

Institute of Agriculture and Natural Resources — AT WORK FOR NEBRASKA

Nebraska's natural resources.

Grasslands. Wildlife. The very soil and water that sustain us.

Nebraska depends on its natural resources both for quality of life and as the foundation of the state's largest industry, agriculture.

That makes the Institute of Agriculture and Natural Resources' work in environmental sustainability and preservation critically important. In Nebraska one in three jobs – jobs located in both urban and rural areas – depends upon agriculture.

Through research, teaching and extension education, the Institute helps Nebraskans preserve and sustain the state's natural resources. In turn, those resources support Nebraska and remain key elements in growing Nebraska's future.

Environmental sustainability covers many things. It includes wildlife and water resource management, community environments, and soil and range resource management.

Environmental change management is part of environmental sustainability. How do we adapt to and best manage our resources through environmental change? An independent study* of the Institute noted, *"In a state that depends on its environment, not only for quality of life but also as the underpinning of its agriculture-based economy, the work of IANR in environmental sustainability and preservation is of critical importance. IANR is highly active in this area ..."*

The report also said, *"Much of what is required for 21st century success (innovation, technology transfer, human capital enhancement, productivity improvement, networking, and quality of environment and place) is directly addressed through the mission and operations of IANR."*



Here are examples of just a few of the many ways IANR is at work for Nebraska, sustaining and preserving Nebraska's natural resources.

Groundwater levels 24/7

UNL water researchers are teaming with 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 have been installed in 52 of the 5,800 wells monitored statewide to compile and access groundwater data (<http://snr5.unl.edu/realtimewater/>). Recent drought coupled with recent water policy and legal decisions have increased the need for more timely groundwater information.

Reducing metro soil and sediment losses

Washed into streams, lakes and rivers, soil becomes a major pollutant. UNL Extension Erosion and Sediment Control Seminars teach building industry professionals about stormwater management issues and regulations to reduce soil and sediment losses from construction sites. Anywhere from 140 to 322 people, including engineers, architects and grading contractors, have attended sessions annually since 2003. In 2007, 93 percent of participants said they would apply new knowledge from the seminar in their work.

Dealing with drought

New Web-based technologies being developed at UNL are giving farmers, ranchers and others better tools to contend with drought. A partnership



between the IANR-based National Drought Mitigation Center and university Computer Science and Engineering scientists has resulted in Greenleaf, which hosts a variety of tools that help producers assess drought and other crop-production risks. Other tools being enhanced or developed

*No state tax funds were used in financing this study.

include the Drought Monitor, Drought Impact Reporter, Drought Atlas, Vegetation Drought Response Index and Ranch Drought Planning Web site.

UCARE research and experience

UNL undergraduate students get hands-on research experience through a College of Agricultural Sciences and Natural Resources program. Undergraduate Creative Activities and Research Experiences (UCARE) benefits faculty as they receive assistance on research projects, while students expand their out-of-classroom learning. One UCARE project involved surgically implanting transmitters into poisonous snakes to track their whereabouts in an effort to determine how various land management practices affect snake survivability.

High-tech detection

UNL researchers are using remote-sensing instruments on satellites, airplanes and boats to detect the threat of toxic blue-green algae on public lakes before the bacteria that produce it can grow into full-scale bloom. With the technology the scientists, working with the Nebraska Department of Environmental Quality, can identify, map and monitor in real-time the water-borne agents that can cause toxic blue-green algae to flourish and become a health threat. As for private lakes and ponds, UNL Extension provides free test kits to property owners so they can have the university conduct tests of their water for algae toxins.



For the environment

UNL Extension is minimizing environmental impact of livestock manure. Vegetative Treatment Systems in small livestock operations help with environmental sustainability and economic viability; the technology's value to Nebraska's cattle industry is estimated at \$152 million. In 2009 extension pioneered and demonstrated the largest VTS for an 800-head feedlot in northeast Nebraska. Meantime, researchers are studying how to reduce phosphorus in manure and ethanol coproducts; while phosphorus can help produce healthy crops, overapplication can pollute water. Strategies include removing phosphorus during ethanol production and developing management practices to reduce runoff.



Tree and grass combos to maximize profit

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 works 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.

Keeping wastewater systems safe

Poor design, improper installation or inadequate maintenance can cause onsite wastewater systems to fail, which can contaminate water and soil or expose people to disease-causing pollutants. Extension delivers programming to rural homeowners on septic or residential lagoon operation and maintenance, as well as training for wastewater, real estate and public health professionals.

What's that you're wearing?

Turning agricultural waste products into fabrics can make the U.S. textile industry more sustainable. A UNL textiles science team has discovered how to make fibers from cornhusks, cornstalks, rice and wheat straw, sorghum leaves and stems, and switchgrass. They offer excellent mechanical and acoustic properties for automotive interiors and other uses. The team also discovered how to obtain natural protein fibers from chicken feathers and can make fibers from proteins in wheat, corn and soybean.

Masterful advice

Unbiased, research-based, Nebraska-specific guidance can be hard to come by. UNL Extension's Master Gardener program has helped fill that need for more than 30 years, training a corps of volunteers across the state to help Nebraskans with their gardening questions, including how to develop sustainable, water-wise landscapes that emphasize native plants. In 2008, extension specialists and educators provided 3,500 total hours training Master Gardener volunteers, resulting in more than 80,000 contacts by 447 volunteers in 46 of Nebraska's 93 counties.



THE POWER OF RED.™ AT WORK FOR NEBRASKA.

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