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At Work for Nebraska

IANR SUCCESSES



2007

University of Nebraska–Lincoln
Institute of Agriculture and Natural Resources
Extension, Research and Teaching

About IANR Successes

From laboratories to the classroom and from extension programs to field studies, the projects, programs and people in the Institute of Agriculture and Natural Resources at the University of Nebraska–Lincoln serve all Nebraskans.

This booklet features some of the many research, extension and teaching efforts under way in IANR to help Nebraskans meet the challenges of a changing world. This is not a comprehensive listing of IANR accomplishments, but highlights some ongoing efforts.

Writers in Communications and Information Technology prepared these impacts in cooperation with IANR faculty and administration. These deliberately brief impacts focus on the public benefits and payoffs of IANR projects. Each statement features a single-paragraph summary at the end that highlights the project's benefits. This information is used extensively in IANR communications and marketing efforts.

You are welcome to use any or all of this information to promote IANR programs.

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¹ * Denotes an update of an impact statement used in 2004.

Nutrition and Health

Topic: Food Stamp Nutrition Education Project

Issue:

All Americans need to eat healthier. However, this is especially difficult for low-income, aging or culturally diverse Nebraskans with limited nutrition education and limited knowledge and skills when it comes to diet quality, food safety and food resource management.

What has been done:

The University of Nebraska-Lincoln Extension Food Stamp Nutrition Education Project helps program participants – 73 percent of whom are living at or below the poverty level – to eat healthier and manage their budget so they have enough to buy the food they need and not run out of food before the end of the month. The program, offered in 42 counties throughout the state, offers lessons in diet quality, food safety and food resource management for a culturally diverse, limited-resource audience either individually or in small groups. The program helps participants – young and old – prepare quick, low-cost, nutritious meals and snacks, addresses the importance of food groups and nutrients and offers important lessons in food safety, such as washing hands before eating and preparing food.

Impact:

The UNL Extension program reached 3,283 families, 10,459 youth and 885 seniors in 2005-2006. Of the 1,074 graduates of the 2005-2006 program, 71 percent improved at least one food resource management skill, 81 percent improved one or more nutritious practices and 52 percent improved one of more food safety practices. Of the 10,459 youth that participated in the program, at entry 67 percent said they ate breakfast to help them learn better in class. Upon exit, 95 percent said eating breakfast helps them learn better in class. At entry, only 26 percent of youth said they needed to consume two or more servings of milk and cheese everyday. Upon exit, 87 percent answered the question correctly.

Funding:

University of Nebraska–Lincoln Extension
Nebraska Health and Human Services Food Stamp Program

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Summary:

Everyone needs to eat healthier. However, this is difficult for low-income, aging or culturally diverse Nebraskans with limited nutrition education and limited knowledge and skills when it comes to diet quality, food safety and food resource management. The University of Nebraska–Lincoln Extension Food Stamp Nutrition Education Project helps program participants – 73 percent of whom are living at or below the poverty level – to eat healthier and manage their budget so they have enough to buy the food they need and not run out of food before the end of the month. The UNL Extension program reached 3,283 families, 10,459 youth and 885 seniors in 2005-2006. Of the 1,074 graduates of the 2005-2006 program, 71 percent improved at least one food resource management skill, 81 percent improved one or more nutritious practices and 52 percent improved one of more food safety practices. Of the 10,459 youth that participated in the program, at entry 67 percent said they ate breakfast to help them learn better in class. Upon exit, 95 percent said eating breakfast helps them learn better in class. At entry, only 26 percent of youth said they needed to consume two or more servings of milk and cheese everyday. Upon exit, 87 percent answered the question correctly.

Nutrition and Health

Topic: Medicare Prescription Card Awareness Program

Issue:

The 2003 Medicare Reform Act added the first-ever prescription drug benefit to the program, prompting questions, confusion and concerns for Medicare recipients and their families facing a gauntlet of paperwork and choices.

What has been done:

Beginning in 2004, University of Nebraska–Lincoln Extension participated in a pilot program to educate and enroll eligible Nebraskans – one of five extension systems across the country to partner with the USDA on the effort. The Nebraska campaign was titled “The Greatest Gift You Can Give a Senior Citizen This Year is a Prescription Drug Card.” The initial campaign, to encourage enrollment in a temporary prescription drug card program, was publicized via contacts with more than 200 civic organizations, more than 350 news releases, columns and public service announcements, as well as TV and radio spots, interviews and public presentations. Throughout the state, handouts and flyers promoting the campaign were distributed in extension and medical offices, grocery stores, medical facilities, senior centers, senior housing units and elsewhere. Youth and adult volunteers distributed Medicare worksheets and enrollment forms and helped with one-on-one enrollment sessions. In 2005, extension joined with 21 other state and local agencies to form the Nebraska Prescription Drug Coalition. This coalition offered monthly satellite conferences statewide to educate professionals and build a strong network of key stakeholders who would use a consistent, accurate message and a coordinated effort to implement the Medicare Prescription Drug Benefit in Nebraska.

Impact:

Extension staff members personally enrolled more than 622 Medicare beneficiaries, saving them more than \$1.5 million. These staff members have given 97 educational presentations to more than 3,000 Medicare beneficiaries and their families. They have organized 127 enrollment sessions and personally counseled 2,107 beneficiaries and family members about the prescription drug benefit. Nebraska is ranked fourth in the nation for general Part D enrollment. As of May 15, 2006, 92 percent of Nebraskans with Medicare had some form of credible drug coverage. UNL Extension was part of the five-state Medicare Prescription drug Education Team that received the national 2006 Jeanne M. Priester Award for outstanding health education efforts.

Funding:

USDA Cooperative State Research Extension and Education Service
UNL Extension
Special Project dollars provided by CSREES
Nebraska Department of Insurance
AARP Nebraska

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Summary:

The 2003 Medicare Reform Act's prescription drug benefit to the program has prompted questions, confusion and concerns for Medicare recipients and their families facing a gauntlet of paperwork and choices. UNL Extension was one of five extension systems in the country tapped by the USDA to participate in a pilot program to educate and enroll eligible beneficiaries. The Nebraska campaign, titled "The Greatest Gift You Can Give a Senior Citizen This Year is a Prescription Drug Card," was widely publicized via media, presentations and civic organizations. Volunteers distributed Medicare worksheets and enrollment forms and helped with one-on-one enrollment sessions. At least 530 Medicare recipients enrolled for prescription drug cards as a result of this effort in 2004-05, leading to a potential savings of at least \$820,320. Since that initial enrollment, UNL Extension staff have been working to educate and enroll eligible Nebraskans in the Medicare Part D Prescription Drug Plan. In 2005-2006, this work has resulted in 622 Medicare beneficiaries enrolling in the plan with an additional savings of \$777,050 and Nebraska being ranked fourth in the nation for general Part D enrollment.

Nutrition and Health

Topic: Methamphetamine Community Awareness Program

Issue:

Methamphetamine production in Nebraska has decreased with the passage of the law requiring medications containing pseudoephedrine be placed behind the counter but the use has not decreased. This meth epidemic threatens families and communities.

What has been done:

University of Nebraska–Lincoln Extension teamed with 3rd District Rep. Tom Osborne to promote community awareness of the drug's dangers. In 2006, over 4,000 Nebraskans learned about meth from presentations and educational handouts. In pre- and post-program evaluations, a significant difference in knowledge was gained on each of seven questions. Anywhere from 71 percent to 94 percent of those reporting indicated an increase in their understanding about meth from the pre- to post-test. The most important things that participants indicated they had learned were how quickly one can become addicted and the devastating effects and changes on the user which makes them more determined to share the information with others. Over half of those completing evaluations had never attended an Extension program. This has resulted in continued requests for educational programs from community and schools who have not previously worked with Extension. Inmates at the Nebraska Women's Correctional Facility indicated they had never received educational information on meth nor did they understand the consequences of its use. This drug has dramatically changed their lives.

Impact:

In communities where the program has been presented, volunteer clean-up groups are more knowledgeable about meth lab litter safety, thanks to distribution of the volunteer safety DVD and brochure.

Funding:

UNL Extension

Nebraska State Patrol

Keep Nebraska Beautiful grant from Department of Environmental Quality

Midwest High-Intensity Drug Trafficking Areas program

Smith-Lever 3(b) & (c)

User fees

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Summary:

Methamphetamine production in Nebraska has decreased with the passage of the law requiring medications containing pseudoephedrine be placed behind the counter but the use has not decreased. If this epidemic goes unchecked, it can tear apart families and communities and overwhelm legal, medical and social resources. UNL Extension promotes community awareness of the drug's dangers. In 2006, over 4,000 Nebraskans learned about meth from presentations and educational handouts. The "Nebraska Cleanup Volunteer Safety" DVD and brochure are distributed at every program. In communities where the program has been presented, volunteer clean-up groups are more knowledgeable about meth lab litter safety, thanks to distribution of the volunteer safety DVD and brochure.

As a result of this programming, youth programs are being developed and presentations are being scheduled. Over 850 students in Southeast Nebraska recently participated in the new programs.

Nutrition and Health

Topic: HACCP Workshops for School Food Service

Issue:

Congress ordered public schools to implement new food safety guidelines by July 2006. The guidelines are part of Hazard Analysis and Critical Control Point (HACCP) for School Food Service. HACCP requires guidelines to ensure the safety of food. It already is applied to many parts of the food service industry.

What has been done:

University of Nebraska–Lincoln Extension has presented 12 workshops since 2005 for school food service managers to help them implement the HACCP guidelines. Extension worked with the Nebraska Department of Health and Human Services on the workshops, which were held in cities throughout Nebraska.

Impact:

Participants reported an 84 percent increase in knowledge about HACCP procedures, which help prevent pathogens from infecting food. Schools have reported an increase in the proper calibration of food thermometers used to keep food at a safe temperature. Before the workshops, most participants said they did not feel very comfortable about how to implement HACCP. After the workshops, they reported they were more comfortable with implementing HACCP.

Funding:

Department of Education Nutritional Services

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Summary:

Schools were required by Congress to implement food safety guidelines using a program called Hazard Analysis and Critical Control Point (HACCP) for School Food Service by July 2006. University of Nebraska–Lincoln Extension has held 12 workshops across the state since 2005 to help school food service managers to learn the HACCP guidelines, which help prevent pathogens from infecting food. As a result of the workshops, 84 percent of participants reported an increase in knowledge of HACCP procedures. Schools have reported an increase in proper food thermometer calibration to keep foods at a safe temperature.

Nutrition and Health

Topic: HACCP Workshops for Food Industry

Issue:

To ensure the safety of meat and poultry consumers buy at the store, USDA requires meat and poultry processors to employ methods to reduce harmful bacteria, chemicals and contamination in their operations. Plants that fail to comply can be closed and contamination often sparks costly product recalls. While processors know compliance is important, it sometimes can be a challenge, especially for small processing operations.

What has been done:

University of Nebraska–Lincoln Extension, foreseeing the federal regulations, began teaching Hazard Analysis and Critical Control Point (HACCP) for processors in 1992. The regulations took effect in 1996 for large processors and in 1998 for small operations. UNL offers HACCP training to meat and poultry processing personnel to help them develop food safety programs to reduce and/or eliminate bacteria that cause food-borne illnesses. UNL faculty have worked with colleagues at Kansas State University, University of Missouri and South Dakota State University to train processors in Nebraska and surrounding states. During intensive workshops offered annually, with each drawing 30 to 35 people, specialists teach processors how to develop or revise their HACCP plans. In 2005, they expanded training to teach small processors of ready-to-eat meats how to avoid the growth of *Listeria*, a potential deadly bacteria. In 2006 the specialists conducted three workshops for controlling *Listeria* in ready to eat meats which were attended by about 110. Extension specialists also provide print resources and one-on-one consultations to solve problems. Since 2000, more than 1,100 processors have taken UNL Extension's HACCP training.

Impact:

Nebraska leads the nation in commercial livestock slaughter so safe processing is an economic as well as public health issue. Recent Centers for Disease Control and Prevention reports show that from 1996 to 2005, the incidence of *E. coli* O157:H7 infections decreased 29 percent nationwide. USDA's Food Safety and Inspection Service also found a large reduction in *E. coli* infections. In 2001 the FSIS found 59 positive tests in 6,770 ground beef samples. In 2005, 19 positive tests were found in nearly 11,000 samples. These declines are largely attributed to HACCP. An Elwood meat processing business owner said HACCP training helped employees more closely scrutinize their work and keep better records.

Funding:

UNL Extension
USDA CSREES grant
USDA Food Safety and Inspection Service grant
Smith-Lever 3(b) & (c)

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Summary:

Meat safety is an economic as well as public health issue in Nebraska, which leads the nation in commercial livestock slaughter. UNL food safety and meat specialists work closely with processors, especially small operators, to help them implement and update federally-mandated food safety programs for their operations. UNL Extension has provided training on this system, called Hazard Analysis and Critical Control Point, or HACCP, since 1992. Since 2000, extension has helped more than 1,100 small and very small processors adopt HACCP. As a result of HACCP, *E. coli* O157:H7 infections nationally were reduced sharply, according to the Centers for Disease Control and Prevention and the Food Safety and Inspection Service. An Elwood meat processor said extension's HACCP training helped his employees more closely scrutinize their work and keep better records.

Nutrition and Health

Topic: Promising New Cholesterol-Fighter

Issue:

Animal fats are widely considered dietary pariahs but University of Nebraska research shows certain saturated fats actually can lower cholesterol. Harnessing that cholesterol-fighting power could benefit the more than 140 million Americans whose blood cholesterol levels put them at risk for heart disease.

What has been done:

A University of Nebraska–Lincoln nutrition scientist has developed a promising new cholesterol-fighting compound using homegrown ingredients. He developed a way to combine stearic acid from beef tallow with plant sterols from soybeans. The result is a potent cholesterol-lowering compound that could be used as a dietary supplement or a food ingredient. Animal studies showed this new compound packs far more cholesterol-lowering power than commercially available plant-based food additives. Preliminary research also suggests it works at least as well as widely prescribed cholesterol-lowering statin drugs. The new compound is an outgrowth of Nebraska research on fats' role in heart disease which revealed that stearic acid, a saturated fat in beef tallow, actually lowers cholesterol. The university is patenting this technology and the team is further testing its effectiveness and exploring how best to commercialize it for consumers' benefit. Human clinical trials now are under way.

Impact:

Medical experts agree that controlling blood cholesterol is critical to reducing major health problems, including stroke and heart attack. This Nebraska-developed compound should provide a powerful new tool for managing cholesterol. In animal studies, it lowered LDL, or bad cholesterol, by about 70 percent, compared with 10 percent for commercially available plant-based food additives.

Funding:

University of Nebraska Agricultural Research Division
Hatch Act

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Summary:

Beef tallow is a key ingredient in a promising new cholesterol-fighting compound. 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. It outperformed commercially available plant-based food additives in animal studies. Preliminary research also suggests it works at least as well as widely prescribed cholesterol-lowering statin drugs. This is an outgrowth of earlier research by this College of Education and Human Sciences scientist who found that stearic acid, a saturated fat in beef tallow, actually lowers cholesterol. The university is patenting this technology, which could provide a powerful new tool for managing cholesterol. That's a national health concern because more than 140 million Americans' cholesterol levels put them at risk for heart disease, according to the American Heart Association.

Nutrition and Health

Topic: Landscaping Program Reduces Lead Threat

Issue:

Lead poisoning can lower children's IQs, requiring special education instruction; cause hyperactivity; and even contribute to juvenile delinquency. Many east Omaha soils are contaminated from former lead refinery smokestack emissions and deteriorating lead-based paint. Children can contract lead poisoning when they play in bare, dry soil so it must be buried or covered to prevent lead exposure.

What has been done:

Working with Habitat for Humanity, University of Nebraska–Lincoln Extension's Preventing Lead Exposure Through Landscaping helps Omahans learn how to protect their children from soils contaminated with lead. Since August 2004, 10 East Omaha homes have been properly landscaped to stabilize and cover the lead in soils so children don't inhale or ingest it.

Impact:

Participants have learned how to eliminate lead hazards in their yards by covering bare soil with mulch or turf, using raised beds, and by making their soil inaccessible to children. Participants also learned how to conserve water in their landscapes; some had had no previous experience with a lawn or landscaping but have taken on added pride and responsibility in the neighborhood through their yards. After each landscape is installed, a workshop for the general public attracts 15-20 participants showing even more people how to prevent lead poisoning through proper landscaping, and to conserve water while doing so.

Funding:

UNL Extension

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Summary:

Many east Omaha soils are contaminated from lead from former lead refinery smokestacks and deteriorating lead-based paint, which can poison children when they play in the bare, dry soil. Burying or covering the soil prevents lead poisoning in children. Working with Habitat for Humanity, University of Nebraska–Lincoln Extension since August 2004 has taught 10 families how to properly landscape their soils to help keep their children safe. This was some participants' first experience with a yard or landscaping, and developed a newfound sense of pride in their neighborhoods. Workshops presented for the public after each landscape is installed have attracted an average of 15-20 people each.

Nutrition and Health

Topic: Reducing or Eliminating Arsenic and Uranium from Public Drinking Water Systems

Issue:

The U.S. Environmental Protection Agency limits the amount of arsenic and uranium in drinking water. The maximum contaminant levels (MCL) for arsenic and uranium are 10 and 30 parts per billion, respectively. More than 80 small public water systems across Nebraska are struggling to comply with these federal requirement because the cost of water treatment and/or finding a new source of water are cost prohibitive for small public water systems.

What has been done:

University of Nebraska–Lincoln water scientists have been evaluating the occurrence of arsenic and uranium in the water supplies of small Nebraska communities to find ways to reduce arsenic in groundwater that cost less than drilling new wells or traditional approaches to removing the contaminant. Both arsenic and uranium occur naturally and are linked to some cancers and other health problems. Recent work conducted in collaboration with the Nebraska Health and Human Services System indicates that well design and capacity can influence the concentration of the uranium. In addition, the behavior of uranium can be influenced by the management of pumping and reducing the stress on the aquifer system. Uranium concentrations can be stratified whereby distinct zones of higher and lower concentrations of uranium can be found. This stratification provides the opportunity for zones with high uranium concentrations to be packed off, which would lead to lower uranium concentrations. In contrast to uranium, the results for arsenic are not as conclusive. Limited data suggests that in some cases arsenic concentrations can be lowered below the MCL using well design modifications, while in other cases arsenic concentrations do not change.

Impact:

It's estimated that complying with the MCL standards for arsenic and uranium could easily cost more than \$200 million for small community water systems statewide if conventional methods are used to reduce arsenic and uranium concentrations. This Nebraska research indicates that practical recommendations could save small water systems thousands of dollars on reducing arsenic and uranium concentrations.

Funding:

U.S. Environmental Protection Agency
U.S. Geological Survey
Nebraska Health and Human Services System

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Summary:

University of Nebraska–Lincoln water scientists are working to help Nebraska's small communities meet federal limits for arsenic and uranium in their drinking water. More than 80 small public water systems statewide are having trouble meeting these drinking water standards. Researchers are investigating alternatives that cost less than drilling new wells or using water treatment methods. The goal is to provide recommendations to help public water supplies be in compliance with federal water standards. It's estimated that compliance using traditional methods could cost small water systems statewide more than \$200 million. Results of this research could significantly reduce those costs.

Natural Resources and Environmental Sustainability

Topic: Groundwater Level Monitoring

Issue:

Nebraska has some of the world's most abundant groundwater supplies, but groundwater levels have dropped in many areas in recent years. Natural resources managers, irrigators and policymakers need current information to better assess and manage this valuable resource.

What has been done:

For more than 75 years, the University of Nebraska's groundwater monitoring program has annually recorded and published Nebraska groundwater level rises and declines. Today, the program uses early spring readings from more than 5,800 irrigation, domestic, observation and monitoring wells. Yearly changes and cumulative changes since irrigation development began are published as colored maps and are available online. In 2005, the program published a map depicting widespread groundwater level declines from 2000 to 2005, the period of the current drought. Through a partnership with USDA's Risk Management Agency, the program is placing satellite uplinks and associated technology on 52 rapid response wells. This new technology, which will be available on the Internet by spring 2008, will provide current well level readings online to anyone with a computer.

Impact:

Annual and longer-term groundwater level information have long been used by decision makers and resource managers to set policies related to groundwater pumping and to make key decisions about how to use this resource. Recent drought coupled with recent water policy and legal decisions have increased the need for current groundwater information. The new rapid monitoring program will provide immediate snapshots of groundwater conditions across the state to aid growers and policymakers.

Funding:

UNL Agricultural Research Division
USDA Risk Management Agency
Hatch Act
UNL Water Resources Research Initiative

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Summary:

UNL water researchers are teaming with the USDA's Risk Management Agency to provide current groundwater levels across Nebraska via the Internet. For more than 75 years, the university has recorded levels in groundwater wells statewide and reported findings annually in publications to aid decisions about groundwater use, management and policy. Those color maps also are available online. Through the new partnership, satellite uplink and computer equipment is being installed in 52 of the 5,800 wells monitored statewide to compile groundwater data. This will allow information about current levels to be shared immediately via the Web. Recent drought coupled with recent water policy and legal decisions have increased the need for more timely groundwater information. The new rapid monitoring program, which will be available on the Internet by spring 2008, will provide a real-time snapshot of groundwater status.

Natural Resources and Environmental Sustainability

Topic: Integrated Pest Management Training in Schools

Issue:

Pesticides often were being sprayed in public schools to keep bugs away – frequently by untrained custodial and maintenance workers. In one case, a school custodian applied a pesticide on a lawn and did not keep students away from the area. Students walking through the grass tracked the pesticide inside the school.

What has been done:

University of Nebraska–Lincoln Extension has implemented an Integrated Pest Management training program in schools. In 2002 extension surveyed more than 700 school administrators. Of 200 who completed the survey, 64 percent indicated pesticides were routinely applied in their schools, even if they were not shown to be needed. Extension then developed a brochure, a Web site, learning modules and a how-to book, which was given to schools. Extension invited school representatives from Columbus, Lincoln, Malcolm, Omaha, Oshkosh and Sutherland to attend the Urban Pest Management and the Nebraska Turfgrass conferences. Extension also visited individual schools in those districts to provide training.

Impact:

After meeting with extension, school personnel decided to make several changes in the way they dealt with pests. Among the plans were sealing cracks and crevices, improving water drainage to prevent mold and pest-conducive conditions and using fewer toxic pesticides. Omaha Public Schools now use less toxic solutions when spraying for pests and officials have a better understanding of pest management practices. At Lincoln Public Schools, employees are taking steps to prevent pests from entering schools. For example, food containers now are being properly stored rather than being left in the open. LPS also uses more sticky traps and fewer pesticides to control pests.

Funding:

U.S. Environmental Protection Agency
Nebraska Department of Agriculture
University of Nebraska–Lincoln Extension

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Summary:

Custodial and maintenance staff untrained in pesticide prevention were routinely spraying pesticides in public schools in Nebraska. University of Nebraska–Lincoln Extension was concerned about untrained people making pesticide applications, so it implemented an Integrated Pest Management Program in Schools. Extension developed a brochure, a Web site, learning modules and a how-to book which was given to schools. Representatives of some school districts attended conferences and extension visited schools in those districts. Afterward, district representatives changed their practices by better sealing cracks and crevices in their buildings, using fewer toxic pesticides and other steps.

Natural Resources and Environmental Sustainability

Topic: Moisture-measuring Equipment

Issue:

Urban, environmental and agricultural demands mean water is becoming more scarce, and irrigators increasingly are being limited in their crop water use. The challenge is to adhere to water restrictions while maximizing yields and profitability.

What has been done:

The Nebraska Agricultural Water Management Demonstration Network team of University of Nebraska–Lincoln Extension, the Upper Big Blue Natural Resources District and growers are working one-on-one to best use moisture-measuring equipment that takes the guesswork out of irrigation decisions. The NRD and extension assisted with equipment costs for 20 producer participants in 2005 and 67 in 2006.

Impact:

The largest NRD in the state, the Upper Big Blue, has more than 1 million acres of irrigated cropland and more than 13,000 irrigation wells. Saving 1 inch of irrigation water in just this area would result in 3.6 billion cubic feet of water and \$6 million in energy-cost savings. The adoption of irrigation moisture-measuring equipment is increasing and 200 participants are expected in 2007 in other districts.

Funding:

Upper Big Blue Natural Resources District
Natural Resources Conservation Service
University of Nebraska–Lincoln Extension

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Summary:

Urban, environmental and agricultural demand means water is becoming more scarce and irrigators increasingly are being limited in their crop water use. The Nebraska Agricultural Water Management Demonstration Network team of University of Nebraska–Lincoln Extension, the Upper Big Blue Natural Resources District and growers worked one-on-one to take the guesswork out of irrigating decisions using special moisture-measuring equipment. Saving 1 inch of irrigation water in just the UBBNRD would result in 3.6 billion cubic feet of water and \$6 million in energy-cost savings. Participation is expected to grow to 200 producers in other districts in 2007.

Natural Resources and Environment Sustainability

Topic: On-site Wastewater Treatment and Management

Issue:

Poor design, improper installation or inadequate maintenance can cause on-site wastewater systems to fail, contaminating water and soil, and sometimes exposing people to disease-causing pollutants.

What has been done:

University of Nebraska–Lincoln Extension provides on-site wastewater system training for both rural homeowners and installers, pumpers and inspectors. Starting in 2000, Extension helped develop and teach classes for professionals focusing on water quality/environment, engineering/groundwater and biology/soils. Nearly 800 professional training contacts ranging from 2 to 8 hours occurred between 2000 and 2006. Extension also helped establish the Nebraska On-site Waste Water Association. This association sought state legislation to require state certification for on-site installers, pumpers and inspectors starting in 2006. Extension developed and taught in-depth on-site wastewater certification classes for these professionals, resulting in 733 professional certification training contacts occurring in 2005 and 2006. An additional 149 individuals purchased training manuals to study independently. Extension also taught acreage owners and residents in targeted high-risk watersheds how to maintain their septic or residential lagoon systems and spot problems.

Impact:

Educating both those who own and maintain on-site wastewater systems and those who work on them is helping to protect Nebraska's environment and human health. Among installers, pumpers and inspectors, 86 percent of those who participated in extension education passed certification exams by the Nebraska Department of Environmental Quality. In addition, a high percentage of on-site professionals reported changing practices associated with their work to better protect the environment and human health. Among rural residents who participated in extension training, most said they would take steps to reduce environmental or health risks from their on-site system. Steps most often identified include practices requiring no cost or assistance. Steps requiring a financial investment or assistance from others were listed less often. Yet, in one high-risk watershed, three substandard systems had been replaced.

Funding:

UNL Extension
Nebraska Department of Environmental Quality
U.S. Environmental Protection Agency
Workshop registration fees

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Summary:

Poor design, improper installation or inadequate maintenance can cause on-site wastewater systems to fail, which can contaminate water and soil or expose people to disease-causing pollutants. In 2005-2006, University of Nebraska–Lincoln Extension provided 733 in-depth (4 to 8 hour) professional certification training contacts for on-site wastewater treatment system installers, pumpers and inspectors. Eighty-six percent passed certification exams by the Nebraska Department of Environmental Quality. An additional 149 individuals purchased training manuals to study independently. From 2000-2006, UNL Extension made nearly 800 professional on-site wastewater training contacts other than certification training, ranging from 2 to 8 hours each. Extension also teaches rural home owners how to properly maintain their septic or residential lagoon systems and to spot problems. As a result, 89 percent of participants in clinics for acreage owners said they would take steps to reduce environmental risks associated with their on-site system.

Natural Resources and Environmental Sustainability

Topic: Reducing or Eliminating Arsenic and Uranium from Public Drinking Water Systems

Issue:

The U.S. Environmental Protection Agency limits the amount of arsenic and uranium in drinking water. The maximum contaminant levels (MCL) for arsenic and uranium are 10 and 30 parts per billion, respectively. More than 80 small public water systems across Nebraska are struggling to comply with these federal requirement because the cost of water treatment and/or finding a new source of water are cost prohibitive for small public water systems.

What has been done:

University of Nebraska–Lincoln water scientists have been evaluating the occurrence arsenic and uranium in the water supplies of small Nebraska communities to find ways to reduce arsenic in groundwater that cost less than drilling new wells or traditional approaches to removing the contaminant. Both arsenic and uranium occur naturally and are linked to some cancers and other health problems. Recent work conducted in collaboration with the Nebraska Health and Human Services System indicates that well design and capacity can influence the concentration of the uranium. In addition, the behavior of uranium can be influenced by the management of pumping and reducing the stress on the aquifer system. Uranium concentrations can be stratified whereby distinct zones of higher and lower concentrations of uranium can be found. This stratification provides the opportunity for zones with high uranium concentrations to be packed off, which would lead to lower uranium concentrations. In contrast to uranium, the results for arsenic are not as conclusive. Limited data suggests that in some cases arsenic concentrations can be lowered below the MCL using well design modifications. While in other cases arsenic concentrations do not change.

Impact:

It's estimated that complying with the MCL standards for arsenic and uranium could easily cost more than \$200 million for small community water systems statewide if conventional methods are used to reduce arsenic and uranium concentrations. This Nebraska research indicates that practical recommendations could save small water systems thousands of dollars on reducing arsenic and uranium concentrations.

Funding:

U.S. Environmental Protection Agency
U.S. Geological Survey
Nebraska Health and Human Services System

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Summary:

University of Nebraska–Lincoln water scientists are working to help Nebraska's small communities meet federal limits for arsenic and uranium in their drinking water. More than 80 small public water systems statewide are having trouble meeting these drinking water standards. Researchers are investigating alternatives that cost less than drilling new wells or using water treatment methods. The goal is to provide recommendations to help public water supplies be in compliance with federal water standards. It's estimated that compliance using traditional methods could cost small water systems statewide more than \$200 million. Results of this research could significantly reduce those costs.

Natural Resources and Environmental Sustainability

Topic: Water Optimizer

Issue:

Nebraska irrigators and policy makers are facing tough decisions about limited water supplies and how best to use that water.

What has been done:

The University of Nebraska–Lincoln's Water Optimizer became available in 2005 to help farmers make better-informed cropping choices with limited water. In addition, it is helping policy makers analyze the economic impact of their policies. Users load information into the program, and in return it enables them to evaluate what crops to grow, how many acres to irrigate or how much water to apply. The model also was expanded and now covers the entire state. A recent \$885,000 grant will help a multidisciplinary IANR team refine and improve the Water Optimizer to address more critical risk-management issues surrounding limited water. It will take into account crops grown in the semiarid High Plains, expand to additional counties in Nebraska and irrigated areas in Colorado and Kansas, develop capability to evaluate at a "whole-farm" basis or field by field, develop capabilities to deal with multi-year water allocations and evaluate how irrigation system improvements affect decisions. The Water Optimizer is available on the Web at <http://extension-water.unl.edu/> or on a DVD/CD set and was promoted at dozens of UNL Extension meetings.

Impact:

This Institute of Agriculture and Natural Resources-developed tool is helping Nebraska farmers and policy makers make more informed choices that conserve water and producer profits. Nearly 1,200 users downloaded or purchased the tool since it became available in 2005.

Funding:

University of Nebraska–Lincoln Extension
University of Nebraska–Lincoln Agricultural Research Division
USDA Risk Management Agency
Hatch Act
Smith-Lever 3(b) & (c)

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Summary:

Nebraska irrigators and policy makers facing water shortages now have a tool to help them make difficult and complex choices about how best to use limited water supplies. The Water Optimizer, a decision-support computer program developed by IANR researchers, became available in 2005 to help farmers make more informed choices that conserve water and producer profits. Nearly 1,200 users downloaded or purchased the tool since it became available in 2005. It lets users enter individualized information and calculate what crops will be most profitable with the given costs and available water. By running “what if” scenarios, growers can see the best options for farming with limited water whether it be growing different crops, irrigating fewer acres, applying less water to existing crops or going to dryland farming. A recent \$885,000 grant will help refine and improve the Water Optimizer to address more critical risk-management issues surrounding limited water.

Society-Ready Graduates

Topic: Big Red Summer Academic Camps

Issue:

National research indicates that young people who visit a college campus are more likely to enroll on that campus. Countless studies also have shown the value of a college education, including a 2005 U.S. Census estimate that college graduates earn \$1,000,000 more than those with a high school diploma.

What has been done:

To increase the likelihood of students acquiring a college education and gaining skills to lead productive lives in the 21st century, University of Nebraska–Lincoln Extension 4-H teams with colleges across the UNL campus to offer Big Red Summer Academic Camps to students in grades 8-12. Camps are a chance for youth to explore career opportunities, increase their life skills, visit campus and investigate an interest or potential career while having fun. The week-long residential experiences, led by UNL faculty, offer hands-on opportunities in specific career fields, including Web design, fashion design, culinology, child development, theater, movie making, food science, entrepreneurship, and golf. Each camp ends in a capstone event where students showcase their work and skills learned for faculty, family, friends and other campers. For example, theater students scripted, filmed and edited movies that were shown at UNL's Mary Riepma Ross Theatre. Culinology students developed the menu, created the ambience and prepared a five-course luncheon for 50 guests.

Impact:

In 2006, 30 percent of campers said the camp encouraged them to explore UNL as a college choice and 7 percent decided to attend UNL. Also, 48 percent believed they increased their knowledge of various topics and 45 percent felt better prepared for the future. Of those who attended in 2003 and now are college-age, 20 percent enrolled at UNL. Of those who attended in 2004 and are now college-age, 73 percent are enrolled at UNL.

Funding:

UNL Extension
Registration fees

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Summary:

National research indicates young people who visit a college campus are more likely to enroll on that campus, and countless studies have shown the value of a college education to a graduate's earning potential. To increase the college-going rate among Nebraskans, University of Nebraska–Lincoln Extension 4-H teams with colleges across the campus to offer Big Red Summer Academic Camps to students in grades 8-12. These camps allow youth to explore career opportunities, increase their life skills, visit the UNL campus, investigate an interest or potential career while having fun and showcase what they learn. Career fields include: Web design, fashion design, culinology, child development, theater, movie making, food science, entrepreneurship, and golf. Students also get a chance to showcase their work. For example, theater students scripted, filmed and edited movies that were shown at UNL's Mary Riepma Ross Theatre. Culinology students developed the menu and prepared a five-course luncheon for 50 guests. In 2006, 30 percent of campers said the camp encouraged them to explore UNL as a college choice, 7 percent decided to attend UNL and 45 percent felt better prepared for the future.

Society-Ready Graduates

Topic: Justin S. Morrill Scholars

Issue:

To become effective leaders in the future, today's students need opportunities to explore and understand social, public and political leadership and responsibility along with their traditional classes, need to develop the skills to become life-long learners, and, must develop an appreciation for more interdisciplinary connections in their daily lives.

What has been done:

In fall 2005, the College of Agricultural Sciences and Natural Resources at the University of Nebraska–Lincoln began launching the Justin Smith Morrill Scholars Program. It's named for the author of the Morrill Act of 1862, which established the land-grant university system and laid the foundation for U.S. public higher education. Currently, nine sophomores and 12 freshmen are active in the program. The goal is to create a legacy of civic engagement by offering students a chance to explore leadership, political and social issues in and beyond the classroom, including courses related to leadership, public policy and the land-grant system. Organizers hope Morrill Scholars will participate in field trips, including the visiting the nation's capital, meeting congressional staff and leaders in agriculture and natural resources, and an international service experience. Organizers expect it will become student-driven.

Impact:

Participating students will have a broader understanding of America's affordable public higher education system and what that means to the nation. Organizers expect participants to become "more sophisticated and cosmopolitan" as they learn about this legacy of civic leadership and responsibility, and be better prepared for civic leadership after graduation.

Funding:

UNL College of Agricultural Sciences and Natural Resources

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Summary:

UNL College of Agricultural Sciences and Natural Resources students are exploring the roots of the nation's land-grant system through a new program designed to broaden their perspective on interdisciplinary life-long learning, civic and social engagement and leadership. In fall 2005, the college began launching the Justin Smith Morrill Scholars Program. It's named for the author of the Morrill Act of 1862 that established the land-grant university system and laid the foundation for U.S. public higher education. In its second year, the program served over 20 students. The goal is to create a legacy of life-long interdisciplinary learning, civic engagement by offering students a chance to explore leadership, political and social issues in and beyond the classroom, including courses related to leadership, public policy, and the land-grant system. Organizers expect the program will help participants become "more sophisticated and cosmopolitan" as they learn about this legacy of civic leadership and responsibility, and be better prepared for civic leadership after graduation.

Society Ready Graduates

Topic: New Degree Programs

Issue:

Many students are looking beyond traditional fields for career choices in the 21st century. To be successful, universities must meet demands of changing times.

What has been done:

The University of Nebraska–Lincoln's College of Agricultural Sciences and Natural Resources has added several new degree programs to its offerings. In spring 2006, CASNR debuted the insect science program, with 12 students signed up initially. In fall of that year, CASNR collaborated with the College of Education and Human Sciences on a degree program in hospitality, restaurant and tourism management. CASNR and the College of Architecture collaborated on a new major in landscape architecture, and CASNR collaborated with the College of Arts and Sciences on a plant biology degree. CASNR also has added new options within existing degree programs, including agricultural finance and banking and food products marketing and management, both within the agribusiness major; and an equine sciences option within the animal science degree. Further additions are planned.

Impact:

While it's too early to gauge success of these new degree programs, they're important in meeting students' needs in the 21st century and should help attract a broader base of student interests and backgrounds to UNL. In some cases, these new degree programs and options stem from specific requests from industries in need of employees.

Funding:

UNL College of Agricultural Sciences and Natural Resources

UNL College of Education and Human Sciences

UNL College of Architecture

UNL College of Arts and Sciences

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Summary:

Many students are looking beyond traditional fields for career choices in the 21st century. The University of Nebraska–Lincoln's College of Agricultural Sciences and Natural Resources is meeting that need by adding several new degree programs to its offerings. In spring 2006, CASNR debuted the degree program in insect science, with 12 students signed up initially. In fall of that year, CASNR collaborated with the College of Education and Human Sciences on a degree in hospitality, restaurant and tourism management; with the College of Architecture on a degree in landscape architecture; and with the College of Arts and Sciences on a degree in plant biology. CASNR also has added new options within existing degree programs, including agricultural finance and banking and food products marketing and management, both within the agribusiness program; and an equine sciences option within the animal science program. These degree programs and options are important in meeting students' needs in the 21st century and should help attract a broader base of student interests and backgrounds to UNL. In some cases, these new degree programs and options stem from specific requests from industries in need of employees.

Society-Ready Graduates

Topic: Professional Golf Management Major

Impact Nugget:

New golf management major prepares Nebraska students for career in expanding industry.

Issue:

As Americans seek ways to relax and enjoy the outdoors, golf has become increasingly popular. There's growing demand for well-educated professionals in a variety of golf-related careers.

What has been done:

To educate University of Nebraska-Lincoln students to meet this demand, the College of Agricultural Sciences and Natural Resources launched a new Professional Golf Management major in 2003, which in 2004 was accredited by the Professional Golfers' Association of America. The college's strong science-based agriculture and horticulture course work provided a natural foundation for the new program. The rigorous major requires a strong background in biology, physical sciences and turf science, business management from the College of Business Administration, hospitality, food and nutrition from the College of Education and Human Sciences and 16 months of internships. At the end of the 4.5-year program, graduates enter careers such as golf facility management, events coordination, golf instruction, merchandising or the traditional career as a golf course professional. As of January 2007, 100 students were enrolled in this major with significant growth anticipated in the future.

Impact:

This new program is expanding opportunities for students to prepare for careers in this growing industry. UNL is one of only 18 universities nationwide to offer a PGA-accredited program. The program's rapid growth reflects student interest in this major, which is attracting students, especially out-of-state students who would not traditionally enter the College of Agricultural Sciences and Natural Resources. In spring 2006, the 19 professional golf management majors who took the PGA checkpoint tests all passed – a national first. Normally, 20 to 50 percent of students fail at least one or more of the series of eight tests and must retake the checkpoint at another time and place.

Funding:

UNL College of Agricultural Sciences and Natural Resources

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Summary:

UNL students are preparing for careers in the expanding golf industry, thanks to a new College of Agricultural Sciences and Natural Resources' major. Launched in 2003, the new Professional Golf Management major combines the strengths of CASNR's science-based courses with business offerings from the College of Business Administration, and hospitality and nutrition courses in the College of Education and Human Sciences. UNL is one of only 18 universities nationwide accredited by the Professional Golfers' Association of America. The popular new major is attracting students who would not traditionally enter the College of Agricultural Sciences and Natural Resources, many of whom are out-of-state students. As of January 2007, 100 students were professional golf management majors. Enrollment is expected to grow significantly in the future. This new program prepares students for careers in this expanding industry including careers in golf facility management, events coordination, golf instruction, merchandising or the traditional career as a golf course professional. In spring 2006, the 19 professional golf management majors who took the PGA checkpoint tests all passed – a national first. Normally, 20 to 50 percent of students fail at least one or more of the series of eight tests and must retake the checkpoint at another time and place.

Society-Ready Graduates

Topic: Teaching Beef Herd

Issue:

When it comes to understanding livestock production and marketing, nothing beats the real thing.

What has been done:

Animal science students in the University of Nebraska–Lincoln’s College of Agricultural Sciences and Natural Resources get firsthand experience with cattle thanks to the department’s teaching herd. The cattle are used in numerous classes to teach concepts such as anatomy, physiology and nutrition. The teaching herd also provides real-world experience for beef cattle merchandising students who manage UNL’s bull sale each year. Cattle producers buy the teaching herd bulls for their own herds. The teaching herd debuted at the university in 1874. A variety of breeds once were common, but today Angus is the only purebred herd at UNL. In 1985, Husker Red and Husker Black crossbreds were developed based on Hereford, Red Angus, Gelbvieh and Simmental. Students also use the crossbred herd to practice calculating genetic estimates.

Impact:

The UNL teaching herd is a valuable learning tool that gives students hands-on experience and practical insights that better prepares them for careers in the beef industry. Students say the herds are critical to their education. “You can explain a concept up one side and down the other, but it just makes things easier to see them firsthand,” one said. A student who helped organize the annual bull sale said: “There’s no substitute for actually getting your hands dirty, finding out what it’s really like and learning from it.”

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Summary:

Animal science students in UNL’s College of Agricultural Sciences and Natural Resources get firsthand experience with cattle thanks to the department’s teaching herd. These cattle are important teaching tools that are used in numerous classes to teach concepts such as anatomy, physiology and nutrition. The teaching herd also provides real-world experience for beef cattle merchandising students who manage UNL’s bull sale each year. Students say the herd provides practical insights about real-life cattle situations and concepts and better prepares them to work in the beef industry. “You can explain a concept up one side and down the other, but it just makes things easier to see them firsthand,” a student said. “Hands-on learning is the best kind of learning,” another said.

Society-Ready Graduates

Topic: Hands-on Research Experience

Issue:

Combining hands-on research opportunities with traditional course work enriches undergraduate education, but finding such opportunities can be a challenge for students.

What has been done:

The University of Nebraska–Lincoln Undergraduate Creative Activities and Research Experiences Program, known as UCARE, funds research partnerships between faculty and undergraduates. In the first year, students receive guidance from their faculty adviser and work independently on a research project the second year. Sixty College of Agricultural Sciences and Natural Resources students participated in UCARE during the 2006-07 school year. Since the program started in 2000, over 300 CASNR students have participated.

Impact:

Students say the real-world research experience UCARE provides broadens their education, provides insights about their careers and better prepares them for the workforce. For example, one food science and technology senior helped start-up food companies develop new products by working on food safety, ingredient functionality and processing requirements. She said it taught her important skills that will make her more employable when she graduates. An animal science senior studied the effects of nutritional diets during gilt development. She said the experience provided valuable training in genetics as well as a taste of what she could do in her career.

Funding:

Pepsi Endowment
UNL Program of Excellence Funds

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Summary:

Many UNL undergraduates get the chance to apply what they learn in the classroom to hands-on research projects that enhance their educational experience, let them glimpse career possibilities and improve their job skills. UNL's Undergraduate Creative Activities and Research Experiences Program, or UCARE, funds research partnerships between UNL undergrads and faculty advisers. Students enrolled in UCARE work with an adviser the first year and conduct independent research the second year. Sixty students from the College of Agricultural Sciences and Natural Resources participated in UCARE during the 2006-07 school year and over 300 have participated since the program started in 2000. A food science and technology major who helped start-up food companies develop new products said the experience will make her more employable when she graduates. Another participant said she learned more about genetics and possible career opportunities in animal science through UCARE.

Economic Opportunities and Improved Quality of Life

Topic: Access eGovernment

Issue:

Internet and computer technology can help rural government officials more efficiently serve citizens, save money and ease workloads and even help promote local economic development. To make the most of these tools, however, county officials need to understand how to use them.

What has been done:

The concept of eGovernment began in 2003 with University of Nebraska–Lincoln Extension cooperating with University of Minnesota Extension on the Access e-Government curriculum. However, after assessments in pilot counties, it was found that some Nebraska communities first needed basic training. University of Nebraska–Lincoln Extension's Access e-Government program teaches county officials and personnel computer basics, including electronic file management, Web sites, e-mail, spreadsheets and word processing. Training has been offered mainly in smaller rural counties where computers use had been limited. Since the program began in 2004, extension has trained nearly 600 participants in 40 counties. Project partners include the Nebraska Association of County Officials, Nebraska.gov (Web developers for State of Nebraska and majority of county Web sites), Nebraska Secretary of State, Nebraska Information Technology Commission, Center for Applied Rural Innovation, University of Nebraska Rural Initiative and Technologies Across Nebraska. Classes are ongoing pending state funding.

Impact:

This eGovernment education is helping county officials expand Internet and computer technology use to serve patrons more effectively and reduce costs and workload. In counties where training has been offered, residents and county officials are more likely to use the Web to find information and provide services. For example, a county road superintendent learned how to manage his 911 road signs using an Excel spreadsheet, a weed superintendent expanded her records by learning how to use worksheets in her Excel files, and a county assessor was excited to learn how to use tables to enhance MS Word to enhance reports to county supervisors. Also, many counties are forming technology committees to move forward their Web sites and communities.

Funding:

UNL Extension
Nebraska Secretary of State Grant Review Board
User fees
Smith-Lever 3(b) & (c)

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Summary:

More and more Nebraska counties are harnessing Internet and computer tools to better serve citizens, easing county office workloads and reducing costs thanks to a UNL Extension program. Access eGovernment teaches county officials and personnel how to use computers and the Web. Extension has taught nearly 600 people in 40 counties since the program began in 2004. For example, a county road superintendent learned how to manage his 911 road signs using an Excel spreadsheet, a weed superintendent expanded her records by learning how to use worksheets in her Excel files, and a county assessor was excited to learn how to use tables to enhance MS Word to enhance reports to county supervisors. Classes are ongoing pending state funding. Also, many counties are forming technology committees to move forward their Web sites and communities.

Economic Opportunities and Improved Quality of Life

Topic: Acreage Insights

Issue:

Many people are moving to acreages and getting their first taste of rural living. However, they lack information about how basic acreage living, such as how to manage septic systems, pastures and landscapes and how to establish windbreaks.

What has been done:

University of Nebraska–Lincoln Extension in 2006 offered two-hour programs monthly from January to April and August to November on topics of interest to acreage owners. Each program was offered three times, once each in Omaha, Lincoln and Fremont. Topics included native grasses and wildflowers, acreage landscape management, septic systems and waste water treatment, ponds, grapes and woody florals.

Impact:

About 550 people attended the 2006 workshops and reported positive results. One participant reported that new acreage owners in the area were unaware on important issues and were not conserving water or planting windbreaks and drought tolerant plants and trees. Following the workshops, many of the participants took action, planting native grasses and flowers and water-wise perennials, changing their water use habits, and changing their method of tree planting.

Funding:

User fees

Small/Part Time Farming Project grant

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Summary:

People moving to acreages lack information about basic acreage living. University of Nebraska–Lincoln Extension offered workshops in 2006 in Omaha, Lincoln and Fremont on topics including native grasses and wildflowers, acreage landscape management, septic systems and waste water treatment, ponds, grapes and woody florals. About 550 people who attended reported positive results. Many changed their water use habits and planted more drought-resistant plants.

Economic Opportunities and Improved Quality of Life

Topic: BIT Mobile

Issue:

Isolation and distance can make rural living a challenge when it comes to keeping up on technology to conduct business and stay in contact. Rural Nebraskans need technological skills and training to keep up in this always-changing field.

What has been done:

The University of Nebraska–Lincoln Extension’s Business Information Technology Mobile, or BIT Mobile, puts state-of-the-art technology and high-speed Internet access at the finger tips of Nebraskans across the state. The self-contained classroom on wheels offers rural communities that otherwise wouldn’t have the facilities the ability to take a variety of business and information technology classes and training. Training on the classroom’s 14 laptop computers ranges from basic teleliteracy skills to more advanced training, such as developing an online store. Business owners and economic developers can now realize the importance of using the Internet and technology to do business. In addition, they don’t have to travel long distances for the education opportunities extension provides.

Impact:

The UNL Extension BIT Mobile can provide educational programming anywhere in the state. Since a team of UNL Extension information technology educators began offering training in March 2006, the BIT Mobile has been in 24 communities with more than 500 participants. One participant said, “the BIT Mobile is a wonderful tool that enables all Nebraska communities, but especially rural Nebraska communities the ability to get professional e-technology training close to home and at a modest cost.”

Funding:

University of Nebraska–Lincoln Extension
Network Nebraska
Nebraska Telecommunications Association

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Summary:

One of the disadvantages of living in rural areas is the difficulty of keeping up on the latest technology to conduct business and stay in contact. The University of Nebraska–Lincoln Extension’s Business Information Technology Mobile, or BIT Mobile, puts state-of-the-art technology and high-speed Internet access at the finger tips of Nebraskans across the state. The self-contained classroom on wheels offers rural communities that otherwise wouldn’t have the facilities the ability to take a variety of business and information technology classes and training. Training on the classroom’s 14 laptop computers ranges from basic teleliteracy skills to more advanced training, such as developing an online store. Since a team of UNL Extension information technology educators began offering training in March 2006, the BIT Mobile has been in 24 communities with more than 500 participants. One participant said, “the BIT Mobile is a wonderful tool that enables all Nebraska communities, but especially rural Nebraska communities the ability to get professional e-technology training close to home and at a modest cost.”

Economic Opportunities and Improved Quality of Life

Topic: Court-Appointed Guardian Training

Issue:

Guardians, court-appointed individuals who look after the affairs of vulnerable people, are in high demand in Nebraska. More than 2,000 are appointed annually. When acting in their ward's best interest, guardians face sometimes complex rules, traditionally with little training.

What has been done:

For years, the only training available to guardians in Nebraska was limited to a 30-minute videotape. Nebraska judges and others asked University of Nebraska–Lincoln Extension to help develop guardian training materials. Extension developed a curriculum and publications, all reviewed by the Nebraska Supreme Court, Nebraska Bar Association and others. From fall 2004 through November 2006, more than 800 court-appointed guardians in 11 of the state's 12 judicial districts attended extension's three-hour training session, where volunteer attorneys answer legal questions. Court-mandated training now is provided quarterly in 10 judicial districts and monthly in Lancaster County.

Impact:

Guardians serve a much-needed role in the care of the elderly, people with mental or physical disabilities, or children who can't make decisions for themselves. This enhanced training is helping guardians better prepare to serve in their ward's best interest. Guardians say the training increased their knowledge and helped them better understand their responsibilities and how to deal with certain situations. "This class helped me figure out my legal obligations as guardian to my father and to the court," said one guardian. "I learned a ton. A key point was how to complete the paperwork, and when and where to send it to."

Funding:

UNL Extension
Registration fees
User fees
Nebraska State Bar Association

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Summary:

Nebraska county court judges appoint more than 2,000 people annually as legal guardians for elderly and disabled people or children who cannot make decisions for themselves. Guardians are in demand but traditionally received little training. UNL Extension partnered with the legal system at the request of Nebraska judges to develop a curriculum and materials to teach people about guardianship responsibilities. The result is a court-mandated, three-hour training session and resources all approved by the Nebraska Supreme Court and others. More than 800 people in 11 of the state's 12 judicial districts were trained from fall 2004 through November 2006. Guardians say they are more comfortable with their roles, more knowledgeable about their responsibilities and are better prepared to represent their wards' best interest as a result of this training. "I learned a ton," one guardian said. "A key point was how to complete the paperwork, and when and where to send it to."

Economic Opportunities and Improved Quality of Life

Topic: EDGE Program

Issue:

Sparkling economic growth in Nebraska's small towns is essential to their survival. A University of Nebraska–Lincoln Extension program is giving some rural entrepreneurs the skills they need to successfully create or expand businesses.

What has been done:

The NebraskaEDGE – Enhancing, Developing and Growing Entrepreneurs – program is the umbrella organization for rural entrepreneurial training programs hosted by local communities, organizations and associations. The program offers skill-based training for people who want to start or expand a business, including agricultural operations, or improve their business skills. Participants learn legal structures, market strategies, financial statements, bookkeeping, cash flow, financing and how to manage growth. More than 125 training courses have been offered from Scottsbluff to Omaha resulting in new business start-ups, business expansions and local and community economic development since the program began in 1993.

Impact:

Since 1993, NebraskaEDGE has helped nearly 2,000 Nebraskans transform their ideas into viable business opportunities, creating full- and part-time jobs across the state. In a recent survey, more than 70 percent of program participants said they had increased their business volume thanks to EDGE, while 33 percent hired additional employees. One recent EDGE participant said the program helped his business survive and is “a fundamental need in the small business community.” Another said the training is a very effective way to boost rural economy. “Strengthening existing businesses gets more results than bringing in new business.”

Funding:

UNL Extension
Nebraska Department of Economic Development
Nebraska Microenterprise Partnership Fund
USDA Rural Development
Community-based businesses and organizations
User fees

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Summary:

Sparkling economic growth in Nebraska's small towns is essential to their survival. A UNL Extension program is giving some rural entrepreneurs the skills they need to successfully create or expand their businesses. The NebraskaEDGE – Enhancing, Developing and Growing Entrepreneurs – program is the umbrella organization for rural entrepreneurial training programs hosted by local communities, organizations and associations. Since 1993, NebraskaEDGE has helped nearly 2,000 Nebraskans transform their ideas into viable business opportunities, creating full- and part-time jobs statewide. A recent survey showed more than 70 percent of participants had increased their business volume since participating in EDGE, while 33 percent had added employees. One recent participant said EDGE helped his business survive and is “a fundamental need in the small business community.” Another said the training is a very effective way to boost the economy of rural areas by strengthening existing business and encouraging entrepreneurs.

Economic Opportunities and Improved Quality of Life

Topic: Methamphetamine Community Awareness Program

Issue:

Methamphetamine production in Nebraska has decreased with the passage of the law requiring medications containing pseudoephedrine be placed behind the counter but the use has not decreased. This meth epidemic threatens families and communities.

What has been done:

University of Nebraska–Lincoln Extension teamed with 3rd District Rep. Tom Osborne to promote community awareness of the drug's dangers. In 2006, over 4,000 Nebraskans learned about meth from presentations and educational handouts. In pre- and post-program evaluations, a significant difference in knowledge was gained on each of seven questions. Anywhere from 71 percent to 94 percent of those reporting indicated an increase in their understanding about meth from the pre- to post-test. The most important things that participants indicated they had learned were how quickly one can become addicted and the devastating effects and changes on the user which makes them more determined to share the information with others. Over half of those completing evaluations had never attended an Extension program. This has resulted in continued requests for educational programs from community and schools who have not previously worked with Extension. Inmates at the Nebraska Women's Correctional Facility indicated they had never received educational information on meth nor did they understand the consequences of its use. This drug has dramatically changed their lives.

Impact:

In communities where the program has been presented, volunteer clean-up groups are more knowledgeable about meth lab litter safety, thanks to distribution of the volunteer safety DVD and brochure.

Funding:

UNL Extension
Nebraska State Patrol
Keep Nebraska Beautiful grant from Department of Environmental Quality
Midwest High-Intensity Drug Trafficking Areas program
Smith-Lever 3(b) & (c)
User fees

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Summary:

Methamphetamine production in Nebraska has decreased with the passage of the law requiring medications containing pseudoephedrine be placed behind the counter but the use has not decreased. If this epidemic goes unchecked, it can tear apart families and communities and overwhelm legal, medical and social resources. UNL Extension promotes community awareness of the drug's dangers. In 2006, over 4,000 Nebraskans learned about meth from presentations and educational handouts. The "Nebraska Cleanup Volunteer Safety" DVD and brochure are distributed at every program. In communities where the program has been presented, volunteer clean-up groups are more knowledgeable about meth lab litter safety, thanks to distribution of the volunteer safety DVD and brochure.

As a result of this programming, youth programs are being developed and presentations are being scheduled. Over 850 students in Southeast Nebraska recently participated in the new programs.

Economic Opportunities and Improved Quality of Life

Topic: Termite Workshops for Homeowners

Issue:

A home is commonly the most expensive purchase Americans will make. Termite infestations can cause thousands of dollars in damage to a home if ignored or undetected. Consumers often hear conflicting information from different termite control companies and can easily be confused about the various treatment options available.

What has been done:

University of Nebraska–Lincoln Extension has offered termite education workshops to Nebraskans. Since 1995, 1,600 have attended the workshops and more than 160 real estate licensees have received continuing education credits for this training.

Impact:

Based on treatment costs estimated at \$1,500 per home, extension figures the education received through these workshops could save homeowners more than \$2.4 million. Eight-two percent of attendees said they saved money after attending the program, with the average savings calculated at \$312 a person. Ninety-eight percent of attendees said they obtained information needed to better protect their property. One attendee said the workshop will be useful “in helping me make informed decisions about termite treatments.”

Funding:

University of Nebraska–Lincoln Extension
User fees

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Summary:

As a home is normally the most expensive purchase a person will make, it is important to protect it from termite damage. Consumers often hear conflicting information from termite control companies about the best treatment options. University of Nebraska–Lincoln Extension has provided termite education workshops since 1995 that have been attended by 1,600 people. Extension has figured that these homeowners could save \$2.4 million in treatment costs based on the information gained through the workshops. Ninety-eight percent of the attendees said they learned something that will better protect their property.

Economic Opportunities and Improved Quality of Life

Topic: Turning Agricultural Waste Products into Textiles

Issue:

Turning agricultural waste products into fabric not only can add value to agricultural products, but make the fiber industry more sustainable and reduce the use of petroleum-based synthetic fabrics.

What has been done:

A University of Nebraska–Lincoln textiles scientist has found a way to turn rice straw, chicken feathers and cornhusks into fabrics. Several years after developing a patented process that efficiently and inexpensively converts cellulose in cornhusks into textile fibers that can be made into fabric, the scientist also has found a use for the millions of tons of chicken feathers and rice straw available worldwide. Rice fabrics, composed mostly of cellulose, are capable of being spun into fabrics similar to linen using common textile machinery. Chicken feathers, composed mostly of keratin, offer the potential for developing fabrics that are lightweight and offer better shock absorption and superior insulation. It has similar applications as wool fibers. The fibers also are biodegradable. Using these resources could more than keep up with the current world's consumption of 67 million tons of natural and synthetic fibers. However, keeping up with this demand may be a challenge due to limited availability of cultivable land, increasing price and decreasing petroleum.

Impact:

Using agricultural resources already available makes for an abundant, cheap and renewable alternative to petroleum-based synthetic fibers. Corn is Nebraska's largest crop and the U.S. produces about 20 million tons of cornhusks annually. If all of that were used to produce textiles, it could make at least 2 million tons of fibers worth about \$4 billion annually. With about 560 million tons of rice straw available worldwide, more than 80 million tons of fibers can be produced from rice straw every year. Using 50 percent of the rice straw available in the U.S. could produce about 2 billion pounds of fiber with potential sales of about \$2 billion. About 4 billion pounds of feathers are produced by the U.S. poultry industry each year. Assuming 50 percent of those feathers were used to produce fibers, sales of \$16 billion could be achieved each year. This could result in \$400 million in profits per year for farmers growing rice, while using chicken feathers could result in \$6 billion in additional profits for farmers per year.

Funding:

University of Nebraska–Lincoln Agricultural Research Division
University of Nebraska–Lincoln College of Education and Human Sciences
Hatch Act
Consortium for Plant Biotechnology Research
Nebraska Research Initiative

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Summary:

Turning agricultural waste products into fabrics not only can add value to agricultural products, but make the fiber industry more sustainable and reduce the use of petroleum-based synthetic fabrics. Several years after developing a patented process that efficiently and inexpensively converts cellulose in cornhusks into textile fibers that can be made into fabric, the scientist also has found a use for the millions of tons of chicken feathers and rice straw available worldwide. Corn is Nebraska's largest crop and the U.S. produces about 20 million tons of cornhusks annually. If all of that were used to produce textiles, it could make at least 2 million tons of fibers worth about \$4 billion annually. With the about 560 million tons of rice straw available worldwide, more than 80 million tons of fibers can be produced from rice straw every year. Using 50 percent of the rice straw available in the U.S. could produce about 2 billion pounds of fiber with a potential sales of about \$2 billion. About 4 billion pounds of feathers are produced by the U.S. poultry industry each year. Assuming 50 percent of those feathers were used to produce fibers, sales of \$16 billion could be achieved each year. This could result in \$400 million in profits per year for farmers growing rice, while using chicken feathers could result in \$6 billion in additional profits for farmers per year.

Economic Opportunities and Improved Quality of Life

Topic: Wet Byproduct Feed Payoffs

Issue:

Nebraska is the nation's largest ethanol producer and the largest ethanol producing state west of the Mississippi. Turning grain into fuel is big business for the Cornhusker state and making the best use of byproducts from this production is critical to the industry's success.

What has been done:

University of Nebraska–Lincoln animal scientists pioneered research on how to feed cattle wet byproducts from ethanol and corn processing. Their research in the 1990s proved the feasibility, benefits and economic advantages of feeding wet gluten feed, wet distillers grains and steep liquor to cattle directly instead of drying and shipping them to dried feed markets. They found that drying actually reduces byproducts' nutritional value. Feeding byproducts wet saves drying costs for processors and provides an economical feed for cattle producers. More recent studies resulted in formulas for mixing several widely available dry forages with wet distillers grains – findings that could help feedlot managers and cow-calf producers purchase wet distillers grains during the summer when their plentiful supply can mean lower prices and safely store them for use later in the season, or for winter feeding.

Impact:

Thanks largely to this research, wet byproducts from ethanol and corn processing have become a major source of cattle feed in Nebraska, a leading cattle feeding state. Use of wet feeds provides major and ongoing economic benefits. It's estimated that, from 1992 through 2006, the cumulative benefit to Nebraska from feeding byproducts wet instead of dry was nearly \$500 million. Feeding wet byproducts saves cattle feeders \$10 to \$20 per head; selling byproducts wet instead of drying them reduces ethanol production costs about 5 percent. UNL research has been instrumental in encouraging some ethanol plants to locate in Nebraska; the state's ethanol production has increased nearly ten-fold since the early 1990s.

Funding:

Nebraska Corn Board
Nebraska Ethanol Board
UNL Agricultural Research Division
Hatch Act

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Summary:

Economical wet byproducts from Nebraska's expanding ethanol and grain processing industry have become a major cattle feed, thanks largely to pioneering IANR research that is paying handsome dividends for Nebraska. UNL animal scientists proved the feasibility, benefits and economic advantages of feeding byproducts wet instead of drying and shipping them to dried feed markets. Feeding byproducts wet saves drying costs for processors and provides an economical cattle feed. More recent studies resulted in formulas for mixing several widely available dry forages with wet distillers grains – findings that could help feedlot managers and cow-calf producers purchase wet distillers grains during the summer when their plentiful supply can mean lower prices and safely store them for use later in the season, or for winter feeding.

It's estimated that, from 1992 through 2006, the cumulative benefit to Nebraska from feeding byproducts wet instead of dry was nearly \$500 million. Feeding wet byproducts saves cattle feeders \$10 to \$20 per head; selling byproducts wet instead of drying them reduces ethanol production costs about 5 percent. These findings were instrumental in encouraging some ethanol plants to locate in Nebraska; ethanol production in the state has increased ten-fold since the early 1990s.

Enhance Economic Opportunities for Agricultural Producers

Topic: Control of Varroa Mites in Bee Colonies

Issue:

The varroa mite is a major pest of honeybees worldwide, and its control often is difficult because the two anthropods are so closely related – what kills the mites can kill the bees. A University of Nebraska–Lincoln entomologist is developing treatment protocols for a natural product that can reduce mite populations in bee colonies.

What has been done:

The use of bees to pollinate crops is a significant part of agriculture. However, because of the varroa mite, beekeepers have been unable to meet the bee colony demands on these farms. In the past, scientists have come up with some strategies to control varroa mite populations in bee colonies, but these are labor intensive and the mites have become resistant to many available chemical treatments. UNL entomologists are developing mite suppression strategies that use oxalic acid, a natural chemical found in plants such as rhubarb, turnips and broccoli, can deter mite populations from establishing in bee colonies and reduce mite populations. Oxalic acid, which makes vegetation in those plants nonpalatable to insects, will help struggling beekeepers keep their hives healthy and economically profitable. Once varroa mites enter bee colonies, they build up to damaging levels causing bee hives to perish without human intervention. Oxalic acid eventually will become a low-cost, effective and sustainable way to deal with the mite parasite.

Impact:

The Midwest is a prime honey producing area. However, most beekeepers' principle source of income is the use of their bee hives for crop pollination. Of the 2.5 million bee colonies in the U.S., 1.4 million are needed to pollinate crops. The varroa mite has caused beekeepers to lose half or more of their colonies. An average beekeeper might have 1,500 colonies. With each colony worth about \$120, the use of oxalic acid to control varroa mite populations could result in a \$90,000 savings to a single beekeeper with a varroa mite infestation.

Funding:

UNL Agricultural Research Division
Environmental Protection Agency

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Summary:

The varroa mite is a major pest of honeybees worldwide, and its control often is difficult because the two anthropods are so closely related – what kills the mites can kill the bees. A University of Nebraska–Lincoln entomologist is developing protocols for using a natural product, oxalic acid, to reduce mite populations in bee colonies. Oxalic acid, a natural chemical found in plants such as rhubarb, turnips and broccoli, can deter mite populations from establishing in bee colonies and reduce mite populations. Oxalic acid, which makes vegetation in those plants nonpalatable to insects, will help struggling beekeepers keep their hives healthy and economically profitable. Once varroa mites enter bee colonies, they build up to damaging levels causing bee hives to perish without human intervention. Most beekeepers' principle source of income is the use of their bee hives for crop pollination. Of the 2.5 million bee colonies in the U.S., 1.4 million are needed to pollinate crops. The varroa mite has caused beekeepers to lose half or more of their colonies. An average beekeeper might have 1,500 colonies. With each colony worth about \$120, the use of oxalic acid to control varroa mite populations could result in a \$90,000 saving to a single beekeeper with a varroa mite infestation.

Enhance Economic Opportunities for Agricultural Producers

Topic: Crop Management Education

Issue:

Today's crop production requires far more than luck and good weather. To remain competitive and profitable, agricultural producers and the consultants they rely on need the latest research-based information.

What has been done:

University of Nebraska–Lincoln Extension offers a variety of educational clinics, workshops and field days across Nebraska each year that provide critical crop production information. Two examples are the Crop Management and Diagnostic Clinics and Soybean Management Field Days. The clinics included nine programs, mostly offered at the university's Research and Development Center near Mead on topics such as field scouting, disease prevention and treatment, fertilizer and irrigation management, weed identification and more. In 2006 the clinics drew nearly 500 participants from 64 Nebraska counties and 10 other states who influence or manage nearly 6.5 million acres. For Soybean Days, extension teams with the Nebraska Soybean Board, the event's sponsor. The event, held at four sites in the state, helps growers increase their market share in the face of growing demand for their crop. Sessions highlighted research, marketing, promotion, new uses and education. In 2006, these events drew 564 participants who are responsible for about 770,065 crop acres.

Impact:

The Crop Management and Diagnostic Clinics reached those responsible for nearly 47 percent of Nebraska's row crop acres. Participants estimated the knowledge they gained from the clinic was worth an average of \$6.67 per acre or a total of \$42.3 million, based on the acreage involved. Participants estimated the value of knowledge gained at Soybean Management Field Days at an average \$7.95 per acre, or a total of nearly \$6.1 million based on the acres involved. One participant said knowledge gained at Soybean Days helps him improve his farming and management strategies.

Funding:

UNL Extension
Nebraska Soybean Board
User fees
Smith-Lever 3(b) & (c)
Smith-Lever 3(d) (e.g. EFNEP, CYFAR)

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Summary:

UNL Extension offers a variety of educational clinics, workshops and field days across Nebraska that provide critical crop production information. Two examples are the Crop Management and Diagnostic Clinics and Soybean Management Field Days. Clinics included nine programs covering topics ranging from field scouting to fertilizer and irrigation management. In 2006 the clinics drew nearly 500 participants from 64 Nebraska counties and 10 other states who influence or manage nearly 6.5 million acres. Nebraska participants were responsible for nearly 47 percent of Nebraska's row crop 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. For Soybean Days, extension teams with the Nebraska Soybean Board, the event's sponsor. The event, held at four sites, highlights research, marketing, promotion, new uses and education. In 2006, these events drew 564 participants who are responsible for about 770,065 cropland acres. Participants valued knowledge gained at an average \$7.95 per acre, or a total of nearly \$6.1 million based on the acres involved.

Enhance Economic Opportunities for Agricultural Producers

Topic: Distillers Grain Range Cubes

Issue:

Feed costs account for 60 percent of cow-calf herd expenses in Nebraska. Reducing those costs can be key to profitability.

What has been done:

University of Nebraska–Lincoln Extension educators in north central Nebraska and the Farmers and Ranchers Co-op at Ainsworth teamed to develop a range cube made of 60 percent distillers grain meal. Since distillers grains are by-products of regional ethanol plants, these new cubes cost less than conventional protein and energy feed sources for area beef producers. This is part of extension's ongoing effort to help identify new, lower-cost cattle feeds and educate producers about them.

Impact:

This new cube has significantly reduced feed costs and will continue to provide a lower-cost feed source. Changing from conventional range cubes to the new distillers grain cubes reduces feed costs by \$31 per ton. From October 2004 through October 2006, area beef producers have purchased more than 40,000 tons of this new supplement for a total savings of over \$1.2 million.

Funding:

UNL Extension
Farmers and Ranchers Co-op, Ainsworth

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Summary:

Feed costs account for 60 percent of beef herd expenses in Nebraska so anything that reduces that expense helps the bottom line. UNL Extension educators in north central Nebraska and the Farmers and Ranchers Co-op at Ainsworth teamed to develop a range cube made of 60 percent distillers grain meal. Since distillers grains are byproducts of regional ethanol plants, they provide a lower-cost protein and energy source. The new cubes save cattle producers \$31 per ton. From October 2004 through October 2006, area beef producers have purchased more than 40,000 tons of this new supplement for a total savings of over \$1.2 million.

Enhance Economic Opportunities for Agricultural Producers

Topic: Feedlot Heat Stress Research

Issue:

Hot and humid days can be deadly for feedlot cattle. Reducing cattle deaths and performance losses from severe heat and humidity is important to feedlot profitability.

What has been done:

Research over the past decade by University of Nebraska–Lincoln animal scientists at the Northeast Research and Extension Center greatly expanded understanding of the nature of heat waves and their effects on cattle. Based on these findings, researchers developed management tools feedlot operators can use to reduce heat stress in cattle. An extensive UNL Extension education effort helped producers implement these preventive measures. Feedlot cattle deaths steadily declined during the most severe heat waves of 1995, 1999 and 2005 in northeast Nebraska and northwest Iowa – the period during which these management techniques were introduced.

Impact:

Implementation of UNL's heat stress reduction strategies is saving the region's cattle industry millions annually in cattle deaths and performance losses. In the 2005 heat wave alone, widespread adoption of these strategies saved the region's cattle industry between \$10 million and \$27 million. That estimate is based on the heat waves' severity and the number of cattle on feed at the time.

Funding:

UNL Agricultural Research Division
UNL Extension
USDA National Research Initiative
Hatch Act
Smith-Lever 3(b) & (c)

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Summary:

Widespread adoption of IANR-developed strategies for reducing heat stress in feedlot cattle is saving the region's cattle industry millions annually in cattle deaths and performance losses. In the past decade, research by UNL animal scientists at the university's Northeast Research and Extension Center greatly expanded understanding of the nature of heat waves and their impact on cattle. Researchers developed management tools to reduce heat stress in cattle; an extensive UNL Extension education effort helped producers adopt these preventive measures. An economic analysis showed a steady decline in cattle deaths during three severe heat waves since 1995. In the 2005 heat wave alone, it's estimated that widespread use of these tools saved the region's cattle industry between \$10 million and \$27 million in death and performance losses.

Enhance Economic Opportunities for Agricultural Producers

Topic: Market Journal/Market Journal Toolbox

Issue:

Tight operating margins mean Nebraska crop and livestock producers must find ways to increase profits in their production and marketing decisions.

What has been done:

University of Nebraska–Lincoln Extension's Market Journal, an educational outreach television and Web program, provides timely practical information specifically geared to Nebraska agricultural business risk management. Topics include decisions related to crop and livestock production; commodity market analysis and strategies; financial and transition business planning; agricultural policy developments; and weather. In 2006, resource personnel included more than 70 experts from the university's Institute of Agriculture and Natural Resources, plus topic experts from the private sector. The 30-minute program began on the Web in 2001. It now airs weekly on Nebraska Educational Telecommunications, the Dish Network and is available at <http://marketjournal.unl.edu>. Market Journal weekly reaches an estimated 40,000 households, 30,000 of which are in Nebraska.

In addition, an agricultural economist regularly featured on Market Journal helped develop the Market Journal Toolbox. This risk management tool assures producers of a sale price and protects them from large price drops. The 16-session toolbox was released in fall 2006 and is designed to provide strategies producers can apply immediately to counter price volatility.

Impact:

Market Journal is an effective way to reach large numbers of people quickly and efficiently. It is estimated to have an annual value to Nebraska agriculture of \$39 million based on a conservative estimate of reaching 30,000 Nebraska households, each gaining \$25 worth of value weekly. When severe drought struck western Nebraska, extension experts looked to Market Journal to inform cattle producers on grazing, feeding and weaning tips, which one specialist said helped save some Panhandle herds.

Funding:

University of Nebraska–Lincoln Extension
Nebraska Farmer magazine for promotional support
Nebraska Educational Television Network for broadcasting time
Communications and Information Technology
Department of Agricultural Economics

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Summary:

Tight operating margins mean Nebraska crop and livestock producers must find ways to increase profits in their production and marketing decisions. UNL Extension's Market Journal, an educational outreach television and Web program, provides timely, practical information specifically geared to Nebraska agricultural business risk management decisions. The program features the latest information on a variety of crop and livestock production, management and marketing issues. It airs weekly on Nebraska Educational Telecommunications, Dish Network and is also available at <http://marketjournal.unl.edu>. It reaches an estimated 40,000 households weekly, 30,000 of which are in Nebraska. Market Journal's value to Nebraska agriculture is estimated at \$39 million annually based on the Nebraska households each gaining \$25 in value per program. When a severe drought struck western Nebraska, extension experts looked to Market Journal to inform cattle producers on grazing, feeding and weaning tips, which one specialist said helped save some Panhandle herds.

In addition, an agricultural economist regularly featured on Market Journal helped develop the Market Journal Toolbox. This risk management tool assures producers of a sale price and protects them from large price drops, and includes strategies producers can apply immediately to counter price volatility.

Enhance Economic Opportunities for Agricultural Producers

Topic: Mobile Plant Diagnostic Lab

Issue:

Whether they occur naturally, accidentally or intentionally, rapidly identifying plant diseases is critical to controlling their spread and mitigating their impact. In this era of agrosecurity concerns, rapidly diagnosing a potential problem on the spot is important.

What has been done:

In 2005, University of Nebraska–Lincoln Extension launched its new Mobile Plant Diagnostic Lab, the nation's most advanced traveling plant diagnostic lab. Funded through the Department of Homeland Security and UNL Extension, the lab is available to respond to any potential agrosecurity threat and to help farmers diagnose plant diseases on the spot. For example, if soybean rust were to enter Nebraska, the mobile lab would allow UNL plant pathologists to test suspect plants on site and provide results within two hours. The lab is equipped with the latest technology and equipment, including molecular diagnostic tools and satellite communications, for immediate notification of state and federal agencies. The lab also is being used at field days statewide for farmers to bring in plant samples and to increase awareness of plant diseases.

Impact:

Thanks to this lab, Nebraska is better prepared to quickly detect plant disease on site and to respond to potential agrosecurity threats on site. The on-site lab also can provide results in hours instead of the several days typically needed to mail samples to the university's on-campus lab. The speedy response could be especially critical in a case of agroterrorism or a severe disease outbreak.

Funding:

U.S. Department of Homeland Security/Nebraska Department of Agriculture
UNL Extension

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Summary:

Nebraska is better prepared to detect plant disease problems on the spot thanks to UNL Extension's new Mobile Plant Diagnostic Lab. The lab, which began operating in 2005, is the most advanced of its kind in the nation. Funded by the U.S. Department of Homeland Security and UNL Extension, the lab can be pulled anywhere it's needed to respond to potential agrosecurity threats or to help farmers diagnose diseases threats, whether they occur naturally, intentionally or accidentally. Equipped with the latest technology, the lab is able to provide results within two hours and to immediately notify state or federal regulators if necessary. Before the mobile lab, it often took several days for samples to be mailed to and analyzed at the university's on-campus diagnostic lab. The mobile lab will travel to field days statewide and provide plant sample test results before growers leave the site.

Enhance Economic Opportunities for Agricultural Producers

Topic: Moisture-measuring Equipment

Issue:

Urban, environmental and agricultural demands mean water is becoming more scarce, and irrigators increasingly are being limited in their crop water use. The challenge is to adhere to water restrictions while maximizing yields and profitability.

What has been done:

The Nebraska Agricultural Water Management Demonstration Network team of University of Nebraska–Lincoln Extension, the Upper Big Blue Natural Resources District and growers are working one-on-one to best use moisture-measuring equipment that takes the guesswork out of irrigation decisions. The NRD and extension assisted with equipment costs for 20 producer participants in 2005 and 67 in 2006.

Impact:

The largest NRD in the state, the Upper Big Blue, has more than 1 million acres of irrigated cropland and more than 13,000 irrigation wells. Saving 1 inch of irrigation water in just this area would result in 3.6 billion cubic feet of water and \$6 million in energy-cost savings. The adoption of irrigation moisture-measuring equipment is increasing and 200 participants are expected in 2007 in other districts.

Funding:

Upper Big Blue Natural Resources District
Natural Resources Conservation Service
University of Nebraska–Lincoln Extension

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Summary:

Urban, environmental and agricultural demand means water is becoming more scarce and irrigators increasingly are being limited in their crop water use. The Nebraska Agricultural Water Management Demonstration Network team of University of Nebraska–Lincoln Extension, the Upper Big Blue Natural Resources District and growers worked one-on-one to take the guesswork out of irrigating decisions using special moisture-measuring equipment. Saving 1 inch of irrigation water in just the UBBNRD would result in 3.6 billion cubic feet of water and \$6 million in energy-cost savings. Participation is expected to grow to 200 producers in other districts in 2007.

Enhance Economic Opportunities for Agricultural Producers

Topic: Sandhills Calving System

Issue:

Diarrhea is a leading cause of illness and death in beef calves. In some herds, nearly all young calves get diarrhea and up to 10 percent die of related illnesses. Treatment and performance and death losses can cost individual ranchers thousands of dollars annually.

What has been done:

University of Nebraska–Lincoln veterinary scientists developed a calving system to reduce calf scours on ranches in Nebraska's Sandhills. The system manages cow herds during calving season to prevent transmission of diarrhea-causing germs and break the disease cycle by moving pregnant cows to a new pasture every week and leaving cows with new calves in the previous pasture. The system drastically reduced calf illness and treatment costs and eliminated calf deaths from scours in initial tests and has proven effective in numerous Nebraska cow-calf herds since it was introduced in 2000. For example, in a 900-head herd near Tryon, scours death rates dropped from 7 to 14 percent in the five years before adopting the Sandhills system to zero after adoption. The team has taught veterinarians and ranchers how to implement this strategy through UNL Extension education programs.

Impact:

Ranchers who have adopted this system report significantly reducing calf sickness, death and antibiotic use. The owner of the 900-head cow herd estimates he earns an additional \$40,000 to \$50,000 annually since adopting the calving system because of improved calf performance, greatly reduced treatment costs and having more calves to sell. Treatment costs dropped from about \$3,100 per year to about \$129. The owner of a 400-head cow-calf operation said the system virtually eliminated scours problems and estimates it results in about \$10,000 in additional annual revenue.

Funding:

UNL Agricultural Research Division
UNL Extension
Hatch Act
Pfizer Animal Health
Sandhills Veterinary Hospital
Smith-Lever 3(b) & (c)

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Summary:

The popular IANR-developed Sandhills Calving System is helping ranchers who use it virtually eliminate costly scours, a leading cause of death and sickness in beef calves. Veterinary scientists designed and successfully tested the new system, which greatly reduces scours outbreaks by managing cow-calf pairs and pregnant cows to minimize calf contact with diarrhea-causing germs. Since few calves get sick, this system also significantly reduces the need for antibiotics and saves labor. The owner of a 900-head herd reports the incidence of scours deaths dropped from 7 to 14 percent in the five years before implementing the system to zero after adoption. He estimates earning as much at \$50,000 more annually since making the switch in 2000 due to improved calf performance, reduced treatment costs and having more calves to sell. The owner of a 500-head herd estimates the system provides about \$10,000 in added revenue each year. The team continues to teach ranchers and veterinarians how to adopt the system.

Enhance Economic Opportunities for Agricultural Producers

Topic: Silvopasture Options

Issue:

Grazing livestock amid trees that have market value, called silvopasturing, can diversify and improve economic potential. To successfully integrate trees and grazing, ag producers need to know which combination of trees and grasses work best under local conditions.

What has been done:

University of Nebraska–Lincoln range and plant scientists are studying different combinations of forage grasses and trees in test plots to identify the best-performing combinations under different climate, soil and moisture conditions. This study compares yields and forage quality of big bluestem and smooth bromegrass in low, medium and high shade from mature green ash and scotch pine trees. Bluestem outyields bromegrass in full sun but yields are comparable in shade. Bluestem's higher water and nitrogen efficiency make it the better choice for drier situations. Findings show the best combination of forage grasses and trees varies according to local conditions and should be chosen based on specific management goals. The greatest challenge is finding shade trees that will grow in often harsh climates and that also have market value.

Impact:

This research is providing some of the first specific information about the best grass and tree combinations for Nebraska climate and soil conditions. Results should help producers make more informed management choices to combine trees and grazing to maximize profits.

Funding:

UNL Agricultural Research Division
USDA National Agroforestry Center
Hatch Act
McIntire-Stennis Cooperative Forestry

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Summary:

IANR scientists are studying how different grasses perform under varying levels of shade from different trees to identify the best combinations of grasses for grazing and trees with market value. Combining trees and livestock grazing, called silvopasturing, can diversify and improve economic potential. However, producers need to know which combination of trees and grasses work best in their situation. Results show the best combinations of forage grasses and trees vary according to local conditions and should be chosen based on specific management goals of the producer. This research is providing some of the first information on which grass and tree combinations work best in Nebraska. Results should help producers make more informed management choices to combine trees and grazing to maximize profits.

Enhance Economic Opportunities for Agricultural Producers

Topic: Turning Agricultural Waste Products into Textiles

Issue:

Turning agricultural waste products into fabric not only can add value to agricultural products, but make the fiber industry more sustainable and reduce the use of petroleum-based synthetic fabrics.

What has been done:

A University of Nebraska–Lincoln textiles scientist has found a way to turn rice straw, chicken feathers and cornhusks into fabrics. Several years after developing a patented process that efficiently and inexpensively converts cellulose in cornhusks into textile fibers that can be made into fabric, the scientist also has found a use for the millions of tons of chicken feathers and rice straw available worldwide. Rice fabrics, composed mostly of cellulose, are capable of being spun into fabrics similar to linen using common textile machinery. Chicken feathers, composed mostly of keratin, offer the potential for developing fabrics that are lightweight and offer better shock absorption and superior insulation. It has similar applications as wool fibers. The fibers also are biodegradable. Using these resources could more than keep up with the current world's consumption of 67 million tons of natural and synthetic fibers. However, keeping up with this demand may be a challenge due to limited availability of cultivable land, increasing price and decreasing petroleum.

Impact:

Using agricultural resources already available makes for an abundant, cheap and renewable alternative to petroleum-based synthetic fibers. Corn is Nebraska's largest crop and the U.S. produces about 20 million tons of cornhusks annually. If all of that were used to produce textiles, it could make at least 2 million tons of fibers worth about \$4 billion annually. With about 560 million tons of rice straw available worldwide, more than 80 million tons of fibers can be produced from rice straw every year. Using 50 percent of the rice straw available in the U.S. could produce about 2 billion pounds of fiber with potential sales of about \$2 billion. About 4 billion pounds of feathers are produced by the U.S. poultry industry each year. Assuming 50 percent of those feathers were used to produce fibers, sales of \$16 billion could be achieved each year. This could result in \$400 million in profits per year for farmers growing rice, while using chicken feathers could result in \$6 billion in additional profits for farmers per year.

Funding:

University of Nebraska–Lincoln Agricultural Research Division
University of Nebraska–Lincoln College of Education and Human Sciences
Hatch Act
Consortium for Plant Biotechnology Research
Nebraska Research Initiative

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Summary:

Turning agricultural waste products into fabrics not only can add value to agricultural products, but make the fiber industry more sustainable and reduce the use of petroleum-based synthetic fabrics. Several years after developing a patented process that efficiently and inexpensively converts cellulose in cornhusks into textile fibers that can be made into fabric, the scientist also has found a use for the millions of tons of chicken feathers and rice straw available worldwide. Corn is Nebraska's largest crop and the U.S. produces about 20 million tons of cornhusks annually. If all of that were used to produce textiles, it could make at least 2 million tons of fibers worth about \$4 billion annually. With the about 560 million tons of rice straw available worldwide, more than 80 million tons of fibers can be produced from rice straw every year. Using 50 percent of the rice straw available in the U.S. could produce about 2 billion pounds of fiber with a potential sales of about \$2 billion. About 4 billion pounds of feathers are produced by the U.S. poultry industry each year. Assuming 50 percent of those feathers were used to produce fibers, sales of \$16 billion could be achieved each year. This could result in \$400 million in profits per year for farmers growing rice, while using chicken feathers could result in \$6 billion in additional profits for farmers per year.

Enhance Economic Opportunities for Agricultural Producers

Topic: Water Optimizer

Issue:

Nebraska irrigators and policy makers are facing tough decisions about limited water supplies and how best to use that water.

What has been done:

The University of Nebraska–Lincoln's Water Optimizer became available in 2005 to help farmers make better-informed cropping choices with limited water. In addition, it is helping policy makers analyze the economic impact of their policies. Users load information into the program, and in return it enables them to evaluate what crops to grow, how many acres to irrigate or how much water to apply. The model also was expanded and now covers the entire state. A recent \$885,000 grant will help a multidisciplinary IANR team refine and improve the Water Optimizer to address more critical risk-management issues surrounding limited water. It will take into account crops grown in the semiarid High Plains, expand to additional counties in Nebraska and irrigated areas in Colorado and Kansas, develop capability to evaluate at a "whole-farm" basis or field by field, develop capabilities to deal with multi-year water allocations and evaluate how irrigation system improvements affect decisions. The Water Optimizer is available on the Web at <http://extension-water.unl.edu/> or on a DVD/CD set and was promoted at dozens of UNL Extension meetings.

Impact:

This Institute of Agriculture and Natural Resources-developed tool is helping Nebraska farmers and policy makers make more informed choices that conserve water and producer profits. Nearly 1,200 users downloaded or purchased the tool since it became available in 2005.

Funding:

University of Nebraska–Lincoln Extension
University of Nebraska–Lincoln Agricultural Research Division
USDA Risk Management Agency
Hatch Act
Smith-Lever 3(b) & (c)

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Summary:

Nebraska irrigators and policy makers facing water shortages now have a tool to help them make difficult and complex choices about how best to use limited water supplies. The Water Optimizer, a decision-support computer program developed by IANR researchers, became available in 2005 to help farmers make more informed choices that conserve water and producer profits. Nearly 1,200 users downloaded or purchased the tool since it became available in 2005. It lets users enter individualized information and calculate what crops will be most profitable with the given costs and available water. By running “what if” scenarios, growers can see the best options for farming with limited water whether it be growing different crops, irrigating fewer acres, applying less water to existing crops or going to dryland farming. A recent \$885,000 grant will help refine and improve the Water Optimizer to address more critical risk-management issues surrounding limited water.

Enhance Economic Opportunities for Agricultural Producers

Topic: Wet Byproduct Feed Payoffs

Issue:

Nebraska is the nation's largest ethanol producer and the largest ethanol producing state west of the Mississippi. Turning grain into fuel is big business for the Cornhusker state and making the best use of byproducts from this production is critical to the industry's success.

What has been done:

University of Nebraska–Lincoln animal scientists pioneered research on how to feed cattle wet byproducts from ethanol and corn processing. Their research in the 1990s proved the feasibility, benefits and economic advantages of feeding wet gluten feed, wet distillers grains and steep liquor to cattle directly instead of drying and shipping them to dried feed markets. They found that drying actually reduces byproducts' nutritional value. Feeding byproducts wet saves drying costs for processors and provides an economical feed for cattle producers. More recent studies resulted in formulas for mixing several widely available dry forages with wet distillers grains – findings that could help feedlot managers and cow-calf producers purchase wet distillers grains during the summer when their plentiful supply can mean lower prices and safely store them for use later in the season, or for winter feeding.

Impact:

Thanks largely to this research, wet byproducts from ethanol and corn processing have become a major source of cattle feed in Nebraska, a leading cattle feeding state. Use of wet feeds provides major and ongoing economic benefits. It's estimated that, from 1992 through 2006, the cumulative benefit to Nebraska from feeding byproducts wet instead of dry was nearly \$500 million. Feeding wet byproducts saves cattle feeders \$10 to \$20 per head; selling byproducts wet instead of drying them reduces ethanol production costs about 5 percent. UNL research has been instrumental in encouraging some ethanol plants to locate in Nebraska; the state's ethanol production has increased nearly ten-fold since the early 1990s.

Funding:

Nebraska Corn Board
Nebraska Ethanol Board
UNL Agricultural Research Division
Hatch Act

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Summary:

Economical wet byproducts from Nebraska's expanding ethanol and grain processing industry have become a major cattle feed, thanks largely to pioneering IANR research that is paying handsome dividends for Nebraska. UNL animal scientists proved the feasibility, benefits and economic advantages of feeding byproducts wet instead of drying and shipping them to dried feed markets. Feeding byproducts wet saves drying costs for processors and provides an economical cattle feed. More recent studies resulted in formulas for mixing several widely available dry forages with wet distillers grains – findings that could help feedlot managers and cow-calf producers purchase wet distillers grains during the summer when their plentiful supply can mean lower prices and safely store them for use later in the season, or for winter feeding.

It's estimated that, from 1992 through 2006, the cumulative benefit to Nebraska from feeding byproducts wet instead of dry was nearly \$500 million. Feeding wet byproducts saves cattle feeders \$10 to \$20 per head; selling byproducts wet instead of drying them reduces ethanol production costs about 5 percent. These findings were instrumental in encouraging some ethanol plants to locate in Nebraska; ethanol production in the state has increased ten-fold since the early 1990s.

Enhance Economic Opportunities for Agricultural Producers

Topic: Wheat Breeding Benefits

Issue:

To be competitive, growers need wheat varieties that perform well in Nebraska's unique, sometimes extreme growing conditions.

What has been done:

University of Nebraska–Lincoln wheat breeders have long teamed with USDA-Agricultural Research Service scientists based at UNL on research and breeding to develop varieties that are widely grown in Nebraska and beyond. UNL's highly regarded wheat breeding program focuses on both agronomic and end-use characteristics. UNL researchers are collaborating with scientists in 17 states on research to implement new molecular technologies, called Marker Assisted Selection, that will improve U.S. wheat quality and disease resistance. Researchers are working to identify genetic markers and associated genes for complex genetic traits, such as yield, that growers and industry have identified as top priorities.

Impact:

Nebraska-developed hard red winter wheat varieties are planted on about 62 percent of the state's wheat acres. These improved varieties have helped boost Nebraska's annual yields by 9.5 million bushels every year since the 1960s. These improved varieties are worth roughly \$30 to \$35 million annually to Nebraska producers based on increased yield alone. Consumers also benefit from higher-quality grain. Yield improvement in these varieties means Nebraska wheat growers can feed nearly 3.8 million more people a year than they did on the same acreage in the 1960s. Current research to develop new genetic technologies will make future UNL wheat breeding faster and more precise.

Funding:

USDA-Agricultural Research Service
Nebraska Wheat Board
Hatch Act
UNL Agricultural Research Division

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Summary:

Varieties developed through the University of Nebraska–Lincoln's wheat breeding program provide Nebraska growers with improved wheats that perform well in the field and offer the quality characteristics millers and bakers demand. Nebraska-developed hard red winter wheat varieties are planted on about 62 percent of the state's wheat acres. These improved varieties have helped boost Nebraska's annual yields by 9.5 million bushels every year since the 1960s. These improved varieties are worth roughly \$30 to \$35 million annually to Nebraska producers based on increased yield alone. Yield improvement in these varieties means Nebraska wheat growers can feed nearly 3.8 million more people a year than they did on the same acreage in the 1960s. Nebraska wheat breeders now are collaborating with scientists in 17 states on research to implement new molecular technologies, called Marker Assisted Selection, that will improve U.S. wheat quality and disease resistance.

Enhance Economic Opportunities for Agricultural Producers

Topic: Winning the Game Workshops

Issue:

Successful farmers know how to market their crops. That marketing includes forward contracting of corn and soybeans, which can increase their revenue.

What has been done:

University of Nebraska–Lincoln Extension put on Winning the Game workshops at 40 locations across the state in 2005–06, which informed attendees about a variety of marketing strategies. The primary objectives were to help producers recognize seasonal price patterns, consider preharvest pricing more grain, re-evaluate their insurance coverage to support forward pricing, estimate their storage costs and consider completing post-harvest marketing earlier in the year.

Impact:

Before the workshops, nearly 35 percent of the participants reported they had forward priced less than 20 percent of their expected corn and soybean crops. Afterward, 89 percent said they planned to forward price more grain. Those expecting to increase their forward contracting because of what they learned said they would increase it from about 30 percent to 55 percent of their expected production. The advantage of forward pricing is that farmers lock in a price for their crops in the spring when the prices are higher. Increasing forward pricing would have increased the average revenue from corn alone by about \$3,500 per farm per year based on 600 acres of irrigated corn.

Funding:

Nebraska Soybean Board

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Summary:

Forward pricing of corn and soybeans can be a financially successful marketing tool for farmers. University of Nebraska–Lincoln Extension held workshops to educate farmers across the state about a variety of marketing strategies. Before the workshops, nearly 35 percent of the participants said they had forward priced less than 20 percent of their expected corn and soybean crops. Afterward, 89 percent said they planned to forward price more grain. The changes would have increased the average revenue from corn alone by about \$3,500 per farm based on 600 acres of irrigated corn.

Enhance Protection and Safety Of the Nation's Agriculture and Food Supply

Topic: Control of Varroa Mites in Bee Colonies

Issue:

The varroa mite is a major pest of honeybees worldwide, and its control often is difficult because the two anthropods are so closely related – what kills the mites can kill the bees. A University of Nebraska–Lincoln entomologist is developing treatment protocols for a natural product that can reduce mite populations in bee colonies.

What has been done:

The use of bees to pollinate crops is a significant part of agriculture. However, because of the varroa mite, beekeepers have been unable to meet the bee colony demands on these farms. In the past, scientists have come up with some strategies to control varroa mite populations in bee colonies, but these are labor intensive and the mites have become resistant to many available chemical treatments. UNL entomologists are developing mite suppression strategies that use oxalic acid, a natural chemical found in plants such as rhubarb, turnips and broccoli, can deter mite populations from establishing in bee colonies and reduce mite populations. Oxalic acid, which makes vegetation in those plants nonpalatable to insects, will help struggling beekeepers keep their hives healthy and economically profitable. Once varroa mites enter bee colonies, they build up to damaging levels causing bee hives to perish without human intervention. Oxalic acid eventually will become a low-cost, effective and sustainable way to deal with the mite parasite.

Impact:

The Midwest is a prime honey producing area. However, most beekeepers' principle source of income is the use of their bee hives for crop pollination. Of the 2.5 million bee colonies in the U.S., 1.4 million are needed to pollinate crops. The varroa mite has caused beekeepers to lose half or more of their colonies. An average beekeeper might have 1,500 colonies. With each colony worth about \$120, the use of oxalic acid to control varroa mite populations could result in a \$90,000 savings to a single beekeeper with a varroa mite infestation.

Funding:

UNL Agricultural Research Division
Environmental Protection Agency

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Summary:

The varroa mite is a major pest of honeybees worldwide, and its control often is difficult because the two anthropods are so closely related – what kills the mites can kill the bees. A University of Nebraska–Lincoln entomologist is developing protocols for using a natural product, oxalic acid, to reduce mite populations in bee colonies. Oxalic acid, a natural chemical found in plants such as rhubarb, turnips and broccoli, can deter mite populations from establishing in bee colonies and reduce mite populations. Oxalic acid, which makes vegetation in those plants nonpalatable to insects, will help struggling beekeepers keep their hives healthy and economically profitable. Once varroa mites enter bee colonies, they build up to damaging levels causing bee hives to perish without human intervention. Most beekeepers' principle source of income is the use of their bee hives for crop pollination. Of the 2.5 million bee colonies in the U.S., 1.4 million are needed to pollinate crops. The varroa mite has caused beekeepers to lose half or more of their colonies. An average beekeeper might have 1,500 colonies. With each colony worth about \$120, the use of oxalic acid to control varroa mite populations could result in a \$90,000 saving to a single beekeeper with a varroa mite infestation.

Enhance Protection and Safety Of the Nation's Agriculture and Food Supply

Topic: *E. coli* Interventions

Issue:

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.

What has been done:

Five years of intensive University of Nebraska–Lincoln 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. UNL research has determined methods to best use the vaccine in feedlot cattle. A Canadian company, Bioniche, has been granted conditional licensing for the vaccine and its limited use by Canadian veterinarians. If the vaccine's potential holds, it means reducing the possibility of consumers eating meat or produce contaminated with *E. coli*. The University of Saskatchewan and the University of British Columbia were among other partners responsible for developing the drug, now approved by the Canadian Food Inspection Agency. In order to reach full licensing, Bioniche must produce more data which should be completed this year. The UNL team also continues its studies so the vaccine can be fully on the market in both Canada and the U.S.

Impact:

The beef industry is eager for tools to control *E. coli*. The vaccine is the world's first. It is a step toward the first effective intervention to lessen the *E. coli* problem among animals in feedlots, reducing the probability cattle shed the organism in their feces by 60 to 70 percent. This will be an important factor in helping reduce the prevalence of this toxic bacterium in meat and produce contamination.

Funding:

Nebraska Beef Council
USDA
UNL Agricultural Research Division
Hatch Act
Bioniche Life Sciences Inc.
Nutrition Physiology Corp.

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Summary:

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 University of Nebraska–Lincoln 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. UNL research has determined methods to best use the vaccine in feedlot cattle. A Canadian company, Bioniche, has been granted conditional licensing for the vaccine and limited use by Canadian veterinarians. Bioniche and UNL researchers continue to work on the data so the vaccine can be fully on the market in both Canada and the U.S. The vaccine is the world's first and is a step toward the first effective intervention to lessen the *E. coli* program among animals in feedlots, reducing the probability for cattle to shed the organism in their feces by 60 to 70 percent. This will be an important factor in helping reduce the prevalence of this toxic bacterium in meat and produce contamination.

Enhance Protection and Safety Of the Nation's Agriculture and Food Supply

Topic: HACCP Workshops for School Food Service

Issue:

Congress ordered public schools to implement new food safety guidelines by July 2006. The guidelines are part of Hazard Analysis and Critical Control Point (HACCP) for School Food Service. HACCP requires guidelines to ensure the safety of food. It already is applied to many parts of the food service industry.

What has been done:

University of Nebraska–Lincoln Extension has presented 12 workshops since 2005 for school food service managers to help them implement the HACCP guidelines. Extension worked with the Nebraska Department of Health and Human Services on the workshops, which were held in cities throughout Nebraska.

Impact:

Participants reported an 84 percent increase in knowledge about HACCP procedures, which help prevent pathogens from infecting food. Schools have reported an increase in the proper calibration of food thermometers used to keep food at a safe temperature. Before the workshops, most participants said they did not feel very comfortable about how to implement HACCP. After the workshops, they reported they were more comfortable with implementing HACCP.

Funding:

Department of Education Nutritional Services

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Summary:

Schools were required by Congress to implement food safety guidelines using a program called Hazard Analysis and Critical Control Point (HACCP) for School Food Service by July 2006. University of Nebraska–Lincoln Extension has held 12 workshops across the state since 2005 to help school food service managers to learn the HACCP guidelines, which help prevent pathogens from infecting food. As a result of the workshops, 84 percent of participants reported an increase in knowledge of HACCP procedures. Schools have reported an increase in proper food thermometer calibration to keep foods at a safe temperature.

Enhance Protection and Safety Of the Nation's Agriculture and Food Supply

Topic: HACCP Workshops for Food Industry

Issue:

To ensure the safety of meat and poultry consumers buy at the store, USDA requires meat and poultry processors to employ methods to reduce harmful bacteria, chemicals and contamination in their operations. Plants that fail to comply can be closed and contamination often sparks costly product recalls. While processors know compliance is important, it sometimes can be a challenge, especially for small processing operations.

What has been done:

University of Nebraska–Lincoln Extension, foreseeing the federal regulations, began teaching Hazard Analysis and Critical Control Point (HACCP) for processors in 1992. The regulations took effect in 1996 for large processors and in 1998 for small operations. UNL offers HACCP training to meat and poultry processing personnel to help them develop food safety programs to reduce and/or eliminate bacteria that cause food-borne illnesses. UNL faculty have worked with colleagues at Kansas State University, University of Missouri and South Dakota State University to train processors in Nebraska and surrounding states. During intensive workshops offered annually, with each drawing 30 to 35 people, specialists teach processors how to develop or revise their HACCP plans. In 2005, they expanded training to teach small processors of ready-to-eat meats how to avoid the growth of *Listeria*, a potential deadly bacteria. In 2006 the specialists conducted three workshops for controlling *Listeria* in ready to eat meats which were attended by about 110. Extension specialists also provide print resources and one-on-one consultations to solve problems. Since 2000, more than 1,100 processors have taken UNL Extension's HACCP training.

Impact:

Nebraska leads the nation in commercial livestock slaughter so safe processing is an economic as well as public health issue. Recent Centers for Disease Control and Prevention reports show that from 1996 to 2005, the incidence of *E. coli* O157:H7 infections decreased 29 percent nationwide. USDA's Food Safety and Inspection Service also found a large reduction in *E. coli* infections. In 2001 the FSIS found 59 positive tests in 6,770 ground beef samples. In 2005, 19 positive tests were found in nearly 11,000 samples. These declines are largely attributed to HACCP. An Elwood meat processing business owner said HACCP training helped employees more closely scrutinize their work and keep better records.

Funding:

UNL Extension
USDA CSREES grant
USDA Food Safety and Inspection Service grant
Smith-Lever 3(b) & (c)

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Summary:

Meat safety is an economic as well as public health issue in Nebraska, which leads the nation in commercial livestock slaughter. UNL food safety and meat specialists work closely with processors, especially small operators, to help them implement and update federally-mandated food safety programs for their operations. UNL Extension has provided training on this system, called Hazard Analysis and Critical Control Point, or HACCP, since 1992. Since 2000, extension has helped more than 1,100 small and very small processors adopt HACCP. As a result of HACCP, *E. coli* 0157:H7 infections nationally were reduced sharply, according to the Centers for Disease Control and Prevention and the Food Safety and Inspection Service. An Elwood meat processor said extension's HACCP training helped his employees more closely scrutinize their work and keep better records.

Enhance Protection and Safety Of the Nation's Agriculture and Food Supply

Topic: Mobile Plant Diagnostic Lab

Issue:

Whether they occur naturally, accidentally or intentionally, rapidly identifying plant diseases is critical to controlling their spread and mitigating their impact. In this era of agrosecurity concerns, rapidly diagnosing a potential problem on the spot is important.

What has been done:

In 2005, University of Nebraska–Lincoln Extension launched its new Mobile Plant Diagnostic Lab, the nation's most advanced traveling plant diagnostic lab. Funded through the Department of Homeland Security and UNL Extension, the lab is available to respond to any potential agrosecurity threat and to help farmers diagnose plant diseases on the spot. For example, if soybean rust were to enter Nebraska, the mobile lab would allow UNL plant pathologists to test suspect plants on site and provide results within two hours. The lab is equipped with the latest technology and equipment, including molecular diagnostic tools and satellite communications, for immediate notification of state and federal agencies. The lab also is being used at field days statewide for farmers to bring in plant samples and to increase awareness of plant diseases.

Impact:

Thanks to this lab, Nebraska is better prepared to quickly detect plant disease on site and to respond to potential agrosecurity threats on site. The on-site lab also can provide results in hours instead of the several days typically needed to mail samples to the university's on-campus lab. The speedy response could be especially critical in a case of agroterrorism or a severe disease outbreak.

Funding:

U.S. Department of Homeland Security/Nebraska Department of Agriculture
UNL Extension

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Summary:

Nebraska is better prepared to detect plant disease problems on the spot thanks to UNL Extension's new Mobile Plant Diagnostic Lab. The lab, which began operating in 2005, is the most advanced of its kind in the nation. Funded by the U.S. Department of Homeland Security and UNL Extension, the lab can be pulled anywhere it's needed to respond to potential agrosecurity threats or to help farmers diagnose diseases threats, whether they occur naturally, intentionally or accidentally. Equipped with the latest technology, the lab is able to provide results within two hours and to immediately notify state or federal regulators if necessary. Before the mobile lab, it often took several days for samples to be mailed to and analyzed at the university's on-campus diagnostic lab. The mobile lab will travel to field days statewide and provide plant sample test results before growers leave the site.

Enhance Protection and Safety Of the Nation's Agriculture and Food Supply

Topic: Soybean Rust

Issue:

Soybean rust is a new major disease worry for growers nationwide. University of Nebraska–Lincoln plant pathologists are studying this threat and providing resources to ensure Nebraska farmers are ready to combat soybean rust if it strikes the state.

What has been done:

Plant pathologists created a one-stop soybean rust resource Web site at <http://soybeanrust.unl.edu>. Extension teamed with the Nebraska Soybean Board to offer a toll-free phone line with recorded updates and management information, and specialists and extension educators developed publications with specifics farmers can use to prepare. UNL plant pathologists also conducted 13 field trials across Nebraska in 2005 and 10 field trials in 2006.

Impact:

This Institute of Agriculture and Natural Resources research and extension effort and close collaboration with the Nebraska Soybean Board has helped growers learn about and prepare for this new disease. Research will provide practical, science-based information growers and companies will use to control soybean rust under Nebraska conditions. Researchers will use preliminary results and future field trials to devise an integrated soybean rust management program for Nebraska growers.

Funding:

University of Nebraska–Lincoln Agricultural Research Division
University of Nebraska–Lincoln Extension
North Central Soybean Research Program
USDA Animal and Plant Health Inspection Service
Nebraska Soybean Board
Hatch Act
Smith-Lever 3(b) & (c)

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Summary:

Soybean rust is a new major disease worry for growers nationwide. UNL plant pathologists are working to ensure Nebraska farmers have the information and resources to combat soybean rust if it strikes the state. In 2005, plant pathologists created a one-stop soybean rust resource Web site at <http://soybeanrust.unl.edu>. Extension teamed with the Nebraska Soybean Board to offer a toll-free phone line with recorded updates and management information and specialist and extension educator developed publications with specifics farmers can use to prepare. Researchers conducted field trials statewide in 2005 and 2006. This IANR research and extension effort and close collaboration with the Nebraska Soybean Board has helped growers learn about and prepare for this new disease. Research findings will provide practical, science-based information growers and companies will use to control rust under Nebraska conditions.

