 26% of all honey produced nationally, which is valued at approximately \$67 million. Although North Dakota produces more honey than any other state, we do not have a research program supporting beekeepers.

- a. North Dakota honey producers need apiary research to address pressing issues such as colony collapse and improved honey production by developing greater winter hardiness, improved mite resistance, and increased hygiene. Research can improve interactions with other agricultural systems of the state while benefitting native pollinator populations and ecosystem services through improved land use.
- b. Request: Two FTEs total at the Hettinger REC. One bee and apiary scientist, and one bee and apiary research technician. \$40,000 in operating. Total: \$458,200.

6. 5. (Tie) Precision Agriculture

- a. The need for intelligent systems, such as sensors, artificial intelligence, robotics and automation, is greatly increasing across all aspects of agriculture, from farm to plate. Additional resources can provide researchers with equipment and tools needed to build capacity and incorporate advanced agriculture applications for improving cropping systems and livestock farms and ranches.
- b. Request: \$600,000 in operating. Total: \$600,000

We are grateful to the 67th Legislative Assembly for their support of capital improvement projects at the REC's during the regular and special session in 2021. I probably don't need to tell you that it has been an exceptionally difficult bidding climate over the past 18 months. Supply chain issues, labor shortages, and inflation in every sector of the

construction industry has resulted in a very challenging situation. On Pages 49 to 53 in the budget book, you will find a list of capital improvement projects funded in 2021, and their status to date. You'll note that there are several where we were unable to get any contractors to bid on the projects, several where the bids came in over our projected budget, and only a handful where we had a successful bid and are able to move forward. We are asking for your consideration of extending the timeframe to complete projects and additional resources to bring them to fruition. Dr. Schauer, Director of the Hettinger Research Extension Center will also be mentioning more about a potential land purchase request for the Hettinger REC in his testimony.

SBARE also ranks the capital improvement project needs for the ND Agricultural Experiment Station. A summary of these capital improvement project requests is included in your budget book on Pages 47 and 48.

1. Field Lab Facility. Field agronomic, plant disease and soils research address the pressing questions and important issues needed by North Dakota farmers. Unfortunately, the current field facilities used by scientists are no longer adequate to address these critical research needs. Waldron Hall, Widakas Laboratory, the Potato Research Laboratory, and the Horticulture Laboratory were all built between the 1940s and 1960s. Modernizing field facilities will allow researchers to address agriculture's needs with improved access to varieties that are adapted to the climate of North Dakota, better fertility recommendations, improved weed control, and improved responses to plant disease challenges.
 - a. A modern field laboratory requires space that facilitates collaborations between scientists and their teams, is safe, eliminates contamination from soilborne and insect pests, and provides better processing, cleaning and storing of seed.

Additionally, this facility must support research in tuber and root crops, such as potato, and horticulture, including controlled-environment growing rooms that allow precise environments for plant development.

b. Request: \$97,000,000

2. AES Equipment Storage Sheds. The 67th Legislative Assembly supported the construction of one machine shed at the Hettinger REC. Thank you for your support of this effort. Expensive field equipment is an investment that the AES needs to protect. Storing expensive research plot equipment such as tractors, planters, and combines outdoors reduces the life of the equipment and can compromise the sophisticated electronics typically used on such equipment.

a. Request: Seven sheds (\$475,000 per shed). Total:
\$3,325,000.

3. Nesson Valley Facility. A facility is needed for office and lab space, a heated shop, and a conference room at the Nesson Valley Irrigation site located 27 miles from Williston. The irrigation research staff currently uses a small office in a building used to store pesticides, other equipment, and operating items. This facility would support ongoing efforts related to irrigation and high-value crops as well as support the expansion of irrigation, food processing and livestock sectors in western North Dakota.

a. Request: \$1,700,000

4. Precision Agriculture Facility. A facility that would support precision agriculture activities across the entire North Dakota Agricultural Experiment Station is needed to integrate advanced research in precision and advanced agriculture.

a. Request: \$55,000,000

5. Dairy Barn

- a. The last time the 1940s era NDSU dairy barn was updated was in 1978. The current unit needs substantial renovation to the cow barn to update it with robotic milking, automatic calf feeding, improve worker safety, and increase animal care.
- b. Request: \$1,700,000

One time Requests:

1. Deferred Maintenance

Request: \$1,440,465

2. Equipment for an Ag Biotech Innovation Core. Microbiological sciences can best contribute to the future of North Dakota agriculture through the development of microbial inoculants and the microbial valorization of agricultural residues. Broader research interests exist across the NDAES surrounding the microbial transformation of agri-food products and bioproducts.

Funding would be used to purchase laboratory equipment needed to establish a core biotech facility. Equipment needed includes an array of bioreactors to support high throughput and scale-up experiments and metabolomics equipment including a GC MS/MS mass spectrometer.

Request: \$1,000,000

On Page 63 in the budget book you will find a financial schedule that details our base budget. On Page 77 you will find Governor Burgum's executive budget recommendation related to the SBARE initiatives. At this time, I will walk through what he has included in his budget recommendation for our agency.

The North Dakota Agricultural Experiment Station works to provide timely solutions to the wide variety of challenges faced by the state's farmers and ranchers. These solutions are an investment in the future of North Dakota and provide a return on investment through improved yields, enhance productivity, better milling characteristics in grains that leads to enhanced consumer acceptance and market opportunities, improved livestock performance, and more cost-effective input solutions. Most importantly, these solutions provide a means to enhance the state's economy, and improve the economic condition of our communities, large and small, across the state. In short, when we provide research-based solutions, farmers, ranchers, and agribusinesses are more profitable, and they reinvest those dollars locally.

Here are just a few examples of our impacts:

- Livestock exercise and diet improves pregnancy outcomes of mother and offspring, like improved colostrum quality in milk that ensures newborns get vital antibodies necessary for fighting disease.
- Veterinary pathologists performed foreign animal disease testing for highly pathogenic avian influenza as part of the USDA National Animal Health Laboratory Network.
- Microbiologists studying plant root microbiome developed a novel tool to identify nitrogen-fixing rhizobia in fields, providing a way to evaluate inoculants necessary for improved crop yields.
- New plant varieties developed by NDSU can realize an almost \$70 million increase in annual revenues to North Dakota's economy. A new low cadmium durum wheat was released, and the NDSU Dakota Russet was selected by McDonalds as one of only seven varieties for their French fries.

- Pathologists advanced crop protection through new chemistries, new tools, and monitoring for new diseases. Collaborations fostered the development of new chemistries, and improved application timing and amounts.
- New models were implemented in the North Dakota Agricultural Weather Network that provide pest emergence predictions, like for the sugarbeet root maggot that can cause up to 45% yield loss.
- Precision agriculture projects advanced fertilizer efficiencies and the control of weeds. On-the-go optical sensors measured in-season plant nutrient status and prescribed fertilizer delivery to improve nitrogen use efficiency.
- Rangeland scientists determined conservation reserve programs for North Dakota grasslands increased grassland bird abundance by 2-7% and increased beekeeper revenue by \$30 per acre. They also developed unique grazing strategies to simultaneously increase pollinator habitat and livestock forage quality in rangeland ecosystems.

Thank you for your support of our agency. At this time, I would be happy to answer any questions you may have.