



K-State Research and Extension
Kansas State University



An
Informal
Report

to the Kansas Legislature
January 2006



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Director's Introduction

I have had the pleasure of serving as dean of the Kansas State University College of Agriculture and director of K-State Research and Extension for a little more than a year. Before I arrived at K-State, I perceived that K-State Research and Extension faculty and staff were working to address the wants and needs of the people of Kansas. It's a pleasure to know that perception was accurate. It is essential that we stay connected to the people and address their issues, whether those issues are related to production agriculture, the environment, family, or community.

As I stated in last year's report, the motto of K-State Research and Extension is "Knowledge for Life." I believe this is a great motto for a land-grant university, such as Kansas State University. It means developing new knowledge and empowering people with that knowledge, whether they are our youth and 4-H clubs or our senior citizens. In order to accomplish this, K-State Research and Extension is focusing its efforts on Five Core Mission Themes: Natural Resources and Environmental Management; Healthy Communities: Youth, Adults, and Families; Safe Food and Human Nutrition; Competitive Agricultural Systems; and Economic Development through Value-Added Products.

Additionally, K-State Research and Extension and the College of Agriculture, as well as Kansas State University, are developing areas of focused excellence. We cannot be everything to everyone; therefore, we have to focus on serving the highest priorities. Obviously, this also requires that we have the breadth to address other issues. Whether we develop the knowledge within K-State Research and Extension or work with another land-grant university or an industry partner to develop that knowledge, we must disseminate that knowledge in the classrooms on the K-State campus and the informal classrooms in all 105 counties across the state of Kansas.

This report provides a snapshot of the activities and accomplishments of K-State Research and Extension. We have highlighted projects and programs that resulted in true impact for ranchers, farmers, youth, families, and communities within Kansas. I can truly say that the research and extension application has made a difference and will continue to make a difference for the citizens of Kansas, the region, the nation, and the world.

Sincerely,

Fred A. Cholick
Dean and Director



Wheat Breeding Returns \$99 Million Each Year to Producers

Wheat is used to make bread, bed down stalls, and serve as an element in many household items, including plastic bags, postage stamps, and golf tees.

Without a doubt, wheat serves countless purposes in our daily lives.

But for more than 24,000 Kansas producers and their families, wheat has an even greater purpose: It's a living.

"There's very stiff competition in production agriculture," said Vance Ehmke, producer in Dighton, Kan.

"You've got to be constantly using wheats that have the most profit potential."

Fortunately, producers like Ehmke aren't at it alone. K-State's wheat breeding program works year round to develop higher yielding, more resistant varieties available to the public.

According to a recent study led by agricultural economist Andrew Barkley, this research has been increasing Kansas producer revenues by about \$99 million annually since 1977. The varieties developed by K-State are paying off for the producers.

"For a wheat farmer in Kansas, the K-State program is invaluable," said Jeff Bahr, a no-till producer and share cropper in Barber County, Kan.

K-State's wheat breeding program began in 1874, followed by the establishment of a selection program in 1906. K-State's first improved variety, Kanred, was released in 1917. Currently, more than 1,000 crosses are performed each year throughout the state.

In recent years, the K-State improved varieties have been planted to nearly

three-fourths of the total Kansas wheat acres in production.

By offering the varieties publicly and regularly introducing new crosses, K-State is giving Kansas wheat producers the helping hand they need, Bahr said.

"It's paramount that we have a wheat breeding program," he said. "Somebody has to do it, and that's where K-State's program is filling a niche nobody else would. Every few years, when a new wheat is released, I'm ready for it."

Ehmke agreed.

"K-State has really, over the years, distinguished itself as a mover and a shaker."

But the most important impact of the wheat breeding program for Ehmke is the overall economic development it



Louise and Vance Ehmke, Dighton, depend on K-State wheat varieties to help them stay competitive in the agriculture market.

initiates in Kansas communities. By investing in the research needed to keep wheat varieties producing well and adapted to Kansas climate and disease, K-State is contributing to the survival of the family farm, he said.

“You are creating something that allows farmers to increase their net income, remain competitive, and stay on the farm,” Ehmke said. “With these new K-State varieties, if you’re making more money, it increases the possibility you can get one of the kids involved in the operation and keep agriculture going.”

Ehmke also sees a continued focus on research as a potential solution to greater economic strain on agriculture, much of which is being addressed with federal aid.

“Rather than having individuals supported federally, we’d rather be doing this on our own with better yielding varieties,” he said. “K-State plays a role in getting us in that direction.”

Still, for producers like Bahr and Ehmke, it is simply a comfort knowing they have a partner in K-State.

“We owe a great deal to them for their participation in this,” Ehmke said. “Every day you wake up you’ve got to run hard, and it sure is nice having K-State on your team.”

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Wheat Varieties May Fight Cancer

A research partnership between three K-State Research and Extension departments and researchers at Wichita State University and the University of Missouri studied plant-based – or phyto – estrogens called lignans and other antioxidants in wheat bran that appear to suppress cancer in the colon.

Ron Madl

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Enhancing Soybean Production

Genetic improvements of soybean varieties in Kansas increases farm revenue by more than \$3 million per year. Genetic improvement of soybean varieties in Kansas increases yields by about .2 bushels per acre per year, and farm revenue by more than \$3 million per year.

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Providing Resources to the World

The Wheat Genetic and Genomic Resources Center stores stocks of wild wheats and wheat-related grasses that help breeders worldwide preserve and improve varieties. Some of the center’s accomplishments include releasing 47 improved germplasm, training more than three dozen visiting scientists and students, and leading efforts on gene sequencing.

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TV Show, Curriculum Keep Kansas Kids a Cookin' and Movin'

When her students get excited about eating fruit in class, Deb Evans figures she's doing her job.

For the past two years, Evans – a family and consumer sciences (FCS) and physical education teacher at Fredonia Middle School – has used curriculum developed by Kansas State University and its production of the television program, *Kids a Cookin'*.

The show features a Kansas kid – sometimes as young as 4 years old – preparing a simple recipe with the show's adult host. The food they prepare tastes great and is healthy, too.

"I have used the *Kids a Cookin'* program in my 7th and 8th grade FCS classes and with special needs students for the past couple of years," Evans said.

"Last year, I used the videos and recipes that were provided through a team nutrition grant that encouraged students to eat more fruits and vegetables."

Evans said her students at Fredonia Middle School prepared six recipes and "liked every one," though their favorite was the fruit dip with fresh fruit. They had "success and fun in the kitchen while also learning ways to make healthier eating choices," she said.

"The students benefited by learning simple recipes that they could make at home for themselves or their family," Evans said. "They also learned to make simple, healthy snack recipes that could improve their eating habits and promote healthy lifestyles."

The show is produced in English and Spanish for K-State Research and Extension's Family Nutrition Program (FNP), which is funded by the U.S. Department of Agriculture's food stamp nutrition education program through a contract awarded by the Kansas Department of Social and Rehabilitation Services.

The show targets limited income individuals and families, and it has been distributed broadly across the state.

In fall 2005, K-State's Department of Communications released a new version of the program, called *Kids a Cookin' and Movin'*, which encourages basic cooking skills, good nutrition, healthy food choices, food safety, and physical activity. The newer materials include



Deb Evans, Fredonia Middle School teacher, uses curriculum developed at K-State to show her students healthy and fun ways to prepare snacks and meals.

curriculum, tours to help kids make healthy eating choices, food quizzes, and more. Each program also is shown with closed captioning.

The show is distributed through K-State Research and Extension FNP offices across Kansas.

“It has had a positive influence on my FCS curriculum,” Evans said. “My principal was very supportive and encouraged me to keep Kids a Cookin’ in my 6th grade curriculum this school year.”

Julie Voelker, a mother whose daughters attend North Lawn Elementary School in Neodesha, thinks the show’s greatest impact is in the classroom materials.

“My daughter, Tina, was lucky enough to participate in the TV program. Courtney, my other daughter, was able to participate using the classroom workbook,” she said.

Voelker said Neodesha is a community of mainly working-class parents who may not have the time to devote to good food preparation.

She noted: “The Kids a Cookin’ materials really target easy snacks that kids can fix themselves.”

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Kids Learn Better Health Habits

About 125 Shawnee County third- and fourth-graders were visited last year by “Professor Popcorn,” a K-State Research and Extension nutritionist who was teaching about the USDA’s Food Guide and the benefits of exercise. A survey of the students indicated that 15 percent were eating more fruits, vegetables, and dairy products; and 16 percent were more physically active.

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Save and Build Wealth, Not Debt

The Kansas Saves campaign, sponsored by K-State Research and Extension and local community partners, is part of a nationwide effort to boost savings. Participating communities feature information and local activities on how to build savings and how to reduce or manage debt wisely.

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Clarifying Medicare Options

K-State Research and Extension agents have made hundreds of presentations and answered thousands of phone calls to help people understand the new Medicare Prescription Drug Program. Agents and volunteers also manned the Senior Health Insurance Counselor for Kansas (SHICK) hot line 1-800-860-5260.

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Working Out While Walking Kansas

Bill Carson is amazed at what a little teamwork and positive attitude can do.

During an eight-week period in 2005, the 67-year-old with diabetes and five teammates walked across the state of Kansas. And they did it without ever leaving their hometown of Manhattan.

The team was one of more than 3,000 groups across the state who joined Walk Kansas, a program coordinated through K-State Research and Extension. The goal for each team of six is to walk the length of the state of Kansas, a distance of 423 miles, by working out regularly and recording their mileage.

While walking is an emphasized activity, team members can log miles by participating in other forms of physical activity, such as biking, swimming,

weight lifting, running, and – in some cases – even dancing.

The concept, it seems, works for Carson and many others.

“I have made a wonderful companionship with a lot of people, and they all helped me stay motivated,” he said.

Walk Kansas, coordinated through local K-State Research and Extension offices, promotes physical activity for all ages from young children to older adults. It can be a family experience and bonding time, or even an opportunity to meet new friends.

The program has grown from about 5,900 participants in 2002 to nearly 19,000 in 2005.

The U.S. Centers for Disease Control recommends a minimum 30 minutes of

physical activity at least five days each week to maintain one’s health. Mike Bradshaw, extension health specialist for K-State Research and Extension, said that about four out of five people do not meet that requirement, and one in three adults is obese.

Walk Kansas is helping change that trend.

“Last year, we had 90 counties and 3,047 teams that registered,” said Bradshaw, adding that surveys of Kansans show that “we have more people walking and eating healthier.”

In Riley County, about 1,100 Kansans participated in 2005.

Many teams chose the option to track how many fruits and vegetables they ate each day. The goal was to eat five servings of fruits and vegetables daily.



Bill Carson, Manhattan, enjoys the exercise and health benefits of participating in the K-State Research and Extension Walk Kansas program.

“Out of 220 responses to a post-event survey, only one person did not increase fruit and vegetable consumption during the program by at least one serving per day,” said Sharolyn Jackson, a K-State Research and Extension agent in Riley County.

Adds Carson: “It’s great because it helps you realize you should be eating more fruits and vegetables.”

Statewide, the program is evaluated using the U.S. Centers for Disease Control’s Behavior Risk Factor Surveillance System.

“Every year we post maps on bulletin boards to track everyone’s progress,” said Susan Peterson, a participant and recruiter for the program. “We will also meet for a coffee celebration a few

months afterwards to talk about how well everyone is doing. We have one team member who lost 30 pounds.”

Participants also reported that in addition to increased activity during the eight weeks of the program, many of them were able to sustain physical activity for at least six months afterwards.

“Our teams at the Manhattan Seniors Center have grown from one to six this last year,” Peterson said. “We had a lot of people with positive experiences, and I know we’ll have even more next year.”

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Offering Multilingual Training

In Wyandotte County, a newly hired Spanish-speaking agent is teaching classes to residents on such topics as diabetes, nutrition, weight, exercise, proper use of medicines, and radon and lead education. All materials are available in English and Spanish. Two results include residents asking for lower-cost medicines from their physicians, and trying lower-fat ingredients in traditional foods, such as spinach enchiladas.

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Dealing with Limitations

Kansas AgrAbility is a K-State Research and Extension service project that assists farmers with disabilities and limitations, such as those caused by chronic disease, like arthritis. For more information, visit the Kansas AgrAbility Web site at www.oznet.ksu.edu/agrability or call 800-526-3648.

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Beef Cattle ID Technology Aids Producers, Consumers

St. Francis, Kan., cattleman Shannon Grover has done the math, and he likes what he sees.

Grover operates the beef verification center in Cheyenne County. He said he is finding that the ability to track information on slaughtered cattle is bringing an average \$10 premium from packers if producers sell through a source verification program.

And the cost for the tags? About four bucks.

“Everyone’s getting a premium if they use this system,” Grover said.

K-State Research and Extension and Kansas Farm Bureau are working together on animal identification technology. KFB’s Beef Verification

Solution program started in 2004 and has placed 26 beef verification centers around the state.

“I can track my cattle from the cows to the calves to the slaughter house,” Grover said. Over the years, as I build up an information base, I know what cows are doing what, what the trend is, and what cow doesn’t have good calves.”

The program involves e-mail messages in which the producer sends initial information and then receives carcass data after the animals have been slaughtered.

“In the long run, this technology will assist in providing protection in the area of herd health by facilitating the traceability of foreign animal diseases and

routine health surveillance by federal and state animal health officials,” said K-State Research and Extension beef specialist Dale Blasi. “In the short term, this technology will likely be required by beef processors for those producers who wish to participate in market programs targeted for export.”

“We’re going to get a lot of good out of the beef verification program,” Grover said. “We’ll be able to manage our cow herd with the information from the carcass data after they’ve been slaughtered.”

According to Grover, even if producers don’t sell cattle on the source verified program, they will still get \$1 premium from most packing plants just from



Shannon Grover, St. Francis rancher, sees many advantages to using an electronic animal identification system.

having a radio frequency identification tag (RFID), which is the tag used in the program.

“All the producers have to do is put the tag in and send the sheet to me,” Grover said. “Even the guys who don’t have the software and electronic scanners can still reap the benefits.”

The system meets the U.S. Department of Agriculture’s requirements for the National Animal Identification System, which calls for mandatory animal identification by Jan. 1, 2008.

Blasi said K-State Research and Extension has worked to help producers understand such benefits as cost analysis and its application into existing record-keeping systems.

“Since the packers are calling for it, the producers are going to use it,” Grover said.

“Once we all start using it, it’s going to become really handy.

“The best part,” he added, “is that we’re going to be able to make management decisions using the program’s data.”

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Increasing Demand for Sorghum

K-State has established working relationships that will increase demand for U.S. grain sorghum and improve the quality of the crop worldwide. In West Africa: conducted demonstration experiments with broiler chicks to show the nutritional merits of sorghum-based diets; hosted a producer field day for approximately 50 key poultry growers; helped form the Nigerian Poultry Producer’s Assoc. In Central America: gave seminars to promote sorghum as a component in animal feeds.

Research Yields Better Sorghum

K-State researchers have developed large-seed sorghum hybrids that will lead to crop improvement and have higher crude protein and fat content than conventional hybrids.

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Protecting Surface Water

Researchers have determined simple, cost-effective measures to help livestock producers prevent runoff of pollutants into nearby surface waters. Proper range management, such as strategic placement of shelter, feed, and minerals away from water sources, are inexpensive and take little time. Another solution is to plant vegetative cover or a buffer strip near the stream, creating a barrier for runoff.

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Research Helps Improve Golf Courses, Home Lawns

Forgive Dick Stuntz if he's just a bit proud about the lush, green fairways at the Alvamar Golf Course in Lawrence.

As the course's superintendent, he's certainly entitled to brag a little; however, he will be the first to say he wouldn't be able to do it without the help of K-State Research and Extension.

"K-State research is the heart and soul of what we do as golf course superintendents," Stuntz said. "Turfgrass research is just vital. Jack Fry does an awful lot of what I call applied research – the kind of things that lead us to answers on day-to-day issues. It's very important in our profession to have a person who can do that."

Stuntz has been working with Fry – a professor in the Department of Horticulture, Forestry and Recreation Resources, for more than a decade – trying to find ways to conserve water and limit the use of pesticides on turfgrass. Fry said it is impossible to know how much a partnership such as this means to his work.

"The relationship we have with courses such as Alvamar is invaluable," Fry said. "Dick does a great job of bringing us ideas and stimulating thoughts, because he sees things we don't see sitting in an office."

Fry added that though much of his research is done on golf courses, his findings can be applied to several turfgrass entities.

"About 80 percent of my research focuses on golf course turf because the industry is good at sponsoring research at the university, and the research can be applied to several other areas such as lawns and nurseries," Fry said.

Larry Ryan, of Ryan Lawn Care in Overland Park, said he relies on K-State turfgrass research for several reasons. He uses information such as annual rating of grasses, best spring and fall grasses, color quality, and drought resistance to make recommendations to his clients.

"We seed 1,000 lawns every fall, so we use research to make our turfgrass selections," Ryan said.



Dick Stuntz, Alvarado Golf Course superintendent, uses K-State research to keep the fairways at the Lawrence course in tip-top shape.

He added that using research to pick the highest quality seeds has made his business one of the leaders in the Kansas City area turfgrass industry. However, his main focus is to give his customers an end product that will look nice and take less water to maintain.

“We take information we get from the universities and try to show people what is real and what is a fad,” said Ryan, who has been in business for 18 years. “If we weren’t scientific, we wouldn’t have the success we’ve had.”

Decades past, Ryan’s father made regular trips to Manhattan as he built the business on K-State research.

Stuntz noted that Alvarado also was built using university research with a dream of bringing country club conditions to a public golf course.

In 1966, Alvarado was the first golf course to utilize zoysia grass on its fairways. According to Stuntz, the course is currently recognized as the only one to have maintained zoysia fairways since its inception.

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Center Brings Ideas to Life

The Innovation Center works with agri-food and related businesses, agritourism businesses, small towns, and rural communities, developing solutions to challenges. It has helped dozens of clients, large and small, identify and adapt to changing markets and competitive environments.

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Building Community Leaders

The Kansas Environmental Leadership Program (KELP) is a statewide program to train community leaders. During the seven classes, 153 people have registered. The participants work as teams on Applied Leadership Projects with local or statewide environmental impact. Go to www.oznet.ksu.edu/kelp.

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Developing Varieties for Kansas

Results from bedding plant field trials at research centers in Haysville, Olathe, Hays, and Colby benefit consumers, communities and the greenhouse, garden center, and landscape industries. The centers combine their research, which covers two heat tolerance zones and two cold hardiness zones, to determine the best flowers for the Kansas prairie climate and soils.

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Nutrition Program Benefits Parents, Kids

When 21-year-old Jaime Schalk was pregnant with her first baby, she admits she was equally excited and nervous.

Schalk, who lives in Scammon, Kan., said her anticipation of the birth was tempered by being unsure of how to care for the newborn. When her doctor recommended a program that helps families, she was more than willing to give it a try.

During Schalk's pregnancy, Joyce Sanders, a nutrition assistant with the Expanded Food and Nutrition Education Program (EFNEP), visited Schalk's home once a month.

"They had me keep a record of everything that I was eating during my pregnancy," remembered Schalk, now age 25 and expecting her third child.

"Many breast-feeding mothers just don't know what to eat," said Sanders, who retired in late 2005 after working 15 years with the program. "Once mothers learn what they need to eat to provide nutrition for the baby, they are able to do it. Healthier eating means a healthier mom and baby."

After Schalk's first pregnancy, she went to EFNEP breast-feeding classes and was able to discuss questions and concerns with other nursing mothers. EFNEP helps families learn about basic nutrition, food budget management, food preparation, and food safety. It was founded in 1969 to help people with limited resources by teaching them about food safety and how to improve their health.

Nutrition assistants help families learn in homes, schools, assisted-living centers, prisons, clinics, and libraries. In Schalk's case, "Anytime I needed help, they were there," she said.

The participants learn that helpful family and infant feeding information, food safety tips, and food shopping skills are shared in several different languages. In Kansas, the assistants are teaching homemakers and groups whose principal language may be English, Spanish, or Vietnamese.

"The nutrition assistant tells you what fruits to eat, and what things you want to eat more of to improve your baby's health and development. It really taught me how to eat properly," Schalk said.



Jaime Schalk (right), Scammon, stays in touch with nutrition assistant Joyce Sanders, who offered support to Schalk during her first pregnancy.

In 2004, there were 1,551 Kansas families and 2,096 children enrolled in EFNEP. There were 6,594 youth contacts made through the program while 743 EFNEP participants were pregnant. In addition, 69 percent of the families were at or below the federal poverty level.

EFNEP participants work with other assistance programs such as WIC, the Food Stamp program, commodity foods, and child nutrition programs. In surveys, participants said:

- 71 percent of them safely thaw their food more often,
- 77 percent use food labels more often to make their health choices,
- 79 percent no longer run out of food before the end of the month,

- 87 percent improved in food resource management,
- 93 percent improved in one or more nutritional practices, and
- 69 percent improved in two or more nutritional practices.

Four years after their initial meeting, Schalk and Sanders remain friends. Jaime Schalk recently took her healthy toddlers, 4-year-old Wyatt and 17-month-old Kody, to visit Sanders at her home in Pittsburg to play ... and eat fruit, naturally.

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Anger Management: Program Teaches Parents Self Control

Nearly 300 parents responded to a survey indicating they have made “life-changing impacts” as a result of their participation in Fireworks, an online course that focuses on anger management in adult-child relationships. Surveys indicated that parents found positive solutions for anger management by “attending” these online sessions. More than 5,000 people have visited the course Web site at www.ksu.edu/wwparent/courses/fireworks/.

Charles A. Smith

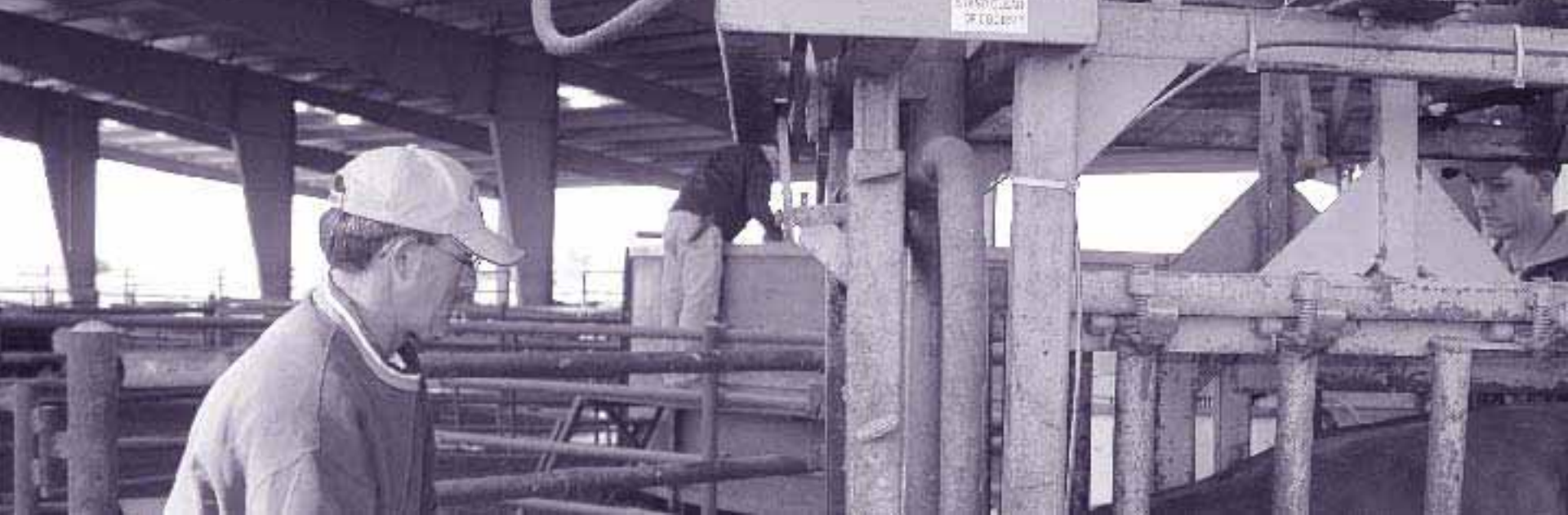
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Adding Value to Kansas Products

K-State and the Kansas Rural Center are leading efforts to help Kansas producers develop value-added enterprises, through a mentoring project titled Guided Explorations of Value-Added Products and Enterprises. For example, the Certified Kitchen Workshops help entrepreneurs capitalize on consumers’ growing interest in buying such local products as bread, baked goods, salsa, baking mixes, jams, jellies, and more. In 2005, 12 products processed by Kansas producers were created; and 25 producers either began small-scale value-added processing or expanded their value-added operation.

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Ultrasound Helps Producers Boost Cattle Health, Profits

He's probably not taking it for granted, but Kansas cattle producer Daryl Bott is beginning to expect a nice price boost on cattle he's been sending to processors.

"On one of our recent cattle shipments to IBP in Emporia, we earned a \$34 premium per head by hitting the grid," Bott said.

The "grid" is a ranking of carcass quality, used by processing plants to award premiums for cattle that fit industry's top standards – or, possibly discounts for cattle that don't meet those standards.

Bott Cattle Company Inc., located in southern Washington County, is one of several Kansas operations implementing ultrasound technology that was created

by K-State Research and Extension researcher John Brethour.

Brethour, who is based at the Agricultural Research Center – Hays, developed the technology to predict the carcass quality of live animals, which enables producers to more efficiently grow cattle that meet industry's highest standards.

Brothers Daryl and Doug Bott and father Delwin manage a 3,500-head feedlot. They have used ultrasound the past three years to improve their return per head.

"Ninety percent of the time, it pays us to use ultrasound to scan the cattle," Bott said. "Even without the premium incentive, ultrasounding is cost beneficial, because it tells us if a steer or heifer would not benefit from more feed. This

way, we don't put inefficient gain on it."

The Botts learned about ultrasounding cattle from Dr. Phil Bentz, a veterinarian from Washington who learned about ultrasounding from Brethour.

"Ultrasounding allows us to evaluate the cattle, carcass-wise, and project how they will finish out," Bentz said. "With this technology, we should be able to place 80 to 90 percent of the cattle in the choice grid."

Like most cattle producers, the Botts previously sorted their cattle by sight, which is not as accurate.

"When we sorted visually, we would get more cattle finishing with a yield grade four, meaning overfat," Bott said. "Now, we rarely see a carcass with a yield grade four."



Daryl and Doug Bott, Washington County, with veterinarian, Phil Bentz, use ultrasound technology developed by K-State researchers to evaluate cattle.

Each carcass with a yield grade four costs their operation a \$25 per hundred-weight discount. With ultrasound, the cattle are not overfed or overfat, which saves feed and increases profit.

And in the cattle business, time is money. Yet, in about the same amount of time it takes to process a group of cattle through a working chute, they can be evaluated by ultrasound for muscle tissue and backfat.

The cattle are then sorted into groups, based on the number of days they should be on feed to hit the grid. It only takes a matter of minutes, but the return is significant.

Pat Coyne, head of K-State Research and Extension's Western Kansas Agricultural Research Centers, said the potential

economic benefit to the beef industry from Brethour's discovery is massive.

"Several studies have documented that precision feeding, based on the ultrasound work, increases feedlot profits \$15 to \$20 per head, while improving beef quality," Coyne said. "There were 28 million fed cattle slaughtered in the United States in 2003, so the potential benefit of this technology is more than \$500 million annually."

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Weaning Age Influences Profit

K-State swine researchers have found that for every day the age at weaning is increased, the improvements in growth rate and feed efficiency result in a profit of \$0.94 per pig. If a swine producer with approximately 500 sows were to increase weaning age by two days, it would generate \$20,000 of added income.

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Feeding Flaxseed to Cattle

K-State researchers have improved the health traits and quality of consumer beef by feeding modest levels of flaxseed to cattle (5 – 10 percent of the diet dry matter). They also have found that feeding flax to cattle has resulted in modest reductions of generic coliforms and *E. coli* in the feces of cattle.

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Improving Livestock Handling

Results of a K-State survey prompted K-State Research and Extension, the Kansas Animal Health Department, and the Kansas Motor Carriers Association to jointly produce fact sheets, a computerized slide presentation on biosecurity, and a video to improve conditions when handling and shipping livestock.

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Searching for Ways to Prevent Age-Related Vision Loss

Ray Blanchard isn't complaining about his life.

In fact, the 83-year-old from Manhattan lives quite happily with his wife of 60 years, Maxine. The couple have three grown children and now grandchildren. In his younger years, Ray successfully managed operations for an oil and gas company.

But for the past 15 years, Ray also has struggled with central vision loss, a condition known as age-related macular degeneration (AMD). The condition worsens over time, and there is no known cure.

"I can still work all day long," said Ray, "but I can't see very well. So I'm

restricted. I can't go out alone, and that's just not my nature."

According to the Macular Degeneration Foundation Inc., 12 million Americans are affected by this disease. The Foundation reports that in the United States, one more person is diagnosed with AMD every three minutes, and one in six people between the ages of 55 and 64 – and one in three over age 75 – are affected.

Blanchard says AMD has robbed him of routine things he had previously enjoyed, such as attending Lion's Club meetings and helping at club-sponsored breakfasts, driving, and even playing simple card games.

"The last couple of years have been the worst," he said. "My vision has gotten worse; that, and you just don't get interested in the things that you used to do."

Carol Ann Holcomb, a K-State Research and Extension foods and nutrition researcher, has conducted studies since the 1990s to help uncover preventive strategies for AMD.

"Consumption of foods high in lutein and zeaxanthin (important carotenoids for eye health) appear to offer some protection against the risk for the more advanced form of AMD," Holcomb said.



Ray and Maxine Blanchard, Manhattan, hope that K-State research can prevent vision loss from age-related macular degeneration.

“It is thought that lutein in the diet contributes to a higher density of the macular pigment as well as the antioxidant activity of lutein.”

Holcomb’s research, however, has found that a typical Kansans’ diet is “very low” in the nutrients needed for eye health.

That’s why she continues promoting such foods as green leafy vegetables, orange and yellow fruits and vegetables, egg yolks, and corn. She’s hoping that further findings will convince Kansans – and others – to make these foods a bigger part of a their daily diet.

“In the young and middle adult years, vision health is often taken for granted,” Holcomb said. “But the stage is being set for degenerative processes that manifest themselves later in life. Good nutrition is good for the eyes as well as the heart, brains, lungs, and bones.”

“If we can find ways to prevent tissue damage, we could reduce the burden of blindness to individuals, families, and our society.”

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Patenting Stem Cell Research

K-State scientists have discovered stem cells in the umbilical cord matrix of pigs that may help address such human health issues as Parkinson’s disease, stroke, heart disease, cancer, and more. Stem cells also may be useful for drug discovery and for screening drugs for safety and effectiveness. Other possibilities include the use of stem cells to prevent disease in livestock, to create better vaccines, and to increase the efficiency of food production. K-State has patents pending on methods to harvest, grow, and store umbilical cord matrix stem cells, and the use of the matrix cells for therapy or tissue engineering.

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Aid for Seniors, Economy

A food stamp program to help senior citizens eat healthier has contributed approximately \$110,000 to the economies of the 18 north-central Kansas counties where it has been tested. K-State Research and Extension has worked with other state agencies to help increase participation in the Kansas Food Assistance Program. Research shows the average benefit to each person in the program is \$563 per year.

Mary Meck Higgins

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Watershed Specialists Work with Producers to Control Pollution

When it comes to decisions on how to manage his land, Jeffrey Janssen says he'd rather be in the "driver's seat."

So when state environmental officials raised concerns about pollution levels in nearby Kanopolis Lake, the Geneseo, Kan., rancher decided to do his part.

Last summer, Janssen hauled in 40 truckloads of dirt to build a ditch to divert water, fenced his feedlot away from the creek, built grass filter strips, and installed automatic waterers for the nearly 100 cattle he feeds.

The result? His cattle no longer go to nearby streams to drink or cool off, and potential pollution from the farm is kept safely away from public waterways.

"I took the necessary steps ahead of the government coming in and saying

that we are going to shut you down," Janssen said.

Landowners' efforts to control pollution in waterways are becoming a norm in Kansas, where an estimated 6.65 million cattle and 2.5 million pigs are raised.

In 2003, the Natural Resources and Conservation Service (NRCS) approved 789 contracts for funds through the Environmental Quality Incentives Program (EQIP). By 2004, that number had jumped to 1,823.

In Kansas, "we are raising awareness and getting more producers to ask questions about cost-share programs and how to apply," said Stacie Minson, K-State Research and Extension watershed specialist for the Smoky Hill Kanopolis Lake watershed near Hays.

Six other watershed specialists are located in Kinsley, Lawrence, Manhattan, Ottawa, Wichita, and Yates Center – all in major Kansas watersheds.

"In the last year, more and more producers have agreed to have on-farm assessments to look at their pollution potential," Minson said. "This is a great sign that we are offering a service to them, and they are willing to let us take a look at their operation to offer best management practice tips that could improve their water quality."

Pollution concerns vary depending on the waterway, but in the Smoky Hill Kanopolis Lake area, producers have worked to reduce the incidence of soil erosion, fecal coliform bacteria, and algae bloom (or eutrophication, caused by nitrogen and phosphorous runoff).



Jeffrey and Linda Janssen, Geneseo, worked with K-State Research and Extension watershed specialists to make improvements and prevent runoff.

One way of reducing fecal coliform bacteria levels is by using livestock waterers. Minson shared this information with Janssen, and it was a perfect fit for the plans he had developed with other agencies. He received help from NRCS in Ellsworth and Hutchinson, the Ellsworth Conservation District, the Army Corps of Engineers, and the Kansas Department of Health and Environment. Those organizations, among others, have worked together to help local efforts.

“We are fortunate in the watersheds,” Minson said. “NRCS, conservation districts, producers, city councils, county commissioners, homeowners, local Farm Bureau boards, and K-State Research and Extension have worked as a great team to get Watershed Restoration and

Protection Strategies, or WRAPS, developed for the watersheds.”

For Janssen and other ranchers like him, it means cleaner livestock, cleaner waterways and, ultimately, more money for their operation.

“It has made a difference for me,” Janssen said. “I feel better now that my cattle are out of the creek. I was tired of seeing those dirty cattle down in the creek drinking. With the automatic waterers, they stay a lot cleaner and are healthier drinking better quality water. It was a good business decision and good for the environment.”

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Cooperative Aids Producers

The Watershed Dairy Environmental Cooperative provided assistance to 20 small dairy producers managing 2,350 lactating cows. Helping producers develop best management practices will lead to improvements in water quality.

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Reducing Carbon Dioxide

Researchers are developing practices to help manage soil carbon and reduce carbon dioxide levels in the atmosphere. For example, no-till annually sequesters an average of about 0.5 metric tons of soil carbon per acre per year for the first 20 to 30 years, which directly reduces atmospheric CO₂ levels.

Chuck Rice

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SDI Helps Conserve Water

Through meetings, training, publications, and Web sites, researchers have educated thousands about subsurface drip irrigation. There are 14,000 to 15,000 acres of SDI in Kansas, which is expected to increase as aging alternative systems are replaced and as the need to conserve water increases.

Freddie Lamm

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4-H After-School Program Helps Students Succeed

Like others in her profession, elementary school principal Jeanna Hernandez deals with many daily challenges.

But at Wichita's Park Elementary, Hernandez has an ally: the 4-H Youth Development after-school program is helping her students succeed.

The school's program, which includes 50 children before or after school, is funded by the Kansas Department of Education and supported by K-State Research and Extension. At Park Elementary, 4-H lessons are used to help inner city schoolchildren enjoy learning.

But that's just one snapshot of these programs across Kansas.

According to Elaine Johannes, a member of the Kansas State 4-H After-School Team, 4-H after-school programs

are available in 95 Kansas counties. State 4-H officials estimate that nearly 2,000 youth participated in these programs in 2004.

The children at Park Elementary have joined the Park Panther Pride 4-H Club and learn academic and life skills to succeed, said Beth Drescher, a K-State Research and Extension 4-H agent in Sedgwick County.

According to Hernandez, Park Elementary was looking for a way to provide tutoring using discovery learning, which supports state and district standards. The 4-H after-school program reinforces the standards and provides outreach and extension in a positive group setting to the students who need it.

"It's a win-win situation," Hernandez said. "It will get kids hooked on something that they're interested in and will keep them connected to the school so they can learn."

Hernandez said the educational value of the program is one of the best aspects of the program. She said students look at the program as a privilege, rather than being punished.

"It becomes the student's idea," Hernandez said. "They want to stay after school to participate in the activities. They don't think of it as tutoring."

The program also pairs the school and community. Hernandez said she supports the program, but the ideas and curriculum come from the state's 4-H program.



Jeanna Hernandez, principal at Park Elementary in Sedgwick County, said students are discovering new ways to learn and succeed through 4-H after-school programs.

“It’s awesome to see the community and school partner for the good of the students,” she said.

Drescher agrees, saying that the school and the 4-H program work hand-in-hand. Other programs, such as a 4-H summer day camp, also allow the school and the community to come together for the good of kids.

“The students are gaining skills not only to succeed in school, but also in life,” Drescher said. “The best part is, they’re having fun while doing it.”

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100 Years and Growing

Kansas 4-H is celebrating its 100th anniversary. The first 4-H clubs were started as boys’ and girls’ clubs in 1905 and chartered in 1906. Though developed to serve rural youth, Kansas 4-H annually serves 160,000 urban and rural youth through clubs, school enrichment, and after-school and camping programs.

Current 4-H families, 4-H alumni, and friends started the year-long centennial celebration at the 2005 Kansas State Fair with a parade, contests, dedication of the redesigned 4-H building, and a feature program on “The Prairie Home Companion.”

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Stepping Up: Youth Become Environmental Stewards

Students participating in the Earth Awareness Researchers for Tomorrow’s Habitat (E.A.R.T.H.) are learning skills they can apply to real-life situations in their community and are becoming better stewards of their environment. Evaluations indicated that students who participated had a stronger commitment to school and greater academic success than those who did not.

www.earthkansas.org

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Computer Lab on Wheels

A donated, used school bus has been outfitted with eight computer stations and a server. Even before it was on display at the Kansas State Fair, more than 1,600 people had used the mobile lab. Some are learning basic computer skills. Others can upgrade skills by learning more advanced programs such as global positioning and information systems.

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4-H Centennial Profiles

Kansas 4-H youth development programs have influenced thousands of Kansans during the last 100 years. To read the stories of some of those 4-H’ers, go to www.4-h.ksu.edu and click on “Centennial Profiles.”



Researcher Improves Heat Treatment for Controlling Insects

K-State research on stored product pest management is helping to protect the environment and benefiting the Kansas food and feed manufacturing industries.

K-State entomologist Bhadiraju “Subi” Subramanyam studies heat treatment as a viable alternative to pesticides in grain, food, and feed manufacturing facilities. His research shows that heating a structure to 122 to 140 degrees and maintaining that temperature for 24 to 36 hours effectively kills insects. This allows processors to produce high-quality products safely and without chemicals, he said.

Heartland Mills, Marienthal, Kan., which produces certified organic grains and flours, uses the method to heat a

19,000-square-foot storage building. General manager Mark Nightengale said heat treatment has been effective.

“No bugs will survive – this includes grain pests, larvae, and eggs. Unlike chemical resistance, bugs have no immunity from heat,” Nightengale said.

It has also been good for business.

“With the heat treatment program there are no returned loads because you’ve destroyed grain pests in the building,” Nightengale said.

Heat treatment has been used for 100 years, but in the ’30s grain elevators and food processors began using chemicals, said Subramanyam. Methyl bromide, a chemical commonly used to eradicate insects in stored grain, was phased out by the EPA in January 2005.

Subramanyam has devoted the last 15 years to finding viable alternatives – non-ozone depleting compounds – for controlling pests in stored products. By collecting data on heat tolerance of common grain insects at all stages of development, he’s come up with a model to determine the insect survival rate.

“With this model, we can predict mortality, Subramanyam said. “Once we gather details about the structure – ambient conditions, what is the building made of, layout, how much exposed metal – we can calculate precisely how much heat it will take in BTUs per hour to achieve 100 percent mortality.”

The goal is to optimize effectiveness of heat treatment.



Mark Nightengale uses a heat treatment process perfected at K-State to protect stored grain from insect pests at Heartland Mills, an organic mill in Marienthal.

“We’re taking what was an art and making it a science,” he said.

Knowing exactly how long to heat the structure can lower energy costs, which may be substantial, depending on the size of the treated area and energy source. In the past, heat treatment may not have been feasible because of the way product storage facilities were constructed. Modern structures have been designed with heat treatment in mind.

Heat treatment fits both organic and traditional facilities. Organic mills are a small, yet fast growing segment of the market, and this technology works for them because it leaves no residues and is safer for people working there.

Safety concerns and a strict regulatory environment make heat treatment an

attractive option for large processors as well. Industry giants such as ConAgra, General Mills, Quaker Oats, and Nestle-Purina all use the method to some extent and send employees to Subramanyam’s annual workshop, which emphasizes the benefits of this nonharmful alternative.

“Heat treatment is innocuous, you don’t have to worry about emission control and reporting, and there’s no need for residue testing because no chemicals have been applied,” he said. “It’s not for everyone, but it is a viable alternative.”

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BRI Moving Forward

When the Biosecurity Research Institute building at K-State is completed in 2006, it will be unique in its integrated agrosecurity/food safety and security capabilities. K-State scientists will be able to develop essential diagnostic and forensic tools for the agriculture, food, public health, and law enforcement communities.

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Extrusion Technology Adds Value

K-State’s work with extrusion is creating new uses for traditional Kansas agricultural commodities. The extrusion process uses heat and moisture to process a variety of raw materials into processed products, including corn puffs, textured vegetable proteins, pasta, a variety of snack foods, breakfast cereal, aquatic feed, pet food and plastics.

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Grain Science Complex

The Hal Ross Flour Mill is under construction on the K-State campus. It is the third of five buildings in the Grain Science Complex. The complex will provide state-of-the-art facilities for the research, teaching, international, and extension programs of the Department of Grain Science and Industry.

Virgil Smail

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Kansas Master Gardeners Share Love of Gardening, Teaching

It may look to some as though Jim Crist spends much of his free time dabbling in the garden.

But listening to the Overland Park resident talk about his favorite pasttime, it sounds an awful lot like teaching.

“I can light a fire in the mind of a child by showing him how a bean seed sprouts,” said Crist. Or send a little girl a letter with a pet caterpillar and witness the miracle of its transformation into a butterfly.

“I can transport an elderly neighbor back in time to their own grandmother’s garden with nothing more than the scent of rose or sweet pea. Or, I can build garden memories that today’s young people can carry with them into maturity.”

Crist is one of nearly 1,000 Master Gardeners in Kansas who donated 67,824 hours to their local communities in 2004. Currently, Master Gardeners are active in 48 of the state’s 105 counties. In dollars and cents, their volunteer work is equivalent to 34 full-time jobs and an estimated \$1,121,800.

In Kansas, horticulture is listed as having the third highest gross crop value, behind the wheat and feed corn industries. The money-making segment of the Kansas horticulture industry is grounds maintenance. The popularity of horticulture in urban settings has been constantly growing, and has spawned such terms as “urban agriculture” and “hobby farming.”

In Johnson County alone, there are 307 Master Gardeners who donated

more than 28,000 hours of volunteer service in 2004 – equal to 13 full-time positions.

Crist, a Master Gardener since 1998, said he enjoys working with the different groups of people and making new friends.

“The biggest impact on me,” he added, “has been that the program gives me an endless opportunity to give.”

“I can bring beauty to my community, and share it with others,” said Crist, noting that he often teaches people to grow plants without harming water, soil, or themselves.

In addition to working with individuals, Kansas Master Gardeners help with demonstration gardens, hot lines, lawn



Jim Crist, Overland Park Master Gardener, spends many hours perfecting his own garden and teaching others how to improve their gardens.

and garden shows, speaker's bureaus, youth programs, garden tours, and more.

Master Gardeners is a volunteer program that helps improve gardening practices across the state. K-State Research and Extension supports their work by providing training and information, and offering workshops. Go to www.oznet.ksu.edu/hfrr/MG for more information.

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Silver Anniversary

In 1980, Chuck Marr, K-State Research and Extension horticulturist, and Larry Stouse, former Johnson County horticulture agent, started the Kansas Master Gardener program in Johnson County to help horticulture agents in the larger urban counties.

Master Gardeners receive 40 to 50 hours of training designed at K-State. The Master Gardeners then "pay back" 40 to 50 hours of community service, which may include answering a plant "hotline," leading a children's plant camp, speaking to a civic group, or building a public demonstration garden.

K-State Research and Extension Offers Aid after Ice Storm

After the severe ice storm in Jan. 2005, horticulture agents from Sedgwick, Reno, Butler, and Lyon counties planned 19 tree recovery classes for spring – emphasizing pruning and replanting with tougher trees. K-State's John C. Pair Horticulture Center posted a Web page showing the stronger trees that held up with the ice load, and the Sedgwick County Extension Master Gardeners published a book on "Recommended Trees for South Central Kansas."

Tips to Trim Energy Costs

Natural gas prices are expected to rise 30 percent – or more – this winter. K-State Research and Extension is providing tips through news releases, information at local offices, and Web sites to help homeowners reduce energy consumption and hold down utility bills. For more information, go to the Energy Extension link library: www.engext.ksu.edu/ees/henergy/linklibrary.html.

Horticulture Tips Available Online

K-State horticulturists produce a weekly online horticulture newsletter. It has timely tips for caring for flowers, trees, vegetables, and lawns. All 2005 issues and archived 2004 issues are available at http://www.oznet.ksu.edu/dp_hfrr/hnewsletter/welcome.htm

Want to Know More? K-Staters who can provide more information on topics in this report.

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The Role of K-State Research and Extension

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.

Mission:

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.

Districting - Finding new ways to work together to serve Kansans

Since 1991, any two or more Kansas counties can legally work together to form an extension district. In an effort to increase efficiency and effectiveness, 17 counties have formed six districts.

Post Rock District #1 (1994) – Mitchell and Lincoln counties; Jewell and Osborne counties joined in 2005.

Walnut Creek District #2 (1997) – Lane, Ness, and Rush counties.

Central Kansas District #3 (2004) – Saline and Ottawa counties.

River Valley District #4 (2005) – Clay, Cloud, Republic, and Washington counties.

Phillips-Rooks District #5 (2005) – Phillips and Rooks counties.

Sunflower District #6 (2005) – Sherman and Wallace counties.

Jackson, Jefferson, and Nemaha counties started the required public process in July 2005, hoping to reach consensus and become a district by July 2006.

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Facilities Across the State

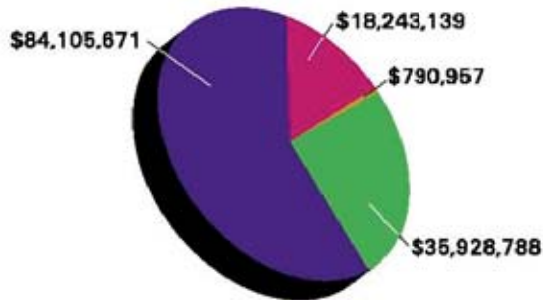
Headquartered on campus in Manhattan, K-State Research and Extension includes statewide county and district extension offices, research centers, and experiment fields supported by county, state, federal, and private funds. K-State Research and Extension supports faculty in 23 academic departments across five K-State colleges. Research conducted on-campus and at off-campus research facilities is shared with Kansas citizens through meetings, field days, publications, Web sites, news releases, radio, and television.

*“Knowledge
for Life”*

K-State Research and Extension Budget Data for Fiscal Year 2006

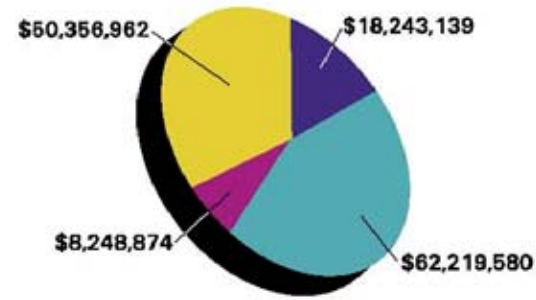
K-State Research and Extension FY 2006 Budget Responsibilities

- Agricultural Experiment Station
- Cooperative Extension
- Physical Plant State Funds
- County Funds

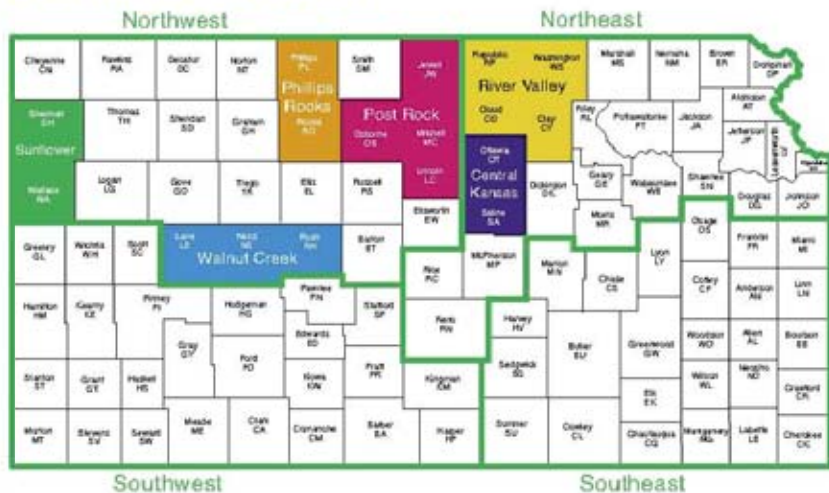


K-State Research and Extension FY 2006 Budget Fund Source

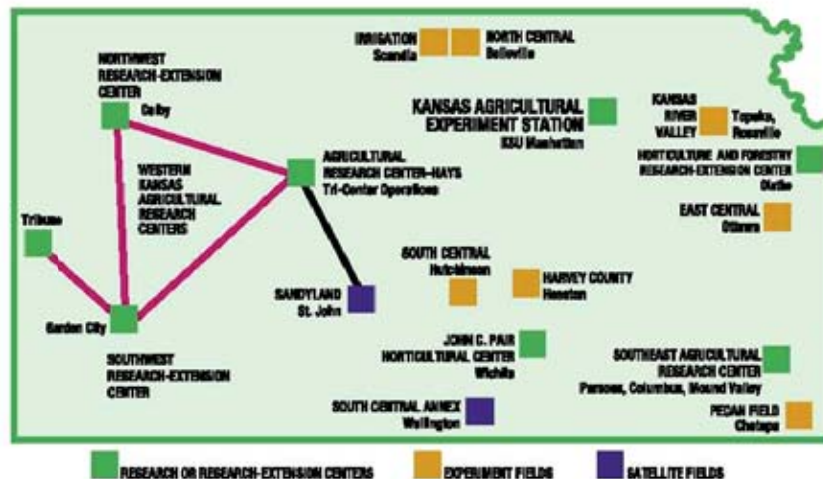
- State Appropriation (AES\CES\Physical Plant)
- Federal Appropriation (AES\CES)
- Grants and Services
- County Funds



Statewide Offices



Research Facilities





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