

## **The University of Nebraska Institute of Agriculture and Natural Resources: Meeting the Challenges of a Changing World, 2006**

Agriculture continues to be Nebraska's dominant industry, contributing more than \$14 billion to the economy annually and accounting for 31% of all employment in the state. Yet serious challenges face our state's agricultural sector, challenges that the University of Nebraska-Lincoln Institute of Agriculture and Natural Resources (IANR) is uniquely positioned to help our citizens meet.

IANR consists of the College of Agricultural Sciences and Natural Resources, the Agricultural Research Division, and the Extension Division. We have 12 academic units that offer 24 undergraduate majors, 14 Masters degree programs, and 11 Ph.D. programs of study. Through the Extension Division and the Agricultural Research Division, we have a statewide presence with 190 faculty stationed across Nebraska.

Strategic planning is an ongoing activity for IANR and is guided by a commitment to meaningful education, discovery, and extension education which serves Nebraska. Therefore, IANR planning is responsive to changes, outcome focused, interdisciplinary, seeks solutions to problems, fosters stewardship of the state's resources, and relies on stakeholder participation. Stakeholder participation is obtained through listening sessions. In 2003-2005, 35 listening sessions were conducted statewide and on campus. Since then, listening sessions have become an ongoing means of involving stakeholders in IANR's strategic planning with five sessions conducted statewide in 2005-2006.

Internal and external collaborations are important to the successful implementation of the plan. External collaborations include multi-state efforts with other land-grant universities which allow IANR to expand its opportunities by building on a foundation of mutual objectives and shared benefits that are unbounded by disciplinary or political borders.

As new opportunities emerge, the IANR Deans' Council considers their value in light of existing programs, the strategic plan, and resource constraints. Weekly, the Council discusses the IANR faculty hiring plan (reviews position requests, releases positions that address high priority needs, monitors search progress, participates in interviewing, and reviews offers to candidates).

**Priority Goal 1: Redefine the College of Agricultural Sciences and Natural Resources (CASNR) to capture its breadth and diversity of academic programs and to ensure student success in the 21<sup>st</sup> Century.**

**Relation to Core Values:** This priority supports the UNL core values of preparing students for life through learner-centered education, commitment to an uncompromising pursuit of excellence and creating a University culture that values diversity of ideas and people.

### **Accomplishments:**

- In Fall 2005, CASNR had the largest percentage increase in enrollment of any college at UNL, and the largest absolute increase (42 students) in enrollment.
- Based on market research, a change was not made in the CASNR name. The research will be replicated in 3-5 years to determine if a change in the college name is warranted.
- New majors were approved in Insect Science; Hospitality, Restaurant and Tourism Management; and Landscape Architecture. The last two are joint majors between CASNR and the College of Education and Human Sciences and the College of Architecture, respectively. A Community Development specialization in the Master of Agriculture was approved.

- Piloted on-line assessment (PEARL) in partnership with the College of Education and Human Sciences.
- Veterinary Medical Education Program in final stages of approval at Iowa State University and University of Nebraska.
- Bachelor of Science in Agricultural Sciences and Bachelor of Science in Natural Resources degrees changed to Bachelor of Science in the names of the majors.
- Faculty hires: Ag Journalism, Companion Animal (Lecturer), Beef Specialist, Animal Geneticist, Microbial Ecologist, Instructional Biochemist, Biochemical Genetics (2), Statistical Scientist, Histologist (Lecturer), Reproductive Physiologist, Food Chemist, Fisheries Ecologist, River/Stream Ecologist, Biological Engineer, Non-ruminant Nutritionist and 4-H Professional Development Extension Educator.

**Internal Actions:**

- Change the curriculum, develop new degrees and new programs.
- Explore a new interdepartmental, undergraduate major in bio-renewable fuels.
- Increase the number of undergraduate and graduate students enrolled in CASNR degree programs.
- Increase the number of student scholarships and internship opportunities.
- Investigate additional linkages with P-12 programs.

**Hiring Intentions:** Tourism Marketing, Lodging Management, Biological Engineer, Veterinary Medical Parasitologist, Neurobiologist, Veterinary Immunologist, Veterinary Epidemiologist, Veterinary Gross Anatomist, Veterinary Pathologist, Veterinary Surgery and Anesthesiology, and Beef Cattle Clinical Veterinary (Temporary Lecturer).

**Timeline:** 2006-2008 Develop and implement successful new programs. Finalize negotiations to establish a joint Veterinary Medical Education Program with Iowa State to start in 2007.

**Partners:** CASNR alumni, NU Foundation, College of Education and Human Resources, College of Business Administration, College of Arts and Sciences, Hixson Lied College of Fine and Performing Arts, Nebraska College of Technical Agriculture, Nebraska community colleges, high school counselors and administrators, Extension Division, Agricultural Research Division, Kansas State University, Iowa State University, University of Missouri, Nebraska State Department of Education, Nebraska Science Teachers Association, National Science Teachers Association, Nebraska Cattlemen, Ag Builders of Nebraska.

**Benchmarks:** Increased enrollments in most majors. Stabilized enrollments in some majors. Increased scholarships and internship opportunities. New programs and specializations. Increased collaborations.

**Priority Goal 2: Develop an integrated multi-disciplinary, multi-functional water resources program addressing Nebraska's needs that provides statewide, national and international leadership in water quality and quantity management in the next decade.**

**Relationship to Core Values:** This priority relates to a commitment to an uncompromising pursuit of excellence, stimulates research and creative work that fosters discovery, pushes frontiers and advances society, establishes research and creative work as the foundation for teaching and engagement, and engages with academic, business and civic communities throughout the state and the world.

**Accomplishments:**

- In 2005, nearly 700 users downloaded or purchased the Water Optimizer, a decision-support computer program to help farmers make better informed cropping choices when irrigation is limited.

- The Republican River Basin Irrigation Management Project demonstrates research-based irrigation management strategies in farmers' fields and provides practical information for implementing these practices. In 2005, the 230 program participants estimated the knowledge gained was worth about \$16,073 per operation, or nearly \$2.9 million annually.
- Extension partnered with the Nebraska Soybean Board to present Soybean Management Field days in 2005—participants represented 564,000 acres of cropland farmed or managed. Average value placed on knowledge gained and/or anticipated change in practices was \$7.21 per acre with potential impact of \$4,070,000.
- Educated clientele on sustainable landscape practices and integrated pest management techniques to protect natural resources from the runoff of excess fertilizers and improper pesticide application through *Creating a Horticulture Paradise*.
- Extension helped establish the Nebraska Onsite Waste Water Association. This Association sought state legislation to require state certification for on-site installers, pumpers, and inspectors starting in 2006.
- In 2005, more than 630 voluntarily participated in extension training on-site wastewater management classes for professionals focusing on water quality/environment, engineering/groundwater and biology/soils.
- Kansas State University and UNL continue joint research and extension programs to address atrazine levels in the Blue River Basin of Nebraska and Kansas.
- Nebraska has taken the lead in drought mitigation education working with Colorado and Wyoming.
- Through a partnership with USDA's Risk Management Agency, the Groundwater Level Monitoring program is placing satellite uplinks on 52 rapid-response wells. This new technology will provide current well level readings online to anyone with a computer.
- Faculty hires: Irrigated Weed Specialist, Surface Hydrologist, Climate Modeler (2), Environmental Economist, Fisheries Ecologist, Water Resource Scientist, River/Stream Ecologist, Cenozoic Stratigraphy, Crops/4-H Extension Educator, and Agriculture Extension Educator.

**Internal Actions:**

- Research-based information from IANR programs will be provided for individuals, groups, and decision makers that will enable informed decisions relative to use of limited water supplies and protection of water quality.
- Investigate and propose alternative crops that require less applied irrigation water or are adapted to non-irrigated production, that will fit into Nebraska cropping systems, and for which a market exists.
- Analyze opportunities for shifting from irrigated to non-irrigated production or other enterprises that will maintain economic viability and sustainability for producers and communities.
- Construct decision-making support systems that enable producers, policy makers, financial institutions, and others to make critical decisions regarding crop production and water resources use.
- Expand research and extension education programs that will increase the scientific knowledge base and public understanding of the occurrence, movement, and quality of ground water, the interrelationships between ground water and surface water; and the ecology of Nebraska's ground water and surface water systems.
- Design research and extension education programs that analyze the water resource and economic impacts of existing or proposed public policies.
- Increase research and extension education programs that enable Nebraskans to protect ground water and surface water quality and respond to regulatory requirements.

**Hiring Intentions:** Remote Sensing/GIS Scientist, and Water Resource/Irrigation Engineer.

**Timeline:** 2006-2008 Water-related research and education programs are ongoing.

**Partners:** Natural Resources Districts, Nebraska Department of Environmental Quality, Irrigation Districts, public power entities, municipalities, U.S. Corps of Engineers, U.S. Bureau of Land Management, U.S. Environmental Protection Agency, Ground Water Foundation, College of Engineering, UNL Water Initiative, College of Arts and Sciences, College of Education and Human Sciences, College of Law.

**Benchmarks:** Appropriate technologies will be in place for the management of Nebraska's water, livestock waste, soil and range resources, and to mitigate environmental change. Nebraska's natural resources will be inventoried to meet needs of managers. Provide Nebraskan's with appropriate forestry, aquatic, and natural resources.

**Priority Goal 3: Enhance economic opportunity and community revitalization efforts to create more opportunities for future generations, improve the quality of life for youth and families, and to attract talented and educated people to build their lives in Nebraska.**

**Relation to Core Value:** This priority supports a commitment to uncompromising pursuit of excellence, stimulates research and creative work that fosters discovery, pushes frontiers and advances society, establishes research and creative work as the foundation for teaching and engagement, prepares students for life through learner-centered education, engages with academic, business and civic communities throughout the state and the world, and creates a University culture that values diversity of ideas and people.

**Accomplishments:**

- Participants in the 2004-2005 Ranch Practicum influenced decisions on 603,000 acres of range, hayland, and cropland, 42,200 head of cattle and 1,160 people through their ownership, consultation, and educational activity.
- 2005 Conservation Security Partnership informed and educated 1,500 crop and livestock producers about CSP Program. More than \$5,700,000 was awarded to Nebraska producers for 2005. The total 5-10-year impact from the 1,092 contracts is nearly \$11 million.
- Adoption of UNL's heat stress reduction strategies in 2005 saved those in the cattle industry in northeast Nebraska and northwest Iowa between \$10 million and \$27 million.
- Market Journal, an educational agricultural television and Web program, reaches an estimated 12,000 Nebraska households weekly with an estimated annual value to agriculture of \$26 million based on weekly viewership.
- Genetic engineering of Dicamba herbicide resistance in crop plants will provide growers a broader range of efficient and safe patented technology.
- From fall 2004 through January 2006, 235 court-appointed guardians attended training offered by Extension Educators and Nebraska Bar Association attorneys in eleven of the twelve judicial districts.
- Carbon sequestration research confirmed that the energy output from corn-based ethanol is ~+30% greater than the fossil fuel energy input consumed in its manufacture.
- Studies determined that, on average, if a feedlot is feeding wet distillers grains plus solubles at 20% to 40% of the diet and is within 100 miles of the ethanol plant, the returns are \$15 to \$25 per animal fed for 150 days.
- Projections indicate a 50% ethanol processing expansion in Nebraska alone would retain another 10% of the corn crop within the state, increase corn production negligibly, and increase Nebraska corn price by about \$.04 per bushel. However, if ethanol production increased in the rest of the country at the same rate, Nebraska corn prices would rise further.
- Faculty hires: Community/Rural Economic Development Specialist, Reproductive Physiologist, Adolescent Development, Child Development/Early Childhood Education, Family Life Specialist, Biological Engineer, Alternative Swine Production Extension Educator, Livestock/4-H Extension Educator (2), and Livestock Extension Educator.

**Internal Actions:**

- Provide a perspective for communities to prosper in a regional environment.
- Increase entrepreneurship in Rural Nebraska.
- Expand research and education in energy sciences; establish the Nebraska Center for Energy Sciences Research.
- Develop strong people, strong families, and strong communities which lead to a more stable society.
- Increase value-added and new enterprise development, including livestock and crop-based products.
- Build the human capital and enhance the economic well being of Nebraskans.

**Hiring Intentions:** Tourism Marketing, Lodging Management, Beef Specialist/Animal Geneticist, Beef Nutritionist, Non-ruminant Nutritionist, Veterinary Parasitologist, and Swine Veterinarian

**Timeline:** 2006-2008 Enhancing rural economic opportunities is an ongoing programming thrust (2005-2008). Youth development curriculum 2006, entrepreneurship development will be an ongoing program, leadership development programs have been initiated in 2005, value-added and new enterprise development programs will be expanded in 2006-2008.

**Partners:** Nebraska Department of Economic Development, Nebraska Department of Agriculture, Nebraska Department of Labor, Nebraska Department of Insurance, Nebraska Health and Human Services System, Nebraska Business Development Center at UNO, University of Nebraska Rural Initiative, local economic planners, Lied Main Street Program, Nebraska Agricultural Leaders Council, Nebraska Public Power District, USDA Rural Development, Nebraska Association of County Officials, Nebraska Forest Service, College of Education and Human Sciences, College of Business Administration, College of Architecture.

**Benchmarks:** Nebraskans will have knowledge to make effective choices about their health, wellness, and food choices. Rural Nebraska will have viable communities. Nebraskans will have effective leadership skills. Nebraska's communities will have access to the tools they need for their economic development. Nebraskans will have the opportunity for diversity of life styles and community settings. Nebraska landscapes will support a diversity of agricultural enterprises.

**Priority Goal 4: Strengthen food security, food safety, and nutrition programs to ensure that all Nebraskans have a secure and nutritious food supply that enhances wellness.**

**Relation to Core Values:** This priority supports a commitment to uncompromising pursuit of excellence, stimulates research and creative work that fosters discovery, pushes frontiers and advances society, establishes research and creative work as the foundation for teaching and engagement and creates a University that values diversity of ideas and people.

**Accomplishments:**

- The Mobile Plant Diagnostic Laboratory, the nation's most advanced traveling plant diagnostic lab, is now available to respond to any potential agrosecurity threat and to help farmers diagnose plant diseases on the spot.
- Results of beef muscle profiling have added \$50 per head for US producers and processors.
- Over 1,600 youth participated in food safety programs.
- ServeSafe® for Employees has been offered to 200 Nebraska participants at the request of the Nebraska Grocery Industry Association.
- Extension Educators initially certified 753 private applicators (farmers/ranchers) in 2005 and recertified 12,000 private applicators.

- In 2005, 6,500 individuals (915 teams) participated in N-Lighten Nebraska. Average weight lost by participants was 3.1 pounds, and average miles logged were 662 miles.
- From October 1, 2004, through September 30, 2005, Nebraska's Food Stamp Nutrition Education Program (FSNEP) served 3,038 families, 3,235 youth, and 908 seniors.
- In 2005, UNL food scientists' new test for soy flour became commercially available. The test will allow companies to rapidly and accurately detect minute traces of soy flour on equipment or in foods processed on shared equipment.
- Faculty hires: Microbial Ecologist, Food Chemist, Molecular Nutrition, and Cereal Pathologist.

**Internal Actions:**

- Add new programs on bioterrorism and biosecurity issues to ensure the health of the livestock and crop production sectors.
- Enhance food safety research and education programs.
- Increase nutritional quality of foods.

**Hiring Intentions:** Biochemical Genetics, Biosafety Level-3 Core Facility Director, Veterinary Epidemiologist, Veterinary Immunologist, Neurobiologist, Biological Engineer, and Beef Cattle Clinical Vet (Temporary).

**Timeline:** 2006-2008 Much of this work spans 2005-2008. Some educational programs were initiated in 2005; the Doctor of Plant Health decision was pushed back to 2006-2007.

**Partners:** University of Nebraska Medical Center, Kansas State University, Iowa State University, Nebraska Department of Agriculture, Nebraska Department of Health and Human Services, National Science Foundation, National Institutes of Health, U.S. Department of Agriculture, College of Arts and Sciences, College of Education and Human Sciences, youth-serving organizations, non-profit organizations, schools, Nebraska Restaurant Association, hospitals and other health care providers, Nebraska Sports Council.

**Benchmarks:** Nebraska will have a safe, pathogen-free food supply. An appropriate array of products and food technologies will be available to Nebraska's ag-based industries.