North Dakota Agricultural Experiment Station

NDSU Extension Service

NORTH DAKOTA STATE UNIVERSITY

2015-2017 Biennial Budget Request

OMB Budget Meeting

Oct. 8, 2014

NDSU Extension Service - Budget No. 630

North Dakota Agricultural Experiment Station
- Main Station - Budget No. 640
- Branch Research Extension Centers - Budget No. 628
- Agronomy Seed Farm - Budget No. 649

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NDSU NORTH DAKOTA STATE UNIVERSITY

Agency Overview

NDSU Extension Service

Agency Statutory Authority

North Dakota Century Code Chapter 4-08.

Agency Description

The North Dakota State University (NDSU) Extension Service is part of a nationwide, university-based educational system that provides research-based educational programs to citizens in all 53 counties and four American Indian reservations in North Dakota. Programs focus on selected needs and issues affecting the state's agriculture, youth, families, communities and natural resources. The staff is located at state, area and local/county offices. The NDSU Extension Service combines funding from federal, state, county and grant sources to specifically address local concerns.

Agency Mission Statement

The purpose of the NDSU Extension Service is "to create learning partnerships that help youth and adults enhance their lives and communities." This purpose is accomplished through the dissemination of research-based information and the implementation of educational programs geared to the changing needs of North Dakotans. Major program areas include agriculture and natural resources; youth development; family and consumer sciences; and community economic development and leadership.

Agency Performance Measures

Per North Dakota Century Code 4-05.1-19, the State Board of Agricultural Research and Education (SBARE) presents a status report to the budget section of the Legislative Council. SBARE's most recent presentation to the budget section was on March 12, 2014. The report they gave and provided in written form included the status of the North Dakota Agricultural Experiment Station and the NDSU Extension Service. A copy of the information is on file in the Legislative Council office.

Agency Future Critical Issues

Areas that need continued emphasis and emerging issue areas that need to be addressed include livestock industry support to optimize management practices, implementation of precision agriculture, enhanced technological capacity for Extension delivery of information, and technical support to increase the efficiency of agricultural specialists; educational programs on informed decision-making and community-based leadership for communities impacted by either oil development or population loss; increased education to address chronic disease prevention, consumer education on food systems, and food safety; increased educational capacity to address ND water quality issues; youth development through expanded 4-H efforts in leadership education and agri-science and technology; recruitment and retention of Extension employees in the high-cost oil-producing counties; and increased operating.

NDSU EXTENSION SERVICE

NDSU EXTENSION SERVICE

2015-17 Program Initiatives as Ranked by SBARE

1 Agricultural Programs and Capacity

Situation: For agriculture to maintain its cutting edge, increased Extension capacity is needed in livestock, precision agriculture and support infrastructure. The livestock industry of southwest North Dakota lacks educational support on forage resources for backgrounding and other management practices. In precision agriculture, producers need assistance with management of large quantities of data and integration with financial decisions. To meet increased demands of delivering information in a variety of media, Extension needs increased technological capacity. Specialists need increased technical support to efficiently program in the departments of Animal Science, Soil Science, Plant Pathology and Plant Sciences.

Need: Area livestock specialist-HREC (1.0 FTE) and operating; Extension precision agriculture economist (1.0 FTE) and operating; increased operating support for Extension's technology infrastructure; Extension fellows (3.75 FTE) for increased support of specialists - $1,285,000

2 Community Vitality

Situation: The social, environmental and economic well-being of many North Dakota communities is in danger if communities do not take steps to shape their own future. The unprecedented growth is driving the demand for Extension assistance in community development. Community-based issues can be addressed more effectively through community-based leadership, public dialogue, planning processes, organized public forums and informed decision making. Specialists can develop programs and utilize agents to bring educational programming to local communities. North Dakota's farm and ranch owners also have a critical need to begin transition/succession planning. One of the three requested specialists will focus on transition and succession planning programs.

Need: Area community vitality specialists (3.0 FTE) and operating - $780,000

3 Food Systems and Health

Situation: North Dakota needs healthy people and communities, including farm/ranch families. Educational programs can enhance health by targeting chronic disease prevention, food systems consumer education and food safety, including education on the Food Safety Modernization Act. Extension is uniquely positioned to address each of these needs with factual information and to leverage its strong partnerships with health organizations and specific community-based task forces to meet local needs. Area specialists (east and west) will provide leadership to address these needs. A salary pool will increase our capacity for county agents to provide local programming.

Need: Area food and health specialists (2.0 FTE) and operating funds, and a salary pool to increase local county programming - $720,000

4 Water Resources

Situation: Water is extremely important for the life of all North Dakotans, such as water quality for livestock, drinking water quality in homes, impacts of saltwater spills, and best management practices to prevent nutrient movement to surface water. A water specialist is needed to provide educational programs and information to assist land owners and citizens to make informed decisions when using and protecting our precious water resources.

Need: Extension water specialist (1.0 FTE) and operating funds - $310,000

Details on other unranked Extension needs are available upon request.

DETAILS:
2015-2017 Program Initiatives as Ranked by SBARE

NDSU Extension Service

1. Agricultural Programs and Capacity

$1,285,000 Total General Fund Increase

1.0 FTE Area livestock Extension specialist – HREC **$200,000**
Operating **$80,000**

Southwest North Dakota is experiencing a major reduction in land enrolled in the Conservation Reserve Program (CRP). Frequently these lands were used as emergency hay lands for livestock producers during drought and now those emergency hay supplies are no longer available. The calf backgrounding industry expanded rapidly in the early 2000s based on the availability of forage, but that has changed. An area livestock specialist is needed to assist the industry with education on untapped forage resources for calf backgrounding and other livestock production issues in the southwest. This position will also provide the first and only Extension area specialist position at the Hettinger REC.

1.0 FTE Extension precision agriculture economist **$230,000**
Operating **$80,000**

Precision agriculture describes a multitude of technologies that crop and livestock producers can employ to improve their productivity through site-specific farming or managing livestock at a sub-herd or individual level. These technologies include variable rate planting and fertilizer applications, site specific hybrid and variety planting, and remote pest and crop monitoring. For farmers and ranchers to profitability use these technologies, they need to understand the costs and benefits of the technology and be able to effectively manage the amount and types of data in making management decisions. An Extension precision agricultural economist will develop and provide information, educational programs and decision support tools to address these needs.

Extension infrastructure operating support **$320,000**

Reliable, accurate, research-based information is the basis for sound crop and livestock production and resource protection decisions. This has been the hallmark of the NDSU Extension Service. Technology can enhance how people manage and receive the information that they need to be successful and profitable. New information-sharing technologies like apps, YouTube videos, embedded computer programs and social media have greatly expanded the opportunities and needs for Extension to use these techniques to supplement our delivery of programs and information. However, we lack the internal capacity to enable our specialists and agents to fully harness these technologies. These technologies will not replace the need for Extension agents and specialists to interact directly with people, but this added capacity will improve the quality and quantity of advanced technology used to meet consumer expectations.

3.75 FTE Extension fellows **$375,000**

The responsibilities of NDSU Extension specialists are highly demanding because they often cover numerous crops or multiple program areas. In addition, they frequently need to conduct applied research and field demonstrations to generate and disseminate the information needed by their North Dakota clientele. To effectively and efficiently use the specialized talents of these specialists, they have a need for technical support for their applied research and in developing materials for their educational programs. Furthermore, NDSU Extension recognizes the need

to train the next generation of Extension state and area specialists and agents with individuals who are experienced in Extension. To fulfill these three needs, Extension fellows are requested to support specialists in the departments of Animal Science (0.75 FTE), Soil Science (1.5 FTE), Plant Pathology (0.75 FTE) and Plant Sciences (0.75 FTE). The fellowships will be 0.75 time positions with the expectation that they work on their graduate degree while providing technical support to their specialist's Extension program. At the completion of their degree in three to six years, their position will terminate and the fellowship will be used to recruit a new fellow.

2. Community Vitality

$780,000 Total General Fund Increase

3.0 FTE Area community vitality specialists	**$600,000**
Operating	**$180,000**

The social, environmental and economic well-being of many North Dakota communities is in danger if communities do not take steps to shape their own future. Energy growth in the west poses multiple farm, ranch, business and community challenges due to rapid growth while many other small towns are suffering from record population and service losses. Unprecedented growth in North Dakota is driving the demand for Extension assistance in community development along with population forecasts, impact studies and resource impacts. Community-based issues can be addressed more effectively through community-based leadership, public dialogue, planning processes, organized public forums and informed decision making. Specialists will develop programs and utilize agents to bring educational programming to local communities.

One of the most significant community concerns is the rapidly changing landscape of farm owners and operators. Less than 50% of farm and ranch families have a will, much less a transition plan. Without proper planning, they will not pass the land to the next generation. This threatens the fabric of many small communities in North Dakota. North Dakota's farm and ranch owners have a critical need to begin transition/succession planning. One of the three requested specialists will focus on transition and succession planning programs for the state, and lead Extension's efforts to assist families with developing their strategic plan and being prepared to work with professional advisors to complete their plans.

3. Food Systems and Health

$720,000 Total General Fund Increase

2.0 FTE Area food and health specialists	**$400,000**
Operating	**$120,000**
Salary pool to increase local county programming	**$200,000**

North Dakota needs healthy people, communities and agri-business, including farm/ranch families. More specifically, three key aspects emerge as needs for North Dakotans: nutrition and wellness, food-systems consumer education, and food safety. Chronic disease prevention education will be successful when based on solid nutrition and wellness education. NDSU Extension Service is uniquely positioned to foster access to healthy physical activity and nutrition environments, offer chronic disease prevention education throughout the state, and to leverage its strong partnerships with health organizations and specific community-based task forces that form to meet identified local needs.

Consumers, even in North Dakota, are often disconnected from the source of their food and are confused by misinformation about GMOs, organic foods and other food claims. Existing Extension programs are factual and successful but very limited in reach. Increased capacity of Extension educators is needed to address the disconnection between consumers and the agriculture industry.

Despite the rising numbers of foodborne illnesses in ND, NDSU Extension has no funded position in food safety to respond to the growing demand for education. Nationally there is a strong

emphasis in this area and evidence of how one outbreak can destroy a food business. The Food Safety Modernization Act will significantly increase the pressure for education, and North Dakota producers and consumers will require more support.

4. Water Resources

$310,000 Total General Fund Increase

1.0 FTE Extension water specialist	**$230,000**
Operating	**$80,000**

Water has been and will continue to be an extremely important aspect for the life of all North Dakotans. However, many questions are being asked on topics such as water quality for livestock, drinking water quality in homes, impacts of saltwater spills, best management practices to prevent nutrient movement to surface water, and how water can be used efficiently in new local foods ventures. Educational programs and information are needed to assist land owners and citizens to make informed decisions when using and protecting our precious water resources. The resulting water quality educational program will work in cooperation with conservation groups and state regulatory agencies.

NDAES
Main Research Station

Main Research Station

North Dakota Agricultural Experiment Station

Agency Statutory Authority

ND Constitution Article XIX; North Dakota Century Code Chapter 4-05.1.

Agency Description

The North Dakota State University Main Research Station is located on the campus of the North Dakota State University of Agriculture and Applied Science. The station is the administrative location of the North Dakota Agricultural Experiment Station. The station conducts research and coordinates all research activities of the Agricultural Experiment Station. The purpose of the research is the development and dissemination of technology important to the production and utilization of food, feed, fiber, and fuel from crop and livestock enterprises. The research provides for an enhancement of economic development, quality of life, sustainability of production, and protection of the environment. The Main Research Station keeps detailed records of all activities and publishes the information that will be of value to the residents of this state.

Agency Mission Statement

The agricultural experiment station shall develop and disseminate technology important to the production and utilization of food, feed, fiber, and fuel from crop and livestock enterprises. The research must provide for an enhancement of the quality of life, sustainability of production, and protection of the environment.

Agency Performance Measures

Per North Dakota Century Code 4-05.1-19 the State Board of Agricultural Research and Extension (SBARE) presents a status report to the budget section of the legislative council. SBARE's most recent presentation to the budget section was on March 12, 2014. The report they gave and provided in written form included the status of the North Dakota Agricultural Experiment Station and the NDSU Extension Service. A copy of the information is on file in the legislative council office.

Agency Future Critical Issues

The NDAES continues to focus on developing an infrastructure in which to do quality research. Shortfalls occur in laboratory research facilities, especially those for plant-based field research laboratories at the Main Station. Cereal and grain quality laboratories, critical to maintaining and enhancing quality parameters for new crop varieties, are in desperate need of renovation/replacement. Developing separate laboratories for quality evaluation of transgenic experimental breeding lines also is required, due to the separation of transgenic material required by Federal policies on transgenic material. Laboratory space at the Main Station needs to be renovated/enhanced in order to carry out both applied and fundamental research on crops and livestock. Disease evaluation by the Veterinary Diagnostic Lab is critical for our livestock industries to thrive, yet this facility is in jeopardy of losing accreditation due to its deteriorating condition. Similarly, the Meat Science laboratory, built in the 1950's and last renovated in 1970's is in very poor condition. A new facility is needed to

allow our scientists to carry out cutting-edge research in meat quality, meat science, muscle quality and physiology. The new facilities, specifically the new agronomy labs at the RECs, as well as the AES greenhouse and the new animal research complex at the Main Station, have had strong positive impacts on the ability of NDAES scientists to carry out high quality research in these state-of-the-art facilities. New technologies in crop development will provide novel methodology to incorporate disease, insect, and environmental stress resistance, thereby improving the overall adaptation of our many crops grown in the state. Our scientists travel farther each year in the state to conduct site-specific research to control wheat and barley scab (an ongoing problem) and other important yield-limiting diseases of crop commodities grown in the state. Addressing new issues, such as wheat stem sawfly, new races of existing diseases for which these is little resistance, and identifying and responding to livestock producer concerns over outbreaks of zoonotic diseases are fundamental to the mission of the NDAES. Major problems occur in acquisition of costly field and laboratory equipment that cannot be obtained through grants. NDAES has insufficient laboratory space to meet the needs of 21st Century agriculture. North Dakota is becoming increasingly urban, and urban populations require some products and services that are different than those needed by livestock and crop producers. Continual efforts to improve horticultural research are occurring, and NDAES is actively evaluating new research and demonstration programs in this area. Enhanced efforts in areas including, but not limited to, food safety, food security, natural resources management, new bioproducts (including fuel) need to continue in order to allow NDAES to serve this segment of agriculture well. A systems approach for livestock research, literally from conception to consumption, is identifying ways to better serve this important sector of the North Dakota agriculture. Our strength is in our scientists and staff, but they are too few to cover all of the critical issues facing North Dakota agriculture, and the lack of adequate numbers precludes important scientific achievement. While we are proud to provide a high level of applied research that is readily transferred to our stakeholders, some areas of fundamental research have become important to improve the efficiencies of our plant and animal-based applied research. Genomics, bioinformatics, and epigenetics all have their basis in fundamental research, but they provide products and expertise to enhance plant breeding (through genomic selection, marker-based selection) and livestock genetics (evaluating environmental influences on genetic expression). For some units, additional technical support would significantly increase productivity of researchers. Scientists are responsible for attracting external funding, and their success during this biennium is impressive; however, the effort to write more, and larger, grants is apparent, and we have concern that significant research efforts at the Main Station and the RECs rely almost exclusively on extramural funding. Economic realities often place the NDAES in a position of responding rather than being proactive in effecting positive change. Our efforts to develop close collaborative relationships with industry and other scientific organizations will help allow the NDAES to become more proactive in solving problems critical to the state's largest industry.

NDSU NORTH DAKOTA AGRICULTURAL EXPERIMENT STATION

2015-17 Program Initiatives as Ranked by SBARE

1 Bioinformatics

Situation: Bioinformaticists utilize sophisticated computer programs to identify the appropriate genetic codes responsible for desired traits by analyzing extremely large data sets. This important task is a bridge from geneticists to plant breeders and other researchers, with the ultimate goals of enhancing the efficiencies of plant breeding programs, understanding the genetics of disease and insect pests, and increasing the knowledge base in animal genomics.

Need: (3.0 FTE, Main Station) - $1,200,000

2 Precision Ag

Situation: Developing Unmanned Aerial System (UAS)-precision agricultural systems would offer agriculturalists in the state and nation increased opportunities to manage their resources for maximum profit. UAS technology, coupled with other precision ag technologies such as GPS instrumentation, variable rate technology, fertilizer placement options, soil and crop sensors, complemented with ground-based research on the large number of crops grown in the state, will provide needed momentum for N.D. to become a leader in the field, given that N.D. was designated as a Federal test site.

Need: Increased funding for operating; scientist and technician (2.0 FTE, Main Station) - $2,910,000

3 Enhancing Research Infrastructure for Greater Research Efficiencies and Effectiveness

Situation: Research costs continue to escalate throughout the AES. This increased cost hampers the ability of scientists to carry out their research mission, reduces their ability to hire students, and limits their ability to purchase and utilize the necessary equipment that will allow them to carry out their research for the benefit of North Dakota.

Need: Additional funding for the Revolving Equipment Funds (Main Station and REC), additional GRA support (Main Station) - $1,900,000

4 Risk and Trade

Situation: Center for Ag Policy and Trade Studies (CAPTS) - The Center is the premier agricultural policy center in the region, currently evaluates state, domestic, and international policies that affect demand-supply of grains and net farm income. Analyzing farm policy and providing timely information relevant to the state's agricultural industries have been important to crafting farm policies beneficial to the state and addressing issues to increase competition of N.D. agriculture. **Risk Management -** Risk in agriculture has increased three to four times since 1980 and will continue to grow in importance as a management strategy, given the wide fluctuations in yield, prices, input costs, availability of crop insurance, land costs, and food safety. With the mix of crop commodities in the state (and the importance of these commodities), the need to develop risk management strategies is critical. The Commodity Trading Room provides a research lab for marketing information for farmers and outreach groups.

Need: Policy and trade issues research scientist, risk management support staff; increased funding for operating (2.0 FTE, Main Station) - $420,000

5 Enhancing Research Capacity at the RECs

Situation: The RECs play a very important role in carrying out applied research in the Agricultural Experiment Station. The addition of one technical support staff position in livestock research at Hettinger REC will greatly enhance research productivity and ease the burden of the only animal scientist at the Center, who also serves as Center Director. Dust created by extensive truck traffic servicing the oil industry in N.D. has led to a number of crop and livestock issues on farms and ranches in the Oil Patch. One technical support staff position located at Dickinson REC would allow scientists at the Main Station and other Centers to carry out research in the affected area to reduce the adverse effect of dust on crop and livestock productivity. Two new technical support staff positions at Carrington and Dickinson RECs in livestock research will enhance our research productivity using two vastly different systems for livestock production. The confined cow/calf research effort at CREC is known nationally for its research on a unique and profitable management system; similarly, the unique management opportunities in the short grass prairies of western N.D. are known in similar areas of the world, where livestock in semi-arid environment are important. New technical support staff are critical to expanding our livestock research enterprise. Western N.D. has seen an increase in the number of crops grown in the area in recent years. These crops are not without disease challenges, yet the closet plant pathologist in located at Carrington REC. A team of a plant pathologist and one technical support staff will allow the NDAES to provide expertise in plant pathology and disease management to farmers located in western ND and to address all of the crops that are "new" to the region.

Need: Technical support staff (1.0 FTE, HREC), (1.0 FTE, DREC), (2.0 FTE, CREC, DREC); scientist and technical support (2.0 FTE, WREC); increased funding for operating (all 7 RECs) - $1,270,000

2015-17 Program Initiatives as Ranked by SBARE (continued)

6 Genetics and Genomics Initiative

Situation: Epigenetics is the study of genetic expression modified by external environmental influences. Genetics of an organism codes the potential of the organism – the external environment affects the expression of many genes that influence final phenotypic expression of the organism (e.g., diet of the parents affecting carcass quality of the offspring). Understanding these external influences on gene expression may allow for enhanced benefits and profits to the livestock industry. **Statistical genomics** uses statistical methodologies to determine genetic linkages and markers beneficial to crop improvement programs. Statistical genomics works with bioinformaticists to interpret the data to meaningful information for use by plant breeders and geneticists for desired traits. **Metagenomics** is the method to study contributions the microbiome makes toward plant, animal, and soil health. It is the interaction of microbial genomics with plant and animal genomics, which may lead to greater efficiencies, less disease, and a greater understanding of epigenetic factors.

Need: Epigenetics scientist and technician (2.0 FTE, Main Station); statistical genomics scientist and support staff (2.0 FTE, Main Station); metagenomics scientist and technical support (2.0 FTE, Main Station); increased funding for operating - $1,305,000

7 Livestock Research to Enhance Productivity and Profitability

Situation: Microbiome Initiative - The microbiome is the ecological community of commensal, pathogenic, and symbiotic microorganisms that impact livestock production. Animal scientists will study the role of the microbiome in nutrition, disease, and environmental impact and, ultimately, human health. **Forage Nutrition -** Forage and hay represent the greatest amount of nutrition received by beef cattle in North Dakota. Differences in the nutritional quality of forages and hay affect growth, development, and productivity of individual animals, thereby affecting profitability of the livestock producer. Developing a program in forage nutrition can assist producers throughout the state on improving forage quality and potentially increase profitability. This will complement existing programs in forage management, nutrition management, and range management.

Need: Microbiome scientist and technical support (2.0 FTE, Main Station); forage nutrition scientist and technical support (2.0 FTE, Main Station) - $710,000

8 Food Safety/Global Institute for Food Security and International Agriculture

Situation: Food safety and security are identified as among the most significant topics globally. Each nation is concerned about food security – a food supply to nourish the citizens of a specific country, safe from environmental or created catastrophes, terrorism, and trade disputes. Similarly, food that is free from contamination and is safe to consume is critical to ensure the health of a country's citizens. Food Safety involves research collaboration across disciplines and Extension. The AES has several established food safety research collaborations and seeks to expand its capabilities to enhance the efforts of the new global institute.

Need: Increased funding for operating (Main Station) - $500,000

9 Soil Health Research Support

Situation: The rise of the oil industry in western N.D. may have long-term impacts on land quality, which may reduce agricultural productivity. Brine spills and soil compaction have reduced land quality and crop productivity in western North Dakota.

Need: Increased operating to build upon the Soil Health Initiative supported in the 2011-13 Legislative Session (Main Station) - $150,000

DETAILS:
2015-2017 Program Initiatives as Ranked by SBARE

North Dakota Agricultural Experiment Station

1. Bioinformatics

$1,200,000 Total General Fund Increase

$1,200,00 salary and fringe benefits, 3.0 FTE – Main Station

Bioinformatics is the utilization of very large data sets generated by genetic analyses. Bioinformaticists utilize sophisticated computer programs to identify the appropriate genetic codes responsible for desired traits by analyzing extremely large data sets. This important task is a bridge from geneticists to plant breeders and other researchers, with the ultimate goals of enhancing the efficiencies of plant breeding programs, understanding the genetics of disease and insect pests, and increasing the knowledge base in animal genomics.

2. Precision Ag

$2,910,000 Total General Fund Increase

$355,000 salary and fringe benefits, 2.0 FTE scientist and technician – Main Station
$2,555,000 increased funding for operating

Developing UAS-precision agricultural systems would offer agriculturalists in the state and nation increased opportunities to manage their resources for maximum profit. UAS technology, coupled with other precision Ag technologies such as GPS instrumentation, variable rate technology, fertilizer placement options, soil and crop sensors, complemented with ground-based research on the large number of crops grown in the state, will provide needed momentum for ND to become a leader in the field, given that ND was designated as a Federal test site. Operating funds to be used as source for in-house competitive grants, fostering teams across disciplines at Main Station and with other state entities, to address the broad range of issues in precision ag (eg. metadata, UAS, precision applications).

3. Enhancing Research Infrastructure for Greater Research Efficiencies and Effectiveness

$1,900,000 Total General Fund Increase

$800,000 Graduate student funding – Increase pool of funds for additional 20 graduate research assistantships. – Main Station
$1,100,000 Revolving Equipment Fund (REF) – Increase fund, make it annual instead of revolving. – Main Station and RECs

Graduate research assistantships are critical to ongoing, vibrant research programs. These students are hardworking, intelligent, and driven to succeed. They carry out research under the supervision of scientists at the Main Station and RECs, and these research topics broaden the overall research agenda of AES projects. The students work for approved research programs in the AES, attend classes to improve their understanding of their respective disciplines, and also carry out their individual research topics. Access to a small pool of funding to increase the number of students in Agriculture has been very successful, not only in terms of enhancing research activities, but also by leveraging funds from other sources to increase the number of students. In 2011-13, the AES had funds for 20 students; departments and individual scientists were able to leverage these funds to increase the number of students to 36. Of these 36 students, 33 were from either the state (23) or region (10). Because of the strong Ag economy in ND, jobs are plentiful and many students will remain in the state upon graduation. This request is to provide funds for an additional 20 research assistantships.

The Revolving Equipment Funds for the RECs and Main Station have been very successful in allowing units to purchase expensive, but needed, equipment. The cost of field and laboratory equipment continues to increase – a small plot combine can exceed $300,000 and some specialized laboratory equipment can also exceed that price. Granting agencies assume that scientists have the equipment necessary to complete the work. Without the appropriate equipment, our scientists cannot be successful as they seek external funds to carry out their research programs. Increasing the REF for the RECs so that each REC will receive $150,000 each biennium rather than rotating across biennia will allow for more timely purchases and better planning of equipment purchases. Similarly, enhancing the Main Station REF by the same level to allocate funds to each unit every biennium will allow for better management and opportunities to leverage funds for the scientists that exist at the Main Station (allocation to units at Main Station is based on number of Scientist Years [SY] due to the varied size of Main Station units).

4. Risk and Trade

$420,000 Total General Fund Increase
$160,000 salary and fringe benefits, 1.0 FTE research scientist – Center for Ag Policy and Trade Studies (CAPTS) -Main Station
$160,000 salary and fringe benefits, 1.0 FTE support staff – Risk Management - Main Station
$100,000 increased funding for operating

Center for Ag Policy and Trade Studies (CAPTS) - The Center is the premier agricultural policy center in the region, currently evaluates state, domestic, and international policies that affect demand-supply of grains and net farm income. Analyzing farm policy and providing timely information relevant to the state's agricultural industries have been important to crafting farm policies beneficial to the state and addressing issues to increase competition of ND agriculture.

Risk Management - Risk in agriculture has increased 3-4X since 1980 and will continue to grow in importance as a management strategy, given the wide fluctuations in yield, prices, input costs, availability of crop insurance, land costs, and food safety. With the mix of crop commodities in the state (and the importance of these commodities), the need to develop risk management strategies is critical. Commodity trading Room provides a research Lab for marketing information for farmers and outreach groups.

5. Enhancing Research Capacity at the RECs

$1,270,000 Total General Fund Increase
$130,000 salary and fringe benefits, 1.0 FTE animal science technical support staff –HREC
$130,000 salary and fringe benefits, 1.0 FTE technical support staff (dust issues in western ND) – DREC
$260,000 salary and fringe benefits, 2.0 FTE technical support staff (livestock productivity and protection) – CREC, DREC
$330,000 salary and fringe benefits, 2.0 FTE scientist and technical support (plant pathologist for western ND) – WREC
$420,000 increased funding for operating; all 7 RECs

Hettinger REC (1.0 FTE, animal science technical support staff, HREC) The HREC is generally well equipped to carry out research activities on crop and livestock issues for southwest North Dakota. However, labor is limited on the animal science effort. The Center has a highly productive animal science research agenda, but the Director currently serves as the only animal scientist at the Center. Additional staffing is needed to help address the needs of the livestock industry and to offset the already high workload of the Center Director.

Dust issues in western ND (1.0 FTE, technical support staff, DREC)
Dust created by the extensive truck traffic servicing the oil industry in western ND has led to a number of cropping and livestock issues. These include, but are not limited to, reduced yields, inability/ unwillingness to harvest hay, and respiratory issues in livestock. The result is that dust is creating a negative effect on crop and livestock enterprises. Research to assist livestock and crop producers is necessary to identify ways to minimize this adverse effect on the agricultural industry in this region of the state.

Livestock Productivity and Protection (2.0 FTE technical support, CREC and DREC) North Dakota livestock producers are committed to producing the safest, highest quality food products possible. Increasing demand for our meat products nationally and internationally will require additional emphases on productivity and also will present additional opportunities for specialty markets. Through research, we can identify sustainable, profitable opportunities to improve livestock productivity in North Dakota.

Plant Pathologist for Western ND (2.0 FTE, scientist and technical support, WREC) There is an increasing level of crop disease problems occurring in western North Dakota due to changes in crop diversity, cropping systems, and crop rotation patterns. A plant pathologist is needed to evaluate and research crop diseases and impacts under both dryland and irrigated, no-till, and continuous cropping systems in Northwest North Dakota. The closest plant pathologist to western ND is located at the Carrington REC.

6. Genetics and Genomics Initiative

$1,305,000 Total General Fund Increase
$355,000 salary and fringe benefits, 2.0 FTE scientist and technician (epigenetics) – Main Station
$355,000 salary and fringe benefits, 2.0 FTE scientist and support staff (statistical genomics) – Main Station
$355,000 salary and fringe benefits, 2.0 FTE scientist and technical support staff (metagenomics) – Main Station
$240,000 increased funding for operating

Epigenetics is the study of genetic expression modified by external environmental influences. Genetics of an organism codes the potential of the organism – the external environment affects the expression of many genes that influence final phenotypic expression of the organism (e.g., diet of the parents affecting carcass quality of the offspring). Understanding these external influences on gene expression may allow for enhanced benefits and profits to the livestock industry.

Statistical genomics uses statistical methodologies to determine genetic linkages and markers beneficial to crop improvement programs. Statistical genomics works with bioinformaticists to interpret the data to meaningful information for use by plant breeders and geneticists for desired traits.

Metagenomics is the method to study contributions the microbiome makes toward plant, animal, and soil health. It is the interaction of microbial genomics with plant and animal genomics, which may lead to greater efficiencies, less disease, and a greater understanding of epigenetic factors.

7. Livestock Research to Enhance Productivity and Profitability

$710,000 Total General Fund Increase
$355,000 salary and fringe benefits, 2.0 FTE scientist and technical support (microbiome initiative) – Main Station
$355,000 salary and fringe benefits, 2.0 FTE scientist and technical support (forage nutrition) – Main Station

Microbiome Initiative - The microbiome is the ecological community of commensal, pathogenic, and symbiotic microorganisms that impact livestock production. Animal scientists will study the role of the microbiome in nutrition, disease, and environmental impact and, ultimately, human health.

Forage Nutrition - Forage and hay represent the greatest amount of nutrition received by beef cattle in North Dakota. Differences in the nutritional quality of forages and hay affect growth, development, and productivity of individual animals, thereby affecting profitability of the livestock producer. Developing a program in forage nutrition can assist producers throughout the state on improving forage quality and potentially increase profitability. This will complement existing programs in forage management, nutrition management, and range management.

8. Food Safety/Global Institute for Food Security and International Agriculture

$500,000 Total General Fund Increase

$500,000 increased funding for operating – Main Station

Food safety and security are identified as among the most significant topics globally. Each nation is concerned about food security – a food supply to nourish the citizens of a specific country, safe from environmental or created catastrophes, terrorism, and trade disputes. Similarly, food that is free from contamination and is safe to consume is critical to ensure the health of a country's citizens. Food Safety involves research collaboration across disciplines and Extension. The AES has several established food safety research collaborations and seeks to expand its capabilities to enhance the efforts of the new global institute.

9. Soil Health Research Support

$150,000 Total General Fund Increase

$150,000 Increased operating to build upon the Soil Health Initiative supported in the 2011-13 Legislative Session – Main Station

The rise of the oil industry in western ND may have long-term impacts on land quality, which may reduce agricultural productivity. Brine spills and soil compaction have reduced land quality and crop productivity in western North Dakota.

NDAES
Branch Research Centers

Carrington Research Extension Center

North Dakota Agricultural Experiment Station

Agency Statutor Authority

North Dakota Century Code Chapter 4-05.1

Agency Description

The Carrington Research Extension Center was established in 1960. CREC operates on a land base of around 1,700 acres and has infrastructure to irrigate about 260 acres with center-pivot systems and 120 acres by surface methods. The balance of the acreage is managed as traditional dryland and is utilized primarily for dryland field crop research activities.

The research effort at CREC focuses on these general program areas: traditional crop variety evaluation, crop production and management, plant disease management, alternative crop development, cropping systems, irrigation, integration of crop and livestock production, intensive cow/calf production, beef cattle feeding, feedlot management, livestock waste and nutrient management, foundation seedstocks production, and development of new agricultural enterprises. Through these efforts, the CREC research program has gained a national reputation for its involvement in agriculturally-based economic development and study of a wide range of crops and cropping systems.

CREC maintains a strong Extension program as five extension specialists base their educational programming from the center. The extension program emphasis areas addressed by these specialists include: agronomy, plant pathology, irrigation, livestock, and livestock waste - nutrient management.

Agency Mission Statement

The Carrington Research Extension Center conducts research that will lead to the enhancement of agriculture and improve the quality of life across the central region of North Dakota. Specifically, the Carrington Center conducts research on both dryland and irrigated crop production methods and systems, improved crop cultivars, feeding of beef cattle, cow/calf nutrition, sustainable agricultural production, and produces foundation seedstocks. The objective is to discover the balance between farm enterprise profitability and conservation of the natural resource base. The results of these studies are disseminated to the entire state through an on-going extension educational program.

Agency Performance Measures

Per North Dakota Century Code 4-05.1-19 the State Board of Agricultural Research and Extension (SBARE) presents a status report to the budget section of the legislative council. SBARE's most recent presentation to the budget section was on March 12, 2014. The report they gave and provided in written form included the status of the North Dakota Agricultural Experiment Station and the NDSU Extension Service. A copy of the information is on file in the legislative council office.

NDSU NORTH DAKOTA AGRICULTURAL EXPERIMENT STATION

Agency Future Critical Issues

- A secure (owned or long-term leases) land base is critical to sustain the current and future research mission of the Carrington Center. The diverse and broad based programs of the CREC operate on a relatively small land base. For many years, the Carrington REC has operated on a land base of around 1,700 acres with the state owning around 840 acres. The remaining land base of more than 850 acres must be secured from annual rental agreements with multiple landlords. This heavy reliance upon a willing group of land owners to annually rent a significant portion of the minimum amount of acres the CREC requires is risky at best. If any one parcel of rented land were not made available in a given year, the CREC would be forced to greatly reduce or eliminate program contributions that are depended upon by North Dakota producers and are basic to our department mission.
- A series of primary program facilities are further issues that need to be addressed to sustain the viability of the diverse programs at Carrington. These facilities influence worker safety concerns, program capacity and productivity, and impact operational costs.
- The CREC's foundation seedstocks program is an important part of NDSU's seedstocks program as it produces and processes at least 25 varieties representing 6 to 7 different crops annually. The CREC is consistently challenged to process this diversity of foundation grade seed due to the limitations of the existing facility and other demands on staff during the field season. The CREC seed conditioning plant is in need of replacement since the current facility has very limited capacity and structurally is too small to accommodate needed upgrades in capacity and workplace safety.
- The beef research unit desperately needs a multi-use 'feedlot research support facility'. This facility would expand the scope of research capabilities, assist in sustaining IAUAC compliance, address worker protection challenges, and reduce maintenance costs for equipment. An associated need for this program is an additional set of feedlot pens. Current pens are fully utilized and feedlot research projects are often backlogged. An additional set of pens would allow the CREC to conduct at least one additional experiment per feedout period. Alternatively these pens would allow more treatments or replications within other studies thereby expanding research capacity and quality. Any feedlot pen expansion must include associated waste containment facilities to remain compliant.
- It is important that grant fund opportunities continue to be widely available in future years. Funds that support crop and livestock production or agricultural related issues in general are needed to leverage public funding. The CREC research programs must continue to have a diversity of opportunities to compete for grant funds that when successful allow us to most effectively empower current research programs.

Agency Overview

Central Grasslands Research Extension Center – Streeter

North Dakota Agricultural Experiment Station

Agency Statutory Authority

North Dakota Century Code Chapter 4-05.1

Agency Description

The CGREC conducts research for the Coteau region of North Dakota, an area bounded by the Missouri River on the west and the James River on the east and extends from Divide and Burke counties in northwestern North Dakota in a southeasterly direction through Dickey County. CGREC is located between two counties which rank in the top 10 counties for the production of livestock and forages. The area served by CGREC contains 5.0 million acres (44 percent) of the state's rangeland where 42 percent of the state's livestock is raised on 38 percent of the state's farms.

Research objectives must increase the range-carrying capacity of native range emphasizing conservation and preservation, stabilize grass production to compensate for the vagaries of the weather and precipitation as it influences forage production in the dryland agriculture, identify the impact of different management systems upon beef production in the central region and explore the increased use of crop residues and byproducts for the maintenance of the cow herd. CGREC's primary focus is management of grassland acreage which occupies about one-third of the agricultural land in the state and aims to improve production and increase returns to cattle producers.

Agency Mission Statement

The legislated mission of the CGREC is as follows: "The CGREC shall conduct research designed to fulfill needs within an area bounded by the Missouri River on the west and the James River on the east with research objectives as follows:

1. To increase the range-carrying capacity of native range with emphasis on conservation.
2. Stabilization of grass production to determine how to best compensate for the variability of the weather as it influences forage production.
3. Identification of different management systems on beef production in the central region of the state.
4. Exploration of increased use of crop residues and by-products for the maintenance of the cow herd.
5. To disseminate research results and information for the benefit of the state of North Dakota.

Agency Performance Measures

Per North Dakota Century Code 4-05.1-19 the State Board of Agricultural Research and Extension (SBARE) presents a status report to the budget section of the legislative council. SBARE's most recent presentation to the budget section was on March 12, 2014. The report they gave and provided in written form included the status of the North Dakota Agricultural Experiment Station and the NDSU Extension Service. A copy of the information is on file in the legislative council office.

NDSU NORTH DAKOTA AGRICULTURAL EXPERIMENT STATION

Agency Future Critical Issues

1. Laboratory space, in the form of an agronomy lab, is needed to allow scientists the opportunity to expand current research and develop and implement new research projects.
2. Current livestock facilities are deficient for a fully implemented animal science program. Improvements to livestock handling and feeding facilities including replicated drylot pens, feed storage, and a new working barn are needed to allow for growth of the animal science research program.
3. Technical support is a critical issue. In order to strengthen current research programs, research specialist is needed for the animal science program.
4. Significant improvements or replacement of the director's residence is needed as the current residence has water, possible mold, and foundational issues in the basement.
5. Other facilities are in need of deferred maintenance funding. Specifically, roofing and windows on the technician residence, as well as updates to many barns and buildings located around the center are needed.

Agency Overview

Dickinson Research Extension Center

North Dakota Agricultural Experiment Station

Agency Statutory Authority

North Dakota Century Code Chapter 4-05.1

Agency Description

The NDSU Dickinson Research Extension Center has an established record of service to the people in the 13-county region south and west of the Missouri River. The DREC operates 4,916 acres of owned land within the region as well as annual land leases needed to accommodate ongoing projects. The land base provides opportunities for a broad perspective in evaluating various agricultural systems that can serve as engines for economic development. This is a continuation of what has taken place for over 100 years. Currently, the DREC assists agricultural producers in solving production problems with agronomy, animal science and range science, while integrating new developments. Five major areas are served: agronomy, beef management, bio-security, range management, and sustainable agricultural practices. Faculty and staff are committed to engaging people of the region and to the identification of current economic opportunities, while sustaining natural resources for future generations as directed by the mission statement and Advisory Board. Research data and producer ideas are continually considered so the DREC can leverage the latest knowledge to best benefit the people of North Dakota.

Agency Mission Statement

The Dickinson Research Center must be located at or near Dickinson in Stark County. The Center shall conduct research on increasing the carrying capacity of native rangeland, with emphasis on conservation and preservation for future generations. The Center shall conduct research on grass production to determine how to best compensate for the vagaries of the weather as it influences forage production in the dry land agriculture of western North Dakota. The Center shall conduct research at the ranch location in Dunn County with beef cattle breeding, feeding, management and disease control for the benefit of livestock producers of western North Dakota and the entire state. The Center shall conduct research designed to increase productivity of all agricultural products of the soil by maintaining or improving the soil resource base in the dry land agricultural region of southwestern North Dakota by the identification of adapted crop species and superior crop cultivars; propagation and distribution of selected seed stock; and development of profitable cropping systems that achieve the necessary balance between profitability and conservation of all natural resources. The Center shall disseminate research results and information for the benefit of this state.

Agency Performance Measures

Per North Dakota Century Code 4-05.1-19 the State Board of Agricultural Research and Extension (SBARE) presents a status report to the budget section of the legislative council. SBARE's most recent presentation to the budget section was on March 12, 2014. The report they gave and provided in written form included the status of the North Dakota Agricultural Experiment Station and the NDSU Extension Service. A copy of the information is on file in the legislative council office.

NDSU NORTH DAKOTA AGRICULTURAL EXPERIMENT STATION

Agency Future Critical Issues

Dust issues in western ND - Dust created by the extensive truck traffic servicing the oil industry in western ND has led to a number of potential cropping and livestock issues. These include, but are not limited to, reduced yields, inability/ unwillingness to harvest hay, and respiratory issues in livestock. The result is that dust is creating an undocumented and potentially negative effect on crop and livestock enterprises. Research to assist livestock and crop producers is necessary to identify ways to document and minimize any adverse effect on the agricultural industry in this region of the state.

Livestock Productivity and Protection - North Dakota livestock producers seek increased demand for meat products nationally and internationally. This demand will require additional emphases on documented beef production systems that capture additional marketing opportunities. To explore and enhance these opportunities, new forage and cattle resources need to be evaluated to meet market specific targets. Both grain-based and forage-based beef production systems need additional evaluation. Through research, we can identify profitable opportunities to improve livestock productivity in North Dakota.

Deferred Maintenance Increase - Deferred maintenance funding continues to be an important issue at the DREC. Updates and repairs to facilities that enhance worker safety and productivity are needed. The DREC, specifically, has maintenance issues with the main public use and cattle working facility at the ranch. The facility needs major roof repair and 1,800 square feet of additional cattle working space.

The Center would be appreciative of enhancing funding that supports the efforts of SBARE through the North Dakota Agricultural Experiment Station and NDSU

Agency Overview

Hettinger Research Extension Center

North Dakota Agricultural Experiment Station

Agency Statutory Authority

North Dakota Century Code Chapter 4-05.1

Agency Description

The HREC is a semi-arid site located in southwest North Dakota, providing the most southerly NDSU location in the non-glaciated portion of North Dakota as a site for its agronomy research program. The HREC also is located at the center of the North Dakota sheep industry, the focus of one of its animal research programs, and in an area of rapidly growing livestock feeding ventures, another focus of animal research at the HREC. Additionally, the HREC is located in a region where much of the land base is in the Conservation Reserve Program, which has resulted in additional research evaluating potential changes in the CRP program and how these changes may affect upland native and game bird populations. A new research program evaluating low-cost rangeland monitoring strategies on U.S. Forest Service lands and wildlife/livestock interactions has resulted in a significant increase in the quantity of rangeland research conducted at the HREC throughout the western Dakotas. Research at HREC involves the disciplines of animal science, range science, wildlife science, agronomy, and agri-business and applied economics. Collaboration is with Main Station scientists, Branch Station scientists, U.S. Forest Service, grazing associations, university scientists from WY, SD, and MT, and USDA research entities in these research disciplines to improve productivity of livestock, grazing, and cropping systems, and to improve economic development of the region.

Agency Mission Statement

The Hettinger Research Extension Center, an outreach of North Dakota State University, provides applied research and education in agriculture and environmental sciences that will enrich the lives of North Dakotans and support economic development.

Agency Performance Measures

Per North Dakota Century Code 4-05.1-19 the State Board of Agricultural Research and Extension (SBARE) presents a status report to the budget section of the legislative council. SBARE's most recent presentation to the budget section was on March 12, 2014. The report they gave and provided in written form included the status of the North Dakota Agricultural Experiment Station and the NDSU Extension Service. A copy of the information is on file in the legislative council office.

NDSU NORTH DAKOTA AGRICULTURAL EXPERIMENT STATION

Agency Future Critical Issues

- Extension and Research staffing, both professionals and technical support, for livestock production continue to be a priority to meet the educational and research needs of producers in SW North Dakota. A Livestock Extension Specialist and Research Technician are both needed to meet the livestock needs in SW ND.
- A modern livestock processing and research support facility is needed to conduct the research by our sheep and cattle research programs. The current facility is a 16' x 32' lean-to, with no ability to utilize todays modern technology, such as web access, in our research program.
- A Sheep Feed Efficiency Research Facility for the evaluation of feed efficiency is needed for the sheep producers of ND to remain competitive. The ND Lamb and Wool Producers Association continues to support such a facility at the Hettinger REC.
- Housing of the graduate students and technicians needed for a nationally competitive program continues to be a struggle in western ND. Permanent housing, in a bunkhouse format, is needed to ensure the HREC program can continue to recruit these valuable members of our team on an annual basis.
- Deferred maintenance and safety issues will likely reach $1,000,000 by the end of the current biennium. Specifically, due to a continued wet cycle and heavier than normal traffic, the road to the office is unstable and needs to be replaced. Additionally, a frontage road is needed to remove the daily use of Highway 12 by our feed-wagon and tractor, which is on the road 8 to 12 times daily during peak usage. Additional needs include mechanical system renovation of the 1992 office, parking lot re-paving, and roofing and carpeting in the current bunkhouse.

Agency Overview

Langdon Research Extension Center

North Dakota Agricultural Experiment Station

Agency Statutory Authority

North Dakota Century Code Chapter 4-05.1

Agency Description

The Langdon Research Extension Center (LREC) is located one mile east of Langdon on US highway five. The agricultural land base at the station consists of 389 owned acres and an additional 320 acres under lease agreement. The LREC serves a nine-county region located in northeast North Dakota and has North Dakota's highest precipitation rates, coolest temperatures, and richest productive soils. The climate creates high levels of diverse crop production and recurring disease problems.

The LREC has a strong tradition of assisting the region's producers to meet agricultural production challenges throughout the course of its existence. In 1993, the LREC redirected much of its research programming to focus on the significant increase of disease and insect pressure associated with its climate. This redirected applied research programming has provided producers with proven cultural practices and advances in chemical applications that minimize disease and insect pressures in all regions of North Dakota.

Since 2001, the LREC has significantly enhanced its overall agricultural research programming with the addition of a crop protection scientist, a director that also serves the region with an emphasis in rural economic/community development, increased foundation seed stocks program and a farm business management instructor. In addition, a full service agricultural based learning center was constructed in 2004 that greatly enhances outreach and extension efforts delivered to the regions agricultural industry. Finally, additional programming has been created that is working to employ LREC resources as an engine for rural community and economic development in partnership with the region's economic developers.

Agency Mission Statement

The Langdon Research Extension Center will conduct applied agricultural research that enhances the quality of life for the regions citizens with a responsive, flexible and accessible overall agricultural based research program. This programming will combine the concepts of agricultural research, information technology and community/economic development while conserving the regions natural resources.

Agency Performance Measures

Per North Dakota Century Code 4-05.1-19 the State Board of Agricultural Research and Extension (SBARE) presents a status report to the budget section of the legislative council. SBARE's most recent presentation to the budget section was on March 12, 2014. The report they gave and provided in written form included the status of the North Dakota Agricultural Experiment Station and the NDSU Extension Service. A copy of the information is on file in the legislative council office.

NDSU NORTH DAKOTA AGRICULTURAL EXPERIMENT STATION

Agency Future Critical Issues

The Langdon REC conducts all of its research and extension programming on 740 acres of crop land. Of this, 390 acres is owned and 350 acres is leased. Langdon has been leasing a 160 acre quarter section of land to be able to conduct research programming for over 30 years. Recently the landowner of this quarter section of land experienced failing health and is preparing to sell the land. The landowner is allowing the state of North Dakota first chance to purchase the land for the Langdon REC's agricultural research programming. Purchasing the land for Langdon's research will provide a solid land base in the future to continue serving the agricultural industry in North Dakota. Losing this land will force Langdon to cut its research programming effort.

In 1962, a seed cleaning plant was constructed at Langdon to provide local seeds men and producers the ability to purchase and grow the highest quality seed available (foundation grade seed). The regions seeds men and producers have come to depend on this program to supply them with foundation grade seed. Langdon still uses the same facility and equipment that was constructed in 1962. The inefficiencies associated with the plant forces Langdon's seed cleaners to run individual lots of dirty seed through the plant two to five times to achieve foundation grade seed. Because of this and the ability to only clean 20 to 30 bushels of seed per hour, Langdon does not complete its seed cleaning operation until the start of the growing season beyond the prime time for producers to acquire seed. In addition, numerous safety violations have been identified that can only be resolved with a new seed cleaning plant.

The cost of research equipment is extremely high and getting higher year after year due to the fact there are only a few companies that manufacture this specialized equipment. Three years ago a research plot combine cost approximately $170,000 and that same combine today is $250,000 to $300,000. Repair parts for Langdon's older research equipment is either very hard to find or is not being manufactured anymore. An increase in equipment funding would help to keep equipment up to date and manageable.

North Central Research Extension Center – Minot

North Dakota Agricultural Experiment Station

Agency Statutory Authority

North Dakota Century Code Chapter 4-05.1

Agency Description

The NCREC was established in 1945 and is located one mile south of Minot on Highway 83. The 1,200-acre center specializes in crop research and extension education activities and foundation seed production. Approximately 1,500 owned, rented, and contracted acres are planted for foundation seed production each year. The NCREC evaluates conventional and new crops for production in the region and explores weed management and cropping systems to improve the economic potential of crop production in the north central region. The NCREC is a leader in North Dakota on production and disease research of canola, pea, lentil, and chickpea crops, in addition to the conventional crops of hard red spring and durum wheat, barley, flax, sunflower, and oats. The NCREC works closely with business and economic development leaders in the region to improve the economic vitality of north central North Dakota.

Agency Mission Statement

The North Central Research Extension Center conducts research to increase agricultural productivity in north central North Dakota. The center serves agricultural producers in a 12- county region surrounding Minot through crop research, foundation seed production and dissemination, and extension education programs in crop and livestock production. Studies at the center focus on crop variety and new germplasm evaluation, weed control, cropping systems, crop pest management, reduced tillage, and soil fertility. Research is conducted on cereal grains, oilseeds, legumes, forages, and new specialty crops.

Agency Performance Measures

Per North Dakota Century Code 4-05.1-19 the State Board of Agricultural Research and Extension (SBARE) presents a status report to the budget section of the legislative council. SBARE's most recent presentation to the budget section was on March 12, 2014. The report they gave and provided in written form included the status of the North Dakota Agricultural Experiment Station and the NDSU Extension Service. A copy of the information is on file in the legislative council office.

NDSU NORTH DAKOTA AGRICULTURAL EXPERIMENT STATION

Agency Future Critical Issues

- A mobile seed conditioning mill adequate to handle peas, lentils, beans, and chickpeas (in addition to small grains and oilseeds) for the expanding pulse industry and NDSU breeding program is needed.
- Base funding for personnel to address the research and extension needs for pulse crops, canola, and cereal grains to meet the needs of growers and the increase of processing plants in the Minot area.
- Technical support
- Increased operational costs
- Equipment replacement
- Removal of old seedhouse
- Tile drain yard
- Encroachment from city of Minot/re-location of center (land and facilities)
- Horticulturist needed to serve growing urban population and projects
- Affordable housing/competitive salaries

Williston Research Extension Center

North Dakota Agricultural Experiment Station

Agency Statutory Authority

North Dakota Century Code Chapter 4-05.1

Agency Description

The Williston Research Extension Center, established in 1907 and relocated to the present site in 1954, is an 800-acre rain-fed farm located in northwest North Dakota near the city of Williston. In 2001, an additional 160 acres were purchased in the Nesson Valley and an irrigated research and development project was established. WREC research studies are conducted on crop variety evaluation, herbicide performance and other cultural management research, cropping systems and soil and water conservation practices. The main dryland crops are spring wheat and durum. Barley, oats, safflower, pea, lentil, chickpea, canola, flax, alfalfa and other alternative crops are also grown as cash crops or for livestock feed.

WREC research is intended to increase the producer's net profit, support crop diversification and encourage more intensive cropping and irrigation development. Research on soil and crop management systems for sprinkler irrigation, on alternative irrigated high value and value-added crops and on western malting barley programs are conducted. WREC also conducts variety development research on safflower, winter wheat, and durum and variety evaluations in cooperation with NDSU Main Station scientists. WREC produces and supplies foundation seed to area farmers of new and old varieties adapted to the region.

Agency Mission Statement

The Williston Research Extension Center conducts research to increase agricultural productivity in the semi-arid region for northwestern North Dakota while achieving a necessary balance between profitability and conservation of natural resources.

Research on soil and crop management systems for sprinkler irrigation and alternative irrigated high-value/value-added crop production at the Nesson Valley site are conducted in cooperation with the Montana State University Eastern Agricultural Research Center at the USDA-ARS Northern Plains Agricultural Research Laboratory in Sidney, Montana and other cooperating NDSU and University of Minnesota scientists.

Agency Performance Measures

Per North Dakota Century Code 4-05.1-19 the State Board of Agricultural Research and Extension (SBARE) presents a status report to the budget section of the legislative council. SBARE's most recent presentation to the budget section was on March 12, 2014. The report they gave and provided in written form included the status of the North Dakota Agricultural Experiment Station and the NDSU Extension Service. A copy of the information is on file in the legislative council office.

NDSU NORTH DAKOTA AGRICULTURAL EXPERIMENT STATION

Agency Future Critical Issues

Pea and lentil acreage has dramatically increased over the past 15 years and there has also been a significant increase in production of other broadleaf alternative crops. The switch from a strict small grain fallow rotation to a more intensive and diversified cropping system has resulted in a reduction of one million summer fallow acres in northwest North Dakota to considerably increase annual return on these acres by 200 million dollars.

Farmers in the MonDak region grow more than 20 different crops. There is an urgent need for additional technical support for WREC and off-station variety testing in each of the crops in dryland and irrigated cropping systems. There is a critical need for a plant pathologist to evaluate and research crop disease impacts due to the more intensive cropping systems used in Western North Dakota.

A new seed plant at the WREC is needed to condition Foundation seed to replace the aging seed conditioning plant built in 1954. Seed conditioning efficiency and worker safety of all crops would be significantly enhanced with a new mobile seed conditioning mill. A modern horizontal seed conditioning plant is also needed to allow gentle handling and seed conditioning of field peas, soybeans, edible beans, and other fragile crops.

Retention and recruitment of staff is our most critical issue for WREC due to the huge impact of oil and gas development in the Williston area. The energy explosion has significantly increased the cost of living and created a severe housing shortage in the region.

The Williston area is the fastest growing micropolitian community in the nation with a projected increase in population to 50,000 to 60,000 and a projected increase of 160,000 people in our four county area; there is an increased need for landscape materials and requests for adapted plant species for this climate not only by landscapers, but for homeowners, architects, local nurseries, and gardeners. The collaboration between NDSU researchers and the staff at WREC is becoming even more important for the emerging wine industry, truck farms and Community Supported Agriculture. As is the need for a greenhouse for Horticultural research purposes to expedite growth and assist with acclamation for moving plants outdoors.

NDAES
Agronomy Seed Farm

Agronomy Seed Farm

North Dakota Agricultural Experiment Station

Agency Statutory Authority

North Dakota Century Code Chapter 4-05.1.

Agency Description

The Agronomy Seed Farm (ASF) is a 590 acre farm located near Casselton, which has been a part of the North Dakota Agriculture Experiment Station (NDAES) since it was gifted to the state in 1950. It was the result of a fund drive conducted by the North Dakota Crop Improvement Association, which solicited farmers, seed companies and many others throughout the state to help establish a farm whose main purpose is to increase seed of new varieties as they are developed by the plant breeding and supporting departments of the NDAES. The ASF also propagates seed of older but still desirable varieties for the seedsmen of the area.

Agency Mission Statement

To produce an adequate supply of Foundation grade seed for the seedsmen of the state and area at a reasonable price and to support the varietal development research of the NDAES.

Agency Performance Measures

Per North Dakota Century Code 4-05.1-19, the State Board of Agricultural Research and Extension (SBARE) presents a status report to the Budget Section of the Legislative Council. SBARE's most recent presentation to the Budget Section was on March 12, 2014. The report provided the status of the North Dakota Agricultural Experiment Station and the NDSU Extension Service. A copy of the information is on file in the Legislative Council office.

Agency Future Critical Issues

The critical issues facing the ASF are a continued demand for Foundation grade seed, favorable weather for growing seed and a good supply of varieties that are in demand by the seed industry. If these three conditions are present and good commodity prices accompany them, the future of the ASF is secure.

NDSU NORTH DAKOTA AGRICULTURAL EXPERIMENT STATION

NDSU EXTENSION SERVICE

2015-17 One-time Request and Additional Request as Supported by SBARE

One-time Request: Oil Patch Salary Differential Pool

One-time funds are requested to provide salary support to aid in the retention and recruitment of Extension employees in the heaviest-impacted oil counties. These Extension educators are essential for the NDSU Extension Service to fulfill our mission to serve North Dakotans in this region. Data from the Job Service ND documents that the average salaries in the targeted eight counties were 50% greater than the state average as a result of oil industry market competition. As a result, our efforts to recruit employees into these counties and retain employees who live and work in these counties is a major challenge because of market competition and housing costs. - $250,000

Additional Request

Funding to provide technical assistance grants to soil conservation districts to help landowners reduce soil erosion, improve water quality, and enhance tree plantings, grazing lands and wildlife habitat - $75,000

DETAILS:
2015-2017 One-time Request and Additional Request as Ranked by SBARE

NDSU Extension Service

One-time Request: Oil Patch Salary Differential Pool $250,000

One-time funds will be used to provide salary support to aid in the retention and recruitment of critical Extension employees in oil-impacted counties facing the pressure of high market competition and high housing costs.

One-time funds will be used to provide full- and part-time permanent NDSU Extension Service employees with less than 10 years of Extension employment with an FTE pro-rated $500/month salary differential payment. The NDSU Extension Service serves agriculture, families and communities through agents serving each county in the state and the Fort Berthold Reservation. Extension area specialists provide program leadership from the Dickinson, North Central and Williston Research Extension Centers. These Extension educators are the essential element for the NDSU Extension Service to fulfill our mission. These targeted Extension employees in the oil patch counties include county-based agents, specialists and office support staff (18 employees, 16.4 FTE). In addition to the proposed salary differential payment, a 10% additional expense is budgeted for payroll tax and deductions. These one-time funds will be used for temporary salary differential payments for this biennium and will not be added to base salaries.

All of the targeted NDSU employees work in seven of the heaviest impacted oil producing counties (Burke, Divide, Dunn, McKenzie, Mountrail, Stark and Williams counties as based on oil drilling, wells and production; source ND Industrial Commission) and Ward County which serves as a major oil industry service hub.

The 2012 Quarterly Census of Employment and Wages from Job Service ND documents that the average salaries in these eight counties are 50.0% greater than the state average as a result of oil industry market competition. As a result, our efforts to recruit employees into these counties and retain employees who live and work in these counties is a major challenge because of market competition and housing costs. We currently have six vacancies in this region. Because of recruitment, retention and housing cost challenges, we have proposed a $500/month salary payment, which is modeled on the $484 and $500/month payments of ND Department of Transportation and ND Highway Patrol, respectively. This payment will provide a 12% average salary increase for these newest and least-established Extension employees. While this modest amount will not rectify salary disparities or shortfalls in the rental market, we believe it will boost morale and help to achieve our objective and acknowledge the additional stress faced by employees serving in these counties. These funds are requested because our state authorized funds are fully committed. The State Board of Agricultural Research and Education (SBARE) has state-wide responsibility for assessing Extension needs and they have identified the importance of retaining and recruiting staff in oil-impacted regions in order for Extension to serve ND clientele.

Additional Request - North Dakota State Soil Conservation Committee $75,000

For increased technical and administrative support for the Soil Conservation District Assistance Program to assist landowners with conservation practices. The planning, design, installation and checkout of conservation practices by participating soil conservation districts have a significant

impact on North Dakota's natural resources. Funds from this request will assist soil conservation districts to help landowners reduce soil erosion, improve water quality, and enhance tree plantings, grazing lands and wildlife habitat.

NDSU NORTH DAKOTA AGRICULTURAL EXPERIMENT STATION

2015-17 Capital Improvement and One-time Requests as Ranked by SBARE

1. Veterinary Diagnostic Lab replacement - Main Station

The NDAES Veterinary Diagnostic Lab (VDL) may lose accreditation because it does not meet modern laboratory standards. Loss of accreditation would affect North Dakota veterinarians and livestock producers relying on the facility for test results; would result in significantly higher costs for animal health and regulatory testing for North Dakota livestock producers, veterinarians, and the public. The state would be unable to respond to animal health emergencies in a timely fashion.

A new and modern facility to house the veterinary diagnostic laboratory (VDL) at North Dakota State University should be a minimum of 20,000 square feet (current facility is approximately 8,000 square feet) and be designed to allow cost effective addition of laboratory space, as needed, to meet future testing demands. - $18,000,000

2. Meats Lab Facility – Main Station

A new/upgraded facility urgently needed. The current Meats Lab is approximately 7,500 sq. ft. and was built in the 1950's and no longer serves the needs of modern meat science research. Annual repair and maintenance costs to the current facility continue to increase. Additionally, the Lab continues to struggle to meet the U.S. Department of Agriculture inspection requirements for safe meat handling and processing. A new facility is necessary because opportunities to grow the state's livestock industries are tied to the knowledge of the end product and how that product meets the needs of national and international consumers. Design features of a 19,000 sq. ft. facility would include animal holding and handling areas, an abattoir, processing and fabrication rooms, research labs, walk-in coolers and freezers, sensory evaluation labs, preparation kitchens, conference rooms, and other miscellaneous support, storage, and equipment rooms. - $7,600,000

3. Seed Cleaning Facilities – CREC, LREC, NCREC, WREC

Seed cleaning facilities at CREC, LREC, NCREC, and WREC need to be replaced. Current facilities are antiquated, lack reliable capability to ensure high quality seed, are slow, and inefficient. These facilities were designed to handle cereal crops and have limited/no capability of cleaning pulse crops and other fragile seed that are in high demand. Also, the existing facilities pose considerable worker safety issues. The request is for four portable mills and a storage facility for the mill when not in use. Each Center will have one mill, with appropriate air screen cleaner, indent mill and gravity mill, augers, conveyors, and cyclone dust cleaning system. The capacity would be approximately 300 bu/hr, depending on type of crop being cleaned. The facility will have the appropriate electrical, ventilation, and heating necessary for electric eye separators (at CREC, NCREC, and WREC) to ensure a high quality product. - $5,250,000

NDSU NORTH DAKOTA AGRICULTURAL EXPERIMENT STATION

2015-17 Capital Improvement and One-time Requests as Ranked by SBARE

Unranked Capital Request:

Funding of $400,000 was appropriated by the sixty-third Legislative Assembly. Bids received for the project were significantly over budget. The amount requested is an estimate to complete the project as presented. The amount was calculated by the architectural firm that has been contracted for all agronomy lab construction projects that were funded this biennium.

Agronomy Lab CGREC

With the addition of a forage agronomist at the CGREC, the center is in need of a forage lab building. Currently samples collected in the field by the scientist are processed in a corner of an equipment storage building with a dirt floor. The dust from opening the overhead door and moving equipment renders this area very dusty and difficult to keep scales and computers clean. The new building would house the forage drying ovens, computer, scale etc. for sample data processing. It would also house the grinders and equipment to process the forage samples in preparation for nutrient analysis. - $783,796

One-time Requests:

Oil Patch Salary Differential Pool

The oil industry on the infrastructure, salary, and cost of living in western North Dakota is having a wide and lasting impact on the state's western population and the state's workers residing in the area. This will provide salary support to aid in the retention and recruitment of Experiment Station employees at RECs located in oil-impacted counties, which are experiencing the pressure of high market competition and high housing costs. - $430,000

Deferred Maintenance Increase

Deferred maintenance funding continues to be an important issue. Updates and repairs to facilities that enhance worker safety and productivity are needed across the AES. The CGREC, specifically, has maintenance issues with all residences, barns, and office buildings. Similar issues exist at other centers, primarily with respect to facility updates and repairs. - $1,440,465

Main Station Greenhouse

- Increase geothermal well capacity $1,200,000 – funding for the greenhouse construction allowed for a portion of geothermal wells to be installed – the system is working well, but additional well capacity is needed to heat/cool the headhouse building. It is estimated that 200 additional wells will be needed, given the high heating and cooling demand of the facility.
- Utilities $400,000 – underestimated in construction phase. As the BL-3 portion of the facility comes online, utility costs will increase further. This request would provide needed funds and allow data to be collected on usage and costs that will be used for a formal permanent request in 2017.

- $1,600,000

DETAILS:
2015-2017 Capital Improvement Projects
as Ranked by SBARE

ND Agricultural Experiment Station

1. Veterinary Diagnostic Lab Replacement/Upgrade $18,000,000

The NDAES Veterinary Diagnostic Lab (VDL) may lose accreditation because it does not meet modern laboratory standards. Loss of accreditation would affect North Dakota veterinarians and livestock producers relying on the facility for test results; would affect affiliation with the National Animal Health Laboratory Network (subsequently affecting funds for diagnostic equipment, proficiency testing for regulatory diseases, partial salary support for an IT position, and would prevent competition for surveillance testing contracts); would restrict access to Federal funds for bioterrorism preparedness and partial funding of technical support; inhibits the ability to conduct regulatory testing for animals crossing state and international borders; restricts surveillance of diseases of human health significance, such as rabies, anthrax, and West Nile virus; affects the ability of the VDL to participate in the Veterinary Laboratory Response network for toxicology testing. Veterinary clinics often require the use of an accredited veterinary diagnostic lab for biopsies and bacterial culture. The loss of accreditation would result in significantly higher costs for animal health and regulatory testing for North Dakota livestock producers, veterinarians, and the public. The state would be unable to respond to animal health emergencies in a timely fashion.

A new and modern facility to house the veterinary diagnostic laboratory (VDL) at North Dakota State University should be a minimum of 20,000 square feet (current facility is approximately 8,000 square feet) and be designed to allow cost effective addition of laboratory space, as needed, to meet future testing demands (i.e. meat testing, analysis of feed and animal samples for petroleum residues, international export testing). The facility should include adequate laboratory and office space for sample receiving, toxicology, serology, information technology, administration, clinical pathology, gross pathology, histology, quality assurance, bacteriology/mycology, virology and molecular diagnostic sections. In addition, space to house a library and conference/meeting room that can accommodate presentations for producer groups, veterinary groups and student groups should be included. Since the future of carcass rendering is uncertain, it is necessary to install a tissue digester to insure safe and adequate carcass disposal capacity. A new VDL needs to have dedicated Biosafety Level 3 necropsy/laboratory space (including the ability to capture effluent) to safely address current and future public health threats and potential introductions of foreign animal diseases. This facility should have a biosecure visitor's entry with dedicated bathrooms. Adequate parking space, semi-truck and trailer access and a radiology room are needed. An enclosed receiving area that will allow for off-loading of animal carcasses, as well as live animals that may require euthanasia, is required. Appropriate storage for archiving records and data storage is necessary. Adequate freezer space for individual labs and lockup of samples involved in litigation cases is important. The post mortem laboratory should have access points that allow shower-in/shower-out capability for personnel as well biosecure entry and exit points to safely contain animal and human pathogens. The entire building must be sufficiently secure with electronic card key access to individual laboratories. An alarm system including monitoring of major equipment, and a back-up power source are necessary as well. Building surveillance cameras are suggested.

2. Meats Lab Facility **$7,600,000**

Main Station – A new/upgraded facility urgently needed. The current Meats Lab is approximately 7,500 sq. ft. and was built in the 1950's and no longer serves the needs of modern meat science research. Annual repair and maintenance costs to the current facility continue to increase. Additionally, the Lab continues to struggle to meet the U.S. Department of Agriculture inspection requirements for safe meat handling and processing. A new facility is necessary because opportunities to grow the state's livestock industries are tied to the knowledge of the end product and how that product meets the needs of national and international consumers. Design features of a 19,000 sq. ft. facility would include animal holding and handling areas, an abattoir, processing and fabrication rooms, research labs, walk-in coolers and freezers, sensory evaluation labs, preparation kitchens, conference rooms, and other miscellaneous support, storage, and equipment rooms.

3. Seed Cleaning Facilities **$5,250,000**

Seed cleaning facilities at CREC, LREC, NCREC, and WREC need to be replaced. Current facilities are antiquated, lack reliable capability to ensure high quality seed, are slow, and inefficient. These facilities were designed to handle cereal crops and have limited/no capability of cleaning pulse crops and other fragile seed that are in high demand. Also, the existing facilities pose considerable worker safety issues. The request is for four portable mills and a storage facility for the mill when not in use. Each Center will have one mill, with appropriate air screen cleaner, indent mill and gravity mill, augers, conveyors, and cyclone dust cleaning system. The capacity would be approximately 300 bu/hr, depending on type of crop being cleaned. The facility will have the appropriate electrical, ventilation, and heating necessary for electric eye separators (at CREC, NCREC, and WREC) to ensure a high quality product.