



K-State Research and Extension
Kansas State University

An Informal Report to the Kansas Legislature

January 2007



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Director's Introduction

Fred Cholick, director of K-State Research and Extension, and Pat McNally, assistant director of 4-H Youth Development, accompany Governor Kathleen Sebelius through Centennial Hall at the Kansas State Fair.

I have the best “job” in the world, because I have the opportunity to work with dedicated faculty and staff of the College of Agriculture and K-State Research and Extension, who truly want to make a difference for the people of Kansas and beyond. 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.

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 in 4-H 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.

It is essential that we stay connected to the people and address their wants, needs, desires, and dreams, whether those are related to production agriculture, the environment, family, or community.

Sincerely,

Fred A. Cholick
Dean and Director



Researchers Study Modified Intensive-Early Stocking Rates

Keith Harmony thinks he's on to something.

For the past seven years, Harmony, a rangeland scientist at the K-State Agricultural Research Center-Hays, has methodically – and strategically – been moving cattle on and off grazing land.

In his business, it's a strategy called modified intensive-early stocking: beginning the first week of May each year, young cattle graze the land for 75 days, at which time the heaviest cattle are moved and the lighter cattle stay for another 75 days.

So far, there is good news.

“Using animal gains from this study and applying them to livestock pricing from 1974 to 1998, 25 years prior to the beginning of this study,

the average dollars per acre in the modified system were \$7.18 higher than the season-long stocking system,” Harmony said.

When figuring a producer's average costs of purchase and interest paid on grazing animals since 1999, Harmony's work also showed an average increase of \$9.61 per acre in the modified system.

From Salina into all of western Kansas, areas where Harmony says the system's results mostly apply, there are an estimated nine million acres of privately owned grazing land. If the modified system were part of a three-year rotational system on just 25 percent of that land, the economic impact would be \$7.2 million per year.

Even so, the work is not without challenges. So far, Harmony has not been able to maintain maximum early-season gains per animal in the modified grazing system.

Simply, compared to traditional grazing systems, “average daily gains were less on the modified system early in the season, which is not expected,” Harmony said.

In the last half of the season, the two systems showed no difference between gains, according to Harmony.

Harmony began his research in 1999. He is testing 104 head of Angus and Angus-cross cattle when they are approximately 600 pounds. The cattle are put on pasture the first week of May when vegetation is at its highest



Keith Harmony (left) and John Jaeger, check on cattle moved to the center's feedlot to collect further carcass data. after being used in grazing studies.

level of nutrition. After 75 days of grazing, the heaviest cattle are moved and the lighter cattle stay for the next 75 days.

In six years of research, Harmony notes that vegetative changes in the grazing lands have not taken place. Even so, he notes the research has not yet been recommended to producers because the long-term stability of the grazing land is not yet known.

“The results have been excellent so far, but with studies that involve grazing lands, many years are needed to determine the stability of the ecosystem once management tools are implemented,” he said.

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New Wheat Virus Discovered

A plant pathologist at the Agricultural Research Center-Hays has discovered a new wheat virus.

The virus did not impact production in 2006; however, researchers will monitor the virus closely to see how widespread it was in 2006 and what weather conditions it favors.

The virus, triticum mosaic virus, seems to have affected cultivars that have been developed for their resistance to wheat streak mosaic.

The discovery will help researchers establish control measures that can cut future yield losses for farmers.

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Learning About Insects

The Insect Zoo, located in the Glenn Beck Dairy Barn on the K-State campus, hosts 8,000 to 9,000 visitors each year. The zoo features many exhibits of live insects and their arthropod relatives in natural settings. Most of the visitors are pre- and elementary-school students, but all ages enjoy the opportunity to see, learn about, and sometimes touch insects.

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Selecting Meat Tenderness

K-State animal scientists collaborated with researchers from three other universities to conduct extensive carcass merit traits research funded by the National Cattlemen's Beef Association and 13 beef cattle breed associations. The data helped breed associations develop expected progeny differences (EPDs) for meat tenderness. This allows breeders and commercial cow-calf producers to select for improved tenderness, which is a first for the beef cattle industry.

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Preparing for Avian Flu

A team of agents, specialists, and communications staff has been actively involved in state and federal preparations for a possible outbreak of avian flu in the United States. Their purpose was to provide information ahead of a potential crisis. The team partnered with various state agencies.

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Counseling Sessions Help Seniors Choose Medicare Coverage

Pat Griffin knows that much of society is bombarded with health care costs these days. For most, affordable insurance is tough to find.

But for Griffin, finding a coverage plan that worked for her was a proverbial walk in the park.

“My husband was in the military, so his medications are covered by the federal government. But I was clueless about how to get help in paying for my own medications,” said Griffin, who lives in Paola, Kan.

Griffin worked with Miami County agent Diane Burnett to choose a drug plan that fit her needs – and pocketbook.

In fall 2005, Burnett presented 11 public programs that reached 538 Kansas citizens.

The drug plan, called Medicare Part D, began January 1, 2006, to make prescription drug coverage available to everyone eligible for Medicare, regardless of income, health status, or current prescription plans. Roughly, 5.5 million people across the nation meet these standards, but many are confused by the complex process and the number of drug plans available.

In Kansas, K-State Research and Extension agents have helped an estimated 400,000 Medicare-eligible people to make informed health insurance decisions. K-State formed a partnership with Senior Health Insurance Counseling for Kansas (SHICK), which distributes grant funds to sponsoring agencies.

“I had no idea how to go about finding what program was for me,” Griffin said. “It made me feel almost lazy, but Burnett was able to take care of all the work for me. It just made me feel like I didn’t need to worry anymore.”

Griffin and more than 15,000 other Kansans have gained health insurance education and assistance. K-State Research and Extension agents estimate an average savings per person to be \$1,000 or more per year on medications and/or premiums.

“People have been so grateful for the individual help – some in tears,” Burnett said. “Many said they’d spent a number of sleepless nights worrying about which plan to choose and



Diane Burnett, Miami County agent, explains Medicare Part D coverage to Pat and Bill Griffin.

how to make sense out of all the information.”

Added Griffin: “The benefits were really noticeable. I appreciate all of the help I had and am very happy with how things turned out.”

Burnett notes she expects long-term benefits from helping Kansans with Medicare questions. “I have worked hard to build a trusting relationship with clientele, and I feel that they will now come for information about health insurance and financial assistance,” she said.

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Taxpayer Assistance

Partnering with the IRS Volunteer Income Tax Assistance (VITA) program, K-State Research and Extension agents helped qualified individuals make maximum use of tax refunds.

In Shawnee County alone, volunteers at eight VITA sites helped 5,000 low- and moderate-income taxpayers receive nearly \$4.5 million in refunds to supplement take-home pay.

Agents provided wealth coaching to help eligible families take advantage of EIC tax credits, use refunds to open savings accounts, and reduce debt.

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Communicating in a Crisis

K-State communicators are working with the National Center for Food Protection and Defense on how to explain risks associated with food and the best way to communicate with farmers, ranchers, and rural leaders. The research is financed by the Department of Homeland Security.

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Seniors Receive Money for Farmers' Market

In Harvey County, extension agents helped establish a program in which qualifying senior citizens receive \$30 checks to spend at the local farmers market. The effort not only helped the local market but also helped the seniors to eat healthful foods. In 2006, the farmers' market sold more than \$36,000 in food – up from \$28,500 in 2004.

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Reviewing IPM Options

Each year the Integrated Pest Management (IPM) program provides mini-grants for IPM research and implementation trials. One study concluded that if corn seedling pests attacked 250,000 acres of corn, seed treatments would save growers \$2.5 million annually. However, in the absence of insect pressure in first year corn (not rotated), if one million acres of corn were not treated at \$5/acre, Kansas farmers would save \$5 million annually.

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Strong Women Program Promotes Exercise for All Ages

For the better part of the past two years, 78-year-old Betty Piester has driven 25 miles twice a week to the K-State Research and Extension office in Pratt County.

Her goal: Pump some iron.

Piester, from rural Coats, Kan., is one of 35 women, ages 30 to 80, who participate in the Strong Women program, which encourages appropriate weight lifting and strength training for better health.

Pratt County agent Jean Clarkson-Frisbie started the Strong Women program in October 2000 after reading a book on the benefits of strength training for women. She began writing a news column on the topic and soon was flooded with

phone calls from women interested in such a program.

In its first year, 24 women enrolled in Pratt County's Strong Women program. Since then, 350 women have participated.

Piester enrolled in Strong Women in mid-2005 on a suggestion from her daughter-in-law. She says the program spared her a trip to a surgeon's operating table.

"My doctor is pleased with the improvements in my knee and increased bone mass," she said. "My heart doctor also is pleased with the improvements in my overall health. I am also pleased with the results, because my knees don't hurt anymore."

Clarkson-Frisbie says that's exactly what the program is designed to do.

"The Strong Women program is designed to motivate individuals to exercise by being in a group," she said. "Participants are encouraged to be social and make friends while improving their health."

According to Clarkson-Frisbie, many of the women who have participated have improved their lifestyles and health.

"Doctors have commented about the participants' increased bone density scans and an improved resistance to osteoporosis," said Clarkson-Frisbie. "The women claim to be more agile, have improved flexibility, have less pain and most



Members of the Strong Women program improve their health and build friendships through twice-weekly exercise sessions.

importantly feel better about themselves.”

The program meets twice a week on Tuesdays and Thursdays. Women bring in their own weights – most are two- to five-pound dumbbells and ankle weights – and work on repetitions.

The program is based on curriculum designed by Miriam Nelson of Tufts University. The workout includes four lower-body and four to five upper-body exercises.

Does Piester believe in the program? You bet, and she thinks younger children should start similar programs.

“If younger children start an exercise program now, they can prevent bone loss and other effects of

aging,” said Piester. “I like everything about the Strong Women program. If it’s worth me driving 25 miles twice a week with gas prices right now, you know that it has to be good.”

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Walk Kansas Raises Activity

Finney County residents who participated in the Walk Kansas fitness challenge ate about 12.5 tons of healthful foods and circled the globe one and one-half times last year – all in about eight weeks. They also saved themselves an estimated \$460,000, using a cost estimate of \$1,412 in direct and indirect health costs for inactive people.

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PRIDE Boosts Communities

Community-based PRIDE programs have been established in more than 60 Kansas communities. In 2005, PRIDE communities raised more than \$900,000 through grants and gifts that were reinvested in their communities. PRIDE volunteers worked more than 75,000 hours, valued at more than \$1.3 million to support such community projects as two new parks in Lakin, free university classes in Glasco, social events in Alton, and more.

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Improving the Bottom Line

K-State agricultural economists held ag profitability conferences in nine communities around the state on topics that affect a farmer’s or rancher’s bottom line. Some of the topics included: high fuel and fertilizer prices, the upcoming farm bill, new insurance products, and opening or reopening markets for U.S. beef.

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Healthful Eating Translates Well to Other Languages, Cultures

Rather than leave her native land in Togo, West Africa, seven years ago, Christine Esse figured out a way to bring it with her.

She talks of her father's farm, more than 6,000 miles away, as she slowly walks up a row of beets, tomatoes, and okra that she has grown. She stops and closely inspects a freshly grown hot pepper.

"You only need one of these in a soup, or you can't eat it," she said. "Very, very hot."

Like her father, Esse grows a leafy plant she calls *ademè*, which is eaten with corn flour in West Africa.

"I have friends who come from Des Moines, Iowa, to visit and they say, 'You are still home – look at you,'" Esse said.

Esse may have found that home when she came into contact with Pat Lawson, a volunteer Master Gardener in Wyandotte County, Kansas. With numerous others, they have built an impressive community garden on a common, residential street corner in Kansas City.

While the program has helped people from many ethnic and cultural backgrounds, Esse also notices the impact it has had on the lives of her three children, who range in age from 10 to 16.

"I want them to feel like they're home," said Esse, watching her kids participate in a pumpkin carving activity. "They lost their friends in Togo, but they have friends here now.

"The most important thing they're learning is how to share with humanity, and how people can care about all of us. When they grow up, I want them to be able to feel the importance of people in one person's life, and how to care about others."

More than 40 percent of the residents of Wyandotte County are racial or ethnic minorities. According to the Kansas-based REACH Health-care Foundation, approximately 16 percent speak a language other than English in the home.

So the work that Terri Bookless does makes a lot of sense.

Bookless, a K-State Research and Extension agent in Wyandotte County, teaches weekly classes on diabetes education. She gets excited



Wyandotte County Master Gardeners encouraged the Esse family to raise vegetables from their native Togo in the community garden.

when she tells the story of “Larry,” a local resident whose blood sugar was a dangerously high 500.

“After two or three weeks, with changes in his diet, he got that down to 200,” Bookless remembers. “And he was able to walk without a cane.”

Another pupil, a middle-aged man originally from Ethiopia, said he determined that “when” he eats is as important as “what” he eats.

“He tells me that every time he eats, he thinks of ‘Terri,’” Bookless said with a laugh. “Don’t eat so much, don’t eat so much. ...”

Bookless, fluent in Spanish, has provided class materials in her students’ native languages, including French, Vietnamese, and Amharic (the language of Ethiopia). Her

students are referred to her classes through a partnership with Riverview Community Services, which serves more than 1,500 clients yearly.

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Helping Military Kids

Families of U.S. Army Reservists and National Guardsman serving in Iraq are adjusting to new family dynamics. Operation Military Kids raises awareness and builds support systems and community coalitions to help children when family members are deployed. Kansas is one of 34 states working with various state and national organizations.

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Understanding Leases

A K-State Research and Extension agent in Marshall County estimates the value of programs he conducted to help landlords and tenants learn legal issues related to leased land at \$290,000.

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Growing Pecans in Kansas

A double tree-row planting system, developed at K-State’s Pecan Experiment Field near Chetopa, offers landowners a new strategy for converting row crop land into high-value pecan orchards. The system helps maintain an income stream before young trees begin bearing economically significant nut crops by devoting one-third of the land area to pecan trees with a grass alleyway between each tree row. The remaining land area is planted to an agronomic intercrop.

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Horticulture Research Enhances Communities, Supports Producers

In the very near future, Stephanie Thomas plans to expand her business.

Last year, the Baldwin, Kan., farmer participated in Kansas' Growing Growers program, which is designed to give local producers the training and information they need to be successful in the local market. Now, Thomas says, it's just a matter of time before more fruits and vegetables from her business begin flowing to local restaurants, farmers' markets, and direct buyers.

"The program to me has been way more than I ever expected; I got back so much more," Thomas said. "First of all, I've been able to almost seamlessly move into an organic method. I know a lot more about sustainable farming, and I'm a much better farmer as far as

taking care of my land. Because of that, I can grow on a much larger scale."

Katherine Kelly, manager for the three-year-old Growing Growers program, said farmers learn new skills through hands-on training and apprenticeships.

"Growing Growers puts farmers into contact with people who recognize what they do and want to support them," said Kelly, who works out of K-State Research and Extension's horticultural research center in Olathe. "Consumers are really wanting to know the person who grows the food or produces the meat they take home to their families to eat."

Thomas' business is heavy on the tomatoes, but she is growing other

fruits and vegetables, including spinach, lettuce, peas, broccoli, sweet potatoes, melons, blackberries, raspberries and more. She said that many of her customers pay up front for a share of what is harvested from the fields in a given week, and get the best quality produce before it is offered at market.

Thomas' story is typical of many local growers who have turned to research centers in Olathe, Wichita, and Manhattan for a helping hand.

The Olathe center is a regional testing site for the international Certified Landscape Technician program and is home to the Prairie Star annual and Prairie Bloom perennial flower research programs, which select flowers specifically for their



Baldwin producer Stephanie Thomas grows fruits and vegetables for local restaurants, farmers' markets, and direct buyers.

success in Kansas climates and soils.

At the John C. Pair Horticulture Center near Wichita, the primary focus is on ornamentals and woody plants.

“There is hardly a tree or shrub that cities are planting across this state that was not brought in by this station or tested by this facility,” said Jason Griffin, director of the center.

Most recently, the center has focused on increased public involvement and awareness. Through tours, field trips, open houses, and the construction of the educational and research-focused Kaegi garden, Griffin hopes to continue building relationships with local residents.

Tim Martz, superintendent of the forestry and maintenance division for

the city of Wichita, said he relies on the center’s research for the city’s urban reforestation program, one that requires the purchase of nearly 2,000 trees each year.

“The center has been instrumental in a lot of our plant selections,” Martz said. “Many of our decisions are based on the research that comes out of the center. It makes a huge difference in the health of our urban forest and on our tree canopy.”

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Gardening with Less Water

Homeowners in western Kansas used K-State research to design gardens and landscapes that used less water and fertilizer. A Post Rock District agent reported that citizens attended workshops on pruning trees, planting gardens, and more that helped them establish and maintain healthy yards.

Scott Chapman

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New Purpose for Runoff

Master Gardeners in Douglas County built a rain garden to use the runoff from the fairgrounds parking lot. The garden features native wetland and prairie grasses and wildflowers. Rain gardens can help control flooding and minimize surface runoff and soil erosion keeping creeks, streams, and lakes cleaner.

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Finding the Best Grasses for Kansas

Turfgrass specialists have test plots of various grasses – including zoysia, Bermuda, fescue, buffalograss, and Kentucky bluegrass – near Olathe, Wichita, and Manhattan. Research results help golf course grounds keepers, athletic field staff, homeowners, lawn care companies, and sod producers determine what grasses will grow best in their locations.

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Computerized Plant Diagnosis Provides Prompt Answers

More than 1,500 samples of suspect diseases, unidentified bugs or unusual spots on plants and farm crops poured into the plant diagnostic labs at K-State last year.

None, however, were more important to Lori Sporer than the three or four that she sent in each month.

The past two years, Sporer, who runs a one-agent K-State Research and Extension office in Logan County, moved out of her comfort zone and into the county's farm fields. As the county's family and consumer sciences agent, she's a home economist by training.

But when the area's farmers and other growers have questions about suspect diseases, she's the go-to gal in Logan County.

"This county has little or no industry outside of cattle and farming," Sporer said, adding that the county normally has an agriculture agent in the extension office, but the position has been vacant for two years.

"Being the only person in the county, I've had to cover all the bases."

Armed with a digital camera and her office computer, Sporer sends test samples electronically to the nine-state Great Plains Diagnostic Network (GPDN), which is based at K-State's Manhattan campus.

Compared to traditional testing methods – which includes bagging samples and mailing them to a testing lab – the diagnostic system drastically reduces the time that farmers must wait to get results on a suspected disease or damaged crop.

GPDN is one of five regional centers in a national network of plant diagnostic laboratories. Each center has plant specialists, but they also share information across the country to detect potential disease outbreaks or even bioterrorist threats.

GPDN gives farmers the combined expertise of plant diagnosticians, entomologists, and other specialists across the United States.

"It allows us to get information from across the country that can be mined," said Will Lanier, an entomologist at Montana State University who has been using the plant diagnostic software for two years.

Extension agents across the country are being trained as "first detectors," said Joy Pierzynski, a diagnostician at K-State. The software



Lori Sporer, Logan County agent, talks with Greg Anderson and his son Casey about watching for problems in the 2007 wheat crop.

that powers the national network – called Plant Diagnostic Information Service, or PDIS – was developed by Will Baldwin, a software engineer with K-State Research and Extension.

Pierzynski notes that the software has made it possible to do large surveys of plant diseases, such as an extensive project being conducted at Cornell University.

In Kansas, it means that farmers get the combined expertise of plant diagnosticians, entomologists, and other specialists across the nation.

“It’s made my job easier,” said Montana’s Lanier, who has helped implement the system in his state. “I can service my clients quicker, and it forms a database, of sorts, for the farmer, the extension agent, and the diagnostician.”

Lanier added that the sooner suspect diseases are identified, the sooner that scientists and farmers can address the problem with less toxic, less intrusive treatments.

Kansas farmer/rancher Greg Anderson knows the peace of mind that comes with quick diagnosis. In 2006, he noticed an unusual spot in one area of a wheat field.

“We thought maybe I had a bug, maybe Hessian fly,” Anderson said. “They determined pretty quickly that it wasn’t that. It eased my mind. Having that quick diagnosis is worth quite a bit to me.”

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Biosecurity Research Facility Completed

K-State’s Biosecurity Research Institute, housed in the new Pat Roberts Hall, has increased the state’s ability to study and stop foodborne disease outbreaks. K-State Research and Extension scientists will be able to work in “biosafety cabinets” to study plant and animal infectious diseases. The facility’s work has major implications for the state’s multi-billion dollar farm economy, because more than 36,000 Kansas jobs are tied to agriculture or agricultural exports.

Jim Stack

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Wheat Varieties Up Yields

New K-State wheat varieties have helped Kansas farmers achieve an average yield improvement of 0.27 bushels per year. Over the last 29 years, the estimated economic benefit of these improvements is \$88.7 million.

Bikram Gill

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Agronomy Celebrates Centennial

The Department of Agronomy observed 100 years of excellence in teaching, research, and extension in 2006. Former and current students and faculty members gathered at the Manhattan campus to celebrate the department’s accomplishments. For more information about the centennial, go to www.agronomy.ksu.edu.



K-State Experts Help Entrepreneurs Ready Products for Market

Cheryl Zumbrunn wanted to produce and market products made from wheat grown on her family's farm north of Chapman in Dickinson County. She turned to K-State experts for help, and she's glad she did.

The Zumbrunns are using Kansas-grown products to make four flavors of Harvest Lark bars – healthy food bars – in their rural community.

Cheryl Zumbrunn attended a seminar on opportunity scoping presented in February 2004 by Vincent Amanor-Boadu, assistant professor in the Department of Agricultural Economics and director of the K-State Innovation Center. The center is funded by a USDA grant.

After the session, Zumbrunn approached Amanor-Boadu for help

with her fledgling business.

Amanor-Boadu worked with Zumbrunn to identify the opportunity through careful research and analysis, then market tested it. The center provided the technical and business development resources to help transform the ideas from the research and analysis into products that could be marketed competitively. Next, they helped develop the business plan for Harvest Lark's cereal bar business, recruited service providers, and looked for financing for the Zumbrunns.

"We try to surround our clients with all the resources they need to succeed – knowledge and connections – organizational, physical, and financial. We know that many entre-

preneurs fail not for lack of resources but for lack of knowledge about how to access the available resources," noted Amanor-Boadu.

"I think of the Innovation Center as a coach," said Zumbrunn. "They helped us follow through and were always available to coach us. I don't know why more people don't take advantage of all the resources K-State offers."

The Zumbrunns also worked with the K-State Food Product Development Services Lab run by Fadi Aramouni.

"We provide support for value-added activities," said Aramouni, professor in the Department of Animal Sciences and Industry. "We test and help develop the products,



Cheryl Zumbrunn, Chapman, Kan., prepares freshly made Harvest Lake food bars for packaging.

and then provide educational programs and technical support. We developed nutrition labels and the ingredient statement for the Harvest Lark products.”

Mary Meck Higgins, human nutrition specialist with K-State Research and Extension, worked with Zumbrunn on the nutritional analysis and to determine the correct bar size.

“From a health viewpoint, the size of a single serving is an important aspect to food product development,” said Higgins. “By having an appropriate portion size for the bars, consumers will be able to more easily follow current nutrition recommendations while they also satisfy their hunger. I am excited that Harvest Lark bars offer the public another chance to

purchase a locally grown food.”

The Zumbrunns are marketing Harvest Lark bars through their Web site and local and regional stores.

The Innovation Center at K-State has provided workshops and consultation to 58 entrepreneurs the past two years. They receive training in developing their business, assistance with operations, and more.

A study indicates that for every federal and state dollar invested in the program, the economic benefit is \$4.52 to Kansas economies.

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Flour Mill Dedicated

The new Hal Ross Flour Mill was dedicated on Oct. 20, 2006. The \$10 million mill, built entirely from private funds, is a 22,000 - square-foot, five-story concrete structure that houses equipment donated by 30 milling industry equipment suppliers. The modern mill can process hard wheat, soft wheat, and durum to train future millers.

Fred Fairchild

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Fuels for the Future

Ethanol plants consume grain to make ethanol. Research at K-State will help ethanol plants of the future convert cellulosic materials (wheat straw, corn stover, soy hulls, switch grass) into sugars for ethanol fermentation. The research represents better use of plant resources, leaving grain for human and animal food.

Grain scientists are expanding research capabilities to support the growing need for biofuels and bioproducts from agriculture. They are working with major ethanol producers to find new, higher value uses for distiller's grain – a major co-product from the grain ethanol process.

New faculty in enzymology and bioconversion / fermentation conduct research with the long-term goal of producing a range of products beyond ethanol, such as butanol and other fuels for the future.

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Master Food Volunteers Teach Nutrition in Their Communities

In a fast-paced world, convenience often reigns. Sports practices, school activities, music lessons and more. And Salina resident Karen Black wonders if we're missing something.

"One of the things we are losing is the appreciation for a home-cooked meal and the ability to do it," said Black, an attorney, and one of Saline County's Master Food Volunteers.

"Through the Master Food Volunteer program," she adds, "we are bringing people back to the table, instead of them running through the drive-through or throwing something in the microwave."

In Kansas, K-State Research and Extension agents recruit Master Food Volunteers who have a high interest in food topics. The volunteers receive

training and then donate their time working with or teaching about food and related areas, such as food preservation, nutrition, safety, and preparation.

Black had not worked with K-State Research and Extension much before beginning this program, but had heard of Master Gardeners and was fascinated by a food-equivalent program.

"I didn't know a lot about extension until I took this class, other than I know that their focus is lifelong learning and education in community," Black said. "The Master Food Volunteer program seems to be a great way to accomplish that."

As a third-year member, Black is no longer obligated to volunteer but still finds time in her busy schedule to

teach classes, share information, and promote healthful eating.

"I really do enjoy teaching classes because it sharpens your own skills," Black said. "You can't just go in there and teach how to cook a recipe. You have to know how nutritious it is, the best way to prepare it, proper food safety, and other background information."

Like many of the nearly 90 Master Food Volunteers throughout the state, Black's love of cooking motivated her to join the program.

"I'm not an artist, I'm not a singer, I'm not a gardener, but I am a pretty good cook," she said. "This is a way for me to put my skills to work in the community as a volunteer. It's fun to reach out to people who are afraid to



Karen Black, a Salina attorney, takes time from her busy schedule to prepare summer squash for her Master Food Volunteer presentation.

cook or don't know how and hear them say, 'this really is pretty easy.'"

Sherrie Mahoney, Central Kansas district agent, said the Master Food Volunteer program allows K-State Research and Extension to offer more programs to more people.

"The Master Food Volunteers in our county have developed sorghum flour recipes, worked at farmers' markets, taught classes at the food bank, distributed produce coupons to seniors, taught 4-H and children's cooking classes, and much more," Mahoney said. "There is no way I could do all of those things."

Karen Blakeslee, K-State Research and Extension food specialist and state coordinator of the Master Food Volunteer program, said the program

is a great way to expand the foods and nutrition program.

"It helps the agents get more done and allows us to reach new audiences, those who have never been taught anything about food or nutrition before," Blakeslee said. "Plus, it is a great outlet for people who are interested in food and want to help teach food or nutrition topics. They are proud to work with K-State Research and Extension. I think it is a positive program, any way you look at it."

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Cutting Health Costs

A regional economic report conducted for the Expanded Food, Nutrition and Education Program (EFNEP), administered through K-State Research and Extension, has found that for every dollar invested in the program, health care costs for Kansans were reduced by \$8.82. EFNEP helps low-income families learn about nutrition, diet, and exercise.

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Training Food Handlers

An estimated 75 million Americans become sick each year from foodborne illness. ServSafe, a national certification program designed to teach safe handling practices to foodservice employees, is available in 35 Kansas counties. In 2006, 650 employees and nearly 300 foodservice managers received ServSafe training from K-State Research and Extension in partnership with the Kansas Restaurant and Hospitality Association.

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Water Testing Info Available

K-State researchers and watershed specialists have developed and field tested a series of "Citizen Science" fact sheets on water quality, water testing, and more. The packet offers clear explanations and testing instructions. These are useful for landowners, citizens, WRAPS coordinators, and high school science/agricultural classroom use. The next series of fact sheets will deal with soil testing.

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Canola Becomes Viable Alternative Crop in the Great Plains

In late April, people in central Kansas may wonder what crop produces bright yellow blossoms.

John Haas, who farms near Larned, has responded to questions about his bright fields since he started growing canola about seven years ago. Haas, who graduated from K-State with a degree in agronomy, enthusiastically explains the benefits of canola.

In fact, he enjoyed promoting the new Kansas crop so much that he got involved with the U.S. Canola Association (USCA). He is the Great Plains region board member and current president of the organization. The USCA mission is to increase U.S. canola production to meet the growing public demand for healthy products.

“Canola is the healthiest of all food oils,” said Haas. “It has no trans fats and doesn’t hydrogenate. Now, we import 70 percent of our canola from Canada.”

“Canola also is the best oil for biodiesel,” said Haas. “It has a low cloud point, which is the temperature that biodiesel coagulates.”

As a producer, he likes that canola works well as a rotation crop with wheat, and it can be grown with existing tools. There are just over one million acres planted to canola in the United States, with North Dakota as the major area of canola production.

His operation has been strictly no-till since 1980. He grows wheat, alfalfa, corn, sorghum, soybeans, sunflowers – basically everything but

cotton. Canola can be planted no-till in milo stubble, and wheat plants easily in canola stubble. Haas noted an 8 to 12 percent yield boost in wheat planted after canola.

Haas sees canola as a viable crop for the Great Plains of Kansas, Oklahoma, and Texas. And starting in fall 2006, crop insurance is available for canola growers.

“In the Great Plains, we grew about 60,000 acres in 2006 compared to about 20,000 acres in 2005 and 3,000 acres in 2004,” said Haas.

“European canola varieties didn’t adapt to the Kansas climate. K-State has done a super job in developing winter canola that can be grown in Kansas. Mike Stamm will take it to the next level.”



John Haas grows canola on his family farm near Larned. He also serves as president of the U.S. Canola Association.

Stamm, also a K-State agronomy graduate, was hired jointly by K-State and Oklahoma State University in 2005 as a canola breeder. He is stationed at the Manhattan campus.

Stamm and other K-State researchers collaborated with scientists at OSU and the University of Nebraska, Lincoln to produce the Great Plains Canola Production Handbook. It's a 32-page manual full of information and color photos to help producers make informed decisions about planting canola.

In July 2006, Stamm helped with presentations in Dodge City, Kan., and Enid and Altus, Okla., on winter canola production and utilization.

“We are seeing an increased visibility and interest in canola,” said Stamm. “There are 57 entries in 23 states in the National Winter Canola Variety Trials (NWCVT) – up from 36 entries last year. Eleven of those are in Kansas and Oklahoma.”

“Ten canola breeding programs in the United States and Europe supply entries for the NWCVT,” said Stamm. “All the data collected from the trials are shared to help make marketing decisions on the best varieties to promote.”

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Identify Wheat on the Spot

K-State researchers are developing a way to identify wheat characteristics within seconds on the spot – whether that spot is in the field, on the truck, at the elevator, or at the port. The “Lab on a Chip” will allow the user to identify wheat’s variety, protein and moisture levels, and quality traits. Instead of waiting two to three days, farmers will be able to check their crop during harvest and segregate it for protein or moisture or quality to improve consistency and the price they get.

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Forage Choices for Drought Conditions

K-State Research and Extension agents provided advice to the state’s farmers on testing forages during the hot, dry 2006 summer season. Questions ranged from using alternative forages to ammoniating wheat straw and planting forage sorghum hybrids. An agent in Marshall County reported he evaluated 35 cow herds and estimated the economic benefit to farmers in his county at \$200,000, based on potential death loss to poor forages.

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4-H Members Join Community Effort to Promote Literacy

Grant County 4-H'ers are helping prepare preschoolers to succeed in school.

For the last five years, 4-H'ers have been participating in the Book Buddies program – where middle- and high-school students read to preschool children to help them develop a lifelong love of reading and learning.

The program was established a few years earlier through the Communities In School Inc. (CIS) of Grant County, a nonprofit organization dedicated to helping children succeed in school.

Each week during the school year, senior citizens, youth, and local business people volunteer to read age-appropriate books to 4-year-olds.

The 4-H'ers are responsible for one session each month. In addition to

reading to the children, they show the youngsters how to make healthy snacks, such as trail mix or fruit shish kababs.

“The children really get excited when the 4-H'ers come to the program. They know there will be nutritious snacks, books, and interactions with the 4-H'ers,” said Judy Alig, director of CIS.

Another bonus to the program is that the preschoolers get to keep the books and build a home library.

Mary Sullivan, K-State Research and Extension agent in Grant County, works with the student volunteers. She helped the students write the Learn and Serve mini grant (from the Kansas Volunteer Commission, Kansas State Department of Educa-

tion) that helps pay for the books.

“It's a wonderful learning experience for the students,” said Sullivan. “We tried to divide up the duties among the 4-H clubs, but some of the 4-H'ers enjoy it so much they want to come every time.”

The students help promote the event by setting up the Book Buddies booth at the Fairy Tale Fair – a community literacy event – at the beginning of the school year. They also help coordinate the program, making sure that there are appropriate books and snacks and at least one reader for every two preschoolers.

Sullivan said the schools have been very cooperative. If possible, the student readers get out of school a few minutes early to prepare for the arrival



Grant County 4-H members read to 4-year-olds to help them prepare for school. The 4-H'ers applied for grant funds to purchase the books.

of the eager preschoolers.

Grant County has an emerging Hispanic population. Census data for the county from 2000 show that English is not the primary language spoken in nearly 30 percent of homes. The Book Buddies program uses some bilingual books, but the volunteers read to the children in English to prepare them for school.

The Anderson family has a long history with the Book Buddies program. The two youngest – Timothy and Rachel – were read to as 4-year-olds. Now they are old enough to be in 4-H, and they get to participate with their older siblings as readers.

The Andersons are homeschooled. The 4-H program offers them established, quality programs and the

opportunity to interact with other youth.

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4-H'ers Learn to Give Back

More than 3,500 Kansas 4-H'ers in 36 counties donated 3,539 volunteer hours for local food programs, collected 10,679 cans of food, 2,118 pounds of fresh produce, and \$3,513 in cash. This includes \$600 for a centennial quilt auctioned at the Kansas State Fair. The efforts were part of a 4-H centennial project to raise awareness about hunger.

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Youth Build Trail Initiative

Kansas youth are leading a movement to develop, promote, and use walking trails for increased physical activity. A quarter-mile walking trail, built at the Rock Springs 4-H Center, has been the "first leg" of the youth-led project that aims to encourage youth to use trails in their own communities. The initiative begins in spring 2007.

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Promoting Space Technology

The Kansas 4-H Space Tech program is directed by a group of Kansas 4-H youth, ages 12-18, who work to promote aerospace and technology education throughout the United States. They sponsor a four-day, hands-on space and technology experience for youth. The team also provides services through their mobile technology and aerospace lab.

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After-School Program Benefits All Ages

For six weeks each semester, about 60 Kearny County 4-H'ers in grades one to six get together on Wednesday afternoons with volunteers from the senior center to do crafts or activities such as bowling. The program involves one-third of the Lakin Elementary School students. Older 4-H'ers also volunteer to help with the activities.

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EARTH Program Encourages Youth to Conserve Water, Environment

When more than 4,500 students across Kansas get excited about dirt, Tonya Bronleewe knows there has to be a good reason.

As program coordinator for the Earth Awareness Researchers for Tomorrow's Habitat (EARTH) program, teaching students about soil, water, air, and living resources is all part of her goal.

EARTH began as a local program in Sedgwick County, "but it grew so big that they needed someone to hire to take on the job full time," Bronleewe said. "I was hired for the position, and it has grown to a statewide program."

There were 600 students in Sedgwick County the first year, but today, the program reaches 14 coun-

ties and 4,502 students in Kansas – and this is just the third year of expansion.

EARTH is an environmental education program geared to middle-school students – now expanding to high school students – who are taught by participating local teachers. During the year-long program, teachers receive curriculum kits with 26 lessons that can be taught to students from five key areas: land, air, water, living resources, and impacts.

Each county that participates in the program hosts an EARTH workshop in April.

In 2006, there were 2,310 students in 18 Sedgwick County schools who took part in EARTH programs.

Each year, students from each participating county attend a career exploration workshop, where they get a chance to apply what they've learned to "real world" professions. Bronleewe said the day-long workshops are a culmination of everything the students have learned through the year.

"Students really enjoyed this year's activities and presenters. They were able to apply the information learned in class to real life applications," said Kathy Peavey, a teacher at Wichita's Hadley Middle School. "These students get so excited about the program that they write about EARTH in their English essays at school, and then teach the activities to their brothers and sisters at home."

Financial assistance for EARTH is



Middle-school students take part in an activity that illustrates how all parts of nature are dependent on each other for a balanced ecosystem.

provided by an EPA-Section 319 nonpoint source pollution control grant through the Kansas Department of Health and Environment Water Management Section in cooperation with K-State Research and Extension and the Kansas Center for Agriculture Resources and the Environment.

Business groups participating in the workshops include conservation districts, county extension workers, watershed coordinators, and other water-quality agencies.

Their combined efforts have helped students learn more about Kansas' work in developing Watershed Restoration and Protection Strategies (WRAPS) for high-priority watersheds.

The Kansas Department of Health

and Environment provides grants to help areas develop and implement plans to maintain and improve their watershed. Bronleewe said the EARTH programs help by teaching students at a young age how to improve water quality.

Bronleewe said she hopes the program can “continue to grow and reach more students. They’re the ones who are going to be influencing our environment in the future. In teaching them now, we’ll be 10 steps ahead in preserving Kansas resources in the days to come.”

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Reducing Carbon in the Air

K-State scientists are helping to reduce atmospheric carbon dioxide, a cause of global warming. They’re developing best management practices for carbon sequestration, or ways in which carbon can be stored safely in soil and not released to the environment. Plus, publicly traded “carbon credits” could also pay farmers an extra \$1 to \$2 per acre for stored carbon.

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Learning Best Practices

A team of K-State engineers, agronomists, sociologists, and economists was awarded \$650,000 to study the effects of conservation practices in the Cheney Lake watershed in south central Kansas. The project, part of \$2 million awarded nationally by the USDA, will help the researchers learn more about conservation practices that contribute to net farm income in Kansas, as well as establish best practices for improving water quality.

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Improving Kansas Forests

The Kansas Forest Service provided on-the-ground technical assistance to 467 private landowners and prepared 351 forest management and tree planting plans on 7,076 acres. Based on the plan recommendations, 161 acres of trees were planted and 310 acres of forest improvement work was completed in 2006.

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Subsurface Drip Irrigation Offers Water-Saving Alternatives

Western Kansas farmers Patrick House and Wendell Nicholas are using subsurface drip irrigation (SDI) to grow corn and conserve water.

With SDI, water is applied slowly to the roots of plants. Plastic drip tape is buried – usually 12 inches to 15 inches deep and 60 inches apart. The tape has evenly spaced emitters that disperse water at a set rate.

House, who farms near Goodland with his father Norman, recently harvested his fourth corn crop with the SDI system.

“The field previously was flood irrigated,” said House. With the flood system, you release enough water to fill the furrows in the field. “SDI is more efficient because there is no wind evaporation.”

“Also, you get to use your full acreage. With a center pivot irrigation system, water is dispersed in a circle and doesn’t get to the corners of the field.”

Nicholas from Stanton County has been using SDI for 13 growing seasons.

“The maintenance is minimal – about one repair for every 20 acres – and it uses about 50 percent less water,” said Nicholas. “The goals are to conserve water and maintain yield.”

Both House and Nicholas have worked with K-State Research and Extension experts to install and maintain their systems.

Since 1989, Freddie Lamm, research irrigation engineer at the Northwest Research-Extension Center (NWREC) in Colby, has been

developing techniques for successful application of subsurface drip irrigation. The overall objectives were to conserve water, to protect groundwater quality, and to develop sound methodologies for SDI.

When producers say that “Lamm wrote the book on SDI,” they are correct. He wrote the introduction and the chapter on SDI for a book published in 2006 called “Microirrigation for Crop Production – Design, Operation and Management.” The book has 15 chapters written by numerous international authors and is considered to be the leading international reference for microirrigation.

“There is a growing interest in SDI around the region, and it is amazing to see some of the progress many of



Patrick House, Goodland, checks the filter on his subsurface drip irrigation system.

the producers have obtained,” said Lamm. “They keep us refreshed with new ideas for research and extension of this efficient technology. It’s a relatively new technology, so we can learn from each other.”

The NWREC has about 20 acres of corn, alfalfa, grain sorghum, soybeans, and sunflowers dedicated to SDI, depending on the year. The Colby research site has plots with various dripline spacings and depths and also various emitter spacings and flowrates that are suitable for examining a wide range of various agronomic and engineering practices. The research data give producers information to make choices about whether SDI will work for them and how to set up the most efficient system.

During the recent drought years, germination with SDI has emerged as a problem, so K-State Research and Extension has initiated some new studies to try to alleviate this problem.

“Ninety-five percent of the time there is enough moisture in the spring for germination,” said Danny Rogers, irrigation engineer in the Department of Biological and Agricultural Engineering. “But we had some recent years that were extremely dry.”

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Building Bioretention Cells

K-State Research and Extension biological and agricultural engineers have established areas of green space, called bioretention cells, in parts of Topeka and Kansas City to filter pollutants in stormwater before it can reach public rivers. The landscaped green spaces look nice, while the plant’s roots collect water and reduce pollution. The engineers just completed the second of five years’ work on this project.

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Re-evaluating Tillage Practices

A K-State Research and Extension agent in Pawnee County has helped farmers in his area convert to strip-till measures that will help protect the soil from water and wind erosion. Another important feature: By tilling the land less, farmers can cut their fuel and fertilizer costs.

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Software Forecasts Net Returns

Scientists in Garden City are helping western Kansas farmers develop strategies for using limited water resources to irrigate their crops. They are using computer software developed by K-State Research and Extension to forecast the net returns of possible cropping rotations. This will help farmers make sound decisions on crop production and irrigation.

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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, 21 counties have formed seven 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; Cheyenne joined in 2006.

Meadowlark District #7 (2006) – Jackson, Jefferson, and Nemaha counties.

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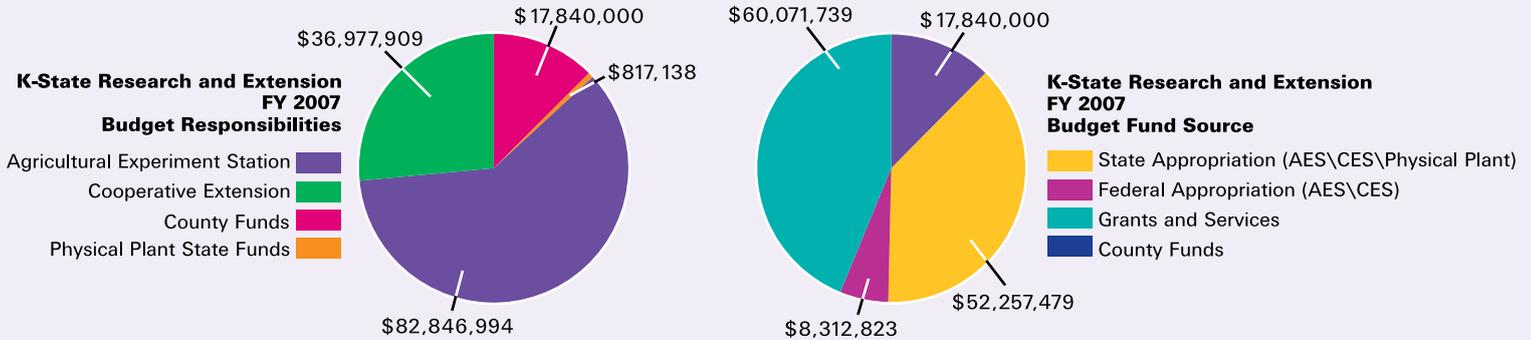
Facilities Across the State

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.

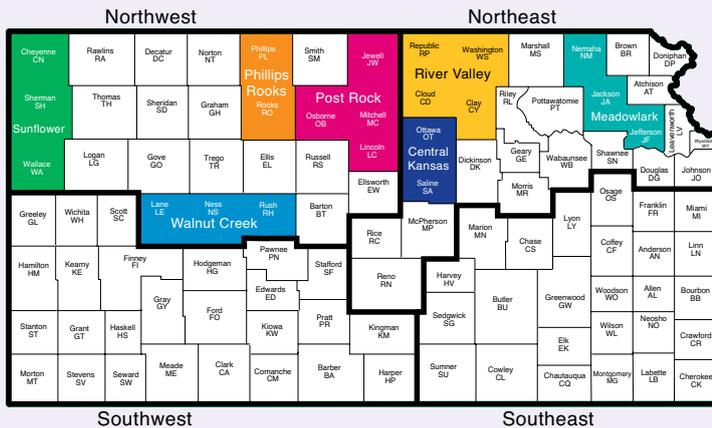
K-State Research and Extension Budget Data for Fiscal Year 2007

For more detailed budget information, go to www.oznet.ksu.edu/budget/2007/2007_esarp_budget_data.pdf

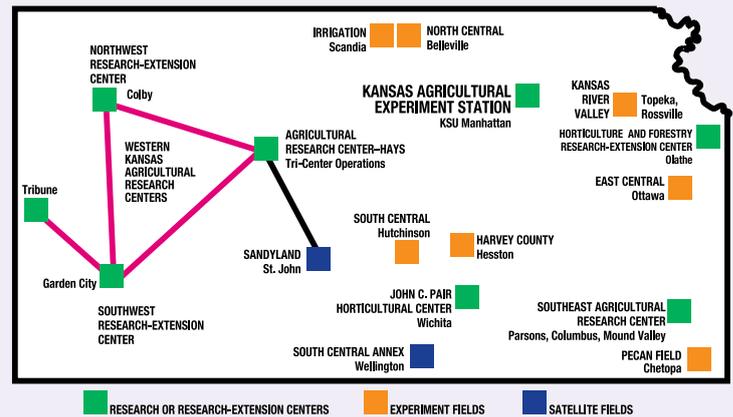
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Statewide Offices



Research Facilities



“Knowledge for Life”

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