Needs

Resilience Agriculture: Creating food security through productive and profitable systems despite extreme events

- **Request:** One research faculty, one extension faculty, and operating funds to perform research and promote management practices that enhance resilient production.
- **Justification:** North Dakota producers face a variety of extreme natural events including drought, floods, wildfires, and extreme heat. These events threaten production while often leading to additional problems from insects, diseases and plant stress. Various management options may help deal with such problems, including: water- and soil-conservation tillage, cover crops, drought-tolerant crops, and increasing soil carbon. Yet much more research is needed to find the most effective options for North Dakota systems, and more extension efforts are needed to these discuss possible options and increase dialogue on current and future problems.

A research-focused and extension-focused faculty pair who build on our current expertise could play a huge role in finding solutions and discussing them with stakeholders to increase the resiliency, security, and profitability of North Dakota agriculture.

Service Labs: Increasing capacity for soil testing lab

- **Request:** Full-time lab director (faculty) and research specialist. Resources to update facilities and equipment.
- **Justification:** The soil testing lab is a source of unbiased laboratory analyses for research, extension, and the public. It serves as an anchor of accepted laboratory methods in an industry prone to trying less than established methodologies. Promoting soil testing and related activities can have very large returns on investment. For example, knowing how much nitrogen is still in the soil can enhance nitrogen use efficiency, ultimately saving ND farmers input costs while improving water quality.

A new permanent director can integrate into research and extension activities in SNRS and throughout ND while providing a cohesive vision for the lab and improving service to its users.

Natural Resources Extension Faculty

- **Request:** One extension faculty and operating funds.
- **Justification:** Natural resources, including water, soil, plants, animals, and the services they provide, are essential for the structure and function of agricultural systems. The SNRS has a broad group of faculty that investigate these resources and their management in and across working landscapes. Yet we have no tenure-track faculty who explicitly work on natural resources. This hinders our ability to communicate about natural resource issues, deliver research messages to stakeholders, and to best serve the state's extension personnel.

A new extension faculty member would greatly increase our capacity to serve the state, particularly in areas related to water quality, pollinators, invasive species, wildlife, and other natural resources that extend across the interface of urban, natural, and agricultural systems.

Gratitude! A huge "thank you" to SBARE and your advocacy. The Big Data funding will allow our ability to provide impacts from our NDAWN data.

Department updates

Retirements/Resignations: Marion Harris (insect-plant interactions), Jay Goos (soil fertility), Amitava Chatterjee (soil management), Devan McGranahan (range ecology)

Agronomic, Pathology and Soils Field Lab Facility

For the School of Natural Resource Sciences, Waldron Hall currently houses a faculty research laboratory (Soil Health) and Soil Testing Laboratory Facilities. There is a major need for a facility that serves as a transition between field operations and wet laboratory analysis. This type of facility would accommodate preparation for outgoing field operations and processing of incoming field samples before they are brought into clean areas. Activities would include storage of field equipment, safe sample processing (dryers, soil grinders), wet facilities for analysis, such as extractions and analysis, and Soil Testing Laboratory. The current building was built in phases in the 1950's and 1960's field research efforts related to agronomy, soils, and plant pathology. The current building was not built to house the number of scientists and support staff currently assigned to the building. The lack of dust handling poses a health hazard, and lack of sufficient storage has resulted in equipment theft and damage.

Expected benefits to the state of North Dakota from this building include:

- Advance soil and land management to reduce expansion of saline and sodic soils, declining soil fertility, and obtaining a better understanding of the soil microbial populations that impact (both positively and negatively) crop productivity.
- Improved nutrient use efficiency and better fertilizer and nutrient management. This has direct economic benefits to farmers through cost savings related to input purchases but also has far reaching effects for improved natural resource management and conservation.
- Enhanced economic opportunities for farms and ranches participating in carbon markets through a better understanding of carbon cycles in North Dakota soils.