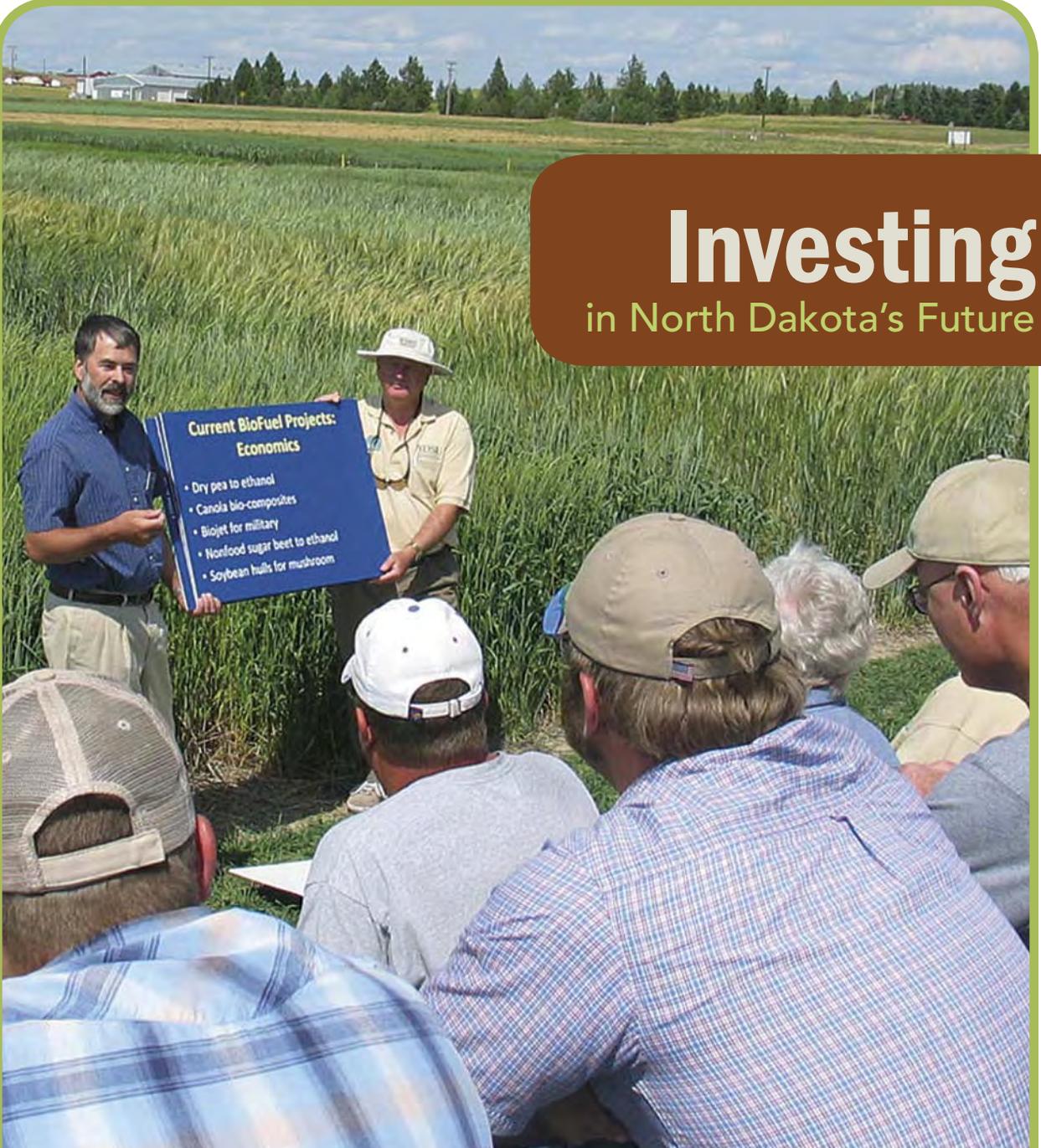


Investing in North Dakota's Future



North Dakota State University



North Dakota
Agricultural
Experiment
Station

NDSU
Extension
Service

NDSU



2008 ANNUAL HIGHLIGHTS



This publication was produced by
NDSU Agriculture Communication.

Writers: Richard Mattern, Ellen Crawford,
Mary-Anne Fiebig

Graphic Designer: Deb Tanner

Photography: NDSU, NDSU Agriculture and
University Extension faculty and staff

North Dakota State University does not discriminate on the basis of race, color, national origin, religion, sex, disability, age, Vietnam Era Veterans status, sexual orientation, marital status, or public assistance status. Direct inquiries to the Vice President for the Division of Equity, Diversity and Global Outreach, 205 Old Main, (701) 231-7708. This publication will be made available in alternative formats for people with disabilities upon request, (701) 231-7881.



Duane Hauck, D.C. Coston and Ken Grafton

Agriculture and rural communities will face serious challenges in the coming years, but agriculture will remain an important underpinning of North Dakota's economy.

Finding and supporting additional economic opportunities in rural areas that build on the land's productivity and creativity of farmers and ranchers is vital for North Dakota's future.

NDSU's effort is called Grow 21: Enhancing North Dakota's Economy Through Agriculture.

The focus of this effort must be on communities because the success of farms, ranches, agribusinesses and communities are intertwined. Successful farms and ranches lead to strong agribusinesses that, in turn, support healthy communities.

A healthy community has these three essential attributes:

- Diverse, resilient economy
- Effective, efficient infrastructure
- Leadership

The North Dakota Agricultural Experiment Station and NDSU Extension Service are leading the way in researching new economic opportunities and providing the education and other services that citizens need to take advantage of those opportunities.

This publication provides a snapshot of advances in the past year. It also demonstrates a continuing commitment to provide the technology and knowledge to enhance the efforts of farmers, ranchers, agribusinesses, families and communities.

Research Enhances BIOENERGY KNOWLEDGE

NDSU is at the forefront of North Dakota's efforts to expand its role in developing energy and products from renewable sources. Here are some results of NDSU's research:

- Bioenergy has the potential to provide a direct annual contribution to the state of more than \$800 million.
- Fractionated field peas could replace corn in ethanol production. Field pea starch results in higher conversion rates and greater ethanol production.
- Three canola germplasm lines have significant potential for higher oil yield per acre for increased biodiesel production.
- Corn condensed distillers solubles (CCDS), an ethanol coproduct, can be a protein supplement to improve low-quality forage-based cattle diets, and the CCDS can be mixed with the forage or fed separately.
- Scientists use a canola oil-based resin and canola meal separately to create a composite matrix, or base material, and derive fiber from corn distillers dried grains (DDG, an ethanol coproduct) and flax stem fiber. A composite matrix reinforced with fibers is an excellent alternative to steel and other metals.
- Researchers are forming polymers from vegetable oils, particularly soybean and linseed, as well as other biobased raw materials to produce environmentally friendly, high-performance coatings for numerous commercial applications, such as flooring materials and latex paints.
- DDG can be used in backgrounding and finishing diets as a replacement for a portion of the corn and protein supplement. NDSU research indicates no adverse effects on meat quality attributes, including tenderness and flavor, with the use of DDGs in these diets.
- Researchers are getting very good results on a study evaluating the effects of including glycerol in beef cattle finishing diets. Glycerol is a coproduct of converting canola and other oilseeds to biodiesel.
- Researchers in the Agribusiness and Applied Economics Department say the economic impact of a cellulosic ethanol biorefinery is so much greater than a corn ethanol plant because some of the materials used, such as wheat straw and other crop residues, currently have no commercial markets.

For more information:
Ken Hellevang, (701) 231-7243,
kenneth.hellevang@ndsu.edu
www.ndsu.edu/bioopportunities

North Dakota ethanol plants have the capacity to produce

223 million
gallons per year (as of fall 2008)

North Dakota's ethanol industry produces

723,214 tons
of distillers dried grains

Canola, soybeans, sunflowers and safflower can produce up to

100 gallons
of biodiesel per acre



Ear Tags State of the Art

NDSU is helping cattle tracking go high tech.

University researchers have developed an ultrahigh frequency identification antenna that can be embedded in a cow's ear tag. In a test on 188 head of cattle at a sales yard in Dickinson, scanners read 99 percent of the tags while cattle were moving at market speed.

The development of an accurate, efficient cattle identification system is part of a national initiative to combat disease outbreaks in livestock, according to Doug Freeman, head of NDSU's Department of Veterinary and Microbiological Sciences. If an outbreak occurs, the tag will help identify an individual cow and determine age, source and other relevant history.

The NDSU system also includes software that maintains the privacy of the individual producer's data. In addition to disease surveillance, the data associated with animal tracking can enhance market opportunities for producers and create added value.

Tags with an antenna built into them are the fourth generation radio frequency ID tag NDSU researchers have created in collaboration with Alien Technology of Fargo.

Developing a better tag and implementing a workable system in the field is a collaborative effort of researchers from the Department of Electrical and Computer Engineering, Veterinary Diagnostic Services, Center for Nanoscale Science and Engineering, and NDSU's Dickinson Research Extension Center. The partnership also includes faculty and students from Dickinson State University. The project has received significant support from U.S. Sen. Byron Dorgan as well.

For more information: Doug Freeman,
(701) 231-8504, douglas.freeman@ndsu.edu



North Dakota produced

29.8 million

pounds of red meat
in 2007



Among U.S. 15-year-olds
with jobs

29 percent

work in eating and drinking
establishments

Teens Learn **Food Safety**

Teens working in the food service industry often don't get the training they need in safe food handling. But that's not the case in North Dakota. About 5,000 youth have completed Teens Serving Food Safety, a classroom-based course the NDSU Extension Service developed.

Youth learn to clean hands, utensils and food preparation surfaces properly; keep raw meat, poultry and seafood and their juices separate from ready-to-eat foods to prevent cross-contamination; cook food to the proper internal temperature; and chill cooked food properly to discourage bacterial growth. They receive a food safety kit that includes meat and refrigerator thermometers, a magnet listing recommended internal temperatures for cooking meat and poultry, a wash-your-hands reminder and brochures to take home.

Scores on tests to determine their food safety knowledge before and after the program increased from 54 percent to 84 percent. On surveys following the course, 81 percent of the students reported washing their hands more often during food preparation, 67 percent reported being more careful about cleaning and sanitizing utensils, 24 percent reported checking refrigerator and freezer temperatures more often and 20 percent reported using a food thermometer more often.

For more information: Julie Garden-Robinson,
(701) 231-7187, julie.garden-robinson@ndsu.edu



Groundbreaking for Phase 1 of the new NDSU Greenhouse Complex occurred May 30, and construction is scheduled to be completed in December 2009. This facility will allow continued integrated, collaborative research to enable researchers to achieve results quickly and efficiently.

NDSU Adding 2 Ag Research Facilities

The NDSU Beef Cattle Research Center, Stage 1, construction was completed Sept. 30. The center will use integrated and multidisciplinary approaches to enhance collaborative efforts in solving the challenges facing the beef industry in North Dakota.

The State Board of Agricultural Research and Education and NDSU will seek funds from the Legislature and private sources to complete both projects.



Nearly
24 percent

of North Dakota workers
are farmers, ranchers or
in agriculture-related jobs

North Dakota has
30,100
farms and ranches

Production agriculture is
25 percent
of the state's
economic base

The 2007-09 Legislature provided funding for two new research facilities and major expansion at three NDSU Research Extension Centers.

Research Extension Centers **EXPAND**

Carrington Research Extension Center Addition

The Carrington Research Extension Center is expanding its headquarters facility by 3,500 square feet. The addition will provide six more offices, a room for videoconferencing and computer-based instruction, a conference room and a storage area for educational equipment.

The headquarters expansion empowers the CREC to sustain and expand NDSU's diverse research and Extension programs to the dynamic agricultural constituency of the state and region.

Hettinger Research Extension Center Addition

A 1,400-square-foot addition is adding eight offices to the HREC complex.

The addition allows the HREC to continue to provide agricultural programming to the landowners and producers of the region through additional working space for post-doctoral students, graduate students and additional scientists.

North Central Research Extension Center Machine Shop

The NDSU North Central Research Extension Center received funding during the 2007 legislative session to construct an equipment storage and maintenance facility. The 80-foot by 90-foot steel structure includes a heated-floor shop area.

For more information:
Ken Grafton, (701) 231-7655,
k.grafton@ndsu.edu

Carrington Research Extension Center



Hettinger Research Extension Center



NDSU Helps Producers Cope With Drought

Severe drought conditions in some parts of the state made 2008 a tough year for affected farmers and ranchers.

Providing options were NDSU Extension Service and North Dakota Agricultural Experiment Station specialists, faculty and staff.

“We provided information to help producers as they went through the process of making some tough decisions,” says Greg Lardy, Extension beef cattle specialist. “This year was even more difficult because of the higher fuel, grain, hay and fertilizer costs.”

Through statewide conference calls, the NDSU drought team kept in touch with county Extension agents to assess the situation. The team also provided information to state and federal agencies so appropriate action, such as a disaster declaration, could be taken.

Drought information was sent to state news media and placed on a Web site at www.ag.ndsu.edu/disaster/drought.html.

The Web site includes weather information, drought maps, crop and livestock production advice, information addressing family and financial concerns, and horticultural information. The Web site also provides links to other drought Web sites.

For more information: Greg Lardy, (701) 231-7660, gregory.lardy@ndsu.edu

www.ag.ndsu.edu/disaster/drought.html



North Dakota is
the nation's

No. 1

producer of 13 crops



NDAWN Implements Irrigation Scheduler

The North Dakota Agricultural Weather Network (NDAWN) has added an irrigation scheduling program.

The system increases water use efficiency for irrigators by calculating site-specific soil water deficits. The soil water deficit is calculated based on a selected field and the growth stage of the crop. The application interfaces with a geographic information system to select a specific field to obtain the geographic coordinates for the soil types and soil water-holding capacity in the field. It also interfaces with the nearest NDAWN automated weather station to obtain weather information to calculate daily water requirements for the crop in the selected field.

NDAWN consists of 70 automated weather stations distributed among prime agricultural locations across the state and border regions of surrounding states. The network assists North Dakota farmers with a multitude of agricultural applications:

- Canola degree days, growth stage and sclerotinia risk
- Corn growing degree days and departure from normal
- Potato late blight severity values and favorable days
- Sugar beet degree days, growth stage and cercospora infection values
- Sunflower degree days and estimated growth stage
- Wheat degree days, growth stages, disease forecaster and wheat midge degree days
- Small-grains disease forecast system for scab, septoria, rust and tan-spot diseases
- Crop water use for potato, corn, dry beans, wheat, barley, sugar beets, soybeans, sunflower, alfalfa and turfgrass for a number of preset emergence dates
- Insect degree-day table with base temperatures of 40, 45, 50, 55, 60 and 65 degrees
- Heating and cooling degree days with base temperature of 65 degrees for energy and home utility characterization

For more information: Adnan Akyuz,
(701) 231-6577, adnan.akyuz@ndsu.edu
<http://ndawn.ndsu.nodak.edu>

NDSU Studies Grass for Energy

An NDSU study to evaluate perennial grasses for biofuel production indicates warm-season grasses, such as switchgrass, need adequate moisture to grow well. However, cool-season grasses, such as wheatgrasses, grow better in years or areas with limited moisture, preliminary results show.

The 10-year study is a collaborative effort of NDSU's Carrington, Central Grasslands (Streeter), Hettinger, North Central (Minot) and Williston Research Extension Centers.

Irrigated plots at Williston were the top switchgrass producers, yielding about 7 tons per acre, while dryland plots at Williston produced less than 1 ton per acre because of dry conditions in 2008. Expectedly, switchgrass may not do well in North Dakota without water because it is native to higher rainfall areas, researchers say.

Researchers also evaluated the effect of using glyphosate, a nonselective systemic herbicide, to control cool-season weedy grasses in stands of switchgrass. Preliminary results indicate switchgrass production increases twofold where the cool-season grasses were controlled.

For more information: Paul Nyren, (701) 424-3606, p.nyren@ndsu.edu
www.ag.ndsu.nodak.edu/streeter/2007report/Grasses_Biofuel.htm

4-H Clubs Eat Smart, Play Hard

Twenty-seven North Dakota 4-H clubs earned special recognition for making "Eat Smart. Play Hard." lessons part of their 2007-08 club meetings.

They were, by county: Barnes - Blazing Saddles; Burleigh – Creative Cool Kidz, Sterling Livewires, Silver Colts, Northern Lights, McKenzie Magnums, Haystack Buttes, Dakota Guys and Gals, Biz Kids, Country Kids, Rocky Ridge, Rangers; Cass – Rainbow Kids, Valley Adventures, Harwood Helpers, Kindred 4-H Friends, Page Power, Wheatland Pioneers; Divide – Flickertails; Grand Forks – Eagles; McHenry – Balfour Roughriders; Pembina – Crystal Clovers; Towner – Handy-Thrifty Helpers; Richland – Helping Hands, Energizers; Walsh – Made in America Kids; Ward – Northern Light.

"Eat Smart. Play Hard." is a statewide campaign that emphasizes the importance of making healthy food choices, getting regular exercise and families eating together. The NDSU Extension Service and Bison Athletics teamed up to launch the initiative in 2005.

To receive the Healthy North Dakota 4-H Club designation, clubs were required to incorporate at least one health, nutrition, food safety or physical activity into a minimum of six regular meetings during the year.

Activities that helped clubs earn recognition included climbing a rock wall, donning firefighting gear and practicing with water hoses, holding a community event to promote Healthy Heart Month, making healthful trail mix, cleaning ditches, scraping and painting picnic tables and benches in a local park, touring restaurant kitchens and the produce section in grocery stores, learning proper hand-washing techniques, holding a food drive, planting a garden and taking part in the Walk North Dakota program.

For more information: Julie Garden-Robinson, (701) 231-7187, julie.garden-robinson@ndsu.edu



3,507
individuals have taken
1.35 billion
steps in NDSU Extension's
Walk North Dakota program

Interest in **PULSE CROPS** Continues to Grow

North Dakota producers lead the nation in field pea and lentil production. Field peas and lentils, along with chickpeas, are known as cool-season pulse crops. Pulse crops produce edible seeds from annual legumes.

“There is a lot of interest in pulse crops,” says Jay Fisher, director of the NDSU North Central Research Extension Center at Minot. “Our research indicates they are excellent in rotation with cereal grain crops because they create a break in disease cycles and grow well in cool weather. Researchers also have developed new varieties and ways to control weeds.”

Pulse crops have the ability to obtain much of the nitrogen they need from the atmosphere and have some left over for the wheat, barley, durum or oat crop planted on the same field the next year.

“That means farmers won’t have to apply as much nitrogen to the following year’s crop, which will save them time and money,” Fisher says.

The number of markets for crops statewide, nationally and worldwide is another reason for the jump in production. North Dakota has more than 30 businesses that buy one or more pulse crops.

“Research shows that field peas are a beneficial source of protein and energy in all phases of beef cattle feeding,” Fisher says.

For more information: Jay Fisher,
(701) 857-7679, jay.fisher@ndsu.edu





NDSU Expands Horticulture Program in Western N.D.

"The opportunities for horticulture programs in western North Dakota are as open and vast as the scenic landscape itself," says Tom Kalb, NDSU horticulturist.

Kalb joined the NDSU Plant Sciences Department in March, but works out of Bismarck to coordinate horticulture programs in the western half of the state. Funding for the horticulture program expansion was made possible by the 2007-09 Legislature.

The horticulture industry is one of the fastest growing segments in agriculture, generating \$450 million annually in North Dakota.

"Industry professionals and their consumers need research-based information on caring for landscapes in an environment-friendly manner," Kalb says. "There also is tremendous interest in finding new crops to supplement traditional farm incomes."

Kalb has started several initiatives in western North Dakota and is creating outreach projects for the future. They include:

- Launching one of the largest variety trial programs in the nation. More than 100 growers across the state evaluated vegetable and cut-flower varieties.
- Reactivating horticulture research at the North Central Research Extension Center in Minot. Plans are to expand research to other western Research Extension Centers.
- Creating a movement in Bismarck to establish a major public garden, including a rose garden. Plans are to establish other community gardens across the region.
- Publishing an online gardening newsletter called "Dakota Gardener." The newsletter provides research-based information to gardeners on a timely basis.
- Planning a gardening program for youth on the Standing Rock Reservation. The program will promote nutrition and entrepreneurship.

Expanding the pool of Master Gardener volunteers in the region has emerged as a high priority.

"We need an army of volunteers to foster stronger communities and help people enjoy healthier lives," Kalb says.

For more information: Tom Kalb, (701) 221-6865, tom.kalb@ndsu.edu



Program Builds CONNECTIONS

Building Connections, the NDSU Extension Service project to strengthen families and increase positive youth development at Home on the Range and on the Standing Rock Indian Reservation, received national recognition — a 2008 certificate of commendation from the National Children, Youth and Families at Risk Program.

Building Connections provides parent education and 4-H programming at Standing Rock and 4-H activities for youth at Home on the Range and educational newsletters for their parents.

More than 600 youth and adults from Standing Rock have participated in the project. About 80 youth at Home on the Range and their families take part each year.

Youth increase their sense of positive identity, improve their self-esteem, learn to deal with their emotions and problems in their lives, and increase their social skills and behaviors so they develop positive relationships with others.

Parents at Standing Rock increase their knowledge of child development; enhance their parenting skills; increase healthy living habits, such as a nutritious diet and exercise; and develop a sense of cultural identity as a parent.

For more information: Sean Brotherson, (701) 231-6143, sean.brotherson@ndsu.edu, www.ag.ndsu.edu/building-connections/

NDSU's Tree Man Exceeds Goal

Dale Herman's goal before he retires is to release one new woody plant variety for each year he has been at NDSU. With 37 of years specializing in research of hardy woody plants of the North Plains and 42 varieties released, he's already exceeded his goal.

"It takes a lot of research and patience to do that," Herman says. "With this type of research, you don't always know how many years of testing are required, especially in a Plains environment where you have cold climate hardiness concerns, deficient moisture stress, and variable soil and pH conditions."

For example, developing the Prairie Dream paper birch (*Betula papyrifera* 'Varen') took 27 years.

"The goal was to find a more environmentally adapted, stress-tolerant paper birch for landscape planting," Herman says. "After all those years, we came up with a tree that has a distinct white, peeling bark and dark green leaves that turn a golden yellow in the fall. It also has a high resistance to bronze birch borer, which has taken its toll on many other birch varieties."

The main NDSU research arboretum is near Absaraka. Woody plants are evaluated in statewide trials headed by research specialist Larry Chaput at Research Extension Centers in Langdon, Minot, Dickinson and Carrington. Herman and Chaput also collaborate with urban foresters in Grand Forks, Fargo and Bismarck, as well as the North Central Regional Plant Introduction Station in Ames, Iowa, which includes 15 other states in the evaluation process. He also works closely with wholesale production nurseries that propagate his introductions.

Herman is one of the authors of "Trees and Shrubs for Northern Great Plains Landscapes," which is available through the NDSU Distribution Center.

"The publication contains many of the major species of trees and shrubs to consider for planting in the northern Great Plains," Herman says.

For more information: Dale Herman,
(701) 231-8477, dale.herman@ndsu.edu
www.ag.ndsu.nodak.edu/plantsci/breeding/Woody.htm

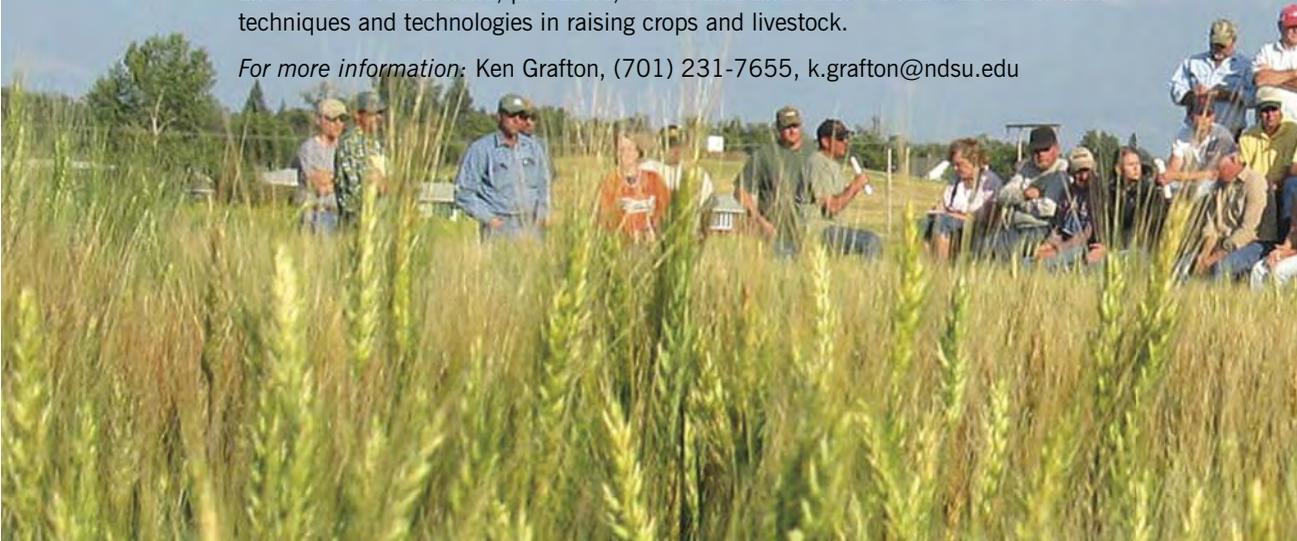


Visiting the Research Extension Centers

NDSU's Research Extension Centers across the state played host to tours, field days and other events during the 2008 growing season. Many people also logged onto the centers' Web sites.

Researchers at the centers work on problems the state faces and test new management techniques and crop varieties under various conditions. The centers also host sessions and tours for researchers, producers, consultants and others to learn about the latest techniques and technologies in raising crops and livestock.

For more information: Ken Grafton, (701) 231-7655, k.grafton@ndsu.edu



North Dakota cows
produce

950 million
glasses of milk annually

North Dakota has

151
cattle feedlots

North Dakota produces
enough soybeans to make

219 billion
crayons



North Dakota produces
enough potatoes for

178 million

servings of french fries

North Dakota producers
raise enough canola to fill
the state Capitol tower more than

17 times

North Dakota produces
enough pork for

5.4 million

pork chops



NDSU Extension Service's
Rural Leadership North Dakota
program has prepared

41

people to be effective leaders

Program Prepares **LEADERS**

The NDSU Extension Service's Rural Leadership North Dakota (RLND) program has prepared 41 people to be effective leaders with the skills to navigate successfully through the challenges facing the state. They are from farms, ranches and rural communities in 27 counties throughout the state. Another 16 North Dakotans are members of RLND's third class, which will graduate in fall 2009.

RLND is a two-year program. Participants attend nine in-state workshops and a four-day seminar in Canada, plus take a six-day study tour to Washington, D.C., to learn to think critically and creatively, communicate effectively, use technology, and understand agricultural and rural policy.

Participants also implement a project that benefits their organization, community or region. Twenty-one projects have improved the quality of life in communities, 10 have had an economic impact on communities and another 10 have had a positive effect on tourism.

Those projects include a handicapped-accessible playground and an eight-plex multifamily housing unit in Watford City, new swimming pool in New England, visitors center in Dawson, campgrounds and marked trails for horse riders in Stutsman County, exhibits showcasing Ellendale area artists and a promotional effort encouraging Carrington area residents to support their local businesses.

"RLND provides the springboard for innovation, entrepreneurship and leadership development from all corners of the state," says class member Sandy Arends of Fargo. "North Dakota stands to benefit immeasurably from this fine program, and I am very proud to be part of it."

The 2007-09 Legislature provided funding for RLND.

For more information: Marie Hvidsten, (701) 231-5640,
marie.hvidsten@ndsu.edu, www.ag.ndsu.edu/rlnd/

Communities Thrive Through Horizons

Twenty-six North Dakota communities have found ways to combat poverty, population loss and economic decline with assistance from the Horizons program.

Horizons is a partnership between the NDSU Extension Service, which facilitates the program, and the St. Paul, Minn.-based Northwest Area Foundation, which funds it.

Community conversations helped residents explore their perceptions about poverty and develop plans to help their community become better places to live. More than 600 residents attended a leadership development course.

Here are some specific ways communities have benefited from Horizons:

- New Town started a Neighborhood Watch program
- Cooperstown, Anamoose and Harvey established community foundations for long-term philanthropic efforts
- Gackle, Anamoose, Sheyenne, Cando and Bowdon started farmers markets to help local entrepreneurs market their produce and give residents access to fresh fruits and vegetables
- Rolette developed a walking trail for family activity
- Maddock began an after-school activities program for children of working parents
- Walhalla obtained cell phone service for the area
- Lidgerwood gained high-speed Internet access in the public library for everyone of any income level
- Rutland established a Renaissance Zone to encourage investment in properties that need revitalization
- Dodge residents wrote and received a grant to purchase library resources
- Carson, Elgin and New Leipzig worked to keep the local food pantry open and are starting a new rural outreach program
- Linton is working on downtown beautification and enhancing areas leading into the community
- Alexander, Arnegard, Keene and Watford City sponsored training for businesses on tobacco compliance checks so youth do not purchase tobacco products
- Rock Lake has young adults making a difference by purchasing local businesses
- Stanley has two new certified child-care facilities to help working families
- Steele formed a nonprofit organization to support a local food pantry
- Hazelton has reopened its community grocery store



For more information: Lynette Flage,
(701) 265-5200, lynette.flage@ndsu.edu
www.ag.ndsu.edu/horizons
www.northdakota.communityblogs.us

Nearly
1,000
individuals in 21 communities
participated in community
conversations in 2008

32,581

youth participated in
4-H youth programming
in 2007



Youth Learn Work-force Skills

North Dakota 4-H programs are helping youth throughout the state learn and practice work-force readiness skills.

For example, more than 300 annually enhance their public speaking and communication skills in district communication arts events. In 2008, more than 1,700 youth demonstrated the ability to carry through on a project by exhibiting 10,192 exhibits at the North Dakota State Fair.

More than 600 youth demonstrated their decision-making skills in regional and state judging contests. Participants advanced to these regional and state events from county and American Indian reservation 4-H programs across the state.

Nearly 50 youth represented North Dakota in 2008 through national opportunities that included the National 4-H Congress, National 4-H Conference, Citizenship Washington Focus in Washington, D.C., and national judging teams in several areas of the sciences.

For more information: Brad Cogdill,
(701) 231-7253, brad.cogdill@ndsu.edu
www.ext.nodak.edu/4h/4-h.htm



18 U.S.C. 707

Looking for SCAB

In NDSU's statewide field survey of major diseases and insects in wheat and barley, one of the major diseases looked for each year is fusarium head blight (FHB or scab). Scab has cost producers hundreds of millions of dollars in reduced yields and crop quality.

The 2008 survey revealed very low scab incidences and severity. Of the post-flowering wheat fields, 23.3 percent showed some symptoms of scab, but the average scab index was only 1.7 percent. Of the post-heading barley fields surveyed, 10.8 percent showed some symptoms of FHB, but the average FHB index in these fields was only 2.2 percent.

The most frequent occurrence and highest severity were observed in the northeastern district of the state. Repeated small showers in combination with late maturation of the crop in the first half of August favored FHB development and some late deoxynivalenol (DON) production. The average FHB index in the northeastern district was 3.4 percent in wheat and 3 percent in barley, values

higher than elsewhere in the state, but still at relatively low levels. FHB was not observed at all in the most western districts because of very dry conditions throughout most of the growing season.

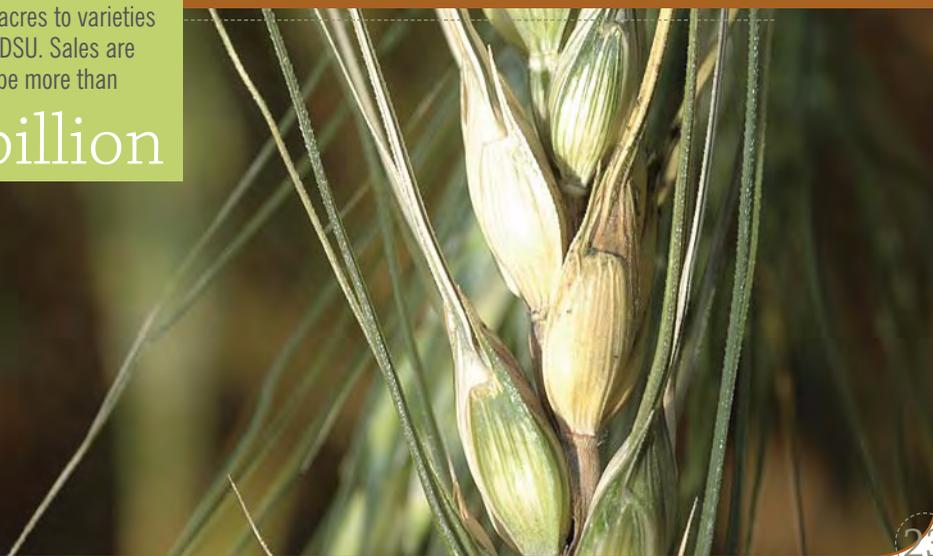
FHB occurrence and severity were low in 2008 for three reasons:

- Use of improved FHB-resistant varieties. The NDSU hard red spring wheat variety Glenn was the No. 1 variety grown in 2008. It is popular because of its fusarium head blight and leaf rust resistance, as well as its competitive yields and high quality.
- Registrations of improved fungicides that have an excellent ability to suppress FHB. These were fungicide registrations that were received, in part, because of data supplied by NDSU research.
- Dry summer across much of the state, with only a few areas receiving rain during the critical period of FHB infection (flowering in wheat, full head emergence in barley)

For more information: Marcia McMullen, (701) 231-7627, marcia.mcmullen@ndsu.edu

In 2008, North Dakota producers planted 70 percent of their hard red spring wheat acres to varieties developed by NDSU. Sales are estimated to be more than

\$1.5 billion



NDSU and USDA to **COLLABORATE** on Biofuels

NDSU and the USDA's Agricultural Research Service have signed an agreement to collaborate on research to enhance biomass production for energy use in North Dakota.

Under the agreement, the ARS's Northern Great Plains Research Laboratory in Mandan will fund a research associate in the NDSU Agricultural and Biosystems Engineering Department who will be based in Mandan. The research associate also will work closely with NDSU's Bio Energy and Product Innovation Center (BioEpic). The center serves as a single site within NDSU to coordinate and promote the development of bio-related activities at NDSU and in North Dakota.

The collaboration has two main objectives:

- Determine appropriate crops to maximize biofuel production
- Develop economically feasible management systems for transitioning in and out of bioenergy crop production

"This endeavor is too big for a single institution, and for that reason our partnership with NDSU provides an outstanding means to enhance and maintain North Dakota agriculture," says Jon Hanson, laboratory director.

The North Dakota Agricultural Experiment Station is conducting research at its centers throughout the state in conjunction with the Northern Great Plains Research Laboratory to develop dedicated energy crops.

"This project will strengthen and enhance ongoing research efforts on dedicated energy crop production," says D.C. Coston, NDSU vice president for Agriculture and University Extension. "This agreement continues our effort to pull together the full set of capabilities within NDSU and position ourselves to be partners with others, such as the ARS's Northern Great Plains Research Laboratory, to develop and grow biobased production."

"We look forward to building upon this research partnership as we develop innovative and sustainable agricultural systems throughout the northern Great Plains," Hanson says.

For more information: D.C. Coston, (701) 231-7656, nds.vpag@ndsu.edu, www.ndsu.edu/bioopportunities



Parent Resource Centers Reach Out

The NDSU Extension Service Parent Resource Centers work in various settings and agencies to serve children and families throughout the state. The centers provide a prevention element through education, parent support groups, a lending library and publication of the "Parenting Tips & Times" newsletter. Information on other parenting services also is available.

Centers are in Dickinson, Fargo, Grand Forks, Mandan, Minot, Valley City and Williston.

A recent study of parent education in North Dakota showed that these centers and the NDSU Extension Service are ranked first as the main contact for parenting information in local communities.

The centers also ranked as the most useful organization in addressing parenting and family issues.

"These examples highlight the strength and importance of the resources, educational programs and partnerships developed by the NDSU Extension Service Parent Resource Centers to benefit children, families and communities," says Sean Brotherson, NDSU family life specialist.

Along with working with local agencies, the centers collaborate with the North Dakota Department of Human Services. The 2007-09 Legislature provided funding for the resource centers.

For more information: Sean Brotherson, (701) 231-6143, sean.brotherson@ndsu.edu www.ag.ndsu.edu/family/resources.htm





Outdoor education programs increased from 217 youth in 2002 to

779
in 2007

4-H Strengthens Programming

North Dakota 4-H is expanding its programming in a subject of vital importance to the state – agriculture and the environment.

The North Dakota Center for 4-H Youth Development has added an agriculture and environmental science youth specialist to provide support for youth education programming in these areas. Expansion of the program was made possible by funding from the 2007-09 Legislature.

Interest in the environmental education area is skyrocketing. Participation in shooting sports, for instance, jumped from 178 youth in 2002 to 1,092 in 2007, the latest year for which data are available.

The specialist also leads 4-H programming in energy development and how that affects North Dakota agriculture. North Dakota has alternative and environmentally friendly energy sources, such as wind, and 4-H teaches the state's youth about these sources as well as how to be environmentally responsible,

according to Brad Cogdill, 4-H Youth Development program leader.

“There is a need for youth activities in our communities throughout the state to educate and foster an interest in agricultural and environmental impacts,” says Adrian Biewer, the new specialist. “With more than 450 4-H clubs in the state, after-school programs and camps, we have an opportunity to influence many youth and adult volunteers.”

Cogdill says the new position is an investment in additional opportunities to reach youth in areas that are the backbone of the state. Youth will receive hands-on experience in how environmental sciences interface with agriculture and learn what agriculture means to the state and its economy.

Efforts to enhance agricultural and environmental science programming also parallel 4-H's efforts to spark youths' interest in science, engineering and technology, areas in which they will need skills to compete in the 21st century work force, Cogdill says.

For more information: Brad Cogdill, (701) 231-7253, brad.cogdill@ndsu.edu, www.ext.nodak.edu/4h/4-h.htm



North Dakota
has about

1.81 million

head of cattle



Faculty and staff at NDSU's Carrington Research Extension Center developed a livestock handling system that can help cattle producers improve the way they weigh, treat and vaccinate their animals.

The system consists of three sequential holding pens and a rectangular corral from which cattle enter a double alley, then move into a single alley. From there, the cattle move to a single-animal scale and then a hydraulic squeeze chute. Other features include center-opening hydraulic gates on both ends of the scale.

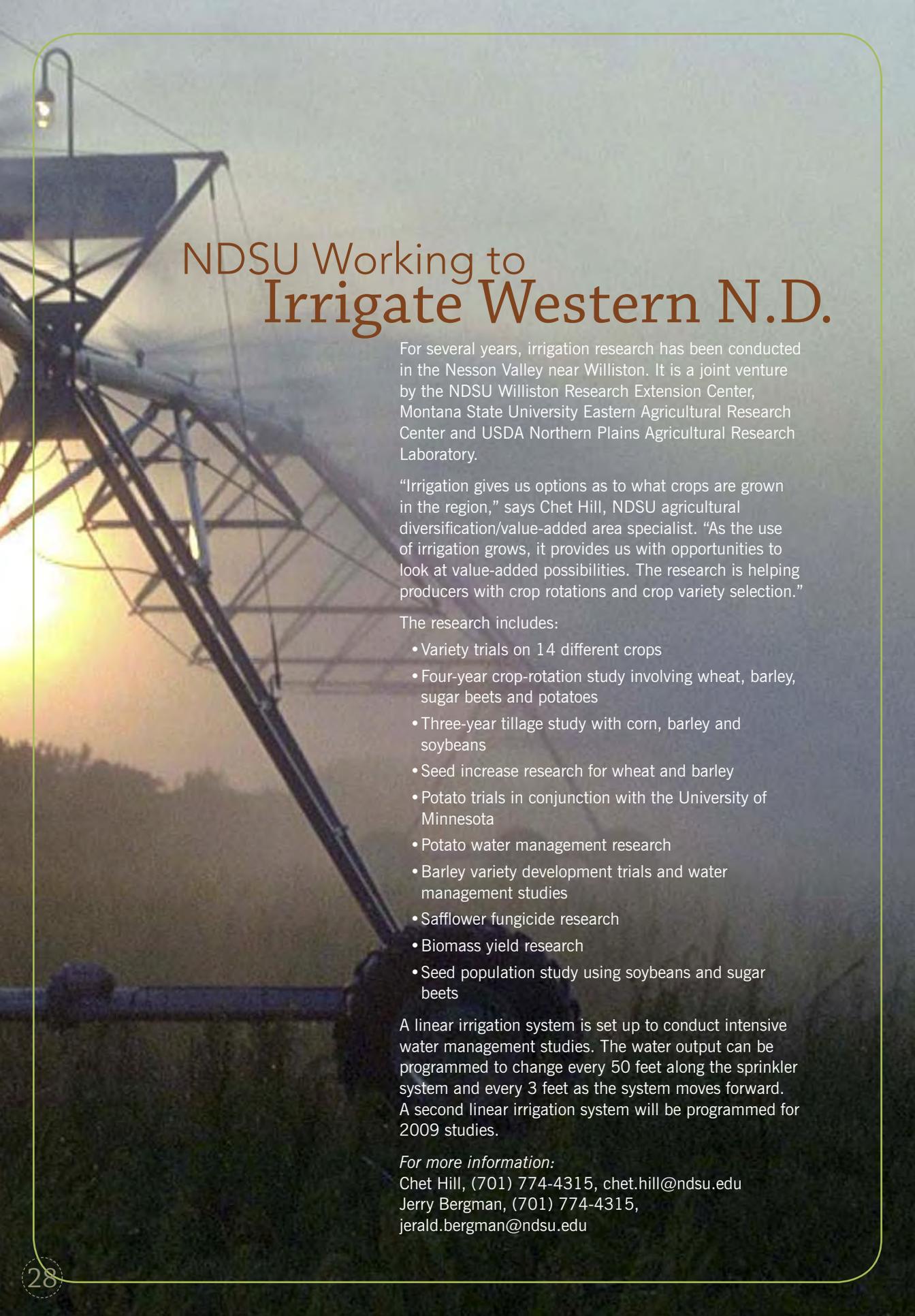
Center animal scientist Vern Anderson, who helped develop the system, says it is less stressful on cattle because they move in a more natural flow pattern. Cattle handlers like the system because it makes their job safer and requires less labor to get the animals into the chute.

Adrian, N.D., cow-calf producer Dave Heinrich incorporated some of the system's concepts into his livestock handling facility and is very pleased with the results.

For more information: Vern Anderson, (701) 652-2951, vern.anderson@ndsu.edu www.ag.ndsu.edu/pubs/ansci/beef/as1389.pdf



Center Staff Develops Livestock Handling System



NDSU Working to Irrigate Western N.D.

For several years, irrigation research has been conducted in the Nesson Valley near Williston. It is a joint venture by the NDSU Williston Research Extension Center, Montana State University Eastern Agricultural Research Center and USDA Northern Plains Agricultural Research Laboratory.

“Irrigation gives us options as to what crops are grown in the region,” says Chet Hill, NDSU agricultural diversification/value-added area specialist. “As the use of irrigation grows, it provides us with opportunities to look at value-added possibilities. The research is helping producers with crop rotations and crop variety selection.”

The research includes:

- Variety trials on 14 different crops
- Four-year crop-rotation study involving wheat, barley, sugar beets and potatoes
- Three-year tillage study with corn, barley and soybeans
- Seed increase research for wheat and barley
- Potato trials in conjunction with the University of Minnesota
- Potato water management research
- Barley variety development trials and water management studies
- Safflower fungicide research
- Biomass yield research
- Seed population study using soybeans and sugar beets

A linear irrigation system is set up to conduct intensive water management studies. The water output can be programmed to change every 50 feet along the sprinkler system and every 3 feet as the system moves forward. A second linear irrigation system will be programmed for 2009 studies.

For more information:

Chet Hill, (701) 774-4315, chet.hill@ndsu.edu

Jerry Bergman, (701) 774-4315,

jerald.bergman@ndsu.edu



Kindergarten Preparation Program Expands

The NDSU Extension Service has expanded its school readiness program to 10 sites statewide.

Gearing Up for Kindergarten helps parents prepare their children for a successful transition into kindergarten. Parents receive information on topics including parenting styles; children's brain, social and emotional development; teaching children to enjoy reading; guidance and discipline; importance of sleep and good nutrition; early literacy; safety; and the parent's role in school success. Children learn to share, get along with others, listen, do tasks for themselves, and develop cognitive and literacy skills.

The program is offered as two eight-week sessions, with one in the fall and the other in the spring. It provides activities for parents and children to do together and separately.

The NDSU Extension Service and Region V Parent Resource Center developed the program in collaboration with the Fargo, West Fargo and Northern Cass school districts and the Southeastern North Dakota Community Action Agency Head Start program and funding from the United Way of Cass-Clay. Funding from the North Dakota State Parent Information Resource Centers helped the program expand statewide.

For more information: Sharon Query, (701) 231-5923, sharon.query@ndsu.edu





IPM

North Dakota Integrated Pest Management Crop Survey

North Dakota producers need up-to-date growing season information on pest risks to implement timely and appropriate management strategies. NDSU research and Extension personnel also need to know if new pests or shifts in distribution are occurring to respond with the development of improved or new management approaches.

The integrated pest management (IPM) survey, coordinated by Extension state and area specialists, detects the presence and severity of diseases and insects that are threatening major crops. Field scouts survey five major crops (wheat, barley, soybean, canola and sunflower) across all counties. Field location, growth stage, previous crop and the presence or absence of seven major insects and 20 major or minor diseases are recorded.

The survey data generated indicate management strategies that will be needed. Survey information is provided at least once a week to producers, crop consultants, Extension agents and field agronomists, and through the North Dakota Crop and Pest Report, several agricultural e-mail lists, county Agriculture Alerts and other electronic, radio and print media. Weekly maps of pest occurrences are posted on the Web.

In 2008, IPM field scouts surveyed 972 wheat fields, 222 barley fields, 244 soybean fields, 206 sunflower fields and 32 canola fields, and placed 95 canola and 44 sunflower insect traps. Some of the results were a low detection of major diseases of wheat and barley, absence of soybean rust, gradual increase of soybean aphid populations to economic levels in six counties, increase in grasshopper populations in some counties, relatively high populations of diamondback moths and frequent occurrences of sunflower rust.

Actions because of the IPM surveys included:

- Less use of fungicides on small grains because of low disease pressure
- Less use of insecticides on small grains because of low aphid pressure
- Appropriate use of insecticides only where soybean aphid thresholds were reached
- Exemption of appropriate fungicide because of early detection of sunflower rust

For more information: Marcia McMullen,
(701) 231-7627, marcia.mcmullen@ndsu.edu,
www.ag.ndsu.nodak.edu/aginfo/ndipm

FOOD, NUTRITION PROGRAMS Benefit N.D. Families

Thousands of North Dakota families are stretching their food dollars and making healthful food choices with help from two NDSU Extension Service programs that serve people with limited incomes.

The Family Nutrition Program (FNP), which assists people of all ages who receive or are eligible to receive food stamps, reached 48,828 individuals directly through educational programming in 2008. The program also reached 357,000 people indirectly, such as through the monthly Food Wise newsletter.

FNP focuses on increasing people's consumption of low- or nonfat dairy products, improving recognition and consumption of fruits and vegetables as snacks, educating people about the health benefits of whole grains, and increasing their knowledge about balancing calorie and activity levels in their daily lives.

The Expanded Food and Nutrition Education Program (EFNEP), a nutrition program for families with young children, served 2,500 families.

"Both of these are very cost-effective programs," says Barb Holes-Dickson, NDSU's state EFNEP/FNP coordinator. "For every dollar spent on food and nutrition education, we save \$8.64 in future health-care costs."

For more information: Barb Holes-Dickson,
(701) 231-7256, barbara.holes.dickson@ndsu.edu,
www.ag.ndsu.edu/foodwise/

Every dollar spent on
food and nutrition education saves

\$8.64

in future health-care costs



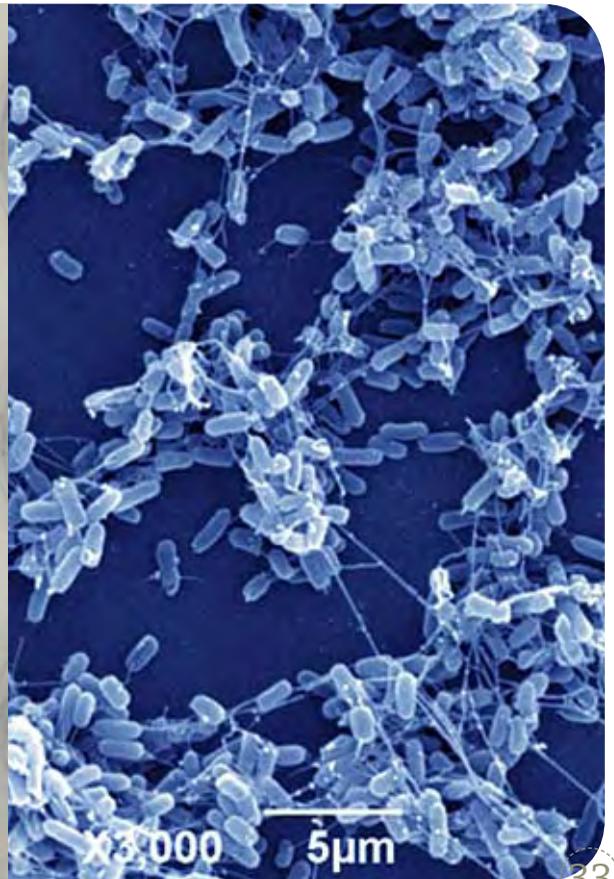
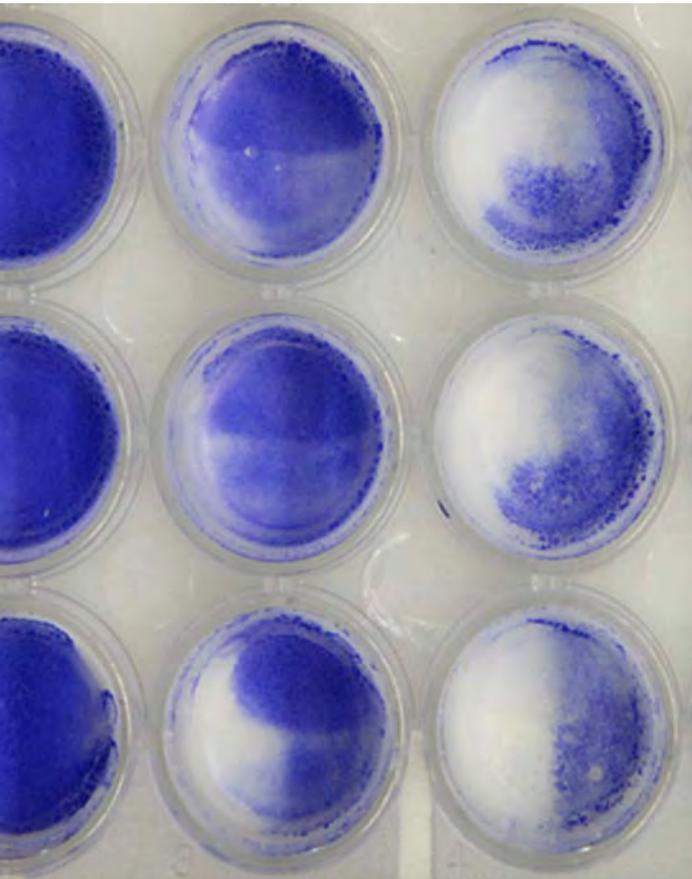
Researchers Study Bacterial Biofilm

In a new collaboration, Birgit Pruess in the Department of Veterinary and Microbiological Sciences and Shane Stafslin in the NDSU Center for Nanoscale Science and Engineering (CNSE) Bioactive Materials Research Laboratory are researching bacterial biofilms. Those are communities of bacteria that collect on surfaces, forming a film that adheres to surfaces, such as ship hulls or the inside of water pipelines, and cause hydrodynamic drag and contamination.

This research is designed to identify specific genes that influence the development of a bacterial biofilm on surfaces. The resulting information aids in the development of new coating technologies to effectively prevent bacterial biofilm formation on ship hulls, implanted medical devices or food-processing equipment.

This research is funded by a CNSE grant from the Office of Naval Research.

For more information: Birgit Pruess,
(701) 231-7848, birgit.pruess@ndsu.edu





Learning Farm Environmental Impacts Through Discovery Farms

Changes in local and state livestock ordinances, regulations and permits, plus new requirements for participation in government programs, have increased the need for producers to develop and implement management practices that are profitable and protect air and water resources.

To determine the environmental impacts of standard farm and ranch practices, the North Dakota Agricultural Experiment Station, NDSU Extension Service, North Dakota Health Department and U.S. Geological Survey have launched the Discovery Farms program across the state.

“A Discovery Farm is a working farm or ranch that voluntarily cooperates with local, state and federal natural resource managers to demonstrate and evaluate the effectiveness of various practices that will reduce environmental impacts but still maintain profitability,” says Ron Wiederholt, NDSU nutrient management specialist.

The goal is to set up Discovery Farms that will collect environmental and farm production data that account for the diversity of agriculture, topography, weather and other factors across the state.

“With the grassroots focus, the results from each Discovery Farm will have local application, as well as relevance to a broader range of producers,” Wiederholt says. “Producers, researchers, policymakers and governmental agencies in the state recognize that a balance must be reached between farm and ranch profitability and the implementation of regulations and policies that protect our natural resources.”

For more information: Ron Wiederholt, (701) 652-2951, ron.wiederholt@ndsu.edu



Turfgrass Program Growing

NDSU's Sports and Urban Turfgrass Management program is growing with the addition of two new teaching and research positions.

Alan Zuk, associate professor in the Department of Plant Sciences, is one of the new hires. Zuk feels the program now has the potential to move to a higher level.

"We are planning to add new classes and expand our research program," Zuk says. "It should have a positive impact on our student recruitment and retention efforts. We also hope to expand our ties with the turfgrass industry and look beyond the NDSU campus to serve the residents of North Dakota."

The turfgrass industry is the fastest growing segment in horticulture. Graduates can find employment in fields such as golf course and sports field management, parks and recreation, landscaping, sod production, seed and chemical sales, residential lawn care services, and teaching and research.

The turfgrass program has a campus greenhouse available for research. Research plots are located on campus and at Research Extension Centers in Dickinson and Williston.

As for his own research interests, Zuk plans to focus on low-maintenance turf, and native and ornamental grasses, and hopes to develop cultural methods to manage lawns and landscapes with limited water, fertilizer and pesticide requirements.

For more information: Alan Zuk,
(701) 231-7540, alan.zuk@ndsu.edu



North Dakota State University



Agriculture and University Extension at North Dakota State University

The North Dakota Agricultural Experiment Station consists of seven Research Extension Centers placed strategically throughout the state and the Main Station in Fargo. We work to develop techniques and technologies to enhance the production and use of food, feed, fiber and fuel from crop and livestock enterprises.

The NDSU Extension Service provides the people of North Dakota with the research-based information they need to succeed in today's increasingly complex world and be prepared for the future. We have offices serving all of North Dakota's 53 counties and Fort Berthold.

If you would like more information on the programs in this publication, contact the faculty and staff listed. If you would like more information about our other programs or have questions, comments or suggestions, please contact one of us.

D.C. Coston

Vice President for Agriculture and University Extension

NDSU Dept. 7520
314 Morrill Hall
Box 6050
Fargo, ND 58108-6050

Ken Grafton

Director, North Dakota Agricultural Experiment Station
Dean, College of Agriculture, Food Systems, and Natural Resources

(701) 231-7656
Fax (701) 231-7566
ndsuvpag@ndsus.edu

Duane Hauck

Director, NDSU Extension Service



www.ag.ndsu.edu NDSU