The University of Nebraska Institute of Agriculture and Natural Resources: Meeting the Challenges of a Changing World, 2007

Fifteen to one! An independent study released in February 2007 and conducted by Battelle Memorial Institute at the request of IANR concluded that "…IANR's research, teaching, and extension activities are having powerful impacts on Nebraska's economic growth and on economic and social sustainability in the state…Taken together the impact of IANR's programs and expenditures represents a leverage of state funding that exceeds fifteen to one." (Available at: http://atworkfornebraska.unl.edu).

IANR is focused on improving and sustaining Nebraska—improving its economy, preserving its environment, growing a skilled workforce, and contributing to continuing social sustainability and responsibility. IANR consists of the College of Agricultural Sciences and Natural Resources, the Agricultural Research Division, the Extension Division and personnel in the College of Education and Human Sciences. We have 12 academic units that offer 25 undergraduate majors, 14 Masters degree programs, and 11 Ph.D. programs of study. Through the Extension Division and the Agricultural Research Division, IANR has 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 2003-2006, 39 listening sessions were conducted statewide and on campus. Since then, listening sessions have become a mechanism for involving stakeholders in IANR's strategic planning with four sessions conducted statewide in 2006-2007, as well as one session with IANR faculty via satellite and another faculty session on campus.

This past year IANR Deans and unit administrators analyzed faculty and unit accomplishments, outcomes and goals in relationship to strategic priority goals and themes. This analysis resulted in the collaborative development of four logic models—one for each strategic priority goal (Available at: http://ianrhome.unl.edu/ianrstratplan.shtml). Internal actions and benchmarks from the logic models are reflected in this report.

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 21st 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 2006, CASNR undergraduate enrollment increased 3.1% (39 students). This is the second consecutive year that the College had an increase in enrollment. Increased total amount of undergraduate college scholarships distributed in 2006-07 by 22.7% ($629,269 to $772,451), increased number of individual students receiving awards by 20.9% (603 to 729), and increased average individual awards by 7.9% ($974 to $1,051).
- Established 'Nebraskans for Nebraska,' a consortium of CASNR stakeholder groups sponsored by the CASNR Alumni Association and the Agriculture Builders of Nebraska, Inc. to support the College and the Extension Division in marketing career opportunities and academic programs at the local level.

- A new major in Plant Biology was approved. This is a joint major between CASNR and the College of Arts and Sciences. Two other majors (Food Technology for Companion Animals and Forensic Science) are being considered by the Nebraska Coordinating Commission for Post-secondary Education. Received a $44,000 grant from the Nebraska Center for Energy Sciences Research for the development of a minor in Energy Science.
- Expanded the on-line assessment (PEARL) in partnership with the College of Education and Human Sciences to the College of Journalism and Mass Communications, and the Hixson-Lied College of Fine and Performing Arts.
- Finalized the UNL/Iowa State University Professional Program in Veterinary Medicine and received full accreditation from the American Veterinary Medical Association. The first class will enter in fall, 2007.
- Faculty hires: Beef Cattle Clinical Veterinary (Temporary Lecturer), Biochemical Genetics, Forensic Scientist, Histologist (Lecturer), Microbial Ecologist, Non-ruminant Nutritionist, Veterinary Gross Anatomist, Veterinary Immunologist, and Veterinary Surgery and Anesthesiologist.

Internal Actions:
- Increase packaging of curriculum (more interdisciplinary courses and curriculum).
- Increase number of Associate to Bachelor agreements.
- Modified, innovative recruitment and retention programs.
- 4-H data interface with Talisma (UNL's on-line recruitment tracking system).
- Increase the number of student scholarships, internship and placement opportunities.
- Increase P-12, lifelong learning programming.

Hiring Intentions: Livestock Judging Team/Student Recruitment Extension Educator, Tourism Marketing, Lodging Management, Beef Specialist/Animal Geneticist, Biological Engineer, Neurobiologist, Veterinary Medical Parasitologist, and Veterinary Epidemiologist.

Timeline: 2007-2008 Develop and implement successful new programs. Complete faculty hires and curriculum approval for Professional Program in Veterinary Medicine with Iowa State University and the University of Nebraska.

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, Nebraskans for Nebraska, 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: Society ready graduates capable of leading change. New professionals. New career paths. Graduating and meeting the needs of lifelong learners. More seamless relationships with 4-H, FFA, science teachers, etc. New understanding by the public of applied science.

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:

- An extension demonstration project in the Republican River Basin focuses on teaching producers to achieve nearly full yields with less water. The project showed a water miser strategy used 31% less water while reducing corn yields only 3%. Pumping cost savings usually more than offset yield loss. Overall estimated value of knowledge gained in 2006 was $2.4 million, according to 130 producer participants.
- Currently, 80% of the chickpeas, or garbanzo beans, used in the US are imported. Research and extension education have shown them to be a viable alternative crop for Panhandle growers, who are contracting for 10,000 acres of chickpeas in 2007. At $27 per cwt., a typical dryland yield of 900 lbs. per acre generates nearly $243. Next year garbanzo beans will add approximately $2.4 million to the Panhandle economy. Birdseed is another alternative crop IANR scientists have researched for the Panhandle; its total direct impact on the region is projected at $4.5 million per year.
- Erosion and Sediment Control Seminars teach building industry professionals about stormwater management issues and regulations to reduce soil and sediment losses from construction sites. Anywhere from 140 to 220 people, including engineers, architects and grading contractors, have attended sessions annually since 2003. In 2006, 91% of participants said they would apply new knowledge from the seminar in their work.
- Researchers are using remote-sensing instruments on satellites, airplanes and boats to detect the threat of toxic blue-green algae on public lakes before the bacteria that produce it can grow into full-scale bloom. With this technology, scientists in collaboration with the Nebraska Department of Environmental Quality, have the capacity to identify, map and monitor in real-time the water-borne agents that cause toxic blue-green algae to flourish and become a health threat. As for private lakes and ponds, Extension provides free test kits to property owners so they can have the University conduct tests of their water for algae toxins.
- A partnership between the National Drought Mitigation Center and the Dept. of Computer Science and Engineering is uniting the expertise of climatologists and computer scientists to bring cutting-edge computer technologies to producers' age-old decision processes (National Ag. Decision Support System). Current efforts are funded by a $6,400,000 USDA Risk Management Assessment grant.
- Faculty hires: Cropping Systems Extension Educator (2), Remote Sensing/GIS Scientist, and Water Resource/Irrigation Engineer.

Internal Actions:

- Develop understanding of basic plant, water, soil and climate relationships; adapted crop varieties; decision-making support systems; and research and extension education programs.
- Evaluate alternative water delivery systems; irrigation water management strategies; crops that require less applied irrigation water; and opportunities for shifting from irrigated to non-irrigated production.
- Enhance education programs that increase the scientific knowledge base, public understanding of the occurrence, movement and quality of round water; enable Nebraskans to protect ground water and surface water quality, and respond to regulatory requirements; enable communities and individuals to better understand and use appropriate technologies to protect the quality of drinking water supplies; and enable individuals groups and communities to make informed decisions relative to use of limited water supplies and protection of water quality.

Hiring Intentions: Alternative Crops Breeding Specialist, and Biological Engineer (Splinter-Othmer Professorship).

Timeline: 2007-2008 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: Ensure supply of water to meet economic, social and environmental needs of Nebraska. Policy makers will consider basin-wide factors when making decisions. Nebraska will not exceed its allocation of water in the Republican River as allowed by the interstate compact with Kansas and Colorado.

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:

- IANR research into the feasibility and economics of feeding cattle wet byproducts from the ethanol and grain processing industry encouraged the 10-fold increase in the state's ethanol production capacity since the early 1990s. Grants nearing $100,000 from Nebraska commodity organizations help support this research.
- From 1992 through 2006 the estimated cumulative benefit to Nebraska from feeding byproducts from Nebraska's expanding ethanol and grain processing industry wet instead of dry was approaching half a billion dollars. IANR animal scientists provided the feasibility, benefits and economic advantages of feeding byproducts wet instead of drying and shipping them to dried feed markets.
- In 2006 Crop Management and Diagnostic Clinics drew nearly 500 participants from 64 Nebraska counties and 10 other states that influence or manage nearly 6.5 million acres. Participants valued the knowledge gained at the clinics at an average of $6.67 per acre, or a total of nearly $42.3 million based on acreage involved.
- 4-H in Nebraska emphasizes science and technology skills, which led to hosting the National 4-H Technology Leadership Conference in 2006. Nearly 200 youth from 27 states, working in teams, refurbished approximately 100 donated computers for a Nebraska organization that distributes the computers to Nebraska children, people in vocational rehabilitation, senior citizens and people experiencing a disability.
- Faculty hires: Alternative Swine Production Extension Educator, Animal Nutritionist, Forensic Scientist, Swine Specialist, and Weed Science Extension Educator.

Internal Actions:

- Conduct research, instruction and extension education programs that enable Nebraskans to strengthen their families and communities. Output efforts will reduce food-borne illness, increase healthy eating and active behaviors, increase number of self-confident community leaders and increase the number of communities with access to tools to aid economic development.
- Employ a blend of teaching strategies to accomplish education goals through Extension, CASNR, and CEHS which accommodate learners' desire for convenient access to information.
- Research will focus on development of new knowledge to reach individuals who want research-based and indepth, behavior-changing information.

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

Timeline: 2007-2008 Enhancing rural economic opportunities is an ongoing programming thrust (2005-2008). Youth development curriculum was released in 2006, entrepreneurship development is an ongoing

program, leadership development programs were initiated in 2005, value-added and new enterprise development programs are expanding in 2007-2008.

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: Nebraska will have social and economic vitality because of strong community leaders who understand the needs of their communities; the entrepreneurship spirit which encourages the development of jobs that build upon Nebraska's resource, i.e., Agriculture; youth will remain active members of their communities into adulthood; and families who are healthy and thriving.

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:

- Proper nutrition helps keep individuals healthy and reduces disease. Extension's Expanded Food and Nutrition Education program (EFNEP) teaches limited-resource parents with children and youth-at-risk how to meet daily nutritional requirements. EFNEP reached 2,575 families and 4,485 youth in Douglas/Sarpy counties, Adams/Hall/Buffalo counties and Lancaster County in fiscal year 2005-2006. Impact assessment studies indicate that for every $1.00 invested in EFNEP programming, participants save a projected $8.00 in health care costs in the future.
- Organic farming is one of the fastest growing segments of US agriculture. As part of a $750,000 grant, IANR researchers will establish the university's first certified organic research plots at four research farms around the state where scientists can study locally-important organic production issues.
- In 2005-2006, Extension helped educate more than 5,100 Nebraska caregivers and beneficiaries about the new Medicare Prescription Drug Program. Extension enrolled 622 Nebraska beneficiaries, saving them more than $770,000.
- Consumers and cattle producers share concerns about *E. coli* O157:H7, a dangerous bacteria that causes foodborne illness outbreaks. Finding ways to control the bacteria in cattle before slaughter is a critical step in reducing chances it will reach consumers. Five years of intensive research on controlling *E. coli* O157:H7 in feedlots have demonstrated the effectiveness of a new vaccine and a beneficial bacterial feed additive to reduce *E. coli* in the manure of feedlot cattle. This research is funded by a $500,000 grant from the USDA.
- An IANR nutrition scientist combined stearic acid from beef tallow with plant sterols from soybeans to create a potent cholesterol-lowering compound that could be used as a dietary supplement or a food ingredient. The university is patenting this technology, which could provide a powerful new tool for managing cholesterol. Managing cholesterol is a national concern--more than 140 million Americans' cholesterol levels put them at risk for heart disease, according to the American Heart Association. This research is funded by $800,000 through a combination of Beef Products Inc. and the USDA grants.
- Faculty hires: Beef Cattle Clinical Veterinary (Temporary Lecturer), Biochemical Genetics, Statistics, and Veterinary Immunologist.

Internal Actions:

- Food literacy curriculum for all ages and cultures.
- Development of curriculum in agrisecurity (Masters level).
- Diagnostic tools for new pathogens.
- Develop products and processes for designer plants and animals.
- Knowledge of nutritional requirements tailored to the individual.

Hiring Intentions: Alternative Crops Breeding Specialist, Biological Engineer (Splinter-Othmer Professorship), Neurobiologist, Veterinary Epidemiologist, and Veterinary Immunologist.

Timeline: 2007-2008 Much of this work spans 2005-2008. Some educational programs were initiated in 2005; the Doctor of Plant Health decision will be made in 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, USDA, 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: Healthy Nebraskans. Sustainable/affordable food security systems. Profitable food production systems (economics). Viable communities. Next generation of innovators and discoverers of food security. Economic prosperity. Monitoring and privacy systems. Durable disease resistance in agricultural plants and animals.