# Kansas

# Annual Report of Accomplishments and Results

# FY2003

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# Introduction

This marks the final year report of our first Five-Year Plan for Kansas State University's K-State Research and Extension that began in 1999. Each year we have reported on our progress and showcased some of our accomplishments. This report includes a few of the many programs and projects being carried out on campus and across the state. There is simply not enough room to feature all of them. But they are representative of what we are doing and how we are accountable.

Accountability checks and balances include:

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

The goal for the next Five-Year Plan is to set a course that will make the most of our resources and opportunities. The effort involves extension agents; professional staff; state and area researchers; specialists; and representatives from administration. The new Five-Year Plan is based on the idea that strategic planning is critical to our success as a land-grant university with its dual mission of research and extension. It allows us to build on core values. And it serves as a guide for us to respond to the needs of Kansas citizens. Faculty groups have interacted with external groups of agencies, organizations, and citizens to gain stakeholder feedback that has helped these efforts in terms of relevance, support, and understanding. Throughout this process, we have been trying to build on the results of surveys that provided feedback about how KSRE was perceived by taxpayers.

In fiscal year 2003, total funding in support of the programs described in the plan totals $91,463,296 (See Appendixes A and B). This total and the program efforts included in this report represent all funding streams–not just Federal dollars.

## A. PLANNED PROGRAMS

## GOAL 1 – AN AGRICULTURAL SYSTEM THAT IS HIGHLY COMPETITIVE IN THE GLOBAL ECONOMY

**Overview** (includes sections a, b, c, and d)

K-State Research and Extension (KSRE) is working to develop better cropping systems; develop more efficient and profitable livestock production systems while protecting the environment; enhance the value of Kansas agricultural goods; develop agricultural risk-management strategies; develop agricultural technologies and information systems; and develop new and appealing food products.

Advances in **food processing and marketing** come from adding value to existing commodities and products. Research is necessary to determine which value-added products or processes are economically sustainable in Kansas, and educational programs are essential to teach Kansans how to take advantage of value-added opportunities.

KSRE has been working on many value-added projects for the benefit of the state and its citizens. In the area of wheat, for example, value-added projects have included pasta production from wheat; starch and gluten from wheat; uses of wheat in shellfish diets; nonfood and nonfeed uses of wheat; new food productions from wheat; utilizing wheat milling by-products; and use of wheat for oriental noodles.

One of the projects intended to add value to soybeans involved developing industrial adhesives and resins from that commodity. The project has resulted in patents being issued to K-State, and it has now reached the industrial-scale proof of concept stage in partnership with a major resins manufacturing company.

A number of projects also have focused on improving quality and marketability of agricultural products, including improving the grain marketing system, expanding export markets, evaluating food marketing, and processing sorghum for improved marketability.

Through all of these efforts, educational support has been provided to entrepreneurial farm families seeking alternative sources of farm product sales as a means of enhancing income. The Kansas Center for Sustainable Agriculture and Alternative Crops has worked with Kansas producers to develop local food systems, providing renewed emphases on growing food crops and developing local markets in Kansas. One such example has involved working with a local beef production cooperative to create a niche market.

KSRE also responds to immediate problems that affect agriculture, families, and communities.

The United States Department of Agriculture granted $3 million to K-State to establish a **National Agriculture Biosecurity Center**. The grant was authorized in the Public Health Security and

Bioterrorism Preparedness and Response Act of 2002. K-State has partnered with Texas A&M and Purdue universities to work on evaluating disposal of potentially contaminated animal carcasses in case of a serious contagious disease outbreak; to assess execution, management, and effectiveness of current agroterrorism exercises; and to analyze ways that agricultural pathogens might enter and be disseminated within the country.

Additionally, K-State is a lead institution on development of improved early detection and rapid response for plant pests and diseases. This multistate project in **agricultural technology**, the National Plant Diagnostic Network (NPDN), is supported, in part, through special USDA CSREES funding, will enhance the capacity of scientists' ability to detect and report unusual occurrences of plant associated problems. These problems could be the result of a planned terrorist action to affect the nation's ability to produce food or may develop from unintentional movement of a pest or pathogen into the country.

For more than 100 years, K-State has provided knowledge that helps solve or alleviate problems. For example, the **drought of 2003** required special emphases and study of the problems created across the state and strategies to work with the conditions created in this unusually severe drought. The Kansas Weather Data Library (KWDL), operated by KSRE, is the official source of climatological data for the state. The KWDL took on new responsibilities during the drought and provided critically important drought status reports to state and local governments. Weekly and bi-weekly **crop and forage teleconferences** among agents and specialists were used to keep everyone aware of changing drought conditions and issues. Information was gathered and developed for use in radio broadcasts, newsletters, a drought resource Website <http://www.oznet.ksu.edu/drought> and resource materials that farmers could use. A series of K-State supported meetings brought livestock producers together to discuss and share new ideas for planning and decision-making.

With an identified need for pasture and hay exchange among ranchers; KSRE cooperatively supports a Website on the Kansas Farm Bureau server that brings together those who have pasture and hay with those who need them. Current and historical weather data from the Weather Data Library of KSRE are being provided to state and federal agencies needing it. Agents and specialists have consulted one-on-one with producers on the critical drought-related decisions. They also provided local drought-related information through newspaper columns, radio programs, and KSRE publications.

Agricultural risk management is vital to the farming and ranching industries of Kansas. A team of K-State agricultural economics faculty and staff have developed the Agmanager.info Website where newsletters, decision aids, policy briefings, information updates, and current educational program offerings are provided to the agricultural business professionals, farmers, and ranchers all across Kansas for improved decision making. Decision-making tools such as budget spreadsheets and data sets also are available to aid farmers in managing their operations. Information about upcoming seminars, such as the annual K-State Risk and Profit Conference, also can be found. AgManager can be viewed at *www.agmanager.info* . The focus is on KSRE information, and the goal is to improve the organization of Web-based material and allow greater access for agricultural producers and other clientele. Topics on the ag economics site include crop

and livestock marketing and outlook reports; crop insurance; farm management; agricultural policy; human resources; income tax and law; and agribusiness. The site contains several pages that are updated weekly as market prices and conditions change.

Kansas has one of the largest beef industries in the United States (more than $5 billion annual farm receipts from the sale of cattle and calves). Leading the way in Kansas to establish a system of identification for all livestock, KSRE faculty are responding to producer interests by providing an understanding of the available technologies and options for assuring a safe food supply at the production level. Animal health is vital to the profitability of that industry. Many of the nutrition, diet, and management systems used in animal care and feeding can be traced back to KSRE programs. Kansas has developed one of the fastest growing dairy industries in the nation with at least 260 new jobs created during the last eight years. New annual sales have exceeded $80 million in products produced. Work with the swine industry has resulted in the adoption of rations with reduced phosphorus in the diets, lessening the environmental impact of swine waste.

e. Total expenditures by funding source and FTEs
FY2003 Projected: $54,927,070 Actual: $62,227,733 FTEs: 266.67

**Key Theme – Adding Value to New and Old Agricultural Products**

**K-State Evaluates an Effective Alternative Insecticide for Grain Production**

a. Spinsosad is a by-product of bacteria, and it is safe for mammals and the environment. Because insects die by coming into contact with it, Spinosad also can be used on such surfaces as empty grain bins and retail store buildings.
b. A K-State grain scientist studying the stored grain insecticide Spinosad found it to be lethal against the lesser grain borer, a primary destroyer of wheat in grain bins. Establishing the effectiveness of this commercially available product is significant because the 1996 Food Quality Protection Act is phasing out traditional organophosphate insecticides.
a. Scope of impact – Multistate Integrated Research and Extension

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**Multiple Benefits Derived from Feeding Flaxseed to Cattle**

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

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**Key Theme – Agricultural Competitiveness**

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

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

**Key Theme – Agricultural Profitability**

**Workshops that Benefit Operators of Small Farms**

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

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**Farm Bill Education and Its Impact in Kansas**

a. Producers faced the need to understand the new Farm Bill and its complex sign-up options. What made producers' decisions complex was that the best option varied depending on each farm's previous Farm Bill base acreage and payment yield; the recent crop history on the farm; and the producer's expectations for future commodity prices and the resulting program payments. K-State Research and Extension supported USDA's Farm Service Agency (FSA), reaching more than 27,000 producers through more than 400 meetings statewide.

b. For the average producer with 504 acres, the data collected suggested a $2.72 per-acre, per-year advantage when selecting the best sign-up decision compared to the average of all the sign-up options. The partial payoff to Kansas producers from using the spreadsheet and consultations provided through the educational program exceeds $14.3 million annually in larger farm program payments

. Scope of Impact – State Specific

**Key Theme – Animal Production Efficiency**

**Precision Management of Feedlot Cattle**

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

**Updated Guidelines for Feeding Nursery Pigs**

a. Based on recent research trials, swine nutritionists updated their recommendations for feeding nursery pigs. The new guidelines include adding more amino acids and less fat to the pigs' diets.
b. The benefit of the new guidelines to producers and the swine industry isn't necessarily in reducing feeding costs but rather in increased revenue because gain should be about two pounds more per pig.
c. Scope of impact – Multistate Integrated Research and Extension

**Key Theme – New Uses for Agricultural Products**

**Plastics from Starch and Polylactic Acid**

a. Soybean is a major crop in Kansas. Soy proteins, oils, and carbohydrates are natural polymers and have shown great potential for biofuels and bioproducts. A KSRE project is focusing on developing biobased adhesives from soybean. The objective is to develop adhesives that can serve as alternatives to urea formaldehyde resins for particle boards.
b. One patent has been approved, and a patent for a new technology in this area has been filed. This research addresses the needs proscribed by the USDA for biomass industrial bioenergy and bioproducts. Such research will help the Kansas farm economy, ease environmental

pollution, and improve biofuel industry sustainability by providing technologies for high-value products for the biofuel system. It could impact national soybean research and research on other agricultural commodities for industrial uses.

c. Scope of impact – Multistate Integrated Research and Extension

**Key Theme – Plant Production Efficiency**

**The Importance of Wheat Breeding in Kansas**

a. A majority of wheat varieties planted in Kansas originate from KSRE wheat-breeding program. One of the newest is the hard white wheat Lakin, which is adapted to southwest Kansas.
b. An economic analysis of K-State wheat-breeding programs revealed that the average economic benefit to Kansas wheat producers is $52.7 million. For each dollar invested in varietal development, nearly $12 was earned by Kansas wheat producers.
c. Scope of impact –State Matching, Hatch Act Funds, and Grants

**Variety Testing for Kansas Crops**

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

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

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

c. Scope of impact – State Specific

**Study Shows Sunflower Roots Go Deeper**

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

## GOAL 2 – A SAFE AND SECURE FOOD AND FIBER SYSTEM

### Overview

K-State Research and Extension is a national leader in food-safety programs. K-State scientists and educators are focusing on developing and promoting a safe food supply from production to consumption.

The goal of food safety programs is to prevent food borne illnesses. Between 6.5 and 81 million cases of food borne illnesses, including 9,000 deaths, occur each year in the United States. The level of illness reported in Kansas is low, but the reporting system is not an active one, and it is a well-known fact that food borne illnesses are greatly under-reported. Experts believe the risk of food-borne illness is increasing due to multiple factors. One of the goals of Healthy People 2010 is to reduce food borne illness. Key to accomplishing this goal is to increase the proportion of consumers and commercial food handlers following key safety practices.

A Food Science Institute was created in 2002 to more efficiently draw upon food science expertise. Combining resources in education, research, and extension is improving the coordination, visibility, and capacity of KSU food science programs. The Institute builds on the university's outstanding reputation in food sciences The Food Science Institute also offers a variety of academic programs through various KSU departments and via distance education through the Division of Continuing Education. A recent survey by the Institute of Food Technologists rated K-State's food science distance education program as the most comprehensive in the nation.

- K-State Research and Extension began playing a leading role in agricultural biosecurity by directing resources and research toward ways that will help protect agriculture and food systems in the Midwest and the nation. Scientists are working with the U.S. Center for Domestic Preparedness to train "first responders" in Kansas.

- A food irradiation education project was funded by a grant from CSREES. The Master Food Volunteer program provides base knowledge to volunteers in the areas of food safety, food science, food preparation, and food preservation. Nearly 300 participants attended ServSafe workshops representing a variety of foodservices including restaurants, schools, hospitals, "quick-type" shops with gas stations, private catering, and others. Because of the importance of food safety issues and the need to reach a rapidly increasing audience, a Meat Safety and Quality program was presented to KSU students, Kansas Department of Commerce and Housing personnel, and Kansas meat processors. Research has been directed to the improvement of the microbiological safety of meat and poultry products, especially on development of slaughter interventions and interventions that may be applied on-farm and during fabrication of sub-primals, irradiation and chemical treatments, and post-process pasteurization. KSU's research on slaughter interventions has been widely implemented by the meat industry. Researchers are testing a foam that was found to kill anthrax spores for use in food and agriculture sectors.

Those receiving educational intervention training on food irradiation responded more correctly and also more positively to a post-questionnaire. Twenty-one volunteers were trained in the Master Food Handler program, with each trained volunteer participating in 40 hours of training. Since that time, the volunteers have logged hundreds of hours of payback time and have conducted demonstrations, Lunch-and-Learn sessions, and delivered after school nutrition programs. Many ServSafe participants have commented that they will change certain practices as a result of the training activity. Some gain employment as a result of participation. ServSafe-trained people are sought after in food service for managerial positions. Many Kansas food and meat processors received training and assistance in developing, implementing, and maintaining GMPs, SSOPs, and HACCP which enabled them to provide consumers with safer foods, stay competitive in the market, and comply with regulatory agency directives. The impact of KSU's food safety research program can be seen throughout the meat industry. Beef carcasses are routinely pasteurized in almost all major beef slaughter plants. The ground beef industry is implementing a technology which was evaluated at KSU for decontaminating beef trimmings prior to grinding - the Sanova process. The research on control of *Listeria monocytogenes* in processed meats has resulted in the commercial development of a post-process steam pasteurization system offered to the industry in 2002. In addition, the industry is implementing chemical treatments that were evaluated at KSU for *Listeria* control. KSU's research on slaughter interventions has been widely implemented by the meat industry. As a result, carcasses are visually and microbiologically cleaner than at any time in our history. The extension of antimicrobial treatments to include pre-harvest and post-slaughter applications will further reduce the risks of microbial hazards in meat and poultry products.

c. ServSafe trained people are sought for managerial positions in food service. Agents who plan and conduct ServSafe workshops gain visibility in their communities for knowledge and expertise in food safety among the foodservice commercial and noncommercial sectors, thus expanding their traditional audience. Food safety and HACCP assistance programs are enabling meat and food processors to comply with regulations and improve their products. Based on the types of assistance provided to plants, the USDA announced the successful implementation of HACCP in all federal- and state-inspected small plants. The direct impact of the biosecurity program is an increase in the value of Kansas products. By incorporating biosecurity principles, the indirect impact may be to decrease the potential food borne pathogens that leave the farm.
d. It is believed that substantial progress has been made in Kansas toward the reduction of food borne illness, improved food production and management practices, and compliance with HACCP guidelines. Faculty of K-State Research and Extension have contributed greatly to this progress and are recognized at state and national levels for these contributions.

e. Total expenditures by funding source and FTEs

| | | | |
|---|---|---|---|
| FY2003 | Projected: $2,419,892 | Actual: $2,736,687 | FTEs: 19.1 |

**Key Theme – Food Safety**

**Food Safety for Consumers, Food Service, and Retail Stores**

a. The focus of this program is research on the economics of food safety–primarily on consumer

perceptions of risk from food, their demand for safer food, their preferences for methods of enhancing food safety and factors influencing those preferences.

b. The results of this work provide strong evidence to suggest that consumers are willing to bear the costs of using new technology to enhance food safety, and that a majority of informed consumers have a preference for more effective risk reducing technologies (e.g., 60% of survey respondents preferred food irradiation over carcass pasteurization).
c. Scope of Impact – State Specific

**Key Theme – HACCP**

**Meat Safety and Quality**

a. The purpose of the Meat Safety and Quality program is to provide technical assistance and support to the Kansas meat industry to enhance the quality, safety, and variety of Kansas meat products. In 2000, USDA provided funding for a three year cooperative project between Kansas State University, the University of Nebraska, the University of Missouri, and South Dakota State University to provide support, training, and technical assistance to meat and poultry facilities in a four-state region. One primary goal during 2003 was to provide programs, training, and assistance to Kansas meat processing businesses so they could meet the challenges set by regulators and remain in compliance with additional mandates required.
b. The majority of companies serviced through this program are small and very small meat processing businesses, many with fewer than 10 employees. Had this program not been available, these companies would not be able to afford these types of services. In the past year, processors and entrepreneurs realized a savings of over $46,000 while enhancing the quality and safety of meat and meat products for Kansas consumers.
c. Scope of Impact – Multistate Integrated Research and Extension
   • With MO, NE, SD

## GOAL 3 – A HEALTHY, WELL-NOURISHED POPULATION

Overview

Kansans are concerned about their personal health and safety as well as that of their families and communities. Statewide surveys, forums, and other data revealed that citizens have a keen interest in programs delivered by local and state organizations. Public health planning documents, such as Healthy Kansans 2000 and Healthy People 2010, call for reductions in the incidence and prevalence of certain types of morbidity and mortality. Cardiovascular-pulmonary diseases, cancer, and cerebrovascular disease leading to strokes account for 63% of Kansas' deaths that are primarily preventable by adopting healthy and safe lifestyles. Eating disorders and other weight issues are increasing problems. Arthritis affects 40 million Americans, and osteoporosis is present in 9 of 10 women and 1 in 3 men by age 75.

Tobacco use increases risk for many diseases, including lung cancer and emphysema. Currently, 22% of Kansans smoke, and more youths are using tobacco products. Alcohol and drug abuse are common, especially inappropriate use of medications and over-the-counter drugs by the elderly and binge drinking by youths and young adults. Fourteen percent of adult Kansans engage in binge and heavy drinking. Exposure to environmental hazards (e.g., lead, radon) in their homes can also be a cause of illness and death for Kansans. Other environmental hazards can result in health problems for people with asthma and allergies or in death from carbon monoxide. Limited-resource and near-poverty individuals and families, those without health insurance, the very young, and the aged are most at risk for poor health and early death.

K-State's Office of Community Health offers distance learning, networks, help with training, evaluation systems, process surveys, and basic and applied research expertise and support to help communities change unhealthy environments into places that allow children, youths, and adults to make healthy choices. In 2003, the Family Nutrition Program (FNP) provided nutrition education to more than 375,000 food-stamp eligible citizens in 84 counties and included education to improve skills in food resource management, obtain safe and nutritious foods, and balance physical activity with food eaten. The Kansas Nutrition Network (KNN), a sister program to FNP, is a partnership of state-level public and privately funded nutrition education and food assistance programs. Led by K-State Research and Extension, KNN uses social marketing techniques to mobilize Kansans with limited incomes to use available nutrition education and food resources to improve their health. The Expanded Food and Nutrition Education Program (EFNEP) is available in three counties for youths and homemakers with limited resources. EFNEP reached 1,781 Kansas families with 2,491 children in 2003. KSRE collaborated with other Kansas agencies to increase use of Food Stamps by eligible older adults in 18 counties in north central Kansas. Dining with Diabetes provides dietary guidance to people with diabetes and their caregivers. Meetings educating the public about nutrition benefits of Healthful Whole Grains were conducted across Kansas and Minnesota for more than 3,000 people. A new program, Gardening with Older Adults, was developed and pilot-tested to promote physical activity and nutrition. The Kansas Senior Farmers' Market Nutrition Program was launched in collaboration with the Kansas Department of Aging and other state organizations. The program helped 6,000 older adults in six

counties improve their health and nutrition through eating more fresh fruits and vegetables and also benefited local growers and community economies.

The PANE (Physical Activity and Nutrition Education) project aims to improve the personal health of Kansans with arthritis. Training workshops for promoting awareness and management of arthritis were held in four locations across the state for KSRE county faculty. Health-related research programs are examining the influence of different dyes on the UV protection value of cotton fabric; developing a protein-based therapy that may alleviate the complications of cystic fibrosis; examining the effect of zinc deficiency on the absorption of vitamins A and E; and examining the connection between cigarette smoke, vitamin A, and emphysema.

The FNP program resulted in significant intention to change behavior, including 47% intending to eat more servings of grain per day; 58% intending to eat more servings of fruit and vegetables per day; 49% intending to drink more servings of milk per day; 41% intending to eat more than one kind of vegetable or fruit per day more often; 34% intending to eat fried foods less often; 40% intending to mover closer to the Dietary Guidelines recommending that Americans include a greater variety of foods in their diets; and 35% intending to increase their level of physical activity. More than 93% of the EFNEP participants showed improvements in dietary intake after completing the series of EFNEP lessons. EFNEP participants increased frequency of reading food labels (69%), adapted use of a safer method of thawing frozen food (64%), and improved in one or more food resource management practice (84%). After food assistance training sessions, professionals and volunteers who work with senior citizens, including KSRE personnel, improved their understanding of and attitudes toward the Food Stamp Program (FSP). For instance, more of those attending believed that they could explain the FSP, and that program benefits can be used to buy vegetable seeds or to contribute towards congregate sites meals. Use of program benefits at Senior Centers rose dramatically during the two-year education campaign, and congregate meals sites participants who had heard of the Vision card rose from 35% up to 58%.

Research programs have shown that red, green, blue, and brown dyes provide better UV protection than black or white and light-colored clothes. Using computer models, peptide synthesis, and laboratory tests, researchers are finding that a specific peptide can restore lost function caused by defective cystic fibrosis cells; zinc deficiency has been shown to markedly reduce the absorption of vitamins A and E; and a connection was found between low vitamin A levels in smokers and the development of emphysema.

Dietary behavior improvements that resulted from the nutrition education programs could affect the risk for a variety of chronic diseases over the next decades. The results of the research projects will likely lead to improved health of the targeted populations.

d. KSRE programs are contributing to improvements in health and nutrition behaviors, especially with low-income individuals who are at particular risk. Whether these behaviors lead to improvement in health status remains to be seen. KSRE faculty are seen as experts in the state, providing guidance so that citizens of Kansas and beyond become more healthy and live in safer environments.

e. Total expenditures by funding source and FTEs
FY2003 Projected: $3,878,303 Actual: $4,386,023 FTEs: 41.86

**Key Theme – Human Health**

**Promoting Physical Fitness through the Walk Kansas Program**

a. Physical inactivity is a serious health risk factor. To reduce that risk, an individual needs to complete 30 minutes of moderate physical activity most days of the week, but in Kansas about four out of five people do not meet that requirement, and one in five adults is obese. KSRE developed Walk Kansas, a science-based, physical-activity promotion program that helps Kansans initiate and maintain a regular regime of physical activity. The program utilizes county task forces that promote the Walk Kansas program.

   Teams of six participate, and the goal of each team is to exercise the equivalent of walking across Kansas. To reach that goal each team member has to do moderate physical activity for 30 minutes a day, five days a week, during the eight-week program.

b. More than 12,000 adult Kansans on teams from 80 counties participated in 2003. Afterward, participants said they felt more confident about being active and they enjoyed the physical activity. This was in increase over 2002 when more than 7,000 persons from 42 counties participated.
c. Scope of impact – State Specific

**Key Theme – Human Nutrition**

**Improving Participation in the Food Stamp Program among Rural Older Adults in North Central Kansas**

a. K-State Research and Extension, the K-State Department of Human Nutrition, The North Central-Flint Hills Area Agency on Aging, Inc., and the Kansas Department of Social and Rehabilitation Services are collaborating in 18 rural Kansas counties on one of the USDA Food and Nutrition Service's three-year Research Grants to Improve Food Stamp Program Access through Partnerships and New Technology. A food assistance training manual for professionals and volunteers who work with senior citizens, including KRES personnel, and a Website with links to resources for food assistance programs, were developed, led by K-State Research and Extension Human Nutrition faculty and staff. They also created a variety of educational materials (some in Spanish), including posters, flyers, brochures, calendars, a roadside promotional billboard, pads of shopping lists, a song, and scripted presentation kits for community speakers. They have engaged dozens of community-based service providers such as health departments, senior centers, congregate meal sites, Head Start, caregiving groups, and faith-based programs to create more opportunities to deliver health and food assistance messages.
b. Food Assistance (Food Stamp Program) participation rates have increased in the intervention region. Project activities and ideas will be shared in 2004 at numerous national conferences so that other states may begin or adapt their program outreach to senior adults.

c. Scope of impact – State Specific

**Kansas Senior Farmers' Market Nutrition Program**

a. Six thousand low-income seniors in six Kansas counties received $30 of check-like coupons that could be exchanged from June to September at participating farmers' markets for locally grown fresh fruits, vegetables, and culinary herbs. Older adults were provided opportunities to receive educational tips on selecting, storing, and preparing fresh fruits and vegetables and using herbs through KSRE agents and nutrition assistants.
b. A survey (n=542 older participants) indicated that 71% used all of their coupons, and another 18% used half or more. Ninety percent ate more fruits and vegetables, and 65% tried a new recipe. Of those who received nutrition information, 86% learned about foods that would be in season at the market and how to select fresh fruits and vegetables, and 93% believed the information they received was helpful. A smaller group of 89 respondents to a longer survey showed that before the program only 30% ate three or more servings of fruits and vegetables a day, while after the program, 43% reported eating three or more servings a day. Similarly, before the program, only 25% reported that they usually or always ate more than one kind of fruit or vegetable a day, while after the program 42% reported that they usually or always ate more than one kind of fruit or vegetable a day. Forty-one percent bought a fresh fruit or vegetable they had never tried before; 22% tasted a new fruit or vegetable this summer, 63% learned new ways to store fresh produce to prevent spoiling; and 56% learned a new way to prepare fresh produce. Of 73 farmers who responded to a survey, 92% indicated that the program was important in increasing community awareness of farmers' markets. Ninety percent indicated they would participate in the program again if it was available, and 93% would recommend it to other producers.
c. Scope of impact – State Specific

**Expanded Food and Nutrition Education Program**

a. K-State Research and Extension makes a difference in the lives of Kansas families because of its research-based information and because of local response to county needs. Low-income families with children can learn through the Expanded Food and Nutrition Education Program (EFNEP) to develop skills and attitudes needed to improve their diets.
b. Students in Shawnee County's EFNEP School Nutrition Breakfast Club kept food diaries. After completing their food records, 91% reported they had eaten breakfast at least 4 out of the 5 days, and 49% reported that they had eaten at least three food groups
c. Scope of Impact – State Specific

**Community Health Focuses on Healthy Youth Places**

* As part of the NIH Behavior Change Consortium (BCC), the Office of Community Health (OCH) is collaborating with 15 of the nation's leading behavior-change research sites. These teams meet twice yearly in Washington, D.C., and communicate through conference calls and e-mail. OCH is providing leadership for a BCC work group targeting development of methods

to translate research findings into practice. In year three of this four-year grant, eight middle schools that were randomly assigned to receive technical training and assistance, implemented environmental changes designed to promote healthy fruit and vegetable consumption and physical activity to adolescents.

* Short-term: Change teams developed after-school activities and school lunch products based on the input of adolescents and school staff. In addition, adolescents led the development of promotional videos using video production equipment provided to the schools by the grants. School teams shot, edited, and submitted their public service announcements and received awards from the Office of Community Health.

Long-term: Data collected about fruit and vegetable consumption and physical activity are in the process of being analyzed.

c. Scope of Impact – State Specific

## GOAL 4 – GREATER HARMONY BETWEEN AGRICULTURE AND THE ENVIRONMENT

Overview (includes sections a, b, c, and d)

Concern about the quality of the environment continues to guide K-State Research and Extension in developing programs that ensure quality and conservation of surface water and groundwater; promote community residential environmental management; develop systems for improved soil and air quality; and maintain plant diversity.

Topics in this area have been making headlines recently because of new research and changing regulations. The Kansas Center for Agricultural Resources and the Environment (KCARE) has led a number of environmental efforts that have helped K-State Research and Extension's progress towards its five-year plan of work goals.

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

For years, K-State Research and Extension has emphasized eduation about recycling, composting, waste management, and Best Management Practices. To demonstrate these techniques, a Waste Management Learning Center was started north of campus. The demonstration site is two miles north of the K-State campus with access to dairy, swine, and beef manure by-products. Citizens can visit the Center and see the application of the different methods and weigh the costs and benefits of each. Farmers can build a similar operation with existing equipment without spending a lot of money. The site uses manure from the KSU dairy unit mixed with liquid from the swine unit. It is applied on university gardens and also offered to the public.

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

Farm Bureau organizations have been active partners in the planning, development, and implementation of this effort.

Five years of subsurface drip irrigation (SDI) field research was used to create an easy-to-use mathematical model within a Microsoft Excel spreadsheet template to project corn grain yield; irrigation, nitrogen, and phosphorus fertilizer requirements; and net returns to land, irrigation equipment, and management. This model can be used to allocate limited water resources to the optimal amount of land at the optimum plant population. The results may appear somewhat surprising to some users in the western Great Plains in that they often indicate that higher numbers of planned corn acres and higher plant populations are justified even at fairly low irrigation capacities when using SDI. The model is a planning tool for near-term decisions in the spring.

It's important for producers to make sure their irrigation systems are performing as intended, providing uniform moisture to the areas they are supposed to. To ensure that irrigation systems are working properly and to develop an educational program about effective irrigation and cropping systems in general, KSRE faculty developed the Mobile Irrigation Lab. The Mobile Irrigation Lab team includes specialists with expertise in irrigation system design and management, crop water management, agronomic cropping systems, and computer programming and software development. The project coordinator stated: "To our knowledge there are no other educational programs like this." The lab cannot evaluate all irrigation systems in Kansas, so the goal is to develop and field test the technology to make it possible for private companies, consultants, cooperatives, and individuals to do this kind of testing. Information on the Mobile Irrigation Lab is available on the Web at <www.oznet.ksu.edu/mil>.

Fecal bacteria are the most common and severe contaminants of rivers and streams in Kansas. The EPA's National Pollutant Discharge Elimination System (NPDES) permitting program has been extremely successful in reducing point source contributions of fecal bacteria from municipal treatment facilities, concentrated animal feeding operations, and meat processing plants. However, non-point sources such as wildlife, pets, livestock, and failing septic systems continue to cause frequent excursions beyond primary and secondary recreational contact standards in much of the state. One of the greatest challenges in addressing non-point source fecal contamination is being able to determine which sources are responsible for contamination in any given water body. Several K-State laboratories are cooperating in the development of cost-effective bacterial source tracing (BST) techniques to differentiate fecal bacteria from various sources. A two-year process of monitoring fecal coliform bacteria in the river has identified a storm drain in Garden City as a major source of bacteria entering the river during moderate runoff events. The greatest concentration of bacteria has been detected in a rural area upstream of the city. While this area has a high density of irrigated cropland on which feedlot manure is applied at high rates, the initial use of BST analysis identified all isolates tested as human. Further investigation has led to the discovery of a "straight pipe" draining into the ditch, but it is not yet clear whether this is related to the high bacterial levels detected in 2002.

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

Several studies have shown that when recommended levels of herbicides are applied up to 5% of the amount applied may be lost. Soil surface condition may be controlled using different tillage practices to reduce runoff losses. K-State has been a national leader in conservation tillage, which leaves some or all of the residue from the previous year's crop on the soil surface. It effectively protects soil against erosion and is one recommendation being made to decrease runoff losses of herbicide. Another recommendation to reduce herbicide runoff is herbicide management.

e. Total expenditures by funding source and FTEs
FY 2003 Projected: $9,002,960 Actual: $10,181564 FTEs: 63.96

**Key Themes – Soil Quality and Air Quality**

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

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

### Cooperating with New Zealand on Climate Change Studies

a. K-State is one of nine universities and a national laboratory in the Consortium for Agricultural Soils Mitigation of Greenhouse Gases. K-State agronomist, Chuck Rice, the national director of the Consortium went with a delegation to New Zealand in 2003 to consolidate cooperation between the United States and New Zealand on the role of agricultural soils in mitigation of such greenhouse gases as carbon dioxide.
b. The partnership is working to develop mechanisms to estimate and verify changes in soil carbon and other greenhouse gases and to identify cost-effective mitigation options for agriculture. Two other areas of cooperation include: improved measurement and modeling of

nitrous oxide emissions from agriculture; and measurement of greenhouse gas emissions for the assessment of the mitigation potential of cropland and grazinglands.

c. Scope of Impact -- Multistate Integrated Research and Extension

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

a. The most recent developments in soil carbon sequestration as a potential solution to global warming were presented at a U.S. Senate subcommittee field hearing this past summer. Soil carbon sequestration is emerging as part of a national solution to global warming through carbon credit offset trading.
b. K-State Research and Extension is one of the leaders in studying the potential benefits of this technology. It may not be too long before agricultural producers will be able to get paid for carbon credits through the marketplace for practices such as no-till and grass plantings.
c. Scope of Impact -- Multistate Integrated Research and Extension

**Key Theme – Sustainable Agriculture**

### Earth Awareness Researchers for Tomorrow's Habitat (E.A.R.T.H.)

a. Selected as a Program of Excellence, the E.A.R.T.H. program is a year-long environmental education program that served 2,000 middle school students in the 2003-2004 school year. The curriculum is built around four major themes: land, water, air, and living resources, and it encourages students to increase their capacity for critical thinking, problem solving, and decision making.

   In the spring, E.A.R.T.H. participants attend an off-site interactive student workshop sponsored by the E.A.R.T.H. Steering Committee, with sessions taught by local business and community organization representatives. At the workshop, children apply the lessons they have learned in the classroom and use their critical thinking skills to learn more about, or become active participants in, some local environmental issues.

b. The E.A.R.T.H. program provides resources, opportunities, and support that would otherwise be unavailable to teachers and students who want to learn and apply environmental skills and knowledge. The students have told the coalition that they have learned skills in the classroom that they apply to real-life situations in their community, and that they now feel more qualified to be wise stewards of their environment. The teachers have told the coalition that experiential environmental learning has allowed their students to develop the critical thinking skills needed to succeed in life.

c. Scope of Impact – State Specific

### Increasing Value of Horticulture

a. Horticulture is now listed as the part of the Kansas agricultural economy with the third highest gross crop value, behind the state's traditionally-strong wheat and feed corn industries. According to the Kansas Agricultural Statistics Service, horticulture's crop value is $586 million (wheat is $939 million and feed corn is listed at $853 million).

. Master Gardeners have become a vital part of Kansas State University's ability to provide accurate, up-to-date and research based information to clientele. In 2003, Master Gardeners volunteered more than 64,377 hours, an average of 66.92 per person. This is equivalent to 30.5 full time extension staff positions and is conservatively estimated to be worth $746,028.

c. Scope of impact – State Specific

**Key Theme – Water Quality**

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

a. Water-quality issues in poultry are of concern today not only during final processing but also when litter and feces are spread on fields to be utilized as fertilizer. Most meat poultry are grown on litter that is part wood shavings, feed particles, and water. Feed moisture impacts the management of the birds, the feed manufacturing process, and the amount of material to be spread. When water is added to feed during manufacturing, starch is gelatinized as the feed is manufactured, a process that may impact the feed consumed, feed efficiency, and litter composition. The objective of this study was to evaluate different levels of starch gelatinization produced by different processes on broiler poultry performance.

b. This research project demonstrated that the water content of poultry feed could impact the amount of gelatinized water starch, which then impacts animal performance. High-moisture byproducts often require conditioning to dry the feed stuffs prior to manufacturing, which uses energy and increases the cost of the by-product.

c. Scope of impact – Multistate Integrated Research and Extension

**Watershed Specialists Provide Local Assistance**

a. Since November 2000, K-State Research and Extension watershed specialists have provided watershed management expertise and developed watershed educational programs throughout Kansas. The watersheds that the specialists are assigned to include the Upper Blue, Lower Arkansas, Lower Kansas, Upper Delaware, Upper Arkansas, Marais des Cygnes, Lower Neosho, and Smoky Hill.

b. The watershed specialists work with landowners and farmers within the watersheds to develop action plans based on the concerns within the watersheds. The specialists strive to improve water quality through educational programs, including on-farm demonstrations, workshops, seminars, and other teaching methods.

c. Scope of Impact – State Specific

**A Partnership with Nebraska to Monitor Water Quality**

a. The Blue River Compact—The Kansas- Nebraska partnership, of which K-State Research and Extension is a part, effectively monitors water quality and promotes practices to prevent runoff of pesticides into the Big Blue River. The work is being conducted under the auspices of the two states' Big Blue River Compact. Water samples regularly are collected at 22 locations through the basin and analyzed for pesticide, nutrient, and bacterial levels. New sites are being added in Nebraska and Kansas in the upper tributaries (Upper Horseshoe Creek,

Lower Horseshoe Creek, Big Indian Creek, and Turkey Creek). The monitoring will help narrow the search for the highest levels of loading.

b. Numerous Best Management Practices are being put into place by both row crop and livestock producers, including many streamside vegetative buffers planted by landowners in both Nebraska and Kansas. Kansas and Nebraska Corn Growers and Grain Sorghum Producers associations and the Kansas and Nebraska Farm Bureau organizations have been active partners in the planning, development, and implementation of this effort.
c. Scope of Impact -- Multistate Integrated Research and Extension

**Key Theme – Natural Resources Management**

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

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

**The Importance of Subsurface Drip Irrigation**

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

**Reducing Water Requirements for Turfgrass**

a. This project is identifying the minimum levels of irrigation water required to maintain acceptable quality of lawns during Kansas summers. It also is focusing on the best methods for converting cool-season stands of turf to seeded zoysia grass.
b. By using a drought-resistant turfgrass such as Bermuda grass, water savings of 30 percent or more could be realized compared to cool-season grasses. Conversion of perennial ryegrass

golf fairways to drought-resistant zoysia grass using a strip-seeding method could save more than $1,000 per acre on seed cost alone.

c. Scope of Impact – State Specific

## GOAL 5 – ENHANCED ECONOMIC OPPORTUNITY AND QUALITY OF LIFE FOR AMERICANS

Overview

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

a. As public resources come under pressure with smaller tax revenues, cooperation and partnership between units within and outside of the university are essential. Building upon the successes of the two previous years, KSRE is now recognized as the community-based agency of choice to support change and positive outcomes in Kansas communities. Because of its physical presence in each county as well as networks established by local educators, KSRE brings knowledge of community dynamics and social interactions that far surpass agencies that are not located in each county. Working with other regulatory agencies, KSRE provides prevention education to audiences who might not otherwise participate due to fears of being cited or penalized. In 2001, inroads were made with the Kansas Association of Counties to communicate the potential opportunities available through local engagement with KSRE involving planning and economic projections for local governments; community based individual, family, and youth development programs; and local leadership capacity building to support and sustain communities of all sizes throughout the state.

b. Since 1999, when research and extension were merged to form KSRE, our Youth, Family, and Community Development (YFCD) programs have been more interconnected, with fewer faculty and local community educators who continue to work in isolation. After three years of team-building efforts, issues are being tackled with cross-disciplinary interests, state policy development, and agency collaboration to benefit the lives of Kansans, their families, and communities.

   Because older youth, especially teens, have positive and constructive voices in community issues, in 2003, KSRE led a planning process to develop a new strategic plan for reaching out to youth across Kansas. The Strategic Plan for 4-H Youth Development is accessible through the Web at http://www.oznet.ksu.edu/4h/strategicplan/stratplanHOME.htm. This plan will provide program, staffing, and resource management for the coming years as we continue to grow and develop the Kansas 4-H Youth Development program.

Tolerance education and the development of conscience in young people are centered in the home. While community environments can reinforce norms, intentional instruction and role modeling from parents and/or care providers are powerful factors in shaping these life skills.

Rural communities with aging median populations and restricted economic enterprises are most at risk of disappearing from the Great Plains. KSRE leadership education is helping communities begin from within to identify strengths and existing capacities upon which they can reconstruct a viable future. External consultants do not effectively impact community development over time. Community change occurs from within the existing population when it is tapped and empowered.

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a. Structured out-of-school programs standards directly increase the quality of the learning environment. 4-H Youth Development included more than 38,000 Kansas youth in long-term, continuously mentored clubs and groups where skills were mastered and recognized. About one third of Kansas' school-aged population (153,545) participated in some type of KSRE 4-H youth development educational program in 2003.

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Leadership programs have increased the capacity of individuals within communities for political participation, managing not-for-profits, community service volunteering, and in bringing the voices of youth to discussions about community futures.

Childcare provider training and parent education strengthen individuals, families, the workplace, and communities. Children are more prepared to engage in learning while in school and to cope with life's issues.

d. KSRE has adopted the Healthy People 2010 goals and is cooperating in the development of Healthy Kansans 2010. Positive social behaviors across the life span are significant part of the 2010 goals. KSRE adopted the standards of the National Research Council and Institute of Medicine of the National Science Academies for its youth-development outcomes in youth development. Family relationships, parent education, 4-H Youth Development, and community leadership education are now better customized within each community context. KSRE is perceived as more relevant to a greater number of Kansans than it was in 1995, and measurable indicators are charting progress on outcomes in positive social behaviors, once only anecdotally documented.

e. Total expenditures by funding source and FTEs

FY2003 Projected: $10,647,406 Actual: $12,041,289 FTEs: 143.76

**Key Theme – Youth Development/4-H**

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

a. The statewide 4-H Horticulture Judging Contest sponsored by KSRE helps youngsters to be more savvy consumers. Preparing for the 2003 contest, held in conjunction with the Wichita

Garden Show, taught participating teenagers how to identify fresh fruits and vegetables available at farmers' markets and grocery stores.

b. What they learned will help them to choose the right kind of flowers and shrubs and how to take care of their lawns when they become homeowners. One hundred thirty-four teens participated in the contest, representing 24 Kansas counties.

c. Scope of Impact – State Specific

**Volunteers Give Back to Youth Development Program**

a. Balancing work, family, and community obligations can be difficult. It might be easier for the more than 7,300 Kansas 4-H volunteers to stay home. Many of our 4-H volunteers are former members who have experienced benefits from the youth development program.

b. They understand how to continue to use the skills they learned in 4-H. They learned how to plan and organize their time in 4-H. They know that starting a project can be great fun, but it's equally important to finish the project. They also learned a lot about working with people in their 4-H years. Although many volunteers' children, former 4-H members, are now grown, they continue as volunteers.

c. Scope of Impact – State Specific

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

a. Leavenworth County is the first Kansas county to offer 4-Hers individual consultations and evaluations of their 4-H leadership projects. The one-on-one concept has worked well with such 4-H projects as food or clothing. It typically gives students an opportunity to talk with adults who can evaluate their projects and offer suggestions. Youth can have great ideas that will help their school or community, but they don't always know how to implement them.

b. The one-on-one sessions allow them to evaluate their accomplishments and ask for suggestions to help strengthen their leadership capacities. For example, James Bailey, a ninth grader, initiated a supply drive for 750 Kansas soldiers serving in Bosnia. Bailey presented the idea to his 4-H Club—the Happy Helpers—and worked with the club to involve such community groups as the Veterans of Foreign Wars (VFW) and American Legion. His project provided 1,560 pounds of supplies that were donated to the National Guard, which sent them on to Kansans serving in Bosnia.

c. Scope of Impact – State Specific

**SpaceTech Offers Youth Rocketry, Robotics Experience**

a. At the 2003 SpaceTech Experience in Hutchinson, youth ages 12-18 transformed a pile of junk into a robot, teaching them skills in engineering, vision, mechanics, mathematics, physics, plus a lot of elbow grease. Although partially sponsored by Kansas 4-H, all youth, whether 4-H members or not, are encouraged to participate. Formerly known as the Aerospace Experience, the four-day event combines aerospace and technology. The Kansas Cosmosphere and Space Center; N.E. Kansas Amateur Astronomer's League; Federal Aviation Agency; University of Kansas Aerospace Department; Don's Hobby Shop; Wichita Exploration Place; and the K-State College of Technology and Aviation are partners in the SpaceTech Experience.

b. Tony Foster, a 12-year 4-H club member from Wabaunsee County, was an initial member who helped to get the program off the ground. Foster said he learned from the night launches,

flight simulators, and looking at airplanes up close. Ben Schwantes, 4-Her from McPherson County, said his interest in space started in childhood. “I’ve always been interested in space stuff,” Schwantes said. “I went to this 4-H Experience and got involved on the action team because I wanted to be a part of it.” For three years, Schwantes has been selected to travel to Oshkosh, Wis., for the Kid’s Venture at the Oshkosh Air Show. Each year, the top participants at the SpaceTech Experience are invited to attend the Wisconsin event to help teach others.

c. Scope of Impact – State Specific

**Key Theme – Communication Skills**

**CoupleTALK: Enhancing Your Relationship**

a. CoupleTALK: Enhancing Your Relationship, a KSRE educational program for enriching marital and couple relationships, was developed to teach communication skills that emphasize growth and behavioral change. County extension agents can distribute the informal personal study course or conduct workshops for such targeted groups as engaged couples, newlyweds, or couples in general. The CoupleTALK program also is offered twice annually as a noncredit Internet course, and it has had over 300 enrollees since 2000.

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

c. Scope of Impact –State Specific

**Program Helps People Maintain a Balanced Life**

a. A team of KSRE specialists and agents developed the Choose Life Balance program that helps busy adults balance the many demands in their lives. In Finney County, for example, participants in the workshops ranged from Chamber of Commerce members to family and community education members to regional SRS personnel to zoo docents. The sessions on Goal Setting and on Organization Style have been especially popular.

b. Participants report improving their ability to set meaningful goals, prioritize activities, reduce clutter, and devote more time to self and family. Also, a series of professional development workshops were established for faculty and staff at the Garden City Community College on such topics as goal setting, communication, stress management, time management, home management, organization, and delegation. Information on the program is available on the Website *www.oznet.ksu.edu/lifebalance* /.

c. Scope of Impact – State Specific

**Key Theme – Community Development**

**Assisting Local Communities**

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

**The PRIDE Program and Community Health Projects**

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

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

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

**Kansas Communities Value Leadership Programs**

a. In 1997, officials of the Huck Boyd National Institute for Rural Development, which is part of KSRE, wanted to help provide leadership training to 500 Kansans in five years. The statewide programs focus on developing leadership skills; encouraging involvement in community activities; working effectively with people; and gaining knowledge of each participant's

community and outside resources available to it. Several state partners helped with the programs, including the K-State Research and Extension LEADS team, the Kansas Leadership Forum, and the Kansas PRIDE program.

b. That goal was not only surpassed but more than doubled, with 1,080 Kansas residents receiving leadership training in that time period. According to a mail survey of participants, "the leadership programs had a positive impact on every one of those factors." Nearly 98 percent of the participants said they would recommend the leadership program to others. Participants said they volunteered for a total of 267 hours per week in their communities after they participated in the programs. The estimated financial value of volunteer service is $16.54 per hour, which means that the leadership programs have a value in Kansas of more than $4,416 each week. Annually, that's about $230,000.
c. Scope of Impact – State Specific

**B. STAKEHOLDER INPUT PROCESS**

The stakeholder input process is a comprehensive effort to seek comments throughout planning and project implementation. Ongoing oversight and review by stakeholders involve several components, including: (1) each county uses the Program Development Committee to determine current priorities; (2) an integrated Research and Extension Advisory Network plus a variety of informal and subject-specific presentations and interactions are used to identify issues and priorities for area Extension and off-campus Research faculty; and (3) biannual meetings of the State Extension Advisory Council.

The Program Development Committees (PDCs) are 24 citizens elected by other local citizens according to Extension law. The committees represent four subject matter areas (six elected to each): Agriculture, Family and Consumer Sciences, 4-H Youth Development, and Economic Development. The 24 PDC members meet as a whole or as individual committees to provide advice on issues for which Extension develops programming in that county. Extension agents develop Action Plans based on this input. Locally developed Action Plans influence statewide issues as plans are designed at the state level. Both state level and locally developed Action Plans are adjusted on the basis of input from the PDCs.

Our research and extension centers make use of advisory committees composed of clientele from the local area. For instance, interested producers, agribusiness concerns, and members of the lay public are brought together to help prioritize some of the projects being considered for deployment at off-campus research locations. New Extension program suggestions often develop from these deliberations. During the year we also meet informally with a large number of diverse organizations to discuss collaborative efforts, consider sharing of resources, review prioritization process, assess progress reports and realized outcomes, and to design complementary educational efforts. Feedback examples include commodity commissions (e.g., deliberations that help prioritize the awarding of producer-funded extramural grants involving check-off dollars) and helping citizens to understand options associated with regulatory decisions made by the EPA, Kansas Department of Health and Environment, Kansas Department of Agriculture and other groups. Successful programs involve co-sponsorship of watershed specialist positions to improve water quality within drainage districts, creation of third-party educational vendor partnerships with NRCS, facilitation of multidisciplinary certified crop advisor training programs, a wide range of projects involving community organizations, school programs (i.e., school enrichment), and social services (e.g., Area Agencies on Aging and SRS).

Our State Extension Advisory Council meets biannually. SEAC membership is composed of County Board/District Governing Body Chairs from each administrative area within Kansas. K-State administrators present topics for discussion that include restructuring areas of emphasis, suggestions for better local delivery that include debating staffing alternatives, and subject-matter coverage. Issues range from budgetary challenges to program prioritization.

Our five-year plan steering committee engaged in internal and external discussions with stakeholders to select new core mission themes, long-term intended outcomes, and strategies that

will result in their implementation. We received comments via e-mail, a Web site, and targeted stakeholder discussions.

Subsets of participants in these endeavors are given the opportunity to comment on the effectiveness of individual and interdisciplinary outreach efforts. College Leadership, Unit Leadership, and State Extension Leaders collectively use this feedback to reallocate resources and determine programming efforts so greater effectiveness and more comprehensive outcomes are attained.

## C. PROGRAM REVIEW PROCESS

Most aspects of the program review process described in the current Five-Year Plan remain unchanged. In response to budget pressures and a mandate from the Kansas Board of Regents and KSU administration, we have undertaken a comprehensive effort to review and prioritize all K-State research and extension programs. The program prioritization process began in 2002 and concluded during 2003. The process was designed to ensure active participation by all levels of the organization, and stakeholder input is being solicited in public meetings. The goal has been to group research and extension programs in several priority clusters so that lower priority programs will be the first to be eliminated as state budget cuts come to bear. We anticipate that this process will help us avoid the organization-wide shift towards mediocrity that would result from across-the-board cuts. Our strategic intention is to ensure continued delivery of the most essential programs during a difficult financial period, and to leave the organization poised to grow in new and important directions when better times return.

## D. EVALUATION OF SUCCESS OF MULTI AND JOINT ACTIVITIES

1. Unit and interdisciplinary teams are common across the breadth of K-State Research and Extension. Some teams are informal, others have more structure and are aligned around the 16 issues that provide much of the focus to our efforts. Teams provide important means of organizing faculty and other resources in efforts to accomplish large-scale goals and to enhance overall productivity. Reporting takes place via individual, annual, comprehensive accomplishment documents that go to each unit leader. Teams have the opportunity to highlight collective efforts through the filing of collaborative impact reports. Consultants have told us that this team culture may take many years to become exhibited as the norm within our organization. Administrative support, incentives, and time will increase our success in this area. The concept of integrated research and extension teams has been very positive for the smooth transfer of the new knowledge gained from research, and it has also provided a mechanism for the insights of extension faculty to be used in designing new research programs. K-State will continue to promote teamwork that features integrated research and extension programs.

   A number of grant-supported programs have strong multistate and joint components.

   Carbon Sequestration. Carbon sequestration is a process that could reduce global warming

while also reducing soil erosion and water runoff. It increases soil organic matter and reduces carbon dioxide in the air. It has been estimated that 20 percent or more of targeted emission reductions could be met by agricultural soil carbon sequestration. Other benefits of this technology are increased soil fertility, reductions in erosion, and increases in soil quality. It is good for the environment and good for crop production. K-State is leading the Consortium for Agricultural Soils Mitigation of Greenhouse Gases, an organization that is working to provide the tools and information needed to successfully implement soil carbon sequestration programs. K-State serves as the lead institution for research and extension activities spread across 10 states in this $15 million project.

Water Conservation and Management. K-State Research and Extension has been a national leader in subsurface drip irrigation (SDI). The year 2004 marks the 15th year for SDI research for agronomic crops at K-State. Research conducted to date has been aimed at water conservation, water-quality protection, and SDI methodology development. As a result of this long-term K-State investment in SDI research, a wealth of science-based information exists to help producers adopt this technology. This information is documented in a variety of research and extension publications and also available on the K-State SDI Website at <www.oznet.ksu.edu/sdi>. Producer interest in this technology continues to grow in all irrigated areas within the state and throughout the region. Approximately 2,000 acres are being converted to SDI annually in Kansas, and that number is likely to grow with increased stresses on water resources; increased number of positive producer experiences with SDI; and with increased availability of irrigation improvement cost-share funds. SDI installation investments in Kansas average $1.5 million to $2 million annually. Research has shown that SDI can reduce irrigation requirements by at least 25 percent, and producers may experience an even larger water savings as they replace aging inefficient irrigation systems. These water savings can greatly extend the life of the Ogallala Aquifer in western Kansas and cushion any transition to less intensive irrigation schemes. Additionally, our Mobile Irrigation Laboratory equipment is used to conduct in-field evaluations of center-pivot systems and to collect in-field irrigation and cropping system information. These evaluations help irrigators learn more about the performance characteristics of their system, which allows them to be better managers. For example, irrigation energy costs can range from $2 to over $5 per acre-inch, and KanSched (our software-based irrigation scheduling tool) can reduce irrigation inputs by two inches to six inches. At $3 per acre-inch saved and four inches of water savings, the cost benefit on a standard 125-acre, center-pivot circle would be $1,500.

Grain Science and Industry Complex. Work began in 2003 on two of the five buildings planned for the new Grain Science and Industry Complex. Construction started on the Bioprocessing and Industrial Value-Added Program (BIVAP) Building. The BIVAP facility will be a place where K-State researchers will work with industry and collaborators from many states to turn crops into marketable products and test new production processes for grain-based food and nonfood products. In addition to the International Grain Program Executive Conference Building and BIVAP Building, the Grain Science and Industry Complex will include a Teaching, Research, Baking, and Administrative Building; flour mill; and feed mill. When finished, the $61 million state-of-the-art complex will cover 16

acres. These new facilities will allow K-State to share research and other information worldwide.

Developing a Sorghum Improvement Center. Work began in 2003 to establish a Center of Excellence for Sorghum Improvement on campus. The Center will focus on developing new, improved varieties, and research also will be conducted at various research fields around the state, including the North Central Research Field near Belleville and the KSU Agricultural Research Center—Hays. Support for sorghum research programs is much lower than it was even five years ago because many public and private sorghum research positions and programs are being lost to attrition and corporate consolidation. Yet grain sorghum is one of the most important dryland crops in the Central Great Plains. Waning water supplies will make it even more important to reduce the growing gap in sorghum research and development. It will provide scientific expertise in plant breeding, biotechnology, pathology, entomology, and physiology. Expertise in crop utilization, including cereal chemistry and animal nutrition, will help to ensure that technologies developed in this research effort will have immediate application. The Center was formed in cooperation with the Kansas Grain Sorghum Association and the National Grain Sorghum Producers Association. The Kansas Sorghum Check-Off Fund contributes more than $250,000 from farmer grain sales to sorghum research annually.

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

Kansas, U.S. Researchers Studying Cattle Odor, Dust. A half-dozen universities and the USDA are working together to study not only cattle odor, but also potential risks to human health when feedlot cattle kick up dust. The K-State team is focusing on minimizing dust and odor emissions in feedlots. K-State researchers have been studying feedlot dust issues for at least 10 years, and particularly the potential health risk of dust to feedlot workers.

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

Multistate Water Quality Monitoring. The Blue River Compact (Kansas and Nebraska cooperating) actively monitors water quality at several locations throughout the basin and

promotes practices to prevent runoff of pesticides into the Big Blue River. This work should help identify sources of problems and help lead to practices that lessen the loading of contaminants in water passing through and leaving the watershed.

Agricultural Biosecurity. K-State Research and Extension began playing a leading role in agricultural biosecurity by directing resources and research toward ways that will help protect agriculture in the Midwest and the nation. Agriculture has been called a "soft target" for terrorist attacks, largely a result of the industry's widespread vulnerabilities (including, but not limited to, transportation of animals) and the potential for diseases such as foot-and-mouth to spread quickly. It also may be an enticing target for terrorists because agriculture generates 17 percent of the U.S. gross domestic product and 13 percent of American jobs. The university is planning to build a $50 million Biosecurity Research Institute building, part of a master plan to improve and expand upon the College of Veterinary Medicine. K-State Research and Extension scientists also are conducting research into how to dispose of a large number of carcasses quickly in case of an emergency, and they are working with the U.S. Center for Domestic Preparedness to train "first responders" in Kansas.

K-State Plays Key Role in National Crop Bioterrorism System. The Plant Diagnostics Information System developed for the Great Plains Diagnostic Network has been modified to support multiple universities. The PDIS software is currently being used by plant diagnostic labs located at 30 land grant universities. This year PDIS has been selected to facilitate activities for the National Plant Diagnostic Network. Portions of the PDIS software are currently being implemented in the remaining 20 states and 2 U.S. territories. Some of this work is being supported by funding associated with improving homeland security through a partnership with USDA-CSREES and UDSA-APHIS. K-State Research and Extension plans to continue developing, and deploying the software as a component of our biosecurity communications and response network. PDIS was developed to facilitate the following activities: diagnostic lab management; agriculture alerts; secure/encrypted communications; exercise/scenario management; image library management. The system allows extension specialists and lab diagnosticians to raise producer and first detector awareness to specific problems as they appear during the growing season. The exercise/scenario management system is being used by the national network to facilitate practice exercises (planning, execution, and after-action reporting). Several scenarios have been developed to simulate the introduction of significant foreign agents into the United States cropping systems. Each scenario involves first detectors, land-grant scientists, multiple state departments of agriculture, multiple land-grant labs, federal scientists and federal officials. There are up to 40 players in each exercise. The exercises assist all players by providing education, analyzing policies, practicing procedures and looking for issues that need to be addressed before the next real world event. Information on this system is available on the Website: <www.gpdn.org> .

The Hazard Analysis and Critical Control Point Program. All state and federally inspected meat and poultry processing plants in the United States are required to establish a preventative food-safety system called Hazard Analysis and Critical Control Point or HACCP. K-State Research and Extension has been providing HACCP training programs for

meat processors, food service personnel, and others involved in food production, distribution, and marketing. HACCP focuses on preventing hazards, relies on science, and places food-safety responsibilities on food operations.

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

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

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

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

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

Water Quality. The Heartland Water Quality Coordination Initiative is funded by the USDA Cooperative Research, Education and Extension Service. Its purpose is to improve water quality programs and their coordination in the four Midwest states of Iowa, Kansas, Missouri, and Nebraska. These states are co-extensive with U.S. EPA Region 7. The Initiative was developed by leaders of extension water quality programs of Iowa State University, Kansas State University, University of Missouri, University of Nebraska, and their agency and institutional partners, represented by a regional leadership team. Water quality issues related to animal manure management, nutrient and pesticide management, and citizen involvement in watershed management are the current priorities for the program.

2. Examples of K-State Research and Extension programs that address the needs of underserved audiences follow:

New Sustainable Ag Website Developed. The Kansas Center for Sustainable Agriculture and Alternative Crops (KCSAAC) at K-State, launched a new Website at www.kansassustainableag.org. It has a calendar of events for producers who want to sharpen their growing and marketing skills. Other features include links to publications; a resource guide for Kansas family farms and ranches; the KCSAAC newsletter; profiles of farmers involved in sustainable agriculture; and information about grant opportunities for

farmers and ranchers. New topics are added to the site every month. For consumers looking for places to buy food grown in Kansas, the site also includes a link to the Kansas Locally Raised Food Directory and a listing of farmers' markets in various communities around the state.

Family Nutrition Program. Good nutrition is important to the health of all Kansans but especially critical for families with limited resources. Families living in poverty are at risk of inadequate diets. Diet is a factor in the development of many diseases. A major emphasis for K-State Research and Extension is nutrition education for families with limited resources. In recent years, the Family Nutrition Program (FNP) has provided nutrition education to more than 220,000 food-stamp eligible citizens in 80+ counties on an annual basis. It focuses on how to choose and prepare nutritious meals on a limited budget; on safe food handling practices; and on balancing healthy eating practices with physical activities. The program works through a network of K-State Research and Extension county agents working with Head Start, the WIC (Women, Infants, Children) program, shelters, and other agencies that work with those struggling financially. FNP programs are located where people of limited means tend to frequent. For example, nutrition education may be provided in a public school in a low-income neighborhood or in a health fair offered by the health department. The Kansas Nutrition Network (KNN), a sister program to the Family Nutrition Program, is a partnership of state-level public and privately funded nutrition education and food assistance programs that are led by K-State Research and Extension. The program uses social marketing techniques to help Kansans with limited incomes use available nutrition education and food resources to improve their health. Another related program is the Expanded Food and Nutrition Education Program. Available in four counties for youths and homemakers with limited resources, it annually reached over 1,800 Kansas families with some 8,000 children.

CoupleTALK is a nationally recognized program that strengthens partner relationships by building skills that emphasize growth and behavioral change. The states of Maine, Ohio, and Nebraska have adopted the program. K-State Research and Extension has been asked twice to participate in Ohio's annual extension in-service on CoupleTALK and to share the program with Florida extension through an in-service training held online. K-State is part of a USDA group that is developing a nationwide extension education program for marriage and couples. In addition, K-State has been working with the University of Nebraska in marketing and delivering the Internet course as a joint Kansas-Nebraska initiative. Participants use materials from the program that focus on six objectives: (1) Understanding the role that fighting plays in maintaining a satisfying relationship; (2) Adopting active listening techniques when communicating with each other about significant issues; (3) Using "I" statements to express feelings about important matters; (4) Identifying expectations that frequently cause conflict; (5) Setting priorities that will allow the couple to maintain a balance between the relationship and work and family responsibilities; and (6) Identifying and adopting practices that strengthen and protect a couple's friendship.

Improving Nutrition in Rural Homebound Adults. In collaboration with the Kansas North Central-Flint Hills Area Agency on Aging, K-State Research and Extension provided in-

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

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

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

The Community Health Institute. This component of K-State Research and Extension is working to improve the health of individuals, families, and communities. It focuses on the healthful aspects of food, physical activity, and social behaviors. Its long-term goals are to: (1) Improve community policies and practices and create healthy social, economic, and physical environments; (2) Increase healthy nutrition and physical activity; and (3) Improve social development and decrease problem behaviors. Members and cooperators are located in various K-State departments and have expertise in kinesiology, human nutrition, sociology, horticulture, regional and community planning, family studies and human services, education, journalism and mass communications, agricultural economics, and statistics. The Community Health Institute offers distance learning networks, training,

evaluation systems, process surveys, and basic and applied research expertise to help communities change unhealthy environments into places that allow children, youth, and adults to make healthy choices when given the option.

3. Planning commenced in 2002 for the 5-year period beginning in 2004. We have consistently used an outcome-based approach for this and related planning activities. Thus, we have invested substantial effort in making sure our planned programs describe the expected outcomes and intended impacts.

4. The 1998-2003 planning cycle has provided some important organizational learning. We have moved forward with the development of electronic data-gathering software (RETORIC) to support planning and reporting needs for both research and extension. We have learned the importance of having an outcome-based orientation rather than an issue-based orientation. We anticipate that clear outcome goals will give us much better evaluation of results.

   We have continued to implement the Logic model as our primary project management framework for joint research/extension projects. We have made some minor language changes to the model which make it more user-friendly to researchers. When we develop our next five-year plan, we will put the greatest emphasis on the short- and medium-term outcomes and the long-term impacts that we anticipate will occur from our work. Crisp, specific outcome statements provide a benchmark that makes the evaluation process much easier.

   We have determined that different levels of evaluation should be used for different issues. For some, examples of how K-State Research and Extension has solved the problem and how stakeholders have used the science-based information in their business/life meet the accountability requirements. For others, more extensive evaluation is needed to convey the social, environmental, or economic impact that has been achieved; decisions need to be made during the planning phase as to what level of evaluation/documentation will be utilized with a given project.

   Survey information generated through a scientific process by an independent, credible source is very powerful. We have found that these data, along with examples of project impacts, are very effective ways of communicating with decision-makers at all levels of government.

   Expanding the reach and saturation of the 4-H youth development movement to all school-aged youth of Kansas is challenging. While the club/group delivery method is clearly substantiated in science to have the most positive potential in promoting positive youth development, 4-H is difficult to enter and sustain without some previous type of Extension or 4-H heritage. By redefining the essentials of a 4-H club/group, new models of long-term, continuous contact mentoring, knowledge, and skill mastery environments are being tested, acknowledged, and sustained across Kansas.

The Expanding 4-H Opportunities Team has gone back to 4-H basics to remove the veneers of traditional activities to expose the beauty of the original 4-H philosophy. By giving people with all types of experiences the freedom to form their own clubs/groups based on the four-fold youth development model, partnerships have developed with other community-based organizations where young people find themselves. K-State Research and Extension is involved in more than 40 of the 48 21st Century Community Learning Grants in Kansas. In addition, healthy 4-H places are now funded with funds from the Juvenile Justice Authority, Social and Rehabilitative Services, Center for Substance Abuse and Prevention, Big Brothers and Big Sisters, and Boys and Girls Clubs.

**E. MULTISTATE EXTENSION ACTIVITIES**

U.S. Department of Agriculture
Cooperative State Research, Education, and Extension Service
Supplement to the Annual Report of Accomplishments and Results
Multistate Extension Activities and Integrated Activities
(Attach Brief Summaries)

Institution Kansas State University
State Kansas

Check one: X Multistate Extension Activities
Integrated Activities (Hatch Act Funds)
Integrated Activities (Smith-Lever Act Funds)

| | Actual Expenditures | | | | |
|---|---|---|---|---|---|
| Title of Planned Program/Activity | FY 2000 | FY 2001 | FY 2002 | FY 2003 | FY 2004 |
| Collaboration at National and Regional committees, meetings, and projects. | 58,614 | 111,284 | 165,600 | 165,600 | |
| **Total** | 58,614 | 111,284 | 165,600 | 165,600 | |

Form CSREES-REPT (2/00)

SUPPLEMENT TO THE 5-YEAR PLAN OF WORK
MULTISTATE EXTENSION ACTIVITIES

**Actual Expenditures for FY 2003**

The multistate interaction at Kansas State University, as listed in the approved 5-Year Plan of Work, represents participation at national and regional professional meetings, panels, conferences and seminars by extension specialists, administrators and faculty.

**F. INTEGRATED RESEARCH AND EXTENSION ACTIVITIES**

U.S. Department of Agriculture
Cooperative State Research, Education, and Extension Service
Supplement to the Annual Report of Accomplishments and Results
Multistate Extension Activities and Integrated Activities
(Attach Brief Summaries)

Institution Kansas State University
State Kansas

Check one:
Multistate Extension Activities
X Integrated Activities (Hatch Act Funds)
Integrated Activities (Smith-Lever Act Funds)

| | Actual Expenditures | | | | |
|---|---|---|---|---|---|
| Title of Planned Program/Activity | FY 2000 | FY 2001 | FY 2002 | FY 2003 | FY 2004 |
| NC 205 | 5,608 | 39,146 | 54,595 | 52,320 | |
| Pecan Fields | 25,478 | 39,209 | 72,745 | 40,692 | |
| Institutional engagement | 672 | 9,392 | 1,135 | 89 | |
| Plant Biotechnology | 0 | 0 | 0 | 30,000 | |
| **Total** | 31,758 | 87,747 | 128,475 | 123,101 | |

Form CSREES-REPT (2/00)

SUPPLEMENT TO THE 5-YEAR PLAN OF WORK
INTEGRATED ACTIVITIES - HATCH ACT FUNDS

**Actual Expenditures for FY 2003**

NC 205: Ecology and Management of European Corn Borer and Other Stalk-Boring Lepidoptera.
The amount reported represents actual federal expenditures for FY 2003.

Pecan Field: Joint research and extension activity to study pecan hybrids as alternative agriculture.
The amount reported represents actual federal expenditures for FY 2003.

Institutional Engagement: attendance at regional research and extension meetings.
The amount reported represents actual federal expenditures for FY 2003.

Plant Biotechnology – Action Plan A1C 5.3
The amount reported represents actual federal expenditures for FY 2003.

U.S. Department of Agriculture
Cooperative State Research, Education, and Extension Service
Supplement to the Annual Report of Accomplishments and Results
Multistate Extension Activities and Integrated Activities
(Attach Brief Summaries)

Institution Kansas State University
State Kansas

Check one: Multistate Extension Activities
Integrated Activities (Hatch Act Funds)
X Integrated Activities (Smith-Lever Act Funds)

| Title of Planned Program/Activity | Actual Expenditures FY 2000 | FY 2001 | FY 2002 | FY 2003 | FY 2004 |
|---|---|---|---|---|---|
| NC 205 | 0 | 17,989 | 0 | 0 | |
| Crop Systems | 0 | 0 | 0 | 10,000 | |
| Pecan Fields | 0 | 21,113 | 25,040 | 24,964 | |
| Environmental management of livestock systems | 11,309 | 61,290 | 12,075 | 13,078 | |
| Grazing, land, and forage issues | 37,226 | 47,294 | 57,161 | 55,184 | |
| Plant Biotechnology | 20,325 | 28,716 | 10,994 | 11,481 | |
| Digital Technology Exchange | 0 | 0 | 11,736 | 12,192 | |
| Precision Ag Technology | 0 | 0 | 25,007 | 32,458 | |
| Cooperative Leadership Development | s0 | 0 | 24,787 | 25,645 | |
| **Total** | 68,860 | 176,402 | 166,800 | 185,002 | |

SUPPLEMENT TO THE 5-YEAR PLAN OF WORK
INTEGRATED ACTIVITIES - SMITH LEVER FUNDS

**Actual Expenditures for FY 2003**

Pecan Field: Joint research and extension activities to study pecan hybrids as alternative agriculture.
The amount reported represents actual federal expenditures for FY 2003.

Cropping Systems Design & Management: Action Plan number AIC 1.1
The amount reported represents actual federal expenditures for FY 2003.

Environmental Management of Livestock Systems - Action Plan number NREM 1.3
The amount reported represents actual federal expenditures for FY 2003.

Grazing Land and Forage Issues - Action Plan number A1C 2.5
The amount reported represents actual federal expenditures for FY 2003.

Plant Biotechnology - Action Plan number A1C 5.3
The amount reported represents actual federal expenditures for FY 2003.

Digital Technology Exchange - Action Plan number A1C 5.1
The amount reported represents actual federal expenditures for FY 2003.

Precision Ag Technologies - Action Plan number A1C 5.2
The amount reported represents actual federal expenditures for FY 2003.

Cooperative Leadership Development - Action Plan number YFCD 1.1
The amount reported represents actual federal expenditures for FY 2003.

**Appendix A**

KANSAS STATE UNIVERSITY

FISCAL YEAR 2004 ESTIMATED SOURCE OF FUNDS

FISCAL YEAR 2003 ESTIMATED & ACTUAL SOURCE OF FUNDS

| March 18, 2004 | FY 2003 Estimate | FY 2003 Actual | FY 2004 Estimate |
|---|---|---|---|
| RESEARCH | | | |
| Base Programs | | 3,393,778 | 3,396,54 |
| Special Research Grants | 2,600,000 | 9,756,768 | 2,600,00 |
| Competitive & Other Grants | 7,000,000 | 9,768,734 | 7,000,00 |
| Total Federal Distribution | 12,993,778 | 22,919,280 | 12,996,548 |
| State Appropriation and Match | 28,212,397 | 28,212,397 | 28,343,979 |
| Total Research Funding | $41,206,175 | 51,131,677 | 41,340,527 |
| EXTENSION | | | |
| Base Funding (Including CSRS Ret.) | $5,055,397 | 5,114,484 | 5,031,48 |
| National Priorities | 868,654 | 1,818,284 | 1,808,40 |
| Other Extension Programs | | | |
| RREA | 49,266 | 51,796 | 50,000 |
| FERS Retirement | 193,920 | 205,501 | 205,000 |
| Total Federal Distribution | 6,167,237 | 7,190,065 | 7,094,88 |
| State Appropriation and Match | 17,502,219 | 17,502,219 | 17,586,786 |
| County Contribution | 16,000,000 | 15,639,335 | 17,257,597 |
| Total Extension Funding | $39,669,456 | 40,331,619 | 41,939,268 |
| Kansas State University Research & Extension | | | |
| Research and Extension: Federal | $19,161,015 | 30,109,345 | 20,091,433 |
| Research and Extension: State | 45,714,616 | 45,714,616 | 45,930,765 |
| Research and Extension: County | 16,000,000 | 15,639,335 | 17,257,597 |
| Total Appropriation | $80,875,631 | 91,463,296 | 83,279,795 |

**APPENDIX B**

Kansas State University

Fiscal Year 2004 Estimated Source of Funds

Fiscal Year 2003 Estimated & Actual Source of Funds

| March 18, 2004 | FY 2003 Actual | FY 2004 Estimate |
|---|---|---|
| Research Base – Federal | 3,393,778 | 3,396,548 |
| Research Base - Animal Health | 125,526 | 125,526 |
| Total Federal Research | 3,519,304 | 3,522,074 |
| Research Base - State | | |
| Base | 28,212,397 | 28,343,979 |
| Others | 0 | 0 |
| Total State Research | 28,212,397 | 28,343,979 |
| Extension - Federal | | |
| Base + CSRS | 5,114,484 | 5,031,483 |
| Others | 0 | 0 |
| Total Federal Extension | 5,114,484 | 5,031,483 |
| Extension - State | | |
| Base | 17,502,219 | 17,586,786 |
| Others | 0 | 0 |
| Total State Extension | 17,502,219 | 17,586,786 |
| County Expense | 15,639,335 | 17,257,597 |
| National & Other Priority | | |
| Integrated Pest Mgmt | 179,023 | 179,902 |
| Farm Safety | 20,000 | 20,000 |
| EFNP | | |
| ENUT | 665,632 | 663,000 |
| FERS | 205,501 | 205,000 |
| RREA | 51,796 | 50,000 |
| Penalty Mail | 335,608 | 325,000 |
| Ks Agribility | 147,753 | 147,000 |
| Army School Age | 146,366 | 150,000 |
| FAMST | 304,000 | 304,000 |
| Indoor Air Quality | 2,500 | 2,500 |
| Implement Cost Effective | 17,402 | 17,000 |
| | 2,075,581 | 2,063,402 |