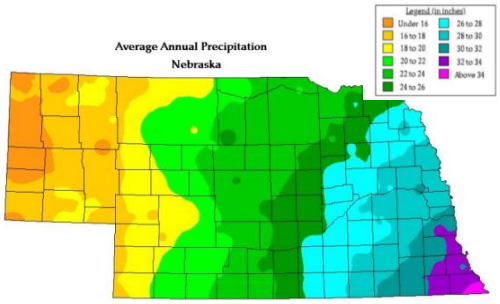
OVERVIEW APPENDIX 9
REEC STATEWIDE STRATEGIC DIRECTIONS

Introduction:

The University of Nebraska Institute of Agriculture and Natural Resources (IANR) at the University of Nebraska-Lincoln (UNL) was created by the Nebraska Legislature in 1973 through the enactment of LB149. This legislation followed more than ten years of discussion by state leaders and University officials in Nebraska who were concerned that agriculture was not being given proper financial support, administrative access and prominence within the University. https://ianr.unl.edu/

The Institute of Agriculture and Natural Resources consists of the three divisions, the Agriculture Research Division, Nebraska Extension and the College of Agricultural Sciences and Natural Resources (CASNR). There are twelve academic Departments in Agriculture & Natural Resources, 3 departments in Education & Human Sciences, 8 research sites located across the state and 16 multi-disciplinary centers. https://ianr.unl.edu/ianr-organizational-chart Collectively the Institute has more than 1,600 full-time employees which include 330 tenure-track faculty and 180 Extension Educators.



Nebraska Extension and the Agriculture Research Division team up to support three Research, Extension and Education Centers across the state which oversee 43,000 acres of land across the state. Each center has multiple research sites that create a unique network of areas to conduct research and extension across the state. The change in annual precipitation from the eastern part of the state to the Panhandle ranges from over 30 inches per year to 15 inches per year; with elevation ranging from 900 feet in the east to over 5,000 feet in the west. The unique cropping systems and crops grown also changes from east to west and within each of the state five agroecozones. Having research and Extension specialists with staff located at various locations across the state is a key contributor to Nebraska's ability to provide quality Extension and research programs. The purpose of the REEC's is to support research and Extension programing conducted by local specialists and all IANR faculty

One third of Nebraska's population of 1.9 million people live in Lincoln and Omaha with half of the population living in Lancaster, Douglas and Sarpy Counties. Eighty-nine percent of Nebraska towns have a population less than 3,000 people. Fifty percent of counties are experiencing a declining population. Four of the least populated counties in the US are located in the Nebraska Sandhills, having a population of less than 600 residents.

IANR Statewide Initiatives:

In 2011, IANR defined its focus on six communities of practice. These communities build on the strengths of cross disciplinary collaborations within the institute. The statewide initiatives that are defined can support IANR communities of practice through research and Extension programing.

Computational Sciences	Drivers of Economic Vitality for Nebraska
Healthy Humans	Healthy Systems for Agricultural Production and Natural Resources
Science Literacy	Stress Biology

The Institute of Agriculture and Natural Resources with Nebraska Extension, the Agriculture Research Division and CASNR are working in concert to fulfill the core aspirations of the University of Nebraska – Lincoln's Mission for the next 25 years. The core aspirations are 1) Nebraska students co-create their experience; 2) Our research and creativity transforms lives and learning; 3) Every person and every interaction matter; and 4) Engagement builds communities. In a call to action, IANR is developing discipline specific Hubs which will work towards fulfilling these core aspirations. The REEC's will work to support research, Extension and teaching in the Hubs which are as follows:

- The Nebraska Integrated Beef Systems Initiative
- The Crops and Water Hub
- The Rural Community Prosperity Initiative

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Structure:

Historically the state was divided into various Research and Extension Districts which administrated research and county Extension offices. Effective January 1, 2020 the district lines went away and to administer Extension programing 11 Engagement Zones were developed. Each Engagement Zone Coordinator is responsible for the administration of the Extension educators and the county staff and operations in their zone. The Engagement Zone Coordinators report to the Dean of Extension. The three Research, Extension and Educations Centers administer the resources and facilities at their centers and connect to the educators across the state to support programing.

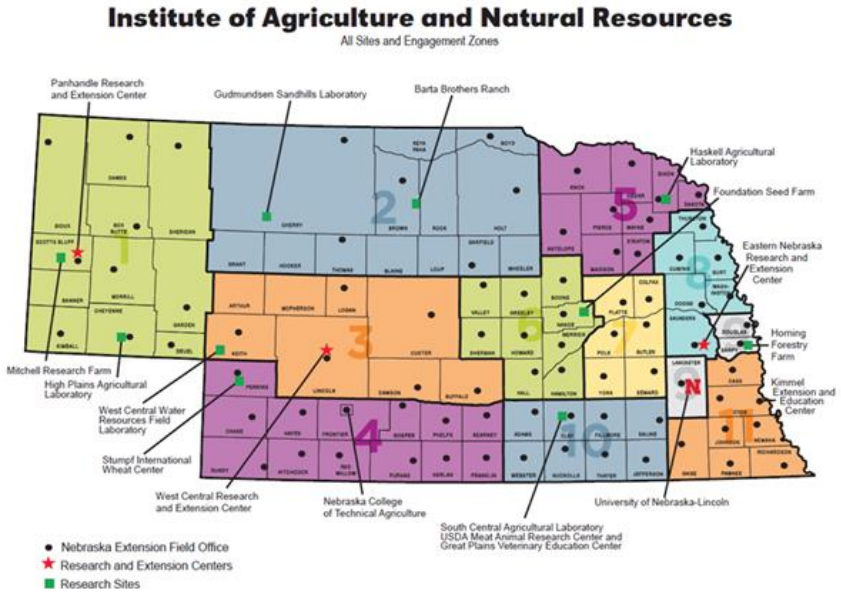
Facilities:

The Institute of Agriculture and Natural Resources is fortunate to have various facilities across the state to conduct research and Extension programing. Those that are administered each REEC are listed below and are shown on the statewide map of IANR facilities.

Eastern Nebraska Research, Extension and Education Center, Ithaca, NE.
The center is located within 30 miles of UNL's East Campus and consists of 9,500 acres of crop land, pasture and livestock operations. The center also oversees the following:
Barta Brothers Ranch, Rose, NE. A 6,000 acre ranch.
Haskell Ag Lab, Concord, NE. A 480 acre farm for crop land and beef research facility.
South Central Ag Lab, Clay Center, NE. A 640 acre farm for crop land research.

West Central Research, Extension and Education Center, North Platte, NE.
The center is located in a semi-arid environment in the Platte river valley and consists of 1,848 acres, which include 1200 acres of grazing pastures and 648 acres for small plot research. The center oversees the following:
Gudmundsen Sandhills Laboratory, Whitman, NE. A 12,800 acre working ranch with 700 cows.
Water Research Lab, Brule, NE. A 1,120 acre farm with five center pivots and two rain fed quarters.
Henry J. Stumpf International Wheat Center, Grant, NE. A 640 acre farm in southwest Nebraska.

Panhandle Research, Extension and Education Center, Scottsbluff, NE.
The center is located on a 156 acre site for small plot research. The center oversees the following:
Mitchel Lab site. A 269 acre cropland site and the Research Feedlot.
High Plains Ag Lab, Sidney, NE. A 799 acre farm consisting of cropland and 1,600 acres of pasture.
Sioux County Experimental Range, Scottsbluff, NE. A 800 acre native range site.



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Mission and Vision:

State wide Research, Extension and Education Center Mission:

"Develop solutions that enhance the lives of Nebraskans through improved management of landscapes, production systems, and resources across our state."

The Research, Extension and Education Centers support the mission and vision of the Institute of Agriculture and Natural Resources as well as the various academic units that comprise IANR. Below are Mission and Vision statements from IANR, Nebraska Extension and the Agriculture Research Division.

The Institute of Agriculture and Natural Resources Vision:

"To serve Nebraska by providing internationally recognized science and education to assure Nebraska's competitiveness in a changing world."

Nebraska Extension Mission:

"Helping Nebraskans enhance their lives through research-based education."

Agriculture Research Division Mission:

To conduct problem-solving and fundamental research that:
Addresses priority issues facing Nebraska's agriculture and food industries.
Provides the knowledge base essential for managing our natural resources.
Promotes family well-being and community development.
Educates future scientists through hands-on experience.

College of Agricultural Sciences and Natural Resources:

Vision: "*CASNR is a community where everyone challenges themselves, is inclusive, asks bold questions, co-creates and is optimistic about the future.*"

Mission: "*Through our collective work, we positively transform the lives of our learners, Nebraskans and our global society."*

Advisory Boards:

Each Research Extension and Education Center hosts multiple advisory boards to provide input and direction to meet the needs of Nebraskans. Faculty are engaged and involved in state commodity boards that are relevant to their expertise. The faculty utilize local connections to stay connected to the ever changing issues that we face.

The Institute of Agriculture and Natural Resources benefits from the support and interactions of Agriculture Builders of Nebraska, Inc. (ABN) which is a state wide not-for-profit membership organization that serves as an advisory board to IANR. The organization is dedicated to ensuring that agriculture, natural resources and food systems continue their positive roles in contributing to the enhancement of life in Nebraska through IANR teaching, research and outreach programs. Made up of over 200 representatives from agricultural industry and production fields, the group is well connected to IANR's administration and faculty.

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REEC STATEWIDE STRATEGIC DIRECTIONS

Statewide Strategic Direction #1.

Water and nutrient management, impacting both water quality and quantity

Goals:

1) Support programing to help Nebraskans recognize interconnection between surface and ground water.
2) Develop programing to increase water and nutrient use effectiveness under variable climate.

Intended Outcomes:

1) Nebraska will see an improvement in water quality in both surface and ground water contaminants.
2) Nebraska will improve the flow of streams/rivers in an effort to increase in the saturation of the Ogallala aquifer.
3) Nebraskans will have a greater appreciation of the importance of water and nutrient use efficiency.

Goal 1. Support programing to help Nebraskans recognize interconnection between surface and ground water

Key Actions	*Implementation*	*Deliverables*
A. Develop educational opportunities that focus on improving nutrient management	REEC Specialists UNL Specialists UNL crops and water team	Producers will understand new technologies to manage nutrient applications and take steps to usethem
B. Prioritize programing that will allow producers to gain hands on experience with new management tools and strategies	REEC Specialists UNL Specialists UNL crops and water team	Programs will foster peer to peer connections and mentoring of technology to monitor water quality
C. Collaborate with Crops and Water Hub to increase awareness of sustainable landscape practices	REEC Specialists UNL Specialists UNL crops and water team	Producers will identify landscapes that are at high risk of contamination and develop strategies for conservation
D. Provide opportunities for water quality educational programs for urban users	Food Nutrition and Health Team Water Team	Programs will be hosted by REEC's which engage urban audiences on water quality
Milestone: By 2022 establish assessment survey to quantify producer involvement in water quality and use.		
Impact: Producers surveyed in 2023 will report they have taken management steps to address water quality.		

Goal 2. Develop programing to increase water and nutrient use effectiveness under variable climate.

Key Actions	*Implementation*	*Deliverables*
A. Increase collaborations with Natural Resource Districts to connect programming with producers	REEC Specialists UNL Specialists UNL crops and water team	Producers will document better conservation of water and nutrient application through survey analysis
B. Expand programing that promotes peer to peer learning opportunities	REEC Specialists UNL Specialists UNL crops and water team	Develop peer interactions in using technologies to make decisions on water use efficiency
C. Provide real time water use data across REEC operations to producers	REEC Specialists UNL Specialists UNL crops and water team	Documentation of an increase in producers who utilize irrigation scheduling
Milestone: By 2022 50% of participants in extension programs will utilize irrigation saving techniques.		
Impact: Producer survey will indicate that 75% of respondents are taking steps to improve sustainability		

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REEC STATEWIDE STRATEGIC DIRECTIONS

Strategic Direction #2.

Innovative cropping systems to improve soil health, conservation, sustainability & profitability

Goals:

1) Develop innovative cropping systems research that is organized in a structure to be repeated across the five agroecozones of Nebraska to address erratic precipitation and extreme temperatures.
2) Engage producers in making decisions to avoid the development of pesticide resistant species.
3) Explore the development of alternative crops and varietal development.

Intended Outcomes:

1) Nebraskans will gain awareness of and implement new strategies to improve farm sustainability.
2) Specialists and educators will engage producers through on farm research to enhance decision making skills.
3) Producers will make decisions that reduce the development of pesticide resistant species.

Goal 1. Develop innovative cropping systems research that is organized in a structure to be repeated and across the five agroecozones of Nebraska to address erratic precipitation and extreme temperatures.

Key Actions	*Implementation*	*Deliverables*
A. Collaborative projects will be identified by faculty that can be implemented across the state	REEC Specialists UNL Specialists UNL crops and water team	Investigators/specialists will document the results of trials across the state's geographic regions
B. Engage producers on soil health and conservation projects through long term crop rotation studies	REEC Specialists UNL Specialists UNL crops and water team	Producers will understand how results of their on farm research compare to others across the state
Milestone: REEC's will identify three new projects that are connected across the state by 2023		
Impact: A better understanding of how and why crop rotations affect soil health and conservation.		

Goal 2. Engage producers in making decisions to avoid the development of pesticide resistant species

Key Actions	*Implementation*	*Deliverables*
A. Research projects will contribute to the development of decision support tools	REEC Specialists UNL Specialists UNL crops and water team	Producers will utilize tools and take appropriate steps to reduce pesticide resistant species
B. New learning opportunities that educate on pesticide resistant species will be developed	REEC Specialists UNL Specialists UNL crops and water team	Management tools will be adopted by farm decision makers and data shared with specialists
Milestone: Producers involved in extension programs will report a 25% increase in identifying and implementing steps to reduce pesticide resistant species on their farms.		
Impact: In five years producers will take steps to improve their management of pesticide resistant species		

Goal 3. Explore the development of alternative crops and varietal development.

Key Actions	*Implementation*	*Deliverables*
A. Expand on a robust variety testing program across the state	Crop variety testing team	Results will be presented to stakeholders to making decisions prior to the next growing season
B. Research demonstration and/or plots will be strategically placed across the state	REEC Specialists UNL Specialists UNL crops and water team	Recommendations for alternative crops and varieties from demonstration plots will be shared
Milestone: Extension will see a 25% increase of producers attending or engaging in variety field days.		
Impact: 50% of producers surveyed will indicate testing a new variety and or new crop on their operation		

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REEC STATEWIDE STRATEGIC DIRECTIONS

Strategic Direction #3.

Developing resilient food animal production systems

Goals:

1) Develop systems for efficient and sustainable beef production.
2) Contribute to the NIBSI[+] Mission of a greater understanding of the interactions of G x E x M x S *.
   [+] (Nebraska Integrated Beef Systems Initiative) *(Genetics by Environment by Management by Social Factors)
3) Integrate the next generation of management technology to beef systems.

Intended Outcomes:

1) Producers will increase the productivity per unit of land.
2) Nebraska beef producers will improve their decision making with the use of newly developed tools to improve rangeland health and sustainability.

Goal 1. Develop educational systems for efficient and sustainable beef production.

Key Actions	*Implementation*	*Deliverables*
A. Programing development will provide steps for producers to improve economy of production	UNL Beef Team Specialists Beef Educator Team	Producer will incorporate steps and identify where profitability can be increased
B. Teams will be formed to develop programing which documents improving beef system sustainability	UNL Beef Team Specialists Beef Educator Team	Educational venues will share products and trainings or consultations with producers
C. Connect with US MARC an GPVEC	REEC Directors	Provide educational platforms
Milestone: By 2023 50% of producers participating in extension programs will be able to document the implementation of steps on their operations for sustainable and resilient production		
Impact: Producers will document an increase in resilient landscapes		

Goal 2. Contribute to the NIBSI[+] Mission of a greater understanding of the interactions of G x E x M x S *.

Key Actions	*Implementation*	*Deliverables*
A. Contribute to the NIBSI genotyping protocol	REEC Directors and Specialists	Data sets will be developed which utilize genetic information
B. Capture environmental and management data for statewide issues	UNL Beef Team	A series of programs will educate on the interactions of G x E x M x S
Milestone: By 2025 UNL faculty will be utilizing data from across the state in program development		
Impact: By 2025 research from all three REEC's will contribute to data presentations and publications		

Goal 3. Use next generation technology and management to develop tools/strategies which aid producer decisions.

Key Actions	*Implementation*	*Deliverables*
A. Provide collaborative translational research projects using technology	UNL Beef Team Specialists Beef Educator Team	Increase the adoption of technology at the farm or ranch
B. Connect next generation, decision tools, data management, and innovative cropping systems	UNL Beef Team Specialists Beef Educator Team	Producers will partner with Educators to test new strategies both at REEC's and on farm.
C. Host and collaborate with statewide cover crop research	UNL Beef and Crops Team	On site research will take place
Milestone: By 2025 REEC facilities will be utilizing multiple next generation tools to make decisions		
Impact: Documentation of new tools and strategies will be presented by producer		

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REEC STATEWIDE STRATEGIC DIRECTIONS

Strategic Direction #4.

Precision agriculture for both crops and livestock

Goals:

1) Develop farming and livestock precision management technologies with improved data collection systems.
2) Develop research and disseminate information on precision management systems to producers.

Intended Outcomes:

1) REEC's will use infrastructure to conduct precision management will utilize and test new technology.
2) Producers will be more inclined to utilize precision management tools to increase efficiency.

Goal 1. Develop farming and livestock precision management technologies with improved data collection systems.

Key Actions	*Implementation*	*Deliverables*
A. Identify sites for innovation centers with a focus on farm, ranch, and feedlot centers at REEC's	REEC Directors UNL Departments UNL Specialists	New technologies will be incorporated at these sites and facilities for research and demonstration
B. Identify producers to provide input and direction for innovation center development	REEC Directors Educators Crops and Water Hub	Advisory teams will guide the development of innovation centers on new technologies. Producers will be identified for collaborations with Educators
C. Develop the capacity to collect, store and disseminate data collection for multiple research groups to utilize	REEC Directors UNL Specialists	Data bases will be developed for multiple entities to utilize data
Milestone: 100% of operations participating in extension programs will identify the use of one new technology that is utilized on their operations by 2023		
Impact: REEC's will develop into interactive and informative educational sites for precision data teams		

Goal 2. Develop research and disseminate information on precision management systems to producers.

Key Actions	*Implementation*	*Deliverables*
A. Provide educational opportunities for producers to engage in hands on learning with new technologies	UNL Specialists REEC Directors and staff	Educational programs will be hosted at REEC's to meet the key action
B. Develop research protocols with producers and the Crops and Water team for the collection of on farm precision management data	UNL Specialists Extension Educators Crops and Water Team	Data will be published in UNL on Farm Research Report
Milestone: All Extension programing will include segments on new and evolving technologies that benefit producer operational function		
Impact: By 2025 50% of producers participating in Extension programing will report using one or more precision management tools on their farm or ranch which has resulted in greater efficiency		

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REEC STATEWIDE STRATEGIC DIRECTIONS

Strategic Direction #5.

Increase financial resiliency of ag producers and rural residents

Goals:

1) REEC's will collect and provide operational data for the development of farm and ranch management decision tools and cost of production parameters.
2) REEC's will provide support for UNL Specialists and Extension Educators in delivering programs to improve the profitability and sustainability of farm and ranch systems.

Intended Outcomes:

1) Data generated from REEC farming and cattle operations will contribute to agricultural economic programing.
2) Agricultural economic programing will reach across the state and be relevant to their geographic area.

Goal 1. REEC's will collect data for the development of farm and ranch management decision tools and cost of production parameters.

Key Actions	*Implementation*	*Deliverables*
A. Hold roundtable discussion with Ag Econ Team, Beef Team and Crops & Water Team	REEC directors	Identify three key areas where collaboration take place
A. Mechanisms will be put in place to collect cost of production	REEC Directors Ag Econ Specialists & Educators REEC Farm Managers	Cost of production data will be collected for each REEC agricultural enterprise
B. Cost of production will be recorded and shared for benchmarking	REEC Directors Ag Econ Specialists & Educators REEC Farm Managers	Data will be utilized to contribute to the Agricultural Economics Farm Management group
Milestone: REEC's will collect and develop a real time data set of unit cost of production for UNL employees to utilize by the end of 2021		
Impact: Greater connections to Ag Economics regional educators and campus-based specialists will be developed		

Goal 2. REEC's will provide support for UNL Specialists and Extension Educators in delivering programs to improve the profitability and sustainability of farm and ranch systems.

Key Actions	*Implementation*	*Deliverables*
A. REEC's will provide land and facility resources for specialists and educators to deliver programing	REEC Directors	Land and Animals will be available for Agriculture Economic programing to be delivered across the state
B. REEC's will work with local advisory groups to identify priority needs for Nebraska agriculture producers	REEC Directors Ag Econ Specialists Regional Ag Econ Educators Extension Educators	The Agricultural Economics Group will lead efforts in providing programing around priority areas
C. REEC's will utilize economic decision support tools developed by Farm Management Team	REEC Directors REEC Specialists	Farm Management Team will receive input from REEC operations concerning tools
Milestone: REEC's will collect data and contribute to the development of decision support tools to assess production practices across the state		
Impact: By 2025 Research collaborations will result in published findings and presentations		

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REEC STATEWIDE STRATEGIC DIRECTIONS

Strategic Direction #6.

Connecting the rural-urban interface through food, agricultural, health and science literacy

Goals:

1) REEC's will collaborate with specialists, extension educators and IANR teaching faculty to develop and produce science based agricultural educational programing for youth and adults.
2) REEC's will enhance their facilities to become living learning centers for agricultural literacy programing.

Intended Outcomes:

1) Nebraskans will have an understanding of the complexity and interconnectedness of the agroecosystem.
2) Nebraskans will have increased consumer confidence with the ability to make science informed decisions when making personally and socially relevant decision concerning food, energy, health and policy.

Goal 1. REEC's will collaborate with specialists, extension educators and IANR teaching faculty to develop and produce STEM based food, agricultural, health and science literacy programing for youth and adults.

Key Actions	*Implementation*	*Deliverables*
A. REEC's will utilize current programing and develop new programing for youth using facilities and mobile resources	Extension Educators UNL Specialists	1 out 3 students will participate in programs That connect them to agriculture and food production
B. Provide programing that connects students to agricultural careers	Extension Educators UNL Specialists	Students will identify at least three different agriculture careers paths related to agriculture
C. REEC's will provide internship opportunities for students desiring to gain agricultural experience	REEC Directors REEC Specialists	REEC's will make a commitment to provide a minimum of 2 internships which provide learning experiences in at least two agriculture areas
Milestone: Currently 1 of 3 students is involved in 4-H programing. REEC will contribute to reaching students with programing and by 2022 and will have an educational program to enroll students in.		
Impact: REEC's will further develop and define the "Educational" component of their operation		

Goal 2. REEC's will become living learning centers for food, agriculture and health literacy programing.

Key Actions	*Implementation*	*Deliverables*
A. REEC's will identify and develop places of learning for youth and the public in collaboration with specialists and educators	REEC Directors UNL Specialists Extension Educators	Each REEC will provide two learning exhibits/stations that will be open to the public providing key practices that occur in each region
B. Enhance Web based educational materials	Extension Educators UNL Specialists	Videos, podcasts etc. will be developed for discipline areas at each REEC
C. Provide opportunities to connect clientele to programs for urban adult learners in areas beyond agriculture programing	Extension Educators UNL Specialists	Expand program offering to industry and policy decision makers; Provide spaces to develop programing for Buy Fresh Buy Local, Health Living and Mental Wellness
D. Identify programing specific to underserved audiences	REEC Directors Reaching One Reaching All	Measurable impacts will be quantified in reaching underserved populations
Milestone: By 2025 Each REEC will have facilities and spaces that engage youth and adults in food, agriculture and health literacy		
Impact: Greater collaborations between REEC specialists with educators and campus-based specialists will be documented		

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REEC STATEWIDE STRATEGIC DIRECTIONS

Strategic Direction #7.

Workforce development for agricultural systems

Goals:

1) Create educational opportunities for Nebraskans to receive continuing education training to improve their skills by identifying specific areas that REEC's can contribute to workforce development in their region.
2) Provide credentialing for program completion with single and stackable digital badging options.

Intended Outcomes:

1) Improvement in the "Education and Skill Index" for the Nebraska Thriving Index.
2) Increase credentialing for those seeking documented completion of educational programs.
3) Improvement in the population "Demographic Growth and Renewal Index" of the Nebraska Thriving Index.

Goal 1. Create educational opportunities for Nebraskans to receive continuing education training to improve their skills by identifying specific areas that REEC's can contribute to workforce development in their region.

Key Actions	*Implementation*	*Deliverables*
A. Form collaboration with Blue Print Nebraska to identify workforce needs unique to the location of each REECC in the state	REEC Directors	Each REEC will identify two workforce needs that is applicable to their region and create educational and work force training programs
B. Develop Programing for Nebraska's workforce needs which results in credentialing	REEC Directors	Participants will receive documentation such as a digital badge for completion of program
Milestone: By 2023 Each REEC will have a signature program which contributes to workforce development		
Impact: New educational credentialing programs will enhance stakeholder's competitiveness in the job market		

Goal 2. Provide credentialing for program completion with single and stackable digital badging options.

Key Actions	*Implementation*	*Deliverables*
A. Identify programs for credentialing by surveying stakeholders and educational leadership	REEC Directors	REEC's will use advisory groups to identify 2-3 key programs where workforce training can be conducted for certification
B. Develop credentialing with digital badges for programs which will be utilized by participants in collaboration with CASNR	REEC Directors Specialists & Educators	Documentation of training for those seeking continuing education and developing skills for future endeavors
C. REEC's will initiate conversations with educational institutions for potential programs	REEC Directors	Each REEC will identify a program that can be collaborated with an educational institution
D. REEC's will develop partnerships with H.S. Agricultural Education Programs	REEC Directors Specialists & Educators	Each REEC will develop an educational program with a regional High School FFA program
Milestone: By 2023 each REEC will contribute expertise in the development and support of a program that results in a form of credentialing for secondary and post-secondary students as well as non-degree seekers		
Impact: By 2025 successful completion of programing resulting in career advancement will be documented		

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REEC STATEWIDE STRATEGIC DIRECTIONS

Strategic Direction #8.

Develop undergraduate and graduate experiences

Goals:

1) Create educational opportunities for students to gain experience in research and Extension.
2) Develop learning spaces where students can engage in learning opportunities beyond the classroom.

Intended outcomes:

1) Students will graduate with higher level experiences through engagement and critical thinking.
2) Students will be sought after by employers.

Goal 1. Create educational opportunities for students to gain experience in research and Extension.

Key Actions	*Implementation*	*Deliverables*
A. Collaborate with CASNR to create opportunities for students at each of the REEC facilities	REEC Directors CASNR Dean's office	Students across multiple majors will have opportunities to engage in learning experiences at REEC's
B. On campus classes will have opportunities to engage in REEC facilities through tours, specialists' interactions and case studies	REEC Director REEC Specialists,	Campus basked faculty will have opportunities to engage with specialists and staff at each REEC to support learning outcomes
Milestone: By the summer of 2021 summer experiences will be set up for students at each REEC		
Impact: Students will report positive increases in critical thinking and understanding of agriculture research		

Goal 2. Develop learning spaces where students can engage in learning opportunities beyond the classroom.

Key Actions	*Implementation*	*Deliverables*
A. Identify experiences for students at each of our research facilities	REEC Directors	Each facility will have students engaged in research learning activities
B. Provide opportunities for entrepreneurs to collaborate with REEC Faculty	REEC Director WCREEC Specialists, Rural Prosperity Educators	New collaborations will be developed to engage aspiring entrepreneurs in areas including food production and business development
Milestone: By January 2021 opportunities for students will be advertised through CASNR		
Impact: Students engaged on off camps learning opportunities will report gains in experience and exposure to current agriculture issues		

CENTER FOR PLANT SCIENCE INNOVATION STRATEGIC PLAN APPENDIX 10

Vision

Improving Nebraska and global well-being through innovative plant science research and education

Mission

The mission of the Center for Plant Science Innovation is to:

(1) enable innovative plant biology research,

(2) facilitate the translation of basic discoveries into applied technologies that improve crop productivity and quality,

(3) foster a collaborative environment that bridges unit, department, campus, state, and national boundaries,

(4) promote scientific education and professional development of students, staff, and post-doctoral scientists, and

(5) improve public understanding of modern plant science research and its societal importance.

Core Values

The Core Values of PSI are:

1. To strive for excellence in individual and team research.
2. To stimulate and support innovation and creativity.
3. To work with professional integrity and mutual respect.
4. To foster collaboration within and outside PSI.

Priorities

Priority 1: Collaboration

Collaboration, both within and outside PSI, increases access to equipment and expertise, broadens opportunities for sharing information and ideas, and has the potential to increase grant funding. The ability of PSI to promote collaboration requires knowledge of resources available to research groups, open communication among faculty within and outside PSI, and stronger linkages with upper administration to seek funding for collaborations and to develop concepts for major external funding opportunities.

Priority 1.1. Create a database of equipment and expertise of PSI researchers

Rationale:

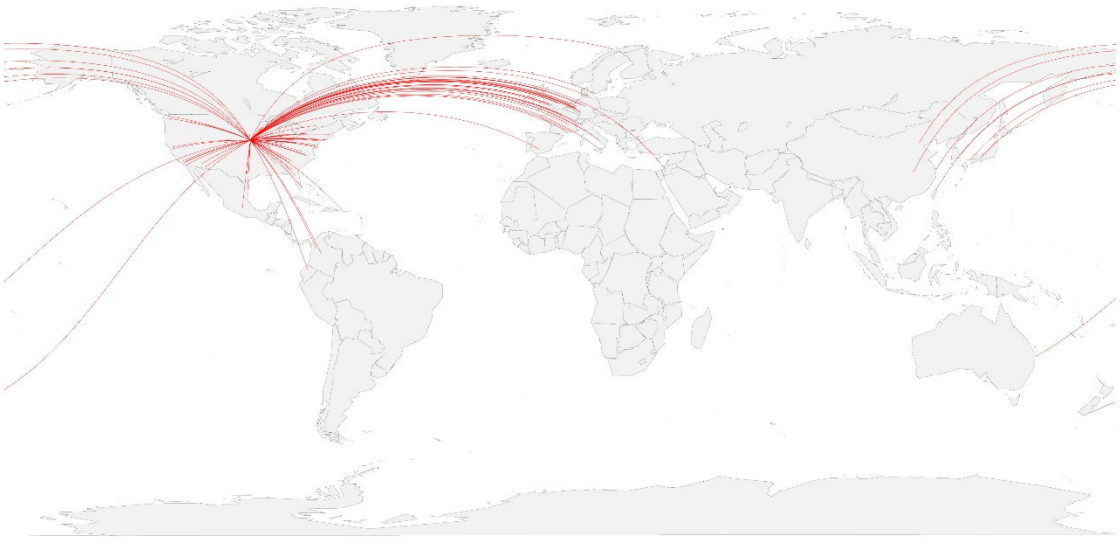
PSI labs have diverse instrumentation and technical expertise, which are often not widely known among PSI personnel.

Activities:

1. Assemble a searchable database of major instrumentation available for use and skill sets in PSI labs.
2. Disseminate database of instrumentation and research expertise in an online form among PSI labs.

Outcomes:

1. Knowledge of existing instrumentation will promote more effective use of resources by reducing duplication of instruments.
2. Knowledge of faculty instrumentation and skill sets will enhance collaborations and expand research capacity.



Priority 1.2. Form collaborative research groups of investigators from within and outside PSI with team-building events once or twice per year

Rationale:

A strength of PSI and the greater UNL scientific community is the diversity of research interests that when brought together allow for achievement of more impactful targets that are beyond the capability of individual research groups. Cross-disciplinary collaborations also increase the competitiveness of PSI and UNL researchers for major external funding.

Activities:

1. Have regular discussions on big grant ideas as standalone meetings (and/or reports during regular PSI meetings).
2. Have more social activities for PSI faculty and staff.
3. Work with other centers, departments, and upper administration to leverage seed funds to promote cross-disciplinary collaborations with high potential for significant scientific impact and external funding.

Outcomes:

1. Enhanced scientific and societal impact of PSI and UNL research.
2. Increased submissions and funding success of large grant proposals.
3. Increased stature of PSI in the UNL research enterprise and in the international plant science research community.

Priority 2: Funding

Funding for PSI is critical not only to the mission but for the future success of the Plant Sciences at the University of Nebraska-Lincoln. Currently the faculty in the Center are very active in both research and teaching. PSI is one of the most productive centers in terms of external research funding as compared to other centers on the UNL campus. PSI not only provides a very small amount of yearly flexible funds for the core faculty, but also uses funds for other important activities related to research and student education. In order to expand the Center to enhance its success and to help boost the national reputation of the University of Nebraska-Lincoln stable funding is essential, as is increased funding in the future.

Priority 2.1. Develop a transparent budget to use current funds to most strategically achieve PSI mission

Rationale: Transparency creates trust and buy in from faculty and will help the Director to make the best decision on the use of funds by getting input from others.

Activities:

1. Review of last year's budget in the different categories.
2. Review of next year's budget with the Advisory Committee to help plan expenditures.
3. Develop a yearly wish list in April of equipment needs.

Outcomes:

1. A transparent budget will allow all members of PSI to have input into how the director is using the funds.
2. Forward planning for the use of funds will avoid scrambling at the end of the year to use the budget and avoid end of year purchases of equipment that is only used by few labs on an occasional basis.

Priority 2.2. Develop a plan for long-term use and obtaining stable funding base for PSI

Rationale: Use funding in a forward looking mode to proactively take advantage of future trends in plant science research which is vital to the agricultural economy and natural ecosystems.

Activities:

1. Seek funding for graduate students by leveraging PSI funds to obtain matching funds from ORED, ARD and IANR.
2. Develop an endowment for PSI by cultivating relationships with alumni and supportive faculty, farmers, and commodity boards.
3. Use funds to seed projects that will be most likely to be able to attract future external funding.

Outcomes:

1. Align PSI's desire to have more graduate students in the plant sciences with IANR's long term goal to increase graduate student enrollment.
2. Higher quality students will enhance PSI research profile.
3. Forward looking investments in faculty research and new scientific areas will enhance grant success and raise the level of excellence in the UNL Plant Sciences.

Priority 3: Increasing Visibility

Increasing the visibility of PSI activities and faculty is critical to obtaining funding resources and support, and attracting excellent students, postdocs, and new faculty. By increasing our visibility and engaging with stakeholders, we can broaden the impact of our research outputs. Increased visibility will enhance our reputation and prestige, and can lead to awards for PSI. We recognize the importance of our visibility at all levels - local, national, and international.

Priority 3.1. Improve web page and increase use of social media

Rationale:

The utilization of internet and social media communication are efficient ways to increase PSI's visibility and especially effective in recruiting students and postdocs. These communication methods can be implemented easily and with relatively low cost. Web page content is freely accessible to audiences and, more importantly, it is not limited by publisher restrictions. Therefore, the PSI and associated faculty web pages can potentially reach and influence a much wider and diverse audience. However, if content is not maintained and regularly updated, our web existence cannot be effective and it may even hurt our visibility.

Activities:

1. Form a committee to construct and improve the PSI web page and establish a means to maintain updated content.
2. Regularly update social media channels to report our achievements in research and outreach.

Outcomes:

1. PSI will have an aesthetically pleasing and informative web page, which will be updated regularly.
2. Various achievements by PSI faculty will be found on social media regularly.
3. We can recruit excellent students, postdocs, and future faculty.

Priority 3.2. Professionally create promotional and outreach materials

Rationale:

Professionally designed and prepared promotional materials will increase our visibility more efficiently.

Activities:

Contract communication professionals to produce promotional materials for PSI. Materials will include web templates, as well as promotional flyers, posters, and videos.

Outcomes:

Various types of promotional materials will be developed.

Priority 3.3. Invite external scientists to come in and interact with the group

Rationale:

The academic visibility is recognition by peers and it leads to reputation, prestige, and awards.

Activities:

1. Employ existing Biotech/Life Science Seminar Series to invite external scientists.

2. Organize symposiums, retreats, and workshops more frequently and invite more external scientists.

Outcomes:

1. External scientists in various fields will be invited more broadly and this will increase visibility within the plant sciences community.
2. PSI has the potential to be recognized nationally as well as internationally.
3. PSI faculty will be invited nationally and internationally more frequently in reciprocal speaking arrangements.
4. PSI students and postdocs can meet external scientists and make connections impacting their careers.

Priority 3.4. Develop outreach activities

Rationale:

Promotional activities such as PSI plant day (e.g., Fascination of Plants Day), state fair, and open house are great ways to enhance our research visibility for a broader audience. An annual open house, for example, can attract the general public, potential investors, administrators, and recruit students and postdocs.

Activities:

1. Establish presence at Plant Day and State Fairs.
2. Hold an annual open house.
3. Develop materials specifically for outreach (see 3.2).

Outcomes:

1. PSI will be more visible at various platforms.
2. PSI will be known locally with a wider audience.

Priority 3.5. Awards Committee

Rationale:

Establish an Awards Committee that will identify awards and recognitions suitable for PSI faculty. The Awards Committee will encourage and facilitate the application process. It will enhance our chance of being nominated for various awards and will increase the visibility of PSI and PSI faculty.

Activities:

Form the Awards Committee. It will identify awards suitable for PSI members, make recommendation, and guide their activities and application process.

Outcomes:

1. More PSI faculty will become aware of various awards process.
2. More PSI faculty will be nominated for national or international awards.

Priority 4: Students/Education

Since its inception, PSI has enabled faculty from different departments and colleges to synergize their research in molecular, biochemical, genomic and statistical aspects in the study and improvement of crop species. Faculty are adept at weaving together their roles as PSI members and successful and influential members of their own departments. However, there is a perception that the identity of students in labs of PSI faculty is less than clearly defined. How do graduate students see themselves with respect to PSI and their home departments? What does PSI mean to them? How can graduate students be encouraged to take ownership of PSI independently of their advisor? Similarly, undergraduates working in PSI labs have little or no understanding of the nature and function of PSI. This priority seeks to extend PSI's influence to graduate and undergraduate students both from UNL and outside.

Priority 4.1. Create a 1-credit class 400/800, 1 hour per week during the summer

Rationale:

PSI students attend the monthly research group meetings during which graduate students and post-docs present their research. Questions arising from presentations usually come from faculty and there is the sense that students are hesitant to ask questions. The proposed activity provides a separate forum to encourage graduate students to interact collaboratively and socially with other PSI lab members and share the in the innovation process of PSI.

Activities:

1. A one credit hour course will be implemented. The format will be one 30-minute research talk and one 30 minute journal club paper presentation per one hour class. All registered students could make one research and one paper presentation during the course and all masters and PhD students will be required to take the course once during their degree. Upper level undergraduate students and graduate students not affiliated with PSI labs will also be encouraged to take the course. Students will be graded on their presentations as well as their participation in the discussion and the quality of their questions. Faculty will be encouraged to attend but not required. Responsibility for running the course will be shared by two to three faculty members on a rotating basis with the

idea that all PSI faculty will contribute.

Outcomes:

1. Students gain practice in presenting their work and presenting published work that is relevant to current trends in plant science.
2. Students develop an appreciation of research being conducted in other PSI labs and the technical capabilities in the Biotechnology center.
3. Students become more proactive in their own research project, more creative and innovative, and more confident at scientific communication with their peers.

Priority 4.2. Develop summer undergraduate research opportunities for students (e.g., REU) and teachers

Rationale:

Related to a perceived need to increase PSI's outreach to the general public, we have great opportunities to provide more formalized research opportunities for undergraduates as they explore the possibility of research careers at UNL or elsewhere.

Activities:

We will apply for NSF REU (Research Experience for Undergraduates) scholarships to support three to five undergraduates per summer. We will also request a matching number of scholarships from the Agricultural Research Division at UNL as well as exploring the possibility of industry funded internships. Scholarships will be distributed at the discretion of the PSI Internal Advisory Committee. Eligible undergraduates will be current UNL students, and students from outside institutions such as Doane University.

Outcomes:

1. Undergraduates gain a research experience, possibly fulfilling their internship requirement.
2. Provides means for PSI faculty and undergraduates to identify future graduate student placings.
3. Helps PSI faculty create innovative educational aspects that fulfill the broader impacts sections of NSF projects.

Priority 5: Membership

Membership is currently defined in the bylaws as follows: Shall be limited to Faculty, holding a tenure-leading Assistant Professor or higher rank, with partial budgeted appointment to PSI or who contribute grant indirect costs to PSI, and whose research program is in accordance with the mission of PSI. It is expected that faculty considered for membership will be actively involved in graduate training and grant submissions

Priority 5.1. At the conclusion of strategic planning, formalize the dates of the internal advisory board committee meetings. Formalize a role for the committee in discussing and implementing membership policy.

Rationale:

Formalized dates will enable the Internal advisory committee to perform the duties defined in bylaws. The role of the internal advisory board in discussing and implementing membership policy was suggested by PSI faculties

Activities:

1. Set 2018 quarterly meeting dates.
2. Formalize the role for the committee in discussing and implementing membership policy.

Outcomes:

1. Have set committee meeting dates.
2. Have a committee to implement membership policy.

Priority 5.2. Redefine the bylaws based on a new membership strategy

Rationale:

PSI needs a mechanism to remove those who do not qualify and to add those who will be strong members.

Activities:

1. In 2017 PSI Faculty meeting, form a committee to redefine the bylaws.
2. Redefine the bylaws.

Outcomes:

PSI will have new bylaws with a new membership strategy.

Priority 5.3. Define who we are. Define what it means to be a part of PSI.

Rationale:

The core value of being a PSI member needs to be defined.

Activities:

1. In 2017, Internal Advisory Committee will set a date to discuss the core value of being a PSI member.
2. The result will be brought to PSI faculty meeting for discussion.

Outcomes:

Have a definition on responsibility and benefits of being a PSI member.

Priority 6: External Advisory Board

Establishment of an external advisory board will benefit PSI's research direction, graduate student training, and scientific excellence. In addition, an external advisory board will validate PSI's contribution to research at UNL and provide external perspectives. The External Advisory Board can also advocate for additional institutional investments to advance PSI's research, teaching, professional development, and outreach activities

Priority 6.1. Create External Advisory Board

Rationale:

PSI research directions, mission, progress, and resource limitations can be better assessed and more effectively communicated to UNL leadership by an external advisory board consisting of high stature scientific and industry experts.

Activities:

1. Assemble a gender-balanced external advisory board consisting of a prominent researcher, a representative each from small and large plant science companies, a director of a plant science center or similar program, and a philanthropist.
2. Set guidelines for expectations of external advisory board, including frequency of meetings with PSI members.
3. Develop a schedule and format for meetings with external advisory board.
4. Deploy the external advisory board for a meeting with PSI community.

Outcomes:

1. PSI research that is better directed to solving major societal and economic challenges.
2. Validation of and empowerment of the PSI director to make changes in PSI research and administrative directions.
3. Advocate for increased resources to support PSI mission.

Priority 7: Linkages with plant science research groups and centers outside UNL

Fostering connections with other plant science research groups and centers will lead to increased research collaboration, educational opportunities for faculty, staff, and students, and increased visibility of PSI outside UNL. These connections can also expand the breadth of resources and expertise available to PSI and promote development of collaborative projects for large grant funding opportunities.

Priority 7.1. Hold combined symposiums with nearby universities

Rationale:

The Midwest region collectively is a powerhouse for plant science-related research, with a particular focus on addressing challenges for crop production. Increased collaboration among nearby universities will enhance the quality and impact of research, the availability of resources and research capacity for PSI labs, and the formation of regional research groups equipped to obtain large federal grants.

Activities:

1. Work with leadership of plant science research groups and centers at nearby universities to develop rotating plant science symposia.
2. Promote participation with regional universities and other research institutions in the PSI biennial plant biology symposium.
3. Develop and/or initiate a rotating Big10 plant science research meeting.

Outcomes:

1. Facilitate expanded opportunities for research collaborations.
2. Increased stature of PSI among Midwestern plant science communities.
3. Promote expanded opportunities for large grant applications.

Priority 7.2. Link to plant science centers at other universities.

Rationale:

PSI and UNL have unique and specialized research capacity and expertise that can complement plant science research at other universities and institutions. Conversely, other universities and institutions may have expertise that complements plant science research at UNL. By developing linkages with these universities and institutions, investments in research capacity can be more strategically directed, recognizing that resources at any one institution are limited by financial constraints.

Activities:

1. Identify plant science centers that complement or augment PSI research capacities.
2. Develop linkages with these plant science centers through activities such as invitations of key faculty from these centers for participation in existing seminar series at UNL.
3. Expand these linkages through development of research collaborations and collaborative publications and grant proposal submissions.

Outcomes:

1. Expanded research capacity and funding opportunities.
2. Increased ability to direct multi-institutional funding to research opportunities.
3. Increased stature of PSI research.
4. Increased success rates of large grant proposal submissions.

Priority 8: Outreach

Public perception and understanding of science in the USA is still lacking. To ensure public appreciation and support for the plant sciences it will be important to provide the public with a glimpse into the aims and outcomes of our research. Particularly in Nebraska where agriculture is a major industry, the appreciation for plant science research should be very high and citizens should be interested in supporting the Center for Plant Science Innovation. Proactive steps to interact with the public should be taken.

Priority 8.1. Hold annual outreach events

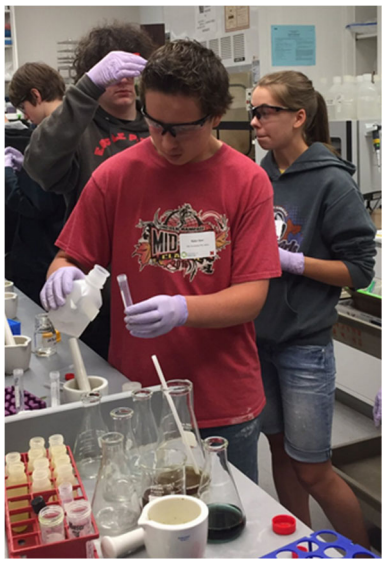
Rationale: Engage the public and enhance understanding of science and the importance of the plant sciences in feeding the world.

Activities:

One or more outreach events will be held each year with the goal of educating the public about our research activities. These activities may include Sunday with a Scientist events and outreach events in Beadle that engage the public in plant science research and its benefits for society.

Outcomes:

Increased support for research from the public and an enhanced profile of PSI at UNL and in Nebraska.



Priority 8.2. Outreach for educators

Rationale: Educating high school teachers in the plant sciences will have a higher return on investment than educating students and will facilitate the teaching of plant sciences in our high schools. Enthusiastic teachers will also help spread the word of the importance of plant science research and education.

Activities:

1. Develop online resource guides from basic to more complex concepts in plant sciences.
2. Organize workshops focused on adoption of the resource guides.
3. Seek funding opportunities for initial teacher reviews as well as continuing funds for teaching materials in the plant sciences.

Outcomes:

Greater awareness of plant sciences in high schools and primary schools will translate into more support for research, more student interest, and increased federal funding.

Priority 8.3. Outreach for journalists and politicians

Rationale: To influence public policy and to gain further support from the public we will also reach out to journalists and politicians.

Activities:

1. Form a panel to answer and compile FAQs about GMOs and other basic science advances.
2. Invite journalists and politicians to PSI events including symposia and outreach events.

Outcomes:

Elevate profile of PSI with the public.

Priority 9: Space and Infrastructure

To expand and perform research more effectively, more space and better infrastructure are needed.

Priority 9.1.

Rationale:

The current space in Beadle Center is limited and not able to accommodate all members of the Center. The overall feeling is that the Center would benefit from all the members being more closely located together. In comparison to other Big10 universities, infrastructure for cutting edge plant science research is lacking at UNL. As more members and grants come in, PSI needs more space and infrastructure to accommodate research and facilities. Additionally, the quality of growth facilities is not optimal at the current time.

Activities:

1. Discuss with upper administration to ask for more space and to improve infrastructure.
2. Develop a long-term planning process for PSI space on NIC or at East Campus.

Outcomes:

1. PSI will have sufficient space and infrastructure to foster and promote faculty research excellence.
2. More collaborative research and collaborative grants will be developed and promoted.

Priority 10: Accountability

For the strategic plan to be effective, we need to develop some mechanism for accountability for implementation. Accountability includes delegation and acceptance of share of work by all PSI members for implementing the action plan from strategic planning.

Priority 10.1.

Rationale:

To ensure that the outcomes of the strategic report are executed efficiently and fairly.

Activities:

1. Director works with Internal and External Advisory Committees to annually assess progress toward implementation of strategic plan.
2. Allocate tasks related to strategic plan to all PSI members. Allocate resources dependent in part on research excellence and participation in implementation of strategic plan.
3. Document should be revisited annually.

Outcomes:

1. PSI will become a more cohesive group and a roadmap will be provided.
2. More fixed path for achieving excellence will be provided.
3. Greater visibility will be achieved.
4. All plans in the strategic plan will be addressed.

Timeline

Priority 1: Collaboration

Priority 1.1. Create a database of equipment and expertise of PSI researchers						
Activities	Checkpoints and **Milestones**					
	Year 1	Year 2	Year 3	Year 4	Year 5	Responsible
1. Assembly of a searchable database of major instrumentation and skill sets in PSI labs.	Sept 2017-April 2018 **Spreadsheet of major instrumentation and skill sets.**	Update of online database				All PSI members
2. Dissemination of database in an online form among PSI labs.		Sept 2018 **Dissemination of database on PSI website in members only section**	Update of online database	Update of online database	Update of online database	All PSI members
Priority 1.2. Form collaborative research groups of investigators from within and outside PSI with team-building events once or twice per year						
Activities	Checkpoints and **Milestones**					
	Year 1	Year 2	Year 3	Year 4	Year 5	Responsible
1. Have regular discussions on big grant ideas as standalone meetings (and/or reports during regular PSI meetings).	Jan 2018 Begin monthly lunch sessions	Sept 2018 **Assess effectiveness of lunch sessions.** Sept 2018-Aug 2019 Based on assessment, discontinue or revise approach.	Sept 2019 Assess effectiveness of sessions. Sept 2019-Aug 2020 Based on assessment, discontinue or revise approach.	Sept 2020 Assess effectiveness of sessions. Sept 2020-Aug 2021 Based on assessment, discontinue or revise approach.	Sept 2021 Assess effectiveness of sessions. Sept 2021-Aug 2022 Based on assessment, discontinue or revise approach.	PSI Membership
2. Organize retreat with chalk-talk session with people from other fields (e.g., computer science, statistics, engineering, etc.).		Sept 2018-Jan 2019 Plan format and other scope of chalk-talk sessions. **May 2019** **Implement chalk-talk**	May 2020 Based on assessment, continue chalk talk sessions.	May 2021 Based on assessment, continue chalk talk sessions.	May 2022 Based on assessment, continue chalk talk sessions.	Education and Outreach Committee

		sessions. Jun 2019 Assess effectiveness of session.				
3. Have more social activities for PSI faculty and staff	Nov 2017 Poll faculty on types of social activities Nov 2017 and continuing: Implement social activities	Continue: Implementation of social activities and assessment of activities. Modify activities as needed.	Continue: Implementation of social activities and assessment of activities. Modify activities as needed.	Continue: Implementation of social activities and assessment of activities. Modify activities as needed.	Continue: Implementation of social activities and assessment of activities. Modify activities as needed.	PSI membership
4. Work with other centers, departments, and upper administration for funds to seed trans-disciplinary research		Sept 2018 Initiate discussions with other centers about transdisciplinary research opportunities. Sept 2018-Aug 2019	June 2019 Initiate activities such as seed funding to promote collaborations.	Continue: Assess effectiveness of activities to promote collaborations. Modify, if needed. Seek opportunities to expand collaborations.	Continue: Assess effectiveness of activities to promote collaborations. Modify, if needed. Seek opportunities to expand collaborations.	PSI Director, PSI membership, collaborators, upper administrators

Priority 2: Funding

Priority 2.1. Develop a transparent budget to use current funds to most strategically achieve PSI mission						
Activities	Checkpoints and **Milestones**					
	Year 1	Year 2	Year 3	Year 4	Year 5	Responsible
1. Look at last year's budget in the different categories	Oct 2017 Present budgetary allocations for previous fiscal year.	Oct 2018 Present budgetary allocations for previous fiscal year.	Oct 2019 Present budgetary allocations for previous fiscal year.	Oct 2020 Present budgetary allocations for previous fiscal year.	Oct 2021 Present budgetary allocations for previous fiscal year.	PSI Director, Beadle Business Center Director
2. Look at next year's budget with the Internal Advisory Committee to help plan expenditures	Oct 2017 Director and Internal Advisory Committee to discuss FY18 budget allocations.	May 2018 Director and Advisory Committee to discuss FY19budget allocations.	May 2019 Director and Advisory Committee to discuss FY20 budget allocations.	May 2020 Director and Advisory Committee to discuss FY21 budget allocations.	May 2021 Director and Advisory Committee to discuss FY22 budget allocations.	Director, Internal Advisory Committee
3. Develop a yearly wish list in April of equipment needs	Jan 2018 Begin soliciting equipment needs and identifying possible sources for splitting costs. **April 2018** **Complete prioritized wish list and identification of funding sources.**	Jan 2019 Begin soliciting equipment needs and identifying possible sources for splitting costs. **April 2019** **Complete prioritized wish list and identification of funding sources.**	Jan 2020 Begin soliciting equipment needs and identifying possible sources for splitting costs. **April 2020** **Complete prioritized wish list and identification of funding sources.**	Jan 2021 Begin soliciting equipment needs and identifying possible sources for splitting costs. **April 2021** **Complete prioritized wish list and identification of funding sources.**	Jan 2022 Begin soliciting equipment needs and identifying possible sources for splitting costs. **April 2022** **Complete prioritized wish list and identification of funding sources.**	PSI Members, Director
Priority 2.2. Develop a plan for long-term using and obtaining stable funding base for PSI.						
Activities	Checkpoints and **Milestones**					
	Year 1	Year 2	Year 3	Year 4	Year 5	Responsible
1. Seek funding for graduate students	Oct 2017 Begin discussion with Vice Chancellor in Consider using internal funding to kick start program.	Continue discussions as necessary in 2018. If not successful, decide whether to continue seeking funds for GRAs.				PSI Director and Education Committee

2. Develop an endowment for PSI		April 2018 Come up with a list of potential donors. Meet with Foundation to solicit input and help.	Jan 2019 Start cultivating potential donors by inviting them to key events related to PSI and EPSCoR project.			PSI Director and PSI Members
3. Use funds to seed projects that will be most likely to be able to attract future external funding		Mar 2018 Develop plan for yearly seed funding activities. Try to get matching funds from Dean. June 2018 Open up call for proposals. Line up external reviewers for proposals. Identify internal committee to review. Make awards.	Mar-June 2019 Develop and implement new call for seed grants	Mar-June 2020 Develop and implement new call for seed grants	Mar-June 2021 Develop and implement new call for seed grants	Director, Internal Advisory Committee.

Priority 3: Increasing Visibility

Priority 3.1. Improve web page and increase use of social media						
Activities	Checkpoints and **Milestones**					
	Year 1	Year 2	Year 3	Year 4	Year 5	Responsible
1. Form committee to construct and improve PSI web page and establish a means to maintain content	June 2017 Form outreach committee. Select new page design and obtain and insert up to date bios from all PSI members	**June 2018** **Unveil new website** Recurring: Obtain requests for updates and new publications and update publication lists for all PSI members in January for previous year	Recurring: Obtain requests for updates and new publications and update publication lists for all PSI members in January for previous year	Recurring: Obtain requests for updates and new publications and update publication lists for all PSI members in January for previous year	Recurring: Obtain requests for updates and new publications and update publication lists for all PSI members in January for previous year	J. Alfano. lead PSI Members L.Vonfeldt (web admin)
2. Regularly update social media to report research and outreach achievements	Recurring: Make regular requests to PSI members for newsworthy items and upload to social media.	Recurring: Make regular requests to PSI members for newsworthy items and upload to social media.	Recurring: Make regular requests to PSI members for newsworthy items and upload to social media	Recurring: Make regular requests to PSI members for newsworthy items and upload to social media	Recurring: Make regular requests to PSI members for newsworthy items and upload to social media	Outreach Committee, PSI Director, PSI Members
Priority 3.2. Professionally create promotional and outreach activities						
Activities	Checkpoints and **Milestones**					
	Year 1	Year 2	Year 3	Year 4	Year 5	Responsible
1. Contact communication professionals to produce promotional materials		June 2018 Identify campus communication professionals and plan promotional materials.	**June 2019** **Prepare promotional materials and begin distribution.**			Outreach Committee

Priority 3.3. Invite external scientists to interact with PSI faculty, students, and postdocs						
Activities	Checkpoints and **Milestones**					
	Year 1	Year 2	Year 3	Year 4	Year 5	Responsible
1. Use Biotech/Life Sciences seminar series to invite external speakers		Apr 2018 Propose speakers for Fall seminar series; Engage students and postdocs in speaker selection. Sept-Dec 2018 Host speakers, involve students and postdocs in speaker hosting	Apr 2019 Propose speakers for Fall seminar series; Engage students and postdocs in speaker selection. Sept-Dec 2019 Host speakers, involve students and postdocs in speaker hosting	Apr 2020 Propose speakers for Fall seminar series; Engage students and postdocs in speaker selection. Sept-Dec 2020 Host speakers, involve students and postdocs in speaker hosting	Apr 2021 Propose speakers for Fall seminar series; Engage students and postdocs in speaker selection. Sept-Dec 2021 Host speakers, involve students and postdocs in speaker hosting	PSI Members, students, postdocs
Priority 3.4. Develop outreach activities						
Activities	Checkpoints and **Milestones**					
	Year 1	Year 2	Year 3	Year 4	Year 5	Responsible
1. Establish presence at Fascination of Plants Day and other venues (e.g., Sunday with a Scientist, State Fair)		Jan-June 2018 Develop materials for displays. June-Dec 2018 Participate in outreach activity.	Jan-Dec 2019 Participate in outreach activity.	Jan-Dec 2020 Participate in outreach activity.	Jan-Dec 2021 Participate in outreach activity.	PSI Education and Outreach Committee, PSI Members
2. Develop an annual open house			Jan-Dec 2019 Develop and present open house	Jan-Dec 2020 Develop and present open house	Jan-Dec 2021 Develop and present open house	PSI Education and Outreach Committee, PSI Members
3. Develop materials specifically for outreach		Jan-June 2018 Develop materials for outreach displays.	Jan-Dec 2019 Update materials for outreach displays.	Jan-Dec 2020 Update materials for outreach displays.	Jan-Dec 2021 Update materials for outreach displays.	Education and Outreach Committee, PSI Members

Priority 3.5. Form awards committee						
Activities	Checkpoints and **Milestones**					
	Year 1	Year 2	Year 3	Year 4	Year 5	Responsible
1. Form awards committee	Sept 2017 Committee formed. Sept 2017-Aug 2018 Committee meets quarterly or as needed to discuss nomination of PSI faculty for university and external awards.	Sept 2018-Aug 2019 Committee meets quarterly or as needed to discuss nomination of PSI faculty for university and external awards.	Sept 2019-Aug 2020 Committee meets quarterly or as needed to discuss nomination of PSI faculty for university and external awards.	Sept 2020-Aug 2021 Committee meets quarterly or as needed to discuss nomination of PSI faculty for university and external awards.	Sept 2021-Aug 2022 Committee meets quarterly or as needed to discuss nomination of PSI faculty for university and external awards.	

Priority 4: Students/Education

Priority 4.1. Create a 1-credit class 400/800, 1 hour per week during the summer						
Activities	Checkpoints and **Milestones**					
	Year 1	Year 2	Year 3	Year 4	Year 5	Responsible
1. Implement a one-credit hour course	Sep 2017-June 2018 Plan course content.	Work with appropriate department and CASNR to get the course listed. **Class implemented June 2019.** Assess class.	Conduct class June 2020. Assess class.	Conduct class June 2021. Assess class.	Conduct class June 2022. Assess class.	Education and outreach committee
Priority 4.3. Develop summer undergraduate research opportunities for students (e.g., REU) and teachers						
Activities	Checkpoints and **Milestones**					
	Year 1	Year 2	Year 3	Year 4	Year 5	Responsible
1. Apply for NSF REU scholarships to support 3-5 undergrads per summer	**June 2018- Aug 2018** **Plan and submit NSF REU proposal.**	Pending outcome of proposal, Spring 2019 advertise for student participants and conduct program from June 2019-August 2019. If proposal is not funded, plan and resubmit revised proposal in August 2019.	Spring 2020 advertise for student participants and conduct program from June 2020-August 2020. If proposal is not funded, plan and resubmit revised proposal in August 2020.	Spring 2021 advertise for student participants and conduct program from June 2021-August 2021. If proposal is not funded, plan and resubmit revised proposal in August 2021.	Spring 2022 advertise for student participants and conduct program from June 2022-August 2022. If proposal is not funded, plan and resubmit revised proposal in August 2022.	Education and outreach committee and/or other PSI faculty

Priority 5: Membership

Priority 5.1. At the conclusion of strategic planning, formalize the dates of the internal advisory board committee meetings. Formalize a role for the committee in discussing and implementing membership policy.						
Activities	Checkpoints and **Milestones**					
	Year 1	Year 2	Year 3	Year 4	Year 5	Responsible
1. Set quarterly meeting dates	Oct 2017-Dec 2017 Set up the quarterly meeting time	Continue, and makes change as needed.	Continue, and makes change as needed.	Continue, and makes change as needed.	Continued, and makes change as needed.	Membership committee
2. Formalize the role for the committee in discussing and implementing membership policy		Jan 2018 Provide charge for committee June 2018 Develop draft policy and present to membership.	Jan 2019 Implement approved policy			PSI Members; Membership committee
Priority 5.2. Redefine the bylaws based on a new membership strategy						
Activities	Checkpoints and **Milestones**					
	Year 1	Year 2	Year 3	Year 4	Year 5	Responsible
1. Form a committee to redefine the bylaws	**Nov 2017** **Form membership committee to redefine bylaws**					PSI Director
2. Redefine the bylaws		**June 2018** **Membership committee generates new bylaw draft and presents to membership**	June 2019 Revisit and update bylaws as needed.	June 2020 Revisit and update bylaws as needed.	June 2021 Revisit and update bylaws as needed.	Membership Committee

Priority 5.3. Re-discuss what we are to define who we are. Define what it means to be a part of PSI.						
Activities	Checkpoints and **Milestones**					
	Year 1	Year 2	Year 3	Year 4	Year 5	Responsible
1. In 2017, Internal advisory committee set up a date to discuss to core value of being a PSI member.		April 2018 Internal advisory committee meets to discuss core values of being a PSI member. **June 2018** **Internal advisory committee drafts statement of PSI member core values.**				Internal Advisory Committee
2. The result will be brought to PSI faculty meeting for discussion		Sept 2018 Internal advisory committee presents draft of PSI member core values.	**Jan 2019** **PSI members approve statement of PSI member core values.**			Internal advisory committee; PSI membership

Priority 6: External Advisory Board

Priority 6.1. Create External Advisory Board						
Activities	Checkpoints and **Milestones**					
	Year 1	Year 2	Year	Year 4	Year 5	Responsible
1. Assemble an external advisory board		**Jan 2018** **Identify and recruit external advisory board members**				Director & Internal Advisory Board
2. Set guidelines, expectations, schedule, format for external advisory board	Oct 2017 Develop guidelines, expectations, schedule, format for external advisory board					Director & Internal Advisory Board with approval from entire PSI membership
3. Deploy external advisory board		Oct 2018 Convene first external advisory board meeting Frequency of future meetings TBD				Director

Priority 7: Linkages with plant science groups and centers outside UNL

Priority 7.1. Hold combined symposiums with nearby universities.						
Activities	Checkpoints and **Milestones**					
	Year 1	Year 2	Year 3	Year 4	Year 5	Responsible
1. Work with leadership of regional plant science research groups and centers to establish rotating plant science symposia.			Sept 2019-Aug 2020 Reach out to leadership of other regional plant science centers about rotating symposia.	**Sept 2020-Aug 2021** **Establish rotating regional symposium**	Sept 2021-Aug 2022 Continue rotating regional symposium	Director and Visibility Committee
2. Promote participation of Midwestern universities and other research institutions in PSI symposium		May 2019 Begin advertising 2019 PSI symposium to other Midwestern universities and beyond		May 2021 Begin advertising 2021 PSI symposium to other Midwestern universities and beyond		Director and Visibility Committee
3. Develop rotating Big10 plant symposium in plant science research or specialized aspects of plant science research			Sept 2019-Aug 2020 Reach out to Big10 plant science programs to develop interactions, workshops, and symposia.	Sept 2020-Aug 2021 Reach out to Big10 plant science programs to develop interactions, workshops, and symposia.	Sept 2021-Aug 2022 Reach out to Big10 plant science programs to develop interactions, workshops, and symposia.	Director and Visibility Committee
Priority 7.2. Link to plant science centers at other universities.						
Activities	Checkpoints and **Milestones**					
	Year 1	Year 2	Year 3	Year 4	Year 5	Responsible
1. Identify plant science centers that best complement PSI research	Sept 2017-Aug 2018 Research other plant science centers and identify those complementary to PSI					Director and PSI Members

2. Develop linkages with these plant science centers		Sept 2018-May 2019 Reach-out to leadership of complementary plant science centers for establishment of linkages	**Sept 2019-Aug 2020** **Develop joint activities with other plant science centers.**	Sept 2020-Aug 2021 Develop joint activities with other plant science centers.	Sept 2021-Aug 2022 Develop joint activities with other plant science centers.	Director, Visibility Committee, and faculty volunteers.
3. Expand linkages through research collaborations, collaborative publications, and grant proposal submissions			**Sept 2019-Aug 2020** **Develop formal research linkages with other plant science centers**	Sept 2020-Aug 2021 Develop formal research linkages with other plant science centers	Sept 2021-Aug 2022 Develop joint activities with other plant science centers.	Director, Visibility Committee, and faculty volunteers.

Priority 8: Outreach

Priority 8.1. Hold annual outreach event at Morrill Hall (Sunday with a Scientist-move to Beadle at some point)						
Activities	Checkpoints and **Milestones**					
	Year 1	Year 2	Year 3	Year 4	Year 5	Responsible
1. Aim for holding two outreach events per year with the goal of educating the public about our research activities.	Sept 2017-Aug 2018 Hold events.	Sept 2018-Aug 2019 Hold two outreach events.	Sept 2019-Aug 2020 Hold two outreach events.	Sept 2020-Aug 2021 Hold two outreach events.	Sept 2021-Aug 2022 Hold two outreach events.	Education and Outreach Committee
Priority 8.2. Outreach for educators						
Activities	Checkpoints and **Milestones**					
	Year 1	Year 2	Year 3	Year 4	Year 5	Responsible
1. Resource guide online which can start small and expand	Dec 2017-Aug 2018 (simultaneous with web development)	Request additions Dec 2018	Request additions Dec 2019	Request additions Dec 2020	Request additions Dec 2021	Education and Outreach Committee
2. Workshop focused on the resource guides		**May 2018-Aug 2018** **Hold workshop**	May 2018-Aug 2018 Hold workshop	May 2018-Aug 2018 Hold workshop	May 2018-Aug 2018 Hold workshop	Education and Outreach Committee
3. Funds for initial teacher reviews, continuing funds for materials		Dec 2018 Based on assessment of workshop	Dec 2019 Based on assessment of workshop	Dec 2020 Based on assessment of workshop	Dec 2021 Based on assessment of workshop	Education and Outreach Committee

Priority 8.3. Outreach for journalists and politicians						
Activities	Checkpoints and **Milestones**					
	Year 1	Year 2	Year 3	Year 4	Year 5	Responsible
1. Form a panel to answer and compile FAQs about GMOs and other basic science advances	Sept 2017	Sept 2018-rotate committee		Sept 2020-rotate committee		Education and Outreach Committee
2. Invite journalists and politicians to PSI events including symposia and outreach events		Sept 2018-Aug 2019 Invite journalists and politicians to symposium and outreach events.	Sept 2019-assess to continue Sept 2019-Aug 2020 Invite journalists and politicians to symposium and outreach events	Sept 2020-assess to continue Sept 2020-Aug 2021 Invite journalists and politicians to symposium and outreach events	Sept 2021-assess to continue Sept 2021-Aug 2022 Invite journalists and politicians to symposium and outreach events	Education and Outreach Committee

Priority 9: Space and Infrastructure

Priority 9.1 PSI needs more space and infrastructure to accommodate research and facilities						
Activities	Checkpoints and **Milestones**					
	Year 1	Year 2	Year 3	Year 4	Year 5	Responsible
1. Discuss with upper administration to ask for more space and to improve infrastructure	Sept 2017-Aug 2018 If space issues arise, discuss with upper administration and space committees.	Sept 2018-Aug 2019 If space issues arise, discuss with upper administration and space committees.	Sept 2019-Aug 2020 If space issues arise, discuss with upper administration and space committees.	Sept 2020 -Aug 2021 If space issues arise, discuss with upper administration and space committees.	Sept 2021-Aug 2022 If space issues arise, discuss with upper administration and space committees.	Director with input from membership.
2. Develop long-term planning process for PSI space on NIC or East Campus		Sept 2018-Aug 2019 Initiate discussion of long-term planning for space outside of Beadle.	**Sept 2019-Aug 2020** **Present plan to upper administration.**			Director, Internal and External Advisory Committees with input from membership.

Priority 10: Accountability

Priority 10.1 Increase accountability to achieve the goals of PSI						
Activities	Checkpoints and **Milestones**					
	Year 1	Year 2	Year 3	Year 4	Year 5	Responsible
1. The internal and external advisory boards discuss progress toward implementation of strategic plan	Sep 2017 and continuing	Sep 2018 and continuing	Sep 2019 and continuing	Sep 2020 and continuing	Sep 2021 and continuing	PSI Director, Internal and External Advisory Committees with input from PSI members
2. Allocate tasks for implementation of strategic plan to all PSI members and link allocation of resources to excellence in research and participation in implementation of strategic plan	Sept 2017 and assessment of faculty contributions Aug 2018	Sept 2018 and assessment of faculty contributions Aug 2019	Sept 2019 and assessment of faculty contributions Aug 2020	Sept 2020 and assessment of faculty contributions Aug 2021	Sept 2021 and assessment of faculty contributions Aug 2022	PSI Director and Internal Advisory Committee with input from PSI members
3. Revisit and revise, if needed, strategic plan document once per year.	Jan 2018 faculty meeting discussion	Jan 2019 faculty meeting discussion	Jan 2020 faculty meeting discussion	Jan 2021 faculty meeting discussion	Jan 2022 faculty meeting discussion	Director and Internal Advisory Committee with input from PSI members

Water for Food
ROBERT B. DAUGHERTY INSTITUTE
at the University of Nebraska

Daugherty Water for Food Global Institute
Strategic Plan FY18 – FY23

Every day, nearly a billion people in the world are food-insecure, without enough safe and nutritious food to lead healthy and active lives. Many of them are also water-insecure, without reliable access to an adequate amount of clean water to meet their needs. By 2050, our global food demand will double to meet the needs of nearly 10 billion people. To ensure sustainable food and water security in the face of population and income increases, a changing climate, and the growing demand for scarce water resources, it is imperative to improve water management in agricultural and food systems.

Nebraska is fortunate to have one of the most progressive and prosperous agricultural industries in the world thanks to the blessings of our natural resources, the ingenuity and hard work of our farmers and the research leadership of the University of Nebraska. The Robert B. Daugherty Foundation selected NU to harness this well-rounded combination for a new institute focused on ensuring water and food security for our growing world. The Robert B. Daugherty Water for Food Global Institute (DWFI) was founded in 2010 to leverage the university's expertise and extend it with strong state, national and international partnerships.

The institute's impact is achieved through the work of its talented staff of more than 100 faculty and global fellows, postdoctoral researchers, and students in a wide variety of fields pursuing projects focused on increasing water and agricultural productivity. Additionally, the institute includes the valuable assets of the Nebraska Water Center and the Water Sciences Laboratory, and benefits from the expertise of the National Drought Mitigation Center at the University of Nebraska-Lincoln. As a system-wide institute, DWFI taps the specialized resources available at all four NU campuses, including the College of Public Health within the University of Nebraska Medical Center in Omaha. DWFI also collaborates with other universities, businesses, non-governmental organizations, and government agencies around the world to address issues on a global scale.

Through research and policy development, education and communication, the institute is enhancing knowledge, fostering future water and food security leaders and developing effective techniques to sustainably manage water and increase food security. DWFI focuses its efforts in five areas of expertise and has identified key outcomes in each area to drive impact and measure success in the next five years, FY2018 to FY2023:

<u>Closing Water & Agricultural Productivity Gaps</u>:

- Develop and deploy global satellite-based decision support and monitoring tools based on daily evapotranspiration estimates in key agricultural areas in the US and selected countries.
- Improve knowledge of best practices to close water and agricultural productivity gaps for key irrigation decision-makers in the US and selected countries and regions (e.g. Iowa, Nebraska, Brazil, India, and the MENA region).
- Influence the adoption of technology and best practices to improve water productivity in key agricultural areas in Nebraska and participating countries.

DAUGHTY WATER FOR FOOD APPENDIX 11

Strategic Plan

Improving Groundwater Management for Agricultural Production:

- Identify and improve knowledge of best practices and cost effective groundwater management policies given local context, climate conditions and constraints in key areas in the US and selected countries.
- Influence groundwater governance and policy through education and pilot programs demonstrating best management practices and innovative technology and institutions in selected US states and countries. Establish and apply new methods to monitor improvements in groundwater conditions in selected areas that are currently degraded (e.g., quality, streamflow, depletion).

Enhancing High-productivity Irrigated Agriculture:

- Identify and improve knowledge of cost-effective practices for water and energy use in agriculture.
- Influence the adoption of technology and best practices to improve water and energy use in agriculture in the US and selected countries and regions. Document the improved use efficiency of water and energy resources in agricultural production as a result of DWFI activities, including DWFI faculty fellow activities and other partnerships.

Supporting Freshwater & Agriculture Ecosystems & Public Health:

- Develop new methods and facilitate the adoption of water quality management best practices
- Support agricultural practices that minimize negative impacts on water quality in Nebraska and selected countries. Influence the adoption of viable water markets in selected U.S. regions and countries. Develop new methods and facilitate the adoption of new knowledge about water re-use and other water conservation approaches in the dairy and other food processing industries.

Managing Agricultural Drought:

- Develop and disseminate information and tools to build resilience to drought in agricultural systems in selected countries and regions (e.g. MENA).
- Influence the adoption of tools and policies to reduce vulnerability and build agricultural resilience to drought in selected US regions and countries.

Crosscutting Efforts

Education & Engagement:

- Develop educational and engagement programs to increase knowledge of water for food issues for key stakeholders in the US and internationally (including NU students, agricultural producers, water managers, and other decision makers).
- Provide and support professional development to influence choice of water- and agriculture-related careers for students, researchers and other future water for food leaders.

Communication:

- Build and protect the institute's brand reputation through strategic and integrated communication with the institute's stakeholders at the regional, national and international levels.
- Enhance support for the institute by engaging stakeholders with two-way information sharing. Attract partners through successful conferences, projects and events. Increase the number of stakeholders through advertising, social media, news releases and other forms of outreach.

DAUGHTY WATER FOR FOOD APPENDIX 11

Strategic Plan

Through these efforts, the institute is building upon the solid foundation developed during its early years and accelerating its progress to fulfill its overall mission. We are working to ensure long-term sustainability with funding from cultivated donor gifts, grants and other revenue sources. Achieving global water and food security for future generations is an audacious goal. However, with the guidance of the strategic plan, adapting to opportunities, and growing and diversifying our revenue resources, the Daugherty Water for Food Global Institute will be known for its role in achieving this vision.

NEBRASKA FOOD FOR HEALTH CENTER APPENDIX 12

Using Food to Improve Health

The mission of the Nebraska Food for Health Center is to improve human health by linking agriculture and food production to wellness and disease prevention through microbiome research.

The multidisciplinary Nebraska Food for Health Center brings together strengths in agriculture and medicine from throughout the University of Nebraska system. We help develop hybrid crops and foods to improve the quality of life of those affected by critical diseases including heart disease, diabetes, obesity, cancers, inflammatory bowel disease and mental disorders.

Our research focuses on microbes living in the human gut microbiome.

Trillions of microbes – bacteria, viruses, fungi and more – live in the human gut microbiome, which normally acts in concert with the body to regulate organs, develop our immune systems, fight disease and metabolize foods. Abnormalities in the gut microbiome are being discovered as factors in many diseases.

Diet is one of the biggest factors that influences humans' gut microbiomes.

Because microbiomes are fed by the same foods that we consume, we can develop foods with health-promoting ingredients that work by selectively feeding beneficial microbes or prohibiting growth of more harmful species. This new interface between agriculture and medicine holds tremendous potential to transform how we think about preventing and treating disease.

The center focuses on:

- Bringing together a research team to tie gastrointestinal and biomedical research to agriculture, plant and animal breeding and genetics. In addition to University of Nebraska-Lincoln faculty, the team includes faculty from the University of Nebraska at Omaha and the University of Nebraska Medical Center.
- Establishing a research program to develop foods with proven health benefits, particularly those that affect the human gut microbiome — the collection of all the beneficial and potentially harmful micro-organisms in the digestive system that can affect health and well-being.
- Preparing a talented workforce for careers in food health, including researchers, food and health industry leaders and food innovation entrepreneurs.

https://foodforhealth.unl.edu/

USDA ARS APPENDIX 13

USDA Agricultural Research Service
U.S. DEPARTMENT OF AGRICULTURE

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Agroecosystem Management Research: Lincoln, NE

Research People

Crop Rotation Study at Mead, Nebraska

Mission

Develop sustainable integrated cropping systems and livestock management technologies and disseminate useful information and technologies to customers.

People

- Allen, Joseph
- Bernhardson, Lois
- Birru, Girma
- Condon, Justine
- Cureton, Marcus
- Durso, Lisa

The Agroecosystem Management Research is located in Lincoln, NE and is part of the Plains Area.
The Research Leader is Virginia Jin.
Email: virginia.jin@ars.usda.gov
Phone: 402-472-5137
Fax: 402-472-4020
USDA-ARS-PA-AGROECOSYSTEM MANAGEMENT RES. UNIT
3720 East Campus Loop South
Lincoln, NE 68583

USDA ARS
APPENDIX 13

USDA Agricultural Research Service
U.S. DEPARTMENT OF AGRICULTURE

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Wheat, Sorghum and Forage Research: Lincoln, NE

Research People

'Liberty' switchgrass

Mission

The mission of the Unit is to improve the productivity, sustainability of production, and value of wheat, sorghum and forage crops by developing improved plant germplasm and management practices with basic and applied research in plant genetics, plant pathology, molecular biology, and production system management.

People

- Alexander, Jeffrey
- Boehm Jr, Jeffrey
- Cai, Xiwen
- Callahan, Patrick
- Danilova, Tatiana
- Divis, Lori

The Wheat, Sorghum and Forage Research is located in Lincoln, NE and is part of the Plains Area.
The Research Leader is Scott Sattler.
Email: scott.sattler@ars.usda.gov
Phone: 402-472-5987
Fax: 402-472-4020
USDA-ARS-PA-Wheat, Sorghum and Forage Res. Unit
3720 East Campus Loop South
Lincoln, NE 68583

CENTER FOR GRASSLAND STUDIES APPENDIX 14

Mission

Our mission is the implementation of focused, interdisciplinary research, education and service programs and activities that emphasize the role of grasslands as a natural resource and enhance the efficiency, profitability and sustainability of grasslands and turfs. Strengthening linkages and developing partnerships with groups of common interest will be a priority.

Objectives

Along with the mission, the goals and objectives serve to foster and support the capabilities of the university to relate to issues concerning grasslands and turfs. Specific objectives directed toward grasslands and turf to meet this overall goal include:

- Fostering interdisciplinary teamwork in research and educational activities and encouraging systems approaches for solving problems associated.
- Initiating and expanding linkages in Nebraska and the Great Plains region with federal and state agencies, educational and research institutions, state colleges, community colleges, organizations, private groups and practitioners.
- Improving the profitability and sustainability while protecting or enhancing water quality, soil quality and the quality of life.
- Developing proactive programs on emerging issues.
- Attracting new support for research, education and service programs and activities.
- Enhancing public understanding and awareness of improving environment, water quality, soil quality and the quality of life.
- Establishing the Center for Grassland Studies and its associates as leaders in grassland studies and providers of information for Nebraska and the Great Plains.
- Providing a focal point in the University of Nebraska for grassland sciences which is visible in the state, regionally, nationally and internationally.

https://grassland.unl.edu/

Doctor of Plant Health

Educating leaders for tomorrow's sustainable plant production systems

Dr. Jeffrey D. Bradshaw, Director / 402-472-3345 / jbradshaw2@unl.edu / dph.unl.edu

A myriad of national and international issues challenge the economic and environmental sustainability of U.S. plant production systems, e.g. resiliency in the face of a changing climate, feeding an ever increasing population, etc. For these production systems to be sustainable at all levels, they must be more knowledge intensive, creating a greater need for individuals with comprehensive skills necessary for diagnostics, problem-solving, and systems management. One critical component of these management systems is the incorporation of Integrated Pest Management (IPM) programs that extend across disciplines. From a weed-science perspective, a major constraint to IPM adoption and use includes the lack of capacity for systems-level knowledge necessary to effectively implement biointensive management programs, for example.

The Doctor of Plant Health (DPH) is a professional degree focused on developing highly capable plant practitioners. The DPH program emphasizes a broad interdisciplinary education across all plant-related disciplines. Practical training and experience are the focus, rather than a total focus on research. This educational concept is comparable to other health practitioner degrees (e.g., M.D., D.V.M.). The DPH program requires 100 graduate credit hours, plus internships or practicums. Unique aspects of this University of Nebraska–Lincoln program include:

- The core curriculum provides significant depth across all major disciplines involved in plant health (agronomy/horticulture, entomology, plant pathology, soil science, weed sciences).
- Experiential learning through required internships provides an opportunity to develop skills in integrated problem-solving and managing plant production systems.
- Flexibility through electives and internships hone professional interests and bolster training credentials.
- Diagnostic training across all disciplines is an important program component to enable effective identification and management of all issues affecting plant health.
- Development of soft skills is emphasized including communication, leadership development, problem-solving, and integrated thinking.

Doctors of Plant Health apply science to improve plant management systems. Academic contributions by the Department of Agronomy and Horticulture are critical to the success of this program and its students. The depth of agronomy and horticulture exposure for DPH students is significant (28 cr). Agronomic and horticultural coursework that is required of all DPH students includes:

- AGRO 826 – Invasive Plants (3 cr)
- AGRO 896 – Interplant Competition (3 cr)
- 4 cr from any of the following, with permission
  - AGRO 812 – Crop and Weed Genetics (1 cr)
  - AGRO 813 – Turgrass and Landscape Weed Management (1 cr)
  - AGRO 822 – Integrated Weed Management (1 cr)
  - AGRO 823 – Herbicide Action in Plants (1 cr)
  - AGRO 896 – Regional Weed Science Contest (1-2 cr)
  - AGRO 896 – Pest Resistance Management (2 cr)
  - AGRO 896 – Technology of Pesticide Application (1 cr)

- AGRO 806 – Plant Ecophysiology: Theory and Practice (4 cr)
- AGRO 807 – Plant-Water Relations (3 cr)
- AGRO 811 – Crop Genetic Engineering (2 cr)
- AGRO 835 – Agroecology (3 cr)
- HORT 824 – Plant Nutrition and Nutrient Management (3 cr)
- AGRO 855 – Soil Chemistry & Minerology (3 cr)
- AGRO 860 – Soil Microbiology (3 cr)

Doctor of Plant Health

Educating leaders for tomorrow's sustainable plant production systems

Dr. Jeffrey D. Bradshaw, Director / 402-472-3345 / jbradshaw2@unl.edu / dph.unl.edu

Points of Distinction

A Leader	The Doctor of Plant Health program is one of only two comparable programs in the world. The other is the University of Florida Doctor of Plant Medicine program.
Interdisciplinary	The major focus of the program is to educate professionals who are able to comprehensively manage plant production systems.
Experiential Learning	Internship opportunities for DPH students have been found across the United States and internationally. They have included experiences related to teaching, extension, and applied research, in addition to diverse industry experiences.
Flexibility / Customized program	The DPH program provides significant flexibility for the student to tailor their education and experiences to enhance their progress down their chosen professional career path.
Meeting employer needs	Numerous prospective employers have expressed the need for the type of graduates this program produces.
Connections	The DPH program has expanded UNL's connections through a number of industry and agency connections.
Success	Thus far, the 27 graduates from the DPH program have all found employment, and demand by employers for intern opportunities is high.