

An  
**Informal Report**  
to the  
**Kansas Legislature**



**January 2004**

*“Knowledge  
for Life”*

Kansas State University  
Agricultural Experiment  
Station and Cooperative  
Extension Service

[www.oznet.ksu.edu](http://www.oznet.ksu.edu)

## Director's Introduction

This marks the final year report of our first Five-Year Plan for K-State Research and Extension that began in 1998. Each year we have reported on our progress and showcased some of our accomplishments. Federal law requires that we begin the planning process anew in Jan. 2004.

This report includes a few of the many programs and projects being carried out in Manhattan and across the state. There is simply not enough room to feature all of them. But they are representative of what we are doing and how we are accountable.

K-State Research and Extension is accountable in many ways, with many checks and balances. They include:

- Extension program development councils in each county
- Citizen advisory panels
- Public advisory committees
- Industry advisory groups
- Input from elected officials
- Input from peers outside the university
- Local, state, and federal reporting requirements
- Input from federal and state agencies
- Budget and program audits
- Annual evaluations

The goal for the next Five-Year Plan is to set a course that will make the most of our resources and opportunities. The effort involves county agents; professional staff; state and area researchers; specialists; and representatives from administration. The new Five-Year Plan is based on the idea that strategic planning is critical to our success as a land-grant university with its dual mission of research and extension. It allows us to build on core values. And it serves as a guide for us to respond to the needs of Kansas citizens.

Sincerely,



George Ham  
Interim Dean and Interim Director





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## K-State's mission as a land-grant university

### The Role of K-State Research and Extension

As the nation's first and oldest land-grant university, K-State is distinguished from other Regents' universities by its College of Agriculture, College of Veterinary Medicine, College of Human Ecology, comprehensive College of Engineering, and the Kansas State University Agricultural Experiment Station and Cooperative Extension Service (K-State Research and Extension, for short). K-State educates professionals in the sciences, engineering, and in business, and that education is applied to the vast agricultural and food industries, including production agriculture; agricultural input supply and finance; agricultural processing for food and materials; agricultural policy and communication; and other fields related to products originating from plants, animals, and natural resources.

K-State works directly with many kinds of agricultural producers who have a broad range of philosophy about how best to steward natural resources. K-State applies chemistry, engineering, and business in search of practical ways to add value to Kansas crop and livestock commodities, resulting in higher returns for farm products and jobs in Kansas communities.

- K-State applies science and care to improve animal health.
- K-State applies microbiology, toxicology, and engineering to discover cost-effective ways to keep food safe from the farm to the table.
- K-State applies soil science, engineering, and economics to generate cost-effective tools for farms, households, and communities to complete their tasks with environmental responsibility.
- K-State applies molecular biology and biochemistry to improve crop and livestock genetics to keep Kansas agriculture competitive world-wide.
- K-State applies all of its disciplines to educate young people to be effective citizens and creative in the workforce.
- K-State applies all of its knowledge to build youth, communities, families, and agricultural businesses across income levels, sizes, cultures, and philosophies.

Kansas State University remains true to the original mission of the land-grant university system: to generate knowledge and disseminate it to students and every citizen who wants it.

### Our Motto:

*“Knowledge  
for Life”*

## Four Core Mission Themes

K-state Research and Extension has developed Four Core Mission Themes. They are:



### Agricultural Industry Competitiveness



### Natural Resources and Environmental Management



### Food, Nutrition, Health, and Safety



### Youth, Family, and Community Development

## **Our Mission Statement:**

K-State Research and Extension is dedicated to a safe, sustainable, competitive food and fiber system and to strong, healthy communities, families, and youth through integrated research, analysis, and education.

## **The role of K-State Research and Extension**

As the only statewide university network, K-State Research and Extension conducts research and provides practical information, education, and training on issues that Kansans consider important and helpful in improving their lives, farms, organizations, businesses, families, or communities.

### **What kind of information and training?**

Our work affects every aspect of life—from ensuring a plentiful, nutritious, safe, and acceptable food supply, to promoting a desirable quality of life, to preserving natural resources. Through science-based programs, we address complex and critical problems and deliver our findings in person or by public presentations, demonstrations, publications, computer networks, CD-ROMs, satellite and video technology, newspapers, radio, and television.

### **Why address current issues and statewide concerns?**

K-State Research and Extension is a short name for the Kansas State University Agricultural Experiment Station and Cooperative Extension Service, a partner in the nationwide land-grant system of universities that was created in the 1860s to educate people from all walks of life and to generate and distribute useful public knowledge. K-State scientists and extension faculty can draw on the expertise and accumulated studies and discoveries of the land-grant system, other universities, state and federal agencies, and industry. Headquartered on campus in Manhattan, K-State Research and Extension includes statewide county extension offices, research centers, and experiment fields supported by county, state, federal, and private funds.

# The Four Core Mission Themes of K-State Research and Extension

## A Standout Category—Farm Bill Education and Its Impact in Kansas

Producers faced the need to understand the new Farm Bill and the complex sign-up options they were being offered in the new Farm Bill. K-State Research and Extension addressed this need by providing information, education, and one-on-one consultations with producers across the state. Efforts to help began long before the final Farm Bill was passed, with meetings across the state to discuss the alternatives and consequences being proposed. After it was passed, the need turned to understanding the new program. In this endeavor, K-State Research and Extension supported USDA's Farm Service Agency (FSA), reaching more than 17,000 producers in more than 200 meetings statewide. Through additional meetings in conjunction with local FSA offices, K-State reached 10,000 more producers at 200 more meetings.

In addition to understanding the Farm Bill, producers faced the most complex part of the process: deciding how to enroll. The program included several sign-up options on acreage bases and payment yields. What made the decision complex was that the best option varied based on each farm's previous Farm Bill base acreage and payment yield; the recent crop history on the farm; and the producer's expectations for future commodity prices and the resulting program payments. Studying the sign-up options involved integrating numerous records on acreage and production for each farm together with price expectations into an analysis involving dozens of calculations.

K-State Research and Extension automated the analysis by developing the K-State Farm Bill Spreadsheet. The work involved with each analysis of an individual farm—an estimated 5,200-plus consultations—represented a major commitment of K-State Research and Extension resources. Producers also could download the spreadsheet from the K-State Research and Extension Website or get a copy from local K-State Research and Extension offices. The estimated total number of producers who benefited from the spreadsheet and consultations exceeded 10,400.

For the average producer with 504 acres, the data collected suggested a \$2.72 per-acre, per-year advantage when selecting the best sign-up decision compared to the average of all the sign-up options. The partial payoff to Kansas producers from using the spreadsheet and consultations exceeds \$14.3 million annually in larger farm program payments. It's more difficult to attach value to the outcome of the educational programs, mainly because management decisions will vary from producer to producer based on particular situations. The overall payoff was that more than 27,000 producers participated in educational programs delivered by K-State, and more than 10,400 producers benefited from using the spreadsheet. The result was that Kansas producers received more than \$14.3 million in additional government payments each year because of improved management decisions.

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## Agricultural Industry Competitiveness

**In this area, K-State is developing better cropping systems; creating more efficient and profitable livestock production systems while protecting the environment; developing agricultural risk-management strategies; improving agricultural technologies and information systems; evaluating alternative crops and approaches; eliminating pests and diseases; discovering better ways of improving rangeland; investigating the benefits of biotechnology; and adding value to Kansas agricultural goods. Emphasis has been placed on realigning research and educational programming to reflect agriculture's need for synthesized information that affects the entire farm business. Help also is given to assess ever-changing governmental programs that impact Kansas agriculture.**



## Natural Resources and Environmental Management

K-State Research and Extension provides research-based, unbiased information and expertise on conservation and ways to protect the land, water, and other natural resources. Programs are in place and being developed to maintain the quality of and conserve surface water and groundwater; promote community residential environmental management; generate systems for improved soil and air quality; and maintain plant diversity. Scientists and extension personnel are working with producers, town leaders, homeowners, and others interested in preserving the environment and natural resources and assuring a better quality of life for themselves and future generations.

### A Standout Category—Water Conservation and Management

K-State Research and Extension has been a national leader in subsurface drip irrigation (SDI). The year 2004 marks the 15th year for SDI research for agronomic crops at K-State. Research conducted to date has been aimed at water conservation, water-quality protection, and SDI methodology development. As a result of this long-term K-State investment in SDI research, a wealth of science-based information exists to help producers adopt this technology. This information is documented in a variety of research and extension publications and also available on the K-State SDI Website at [www.oznet.ksu.edu/sdi](http://www.oznet.ksu.edu/sdi).

Producer interest in this technology continues to grow in all irrigated areas within the state and throughout the region. Approximately 2,000 acres are being converted to SDI annually in Kansas, and that number is likely to grow with increased stresses on water resources; increased number of positive producer experiences with SDI; and with increased availability of irrigation improvement cost-share funds. SDI installation investments in Kansas average \$1.5 million to \$2 million annually. Research has shown that SDI can reduce irrigation requirements by at least 25 percent, and producers may experience an even larger water savings as they replace aging inefficient irrigation systems. These water savings can greatly extend the life of the Ogallala Aquifer in western Kansas and cushion any transition to less intensive irrigation schemes. One producer in Cheyenne County has been so pleased with his early experiences with SDI that he has replaced a fully functional center-pivot sprinkler system with SDI.

Another effective approach to improved irrigation water management has been the Mobile Irrigation Lab (MIL), a team-based program that provides educational workshops and technical assistance to Kansas irrigators. The centerpiece of MIL is a mobile trailer system that has a classroom equipped with computers and field equipment. The MIL classroom allows on-site, hands-on educational activities with specific emphasis on use of KanSched (an irrigation scheduling program), FuelCost (an energy assessment and cost program), and other software tools.

In the '03 Fiscal Year, 16 KanSched training sessions were conducted for 267 people in south central and western Kansas and 42 KSU students (many of whom will either go directly to a farming operation or will be crop consultants). In addition, six irrigation seminars (on general irrigation topics) were conducted for over 600 people. Additionally, the MIL equipment is used to conduct in-field evaluations of center-pivot systems and to collect in-field irrigation and cropping system information. These evaluations help irrigators learn more about the performance characteristics of their system, which allows them to be better managers. For example, irrigation energy costs can range from \$2 to over \$5 per acre-inch, and KanSched based irrigation scheduling can reduce irrigation inputs by two inches to six inches. At \$3 per acre-inch saved and four inches of water savings, the cost benefit on a standard 125-acre, center-pivot circle would be \$1,500.

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# The Four Core Mission Themes of K-State Research and Extension

## A Standout Category—Family Nutrition Program

Good nutrition is important to the health of all Kansans but especially critical for families with limited resources. Families living in poverty are at risk of inadequate diets. Diet is a factor in the development of many diseases.

A major emphasis for K-State Research and Extension is nutrition education for families with limited resources. In 2002, the Family Nutrition Program (FNP) provided nutrition education to more than 220,000 food-stamp eligible citizens in 84 counties. The Family Nutrition Program started in 1995. It focuses on how to choose and prepare nutritious meals on a limited budget; on safe food handling practices; and on balancing healthy eating practices with physical activities.

The program works through a network of K-State Research and Extension county agents who work with Head Start, the WIC (Women, Infants, Children) program, shelters, and other agencies that work with those struggling financially.

For whatever reasons, a lot of families and individuals in Kansas have a difficult time making ends meet. Some are farm families who have fallen on hard times; some are single mothers struggling to raise a family; and some are working full time at minimum-wage jobs and depend on food stamps to help them make it through the month. The Family Nutrition Program focuses on people eligible for food stamps, but the FNP agents do not check status of participants.

FNP programs are located where people of limited means tend to frequent. For example, nutrition education may be provided in a public school in a low-income neighborhood or in a health fair offered by the health department. Not everyone at those events is low income, but many are.

The Kansas Nutrition Network (KNN), a sister program to the Family Nutrition Program, is a partnership of state-level public and privately funded nutrition education and food assistance programs that are led by K-State Research and Extension. The program uses social marketing techniques to help Kansans with limited incomes use available nutrition education and food resources to improve their health.

Another related program is the Expanded Food and Nutrition Education Program. Available in four counties for youths and homemakers with limited resources, it reached 1,867 Kansas families with 8,181 children in 2002.

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## Food, Nutrition, Health, and Safety

**The goals in this area are to promote a safe food supply from production to consumption; to promote healthier and safer lives; and to develop new, appealing food products. K-State Research and Extension is a national leader in food-safety programs. K-State has been in the forefront of developing new processes that are helping the meat industry make safer products and reassuring consumers that those products are safe to eat. Successful work has been done in such areas as steam pasteurization of slaughterhouse carcasses, processed meat validation studies, and detecting the prevalence of the pathogen *E. coli* in beef cattle herds from farm to feedlot. Work also has focused on creating new safety standards for ground beef and microbiological and chemical testing for early detection of microorganisms. Education efforts have involved food-safety training and providing information on food safety on the World Wide Web.**

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# The Four Core Mission Themes of K-State Research and Extension



## Youth, Family, and Community Development

An educated and knowledgeable citizenry is the foundation of Kansas' economic productivity; democratic character and social system; and quality of life. The focus of Youth, Family, and Community Development has been on building strong, healthy communities; improving parenting skills and family relationships; preparing youth to be responsible citizens; balancing demands of work, family, community, and time for self; and developing consumer and financial management skills. Today's complex issues and problems require new perspectives and skills. K-State Research and Extension provides them by helping communities better themselves through economic development, leadership training, improved housing, quality child care, a skilled workforce, and welfare reform. The work involves delivering educational programs and technical information that result in improved skills in communication, group dynamics, conflict resolution, issue analysis, strategic planning, more effective parenting, developing life skills, and helping youth to grow in healthy, productive ways.

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## A Standout Category—CoupleTALK: Enhancing Your Relationships

The divorce rate in Kansas is comparable to the national average of 2.1 marriages for every divorce each year. As a result, CoupleTALK: Enhancing Your Relationship, a K-State Research and Extension educational program for enriching marital and couple relationships, was developed to teach communication skills that emphasize growth and behavioral change. County extension agents can distribute the informal personal study course or conduct workshops for targeted groups such as engaged couples, newlyweds, or couples in general. Crawford County is a good example of K-State Research and Extension CoupleTALK programming. A workshop there was offered for pre-marital couples in collaboration with the local ministerial alliance. Couples learned skills for talking to each other about difficult issues and ways to intentionally focus on their relationships.

The CoupleTALK program also is offered twice annually as a noncredit Internet course, and it has had over 300 enrollees since 2000. Evaluations completed by Internet class participants revealed how the information has helped them pay more attention to their relationships. They indicated satisfaction for having this kind of information available in the privacy of their own homes.

CoupleTALK has gained a national reputation. The states of Maine, Ohio, and Nebraska have adopted the program. K-State Research and Extension has been asked twice to participate in Ohio's annual extension in-service on CoupleTALK and to share the program with Florida extension through an in-service training held online. K-State is part of a USDA group that is developing a nationwide extension education program for marriage and couples. In addition, K-State has been working with the University of Nebraska in marketing and delivering the Internet course as a joint Kansas-Nebraska initiative.

CoupleTALK strengthens partner relationships by building skills that emphasize growth and behavioral change. Participants use materials from the program that focus on six objectives:

1. Understanding the role that fighting plays in maintaining a satisfying relationship.
2. Adopting active listening techniques when communicating with each other about significant issues.
3. Using "I" statements to express feelings about important matters.
4. Identifying expectations that frequently cause conflict.
5. Setting priorities that will allow the couple to maintain a balance between the relationship and work and family responsibilities.
6. Identifying and adopting practices that strengthen and protect a couple's friendship.

Eighty-nine percent of those who completed an evaluation after participating in the Internet program indicated that they either were satisfied, very satisfied, or extremely satisfied with it. The predominant results of what they learned, as indicated by their responses, was how to communicate in order to slow down arguments and to work on resolving ongoing issues impacting their relationship. Learning to listen was a behavior that several mentioned as an anticipated behavioral change.

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## Other examples of work at K-State

### The Importance of Wheat Breeding in Kansas

A majority of the wheat varieties planted in Kansas originate from K-State's wheat-breeding program. One of the newest is the hard white wheat Lakin, which is adapted to southwest Kansas. An economic analysis of K-State wheat-breeding programs revealed that the average economic benefit to Kansas wheat producers is \$52.7 million. For each dollar invested in varietal development, nearly \$12 was earned by Kansas wheat producers.

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### The Kansas Wheat Commission Helps Fund K-State Wheat Research

The hard work that goes into growing a wheat crop is not the only investment Kansas farmers are making to ensure a successful harvest. With every bushel sold, farmers contribute an assessment to the Kansas Wheat Commission that, in turn, supports the K-State Research and Extension wheat-breeding programs. Public wheat varieties developed through KSU comprise approximately 75 percent of the wheat being harvested in Kansas. Popular varieties such as Jagger, 2137, and the new hard white wheat variety Trego are the direct results of this investment. Researchers at KSU are continually selecting wheat crosses with high-yield potential and superior milling and baking characteristics that help maintain a product wanted in the marketplace. By selectively choosing crosses within early generations of wheat lines, KSU wheat breeders have produced wheat varieties that give wheat farmers the genetic potential to have bountiful, good-quality crops. These research efforts continue with the financial support from the Kansas wheat producers to help ensure future successful wheat varieties for Kansas.

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### New Hard Red Winter Wheat Developed by K-State

K-State Research and Extension has released Overley, a new hard red winter wheat variety that has beaten some of the state's top yield producers, including the popular Jagger variety, in five years of testing. Overley has performed well in eastern and central parts of the state, but the new variety is not as well suited for western parts of the state. It averaged nearly 20 percent higher yield than Jagger in central and eastern parts of the state. The new variety's test weights also have outperformed the leader with a 1.5-pound-per-bushel advantage over Jagger for test weight. In addition to its high resistance to leaf rust, Overley has shown resistance to soilborne mosaic virus and spindle streak mosaic virus. It is moderately resistant to stem rust, speckled leaf blotch, and tan spot (similar to Jagger). It also is moderately tolerant to acid soils and has a Jagger-like tolerance to wheat streak mosaic virus. Overley also has outstanding milling and baking qualities. The new variety was named for Carl Overley, an associate professor of agronomy and Foundation Seed Manager at K-State for more than 41 years.

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**Agricultural Industry Competitiveness**



### Crucial to Wheat Breeding— K-State's Wheat Genetics Resource Center

Wheat's ancestry can be traced to wild grasses of the Middle East. After being domesticated, those grasses subsequently flourished as food supply for the world. Today, the wild grasses that remain are crucial to ongoing and future advances in wheat breeding. The KSU Department of Plant Pathology holds the nation's largest collection of wheat's wild relatives in its Wheat Genetics Resource Center (WGRC). The Center has more than 3,000 accessions of species and genetic stocks of *Triticum* and *Aegilops*, the two primary ancestral lines of modern wheat. Many are from Turkey, Israel, Lebanon, Syria, Iran, and Iraq. The wild wheats in the collection are important reservoirs of useful genetic diversity that can be used against biological pests and environmental stresses that affect the yield potential, the yield stability, and the quality of wheat. The Center's primary task is to domesticate and transfer the genes to useful germplasm for use by plant breeders. Germplasm releases from the Center contain new genes for resistance to many diseases and pests, including Hessian fly, greenbug, leaf rust, and soilborne mosaic virus. This new germplasm provides inexpensive and environmentally safe control of these pests in the high-yield wheat varieties of today and tomorrow. Some of the currently grown wheat varieties, Thunderbolt and the recently released Overlay, trace part of their pedigree to WGRC germplasm releases and protection from leaf rust.

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### Progress on the Grain Science and Industry Complex

Work began in 2003 on two of the five buildings planned for the new Grain Science and Industry Complex. Construction started on the Bioprocessing and Industrial Value-Added Program (BIVAP) Building. The BIVAP facility will be a place where K-State researchers will work with industry to turn the state's crops into marketable products and test new production processes for grain-based food and nonfood products. Construction also began on the International Grains Program Executive Conference Center. The educational center will have businesslike conference facilities with up-to-date distance education capabilities to facilitate national and international exchanges that will allow K-State to share research and other information worldwide. In addition to the International Grain Program Executive Conference Building and BIVAP Building, the Grain Science and Industry Complex will include a Teaching, Research, Baking, and Administrative Building; flour mill; and feed mill. When finished, the \$61 million state-of-the-art complex will cover 16 acres just north of Kimball Avenue and across from the KSU Football Stadium.

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### Taking a Leading Role in Agricultural Biosecurity

K-State Research and Extension began playing a leading role in agricultural biosecurity by directing resources and research toward ways that will help protect agriculture in the Midwest and the nation.

Agriculture has been called a "soft target" for terrorist attacks, largely a result of the industry's widespread vulnerabilities (including, but not limited to, transportation of animals) and the potential for diseases such as foot-and-mouth to spread quickly. It also may be an enticing target for terrorists because agriculture generates 17 percent of the U.S. gross domestic product and 13 percent of American jobs.

The university is planning to build a \$50 million Biosecurity Research Institute building, part of a master plan to improve and expand upon the College of Veterinary Medicine. K-State Research and Extension scientists also are conducting research into how to dispose of a large number of carcasses quickly in case of an emergency, and they are working with the U.S. Center for Domestic Preparedness to train "first responders" in Kansas.

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### Developing a Sorghum Improvement Center at K-State

Work began in 2003 to establish a Center of Excellence for Sorghum Improvement on campus. The Center will focus on developing new, improved varieties, and research also will be conducted at various research fields around the state, including the North Central Research Field near Belleville and the KSU Agricultural Research Center—Hays. Support for sorghum research programs is much lower than it was even five years ago because many public and private sorghum research positions and programs are being lost to attrition and corporate consolidation. Yet grain sorghum is one of the most important dryland crops in the Central Great Plains—Kansas is the No. 1 grain sorghum state—and waning water supplies will make it even more important. That growing gap in sorghum research and development is what K-State Research and Extension hopes to fill with the new center. It will provide scientific expertise in plant breeding, biotechnology, pathology, entomology, and physiology. Expertise in crop utilization, including cereal chemistry and animal nutrition, will help to ensure that technologies developed in this research effort will have immediate application. The Center was formed in cooperation with the Kansas Grain Sorghum Association and the National Grain Sorghum Producers Association. The Kansas Sorghum Check-Off Fund contributes more than \$250,000 from farmer grain sales to sorghum research annually.

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### Plastics from Starch and Polylactic Acid

Soybean is a major crop in Kansas. Soy proteins, oils, and carbohydrates are natural polymers and have shown great potential for biofuels and bioproducts. A K-State Research and Extension project is focusing on developing biobased adhesives from soybean. The objective is to develop adhesives that can be alternatives to urea formaldehyde resins for particle boards. One patent has been approved, and a patent for a new technology in this area has been filed. This research addresses the needs proscribed by the USDA for biomass industrial bioenergy and bioproducts. Such research will help the Kansas farm economy, ease environmental pollution, and improve biofuel industry sustainability by providing technologies for high-value products for the biofuel system. It could impact national soybean research and research on other agricultural commodities for industrial uses.

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### K-State Finds an Effective Alternative Insecticide for Grain

A K-State grain scientist studying the stored grain insecticide Spinosad found it to be lethal against the lesser grain borer, a primary predator of wheat in grain bins. This is significant because the 1996 Food Quality Protection Act is phasing out traditional organophosphate insecticides. Spinosad is a by-product of bacteria, and it is safe for mammals and the environment. Because insects die by coming into contact with it, Spinosad also can be used on such surfaces as empty grain bins and retail store buildings.

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### Providing Help for Kansas Hay Producers

Kansas ranks sixth nationally in total hay acres at 2.55 million acres. To help meet the growing needs of the state's producers, K-State Research and Extension and the Kansas Forage and Grassland Council sponsored the Kansas Forage Expo and Hay Machinery Show at the Sedgwick County Extension Education Center. Presentations were made on the latest in forage machinery. Seed companies and forage product exhibitors were on hand for the trade show. Educational topics included Roundup Ready® Alfalfa: What Does it Hold? Certified Weed-Free Hay: What is Involved? New Hay Marketing Standards; and How to Sample Hay Bales.

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### Multiple Benefits Derive from Feeding Flaxseed to Cattle

Current studies show that adding flaxseed to cattle diets dramatically improves carcass value, strengthens the natural immunities of calves, and may enhance the fatty acid profile of beef. Flaxseed can be added to cattle diets either ground or as a processed oil. In addition to finding that flaxseed strengthens the immune systems of calves, which may require fewer antibiotics, the scientists found that it also improves marbling in beef products and increases carcass value, which is likely to mean more money for the cattle producer. In another study, when flaxseed was fed to finishing cattle, it increased omega-3 fats in their muscle tissues. Omega-3 fats are "the good fats" that have been found to lower the risk of cardiovascular disease and stroke in humans.

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### New Spreadsheet Helps Producer Select White or Red Wheat

Advances in wheat genetics, new government incentives for planting hard white wheat, and varying grain company programs are making the decision more complicated about whether to plant hard red winter or hard white winter wheat. A team of K-State Research and Extension scientists and economists developed a spreadsheet to help producers with such decisions. It provides an economic comparison between hard red winter and hard white wheat in western Kansas based on different return and cost scenarios. Contracting information from a grain company—including USDA incentives and 2002 yield data—was used to perform an economic comparison. In that scenario, Trego, a hard white wheat developed at K-State, provided a higher revenue compared to Jagger wheat. Producers can calculate the added cost of on-farm storage, transportation, and seed cost, plus the added revenue generated from yield and the government program associated with planting hard white wheat. They can then compare those figures with hard red wheat. The spreadsheet can be found on the Web at [www.oznet.ksu.edu/grsiext/TraitSp.htm](http://www.oznet.ksu.edu/grsiext/TraitSp.htm) and click on Hard White Wheat Economic Comparison.

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### Study Shows Sunflower Roots Go Deeper

Grain sorghum and sunflower both have a reputation for being relatively drought-tolerant crops, but a three-year study showed that sunflower roots go deeper, allowing the plants to take advantage of water farther into the soil than do sorghum plants. Such information can help producers utilize water more efficiently. Because sunflower roots deeper and depletes water deeper in the soil profile, it is an excellent crop in a rotation to utilize water and nutrients, such as nitrate, that have moved deeper in the soil.

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### Updated Guidelines for Feeding Nursery Pigs

Based on recent research trials, swine nutritionists with K-State Research and Extension updated their recommendations for feeding nursery pigs. The new guidelines include adding more amino acids and less fat to the pigs' diets. K-State has been providing formal feeding recommendations for producers and the swine industry since 1980 and less formally for much longer than that through its 105-county network of K-State Research and Extension offices. The recommendations are based on trials conducted both at the university and in field research facilities. The benefit of the new guidelines to producers and the swine industry isn't necessarily in reducing feeding costs but rather in increased revenue because gain should be about two pounds more per pig.

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### Providing Information for Summer Management of Dairy Cows

K-State dairy producers had the challenge this past summer of keeping their herds cool during the hot summer days and also finding affordable, high-quality feed, particularly in western Kansas, where 2002's drought robbed farmers of forage supplies for winter and spring. To help them, tips were provided by K-State Research and Extension. One tip was to blend available forages with better quality forages. Another was to adjust corn silage planting with short-season varieties of corn to harvest in late summer and long-season varieties to harvest later. Other options given for dairy producers were to utilize wet-corn gluten feed and wet distiller's grains. More information on maintaining the health of dairy herds in summer was provided on a Website: [www.oznet.ksu.edu/ansi/dcattle.htm](http://www.oznet.ksu.edu/ansi/dcattle.htm).

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### Precision Management of Feedlot Cattle

The beef industry is rapidly changing to value-based marketing. Producers will be rewarded for precision in maximizing both carcass merit and performance. As cattle feeding evolves to individual cattle management, the ability to predict future gain becomes important to individual producers. Current systems rely on linear body measurement of the live animal or previous gain to make predictions. But experiments at the KSU Agricultural Research Center—Hays have shown that those have not been successful predictors of cattle gain. K-State Research and Extension has been a national leader in studying the use of ultrasound to evaluate cattle. A current study on precision management of feedlot cattle is focusing on the requirement for models of performance and carcass development that can predict future outcomes for each animal. Conjoining performance and carcass predictors should increase profitability \$25 to \$30 per head. This is a net saving of \$750 million for the 30 million cattle marketed from feedlots each year in the United States.

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### AgManager Site Provides Array of Topics

A new Web site called AgManager pulls together what before now were widely variable K-State Research and Extension departmental and faculty sites. The focus is on extension information, and the goal is to improve the organization of Web-based material and allow greater access for agricultural producers and other clientele. Topics on the ag economics site include crop and livestock marketing and outlook reports; crop insurance; farm management; agricultural policy; human resources; income tax and law; and agribusiness. The site contains several pages that are updated weekly as market prices and conditions change. Decision-making tools such as budget spreadsheets and data sets also are available to aid farmers in managing their operations. Information about upcoming seminars, such as the annual K-State Risk and Profit Conference, also can be found. AgManager can be viewed at [www.agmanager.info](http://www.agmanager.info).

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### Workshops that Benefit Operators of Small Farms

Owners of small farms struggle to survive in a changing industry. To help them, the Kansas Rural Center with ties to K-State Research and Extension has been coordinating business-planning workshops. The aim is to increase knowledge about and help farmers adopt practices that are economically viable, environmentally sound, and socially responsible. Groups of farmers across the state have worked with the Kansas Rural Center to plan workshops around their farm seasons, usually in fall or winter. Linda Hubalek and her husband Verne went through the program to strengthen their business Smoky Hill Bison Co. in Lindsborg. She said it was helpful to see how her goals matched those of her husband and to examine the financial resources of their bison farm. She noted that the support of farmers from her group and their openness were important. The Kansas Rural Center is a private, nonprofit organization that promotes the long-term health of the land and its people through research, education, and advocacy.

More information about the organization and its programs is available through a Website: [www.kansasruralcenter.org](http://www.kansasruralcenter.org).

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### New Sustainable Ag Website Developed

The Kansas Center for Sustainable Agriculture and Alternative Crops (KCSAAC) at K-State, launched a new Website at [www.kansassustainableag.org](http://www.kansassustainableag.org). It has a calendar of events for producers who want to sharpen their growing and marketing skills. Other features include links to publications; a resource guide for Kansas family farms and ranches; the KCSAAC newsletter; profiles of farmers involved in sustainable agriculture; and information about grant opportunities for farmers and ranchers. New topics are added to the site every month. For consumers looking for places to buy food grown in Kansas, the site also includes a link to the Kansas Locally Raised Food Directory and a listing of farmers' markets in various communities around the state.

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### Distance Learning for Agricultural Producers

To help agricultural producers find better, more efficient ways of operating their businesses, K-State has developed the Management, Analysis, and Strategic Thinking (MAST) program. For a period of four months, participants in the program learn through distance education methods from personal computers at home. The lessons are taught by K-State faculty members who are experts in the fields of crop insurance, agribusiness, human resources, efficiency and productivity, tax management, and grain and livestock marketing. The program is self-paced, and participants can have online discussions with other participants and the instructors.

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### Variety Testing for Kansas Crops

For many years K-State Research and Extension has conducted performance testing on such important Kansas crops as wheat, sorghum, corn, soybeans, alfalfa, and sunflowers. Testing also is being conducted on such alternative crops as canola. Testing is done around the state at K-State fields and centers and on farms of growers. The performance figures are summarized and published each year in reports of progress and electronically on the Web: [www.ksu.edu/kscpt/](http://www.ksu.edu/kscpt/). Farmers utilize the information because it can add value to their operations. For example, if wheat tests in western Kansas show a 202 kilogram per hectare advantage for a top-yielding hard white wheat compared to hard red varieties, then shifting only 5 percent of those acres to that variety would produce an additional \$1.8 million in gross farm income for western Kansas.

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### Demonstrations and Field Days for Producers

Each year, K-State Research and Extension holds field days and demonstrations across the state for farmers, ranchers, horticulturists, and many other groups and individuals, covering topics ranging from forage to livestock and from irrigation to crops. These events present the latest research findings that will help producers and others be more efficient and to add value to their operations. For example, the annual Wheat Variety Demonstration day was held last May at the KSU Agricultural Research Center—Hays. The demonstration included examples of 36 wheat varieties from both public and private breeding programs. Information was presented on the attributes and performance history of each variety. The program also featured one new hard red winter variety from Kansas, one from Colorado, and two from Nebraska. Scientists at the Center also discussed new technology for annual grass control in wheat and utilization of small grains as forages. This event and others are free and open to the public.

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## A Wheat Field Day Near Manhattan

The annual K-State Research and Extension Wheat Field Day was held at the Ashland Farm south of Manhattan. Extension specialists and wheat researchers discussed topics ranging from heat and drought tolerance to herbicide resistance. Wheat variety performance was discussed, and field day participants were able to view varieties side-by-side in controlled test plots. Advantages and susceptibilities were outlined for each variety. Researchers explained that experiments are focused on selecting more heat and drought tolerant varieties by using specially designed trials to find expressed tolerances in extreme conditions. Field days such as this one offer producers the opportunity to see what is new about wheat varieties for their area that will allow them to become more efficient and competitive. The plot tours and discussions also allow producers to see how their investment through the wheat checkoff is working for them.

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## Kansas Bull Test Evaluates Beef Cattle Genetics

The annual Kansas Bull Test is conducted each year to provide a centralized feeding and testing program to recognize superior beef genetics. It has been conducted for more than 30 years, and many changes have taken place in beef production over the past three decades. The Kansas Bull Test has been a leader in servicing and developing criteria to aid cattle producers to evaluate beef cattle genetics. Bulls are measured for average daily gain, weight per day of age, carcass traits, and breeding soundness. Entry forms are available online at [www.oznet.ksu.edu/pr\\_bull](http://www.oznet.ksu.edu/pr_bull), or can be requested by calling Lois Schreiner at 785-532-1267. Forms also can be picked up at local K-State Research and Extension offices. The 112-day test is conducted by K-State Research and Extension in conjunction with the Kansas Bull Test Committee.

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## K-State Develops a Handy Reference Tool for Kansas Producers

The Kansas Family Farmer and Rancher Resources and Services Guide created by the Kansas Center for Sustainable Agriculture and Alternative Crops serves as a reference tool for farmers and ranchers in the state. The guide is available via the Internet at [www.oznet.ksu.edu/kcsaac](http://www.oznet.ksu.edu/kcsaac) or from any county K-State Research and Extension office. Questions about product development or direct marketing can be addressed to the KCSAAC at 785-532-1440 or [kcsaac@oznet.ksu.edu](mailto:kcsaac@oznet.ksu.edu). The Center can also be reached at the Kansas Center For Agriculture and Alternative Crops, Kansas State University, c/o HFRR, 3029 Throckmorton Hall, Manhattan, KS 66506.

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## K-State Website Provides Economic Information on Renewable Energy

Renewable energy sources such as ethanol and biodiesel have been getting more attention lately. To help potential investors in alternative fuels and farmers who grow crops for them, K-State Research and Extension has developed a Renewable Energy Website at [www.agmanager.info/agribus/energy/default.asp](http://www.agmanager.info/agribus/energy/default.asp). It contains links to economic analyses of ethanol and biodiesel as well as a link to an Ethanol Prefeasibility Calculator. With the Ethanol Prefeasibility Calculator Website, a user can learn about the economic issues facing an ethanol facility. Information includes maps, graphs, historical prices, and economic analyses of all aspects of ethanol production. The user can input location-specific data into the calculator to find out if ethanol production would be feasible in a given area.

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### Natural Resources and Environmental Management

#### **New Research Area of Ecological Genomics Receives \$3 Million Grant**

The National Science Foundation, through the life science initiative of the Kansas National Science Foundation EPSCoR, has awarded \$3 million for a project that will link ecology and genomics for the first time. The recent explosion of knowledge in the field of genomics made this project feasible. One of the greatest challenges for biologists today is to understand how organisms respond to environmental changes that are caused increasingly by human activities. The primary goal of the National Science Foundation initiative will be to identify genes that are directly involved in how plants and animals respond to a changing environment. The initiative will focus on global environmental changes that are important to grasslands in Kansas: the amount and timing of precipitation, increased nitrogen, and changes in temperature. Ecological genomics will couple the tools of molecular genetics with ecology by taking advantage of the research platform and ongoing experimental work at the Konza Prairie Biological Station near Manhattan. Konza represents the tallgrass prairie in the National Science Foundation's network of long-term ecological research study sites around the globe.

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#### **K-Staters Track Bacteria in Northeast Kansas**

K-State Research and Extension is hunting for bacteria in a northeast Kansas watershed that provides drinking water and other benefits to more than 100,000 residents. In mid-July, the USDA awarded K-State a grant of \$550,000 to conduct the study. The focus will be on the area of land known as the Upper Wakarusa watershed, which stretches from Clinton Lake (west of Lawrence) to south of Topeka. The researchers and extension personnel want to identify the sources of fecal coliform bacteria by using such techniques as bacterial source tracking and computer modeling to understand where bacteria in the Wakarusa watershed originate and how they move into streams, rivers, and lakes. In addition to drinking water, the watershed is used for recreation, fishing, and irrigation. The USDA grant also includes funds to educate residents about their watershed and implement demonstrations of practices that will reduce the sources of fecal bacteria.

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### **An Environmental Checklist for Ag Service Centers**

A water quality protection assessment for agriculture service centers and cooperatives has been developed by the Pollution Prevention Institute, a part of Engineering Extension Programs and K-State Research and Extension. The checklist-format document is available to help facilities identify areas that need work in order to minimize risk to on-site or community drinking water sources. Using the checklist, ag service centers can assess the status of their operations from an environmental perspective. It can be used confidentially by owners and operators to focus on areas that need attention, allowing them to comply with regulations before regulators show up at the door. The Pollution Prevention Institute is contracted through the Kansas Small Business Environmental Assistance Program to deliver specific technical assistance to industries throughout the state. Industrial pollution prevention specialists at the institute have provided free and confidential services statewide for more than 12 years. The Kansas Ag Service Center\*A\*Syst program will help co-ops and other service centers to identify environmental compliance problems; set goals and develop a program to prevent pollution in all aspects of operations; and train employees in hazardous waste handling, spill response and reporting plans, and storm water protection measures. Those interested can contact the Kansas Small Business Environmental Assistance Program toll-free at 800-578-8898 to request the ag service center checklist, get help with environmental questions, or to learn more about free assessments offered to the agricultural industry.

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### **Kansas, U.S. Researchers Studying Cattle Odor, Dust**

The Hays City Commission asked officials of the KSU Agricultural Research Center—Hays to find ways to decrease cattle odor from cattle feedlots used for research. Among possible solutions being discussed are moving the facility, shutting it down, or implementing practices to eliminate the odor. Some half-dozen universities and the USDA are working together to study not only cattle odor, but also potential risks to human health when feedlot cattle kick up dust. The K-State team is focusing on minimizing dust and odor emissions in feedlots. K-State researchers have been studying feedlot dust issues for at least 10 years, and particularly the potential health risk of dust to feedlot workers.

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### **A Leader in Studying the Benefits of Carbon Sequestration**

K-State Research and Extension scientists are studying carbon sequestration, a process that could reduce global warming while also reducing soil erosion and water runoff. Carbon sequestration increases soil organic matter and reduces carbon dioxide in the air. It is good for the environment and good for crop production. K-State is leading the Consortium for Agricultural Soils Mitigation of Greenhouse Gases, an organization that is working to provide the tools and information needed to successfully implement soil carbon sequestration programs. K-State has been one of the nation's leaders in research on controlling soil carbon sequestration and greenhouse gas emission. It has been estimated that 20 percent or more of targeted emission reductions could be met by agricultural soil carbon sequestration. Other benefits of this technology are increased soil fertility, reductions in erosion, and increases in soil quality.

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### Cooperating with New Zealand on Climate Change Studies

K-State is one of nine universities and a national laboratory in the Consortium for Agricultural Soils Mitigation of Greenhouse Gases. K-State agronomist Chuck Rice is the national director of the Consortium. He went with a delegation to New Zealand in 2003 to consolidate cooperation between the United States and New Zealand on the role of agricultural soils in mitigation of such greenhouse gases as carbon dioxide. The partnership is working to develop mechanisms to estimate and verify changes in soil carbon and other greenhouse gases and to identify cost-effective mitigation options for agriculture. Two other areas of cooperation include: improved measurement and modeling of nitrous oxide emissions from agriculture; and measurement of greenhouse gas emissions for the assessment of the mitigation potential of cropland and grazing lands. These areas of cooperation will help advance research efforts and provide options for agriculture in the United States and New Zealand.

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### K-State Chosen as Senate Hearing Site Concerning Carbon Sequestration

The most recent developments in soil carbon sequestration as a potential solution to global warming were presented at a U.S. Senate subcommittee field hearing this past summer. U.S. Sen. Sam Brownback, R-Kan., chaired the hearing. Soil carbon sequestration is emerging as part of a national solution to global warming through carbon credit offset trading. K-State Research and Extension is one of the leaders in studying the potential benefits of this technology. It may not be too long before agricultural producers will be able to get paid for carbon credits through the marketplace for practices such as no-till and grass plantings. Speakers at the field hearing and a technical conference that preceded the hearing discussed the current status of carbon credit trading programs and how carbon sequestration fits in with current government policies on climate change. Those testifying at the field hearing included James R. Mahoney, director of the U.S. Climate Change Science Program and assistant secretary of commerce for oceans and atmosphere; William Hohenstein, director of the U.S. Department of Agriculture's Global Change Program; Melissa Carey, climate policy specialist with Environmental Defense; Michael Walsh, senior vice president of Chicago Climate Exchange; Ted Hartsig, senior project manager with SES Inc. in Lenexa, Kan.; and Peggy Blackman of the Kansas Coalition for Carbon Management.

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### Studying the Environmental Impact of Golf Courses

It's important to know how golf courses, landfills, or any public land affects the environment. Are there negative consequences, and, if so, what are they and how can they be eliminated? A team of K-State researchers who have been doing research at K-State's Colbert Hills Golf Course in Manhattan are assisting their counterparts at Western Michigan University to determine if the environmental evaluation model they developed can be applied to a new course being built on a former landfill site.

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### Forestry Field Day Focuses on Riparian Area

The 2003 Forestry Fall Field Day in October 2003 was held where the Little Walnut River snakes through the middle of David Jackman's property, 20 miles east of Wichita near Leon, Kan. The event attracted professionals who work with trees and land owners and managers dedicated to leaving a legacy of environmental stewardship. The theme for the event was managing and protecting natural resources within riparian areas. The field day was free, and the Kansas Forest Service provided an on-site barbecue lunch. Sponsors also included Butler County Conservation District, USDA Natural Resource Conservation Service, Kansas Department of Wildlife and Parks, USDA Forest Service, Kansas Tree Farm Committee, Walnut Council, and Kansas Forest Products Association.

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### **CD-ROM Released with Irrigation Scheduling Software**

The Mobile Irrigation Lab at Kansas State University began offering a new edition of the Tool Kit and Resources CD-ROM (version 2.0) to help farmers and ranchers use water efficiently in production agriculture. Hand calculation to track soil water balance requires time, and the repetitive nature of the job is unattractive. The resources available in the CD can make the task simpler, faster, and attractive. By utilizing the software, which is called KanSched, producers can water crops when they need it. The software program gives rates on real-time crop-water use for individual crops based on current weather conditions and evapotranspiration rates. Those farming records can remain on the computer for future consultations. The irrigation scheduling tool is especially useful for producers in western Kansas, and it can help producers conserve water from the Ogallala Aquifer. Instead of providing an equalized daily amount of water, the scheduling from KanSched conserves water and might prolong the life of the aquifer. The CD or other irrigation information is available from any local K-State Research and Extension office.

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### **Water-Quality Issues in Poultry Production and Processing**

Water-quality issues in poultry are of concern today not only during final processing but also when litter and feces are spread on fields to be utilized as fertilizer. Most meat poultry are grown on litter that is part wood shavings, feed particles, and water. Feed moisture impacts the management of the birds, the feed manufacturing process, and the amount of material to be spread. When water is added to feed during manufacturing, starch is gelatinized as the feed is manufactured, a process that may impact the feed consumed, feed efficiency, and litter composition. The objective of this study was to evaluate different levels of starch gelatinization produced by different processes on broiler poultry performance. This research project demonstrated that the water content of poultry feed could impact the amount of gelatinized water starch, which then impacts animal performance. High-moisture by-products often require conditioning to dry the feed stuffs prior to manufacturing, which uses energy and increases the cost of the by-product.

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### **Watershed Specialists Provide Local Assistance**

Since November 2000, K-State Research and Extension watershed specialists have provided watershed management expertise and developed watershed educational programs throughout Kansas. The watersheds that the specialists are assigned to include the Upper Blue, Lower Arkansas, Lower Kansas, Upper Delaware, Upper Arkansas, Marais des Cygnes, Lower Neosho, and Smoky Hill. The watershed specialists work with landowners and farmers within the watersheds to develop action plans based on the concerns within the watersheds. The specialists strive to improve water quality through educational programs, including on-farm demonstrations, workshops, seminars, and other teaching methods.

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### **Sustainable Ag Center Helps Farmers and the Environment**

The Kansas Center for Sustainable Agriculture and Alternative Crops assists farmers—especially those with small operations—to identify and develop markets for products. It does this by collecting and analyzing basic information on the Kansas food system and by providing opportunities for production and direct marketing. The K-State Research and Extension project also provides farmers with new research and information on organic products; energy-saving technology; investments that are less capital-intensive; and agricultural practices that reduce soil erosion and restore soil health. Alternative crops that represent new marketing opportunities for Kansas farmers include canola, safflower, dry beans, and cotton.

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### A Partnership with Nebraska to Monitor Water Quality

The Blue River Compact—The Kansas-Nebraska partnership, of which K-State Research and Extension is a part, effectively monitors water quality and promotes practices to prevent runoff of pesticides into the Big Blue River. The work is being conducted under the auspices of the two states' Big Blue River Compact. Water samples regularly are collected at 22 locations through the basin and analyzed for pesticide, nutrient, and bacterial levels. New sites are being added in Nebraska and Kansas in the upper tributaries (Upper Horseshoe Creek, Lower Horseshoe Creek, Big Indian Creek, and Turkey Creek). The monitoring will help narrow the search for the highest levels of loading. Numerous Best Management Practices are being put into place by both row crop and livestock producers, including many streamside vegetative buffers planted by landowners in both Nebraska and Kansas. Kansas and Nebraska Corn Growers and Grain Sorghum Producers associations and the Kansas and Nebraska Farm Bureau organizations have been active partners in the planning, development, and implementation of this effort.

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### Agriculture Mini Grants Awarded

The Kansas Center for Sustainable Agriculture and Alternative Crops, which is part of K-State Research and Extension, awarded mini grants to three Kansas counties. 2004 was the second year the grants were awarded. The purpose of the mini-grant program is to promote county-level, grassroots efforts to improve the viability of the Kansas family farmer and the Kansas communities in which they live. The grants were made possible by the North Central Region Sustainable Agriculture Research and Education program, a U.S. Department of Agriculture program that works to increase knowledge and help farmers and ranchers adopt practices that are economically viable, environmentally sound, and socially responsible. The mini-grant recipients were Allen County—to use the funds to conduct a Bermuda grass yield and survivability trial; Douglas County—to learn about preserving farmland and green space and to manage urban growth in ways that are fiscally, environmentally, and socially responsible; and Lyon County—to learn about a cover crop demonstration plot and conservation and about wildlife and meadow renovation.

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### Consortium for Agricultural Soils Mitigation of Greenhouse Gases

The Consortium for Agricultural Soils Mitigation of Greenhouse Gases is a multiyear, collaborative effort with several other states to improve the scientific basis of using land-management practices to increase soil carbon sequestration, reduce greenhouse gas emissions, and provide the tools needed for policy assessment, quantification, and verification. More than 50 research and outreach projects are underway by the consortium. For example, data on crop and residue yields and soil carbon and nitrogen measurements are being collected from dryland and irrigated cropland experiments in Colorado, Kansas, Texas, and Montana and rangeland in Colorado, Kansas, and Texas. The goal of the consortium is to provide the tools and information needed to successfully implement soil carbon sequestration programs to reduce the buildup of greenhouse gases in the atmosphere. It has been estimated that 20 percent or more of targeted greenhouse gas emission reductions could be met by agricultural soil carbon sequestration. Corollary benefits of carbon sequestration are increased soil fertility, reductions in erosion, increases in soil quality, and improved income for producers.

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### The Importance of Subsurface Drip Irrigation

K-State has been a pioneer in the use of Subsurface Drip Irrigation (SDI), which is a method of delivering water to crop roots at small emission points from a series of plastic lines spaced between crop rows. It allows producers to use wastewater in their irrigation systems without the odor or risk of human contact or drift because it is applied under the soil. The value of annual water savings associated with widespread adoption of SDI on irrigated areas in western Kansas has been estimated to range between \$175 million to \$350 million. The SDI Website [www.oznet.ksu.edu/sdi](http://www.oznet.ksu.edu/sdi) has had thousands of visitors from the United States and around the world.

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### Reducing Water Requirements for Turfgrass

This project is identifying the minimum levels of irrigation water required to maintain acceptable quality of lawns during Kansas summers. It also is focusing on the best methods for converting cool-season stands of turf to seeded zoysia grass. By using a drought-resistant turfgrass such as Bermuda grass, water savings of 30 percent or more could be realized compared to cool-season grasses. Conversion of perennial ryegrass golf fairways to drought-resistant zoysia grass using a strip-seeding method could save more than \$1,000 per acre on seed cost alone.

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### Investigating Environmental Issues Related to Agriculture in Southwest Kansas

This multiproject research is focusing on improving the life of all Kansans by reducing the environmental impact of large-scale crop and animal production systems; enhancing their profitability; and reducing their dependence on nonrenewable resources. It also is developing low-cost tools for identifying sources of fecal bacteria in surface waters. For example, new methods were tested for determining the sources of fecal bacteria entering the Arkansas River between the towns of Deerfield and Ford. Another project found that the use of feedlot manure rather than commercial pre-plant nitrogen fertilizer increased the resistance of corn to drought. It also was found that the main storm drain in Garden City is the most significant source of bacteria entering the Arkansas River during small and medium storms. Another project using antibiotic resistance analysis as a bacterial-source-tracing technique indicated that bacteria from a rural area several miles upstream of Garden City originated from human sources (a few houses) rather than the 80,000 or more cattle and the waste from those cattle that is applied in the area.

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### The Konza Prairie Biological Station

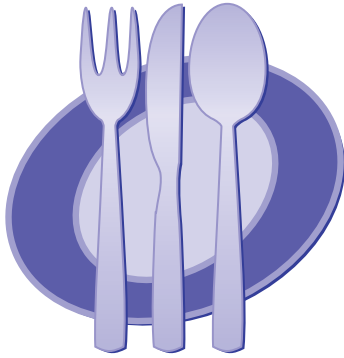
Research at the Konza Prairie, the premier site for prairie research in North America, continues to provide a strong base of scientific information to guide regional range management and agricultural and land-use decisions that enhance the conservation, productivity, and sustainability of rangeland ecosystems. For example, survey and satellite mapping were completed and field experiments were conducted to assess effects of grassland management practices and control methods on the population dynamics of exotic plant species. The National Science Foundation's Long-Term Ecological Research (LTER) Program has been funding research on Konza Prairie for more than two decades. The LTER program was designed to support a multidisciplinary approach to addressing long-term questions in a wide variety of biomes in North America and beyond.

*Contact: David Hartnett, Biology, Telephone: 785-532-5925, FAX: 785-532-6653, Email: dchart@ksu.edu*

### The National Atmosphere Deposition Program

This program entails weekly collection and chemical analyses of wet deposition at the Konza Prairie and more than 200 other sites nationwide as part of the National Trends Network. Atmospheric inputs of nutrients can negatively impact productivity and structure of grassland ecosystems. Monitoring those inputs is critical for the management of grassland ecosystems because they provide a strong economic base for the livestock industry in Kansas. A long-term record of rainfall and its effect is valuable in identifying changes in nutrient inputs. This program has been in place on the Konza Prairie for 18 years.

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### Food, Nutrition, Health, and Safety

Kansans are concerned about their personal health and safety as well as that of their families and communities, and K-State Research and Extension is helping in many areas. Statewide surveys, forums, and other data have revealed that citizens have a keen interest in programs delivered by local and state organizations. Public health planning documents, such as Healthy Kansans 2000 and Healthy People 2010, call for reductions in the incidence and prevalence of certain types of morbidity and mortality. Cardiovascular-pulmonary diseases, cancer, and cerebral vascular disease leading to strokes account for 63 percent of deaths in Kansas—primarily preventable by adopting healthy and safe lifestyles. Eating disorders and other weight issues are increasing problems. Health problems and hazards also include arthritis, osteoporosis, tobacco use, alcohol and drug abuse (especially inappropriate use of medications and over-the-counter drugs by the elderly and binge drinking by youths and young adults), and exposure to environmental hazards (e.g., lead, radon) in homes. Limited-resource and near-poverty individuals and families, those without health insurance, the very young, and the aged are most at risk for poor health and early death. For information about programs in this area:

Contact: Paula Peters, Family and Consumer Sciences, Telephone: 785-532-1562, FAX: 785-532-5504, Email: [peters@humecc.ksu.edu](mailto:peters@humecc.ksu.edu)

### Volunteers Help to Teach Kansans Basic Food Principles

The new Master Food Volunteer program of K-State Research and Extension involves volunteers with a base knowledge of foods who are then trained on food preservation, science, safety, and preparation. The volunteers then teach others in their communities about safe food preparation and nutrition. Modeled after the successful Master Gardener program, the Master Food Volunteer program was first offered in three counties and expanded to nine counties in 2003. Under the supervision of a family and consumer sciences agent, Master Food Volunteers can help local agents provide more food and nutrition programs in their counties and reach a much wider audience.

Contact: Karen Penner, Animal Sciences and Industry, Telephone: 785-532-1672, FAX: 785-532-2461, Email: [kpenner@oznet.ksu.edu](mailto:kpenner@oznet.ksu.edu)

### Corporate Meltdown Targets Extra Pounds

In a Corporate Meltdown weight-loss program in Garden City, 150 participants lost 686 pounds altogether. The loss is the largest in the four-year history of the program. Total weight loss from the program to date is nearly a ton—1,935 pounds. The “Meltdown” focuses on losing weight, improving health, while having fun doing it. It requires a seven-week commitment. Business associates, friends, and family members are encouraged to sign up as teams of five. They agree to weekly weigh-ins and to attend nutrition and health sessions. The research-based tips, health screenings, and low cost of participation also add credibility and make participating in the program easier. Another factor in the program’s success is community support. The Corporate Meltdown program is coordinated by an interagency team that includes K-State Research and Extension, Garden City Recreation Commission, Garden City Community College, and the SW Diabetes Control Program.

Contact: Linda Walter, K-State Research and Extension, Finney County Office, Telephone: 620-272-3670, FAX: 620-272-3576, Email: [lwalter@oznet.ksu.edu](mailto:lwalter@oznet.ksu.edu)

### The Community Health Institute

This component of K-State Research and Extension is working to improve the health of individuals, families, and communities. It focuses on the healthful aspects of food, physical activity, and social behaviors. Its long-term goals are to 1. Improve community policies and practices and create healthy social, economic, and physical environments; 2. Increase healthy nutrition and physical activity; and 3. Improve social development and decrease problem behaviors. Members of the Institute are in various K-State departments and have expertise in kinesiology, human nutrition, sociology, horticulture, regional and community planning, family studies and human services, education, journalism and mass communications, agricultural economics, and statistics. The Community Health Institute offers distance learning networks, training, evaluation systems, process surveys, and basic and applied research expertise to help communities change unhealthy environments into places that allow children, youth, and adults to make healthy choices when given the option.

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### Promoting Healthy Eating and Physical Activity

The Community Health Institute of K-State Research and Extension promotes healthy eating and physical activities. The focus is on developing healthy behaviors among youth, adults, and older adults. Kansas ranks 29th among 50 states and the District of Columbia for the prevalence of obesity among U.S. adults. Increasing physical activity is critical to reversing the epidemic of obesity. Only 22 percent of adult Kansans report achieving recommended physical activity levels. National health-related organizations are urging Americans to eat less fat, especially saturated fat, and to eat more fruits and vegetables. Those recommendations are based on mounting evidence that indicates that nutrition plays an important role in preventing chronic disease. One program is Prevention of Obesity in Children and Adolescents, which is a collaborative project with the University of Kansas School of Medicine in Wichita.

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### Healthy Places for 4-H Youth Development

The Community Health Institute, in cooperation with 4-H Youth Development, provides training opportunities to 4-H club leaders. The goal is to develop 4-H club programs for youth to have more opportunities to be physically active and to develop positive interpersonal skills. For example, the project helped Leavenworth and Smith counties establish an intervention to increase physical activity and positive skills within two 4-H community clubs. In addition to providing training for 4-H leaders, the project evaluates the process of developing Healthy Places with a measurement tool that can be readily used in 4-H or other organizations that serve youth.

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### State Plan Targets Arthritis Awareness

A statewide effort is underway to improve the quality of life of the more than 686,000 Kansans (34 percent of the state's population) currently thought to be suffering from chronic joint problems or arthritis diagnosed by a physician. K-State Research and Extension in each of the 105 Kansas counties is distributing information and promoting awareness, education, and self-help programs across the state. The program is being coordinated by the Kansas Department of Health and Environment.

*Contact: Any K-State Research and Extension County Office  
or Telephone Angela Deines, Coordinator of the Kansas Arthritis Program,  
at 785-291-3418, or Derik Dukes, Kansas Chapter of the Arthritis  
Foundation, at 1-800-362-1108.*

### K-State Plays Key Role in National Crop Bioterrorism System

The U.S. Department of Agriculture and the Cooperative State Research, Extension, and Education Service established the National Plant Diagnostic Network (NPDN) as part of the nation's homeland security. The network will help detect pests and pathogens that may be introduced maliciously or unintentionally into the nation's agriculture industry. In addition to detection, NPDN also provides identification of the pest or pathogen and reporting systems to help ensure a rapid response to any plant problem. The system requires coordination and communication between federal and state agencies and land-grant universities. The NPDN is divided into five regions, and K-State is the regional center for the Great Plains Diagnostic Network. Those regional centers, through the Cooperative Extension Service, have close interaction with growers and are often the first to know of any suspected problems. Once notified, the regional center can utilize its staff of plant scientists and diagnostic labs to identify the pest or pathogen and suggest an adequate treatment procedure. Information on this system is available on the Website: [www.gpdn.org](http://www.gpdn.org).

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5692, Email: [tissne@plantpath.ksu.edu](mailto:tissne@plantpath.ksu.edu)*





### Two Counties Are Sites for Agroterrorism Response Exercises

The National Agricultural Biosecurity Center at K-State staged agroterrorism emergency preparedness exercises in Jefferson and Sublette counties this past fall. The National Agricultural Biosecurity Center exercises are structured to acquaint emergency personnel with how to respond to a deliberate terrorist attack that involves the introduction of foreign animal disease. It plans county-level exercises elsewhere in the state. The National Agricultural Biosecurity Center at K-State works toward the development, implementation, and enhancement of diverse capabilities for addressing threats to the nation's agricultural economy and food supply. The Center participates in planning, training, outreach, and research activities related to vulnerability analysis, incident response, and detection and prevention technologies. A number of scientists and educators with K-State Research and Extension are involved with the work of the center.

*Contact: Marty Vanier, National Agricultural Biosecurity Center, Telephone: 785-532-6193, FAX: 785-532-3929, Email: mvanier@k-state.edu*

### The Hazard Analysis and Critical Control Point Program

All state and federally inspected meat and poultry processing plants in the United States are required to establish a preventative food-safety system called Hazard Analysis and Critical Control Point or HACCP. K-State Research and Extension has been providing HACCP training programs for meat processors, food service personnel, and others involved in food production, distribution, and marketing. HACCP focuses on preventing hazards, relies on science, and places food-safety responsibilities on food operations.

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### A Voluntary HACCP Program for the Commercial Feed Industry

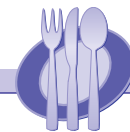
More than 165 million tons of animal feed are produced annually in the United States, representing a market value of approximately \$25 billion. K-State Research and Extension is helping this important industry by showing how to develop and implement voluntary hazard analysis critical control point (HACCP) programs. This will help ensure delivery of safe meat, milk, and eggs to consumers through the elimination of foodborne pathogens and other hazards in animal feed, and it will help retain the comparative advantage of the U.S. agricultural industry in the global market. To accomplish this, K-State is performing four tasks: 1. Assessing the chemical, physical, and biological hazards in finished feeds and ingredients; 2. Developing, implementing, and evaluating individualized HACCP programs in feed mills; 3. Analyzing the economies of implementing a HACCP program; and 4. Building a distance learning program.

*Contact: Timothy J. Herrman, Grain Science and Industry, Telephone: 785-532-4082, FAX: 785-532-4017, Email: tjh@wheat.ksu.edu*

### Utilizing Telemedicine to Monitor the Health of Livestock

A veterinary telemedicine project with help from K-State Research and Extension is studying how to monitor the health of cattle by remote techniques. The National Science Foundation awarded \$899,996 to K-State researchers for the project Information Technology Research: An Infrastructure for Veterinary Telemedicine—Proactive Herd Health Management for Disease Prevention from Farm to Market. The telemedicine system will gather health information for an animal, store it locally so it can be pulled onto a handheld PDA-type device, which gives a producer a coarse health analysis for the animal. Next, the information can be uploaded onto a personal computer at the ranch or feedlot for more sophisticated analysis that could include herd records, weather data, or global information systems data. Such information can be used to detect worrisome health patterns in a herd of cattle. Finally, through an Internet connection, a synopsis of ranch herd data would go to local veterinarians. The idea is to create a regional animal health picture. Successfully developing a veterinary telemedicine system capable of monitoring health information for the vast U.S. livestock herd also provides a national security benefit. With it in place, veterinarians would have early warning of serious diseases.

*Contact: Mark Spire, Food Animal Health and Management Center, Telephone: 785-532-4201, FAX: 785-532-4288, Email: spire@vet.ksu.edu*



## The Many Resources of the Food Science Institute

Resources of the Food Science Institute are helping agricultural producers market their products directly to consumers and thereby receive maximum profits. The Institute was established to combine the university's existing resources to serve students, consumers, and clientele in the food industry, the scientific community, and government agencies. It has several programs that direct marketers can turn to for help with issues ranging from product development to product packaging. They are:

- **The Value-Added/Product Development Laboratory**—It offers such services as assisting in the production of new foods; consultation on methods of adding value to existing products; reviewing product labels for compliance with state and federal guidelines; and suggesting suppliers for ingredients, packaging materials, and equipment. The lab also offers hazard analysis and critical control point (HACCP) and food safety training, and acts as a “processing authority” as defined by the Food and Drug Administration. Many clients request services for business and product development, labeling, processing, safety, and equipment.

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- **The Dairy Processing Plant**—This 9,600-square-foot facility is equipped to make a variety of dairy products, including cheeses, milk, ice cream, and butter. The plant can be used to manufacture new dairy products and also to study functions of new ingredients. Though mainly used to produce dairy foods, it can manufacture or process additional products such as juices. Scientists are on hand to provide technical support and product evaluation. Equipment is tested regularly by the Kansas Department of Agriculture.

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- **The Meat Science and Support Program**—It provides meat processors and producers opportunities to utilize the K-State Research and Extension meat lab, meat sensory lab, and meat color lab. It also offers a variety of technical assistance to the Kansas meat and poultry industry. The program helps entrepreneurs and processors in the development of value-added meat products and in the evaluation of display lighting and packaging systems on meat color and shelf life. It also serves as a resource to assist with HACCP training and offers training workshops and short courses in HACCP, meat processing, and other subject areas, depending on processor needs. If clients want help with business plans, for instance, then this program can point them in the right direction.

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- **The Sensory Analysis Center**—This facility provides two primary types of services, both related to the evaluation of sensory properties of products. One is the determination of the sensory characteristics of a product. The second relates to product acceptability.

*Contact: Edgar Chambers IV, Human Nutrition, Telephone: 785-532-0156, FAX: 785-532-5522, Email: [eciv@humec.ksu.edu](mailto:eciv@humec.ksu.edu)*

## Food Science Certificate Offered by Food Science Institute

The Food Science Institute of K-State Research and Extension and the KSU Division of Continuing Education have teamed up to offer extended learning opportunities to people who want to further their careers in food science. The Food Science Graduate Certificate requires the completion of 20 semester hours of graduate level courses. This graduate certificate is offered through distance learning so that students can take classes at convenient times without interrupting their careers. Careers in food science include quality assurance; food microbiology and safety; process technology and engineering; business management and sales; product development and evaluation; and research and development. More information on the Food Science Graduate Certificate is available from the Food Science Institute Website at [www.foodsci.k-state.edu/](http://www.foodsci.k-state.edu/).

*Contact: Curtis Kastner, Food Science Institute, Telephone: 785-532-1234, FAX: 785-532-5861, Email: [ckastner@oznet.ksu.edu](mailto:ckastner@oznet.ksu.edu)*



### **Serving Safe Food Program (SERVSAFE)**

A component of the overall statewide K-State Research and Extension interdisciplinary farm-to-table food safety effort, SERVSAFE provides manager certification in safe food handling and sanitation. A collaborative program with the Kansas Department of Health and Environment, it is required by many national food operations such as McDonald's Restaurants. Participants learn the principles and practices of food safety in foodservice establishments, including food safety hazards; how to serve food safely; the safe food handler; hazard analysis critical control point (HACCP) programs; keeping food safe from purchasing and receiving through preparation and service; and maintaining sanitary facilities and equipment. The course concludes with an 80-question certification examination.

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### **Using Cell Phone Technology to Report Cattle Disease**

Veterinarians with K-State Research and Extension are working with scientists at Sandia National Laboratories in New Mexico on a system that rapidly detects and reports infectious disease outbreaks in cattle. The Internet-based system, called the Rapid Syndrome Validation Project for Animals (RSVP-A), uses cellular telephones that allow veterinarians to work through a series of questions on the tiny screens of those telephones. The questions represent various syndromes the veterinarians may see in their daily work with cattle. The information then goes into a central database. The RSVP-A project may be the tool to fill a gap in this country's livestock disease diagnostic systems. Such a system is needed because historically not much emphasis has been put on quickly detecting emerging diseases.

*Contact: Mark Spire, Food Animal Health and Management Center, Telephone: 785-532-4201, FAX: 785-532-4288, Email: spire@vet.ksu.edu*

### **Teaming Up to Fight the West Nile Virus Problem**

A team of K-State Research and Extension entomologists began trapping and studying Kansas mosquitoes that carry West Nile virus. They have been attempting to learn more about mosquito diversity and distribution across the state. They also are monitoring the High Plains mosquito season and the insect's role as a disease vector. They discovered that more species of Culex mosquitoes that can carry the virus live in Kansas than previous records indicated. In rare cases, the mosquito-carried virus can lead to serious disease for infected humans, and it kills about 30 percent of unvaccinated, infected horses. The team has maintained a toll-free hotline at 866-452-7810 for Kansans to report birds suspected of having the virus. The U.S. Centers for Disease Control and Prevention funds efforts to track the virus, working through such agencies as the Kansas Department of Health and Environment, which, in turn, coordinates state efforts—including the work of the K-State surveillance team. To help Kansans learn about the disease, a Website was established by K-State Research and Extension: [www.oznet.ksu.edu/westnilevirus](http://www.oznet.ksu.edu/westnilevirus). It provides weekly state updates, including instructions for reporting dead birds, in-depth safety information, and links to related sites nationwide.

*Contact: Ludek Zurek, Entomology, Telephone: 785-532-4731, FAX: 785-532-6232, Email: lzurek@oznet.ksu.edu*

### **Providing Expert Information on West Nile Virus for Horse Owners and Others**

When the second season of West Nile virus began, K-State experts were available to help. Horse owners were able to direct questions to staff members at the equine medicine service of the Veterinary Medical Teaching Hospital, which treated more than 50 cases of West Nile virus encephalitis in horses the year before. A West Nile virus conference was held in Manhattan, and K-State entomologists started collecting Kansas mosquitoes to learn more about mosquito diversity; the insects' distribution across the state; the High Plains mosquito season; and the role of mosquitoes as a disease vector. A specialist on insects that cause medical and veterinary problems was available to discuss the means of transmission of the West Nile virus, ways to aid in preventing the virus, and more. The K-State veterinary diagnostic laboratories, performed lab tests for animals in Kansas and Nebraska suspected of having West Nile. More information on West Nile and what K-State is doing to control, identify, and fight the virus is available on the Web at [www.mediarelations.k-state.edu/](http://www.mediarelations.k-state.edu/) and click on "West Nile virus information."

*Contact: Bonnie Rush, College of Veterinary Medicine, Telephone: 785-532-5700, FAX: 532-785-4039, Email: brush@k-state.edu*



## K-State Scientists, Veterinarians Explain Mad Cow Disease

When mad cow disease (bovine spongiform encephalopathy (BSE) was found in Canada last year, a task force of K-State Research and Extension scientists and veterinarians was mobilized to provide up-to-date information on the disease that some thought could threaten the U.S. beef supply. Through news releases and other ways, the task force explained what BSE is and what causes it. The task force also explained why it was still safe to eat U.S. beef, and it provided information about the circumstances surrounding the case in Canada. Information was provided on what the government has done to keep mad cow disease out of the United States. Kansans were assured that the disease is not transmissible through contact either from animal to animal or animal to people. Websites with information on the disease were given, including the USDA's at [www.usda.gov](http://www.usda.gov), the National Cattlemen's Beef Association's at [www.beef.org](http://www.beef.org), and the Food and Drug Administration's at [www.fda.gov](http://www.fda.gov). People were informed that a K-State Research and Extension publication MF2434 Bovine Spongiform Encephalopathy (BSE) could be obtained through K-State Research and Extension offices statewide.

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## Improving Nutrition in Rural Homebound Adults

In collaboration with the Kansas North Central-Flint Hills Area Agency on Aging, K-State Research and Extension provided in-home nutrition information to older adults who reside in rural areas and receive home-delivered meals. Most of these people do not receive any nutrition education. Nutrition education materials were designed to help home-bound older adults improve their food intake and nutritional well-being necessary to maintain health. The goals of this project are to develop a program to: 1) investigate the effectiveness of nutrition messages to promote healthy nutritional practices and reduce nutritional risk in a small population of women living alone who receive home-delivered meals, and 2) establish a cost-effective method to integrate delivery of the nutrition information with the delivery of home-delivered meals. This program has resulted in reduced nutritional risk and encouraged positive change in nutrition practices by providing home-bound older adults with nutrition information materials targeted to their interests and needs.

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## Nutrition Program Helps Families Stretch Food Dollars

The K-State Research and Extension Family Nutrition Program teaches low-income persons—from youth to older adults—how to choose and prepare nutritious meals on a limited budget, how to handle food safely, and how to balance healthy eating practices with physical activity. The program brings nutrition information to people in 84 Kansas counties through a network of county agents who work with Head Start; the WIC (Women, Infants, Children) program; shelters; and other agencies that focus on those struggling financially. When families eat better, they are healthier and have fewer illnesses. Children from those families perform better in school and are better prepared to live productive adult lives.

*Contact: Karen Hudson, Human Nutrition, Telephone: 785-532-0177, FAX: 785-532-1674, Email: [hudson@humec.ksu.edu](mailto:hudson@humec.ksu.edu)*

## Decreasing the Lingering Aftertaste of Milk

One reason milk consumption has declined may be because people don't like its aftertaste. Food and animal scientists at K-State are working to identify the origin of the aftertaste in milk and enhance or improve its quality and flavor. By decreasing the negative aftertaste associated with milk, they hope that milk consumption will increase, especially in teenagers, helping to keep calcium in their diets. Calcium is needed especially for young girls during physical development and for women when they enter the child-bearing years.

*Contact: Karen Schmidt, Animal Sciences and Industry, Telephone: 785-532-5654, FAX: 785-532-5681, Email: [kschmidt@oznet.ksu.edu](mailto:kschmidt@oznet.ksu.edu)*

## Keeping Kansans Physically Fit—The Walk Kansas Program

Because people in Kansas aren't getting enough physical activity, K-State Research and Extension developed Walk Kansas, a science-based, physical-activity promotion program that helps Kansans initiate and maintain a regular regime of physical activity. The program utilizes county task forces that promote the Walk Kansas program. Teams of six participate, and the goal of each team is to exercise the equivalent of walking across Kansas. To reach that goal each team member has to do moderate physical activity for 30 minutes a day, five days a week, during the eight-week program. Thousands of Kansas have participated in the program.

*Contact: Michael H. Bradshaw, School of Family Studies and Human Services, Telephone: 785-532-5773, FAX: 785-532-6969, Email: [mhb@humec.ksu.edu](mailto:mhb@humec.ksu.edu)*



### Improving Treatment for People Suffering from Dysphagia

More than 15 million people suffer from dysphagia, which causes an inability to safely swallow liquids. They often have to thicken their beverages as a health and safety precaution. Two K-State researchers are studying the factors that influence the taste of thickeners to improve their flavor. By improving taste, those with the disease will be more likely to receive the nourishment they need.

*Contact: Edgar Chambers IV, Human Nutrition, Telephone: 785-532-0156, FAX: 785-532-3132, Email: eciv@humecc.ksu.edu*

### Finding Alternatives to Antibiotics in the Diets of Swine

Antibiotics have traditionally been added to the diets of swine to improve health and enhance growth performance. But many swine production scientists and veterinarians are increasingly concerned that continued antibiotic use for growth promotion in otherwise healthy animals may lead to strains of pathogens that are resistant to antibiotic therapy. Research focusing on natural alternatives to replace commonly used feed-grade antibiotics may change the way swine are fed. A study by K-State Research and Extension focuses on finding alternatives to commonly used feed-grade antibiotics, with special emphasis on the natural additives mannanoligosaccharides (mannan) and sodium chlorate (chlorate). So far, no natural alternative evaluated has recaptured the lost performance in weaned pigs when low-level antibiotics are removed. But the research at K-State is contributing to progress in this area.

*Contact: Ernie Minton, Animal Sciences and Industry, Telephone: 785-532-1238, FAX: 785-532-2461, Email: eminton@oznet.ksu.edu*

### AgrAbility Project Assists Farmers with Many Kinds of Limitations

Kansas AgrAbility Project staff members provide information and assistance to farmers, their family members, and their employees who have sustained disabling injuries or have chronic health conditions that affect their ability to continue working on the farm. AgrAbility staff help find ways to modify operations, equipment, and homes so farmers can continue to live and work safely. In addition to working with farmers who have suffered severe, disabling injuries (amputation, for example), staff members also work to find solutions for people with cognitive, sensory, and chronic health conditions. AgrAbility services are available to people whose disabilities range from a traumatic injury to complications from asthma—any impairment that limits farm work or activities of daily living on the farm. Kansas AgrAbility is a partnership between K-State Research and Extension and Southeast Kansas Independent Living in Parsons. The system is simple: if a farmer has any health condition that limits his or her ability to farm, AgrAbility will help. There are no forms to fill out and no criteria to meet. Since Kansas AgrAbility began offering services in 2002, more than 50 Kansas farmers have been directly served by the project and hundreds more have benefited from AgrAbility educational materials. Contact Kansas AgrAbility by calling 1-800-526-3648 to be connected with an AgrAbility specialist. Or visit the Kansas AgrAbility Website at [www.oznet.ksu.edu/agrability](http://www.oznet.ksu.edu/agrability).

*Contact: John Slocombe, Biological and Agricultural Engineering, Telephone: 785-532-2906, FAX: 785-532-5825, Email: slocomb@bae.ksu.edu*

### K-State Conservation Efforts Involve Cooperation

K-State Research and Extension works with many individuals and agencies to help them be up-to-date on conservation techniques. For example, K-State hosted a day-long orientation session last fall to bolster the ranks of people who can provide conservation-related technical assistance on behalf of the U.S. Department of Agriculture. In cooperation with the USDA's Natural Resources Conservation Service (NRCS), K-State had a key role in providing professional development opportunities to individuals who are becoming technical service providers (TSPs). Those individuals work with landowners in planning and installing conservation practices. The meeting covered such areas as USDA expectations; understanding NRCS policies and procedures; appeals and mediation; decertification; environmental policy guidelines; civil rights; ethics; conflicts of interest; quality assurance; and procedures for paying TSPs. The need for technical service providers arose from an unprecedented increase in conservation-related funds and programs written into the 2002 Farm Bill. The legislation paved the way for non-NRCS technical professionals and allowed for payment to those professionals for assistance they provide farmers, ranchers, and other landowners in conservation planning and design, layout, installation, and checking of approved practices.

*Contact: Will Boyer, Douglas County K-State Research and Extension, Telephone: 785-843-7058, FAX: 785-843-6745, Email: wboyer@oznet.ksu.edu*



### 4-H Celebrates 100 Years of Youth Development

This year marks the 100th anniversary of 4-H, a popular organization that has served millions of young people in Kansas and around the United States. The 4-H Youth Development program sponsors clubs in rural and urban areas to strengthen families and communities; foster leadership and volunteerism; and build internal and external partnerships to develop 4-H programs. Clubs have grown nationally to more than 5.6 million participants ranging from 7 to 19 years of age. In Kansas, 4-H Youth Development programs reach out to more than 100,000 children and teenagers, providing high-quality, hands-on skills. Projects include civics, communications, family and consumer sciences, environmental education, healthy lifestyle education, personal development, plants, animals and technology—all designed to contribute to the development of well-rounded young people.

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### Garden Show Is Successful Backdrop to 4-H Horticulture Contest

The statewide 4-H Horticulture Judging Contest sponsored by K-State Research and Extension helps youngsters to be more savvy consumers. Preparing for the 2003 contest, held in conjunction with the Wichita Garden Show, taught participating teenagers how to identify fresh fruits and vegetables available at farmers' markets and grocery stores. What they learned will help them to choose the right kind of flowers and shrubs and how to take care of their lawns when they become homeowners. One hundred thirty-four teens participated in the contest, representing 24 Kansas counties. In addition to the contest itself, 4-H'ers had an opportunity to view educational displays that were part of the event.

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### 4-H'ers Eager to Develop Their Photographic Skills

Three years ago a 4-H Photo Extravaganza at the Wichita Garden Show attracted 80 participants. The second year, 270 signed up. This year, the number swelled to 450. The event offers youth opportunities for one-on-one photo critiques; how-to sessions with professional photographers; and chances to take photographs at the Breath-of-Spring garden show.

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## Youth, Family, and Community Development



### Program Helps People Maintain a Balanced Life

A team of K-State Research and Extension specialists and agents developed the Choose Life Balance program that helps busy adults balance the many demands in their lives. In Finney County, for example, participants in the workshops ranged from Chamber of Commerce members to family and community education members to regional SRS personnel to zoo docents. The sessions on Goal Setting and on Organization Style have been especially popular. Participants report improving their ability to set meaningful goals, prioritize activities, reduce clutter, and devote more time to self and family. Also, a series of professional development workshops were established for faculty and staff at the Garden City Community College on such topics as goal setting, communication, stress management, time management, home management, organization, and delegation. Information on the program is available on the Website [www.oznet.ksu.edu/lifebalance/](http://www.oznet.ksu.edu/lifebalance/).

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### Volunteers Give Back to Youth Development Program

Balancing work, family, and community obligations, can be difficult. It might be easier for the more than 7,300 Kansas 4-H volunteers to stay home. "Many of our 4-H volunteers are like me, former members who have experienced benefits from the youth development program," said Linda Thurston, Franklin County 4-H volunteer who is serving as president of the Kansas 4-H Volunteers' Association. We understand how we continue to use the skills we learned in 4-H, Thurston said. "I know that I learned how to plan and organize my time in 4-H. Starting a project can be great fun, but it's equally important to finish the project," she noted. "I also learned a lot about working with people in my 4-H years," the mother of four said. Although her children, all former 4-H members, are now grown, she continues as a volunteer. And she's not alone. Some volunteers like Dale Weishaar, from Sumner County, focus on a project area that was of high interest during their time as 4-H members. In Weishaar's case, it's the entomology project. Chuck Otte, from Geary County, is a perennial volunteer for the 4-H woodworking project. He said that he's been attracted to the project because of the 4-H members' skill and interest. A book shelf, dresser, table, or bed all have a clear purpose. The projects also reflect hand and eye coordination, patience, and problem-solving skills, he said. More information on educational 4-H programs open to students age seven and up, is available at county K-State Research and Extension offices or on the Web site: [www.oznet.ksu.edu](http://www.oznet.ksu.edu). Click on "Home, Family and Youth" and then 4-H.

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### K-State Research Project Focuses on Newlyweds

As part of the Kansas Marital Preservation project, which is funded by K-State Research and Extension, K-State is studying newlyweds who have been married between one to three years. Three counties are involved: Riley, Clay, and Pottawatomie. Participants, who must be in first-time marriages and between the ages of 19 and 35, take part in focus groups led by a marriage and family therapist intern from K-State. The purpose is to gain further understanding of early marriage experiences. Titled Newlyweds' Marital Experiences, the project can accommodate couples as well as individuals with spouses who do not want to participate. Information about the study is on the Web at [newlywedstudy@yahoo.com](http://newlywedstudy@yahoo.com).

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### Teaching Preservation Techniques for Vintage Treasures

A K-State Research and Extension project is helping Kansans identify and care for such vintage items as clothing, quilts, samplers, and other keepsakes. Called "Life's Tapestries: Securing the Past for the Future," it's kind of like the popular TV program "Antiques Roadshow," except this show focuses on conservation-based practices to preserve keepsakes, including identifying fibers, how to care for them, and display and storage techniques. The project also includes examples of could-have-been treasures that have been damaged by heat, light, mold, mildew, or poor indoor air quality, e.g. secondhand smoke.

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### Youth Livestock Programs Generate High Interest

K-State Research and Extension sponsors educational research projects to help youth increase their knowledge about livestock. Swine projects, for example, focus on general care, proper feeding, swine industry careers, showmanship, and more. For example, Amanda Oakley, an 11-year-old sixth grader at St. George Elementary School, was named champion in two classes during the 2003 Riley County Fair. The fair capped a four-month stretch in which she and 300 other youth took lessons on swine management from university experts. Commenting on the project, Amanda said, "I just love raising pigs. It's something we do together as a family." Amanda and her father, Tom, were among the hundreds who attended two K-State events focusing on swine management. The Kansas Junior Swine Producer Day was held in March, and the K-State Swine Classic took place in July. Not all of those who attended the events were from rural areas. Among the 48 Kansas counties represented, participants came from such urban areas as Johnson, Leavenworth, Shawnee, Sedgwick, and Wyandotte counties. More information on livestock programs for youth is available from local extension offices or the Web site [www.oznet.ksu.edu/pr\\_eyas/](http://www.oznet.ksu.edu/pr_eyas/).

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### Leavenworth County Provides Individual Counseling for 4-H Leadership Projects

Leavenworth County is the first Kansas county to offer 4-H'ers individual consultations and evaluations of their 4-H leadership projects. The one-on-one concept has worked well with such 4-H projects as food or clothing. It typically gives students an opportunity to talk with adults who can evaluate their projects and offer suggestions. Youth can have great ideas that will help their school or community, but they don't always know how to implement them. The one-on-one sessions allow them to evaluate their accomplishments and ask for suggestions to help strengthen their leadership capacities. For example, James Bailey, a ninth grader initiated a supply drive for 750 Kansas soldiers serving in Bosnia. Bailey presented the idea to his 4-H Club—the Happy Helpers—and worked with the club to involve such community groups as the Veterans of Foreign Wars (VFW) and American Legion. His project provided 1,560 pounds of supplies that were donated to the National Guard, which sent them on to Kansans serving in Bosnia.

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### Community Health Institute Studies Positive Youth Development

Researchers with the Community Health Institute are studying how families can promote social, emotional, and physical competence. The ultimate goal is to prepare children to become adults capable of forming successful and healthy families. This group also is examining how a variety of other settings can promote healthier behaviors. The intent is to prevent emotional and behavioral problems. The focus on this long-term program is on understanding and promoting improved social development by focusing on family functioning and the role of out-of-school development settings—daycare, preschool, 4-H clubs, after school programs.

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### Several Hundred Teenagers Participate in 4-H Discovery Days

4-H club members from across the state navigated their own way through 2003 Discovery Days on Kansas State University's campus. Organized by K-State Research and Extension 4-H Youth Development, the event attracted more than 370 teenagers and 100 adults from 41 counties. The objectives of 4-H Discovery Days are to stimulate personal growth; develop leadership skills; provide interactive learning experiences in diverse interest areas; provide new ideas and techniques that can be used in all youth clubs; and strengthen local 4-H youth development programs. The event provides opportunities to interact with students from other parts of the state and have fun learning. Mary Howell, volunteer from Marshall County, said the event gives youth a strong sense of self. "The teens at Discovery Days believe in and accomplish what they set out to do," Howell said. "The youth are in charge of their destiny, and it truly promotes the motto of making the best better."

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### 2003 County Fairs in Kansas— Families, Communities Participate

Every year, K-State Research and Extension plays a significant role in the success of county fairs. Working on project exhibits for the county fair allows time for families to come together. As an example, usually the whole family has a part in creating and maintaining a garden. Each 4-H'er may have his or her area to plan, plant, weed, water, and harvest. A county fair is a main event that also brings friends and neighbors together. County fairs help young people to learn new skills, set goals, and accomplish the work needed to display their projects. Direct feedback to 4-H'ers about their projects allows them to learn from their achievements and mistakes. Information about educational opportunities at county fairs, is available on the Website at [www.oznet.ksu.edu/topic5.asp](http://www.oznet.ksu.edu/topic5.asp) or year-round from the county-level network of K-State Research and Extension offices.

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### 2003 Insect Spectacular Attracted Emerging Entomologists

Crawling, chasing, and capturing insects were a few of the activities scheduled for regional youth and youth-group leaders at the 2003 Insect Spectacular in southwest Kansas. Seward County's K-State Research and Extension office organized the 10th annual entomology workshop in Meade. Activities at the workshop included insect games, a video, a poster contest, a create-a-bug contest, and an insect judging contest. A speaker discussed tagging monarch butterflies. The group participants also traveled to Meade Lake to learn about finding insects and to collect specimens. The workshop was open to 4-H'ers, scouts, teachers, project leaders, or anyone interested in learning more about insects in an informal, creative atmosphere.

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### Students Learn about Food Production

The Geary County K-State Research and Extension Office held an Ag Day for 560 third graders and 40 adults. Thirty volunteers assisted with the event. The impetus for the Ag Day is the fact that many children have no idea how their food is produced or what is involved before it gets to grocery stores. An Ag Day also helps them understand nonfood uses of agricultural products. One adult at the event commented that the students are amazed when they observe how wheat is transformed into flour. After the milling demonstration, the students were asked to do some math without the use of a calculator to figure the cost of wheat in a loaf of bread or what goes back to the farmer (less than five cents per loaf). The coordinator of the Ag Day relies on the Kansas Wheat Commission's display items and materials to train the volunteers. The Kansas Wheat Commission is a grower-funded, grower-governed wheat advocacy organization working to increase wheat producer productivity and profitability through research, education, and development of domestic and international markets.

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### Assisting Local Communities

K-State Research and Extension is increasingly valued by state agencies, regional health providers, the Legislature, and private organizations as the most engaged entity in local communities. As a result, K-State Research and Extension receives an increasing number of requests to convene, facilitate, or broker comprehensive planning efforts that assist local residents in sorting out and prioritizing the programs and technical assistance needed for healthy individuals, families, and communities. Mobilized with a continuum of knowledge for their lives, Kansans can tap deep sources of knowledge and skills beginning with prenatal care and extending to making decisions regarding the long-term needs of seniors.

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### Rural Development Training

The Kansas Legislature reported that the need for expanding the state's rural community development capacity greatly exceeds current programs. Because of the many challenges that face rural Kansas, especially in creating improved economic opportunities and enhanced quality of life, it is increasingly important to offer additional assistance and support to those communities. USDA Rural Development has offered advanced community development training, and K-State Research and Extension decided the same training should be offered to a wider audience, making it available to rural community leaders across Kansas. The first two rounds of Grassroots Community Development were offered last year in Great Bend in cooperation with USDA Rural Development and the Kansas Rural Development Council. That effort, along with additional future sessions, will lay the foundation to assist rural Kansans to better evaluate and build upon the strengths and opportunities of their local regions.

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### Kansas Communities Value Leadership Programs

In 1997, officials of the Huck Boyd National Institute for Rural Development, which is part of K-State Research and Extension, wanted to help provide leadership training to 500 Kansans in five years. That goal was not only surpassed but more than doubled, with 1,080 Kansas residents receiving leadership training in that time period. The statewide programs focus on developing leadership skills; encouraging involvement in community activities; working effectively with people; and gaining knowledge of each participant's community and outside resources available to it. According to a mail survey of participants, "the leadership programs had a positive impact on every one of those factors." Nearly 98 percent of the participants said they would recommend the leadership program to others. Participants said they volunteered for a total of 267 hours per week in their communities after they participated in the programs. The estimated financial value of volunteer service is \$16.54 per hour, which means that the leadership programs have a value in Kansas of more than \$4,416 each week. Annually, that's about \$230,000. Several state partners helped with the programs, including the K-State Research and Extension LEADS team, the Kansas Leadership Forum, and the Kansas PRIDE program.

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### The PRIDE Program and Community Health Projects

The Kansas Department of Commerce (KDOC) and K-State Research and Extension co-administer the PRIDE program, which provides technical assistance and training opportunities. The program addresses issues of planning, housing, community services, and community enrichment with citizen-initiated plans of action. The following Kansas PRIDE communities recently completed community health development projects: Alton—City Park facelift; Argonia—swimming pool project; Cunningham—playground equipment in City Park; Glasco—community preschool; Palco—volleyball and basketball courts; Park City—skateboard/rollerblade/BMX bike facility; and Potwin—Plant a Row for the Hungry.

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### Small Town's Success Offers Ideas for Others

At first glance, it would seem that Courtland, Kan., pop. 350, would have little in common with such population centers as Topeka or Lawrence. But thanks to the initiative of the people in that town and the PRIDE program, a long-standing community development program available through K-State Research and Extension, Courtland earned a Beaumont Foundation of America (BFA) 2003 Technology Award. The small PRIDE community received \$21,000 in computer equipment for the community library. Courtland's grant application was among 1,600 that were selected from 8,579 applications. Others in Kansas who earned 2003 Technology Awards were from major metropolitan areas—Lawrence, Topeka, Wichita, Manhattan, and Kansas City. The computer equipment the town received included 10 wireless laptops, a digital camera, laser printer, and storage cart. They were placed in the community library. School personnel will offer computer lessons, and the area agency on aging will facilitate classes for older residents.

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### Web Site Aids Communities in Economic Development

Current information for community leaders and others interested in building and maintaining a healthy economy is available on the World Wide Web at [www.agecon.ksu.edu/ddarling](http://www.agecon.ksu.edu/ddarling). The site includes Community Development Study Reports as well as newsletters, programs, bulletins, and other resources available through K-State Research and Extension.

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### Community Services and Volunteers Earn 2003 PRIDE Awards

Formoso, Kan., has a population of 122. It also has a new fire station. That might seem unnecessary for a town its size, but the Jewell County Fire District No. 6 serves more than 50 square miles in north central Kansas. Efforts to complete the new building have earned the tiny community one of 15 STAR Awards presented annually by the Kansas PRIDE Program, a citizen-based community development program. The STAR Awards, which honor completion of a single community improvement, and 15 Community of Excellence awards, which honor comprehensive community improvements, were presented at the 2003 PRIDE Day celebration Unity in the Community. The annual, day-long celebration included community improvement workshops and networking opportunities to help Kansas communities learn from one another. Sixty-six Kansas communities participated in the PRIDE Program in 2003. The program typically helps participating communities to identify needs, resources, and to determine a realistic plan to work to meet those needs. Projects vary because each community is unique.

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### Monitoring Retail Activity in Kansas

Trade Pull Factors produced by K-State Research and Extension estimate the relative strength of the retail community in every county and in many cities across Kansas. Trade Pull Factors are used by big businesses such as the McDonald's Corporation and by chambers of commerce in small cities like Columbus. Businesses use the data to determine the relative strength of the retail community in markets across Kansas. Community groups monitor the data to gauge the performance and overall health of the local business environment. The Trade Pull Factor reports are sent to all county research and extension offices, small business development centers, certified development companies, and field staff of the Department of Commerce.

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### Education and Early Intervention Reduces Juvenile Crime

The OPEN-K program of K-State Research and Extension focuses on education and early intervention to reduce crimes by juveniles in Kansas. The acronym stands for Opportunities for Prevention Education and Networking in Kansas. This federally funded effort aims to reduce juvenile crime by improving the quality of life for youth and communities through after-school projects, mentoring, and parent education. Professional development programs for extension personnel involved in this area are another part of OPEN-K.

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### SpaceTech Offers Youth Rocketry, Robotics Experience

At the 2003 SpaceTech Experience in Hutchinson, youth ages 12-18 transformed a pile of junk into a robot, teaching them skills in engineering, vision, mechanics, mathematics, physics, plus a lot of elbow grease. Although partially sponsored by Kansas 4-H, all youth, whether 4-H members or not, are encouraged to participate. Formerly known as the Aerospace Experience, the four-day event combines aerospace and technology. The experience started as an enhancement to the 4-H rocketry project. Now the project area includes rocketry, astronomy, robotics, remote control, and the like. Tony Foster, a 12-year 4-H club member from Wabaunsee County, was an initial member who helped to get the program off the ground. Foster said he learned from the night launches, flight simulators, and looking at planes up close. Ben Schwantes, 4-H'er from McPherson County, said his interest in space started in childhood. "I've always been interested in space stuff," Schwantes said. "I went to this 4-H Experience and got involved on the action team because I wanted to be a part of it." For three years, Schwantes has been selected to travel to Oshkosh, Wis., for the Kid's Venture at the Oshkosh Air Show. Each year, the top participants at the SpaceTech Experience are invited to attend the Wisconsin event to help teach others. The Kansas Cosmosphere and Space Center; N.E. Kansas Amateur Astronomer's League; Federal Aviation Agency; University of Kansas Aerospace Department; Don's Hobby Shop; Wichita Exploration Place; and the K-State College of Technology and Aviation are partners in the SpaceTech Experience.

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### An Opportunity for Inner City Kids to Go to Camp

Sixty-six under-served youth from the greater Kansas City area received scholarships to attend Open Camp at Rock Springs 4-H Center in Junction City. For one Kansas City boy, it was the first time in his life that he had a summer vacation story to share with classmates and friends. The K-State Research and Extension camp concept began four years ago. It's intended to provide opportunities to youth who might not otherwise have them. The program was initially funded by a juvenile justice program. For 2003, K-State received a \$10,000 grant from the Ewing Kauffman Youth Advisory Board to fund the camp experience for the metro-area youth. Students ages 6-15 who received the scholarships were identified through community centers, the Salvation Army, and supplemental nutrition programs such as the federally funded Women, Infants, and Children (WIC) program. The students' four-day camp experience provided a number of firsts, including canoeing, horseback riding, hiking, and evening campfires. Here's what a few of them said about their experience at the camp:

**A 15-year-old boy wrote:** *Thanks for giving me a chance to be a camp counselor. I would like to come back. I think everyone liked me this year.*

**A 12-year-old girl wrote:** *I love this camp so much. The counselors are amazing role models. I can't wait to come back as a counselor myself. When I come to Rock Springs, I don't have a care in the world.*

**A 12-year-old boy wrote:** *This has been another home for me. All the counselors have been friends like I have never had.*

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### 4-H CARES—Helping Youth Stay Away from Drugs

4-H CARES (Chemical Abuse Resistance Education Series), is a youth program designed to improve self-esteem and family interaction, promote life skills, and teach about chemical abuse. Many youth organizations have included 4-H CARES in their educational campaigns. Nearly all the other states and a number of school systems and provinces in Canada have requested the 4-H CARES educational material. It has been named one of 20 exemplary prevention programs in the nation by the National Association of State Alcohol and Drug Abuse Directors and the National Prevention Network.

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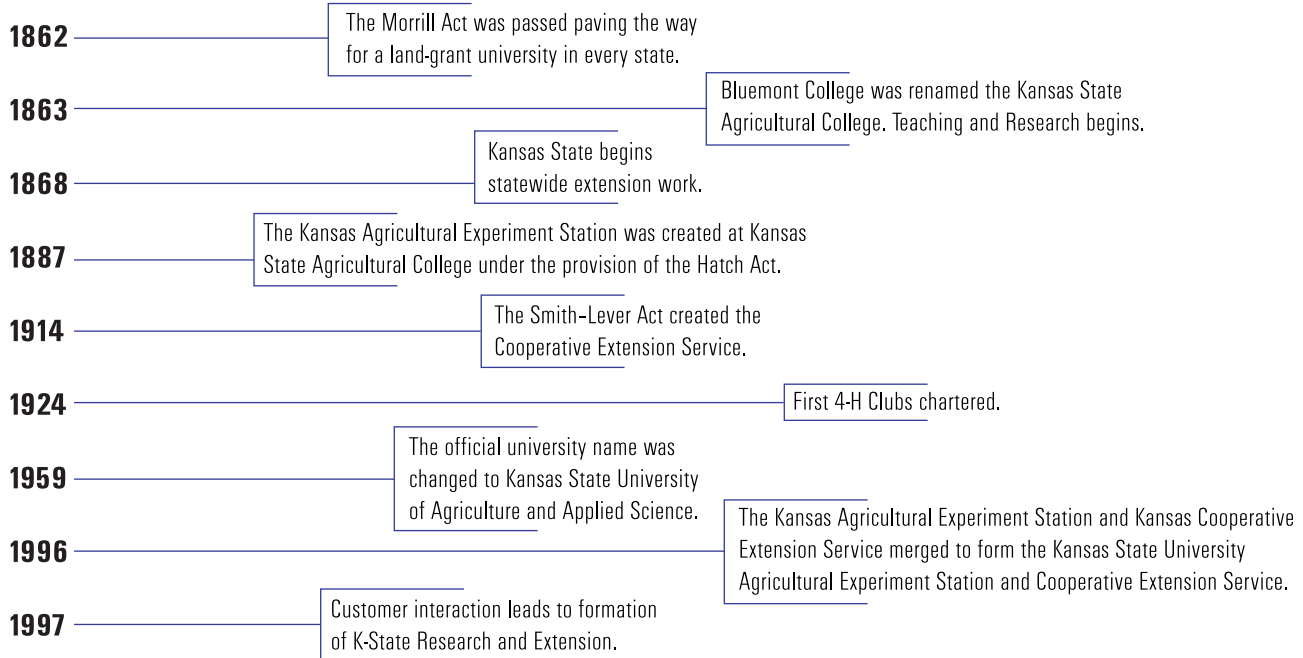
## **Weather Data Library—**

Mary Knapp  
23 Umberger Hall,  
785-532-6247, [mknapp@oznet.ksu.edu](mailto:mknapp@oznet.ksu.edu)

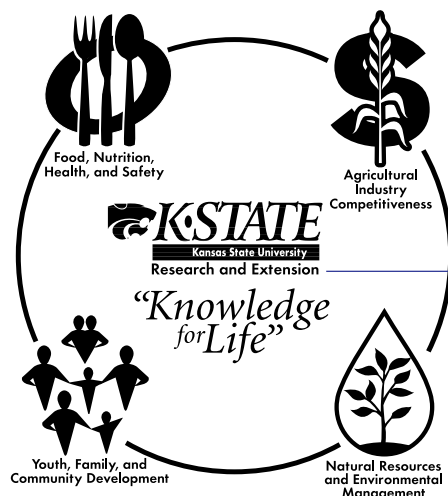
## **Wheat Genetics Resource Center—**

Bikram Gill  
4304/4308 Throckmorton Hall,  
785-532-1108 / 532-1353, [wgrc@ksu.edu](mailto:wgrc@ksu.edu)

# Brief History of K-State Research and Extension



Today, K-State Research and Extension employs more than 300 research scientists, approximately 180 faculty specialists and program leaders, nearly 270 county and area specialists, and more than 400 support staff in 23 departments in five different colleges. In addition to main campus, K-State Research and Extension personnel are located in 105 county offices, eight experiment fields, four area offices, three research centers, and three research-extension centers.



## Our Mission Statement:

We are "dedicated to a safe, sustainable, competitive food and fiber systems and to strong, healthy communities, families and youth through integrated research, analysis, and education."



# Fiscal Year 2004 Annual Budget

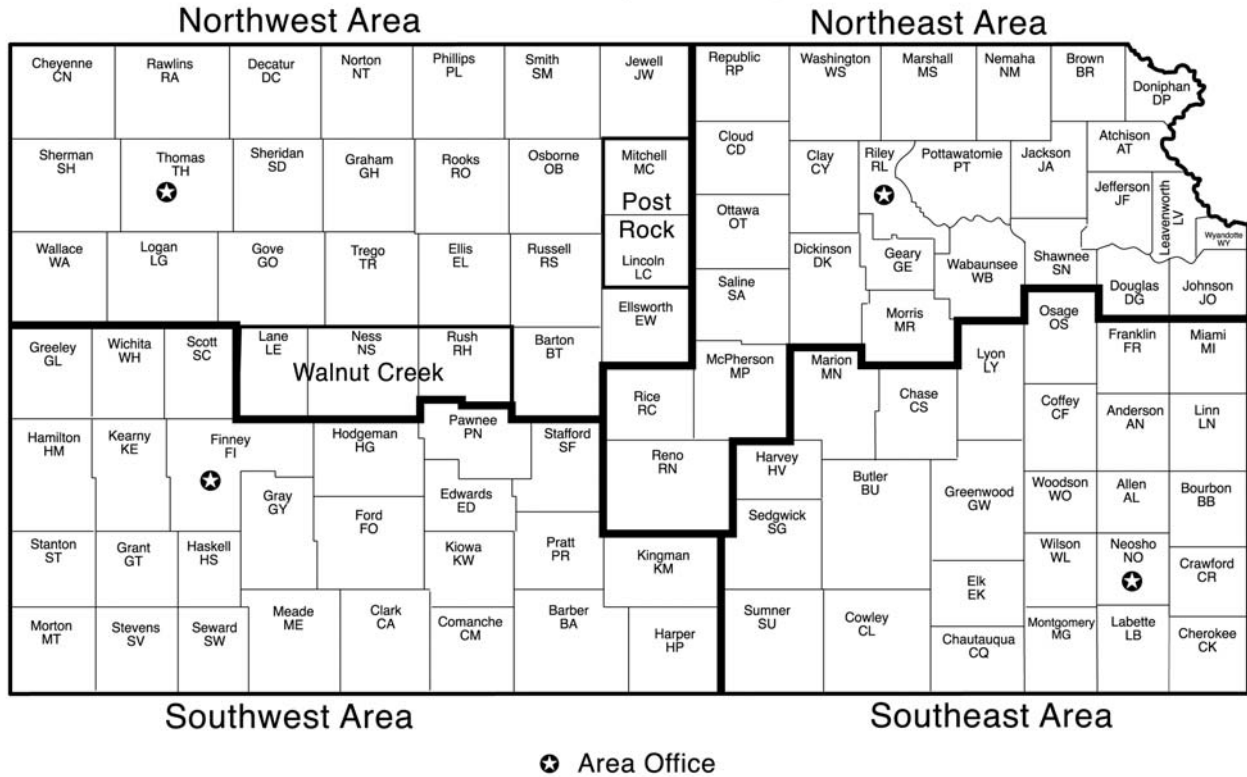
	<u>Amount</u>	<u>Percent</u>	<u>FTE's</u>
<b>Agricultural Experiment Station</b>			
State Appropriation	28,343,979	51.10%	408.79
Federal Appropriation (Hatch, RRF, McStennis)	3,396,548	6.12%	75.00
Grants, Contract, Other Funds	23,729,378	42.78%	255.25
Total Agricultural Experiment Station	<u>55,469,905</u>	<u>100.00%</u>	<u>739.04</u>
<b>Cooperative Extension</b>			
State Appropriation	17,586,786	54.93%	289.35
Federal Appropriation (3b&c, Special Needs)	4,581,483	14.31%	38.04
Grants, Contract, Other Funds	9,850,256	30.76%	139.47
Total State & Federal Budget	<u>32,018,525</u>	<u>100.00%</u>	<u>466.86</u>
Funds Provided by Counties\Districts			
Agent Salary & Benefits	8,257,597	47.85%	161.10
Clerical Support	4,000,000	23.18%	0.00
Operating Support	5,000,000	28.97%	0.00
Total County Budget	<u>17,257,597</u>	<u>100.00%</u>	<u>161.10</u>
Total Cooperative Extension	<u>49,276,122</u>		<u>627.96</u>
<b>Physical Plant State Funds</b>	<u>749,016</u>		<u>24.00</u>
<b>Total K-State Research &amp; Extension</b>	<u>105,495,043</u>		<u>1,391.00</u>
<b>K-State Research &amp; Extension Combined FY 2004 Budget</b>			
State Appropriation (AES\CES\Physical Plant)	46,679,781	52.90%	722.14
Federal Appropriation (AES\CES)	7,978,031	9.04%	113.04
Subtotal General-Use Funds	<u>54,657,812</u>	<u>61.94%</u>	<u>835.18</u>
Grants & Services	33,579,634	38.06%	394.72
Total State & Federal Budget	<u>88,237,446</u>	<u>100.00%</u>	<u>1,229.90</u>
Funds Provided by Counties\Districts			
Agent Salary & Benefits	8,257,597	47.85%	161.10
Clerical Support	4,000,000	23.18%	0.00
Operating Support	5,000,000	28.97%	0.00
Total County Budget	<u>17,257,597</u>	<u>100.00%</u>	<u>161.10</u>
Total K-State Research & Extension	<u>105,495,043</u>		<u>1,391.00</u>

Note 1: Includes state, federal and private grants and contracts, plus fee for service income.

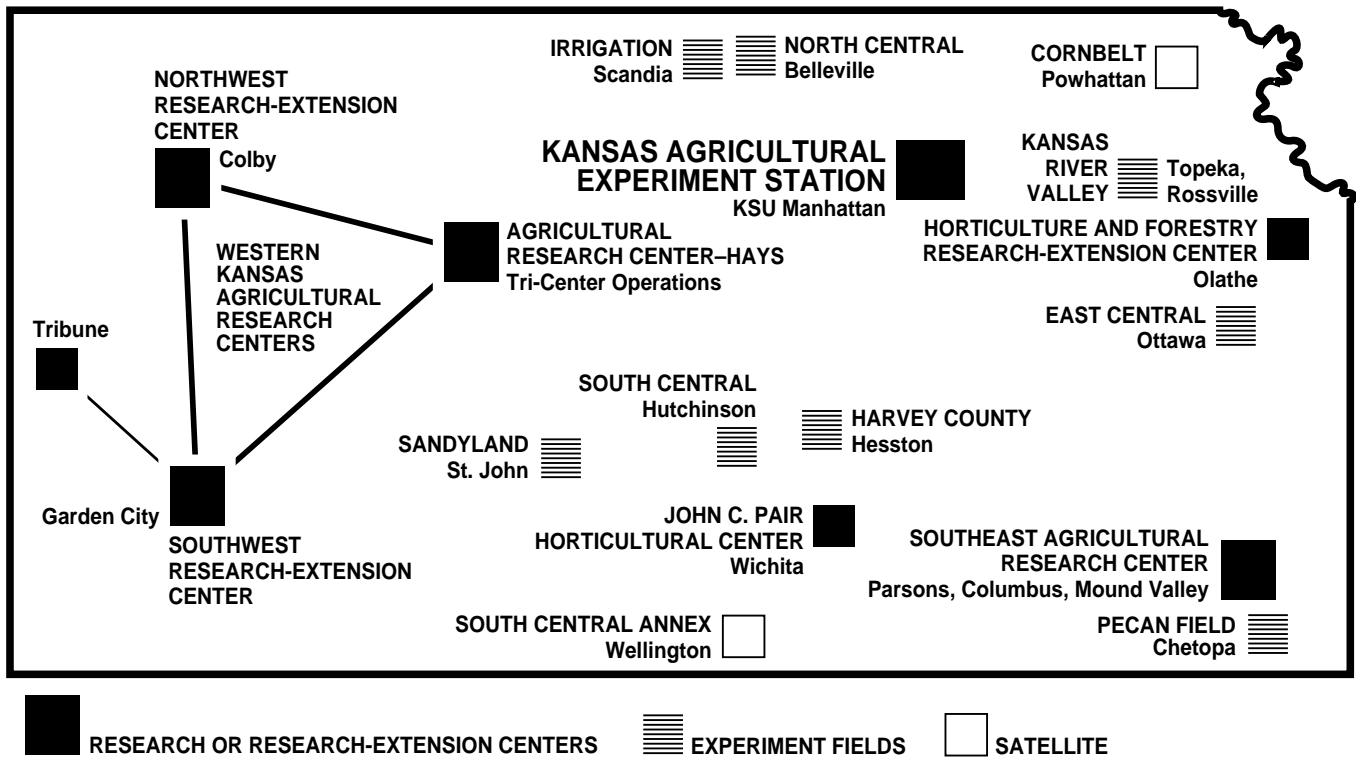
	<u>Amount</u>	<u>Percent</u>	<u>FTE's</u>
<b>Budget by Classification</b>			
<i>General-Use State and Federal Fund</i>			
Faculty & Administrative Salaries & Benefits	38,970,020	71.30%	589.74
Classified & Student Salaries & Benefits	9,074,145	16.60%	245.44
Operating Expenditures	6,613,647	12.10%	0.00
Total General-Use State and Federal Fund	<u>54,657,812</u>	<u>100.00%</u>	<u>835.18</u>

# K-State Research and Extension Statewide Operations

## Areas Served by Area Specialists



## KANSAS STATE UNIVERSITY STATEWIDE AGRICULTURAL RESEARCH SERVICES



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**Kansas State University Agricultural Experiment Station and Cooperative Extension Service**

**Manhattan, Kansas**

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*January 2004–2,500*