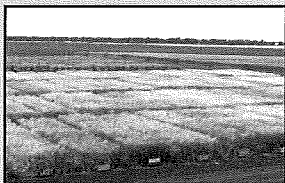




## Program Highlights

- Crop nutrition and fertility
- Germplasm evaluation



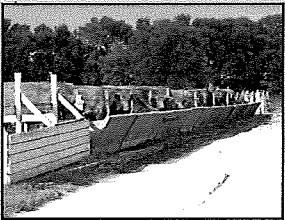
- Disease research



- Soils and salinity
- Precision agriculture



- Livestock research

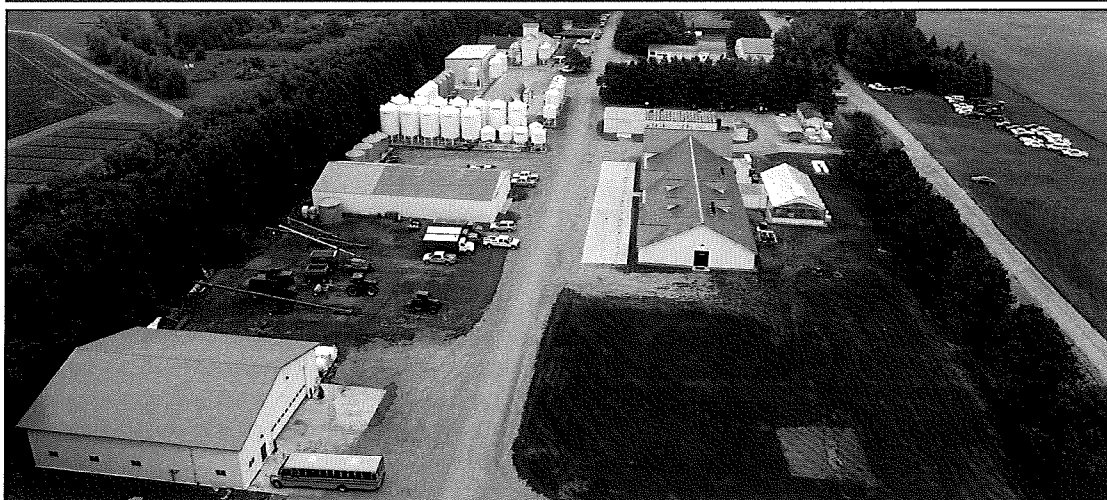


- Foundation seedstocks production
- Extension outreach
- Fruit and berry evaluation



## NDSU Carrington Research Extension Center

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## DESCRIPTION

The Carrington Research Extension Center conducts research and educational programs to enhance the productivity, competitiveness, and diversity of agriculture in central North Dakota. Research activities at the CREC include scientists and support staff trained and implementing programs in Agronomy, Plant Pathology, Soil Science, Precision Agriculture and Animal Science. These program teams are able to address a broad scope of factors that impact North Dakota agriculture. The crop diversity of the state is addressed in all program areas and is further supported by the ability to conduct research under both dryland and irrigated conditions. Projects addressing organic crop production and a fruit and berry program broaden the constituency being served. The foundation seed program of the center represents an important part of the overall NDSU Foundation Seed program. The CREC is the base of operation for four Extension specialists.

## FACILITIES

The CREC operates on a land base of just over 2,000 acres of which the Agriculture Experiment Station owns 840 acres and cooperating area landowners are depended on for rental of the remaining acres. Four center pivots provide irrigation on 250 acres while infrastructure supplies water for more than 80 acres of misting systems on owned land. Researchers also conduct off-station crop production field trials near Dazey, Wishek, LaMoure, and Fingal, and operate an expanded research program on irrigated crop production at the Oakes Irrigation Research Site.

Center facilities include the headquarters building, an agronomy laboratory and greenhouse, shop, seed conditioning plant, and seed and equipment storage buildings. The livestock unit can accommodate about 500 head of cattle. It includes a feed mill, feedlot pens, feed and forage storage, animal shelters and an office. An extensive roadway system links the headquarters and livestock unit with the land owned by the Center.

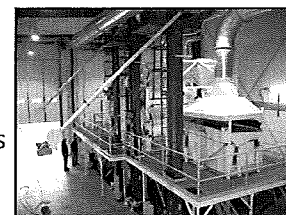
## PROGRAM IMPACTS



- A precision ag field trial showed a 40% reduction in herbicides applied by combining UAS imagery for site-specific weed ID and automatic sprayer nozzle control, leading to both economic and environmental benefits.
- Collaborated with NDSU's spring wheat breeder to compare experimental spring wheat lines across a salinity gradient with the objective to identify potential germplasm with improved tolerance

to soil salinity.

- New seed conditioning plant became operational in 2018 achieving the goal of ensuring the CREC's capability to provide highly pure Foundation grade seed to the industry and improve conditions for worker safety.
- Tolerance of cool-season cover crops to common residual herbicides used for soybean production is being evaluated to improve the success of cover crop establishment in this low-residue crop.
- Increased the educational efforts in the livestock program through the addition of two graduate students conducting research, including collaborations with main station faculty and other REC scientists.



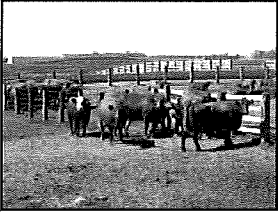
## PROGRAM IMPACTS (CONT.)



- Insect pollinators are being studied using diverse cover crop plantings and annual crops to evaluate their effect on crop performance, determine species populations and identify crops that bees visit through pollen analysis.
- Expanded bunk management and distillers grains research that will aid in understanding the link between feedlot management, distillers grains inclusion, and incidence of Polioencephalomalacia (PEM) in feedlot cattle.

• The fruit and berry project continues to serve a broadened constituency as rural and urban homeowners alike contact the Center's project leader for information on fruit production and related horticultural issues.

- A series of soybean trials with varietal diversity in plant architecture and maturity showed that yields are maximized under white mold pressure when planted to narrow or intermediate rows vs. wide rows when disease incidence is below 50%.



• Ongoing research evaluating the impacts of pre-weaning and post-weaning mineral programs are designed to determine the lasting impacts of trace mineral nutrition on livestock performance and health.

• Provided farmers and the agri-industry with variety and hybrid performance trial results from 68 different trials representing 26 different crops annually.



## PROGRAMMATIC NEEDS

### Increased Technical Support

Additional technical support is requested to support two research programs of the CREC. The plant pathology and precision agriculture scientist positions in the department were derived through the SBARE and legislative process. However, neither program was initiated with any technical support for the scientist.

### Operational Funding Enhancement

Significant increases in operational costs have impacted the research programs across the Ag Experiment Station. The majority of the department's operational costs are supported by funds derived from grants secured by CREC researchers. Opportunities to pursue grants are not increasing and not all types of operating costs are allowed by grant agencies.

### Further Support for Oakes Irrigation Research Site

The SBARE and ND Legislature's support of \$200,000 for the OIRS during the 2019 Legislative Session is greatly appreciated. Additional support is requested to cover reductions that will occur as the Garrison Diversion Conservancy District desires to reduce overall grant support of the research site.

## CHALLENGES TO SUSTAINING PROGRAMS

### Deferred Maintenance

Current support for maintenance of CREC facilities and infrastructure is inadequate to address current deferred maintenance costs. The programs of the CREC are supported by a diversity of facilities that include not only the primary buildings like headquarters and laboratory but also feedlot pens, feed and seed storage, animal shelters, roadways, parking lots, water supply features, storage buildings, and waste containment.

### Land Base

A secure land base is critical to sustain the current and future research mission of the Carrington Center. The diverse programs of the CREC operate on an owned land base that is relatively small. The majority of the land used among programs is generally secured by annual rental agreements from seven different landowners. The heavy reliance on rented land comes with risks in our ability to maintain programs and with significant annual costs to the department.

## FUTURE CAPITAL PROJECTS

### Equipment Storage

Additional equipment storage capacity is needed to protect high-value research and large-scale equipment from exposure to the elements. Equipment degradation due to precipitation events, freeze-thaw cycles and sunlight increases repair costs and results in equipment depreciated in value more quickly.

### Feedlot Facility Enhancement

This long-time CREC capital project priority includes a facility with heated storage for equipment used for feeding livestock daily, an additional set of feedlot pens, a hoop barn, and related waste containment. An additional set of pens would allow the CREC to incorporate more treatments or add replications to existing studies or add feedlot studies. A hoop barn would allow research on an alternative beef production system for northern latitudes and expand our capabilities to evaluate environmental issues.