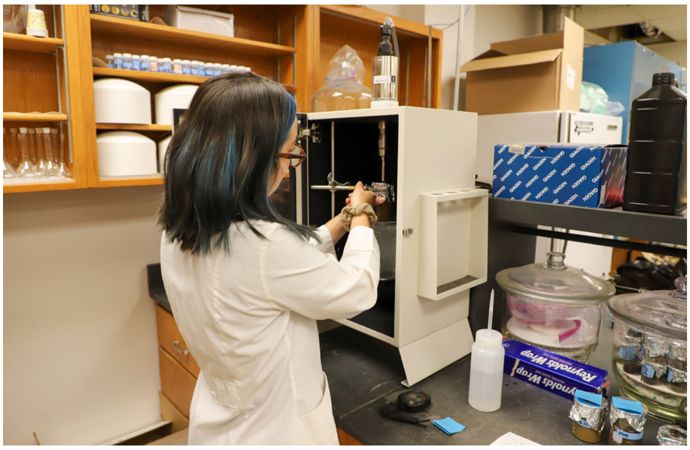
AGRONOMY AND HORTICULTURE

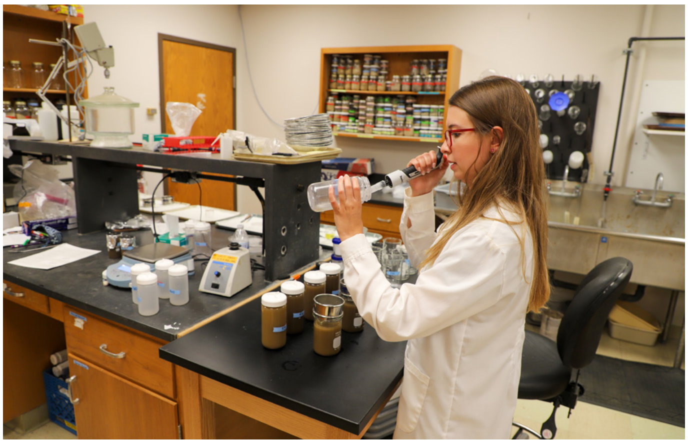
Strategic Framework 2025–2029

Department of Agronomy and Horticulture

University of Nebraska–Lincoln


SOIL JUDGING


Reynolds Wrap




Revised Master Plan

Nebraska agriculture leads the nation—and the world—in the production of food, fuel, and fiber. With more irrigated farmland than any other state in the USA and an annual economic contribution exceeding $25 billion, Nebraska consistently ranks among the top five states in crop production and agricultural value. This leadership carries a vital responsibility: to balance growth with sustainability by ensuring productivity, profitability, environmental stewardship, and community well-being.

Nebraska producers have long demonstrated exceptional productivity. Yet, sustaining profitability is essential to supporting family farms and rural communities. Mounting environmental challenges, water limitations, shifting market demands, and rising input costs require innovative production systems that deliver consistent yields, introduce new crop opportunities, and enhance resilience. Central to this vision is a commitment to stewardship—protecting Nebraska's soils, water, and biodiversity as the foundation for long-term agricultural success.

The Department of Agronomy and Horticulture plays a pivotal role in sustaining and advancing this leadership. Through its integrated mission of research, teaching, and Extension, the department translates science into practical solutions, fosters collaboration across disciplines and with stakeholders, and equips the next generation of agricultural leaders to address real-world challenges. Its work spans critical issues including crop yield and quality, crop diversification, nutrient and water management, sustainable production systems, and food and nutrition security.

Over the past decade, the department has made significant contributions to Nebraska agriculture, global agricultural systems, and workforce development. Selected achievements include:

- **Crop Development**: Release of high-yielding, resilient soybean, wheat, and dry bean varieties.
- **Precision Breeding**: Development of AI-driven models predicting gene responses to environmental stresses.
- **Decision-Support Tools**: Nitrogen Management Tool; Hybrid-Maize for yield potential and planting optimization; SoyWater for irrigation and nutrient management; Nitrogen and Water Dashboard integrating on-farm research and grower data; Wheat Variety App; Vegetable Variety Navigator.
- **Global Contributions**: The Global Yield Gap Atlas, which estimates yield potential and gaps for major crops worldwide.
- **Applied Management Resources**: Development of practical, science-based guides that directly support producers and land managers. Notable examples include the Pocket Guide for Managing Woody Encroachment, Guide for Weed Disease and Insect Management in Nebraska. These resources are widely adopted by producers, crop consultants, educators, and Extension professionals to improve decision-making, reduce risks, and promote sustainable management practices.
- **Educational Resources**: The Plant and Soil Sciences eLibrary (PASSeL), an open-access repository of lessons and interactive modules widely used by students, educators, and industry professionals.

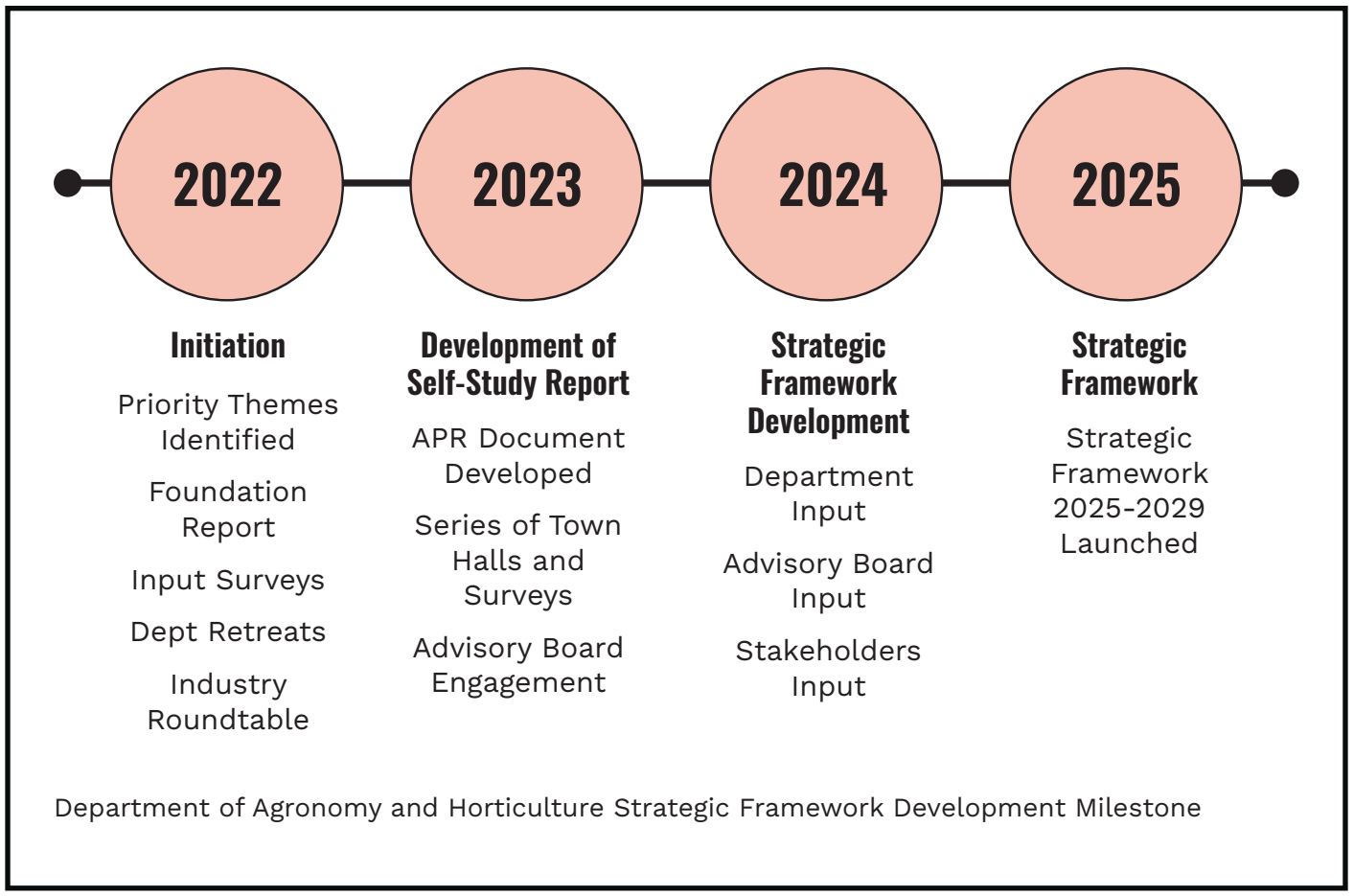
Maintaining global leadership in agricultural innovation will require strong and sustained investment in both research and workforce development. Advancing Nebraska's leadership in sustainable production depends on fostering innovation, adopting emerging technologies such as precision and digital agriculture, and integrating artificial intelligence to optimize resources, enhance decision-making, and strengthen rural communities.

The Strategic Framework 2025–2029 serves as a roadmap for strengthening core capabilities, fostering growth, and achieving excellence in teaching, research, and Extension. It is aligned with the IANR's 5-Year Strategic Direction and NU's Key Strategic Pillars. By providing a focused, coordinated approach, this framework directly supports our vision and mission—ensuring that the work translates into meaningful impact and delivers lasting value to the people of Nebraska and beyond.

Strategic Framework Development Process

The strategic framework was developed over the past year to define the department's priorities and goals for 2025–2029. The process began with the department's Academic Program Review (APR), which included a comprehensive self-study in 2022–23 followed by an external review in 2023. This assessment helped identify the department's strengths, gaps, and opportunities, shaping the priorities and goals outlined in this document. Faculty, staff, and stakeholders provided valuable input and feedback throughout the review and development process, ensuring a well-informed and collaborative approach.

The strategic framework will remain a dynamic, living document—evolving in response to emerging priorities from IANR, the NU System, the State of Nebraska, and federal partners. We are committed to sharing our collective progress annually and will regularly refine, adjust, and expand our goals to stay aligned with changing needs and opportunities.



Department of Agronomy and Horticulture Strategic Framework Development Milestone

This document outlines the strategic framework, focusing on the following key priorities:

- Vision, Mission, and Core Values
- Undergraduate, Graduate, and Online Education
- Research Excellence
- Extension and Outreach Impact
- Collaboration, Teamwork, and Culture

Vision

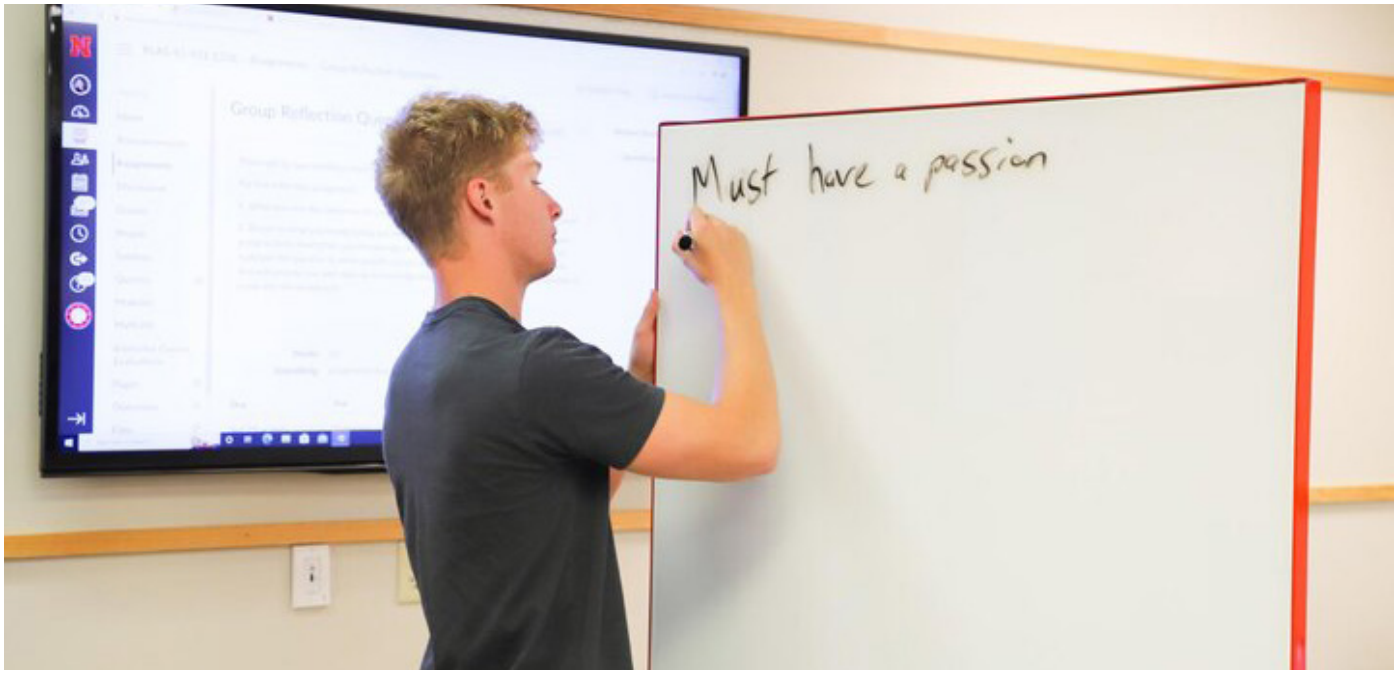
- Leading innovation in diverse plant systems locally and globally.

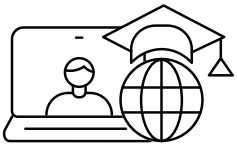
Mission

- Innovating plant systems through science-driven education, research, and outreach—promoting food and energy solutions that power economic growth, environmental health, and human well-being.

Core Values

- Share a **culture of mutual respect and nurture a positive culture and environment** among faculty, staff, students, and stakeholders.
- Strengthen **shared governance**.
- Maintain and expand **core expertise** in teaching, research, and extension.
- Strengthen existing and develop new **industry collaborations**.
- Cultivate **interdisciplinary collaboration** within and across units and with stakeholders.
- Encourage **creativity and entrepreneurship** to solve complex challenges.
- Commit to identify and support **underserved** groups.
- Translate teaching and research **into impact** for stakeholders.





Priority 1 Teaching and Learning: Lead with innovative educational platforms to ensure program responsiveness and viability while providing learners with essential foundational knowledge and tools to thrive in an evolving academic and workforce environment.

The teaching and learning priority has three interconnected pillars across undergraduate, graduate, and online programs.

Foundational knowledge and skills to equip students with essential, discipline-grounded understanding in plant and soil sciences and ecology, preparing them to address complex challenges in agriculture, natural resources, and the environment.

Experiential learning that embeds hands-on, inquiry-driven experiences — from fieldwork and internships to research and global engagement, learners can connect theory to practice and build real-world competencies.

Fostering an environment that supports learners for academic achievement, personal growth, and a sense of belonging.

GOALS

Undergraduate Education

Goals	Progress Indicators
Curriculum Design	
• Strengthen foundational learning in crops and diverse plant systems, soil science, ecology and management through systematically threaded student learning outcomes across the curriculum including CASNR courses. • Integrate foundational data literacy and communication learning across our undergraduate program. • Equip undergraduate students with core competencies in digital agriculture by integrating data analysis, data-driven decision-making, and ag technology literacy into the curriculum.	• Number and quality of courses delivering foundational knowledge, with quality assessed through a variety of approaches (pre and post assessment, performance task activity, selected student deliverables, peer observation, student reflection) • Map or matrix of courses where learning outcomes are explicitly embedded • Number of students with a minor(s) • Number of department courses with some focus on data literacy and communication • Number of new or revised courses, minors, and other initiatives • Increase in the number of undergraduate students • Increase in the number of students pursuing digital ag related minors

Student Experiences and Development

- Enhance and expand experiential learning opportunities in research, teaching, extension, and creative activities. These include entrepreneurship and engagement from local to global to convey real world objectives and strategies of stakeholders to students.
- Enhance student professional development through non-credit experiences
- Expand opportunities for student/industry/employer networking, collaboration, internship, mentoring, and scholarship.

- Number and type of experiential courses in the department (internships, community projects, field study tour, capstone projects etc.)
- Number of students completing a research activity
- Number of students in entrepreneurship programs
- Number and quality of internship presentations (quality as determined by rubric-based evaluation and meeting learning outcomes)
- Number of students participating in education abroad or field courses
- Number of students actively engaged in career fair, resume workshop, and college mentoring program
- Number of students actively engaged in clubs and/or co-curricular experiences
- Type and number of industry businesses providing internship
- Number of students with extended internship program

Recruitment and Retention

- Evaluate and institute improvement plan for student success, retention, recruitment, and program outcomes.
- Strengthen and expand partnerships with stakeholders, employers, alumni, high school teachers, community colleges
- Deploy multiple strategies and new approaches to recruit students including partnerships with 4H, FFA, and high school and middle school teachers.

- First and second year retention
- Percent of students meeting advisor each semester
- Total dollars invested to support student professional activities (competition travels, professional society meetings)
- 4-year and 6-year graduation rate
- Number of recruitment partnerships developed
- Number of innovative programs and partnerships through 4H, FFA, and secondary education teachers
- Number of alums engagement events and activities (guest lectures, mentoring, dep alum event, tailgate, fund support)
- Number of community college transfers
- Number of professional development opportunities for teachers and number of teachers participating.
- Increase in the prospective campus visits
- Increase in application to the department undergraduate program from baseline of about 100

Evaluation

- Enhance teaching and FTE efficiency by ongoing review of curriculum, course enrollment trends and demand, evaluating teaching modalities, and strengthening teaching partnerships.
- Evaluate program outcomes to identify and address curriculum or degree structure factors that impact student learning, retention, and completion, while ensuring alignment with current and emerging workforce needs.
- Level of enrollment in courses
- Number of courses developed
- Number of courses revised
- Number of students in each degree program
- Number of courses taught by the team
- Total student credit hour
- Number of students with professional employment upon graduation

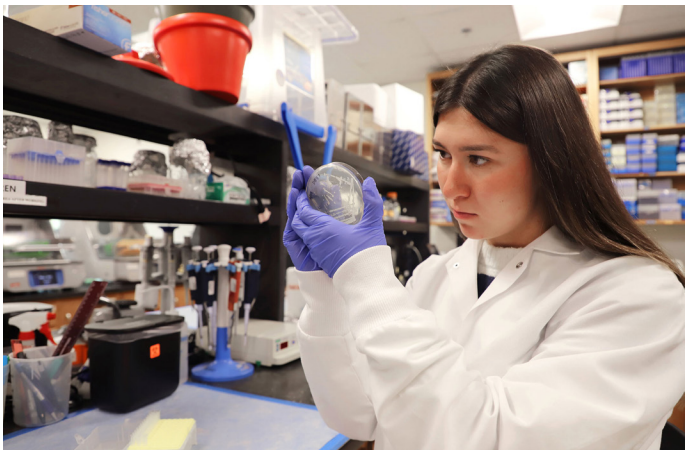
Graduate Education

Goals	Progress Indicators
Recruitment	
• Develop novel ways to support domestic and international graduate students to better exploit the applicant pools • Improve distance MS program	• Number of grad students supported by industry, federal or private foundation funding • Percentage of graduate courses with online offerings • Number of enrollees and graduates of online master's program
Program structure, curriculum and teaching	
• Evaluate curriculum for gaps and redundancies in courses in line with current needs in the workforce. • Increase learning opportunities in quantitative and big data analysis as well as in existing and emerging technologies such as AI and other Digital Agriculture areas. • Deploying current teaching faculty according to expertise, FTE and need across graduate program.	• Percentage of students participating in post-graduation surveys about how their acquired knowledge and skills aligned with their career needs • Number of graduate courses that consistently exceed the enrolment threshold • Number of new courses developed or revised courses to meet workforce needs • Number of students taking short courses, workshops, digital badges to enhance quantitative skills and emerging tools • Number of faculty meeting or exceeding their FTE apportionment • Number of new faculty hired to maintain core graduate teaching • Number of new or revised courses including digital ag related topics
Graduate student research	
• Improve student research planning and accomplishment	• Implement Individual Development Plan for students to map thesis research and for advisors and committees to track progress • Implement annual student progress meeting with committee to track progress and publication plans • Number of theses and dissertation completed within allowed • Number of publications from student research • Number of student honors from research accomplishments

Student development

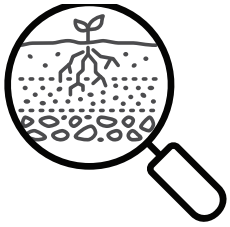
- Improve graduate student onboarding, mentoring professional development, and career counseling.

- Percentage of local and distance students reporting regular guidance in their on-boarding, degree progression and career counseling
- Number of on-campus or off-campus industry days or roundtables
- Number of students engaged in internship and/or industry led professional development
- Number of students placed in professional position after graduation
- Number of students and faculty reporting mutually satisfactory in mentoring and support



Online Education

Goals	Progress Indicators
Program Tracking	
• Assess demand, opportunities and innovate curricula for online education by engaging with internal and external stakeholders	• Number of online course/program (e.g., digital badges, certificates) enrollment • Number of stakeholders engaged (stakeholders: UNL and community college students; extension educators; staff; industry, state and government agencies, coops, commodity boards, community members) • Estimated value on investment return
Development and Innovation	
• Grow and revise non-academic badge, academic certificates, and course options • Retool existing courses for online delivery • Utilize innovative technologies for online learning to increase engagement and interactive experience • Offer new courses on Digital Agriculture related topics	• Number of courses converted to online delivery • Number of courses meeting quality standards through established internal and external standards • Adoption of new learning technologies/ tools in courses by instructors. • Innovations in online pedagogy and technology adoption and number of teaching scholarships and presentations • Number of new courses on Digital Agriculture related topics.
Partnerships	
• Strengthen online education partnerships with state, community colleges, and industry.	• Number of active partnerships or articulation agreements • Number of jointly developed or delivered online offerings • Number of dual-degrees graduates/certificate or badges
Evaluation	
• Evaluate and regularly improve student success, retention, recruitment, and program outcomes in online education • Communicate success in online program	• Online student retention and graduation rates • Number of published success and impact stories/testimonials or positive media mentions.



Priority 2 Research and Discovery: Be a national and global leader in developing resilient agroecosystems, improving resource management (water and nutrient efficiencies, soil health), and enhancing crop yield and quality, while innovating in fundamental and applied research.

The research and discovery will be guided by three interconnected pillars that bridge basic, applied, and translational science. These pillars reflect a commitment to convergence science—integrating disciplines, technologies, and real-world challenges to shape resilient, future-ready agricultural systems.

- Genetic innovation for climate-responsive agriculture- Crop varieties that are more resilient to climate stress, pests, and limited resources, while improving crop value, nutrition and efficiency through advances in breeding, genetics, and genomics.
- Integrated science for sustainable systems - Improve nutrient use, soil health, and plant-microbe interactions by combining knowledge from genetics, agronomy, ecology, modeling, and leverage digital agriculture technologies to deliver sustainable, high-performing cropping systems.
- Testbeds and technology for rapid, scalable solutions- Use statewide testbeds and cutting-edge tools—like phenomics, digital ag, and remote sensing—to test and scale innovations in real-world farming systems.

Goals	Progress Indicators
Crop Value, Quality, & Sustainable Production System	
• Improve UNL's national/international reputation as a leader in crop genomics and translational breeding and sustainable production in dryland and irrigated systems. • Accelerate releases of new crop varieties and traits. • Establish digital agriculture as a departmental research theme that cuts across plant genetics, cropping systems, and landscapes. • Expand faculty-led research in digital agriculture, including sensor-based decision tools, data-driven decision tools, AI/ML in cropping systems, and geospatial analytics. • Develop advanced nutrient management tools through genetic and genomic innovation, modeling, in-season management, and advanced agricultural technologies	• Number of peer reviewed publications • Number of presentations at local, regional, national and international conferences • Number of national and international awards • Total grant dollars received • Total research expenditures and economic value to stakeholders • Number of regional, national, and international partnerships • Number of crop varieties released • Total revenue from UNL crop varieties and licensed genetics/trait patents • Adoption rate of improved crop varieties and practices among target farmers and increase in local food system participation • Percent increase in average yield, profitability, and efficiency under improved or sustainable practices for agronomic and specialty crops

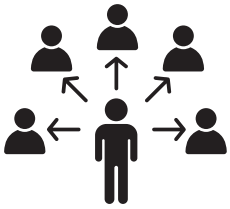
- Provide improved solutions and tools for the leading drivers of agricultural production losses in grasslands and grazing land (woody encroachment, drought, biological invasions)
- Expand research evaluations and tools in soil-health management systems and associated agronomic and environmental outcomes
- Develop research-based solutions and innovations for local fruit and vegetable growers that contribute to the economic vitality and health of Nebraska communities.

- Number of climate-smart practices validated and recommended Number of soil health-related research projects
- Reduction in pesticide usage through use of smart agronomic practices
- Increased in-season N management and improvement in corn NUE
- Percent of farmers/ranchers using advanced technology/tools for input and crop management
- Increase grassland biodiversity and other ecosystem services
- Reduced wildfire risk and improved vegetation recovery

Facilities, Resources, Partnerships

- Enhance crop productivity, resource use efficiency, and advance climate-resilient agronomic practices through partnerships with Centers, USDA-ARS, NRCS, industry, state agencies, commodity boards, other IANR units, and NE Extension
- Improve researchers access to shared research facilities (phenomics facilities, biotech testing center, NFarms, multi-environment field testing).
- Modernize shared facilities to enhance functionality and efficiency (dryers, processing space, storage space).
- Increase entrepreneurial approaches to basic and translational research.

- Number of active partnerships/collaborations with internal and external stakeholders
- Number of regional, national, and international partnerships
- Number of trials conducted at biotech testing sites and statewide field stations
- Number of on-farm trials
- Number of patents and startups



Priority 3 Translation/Extension: Be leaders in transformative research-based extension platforms that are responsive, relevant, and impactful.

The Extension and Outreach priority is anchored in three pillars, aligned with Nebraska Extension's BIG 3 focus areas.

Connected Partnerships for Statewide Impact- Strengthening collaborations between Extension Educators, faculty, and communities across Nebraska's croplands, grasslands, and urban agriculture to extend research and education.

Capacity Building and Innovation for Lifelong Learning- Developing flexible and future-focused educational offerings while expanding internal and external capabilities to meet evolving needs of learners and stakeholders.

Industry Engagement and Storytelling for the Future- Creating and testing next-generation technologies in partnership with industry, and amplifying stories of success to inspire stakeholders and highlight the enduring value of Extension to Nebraskans.

Goals	Progress Indicators
Leverage network (croplands, grasslands, urban/peri-urban agriculture, and underrepresented groups) to enhance and create intentional Extension Educator partnerships with teaching and research faculty.	• Number of new Extension–faculty partnerships formed. • Percentage increase in joint projects between Extension Educators and research/teaching faculty. • Number of outreach activities or stakeholder meetings involving underrepresented groups. • Number of participants (and acres) in collaboration and participation from urban/peri-urban, cropland, and grassland stakeholders (on-farm research).
Create and support extension capacity building for internal and external stakeholders.	• Number of professional development events or cross-training sessions held for Extension Educators and faculty. • Increase in cross-listed or jointly developed educational programs/courses. • Research-based recommendations provided by Extension faculty to UNL research and extension centers to improve crop production and protection. • Number of students and professionals trained to develop the next generation workforce.

Innovate educational resources that meet clientele demands including short courses, workshops, digital badges through partnerships with faculty.	• Number of new educational resources and initiatives developed (e.g., short courses, workshops, digital badges, innovative programs). • Growth in revenue generation and new revenue $ stream generated. • Number of disciplines or subject areas covered by the newly developed resources. • Number of participants enrolled in available resources (short courses, workshops, digital badges). • Completion rate of courses and badges awarded. • Number of responses to immediate need and demands (hail events, new pests, resistance issues, etc.) by stakeholders.
Identify programs with Nebraska Extension and IANR Global for experiential learning on international agricultural production and knowledge sharing.	• Number of international experiential learning programs identified or developed. • Number of partnerships or agricultural programs established with global institutions. • Percentage of programs aligned with Nebraska Extension and IANR Global strategic priorities. • Number of Memoranda of Understanding (MOUs) or formal agreements established. • Number of students, faculty, or Extension professionals participating in international learning opportunities. • Type participants (e.g., by discipline, demographics, or home institution). • Grants or funding secured to support international experiential learning initiatives.
Engage new industry collaborators to create, test, and support next generation technologies.	• Number of new industry collaborators engaged. • Number of contracts or partnership agreements signed with industry. • Type of industry sectors represented (e.g., ag-tech, biotech, precision agriculture, renewable energy). • Amount of external funding, investment, or in-kind contributions secured from industry. • Number of joint grant proposals or R&D funding applications submitted. • Utilization rate of research facilities or testbeds by industry partners. • Number of industry-led seminars, workshops, or tech transfer events hosted.

Uncover stories of successful impact to Nebraska agriculture and share in an inspirational light to the department and stakeholders.

- Number of impact stories identified and documented.
- Variety of stories by topic, geography, audience (e.g., crop production, livestock, urban Ag, underserved groups).
- Number of contributors engaged in story development (e.g., Extension Educators, faculty, producers).
- Percentage of stories aligned with strategic priorities of the department or Nebraska Extension.
- Number of stories that highlight measurable outcomes (e.g., increased yield, reduced input cost, improved sustainability).
- Stakeholder ratings or feedback on the relevance and emotional impact of shared stories.
- Survey results or anecdotal evidence showing changes in perception or support due to stories shared.
- Number of requests for follow-up information or presentations stemming from shared stories.

Priority 4 Build and grow a culture of teamwork, collaboration, and sense of belonging for effective execution of our mission, priorities, and goals.

This priority is anchored in our commitment to faculty, staff, and student success, and aligns directly with the core values outlined in this document. It is supported by three guiding pillars:

Invest in Innovation and Collaboration- Strategic investments that empower creativity, interdisciplinary partnerships, and forward-thinking ideas.

Strengthen Operational Clarity and Transparency- Clear, accessible, and consistent systems that foster trust, efficiency, and accountability.

Cultivate Belonging and Lifelong Growth- A thriving environment where people feel valued, supported, and inspired to grow personally and professionally.

Goals	Progress Indicators
• Commit to making strategic investment to support teaching, research, and extension to cultivate new forward-thinking ideas and collaboration.	• Total seed dollar invested for new initiative across mission areas in support of goals • Number of new and innovative initiative in research, teaching, or extension • Number of external grants received resulting from seed grants
• Create documentation for operational processes that is clear and transparent (including pipelines and timelines and assign a responsible individual or team for oversight and update). • Develop onboarding resources and organized and timed orientation for faculty, staff, and students. • Develop and sustain regularly organized professional and social events to develop connections.	• Number of onboarding resources and events available and accessible to team members • Number of faculty participating in UNL new faculty orientation and new faculty development workshop series. • Number of faculty, staff, and students attending department social events.
• Communicate available professional development resources to faculty, staff, and students. • Create a clear and easily accessible conflict resolution faculty and staff team (ombudsperson).	• Dollar invested for faculty and staff professional development • Number of department organized professional development relevant to culture and communication • Number of faculty, staff, and students accessing department ombudsteam.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