

Approved: 1-13-00
Date

MINUTES OF THE SENATE COMMITTEE ON AGRICULTURE.

The meeting was called to order by Chairperson Steve Morris at 10:00 a.m. on January 12, 2000, in Room 423-S of the Capitol.

All members were present except:

Committee staff present: Raney Gilliland, Legislative Research Department
 Jill Wolters, Revisor of Statutes
 Nancy Kippes, Committee Secretary

Conferees appearing before the committee:

Dr. Marc Johnson, Dean, Kansas State University, and Director, Research and Extension
Jamie Clover Adams, Secretary, Kansas Department of Agriculture
Tracy Streeter, Executive Director, State Conservation Commission
Stephen Paige, Director, Kansas Department of Health and Environment, Bureau of Consumer Health
Kathy Hamilton, Kansas Children's Service League, Healthy Families

Others attending: (See Attached)

Dr. Marc Johnson, Dean of the College of Agriculture and Director of Research and Extension, presented an annual report on Examples of Teamwork and Collaboration (Attachment 1). Dr. Johnson stated that he wanted to focus not only on what they do but on how they are engaged with agencies in the state, with individual producers, with community organizations, with other states and with other nations in order to make the best use of their resources to generate and disseminate knowledge relative to Kansas.

Jamie Clover Adams, Secretary, Kansas Department of Agriculture, stated that on many occasions Kansas State University Research and Extension has provided the Department of Agriculture with technical expertise necessary to successfully implement their regulatory mission (Attachment 2).

Tracy Streeter, Executive Director, State Conservation Commission, advised that over the years Kansas State University and the State Conservation Commission have worked together on a number of research issues aimed mainly at solving water quality and water quantity problems (Attachment 3).

Stephen Paige, Director, Kansas Department of Health and Environment, Bureau of Consumer Health, stated that he recognized early in his career with the Department the importance of partnering with Kansas State University Extension as a technical resource and as a means of promoting understanding and compliance with their food safety standards (Attachment 4).

Kathy Hamilton, Kansas Children's Service League, Healthy Families, gave a presentation on how Healthy Families collaborate with Kansas State Extension.

The next meeting will be January 13, 2000.

SENATE AGRICULTURE COMMITTEE GUEST LIST

DATE: 1-11-00

NAME	REPRESENTING
Leslie Kaufman	KFB
SUE PETERSON	K-STATE
Steven Graham	K-STATE
Marc Johnson	K-STATE
Jamie Clover Adam	KDFA
Greg Krissick	"
Carole Jordan	"
Tracey Streete	SCC
Stephen Paige	KDHE
Kathy LINDA Hamilton	Healthy Families
LINDA ^{LISA} MARTIN	FNEP
Chris Wilson	Wilson
Devek Schmidt	Gov's Office
Mike Beam	KLA
John Garlinghouse	KDA
LANVA HOWARD	SRS
ED ROWE	ENVIRONMENTAL ASSOC.



TEAMWORK AND COLLABORATION IN KANSAS, ACROSS THE NATION, AROUND THE WORLD

K-State Research and Extension is committed to collaborating with industry, government, and other institutions to preclude duplication of efforts and to ensure maximum benefits from research and educational efforts of interdisciplinary teams of scientists and educational experts. Ours is not to do the work of others but to add our considerable abilities to theirs, thereby enhancing the expertise and skills needed to solve the complex problems we face today and will face tomorrow in Kansas, across the nation, and around the world.

In this report, you can see the numerous projects we are involved in and how we are building working relationships with many other agencies, businesses, universities, and foundations to support and advance research, education, and international programs for the betterment of people everywhere and especially in Kansas. We believe that those who support K-State's Research and Extension land-grant mission are chief beneficiaries of its knowledge, programs, and improvements. Our achievements have been and will be keys to progress.

Examples of our cooperative efforts abound. Extension agents in Kansas counties and districts work together to plan and implement programs across county lines. All agents, researchers, extension specialists, and administrators participate in regional and national meetings of professional societies and joint research projects, staying connected with colleagues and learning about different research and outreach methods that effectively address issues. K-State Research and Extension faculty participate in some 44 multistate research projects, nearly 40 coordinating and information exchange committees, and 14 administrative committees focusing on setting goals and priorities.

Scientific peer and merit reviews are done to determine the quality and relevance of all projects funded by the state and the federal government. Project evaluations include overall appropriateness of each project to the four K-State Research and Extension core mission themes and the 16 issues that have been identified as critical to the welfare of Kansans—(these are explained on the first page of this report).

Project leaders from Kansas, Nebraska, South Dakota, and North Dakota meet regularly to develop joint programs and investigate opportunities for further collaboration. To increase the effectiveness of programs in these states, these leaders exchange plans of work in agriculture, natural resources, family and consumer sciences, youth, community resources, and other useful programs.

The result has been increasing numbers of partnerships for sharing scientific know-how and expertise. It is our way of reaching out and leading. It is our way of staying on the cutting edge of constructive growth and development.

Marc A. Johnson

Dean and Director

Senate Agriculture
1-12-00
Attachment 1

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Teamwork and Collaboration

IN KANSAS, ACROSS THE NATION, AROUND THE WORLD

A FIVE-YEAR, COLLABORATIVE WORK PLAN ON FOUR CORE MISSION THEMES AND 16 ISSUES



1. AGRICULTURAL INDUSTRY COMPETITIVENESS

Issues:

Develop Efficient, Integrated Crop Production Systems

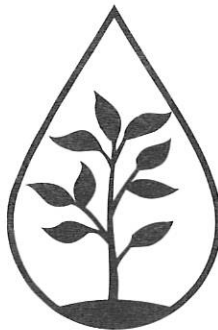
Develop Efficient, Coordinated Livestock System Production Systems

Enhance the Value of Kansas Agricultural Goods

Develop Agricultural Risk Management Strategies

Develop Agricultural Technologies and Information Systems

Emphasis has been placed on realigning research and educational programming to reflect agriculture's need for synthesized information that affects the entire farm business—from tillage and harvest to on-farm and elevator grain storage; from cattle nutrition through carcass evaluation; from input selection to marketing; from starting a home-based business or farm recreational enterprise to developing markets for fruits and vegetables or other alternative crops. Help also is given on assessing ever-changing governmental programs that affect Kansas agriculture.



2. NATURAL RESOURCES AND ENVIRONMENTAL MANAGEMENT

Issues:

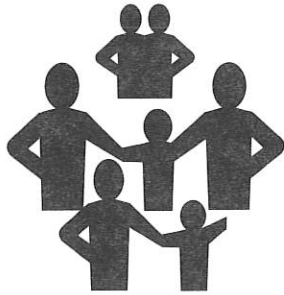
Ensure Quality and Conservation of Surface Water and Groundwater

Promote Community and Residential Environmental Management

Develop Systems for Improved Soil and Air Quality

K-State Research and Extension is providing information and know-how about many conservation techniques and ways to protect the land and water and other natural resources. Researchers

and extension faculty are meeting with producers, industries, town leaders, homeowners, and others who are interested in preserving the environment and natural resources and assuring a better quality of life for themselves and future generations.



3. YOUTH, FAMILY, AND COMMUNITY DEVELOPMENT

Issues:

Build Strong, Healthy Communities

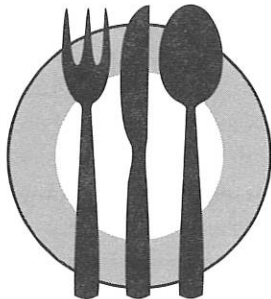
Improve Parenting Skills and Family Relationships

Prepare Youth to Be Responsible Citizens

Balance Demands of Work, Family, Community, and Time for Self

Develop Consumer and Financial Management Skills

Building human capacity is fundamental to economic development, leadership, affordable housing, quality child care, a skilled workforce, and welfare reform. Work in this area 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, helping youths become more effective citizens, and much more.



4. FOOD, NUTRITION, HEALTH, AND SAFETY

Issues:

Promote a Safe Food Supply from Production to Consumption

Promote Healthier and Safer Lives

Develop New, Appealing Food Products

Because Kansas is a national leader in many agricultural commodities, it relies heavily on food safety and nutrition research and expertise at K-State. As lifestyles become more urban, people are separated further from the food production system. Lack of knowledge leads to poor choices regarding food and diet, which is why the need is great for reliable information from K-State. The goal of K-State programs here is to prevent foodborne illnesses; make lives healthier and safer; and develop and market healthy food products from locally produced commodities.

CENTERS FOCUS ON MAJOR ISSUES AND COLLABORATION

The difficult and complex problems of today often cannot be solved by someone working alone. For several years now, K-State Research and Extension has been creating various centers to bring together expertise from many areas to focus on key issues. **These centers, forums, and alliances involve researchers and extension specialists from several departments and colleges, including experts from governmental agencies and private industry, who work together on research and communicate and teach the results.**

Agricultural Product Utilization Forum

Adding value to raw ag commodities is the task of this Forum, which involves an interdisciplinary team of K-State faculty and administrators. Such higher value products are more competitive in domestic and export markets, and they increase income, create jobs, and encourage rural development. Projects include developing improved wheat straw board products; extracting cellulose from agricultural residues for food and nonfood uses; investigating new product opportunities from red blood cells; producing improved feed ingredients; using wheat bran phytase to improve phosphorus utilization in animal feed; and researching starch matrices to create synthetic bones to reconstruct bone and cartilage.

Contact: Rolando Flores, Grain Science,
Phone: 785-532-4064, E-mail: raf@wheat.ksu.edu

Center for Food Animal Health and Management

A major industry in Kansas, animal agriculture is rapidly changing and requires continued development of new management techniques and scientific data. This Center supports the animal industry by focusing on all aspects of preventative medicine and management that affect the health and well-being of food animals and the wholesomeness and profitability of foods from animals. The Center focuses on applied, on-farm research to meet the needs of producers, allied health industries, government agencies, and the public.

Contact: Jerry Gillespie, Director,
Phone: 785-532-4258, E-mail: gillesp@vet.ksu.edu

Food Safety Forum

Food safety is of paramount concern. Consumers expect the food they purchase at supermarkets and foodservice establishments to be safe, wholesome, and nutritious. This Forum works on improving food safety, including testing, food storage, processing, manu-



facturing, and distribution. Two recent accomplishments of Forum participants have been the development of high-temperature vacuum technology and steam pasteurization, which beef slaughter plants can use to remove contaminants.

Contact: Karen Penner, Director,
Phone: 785-532-1672, **E-mail:** kpenner@oz.oznet.ksu.edu



Grain Industry Alliance

A public-private partnership, the Alliance builds on Manhattan's preeminence as an International Grains Center to help solve the many issues facing the grain industry around the nation and abroad. Examples of work include developing technologies to predict grain performance quality; developing rapid wheat class identification methods; providing representative samples of varietal hard red winter wheat flour for promotional evaluation in collaborative labs throughout the world; investigating methods to produce refrigerated dough products with extended shelf life; and designing new analytical technologies to automate and improve consistency in bakery processes. The Alliance offers a multi-disciplined approach to research as well as training and consulting related to the growing, processing, and marketing of grains.

Contact: Ron Madl, Director,
Phone: 785-532-7022, **E-mail:** rmadl@oz.oznet.ksu.edu

Collaboration: AIB, USDA, GMPRC, DPRA



Kansas Center for Agricultural Resources and the Environment (KCARE)

KCARE supports sustainable agriculture and tackles environmental issues such as conservation of soil and water. Through research and education, this Center works to develop mutually beneficial relationships between agriculture, natural resources, the environment, and consumers. For example, KCARE is involved in a three-year project with the University of Nebraska involving surface water quality in the Blue River Basin.

Contact: William Hargrove, Director,
Phone: 785-532-7103, **E-mail:** bhargrov@oz.oznet.ksu.edu

Plant Biotechnology Center

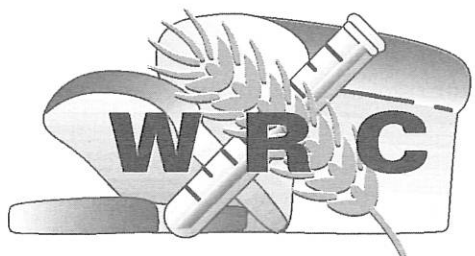
A profitable agriculture will increasingly depend on the ability of scientists in this Center to utilize biotechnology. The goals are to enhance yield and product quality of wheat for traditional uses and to explore value-added uses for new products and markets. Other thrusts include developing disease-resistant wheat; cloning genes that govern susceptibility to insects; and developing wheat for producing new drugs, including antibiotics.

Contact: Robert Zeigler, Director,
Phone: 785-532-6176, **E-mail:** rzeigler@plantpath.ksu.edu

Wheat Genetics Resource Center

This Center holds the nation's largest collection of wheat's wild relatives. These species can provide genetic diversity for use against biological pests and environmental stresses that affect the yield and quality of wheat. The Center's primary task is to domesticate and transfer the genes to useful germplasm for use by plant breeders.

Contact: Bikram Gill, Director,
Phone: 785-532-1391, E-mail: bsg@plantpath.ksu.edu



Wheat Research Center

This Center focuses on research and development of improved, high-quality wheat varieties. Teams of scientists are working to improve wheat-based products, and they are building a comprehensive database on all aspects of wheat. In addition, the Center is working with all associations interested in wheat to develop and maintain a unified strategic plan for the future of the U.S. wheat industry. Work includes combining new process technologies with those of traditional soy protein processing to expand functional uses of wheat protein; improving process technologies for modification of wheat starch to expand its use in foods; and investigating the ability of wheat flour to suppress the growth of colon cancer cells.

Contact: Ron Madl, Director,
Phone: 785-532-7022, E-mail: rmadl@oz.oznet.ksu.edu

OTHER EXAMPLES OF LABORATORIES, OFFICES, AND SERVICES AT K-STATE THAT INVOLVE EXTENSIVE COLLABORATION

Food Product Development Services Laboratory

This lab serves food-related business in the state, especially small- and medium-sized food-processing operations with fewer than 20 employees who want to get into the food business. Services include technical assistance, labeling assistance, food-product development, quality control, acidified food testing, and shelf-life evaluation. **In one year alone, this lab helped 22 companies launch new products or optimize existing ones; fielded 895 inquiries from 212 companies and 62 entrepreneurs; tested the shelf life of 27 products; and generated 107 nutrition facts panels for 53 companies.** This lab also acts as "process authority" (defined by the Food and Drug Administration) for Kansas companies that want to market acidified food products in hermetically sealed containers. Without the service, companies cannot put such products on the market.

Contact: Fadi Aramouni, Animal Sciences,
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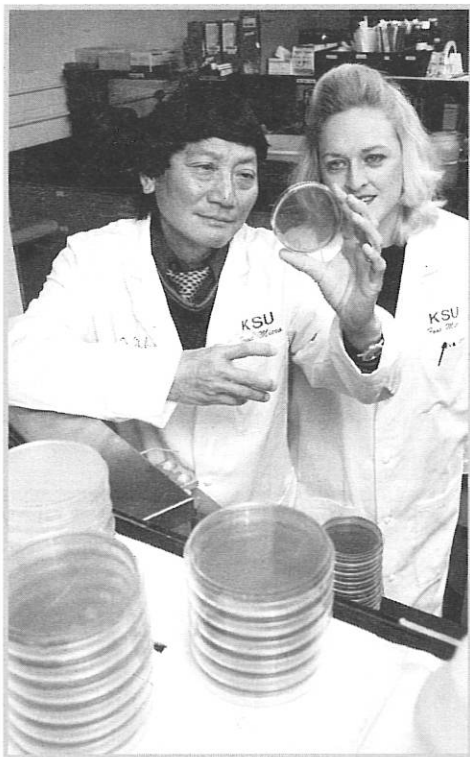
Collaboration: USDA, Kansas Department of Commerce and
Housing, Kansas Department of Health and Environment

Meat Product Development and Technical Assistance Laboratory

This K-State Research and Extension program in the Animal Sciences and Industry Department assists Kansas meat processors and entrepreneurs in developing value-added meat products and improving the quality and safety of existing products. **In one year, processors and entrepreneurs realized a savings of more than \$100,000 while enhancing the quality and safety of meat and meat products for Kansas consumers.** Services, programs, and assistance include product development and reformulation; quality and safety evaluation and testing; shelf-life studies; nutritional labeling assistance, development of documentation programs to meet government requirements; HACCP and other food-safety training; labeling assistance; plant design review; assistance in selecting and locating ingredients; packaging and equipment suppliers; and product compliance evaluation. Users of this program are primarily small businesses, often with fewer than 10 employees, and most likely are not able to afford such services through commercial sources.

Contact: Elizabeth Boyle, Animal Sciences,
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Collaboration: USDA, Kansas Department of Commerce and
housing, Kansas Department of Agriculture



K-State is known worldwide for its microbiology workshop.

Rapid Methods and Automation in Microbiology International Workshop

Every summer since 1980, K-State has offered the Rapid Methods and Automation in Microbiology International Workshop and Symposium. Because of concerns about food safety and because of the advancements in applied microbiology, this workshop has become timely and significant. Participants focus on the practical application of conventional and new commercial systems of rapid identification of microorganisms from food, water, medical specimens, and the environment. **Established for microbiologists, food scientists, medical technologists, consultants, quality assurance and control managers, laboratory directors, and researchers, the workshop has attracted more than 1,500 people from around the world.** They come to K-State for eight days of intensive training (the symposium runs two days concurrently). No other institution in the world offers such a combination of excellent facilities and internationally known authorities in rapid methods and automation in microbiology. The workshop has given the

university and K-State Research and Extension a worldwide reputation for excellence in this area.

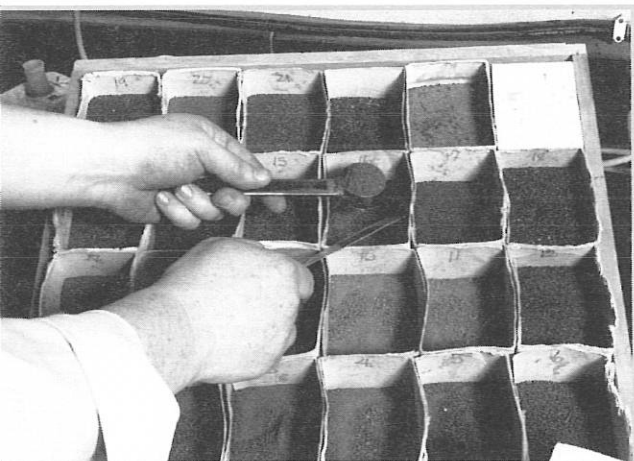
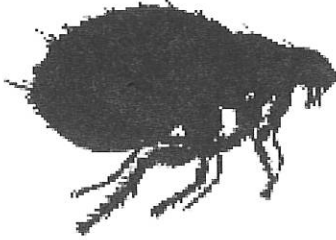
Contact: Daniel Fung, Animal Sciences,
Phone: 785-532-1208, E-mail: dfung@oz.oznet.ksu.edu

Entomology Diagnostic Laboratory

This facility provides the general public and K-State Research and Extension personnel in the counties with quick, accurate identification of insects found in homes and yards, on people and animals, and in agriculture. The lab also provides information on biology of the insect, its status as a pest or nonpest, and control measures. Most insect questions are not of economic importance and are handled without use of insecticides. In addition, a number of insect questions are handled over the telephone and by direct contact with individuals who come to the lab. Alternative control tactics often are suggested for insects in samples submitted by extension/district agents, companies, and the general public.

Contact: Robert Bowling, Entomology,
Phone: 785-532-6258, E-mail: rbowling@oz.oznet.ksu.edu

Collaboration: Kansas Department of Health and Environment



Preparing soil samples for analysis.

Soil Testing Laboratory

The Soil Testing Lab analyzes some 12,000 soil samples each year for Kansas farmers and horticulturists. Each soil sample represents 20 acres, and the lab, in one year, tested 8,000 samples from producers. The results have implications for 160,000 acres at \$5 an acre from either higher yields or lower fertilizer usage and cost. The indirect cost is about \$800,000. In addition the impact on the horticulture industry is conservatively estimated at \$200,000. Overall indirect contribution by the soil testing lab is \$1 million.

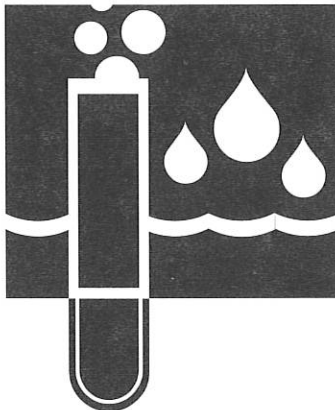
Contact: Gregory Schwab, Agronomy,
Phone: 785-532-7897, E-mail: gschwab@ksu.edu

Collaboration: Kansas producers

The Kansas Water Resources Research Institute

Established by the Board of Regents, following enactment of the National Water Resources Act, the Kansas Water Resources Research Institute (KWRRRI) is a state and federally funded agency headquartered at K-State. The KWRRRI supports statewide water research and educational programs at both K-State and the University of Kansas. The organization is dedicated to finding effective ways of conserving, using, and distributing water. Sponsored projects include water quality protection strategies for Kansas lakes and streams, fate and effect of agricultural and other chemicals, river basin and reservoir management, water conservation, and water-use efficiency.

Contact: William Hargrove, KWRRRI,
Phone: 785-532-7103, E-mail: bhargrov@oz.oznet.ksu.edu



Office of Community Health

The Office of Community health is dedicated to integrated research, analysis, and education activities that enable all children, youth, adults, and families to build healthy environments that lead to a safe and healthy quality of life. Work involves developing a model of healthy behaviors and places in communities; building statewide capacity to help local leaders in health and quality-of-life initiatives; and promote health and disease prevention within communities.

Contact: David Dzewaltowski, Office of Community Health,
Phone: 785-532-7750, E-mail: dadx@ksu.edu

Collaboration: National Institutes of Health, Kansas Department of Health and Environment, local community leaders and governments throughout Kansas



Office of Local Government

To make the best decisions possible, local officials need accurate and reliable technical information. The Office of Local Government provides a wide variety of economic and technical analysis services. In support of community economic development programs, local officials can obtain local market analyses, economic base studies, economic and fiscal impact analyses, industrial targeting studies, and other studies to help understand local trends and anticipate the impacts of local decisions and economic events. Studies also are provided in support of local decision-making related to public services, population studies, tax trend analyses, fiscal impact analyses, local revenue and expenditure studies, and public service efficiency.

Contact: John Leatherman, Agricultural Economics,
Phone: 785-532-2643, E-mail: jleather@agecon.ksu.edu



The
Research
Alliance

The Research Alliance

This is a newly formed organization designed to bring agribusiness and academic leaders together to identify and address key research needs and opportunities in the agricultural and food industry. Its mission is to conduct research to develop commercial agricultural products and eliminate duplicate research efforts. Farmland Industries Inc. created the alliance with K-State, but individuals from other agribusinesses and research institutions are involved by participating in task forces that recommend research priorities.

Contact: Jack Riley, Animal Sciences,
Phone: 785-532-7624, E-mail: jriley@oz.oznet.ksu.edu



THE FOOD SAFETY
CONSORTIUM

Food Safety Consortium

The Food Safety Consortium conducts research on new ways to maintain and enhance food safety to ensure America will continue to enjoy high quality food in the future.

The Consortium consists of K-State, the University of Arkansas, and Iowa State University, and its mandate is to investigate areas of poultry, beef, and pork meat production from the farm to the consumer's table. K-State's contribution involves beef research. Established in 1988, the Consortium is developing technology to rapidly identify contaminants; methods to evaluate potential health risks; risk-monitoring techniques to detect potential hazards in the food chain; and the most effective intervention points to control microbiological or chemical hazards.

Contact: Martha Vanier, Animal Sciences,
Phone: 785-532-1210, **E-mail:** mvanier@oz.oznet.ksu.edu

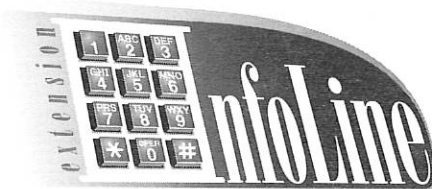


Kansas Agricultural Mediation Services

Free mediation is provided through this office on ag credit issues, which may be requested by any Kansas agricultural borrower. Creditors also can use the service, including banks, suppliers, co-ops, implement dealers, Farm Credit Services, and the Farm Service Agency. Mediation also is provided, at a small cost plus cost of the mediator, to any Kansas ag producer who receives an adverse decision from a USDA agency. The program works with K-State Research and Extension to provide farm financial analysts who work with the farm family to analyze the profitability of an operation and develop options and alternative plans that can be presented at the mediation. The program also has an agreement with Kansas Legal Services to provide direct legal representation to Kansas farmers and ranchers on a reduced-fee basis.

Contact: Kansas Agricultural Mediation Services,
Phone: 785-532-6532, **E-mail:** kams@oz.oznet.ksu.edu

Collaboration: USDA, twenty other states, Kansas Legal Services



Extension InfoLine

K-State Research and Extension is cooperating with University of Missouri Outreach and Extension to provide an audio text system called Extension InfoLine to the residents of the Kansas City metropolitan area. The service provides pre-recorded information to the public through telephone access. It is formatted in one- to two-minute messages on a variety of topics available 24 hours and free of charge. Topics include gardening and horticulture; family and parenting issues; food preparation and preservation; youth activities; agriculture; community development, and many others. Faxed copies of the messages also are available. **The counties participating in this collaborative effort are Clay, Jackson, and Platte in Missouri and Johnson, Leavenworth, and Wyandotte in Kansas.** The Extension InfoLine number is 913-393-1913.

Contact: Johnson County Extension Office,
Phone: 913-764-6300

Collaboration: Six Missouri and Kansas counties, the University of Missouri

MORE EXAMPLES OF IMPACTS OF COLLABORATIVE PROGRAMS AND PROJECTS

[Note: Some collaborators with K-State Research and Extension are either mentioned in each example or listed at the end of each example.]



1. AGRICULTURAL INDUSTRY COMPETITIVENESS

Adding Value to Kansas and Kansas Agriculture

COLLABORATION THAT BOOSTS THE KANSAS ECONOMY

K-State Research and Extension reaches out across the state, affecting it in many ways, but one of the easiest measures of that affect is the economic impact. A K-State publication, *VALUE ADDED: The Economic Impact of Teaching and Research at Kansas State University*, reports that K-State returns nearly \$17 for every \$1 of state funding it receives. **The payback includes more than \$1 billion from K-State Research and Extension.** Sixteen projects related to agriculture were listed that produced a measurable value-added economic impact of \$973 million in fiscal year 1997. Highest on the list was meat processing. It provided a state-wide impact of \$296 million. Second was the category of feedlot performance and livestock implants at \$250 million; third, range management at \$96.5 million. Other categories included steam pasteurization of carcasses—\$70 million; improved wheat varieties—\$51 million; plant disease diagnostics—\$46 million; management to prevent dark cutters—\$42 million; and horticultural services—\$34 million.

Contact: Steven Graham, Assistant to the Dean and Director,
Phone: 785-532-5729, FAX: 785-532-6563,
E-mail: sgraham@oz.oznet.ksu.edu



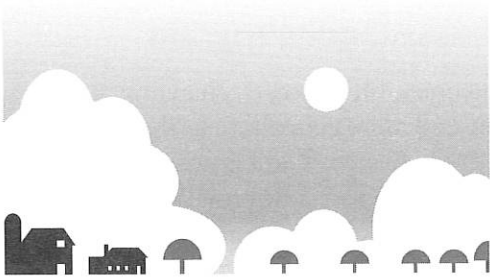
The Western Kansas Irrigation Research Project

The western Kansas economy depends on the Ogallala Aquifer. A diverse group of private citizens and government and industry stakeholders created a task force that recommended that K-State Research and Extension provide technical assistance and leadership to enhance research and educational efforts for the purpose of reducing the rate of aquifer depletion by increasing the efficiency of water use. On this recommendation, K-State Research and Extension developed The Western Kansas Irrigation Research Project. The focus of K-State's efforts range from developing new efficient irrigation systems to developing computer models to pre-

dict the effects of irrigation, to protecting groundwater from contamination, and to developing management strategies for optimal use of the aquifer.

Contact: Pat Coyne, Head, Western Kansas Agricultural Research Centers, Phone: 785-625-3425,
E-mail: coyne@ksu.edu

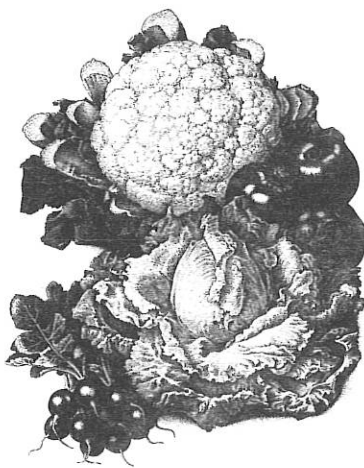
Collaboration: Western Kansas producers, western Kansas private businesses, Sunflower Electric Power Corporation, The Garden City Company, Southwest Kansas Groundwater Management District



An Economic Program to Keep Farms Strong

The statewide Crop Management and Marketing program is helping to enhance profitability for Kansas agricultural producers by training producers to learn to manage their risks better. The goal is to keep Kansas farms strong. In the long run, the environmental focus of this program will help producers and policy makers better understand the tradeoffs between profitability and environmental soundness. Through the educational process, the negative environmental impacts of farm-level decisions often can be diminished without substantially reducing farm profitability. Altogether, reduction of negative environmental impacts, enhanced producer profitability, and increased ability to deal with economic risk will lead to retaining as much social capital (viable farm families) as possible in the rural areas of Kansas.

Contact: Terry Kastens, Agricultural Economics,
Phone: 785-532-5866, E-mail: tkastens@agecon.ksu.edu



Sustainable and Organic Cropping Systems

An Action Team of K-State Research and Extension professionals is defining and prioritizing the research and information needs of Kansas citizens in both sustainable and organic agriculture. Several hundred farmers might identify themselves with the term "sustainable," and the demand for organically grown products has increased 20 percent yearly (nationally) for the past five years. Sustainable agriculture is a comprehensive (holistic), coordinated set of activities that results in increased agricultural efficiency while conserving and protecting natural and human resources. Organic cropping systems represent one part of sustainable agriculture. One long-term project of the Action Team is to compare the economic feasibility of newer alternative approaches with more traditional ones. Another goal is to make K-State Research and Extension the first place that producers and consumers contact to find factual scientific information in these areas. This is being done by compiling existing research, identifying gaps, and conducting original research in collaboration with existing sustainable and organic organizations.

An example of such sustainable work: Researchers from several disciplines are determining whether ivy geraniums—an important greenhouse ornamental crop—can be produced economically by simultaneously reducing water and fertilizer inputs and using biological control as an alternative for managing spider mites, a major pest. The research team members are focusing on understanding how changes in plant production and protection affect management of the pest, the esthetic quality of the crop, and the general profitability of the crop system.

Contact: Jim Nechols, Entomology,
Phone: 785-532-4744, E-mail: jnechols@oz.oznet.ksu.edu

Farm Management Assistance Program

Variable weather, falling incomes, higher costs, changing government regulations—all these and more contribute to the stresses involved with farming. K-State Research and Extension ag economists have been helping Kansas producers by providing them with business and financial counseling. **Kansas Farm Management Association economists have estimated a \$13.8 million return from use of this information by clientele.** The K-State Farm Management Program assists Kansas farm families to improve profits by evaluating their operations, especially their resources and inputs. Current studies show a \$30 to \$50 per crop acre variance in profitability between low-cost and high-cost producers. This kind of information, which is based on research, has seen increasing acceptance by producers, commodity groups, and financial institutions. The potential income improvement is \$90 million to \$100 million.

Contact: Frederick D. DeLano, Farm Management Association,
Phone: 785-532-1513, E-mail: fdelano@agecon.ksu.edu

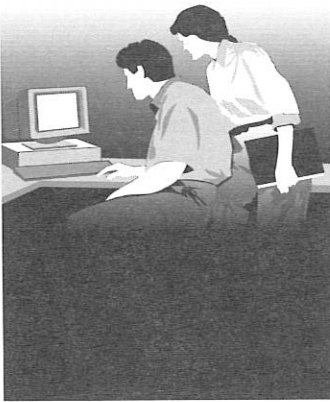
Collaboration: Kansas Farm Management Association, Kansas producers, banks

Profitlink—Combining Knowledge that Works

A component of the Farm Management Program, ProfitLink, works with 3,700 Kansas farm families to collect, review, organize, analyze, and report detailed financial and production information to assist production management, financial management, and risk management decision making by farm managers. **The impact of this program on 1,110 farm families studied is estimated at more than \$28.6 million.** The total impact of the use of the information statewide would be considerably greater. An example: Approximately \$10 million to \$12 million in current and future contract benefits will accrue to 120 contract turkey growers in southeast Kansas, southwest Missouri, and Arkansas through the use of cost/return information from the records of 25 Kansas Farm Management turkey cost-of-production records.

Contact: Frederick D. DeLano, Farm Management Association,
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Farm Analyst Program



An educational service to facilitate business planning, this program has provided assistance to more than 1,000 Kansas farm families. **The major benefit provided by the farm analysts is in determining a producer's competitiveness, profitability, and efficiency.** The farm analysts, trained by K-State Research and Extension, are Kansas farmers and ranchers themselves, with extensive training in business analysis. Their farming experience helps them relate to the families they assist. Analysts work with small, moderate, and large farm operations.

Contact: Duane Hund, Agricultural Economics,
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Collaboration: Kansas Ag Mediation Service

Improving Economic Efficiency in Livestock Production



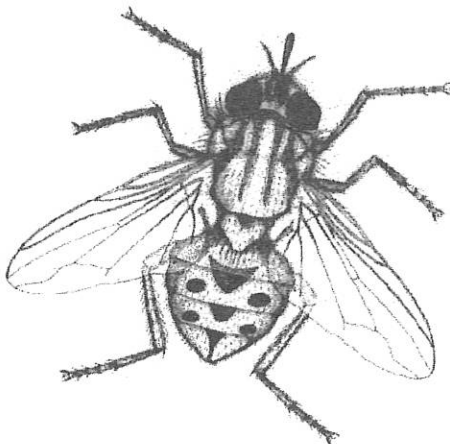
Livestock producers rely on K-State for marketing information.

K-State Research and Extension provides timely livestock outlook and marketing information to Kansas livestock producers. **Kansas cattle producers need such high-quality, information to fine tune their business strategy, especially in a depressed livestock production market.** They receive such information through publications, press releases, radio programs, magazine articles, and public meeting presentations by K-State experts in various areas. Conferences targeting the needs of agricultural lenders are being offered, and Cattle Marketing Workshops are being held on supply and demand fundamentals, risk management, and negotiation skills.

Contact: Jim Mintert, Agricultural Economics,
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Collaboration: Kansas Ag Statistics, Kansas Pork Producers Association, Kansas Livestock Association, National Cattlemen's Beef Association

Long Distance Dispersal of Stable Flies into the Midwest



The blood-sucking stable fly is the most important fly that affects cattle in feedlots and dairies in Kansas. Their movement into neighboring urban areas often results in legal actions against the closest livestock facilities. They do not overwinter in the Midwest states in sufficient numbers to account for the high populations usually observed in the spring and early summer. **With the assistance of cooperators in east-central Kansas, who operated traps in 1997-1998, we tested the hypothesis that these flies migrate on a northeasterly direction with the masses of warm air blowing with the approach of spring cold fronts, the same weather patterns responsible for the tornado-spawning storms in the Midwest.** The number of traps with significant capture increases

correlated with the passage of cold fronts. We are now addressing the following questions: What is the source of these migrating stable flies? Do all stable flies originate from southern areas where they maintain active populations during the winter months? Or, is their dispersal more regional in that the progeny of immigrants into an area are the next wave of dispersing flies? We are considering the possibility that the numerous and large dairies in New Mexico, Texas, and Oklahoma, as well as the large dairies in Chihuahua, Mexico, could be the overwintering sites and the sources of stable flies dispersing northward with spring cold fronts. The information obtained by these studies will be used to formulate integrated pest management programs for stable flies in Kansas and the rest of the Midwest.

Contact: Alberto B. Broce, Entomology,
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Collaborator: USDA-ARS



Corn ranks number two in Kansas crops.

Helping Producers in Southwest Kansas Increase Profits

Every year producers in southwest Kansas must choose what crop cultivars they will plant on that region's 11 million cultivated acres, and every year K-State provides crop information based on research that helps them make the best choices. Recent findings at the Southwest Research-Extension Center—Garden City showed that seeding of *Bt* corn hybrids improved grain yields significantly. These hybrids contain a gene from the bacterium *Bacillus thuringiensis* that has been merged with other corn genes to produce pest-fighting biochemicals not previously present in corn. **An increase of \$5 per acre profit on 30 percent of the 11 million acres generates a \$16.5 million benefit to southwest Kansas.** K-State recommendations are used on about 30 percent of the acreage.

Contact: Merle D. Witt, Southwest Research-Extension Center—Garden City,
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Collaboration: Kansas producers

Saving Money and the Environment with Corn Pest Management Systems

Entomologists at K-State provide recommendations on soil insecticides based on research and for a variety of pests in corn but especially corn rootworms, the primary soil insect pest in Kansas. An insecticide used only where it is needed could increase the average yield potential of corn by five bushels an acre and diminish any harmful effects on the environment. At \$4 a bushel on 1 million acres of infested corn, the potential benefit to Kansas agriculture would be \$20 million annually. If an insecticide is used where it is not needed—for example, on 100,000 acres at a cost of \$12 for in-

secticide—the savings to Kansas farmers would be from \$620,000 to \$1 million annually.

Contact: Gerald Wilde, Entomology,
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Collaboration: Kansas producers

Area-Wide Management of Corn Rootworm

We are investigating the effectiveness of an area-wide approach to managing corn rootworms, one of the most damaging and costly insect pests of corn in the United States. Each state is using the same procedures so that comparisons can be made between the different locations as to the effectiveness of this approach. We are completing the third year of this collaborative project.

Contact: Gerald Wilde, Entomology,
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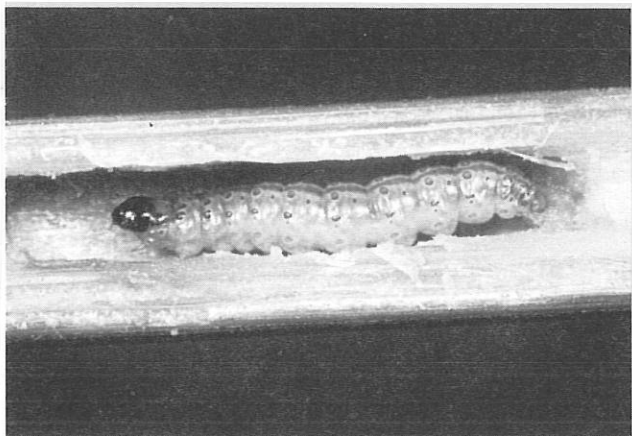
Collaborators: Scientists from North Dakota, Iowa, Nebraska, Illinois, Indiana; USDA

Transgenic Corn and Management of Corn Pests

Bt corn is being widely planted as a means of eliminating losses caused by corn borers. Some parts of Kansas, particularly the southwest and south-central areas, have seen particularly high adoption of this technology because farmers in those areas are faced with southwestern and European corn borers. The EPA has mandated that effective resistance management plans be developed and implemented to prevent the European corn borer from overcoming the crop protection benefits that Bt corn provides. The most widely recommended strategy to prevent resistance combines high-dose Bt hybrids with nonBt corn refuge areas so that some Bt-susceptible corn borers can survive to mate with any Bt-resistant corn borers that develop. Matings by resistant corn borers are expected to produce offspring that can be killed by Bt corn. This strategy is designed to slow the likelihood that surviving resistant corn borers will spread their genes of resistance throughout the European corn borer population. The EPA is considering a proposal that farmers in southern states (where Bt corn and Bt cotton are both grown) have the option of planting no more than 50 percent of their corn crop to Bt corn (because some pests move between the two crops). Farmers in areas without southwestern corn borer may be able to plant up to 80 percent of their corn crop as Bt corn if EPA accepts this proposal. Researchers at Kansas and other states, through a regional research group known as NC205, are collaborating to identify practical methods that permit growers to use the technology widely while complying with federal mandates of resistance management.

Contact: Randall Higgins, Entomology,
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Collaborators: Scientists from 20 states, Canada, and Mexico



Rootworms cause extensive damage to corn in Kansas.





K-State scientists are dedicated to developing hard white wheat varieties for Kansas growing conditions.



Releasing Hard White Winter Wheats in Kansas

K-State ag researchers worked for more than 15 years to develop hard white wheats. The effort paid off when two new KSU hard white wheats were released to the public in the fall of 1998 and a third one in 1999. The new white wheats have milling and baking qualities comparable to or better than popular hard red winter wheat varieties grown in Kansas. More hard white wheat varieties are about to be released. Hard white wheats are preferred by world export buyers. **K-State is encouraging growers, grower organizations, cooperatives, and marketers to develop alliances that will preserve the added value that white wheat could provide for the Kansas economy.** By adding white wheats to the product mix, growers and the Kansas wheat industry can improve the value and demand for their products in world markets.

Contact: David Mengel, Agronomy,
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Collaboration: Kansas Wheat Commission, Kansas Association of Wheat Growers, Kansas Crop Improvement Association, Kansas Department of Agriculture, Kansas Department of Commerce and Housing, Kansas Grain and Feed Association

Wheat Quality Impacts

One study found that the quality of protein affects the value of protein premiums in international markets for hard wheat. This was the first study to uncover this fact, which is an indication of the complexity of a quality-based marketing system. **A second economic study relating to wheat quality quantified the economic linkages for characteristic values between the North and South plains of the United States.** The results pointed to a competitive market for quality and suggested the value of quality characteristics such as protein are determined in an intricate supply-demand framework. For many decades, K-State agronomists have been developing wheats with higher quality.

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Collaboration: Wheat Research Center, U.S. Wheat Associates, Kansas Wheat Commission

New Website Helps Farmers Manage Risk

K-State crop economists have established a World Wide Website to collaborate with farmers and give them a closer and ever-evolving look at the factors, fundamentals, and farm policies that affect bottom-line profits. One case study on corn, for example, includes six possible approaches to selling that crop under current market conditions and with the pluses and minuses of each strategy. The site is available to the public at <http://www.agecon.ksu.edu/>.

Contact: Dan Bernardo, Agricultural Economics,
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Collaboration: Kansas Agricultural Statistics, USDA Risk
Management, USDA Farm Service Agency



Working with the Kansas Agricultural Statistics (KAS) Office

During the growing season (March through November), county agents provide the Kansas Agricultural Statistics Office with weekly updates on the progress and condition of the crops in their area. They also monitor soil moisture conditions and make note of any special issues relating to livestock. An Internet process has just been developed that allows agents to provide the data for the Weather-Crop Survey online in a more timely manner. As of this writing, 50 percent of the reports came by the Internet. During the winter months, agents provide monthly reports. In addition to providing information on the progress and condition of crops, K-State assists in the development and conduct of educational programs and promotes KAS surveys and use of unbiased statistics in planning operations and in marketing farm products. K-State Research and Extension also assists KAS in developing and maintaining current lists of farmers, processors, and handlers of agricultural commodities in order to maintain a capability for the efficient collection of timely and accurate statistics.

Contact: Barry Flinchbaugh, Agricultural Economics,
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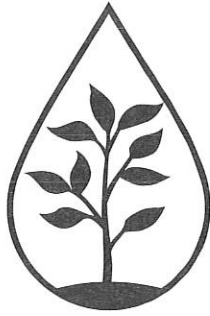
The first hole at Colbert Hills is a rarity among long par fives in that there are several distinct choices on the second shot.

K-State Golf Course—Helping Disadvantaged Youths, Providing New Research Opportunities

The PGA Senior Tour's Jim Colbert is spearheading a project not only good for the golf team at K-State, his alma mater, but it also heralds a new era of golf course research, environmental management, and helping disadvantaged youths from around the country. Colbert Hills also will serve as a golf academy for youths from traditionally underrepresented groups in the sport. To K-State researchers, Colbert Hills will be a living laboratory for studying the environmental impact of a golf course on natural resources and evaluating the best turfgrass management practices for the golf industry in the Midwest. Colbert Hills also provides new career options for students. K-State is offering a new major in golf course management, which focuses on all aspects of running a golf course.

Contact: Jack Fry, Horticulture, Forestry, and Recreation Resources, Phone: 785-532-1430, E-mail: jfry@oz.oznet.ksu.edu

Collaboration: KSU Foundation, PGA Tour, Golf Course Superintendents Association



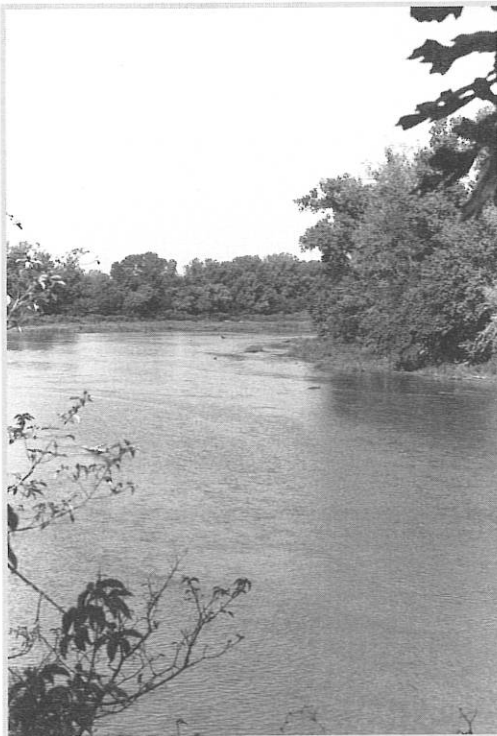
2. NATURAL RESOURCES AND ENVIRONMENTAL MANAGEMENT

Working Together to Improve Water Quality

K-State, Kansas farmers, and commodity groups have joined forces to improve water quality. This innovative program will develop, evaluate, and promote integrated agricultural management systems to minimize the effect agricultural practices have on surface water. **Most of the funding for this program comes from commodity commissions, which demonstrates that farmers are concerned about water quality and are willing to take measurable steps to improve water quality.** The Kansas Center for Ag Resources and the Environment (KCARE) is directing the interdisciplinary research and extension groups involved with the program. KCARE's current environmental research programs focus on soil quality, waste management, water management, and water quality. The program's three parts are to: 1. Survey farmers to document common production practices; 2. Evaluate best management practices (BMPs) under field conditions on relatively large areas; 3. Develop an economic and policy analysis of integrating BMPs into current production practices. The program can be a valuable model of how agriculture can address statewide water concerns by directly taking part in water-quality protection and preservation.

Contact: William Hargrove, KCARE,
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Collaboration: Governor's Office, Kansas Water Office; Kansas Department of Health and Environment; Kansas State Conservation Commission; Kansas Department of Agriculture; Kansas Department of Wildlife and Parks; Kansas Forestry Service; EPA; Kansas Fertilizer and Chemical Association; Kansas Corn, Grain Sorghum, Soybean, and Wheat commissions and grower associations.



K-State is working with farmers to protect rivers from pollution.

River Friendly Farm Project

This program for producers in counties adjacent to the Kansas River is designed to help them reduce costs and protect the environment. **For farmers, it involves developing an action plan and working with a farm assessment manual containing worksheets and questionnaires.** Fact sheets suggest practices that improve the environment and farm and identify additional assistance if necessary. Farmers chosen for the pilot test will receive incentive payments to implement one or more items in their action plan.

Contact: William Hargrove, KCARE,
Phone: 785-532-7103, E-mail: bhargrov@oz.oznet.ksu.edu

Collaboration: Kansas Rural Center, Kansas Department of Health and Environment, U.S. Environmental Protection

Agency, USDA Natural Resources Conservation Service, Kansas Corn Growers Association, Farmers Union, Kaw Valley Heritage Alliance, Kansas Department of Agriculture, Kansas Center for Agricultural Resources and the Environment

Best Management Practices in the Blue River Basin



The goal of this project is to develop, verify, and assist farmers in adopting Best Management Practices (BMPs) for atrazine, nitrogen, phosphorus, and sediments in the Blue River Basin of Kansas and Nebraska. The project has field sites established in the Blue River Basin in both states, and they will serve as research and demonstration activities for local communities. These two research sites will provide information to target producers with problematic watersheds. This targeted approach should improve water quality while sustaining competitive agriculture in the Blue River Basin.

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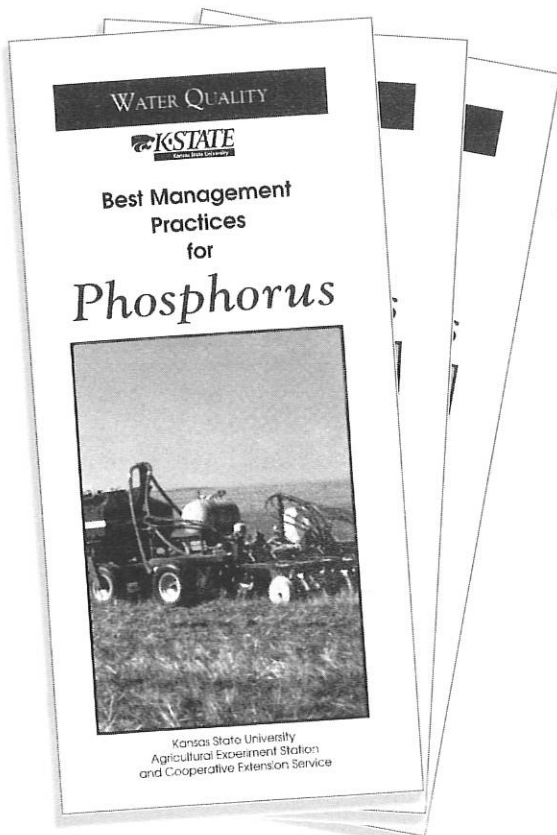
Collaboration: Kansas Department of Health and Environment, Kansas State Conservation Commission, University of Nebraska, Kansas Water Office, Kansas Department of Agriculture, Kansas Corn and Grain Sorghum commissions, Nebraska Upper Big Blue Natural Resources District, Nebraska Lower Big Blue Natural Resources District, Nebraska Corn and Grain Sorghum associations, Nebraska Department of Agriculture

Protecting Water by Best Management Practices

Kansas surface waters often are contaminated by fecal coliform bacteria, herbicides, nitrogen, phosphorus, and sediments. Cropland agriculture is one source of these pollutants. K-State Research and Extension is evaluating Best Management Practices (BMPs) in integrated agricultural management systems at several Kansas locations. The expected outcome of this program is for farmers to adopt integrated agricultural management with improvements in surface water quality, which will help them to meet water-quality goals and avoid state regulation. At each of these locations, BMPs such as reduced tillage, fertilizer placement, pesticide timing, and vegetative strips are implemented on one to three acres. Surface runoff and water quality are evaluated. Understanding and identifying options for farmers and how they affect decision-making also are being studied.

Contact: William Hargrove, KCARE,
Phone: 785-532-7103, E-mail: bhargrov@oz.oznet.ksu.edu

Collaboration: Kansas Corn, Grain Sorghum, Soybean, and Wheat commissions and Kansas Fertilizer Research Fund





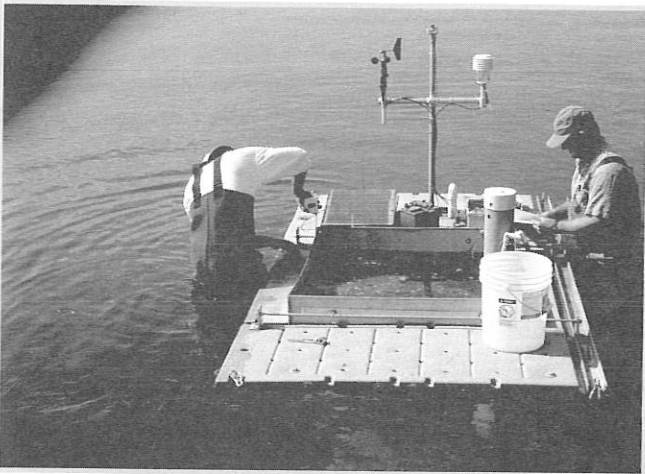
K-State is investigating alternative irrigation systems.

Irrigation Economics Evaluation System

Irrigators can use IEES—Irrigation Economics Evaluation System—to evaluate irrigation system modifications or switches to increase profitability while conserving water in crop production. IEES has been used to help estimate part of the damages that now are being reviewed in the water lawsuit involving the Arkansas River in southwest Kansas. This lawsuit could result in gains of \$72 million to the state of Kansas. IEES is part of a larger K-State project on the economic evaluation of alternative irrigation systems, involving an agricultural economist and two agricultural engineers.

Contact: Jeff Williams, Agricultural Economics,
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Collaboration: Western Kansas producers and western Kansas businesses



Scientists monitor seepage from waste lagoons.

Studying the Impact of Animal Waste Lagoons

Concerns are growing about how animal waste lagoons affect the environment, especially groundwater. K-State Research and Extension has been studying the amount and effects of seepage from animal waste containment lagoons. The latest study involves determining if hog farms pose a risk to the drinking water and air quality of south central Kansas. The study is scheduled to be completed early in 2000 when the Kansas Legislature convenes and as the city of Wichita begins pushing for stringent laws to protect its water supplies. Researchers will look at whether pollution travels from the large lagoons used to store hog waste and at the practice of disposing of millions of gallons of liquid manure by spreading it on crops as fertilizer. The researchers also will study other possible sources of pollution like small cities, rural homes, and waste water pits used by cattle feedlots. If pollution is found in the water, it will be tested to determine if it came from a cow, pig, or human or is the result of commercial fertilizer used on crops. The results could affect livestock and crop operations.

Contact: William Hargrove, KCARE,
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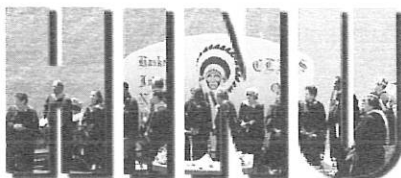
Collaboration: Kansas Department of Health and Environment, USDA, Kansas Water Office

Evaluating the Effects of Pesticide Mixtures in Aquatic Organisms

Most pesticides applied to crops eventually end up in soil and water, and water contamination is most likely caused by more than one pesticide at relatively low concentrations. Scientists are studying the mechanisms of the synergistic effect of the herbicide atrazine and organophosphate insecticide mixtures on an aquatic insect midge. Study has shown that atrazine itself is basically non-



Entomologists evaluate pesticide effects on aquatic systems.



toxic to the midges even at very high concentrations. However, atrazine at very low concentrations can dramatically enhance the toxicity of certain organophosphate insecticides. The objective is to understand the mechanism of such an adversely synergistic effect conferred by atrazine and to investigate what types of organophosphate molecules, to which atrazine can confer synergistic effect. **Knowledge obtained from this study is expected to improve the evaluation of pesticide effects on aquatic systems and to minimize adversely synergistic effects of pesticides on surface water in highly agricultural states such as Kansas.**

Contact: Kun Yan Zhu, Entomology,
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Collaborators: Wichita State University; University of Nebraska; U.S. EPA-EPSCoR Program

Building Tribal Capacity to Improve Water

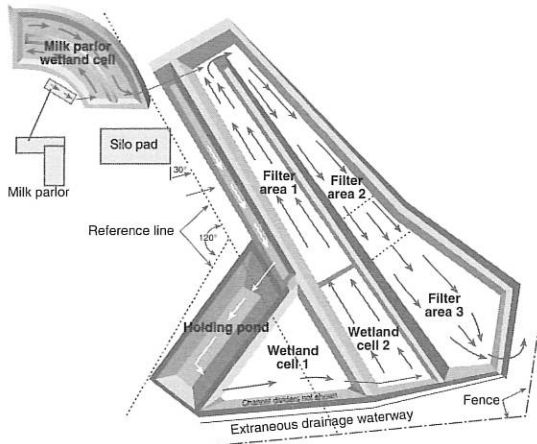
Eroding stream banks and excessive levels of sediment, nutrients, and pesticides from agricultural crops are found in many Kansas streams. Establishment of riparian forest buffers and stream bank stabilization helps remedy these problems. A project was initiated in 1998 to establish demonstration sites on the Prairie Band of the Potawatomi Tribe Reservation in northeastern Kansas. Demonstrated conservation techniques include cedar revetments and willow posts to stabilize stream banks and the planting of native prairie grass and forest buffers to reduce pesticide and nutrient loading. **Staff from several tribal departments as well as high school and college study tribal members have worked alongside K-State Research and Extension and other agency personnel to install the demonstration areas, thereby building tribal capacity to continue the establishment of these practices.**

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Collaboration: Haskell Indian Nations University, Bureau of Indian Affairs, USDA Natural Resources Conservation Agency

Sextro Dairy Parlor Wetland Cell Project

This project involves evaluating an alternative to using holding pods or lagoons for controlling milk parlor effluent. With assistance from K-State Research and Extension, the Sextro Dairy installed a concrete basin during 1997 to provide 120 days of storage of the manure and a vegetative filter planted to grass and trees for removing nutrients from the lot runoff. A wetland cell was constructed in 1998 to treat the milk parlor water. During 1999, the wetland cell was sampled. **The objective is to demonstrate the utilization of a wetland cell for treating milk parlor wash water.** Monitoring of the inflow and outflow is being used to evaluate the system's performance and guidelines.



A new system to control dairy waste.

Contact: Joseph Harner, Biological and Agricultural Engineering, Phone: 785-532-2930, E-mail: jharner@bae.ksu.edu

Collaboration: Kansas Department of Health and Environment, Kansas State Conservation Commission, Natural Resource and Conservation Service, Kansas Forestry Department, Nemaha River Dairy

Nichols Dairy Ecological Pollution Control Demonstration

This project is providing information on the nutrient removal rates of an ecological system that utilizes wetland cells and vegetative filters. The nutrients removed by the plants will be harvested as forages for feed. The study will provide understanding of developing livestock pollution control practices with controlled release rates, which will help producers to install control practices that do not require investments in irrigation equipment for periodic pumping of lagoons. This ecological pollution control project was constructed in Anderson County for a 200-cow dairy.

Contact: Joseph Harner, Biological and Agricultural Engineering, Phone: 785-532-2930, E-mail: jharner@bae.ksu.edu

Collaboration: Kansas Department of Health and Environment, Kansas State Conservation Commission, Natural Resource and Conservation Service, Kansas Forestry Department, Carl Nichols Dairy, Kansas Department of Agriculture, Kansas Parks and Wildlife, and U.S. Fish and Game

Black Vermillion Watershed Dairy Environmental Cooperative

The objective of this study is to reduce the runoff of nutrients, fecal coliform, and sediment from dairies in the Black Vermillion watershed. This is being done by developing and installing demonstration systems for storage of dairy manure and effluent; developing and delivering educational programs to dairy farmers to assist them in implementing Best Management Practices (BMPs); and developing local dairy environmental cooperatives to assist dairy farmers to design and complete waste-management systems. Annual nutrients in manure from a 100-cow dairy are approximately 21,000 pounds of nitrogen, 8,600 pounds of phosphorus, and 17,000 pounds of potassium. A portion of these nutrients leave a dairy if left uncontrolled. Developing BMPs helps producers store these nutrients until they can be applied and used by crops. This also can lead to improvements in water quality.

Contact: Joseph Harner, Biological and Agricultural Engineering, Phone: 785-532-2930, E-mail: jharner@bae.ksu.edu

Collaboration: Kansas Department of Health and Environment, Kansas State Conservation Commission, Natural Resource and Conservation Service, Kansas Forestry Department, Kansas Department of Agriculture, Nemaha and Marshall county dairies





Studying the effects of controlled burning on the prairie.

Konza Prairie Research Natural Area

A vast preserve of rolling hills and wooded streams, the Konza Prairie is the premier site for prairie research in North America. Located in the Kansas Flint Hills, the 8,616-acre tract is a remnant of unplowed tallgrass prairie that is ideal for long-term studies of the interactions of such complex biological and environmental factors as water, soil, climate, fire, animals, insects, and topography. Current and potential research on water on the Konza Prairie includes watersheds, composition of prairie streams, water quality regulation, climate, soil moisture, nutrient flow, and evaporation from plants. **Scientists from K-State, NASA, and other agencies are studying the Konza Prairie by air and spacecraft and are applying what they learn to other ecosystems.** The K-State Division of Biology operates the site with support from K-State Research and Extension.

Contact: David Hartnett, Biology,
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Collaboration: Researchers from around the world; about a dozen agencies and private foundations, including the National Science Foundation and The Nature Conservancy



Kansas Environmental Leadership Program (KELP)

Controlling nonpoint pollution sources requires substantial local commitment and dedication. It requires informed local citizens and leaders who understand the situation to set goals and work to make them a reality. **The Kansas Environmental Leadership Program was created by K-State Research and Extension to develop local awareness, inspire local leadership, and stimulate local action for nonpoint source pollution control and improve water quality through environmental leadership training.** The project's objective is to train landowners, businesses, bankers, realtors, local government officials, community leaders, and others to understand and take responsibility for water quality. Participants learn how to assess the situation and learn what can be done to improve and protect water quality, where to find resources, and how to evaluate progress.

Contact: G. Morgan Powell, Biological and Agricultural Engineering, Phone: 785-532-2932, E-mail: mpowell@bae.ksu.edu

Collaboration: Kansas Department of Health and Environment

Whole Farm Planning

K-State Research and Extension is reaching out to Kansas farmers by providing information on Whole Farm Planning which takes into consideration that the land is more than just an investment to hedge against inflation but also a living, breathing, resource needed to sustain the future productivity of the heartland. Whole

Four Phases of Whole Farm Planning Process



farm planning can bring economic and social benefits. According to some estimates, only about 30 percent of current farmers have a clear idea of their break-even cost for their major market commodities, and only 5 percent have done a recent calculation. **Short-term profitability will increase as farmers determine how to decrease input expenses and increase gross return through alternative and value-added marketing options. Long-term financial benefit will accrue to farms that preserve water quality and improve soil quality.** Economic benefits also will be realized by communities if they can avoid installing expensive drinking water treatment systems. Social benefits are realized by farmers who engage in Whole Farm Planning. Spouses begin to communicate about farm goals, life goals, and other shared values. Children and parents also are brought into the planning process. Barriers to Whole Farm Planning include absentee ownership of farms in Kansas. More than 50 percent of farmland now is rented.

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Collaboration: Kansas Rural Center, Kansas Biological Survey, Kaw Valley Heritage Alliance, Kansas Department of Health and Environment, Kansas Natural Resources Conservation Services

Whole Farm Planning Using Indicators of Sustainability

Literature reviews of whole farm planning tools and proposed indicators of sustainability have been completed by team members involved with this project. Also completed are the meetings of focus groups with Kansas farmers on the topic of whole farm planning tools and sustainable agriculture. Currently, **this project involves developing six farmer clusters around the topic of whole farm planning, with holistic resource management being used as a major training component.** A second phase is the development of a whole-farm environmental assessment tool module modeled after the Ontario Environmental Farm Plan and complementing the Farm-A-Syst Modules now available in Kansas. A third part of this overall program is to present whole farm planning, training, and seminars at the request of county agents.

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Use of Sex Pheromones to Manage Gypsy Moth

Since its introduction to North America near Boston in 1869, the gypsy moth has been slowly expanding its range. The "slow the spread" (STS) pilot program was instituted to delay the onset of gypsy moth impacts in currently uninfested portions of the United States, including Kansas. The strategy of this program has been to use grids of pheromone traps located along the expanding

gypsy moth population front to identify newly established isolated populations in the transition area ahead of the expanding front. These populations are eradicated or suppressed so that they do not expand and coalesce. Results to date indicate that these efforts may reduce radial rates of spread by at least 50 percent. During the pilot program, it became clear that massive populations of adult males sometimes moved unusually long distances, thereby leapfrogging the STS front. The gypsy moth has not yet established itself in Kansas, although a few males have already been caught in pheromone traps. However, recent outbreaks of gypsy moth in Arkansas and Missouri underscore the threat to wooded areas and residential plantings in eastern Kansas and the need for the planned research. Virtually nothing is known about this behavior and why it occurs in some areas but not others.

Contact: Ralph Charlton, Entomology,
Phone: 785-532-6154; E-mail: rcharlto@oz.oznet.ksu.edu

Collaboration: USDA Forest Service



3. YOUTH, FAMILY, AND COMMUNITY DEVELOPMENT

Targeting Education and Early Intervention to Reduce Juvenile Crime Through the Open-K Program

Kansas is one of four states to receive federal funds for its OPEN-K program. OPEN-K stands for Opportunities for Prevention Education and Networking in Kansas. The funds will exceed \$200,000 in the first year and offer renewals of up to \$150,000 for each of four subsequent years. The program involves education and early intervention, which are thought to improve the quality of life for youths and their communities and, at the same time, reduce crime.

OPEN-K is funding statewide professional development programs for extension faculty and community-based programs such as after-school programs, mentoring, and parent education. One of the first programs for several counties involves adding access to the Internet and training people how to use it to expand the resources available to them.

Contact: Elaine Johannes, Office of Community Health,
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Collaboration: Governor's Discretionary Portion of the Federal Safe and Drug Free Schools and Communities Grant program; Office of Juvenile Justice Delinquency Prevention; Teel Institute; Kansas Youth Authority; Koch Crime Commission; 4-H and Youth Programs; Office of Community Health; Kansas Department of Social and Rehabilitation Services; USDA/Children, Youth, and Families At-Risk; Kansas Department of Health and Environment; Kansas Prevention Center Directors Association



K-State is working with communities to improve after-school programs for youths.



Helping American Indian Youths Through Open-K

K-State Research and Extension is developing an OPEN-K extension outreach program with Haskell Indian Nations University in Lawrence. The project focuses on activities and education that can empower American Indian youths to grow and develop self-respect, dignity, self-sufficiency, and self-determination. K-State faculty have positioned the Haskell extension program to serve as a hub to connect nine targeted American Indian communities on tribal land and in Kansas cities so that they can benefit from each other's youth development experience and knowledge. **Efforts are being made to identify people in the Native American communities to interact with American Indian youth and mentor them so that they can advance in society, particularly in Kansas.** Activities have included sponsoring a dance troupe as part of 4-H activities at the State Fair and bringing American Indian youth from around the state to Haskell Indian Nations University to participate in educational activities and be part of a support group that can help them if they choose to attend college.

Contact: Elaine Johannes, Community Health,
Phone: 785-532-7750, E-mail: ejohanne@oz.oznet.ksu.edu



Opportunities for Prevention

Education & Networking in Kansas

Kansas Program Profiles

OPEN-K has been featuring a Kansas community-based, youth-development program on its Website each month. **Each program demonstrates effective collaboration and successful integration of the eight critical elements for successful youth programs, which were developed by the national 4-H organization.** An example of a profile is that of Diane Nielson from Atchison county and Beth Hecht from Leavenworth County who have been collaborating on a program called Urban 4-H. OPEN-K stands for Opportunities for Prevention Education and Networking in Kansas. **The Website for the profiles:**

<www.oznet.ksu.edu/pr_openk>

Contact: Sherri Becker, Community Health,
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Collaboration: National 4-H

Healthy Youth Project

This is a collaborative project to understand how to promote healthy youth development. Do children who bond with a healthy environment at a critical time in their development later on choose healthy lifetime habits and avoid problem behaviors? That is a primary question that a group of researchers will try to find out with the help of a \$1.7 million grant from the National Institutes of Health. Middle schools in 16 Kansas communities are being recruited for the project. The project also will focus on

increasing two specific healthy behaviors: fruit and vegetable consumption and physical activity. Another focus will be developing after-school programs that will meet the needs of students and will build assets in the community—rather than programs on a specific problem like keeping kids off drugs.

Contact: David Dzewaltowski, Community Health,
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Collaboration: National Institutes of Health, Kansas Department of Health and Environment, Department of Preventative Medicine at the University of Kansas School of Medicine in Wichita



4-H Projects Serve Communities

Community service projects are not new to 4-H, and 4-H now serves more than 100,000 Kansas kids each year. About 28 percent of the total are club members; others who benefit are involved in school, after-school, or such community programs as babysitting or safety clinics. Kalia Dalton, a 4-H member in Leavenworth County, chose the local library as a community service 4-H project. Her push to reopen the McLouth, Kan., public library prompted telephone calls from scouts for two national talk show hosts. Thanks to her, the library, which had been closed for 17 years, has reopened. She organized a community crew to sort and catalog the books; sought donations for new books and computer equipment; and arranged volunteer staffing.

Contact: Gary Gerhard, 4-H Youth Programs,
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4-H CARES

An acronym for Chemical Abuse Resistance Education Series, 4-H CARES is a youth program of K-State Research and Extension designed to improve self-esteem and family interaction, promote life skills, and teach about chemical abuse. Many youth organizations have included 4-H CARES into their educational campaigns, including the Scouts, Big Brothers/Big Sisters, schools, and church groups. Nearly all the other states and a number of school systems and provinces in Canada have requested the 4-H CARES educational material. The program has won national awards, including being named one of the 20 exemplary prevention programs in the nation.

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Phone: 785-532-5800, E-mail: ggerhard@oz.oznet.ksu.edu



Community Economic Development

For more than 25 years, the Kansas PRIDE Community Improvement program has encouraged communities to upgrade facilities and service, increase economic vitality, and renew a sense of civic pride. This joint program with the Kansas Department of Com-

merce and Housing involves developing more effective leaders and providing access to resources and information. Statewide recognition is given to PRIDE communities.

Contact: R. Stan McAdoo, PRIDE Program,
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Family Financial Programming Impacts

Money management programming is available in many Kansas counties for men and women of all ages, including high school students, senior citizens, and those with limited incomes. One example of K-State Research and Extension family resource management in Sedgwick County involved designing and implementing a Master Money Managers program. The project involves helping families determine the status of their finances, set goals for the future, manage risk, and find professional financial help. **Fourteen volunteers have assisted with the program, contributing 280 hours of their time to it.** Another program in Douglas County has helped families with financial decision-making. Parents at Even Start participated in an eight-hour basic financial workshop. They learned about basic budgeting, needs versus wants, and use and abuse of credit. Families in the program also used a computer program to pay down debts and save money on loan interest.

Contact: Joyce E. Jones, Family Studies and Human Services,
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Measures that Monitor Retail Activity

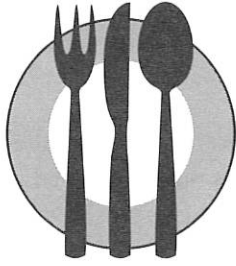
For most of the last 20 years, K-State Research and Extension has been producing Trade Pull Factors. These statistics estimate the relative strength of the retail community in every county and in many cities across Kansas. Pull Factors are used by big businesses such as the McDonald's Corporation and by chambers of commerce in small cities like Columbus. **Businesses use the data to determine the relative strength of the retail community in markets across Kansas.** Community groups monitor the data to gauge the performance and overall health of the local business environment. Also, workshops on building a healthy retail community are offered by KSU extension faculty—35 have been completed in the last 18 months. The Trade Pull Factor reports are sent to all county extension offices, small business development centers, certified development companies, and field staff of the Department of Commerce and Housing. **Anyone can access the reports on the Internet at <www.agecon.ksu.edu/ddarling>.**

Contact: David Darling, Community Economic Development,
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Collaboration: Kansas Department of Commerce and Housing
and U.S. Department of Commerce



K-State provides information that can strengthen businesses in Kansas communities.



4. FOOD, NUTRITION, HEALTH, AND SAFETY

Research Leads to Revised Ground Beef Safety Standards

K-State meat scientists found that the only safe way to kill meat-borne pathogens is to cook ground beef to an internal temperature of 160 degrees. **Based on that finding and other research, the USDA's Agricultural Food Safety Inspection Service revised its safety standard for sufficiently cooked ground beef,** stating that it "must be cooked to 160 degrees Fahrenheit as gauged by a meat thermometer penetrating the thickest part of the hamburger." Prior to that, ground beef was considered done by observing its internal color. The K-State scientists found that premature browning is a function of oxidation and meat pigment chemistry, which can make a hamburger patty look done when it is not. They also studied the color of cooked meat juices but found them to be unreliable indicators of meat being done.

**Contact: Don Kropf, Animal Sciences,
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Collaboration: USDA Food Safety Inspection Service



The Family Nutrition Program

Because K-State Research and Extension has an office in every county, it can adapt educational programs to meet local needs. One successful program is the Family Nutrition Program. Its purpose is to improve the quality of the diets for food stamp recipients and those eligible for food stamps. Teaching people to eat healthier helps to increase their energy and productivity. Better nutrition also contributes to wellness, which reduces medical expenses. One example of the program at work: In Riley County, 2,300 low-income clients were contacted and received instruction on decreasing illness and promoting healthy lifestyles. Locations for this program ranged from the Manhattan Emergency Shelter to Head Start and from Manhattan Public Housing to several grade schools.

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**Collaboration: USDA and the Kansas Department of Social and
Rehabilitation Services (SRS)**



Expanded Food and Nutrition Education Program

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. **Last year, 93.4 percent of Kansas EFNEP participants showed improvements in their diets after completing the series of EFNEP lessons.** In addition, 472 Kansas adult and youth volunteers donated approximately 3,120 hours of work to EFNEP in 1998, which had an estimated dollar value of \$21,840.

Contact: Sandy Procter, Human Nutrition,
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Collaboration: USDA, WIC (Women, Infants, and Children) agencies, Head Start programs, and numerous other agencies in Kansas

Kids' Meal Times

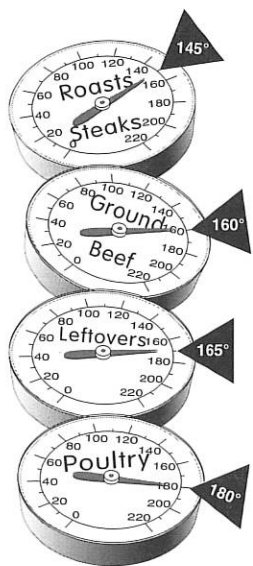
Healthy Food for Growing Children

Good nutrition is important to all children but especially children in low-income families. Some family incomes are too low to feed children adequately. One K-State Research and Extension program addressing this problem is Kids' Meal Times. It entails a set of 12 newsletters for parents and caregivers of preschool age children, including information on basic nutrition and feeding tips; activities to do with the child; books to read with the child; and simple recipes for adult and child to make together. **The program has been reviewed by child nutrition specialists around the country and was approved as a North Central Region Extension Publication. A number of other states have purchased materials, and a Spanish translation has been authorized.**

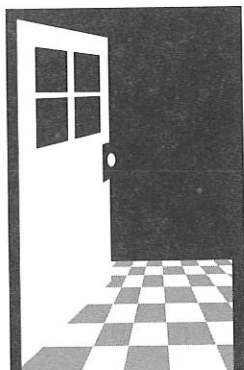
Contact: Paula Peters, Human Nutrition,
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Serving Safe Food Program (SERVSAFE)

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



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Making Homes More Accessible for Those with Disabilities

Safety hazards and accessibility barriers limit those with disabilities to safely perform the daily activities necessary for living independently. K-State Research and Extension helps older people identify hazards and barriers in their homes and implement solutions. In the KSU College of Human Ecology, a Universal Design Laboratory has been developed with examples of bathroom, kitchen, and office equipment that provide accessibility for people with disabilities. K-State faculty give tours and demonstrations to groups and individuals needing design solutions to accessibility programs. Videos and publications have been produced on identifying hazards and barriers and ways to eliminate them. **Many county K-State Research and Extension Offices have provided a program on devices that assist people with such disabilities as mobility problems, blindness, or hearing impairments.**

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International Agricultural Programs A Good Deal for Kansas

Since the first foreign students were enrolled in 1898, there has been an international dimension at K-State. During the last half century, K-State has been a particularly active player among U.S. land-grant institutions in international agricultural research, training, and technical assistance throughout the world. In addition to on-campus training, K-State faculty have been involved in numerous short courses, seminars, conferences, workshops, technical assistance consulting, and sabbatical exchanges in India, Nigeria, the Philippines, Botswana, Honduras, Pakistan, Peru, Morocco, Liberia, Egypt, Tunisia, and Kenya.

The American Council on Education has declared that our country's future depends upon our ability to develop a citizen base that is globally competent, comfortable with cultural diversity at home, and able to cope with international affairs in a rapidly changing world. In response, **K-State and other land-grant universities throughout the United States have renewed their efforts to globalize instruction, research, and technical outreach.** At K-State, this work is coordinated through the International Agricultural Programs (IAP) office.

*More information on K-State International Agricultural Programs is available from Robert Hudgens, Assistant Dean,
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The Value of International Programs to Kansas

Kansas exports totaled \$4.4 billion in 1998 and generated 66,000 jobs in the state. Mexico is the third largest market for Kansas exports and only trails Japan as the largest foreign market for Kansas beef. Two thirds of the Kansas wheat crop with a value of more than \$850 million is marketed internationally every year. **The continued strength of the agricultural economy of Kansas is dependent on maintaining international linkages and viable export markets.**

Unfortunately, poverty, infrastructure constraints, and political instability in many developing countries prevent them from having the purchasing power to import Kansas products. Studies have shown that as developing countries raise their standard of living, they tend to purchase more imported livestock products, agro-chemical inputs and machinery, and feed grains. Expanding the markets for Kansas exports is directly linked to improving the economies in developing countries. International Agricultural Programs is designed to mobilize technical expertise at K-State to improve human resources and strengthen research, education, and extension institutions in developing countries to promote economic growth.

Since knowledge knows no geographical boundaries, K-State faculty actively collaborate in research all over the world. These international partnerships help increase access to genetic materials for domestic crop improvement; broaden our knowledge base on pest-management strategies before the pests reach our shores; and lead to more advanced animal waste-management and soil-conservation technologies for Kansas.

The MidAmerica International Agricultural Consortium (MIAC)

The MidAmerica International Agricultural Consortium (MIAC) was formed in 1977 for the purpose of offering university expertise to carry out technical assistance, institution building, training, and sector analysis/planning programs in developing countries. **MIAC includes five universities: K-State, Iowa State University, University of Missouri, University of Nebraska, and Oklahoma State University.** MIAC's mission is to establish program linkages with other nations.



The Value of International Partnerships

Since 1977, K-State has been collaborating with land-grant universities in Iowa, Nebraska, Missouri, and Oklahoma through the MidAmerica International Agricultural Consortium (MIAC). This collaboration magnifies K-State technical expertise related to crop and livestock production, processing, marketing, and storage, as well as soil and water conservation, environmental sciences, and agricultural policy. MIAC universi-

ties also benefit from their collective reputation and very large international alumni base.

For the last six years, MIAC has targeted international collaboration in research and education primarily toward Mexico. The objective is to establish partnerships that have joint ownership of collaborative projects and share both the benefits and the responsibility to mobilize resources needed to implement projects. Initially, MIAC identified six research/education technical areas for engagement. These include corn, wheat, livestock, natural resource management, women in rural leadership, and plant biotechnology. No other single university or consortium of universities in the U.S. is collaborating with Mexico in such a coordinated way. This long term commitment involves scientists, producers, and the private sector on both sides of the border.



The Value of International Travel for Faculty

K-State is actively nurturing partnerships with universities and research institutes in other countries to facilitate the exchange of faculty on sabbatical leaves and collaborative research and training. **When faculty have opportunities to travel and collaborate with colleagues abroad, they bring that enthusiasm back into their classrooms and laboratories.** Collaborative international research also provides opportunities for graduate student involvement.

Annual faculty development trips to Mexico are conducted in conjunction with MIAC. These are designed for younger faculty with undergraduate teaching responsibilities. The technical focus of these trips varies from year to year. In 1998, the tour focused on food safety and meat science. In 1999, the focus was on the application of biotechnology research to host plant resistance to pests and climatic stress. Future trips will focus on soil and water conservation, distance education, and agribusiness development.

Faculty also contribute to the generation of new knowledge through research. International involvement assures that research at K-State focuses on such important global problems as global warming, ozone depletion, and poverty alleviation through economic development.

International Grains Program (IGP)—22 Years and Growing

For more than two decades, the International Grains Program has been providing foreign grain buyers with the latest research-based information on grains. Since 1978, IGP has provided short courses on grain marketing, price analysis and risk management, flour milling, and feed manufacturing. Individuals throughout the world have participated in its programs, which are part of the Department of Grain Science and Industry. **Funded by the Kansas Legislature and the state's four grain commissions,** IGP also sends K-State faculty overseas to provide technical assistance and to



promote Kansas products. Its educational training includes tours of the operations of various U.S. grains and oilseeds industries. Because of the competitiveness of the market and the need to know the latest information, most participants in IGP courses are senior management officers of major corporations.



An Example of an IGP Program:

Helping Brazil Establish a National Grain Inspection Service—By assisting Brazil with its efforts to reorganize its national grain-grading and inspection system, the International Grains Program of K-State Research and Extension could help increase prospects for more U.S. grain exports to that South American nation. This kind of assistance is being provided through two-week short courses on the K-State campus. The short courses provide an inside look at the U.S. grain inspection and grading system and are designed to help Brazil develop a national, uniform grading and inspection system. **Providing the participants from the Brazilian Ministry of Agriculture a close look at the U.S. system of inspecting and grading grains could help trade and export opportunities between the United States and Brazil.** In addition to improving exports of such U.S. grains as wheat and corn to Brazil, a side benefit of the short courses is improving relationships between the people of these two countries.

**Contact: John Howard, International Grains Programs,
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The Food and Feed Grains Institute

The purpose of this organization is to provide a center of excellence in postharvest grain systems and agribusiness development for technological assistance to developing countries through donor assistance programs. Major international activities over the past year for the Food and Feed Grains Institute include the following:

Three Examples of Projects of the Food and Feed Grains Institute:

The Collaborative Agribusiness Support Program involves working with private sectors in the United States and developing countries and with international research and technology-transfer institutions to develop and evaluate appropriate postharvest agribusiness technologies and processes and to disseminate information about those technologies and processes.

The Haiti Productive Land-Use Systems Project has two purposes: 1) maximize the productive potential of Haitian hillside agriculture by reducing the degradation of the country's natural resources through sustainable land-use interventions; 2) create a marketing system for farmers by which they may achieve market outlets and price enhancements for increases in farm income.





The Uganda Postharvest Handling and Storage Project objectives are: 1. to enable maize and bean producers and the trade sector to increase their profitability through sales in the domestic and export markets by conservation of product and improvement in quality; and 2. to increase the quantity and quality of maize and beans coming into the market place.

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The International Meat and Livestock Program

The International Meat and Livestock Program (IMLP) was established in 1985 by the Kansas Legislature and private livestock and commodity groups. The program is housed and administered in the Department of Animal Sciences and Industry. **IMLP was developed to provide education, training, technology transfer, and promotion of livestock products to international clientele.** IMLP has provided long- and short-term courses, workshops, and seminars in all phases of livestock management, development, and food products both here and with representatives from 30 countries. During the past two years, the IMLP has offered 13 different long- and short-term educational programs, nine of them involved hosting fellowships for visiting faculty from five universities in India.

A short course in Beef Cattle Genetics was conducted for a team from Slovakia. A HACCP and Sanitary Inspection course was conducted for a team from Malaysia. A Meat Processing short course and tour was conducted for a group of Russian businessmen to establish links to U.S. meat exporters. A course in Veterinary Health Management and Feed Medicaments was conducted for a veterinarian representing a private company in Lithuania. On a biannual basis, the IMLP has offered a 100-hour course in Meat Science for students from the Instituto Tecnologica y de Estudios Superiores de Monterrey (ITESM) in Monterrey, Mexico, since 1992.

In addition to formal educational programs, the IMLP hosts guests and cooperates with other private, state, and federal agencies for visitations to KSU. Last year the IMLP hosted government and business personnel from China, Russia, Japan, Thailand, Korea, the European Union, and the French Farmers Union, to name a few.

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Linking with India to Defeat Karnal Bunt Disease

K-State's Wheat Genetics Resource Center has established a national and international network of scientists to undertake collaborative research on the collection, conservation, management,





and utilization of the world's germplasm of wheat. **The collaboration allows our scientists to work in those countries on disease and insect problems of wheat that one day may pose a threat to the U.S. wheat crop.** This occurred when karnal bunt disease became a threat to U.S. wheat. Our scientists had a collaborative project on that disease with India for the past 10 years, a project funded by the USDA Foreign Currency Research Program. Karnal bunt disease was first detected in India in the 1930s, and Indian scientists had done enormous research on it. We quickly were able to tap into that expertise and are currently working on producing karnal bunt disease-resistant germplasm. An agreement is underway between USDA and Punjab Agricultural University in India to screen U.S. breeding materials for resistance to karnal bunt.

The scope of the program has expanded to other areas of wheat research and involves several institutions in India. Scientists from various organizations in India have visited K-State Research and Extension laboratories. One scientist analyzed grain hardness of Kansas wheat using a DNA-based assay. Another scientist worked on leaf rust resistance. Several papers have been jointly published. Wheat germplasm with resistance to preharvest sprouting and leaf rust has been collected. Similarly, Indian scientists have received advanced training to expedite agricultural development in India. Such pooling of talent through international networking is a win-win situation for both countries and at the same time a most efficient use of limited resources.

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EXAMPLES OF OTHER COLLABORATIVE INTERNATIONAL PROJECTS

K-State Sorghum Breeding Program: Utilizing Winter Nurseries in Puerto Rico

In most plant breeding programs, the development and release of new varieties or parent lines require 10 years to 15 years. Although time consuming, the breeding process is conceptually quite simple. In sorghum, crosses are made among elite parent lines or with germplasms that express economically important traits. The resulting progeny are advanced, with or without selection, to generate inbred or partially inbred lines. These progeny are subjected to multi-location and multi-year testing to identify new parent lines with improved yield potential and agronomic performance.

Four or five generations of inbreeding are required to produce sorghum lines for preliminary testing. This represents a significant time lag in the development of new lines. Early generation progenies are advanced as rapidly as possible; however, populations can only be advanced one generation per year during the summer months in Kansas. To address this constraint, the K-State

PUERTO RICO

Sorghum Breeding Program has developed a winter nursery program in Puerto Rico **in cooperation with the NC+ Hybrids seed company.** Winter nursery facilities provide an off-season environment for growing and evaluating breeding populations. Seed samples from nurseries grown in Kansas are harvested and immediately sent to Puerto Rico for off-season production. At maturity, seed samples from these nurseries are sent back to the United States for planting and evaluation during the following summer months. Winter nurseries can be used to advance breeding populations between two and three generations per year and significantly improve plant breeding efficiency.

Winter nurseries also provide an environment for evaluating exotic sorghum lines from the tropics. The USDA sorghum germplasm collection currently maintains over 40,000 sorghum accessions collected from many different parts of the world. This collection of lines provides the genes that sorghum breeders use to further improve the sorghum crop. Many of these accessions will not flower under long-day Kansas conditions, but these entries will flower under short-day conditions in the winter nursery. Large numbers of exotic sorghum can be evaluated in off-season nurseries that would otherwise be unavailable for use in sorghum breeding in Kansas.

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Utilization of Candidate Genes for Analysis of Disease Resistance—A Project with the Philippines, Peru, and Mexico

Advances in molecular biology and genome mapping have offered new possibilities to develop better crop protection strategies. K-State Research and Extension is developing tools to help biochemists, molecular biologists, and geneticists to collaborate effectively in crop improvement. Although much is known about genes involved in plant defense against pathogens, and tremendous amounts of sequence information on those genes are publicly available, it is difficult for individual researchers to utilize the information efficiently. **A multi-institutional collaboration with researchers specializing in several major crop plants was established to allow access to resources and expertise not available at any one institution.** At KSU, we developed a collection of molecular markers corresponding to genes involved in plant defense. The collection is cataloged in a database, also created and maintained at KSU. The defense genes are being used as genetic markers to analyze mapping populations available at collaborating institutions to determine if the genes are associated with complex traits (traits governed by many genes) affecting disease resistance. Complex disease resistance traits are very difficult for plant breeders to analyze; thus, having specific known genes as markers for complex resistance traits will vastly simplify the utilization of these traits in improving crop resistance. KSU's initial collaboration is

investigating the utility of these defense genes for studying complex traits in wheat, rice, maize, and potato. However, since these genes are common to many plant species, benefits are expected to spill over to other economic crops in Kansas (sorghum, soybean, etc.).

Contact: Jan Leach, Plant Pathology,
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Rice Deletion Mutants for Dissection of Quantitative Resistance—A Cooperative Project with the Philippines

As we seek less dependence on chemicals for crop protection, achieving durable or long-lasting disease resistance is one of the most important objectives in disease resistance research. In crop plants, durable resistance is attributed to both single, dominant resistance genes (qualitative resistance) and to the collective contribution of many genes (quantitative resistance). The exact mechanisms by which these genes contribute to disease resistance are far from clear. The successful cloning of many single, dominant resistance genes has led to a better understanding of the molecular biology of the steps for induction of qualitative resistance, yet much remains to be discovered about the genes that collectively confer quantitative resistance—i.e., the defense response (DR) genes.

Our overall goal is to understand how DR genes function to confer disease resistance. To approach this goal, we are developing a collection of rice mutants with deletions in DR genes. We are developing an efficient screen to detect mutants with deletions in specific DR genes. These mutants will be inoculated with two important pathogens of rice, the blast fungus and the bacterial blight pathogen, to determine the effects of the mutations on disease resistance and susceptibility. Understanding the effects of individual DR genes will provide the basis to combining genes for quantitative resistance in rice. **Since these genes are common to many plant species, spill-over benefits are expected for economic crops in Kansas (wheat, sorghum, soybean, corn).** Furthermore, successful application of the mutant screen will have broad applications in identifying mutants deleted in genes involved in other metabolic pathways.

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Predicting Durability of Resistance Genes—A Cooperative Project with the Philippines

Host plant resistance has been used extensively for disease control in many crop species; however, many resistance sources are not durable (long-lasting) as a result of rapid changes in the pathogen.

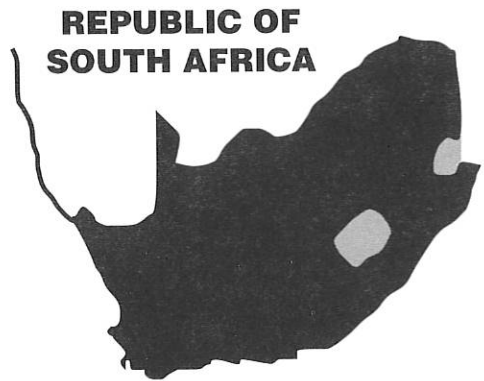
PHILIPPINES



Although many resistance genes have been found in rice germplasm, there is no easy way to predict the quality or durability of these resistance genes. We hypothesize that resistance genes imposing a high penalty for adaptation on the pathogen will likely be durable. By determining the molecular changes that a pathogen undergoes in order to overcome a plant disease resistance gene, it may be possible to develop a proactive approach to predict the durability of resistance genes available for deployment. This project is determining how the bacterial blight pathogen of rice, *Xanthomonas oryzae* pv. *oryzae*, adapts to rice containing a resistance gene not previously deployed in the Philippines and what the consequences of that adaptation are on the pathogenic fitness of the bacterium. **Understanding how to predict durability of resistance genes has broad application to all crops.**

Contact: Jan Leach, Plant Pathology,
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Exchange of Wheat Germplasm to Develop Molecular and Biochemical Assays for the Selection of Aphid Resistant Wheats, A Project with the Czech Republic and the Republic of South Africa



Pest aphids cause more than \$100 million worth of production losses annually to cereal grain crops in Europe and the United States. New genes for cereal resistance to aphids must continually be identified because of the ability of these pests to overcome plant resistance. **KSU entomologists are collaborating with the KSU Wheat Genetics Resource Center, as well as scientists in the Czech Republic and Republic of South Africa to identify new genes for resistance to aphids through the exchange of cereal aphid-resistant germplasm.** Using new and emerging DNA diagnostic technologies, this group also is cooperating to develop biochemical and molecular marker-assisted selection assays to fingerprint aphid resistance in wheat. Several wheats resistant to aphids in both Kansas and the Czech Republic have been identified. This germplasm is now being evaluated for the presence of biochemical and molecular markers linked to aphid resistance. Several DNA markers have tentatively been identified that give KSU researchers a more accurate idea of the location of the genes involved in the expression of resistance to aphids. These cooperative efforts are directed at improving the efficiency of efforts to breed wheat germplasm for aphid resistance in the United States, South Africa, and the Czech Republic.

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Collaboration: Small Grain Institute, Bethlehem, South Africa;
Research Institute of Crop Production, Prague, Czech Republic

Development of Monoclonal Antibody-Based Kit for Monitoring Parasitoids of Corn Insect Pests in Africa

Easy identification is important for monitoring parasitoids used as natural enemies to control pest insects. *Chilo partellus* is one of the most damaging stemborers species of maize and sorghum in Eastern and Southern Africa. Its relatives are pests of several crops in the United States. Monitoring the spread and recovery of parasitoid is tedious because present methods are based on identifying the natural enemies and requiring the dissection and observation of parasitoid structures under powerful microscopes. KSU seeks to develop a monoclonal antibody-based diagnostic ELISA kit that would be simple, easy-to-use, and inexpensive for reliable identification and monitoring *C. flavipes*, which is parasitic on *C. Partellus*, one of the most devastating pests of Maize in targeted areas of Africa. The proposed ELISA method of identification would be useful to biocontrol practitioners throughout the tropical and subtropical areas of the world. **The major impact of the proposed research will be to help in the effective use of biological control agents for controlling a devastating insect pest in sub-Saharan Africa. An additional impact will be in the United States, where Integrated Pest Management and use of nonchemical means of pest control are being mandated.** Availability of a diagnostic kit would be important in determining the efficacy of biological control agents.

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Collaboration: International Center for Insect Physiology and Ecology, Nairobi, Kenya; U.S. Agency for International Development



Identifying Fruit Flies—A Project with New Zealand

The family *Tephritidae* (true fruit flies) includes several species that are pests on a variety of fruits. Members of the economically important genus *Bactrocera* are native to tropical Asia, Australia, and the South Pacific, some of which have become established in Hawaii and South America. A group that is of particular concern from an economic standpoint is the Oriental fruit fly species complex (*Bactrocera dorsalis* complex), composed of several morphologically similar species. Few of the fruit fly species can be identified based on larval characters, and the identification based on adult characters remains a difficult task. Rapid and accurate identification of suspected pests species is an important consideration for both quarantine and eradication. Misidentification or identifications not done in a timely manner can cause large economic losses in the form of discarded fruit or the introduction of an exotic pest. Therefore, the overall objective of the studies is to

estimate how many species exist within the *Bactrocera dorsalis* complex using DNA-based characters and to develop species-specific molecular markers that could be used on single individuals of any developmental stage. **The technology developed during the studies will be applicable to many other pest insects, including those that are important to Kansas agriculture.**

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Collaborator: Lincoln University, Christchurch, New Zealand



Integration of Analysis of Pathogen Population Structure into Plant Cultivar Improvement— A Cooperative Project with the Philippines, India, Indonesia, Nepal, and China

Working with the International Rice Research Institute (IRRI) and the Asian Rice Biotechnology Network (ARBN), information on pathogen population analysis and host genetics is being integrated to develop durable bacterial blight resistance in commercial cultivars. The groups at KSU and IRRI have developed molecular markers and techniques for monitoring the population structure of the rice bacterial blight pathogen. The ARBN program, which involves research teams from PhilRice-Philippines, Punjab Agricultural University-India, Central Rice Research Institute-India, and Central Research Institute for Food Crops-Indonesia, are developing bacterial blight-resistant cultivars. Each team has characterized extensively the local pathogen populations using pathogenicity tests and the molecular markers developed at KSU and IRRI. Representative pathogen strains are then used to assess the effectiveness of single- and multiple-resistance genes in near-isogenic lines. This parallel pathogen-host analysis has enabled each country/region to incorporate appropriate genes into high-yielding cultivars with resistance against local pathogen populations.

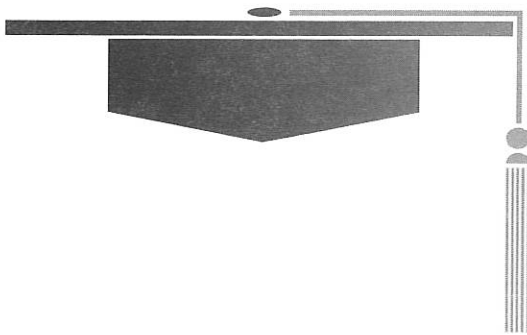
Contact: Jan Leach, Plant Pathology,
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Women Leaders in Rural Development in Mexico

Women in Mexico have varied and vital roles in rural development and agriculture, including roles as development specialists, educators, and researchers. Unfortunately, there are tremendous deficiencies in both the skills and the numbers of women at all levels in these areas. Faculty from the Colegio de Postgraduados (CP) and the MidAmerica International Agricultural Consortium (MIAC) in which KSU participates developed collaborations in programs that would enhance leadership skills of women in rural development. Orientation visits provided oppor-

tunities for CP and MIAC faculty to identify areas of common interest and to define the major needs in advancing women in the sciences. Based on these visits, several collaborative activities were initiated. Faculty exchanges were established to enhance collaborations and to strengthen language and technical skills. For example, Dra. Emma Zaveleta (CP) has received funding from the Mexican government to spend part of her sabbatical leave in a K-State Research and Extension laboratory in the Plant Pathology Department. Also, Dra. Reyna Rojas Martinez visited KSU to work on a jointly taught class between CP and KSU. A symposium titled "Gender and Higher Education in Mexico, the United Kingdom, and the USA" was held in Mexico City. This was co-funded with the British Council. A book of the reviewed proceedings from this symposium will be published in English.

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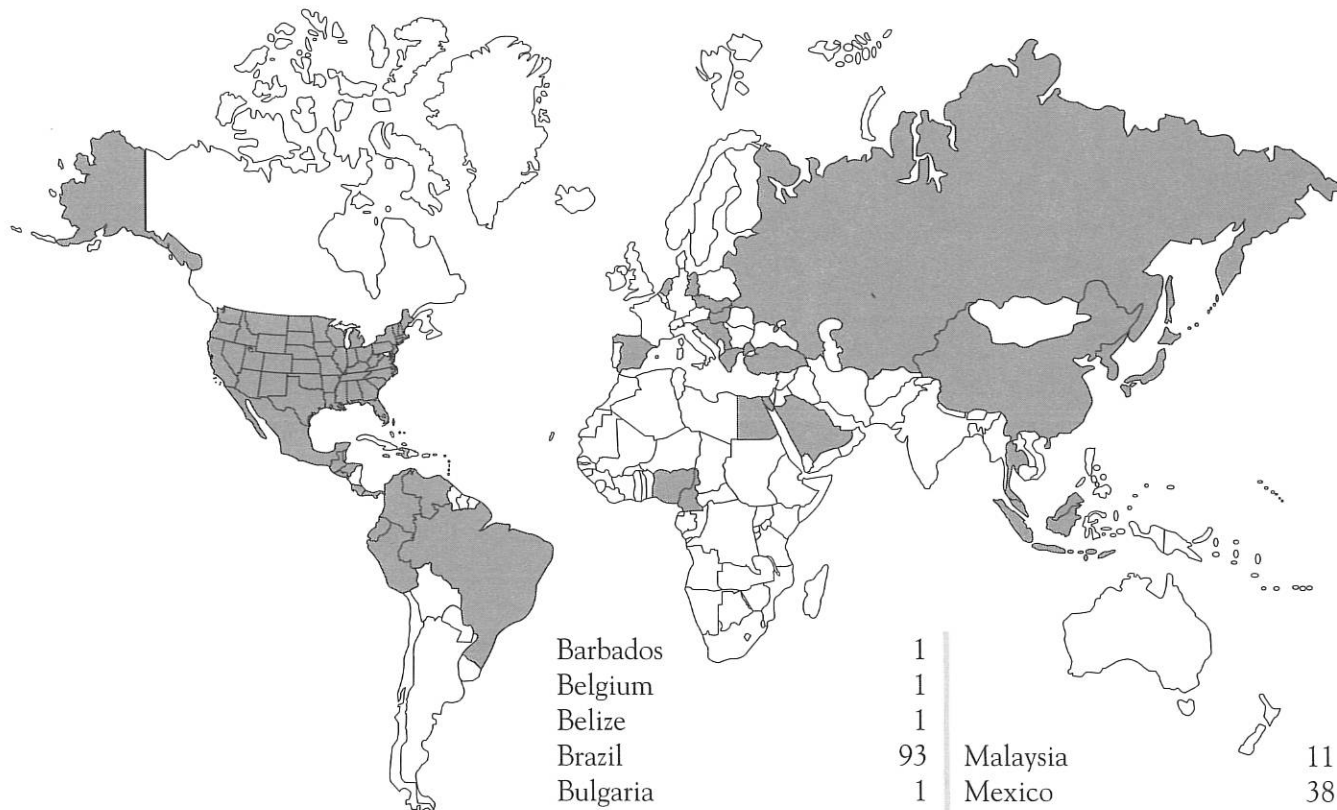
Master's Degree Program in Agribusiness

The Master in Agribusiness distance education program offered by the Department of Agricultural Economics allows agribusiness professionals to earn an advanced degree while they continue their careers. The majority of course work is delivered through the Internet and CD-ROM technology over a two-year period. Although the technology is intriguing, the student diversity adds a very compelling educational component to the program. **Thirty-five students from more than a dozen states, and students from Cambodia, Ecuador, and China are participating in the program. Twenty-five percent of the students are from Kansas. Students' backgrounds are equally diverse. From inputs and producers to processors and retailers, all facets of the value chain are represented. Students are employed with state governments; major agricultural corporations such as Pioneer Hi-Bred, Farmland, and ConAgra; and banking, extension, and educational institutions.** Faculty members have reported that they and the students learn a great deal from each other in addition to the course material. Students average two hours a day on homework assignments, on-line lectures and chats, and course reading. They also attend one-week sessions on the Manhattan campus twice a year to meet with faculty, give presentations, and attend guest lectures given by leading agribusiness professionals. After the courses are completed, students spend about six months on a company-related research project that is conducted under guidance of department faculty members. The first class will graduate in May 2000. This course is part of the K-State College of Agriculture and not K-State Research and Extension, which are separate institutions, but the work of both overlap—many of the professionals graduating with the Master in Agribusiness degree will work with professionals in K-State Research and Extension.

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CONNECTED TO COUNTRIES WORLDWIDE

K-State Research and Extension faculty and administrators have had contact with nearly every country in the world through its many programs, projects, consulting activities, alumni, and friends. Here are countries that have had connections over the past two decades to K-State Research and Extension.



Barbados	1		
Belgium	1		
Belize	1		
Brazil	93		
Bulgaria	1		
Cameroon	3		
China	38		
Columbia	41		
Costa Rica	2		
Czech Republic	2		
Dominican Republic	1		
Ecuador	2		
Egypt	8		
El Salvador	1		
Greece	1		
Grenada	1		
Guatemala	1		
Haiti	1		
Honduras	2		
Hong Kong	2		
Hungary	3		
Indonesia	3		
Jamaica	7		
Japan	37		
Korea	16		
Latin America	72		
		Malaysia	11
		Mexico	38
		Morocco	5
		Netherlands	1
		Nigeria	4
		Panama	3
		Peru	1
		Poland	5
		Russia	4
		Saudi Arabia	1
		Singapore	2
		Slovakia	1
		Slovenia	7
		Spain	1
		Sri Lanka	2
		Taiwan	24
		Trinidad	3
		Turkey	75
		USA	12
		Venezuela	8
		Yugoslavia	32
		Total	586

WANT TO KNOW MORE?

K-Staters who can provide more information on topics in this report.

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This report was prepared by the K-State Department of Communications.

Senate and House Agriculture Committees
Wednesday, January 12, 2000

KDA Presentation with KSU Research and Extension
Teamwork and Collaboration in Kansas

On many occasions, K-State has provided the Department with the technical expertise necessary to successfully implement our regulatory mission. K-State research and technical expertise combine with the experience and know-how of KDA employees to enable the agency to regulate in a reasonable, common sense manner. In short, KSU provides a solid foundation from which to build.

Examples of this cooperation and assistance include:

- Swine nutrient management regulations
- HACCP implementation
- Crop profiles
- Blue River water quality protection programs
- Water quality best management practices
- Special pesticides registration
- TMDL agricultural working group

KSU is also a “technical bargain.” Their staff provide needed service at reasonable cost to the Department and, many times, the regulated community. This morning, I would like to focus specifically on our cooperative efforts with HACCP implementation and FQPA.

Meat & Poultry Program - Implementation of HACCP

Over two fiscal years, KDA used state funds to contract with a post-doctoral student from the KSU Animal Science Department (Kelly Karr Getty). She focused on helping Kansas locker plants and KDA meet the federally mandated HACCP requirements. (FY 1999 - \$55K and FY2000 - \$59K.)

KSU provided HACCP industry training to KDA Meat & Poultry veterinarians and field supervisors at an estimated cost savings to KDA of \$13,500. Very few state programs provide industry training to regulatory staff—even USDA has not. However, we believe it is vital because it allows our supervisors to give better and more consistent advice about HACCP to the locker plants. (Industry also had encouraged us to include this training for our inspectors.)

KSU provided low-cost and convenient HACCP training to the industry on five occasions. The 130 industry participants saved about \$20,000 in training fees—they essentially received training at half-price, when compared to the cost of similar available training.

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KSU provided one-on-one consulting assistance to 11 plants for HACCP implementation plans, saving these plants a minimum of \$16,500 in consulting fees—and perhaps two to three times this amount, had the service been obtained elsewhere. This service was available to all Kansas state-inspected plants. Overall, KSU reviewed 63 plans benefitting 17 plants.

KSU provided HACCP regulatory training for 60 KDA inspectors in-state at KSU facilities that resulted in significant savings of time, travel and meeting space cost to the department.

KSU participated in a regulatory review panel with KDA at the Kansas Meat Processors Association annual meeting last year to answer questions and discuss HACCP-related issues.

KDA is planning to continue the contract with KSU through December 31, 2000, to provide assistance to locker plants who must perform a one-year reassessment of the effectiveness of HACCP plans. We envision this assistance giving plants the tools they need to perform future annual HACCP plan review.

Food Quality Protection Act (FQPA) Implementation

The Food Quality Protection Act (FQPA) requires EPA to reassess all registered pesticides and develop tolerances under a new standard called “reasonable certainty of no harm.” Risk assessments are the tool EPA is using to meet this requirement. However, Kansas discovered that EPA was not only basing decisions on limited data, they were also using crop profiles that frequently did not reflect Midwestern agriculture or dominant production sectors (e.g., the wheat profile was based on Louisiana production).

Given this, the Department contracted the services of an Extension Associate (Sorkel Kadir) from the K-State Agronomy Department to prepare realistic profiles for Kansas crops. KDA used FY 1999 year-end savings for the 16-month contract. None of the \$100,000 in fertilizer fees you authorized last year for pesticide surveys was used for this project.

Crop profiles are complete for wheat and corn. They have been submitted for inclusion in the EPA databases and websites. A crop profile for grain sorghum is nearly complete and one for soybeans is undergoing scientific review. Profiles for alfalfa, cattle and horticulture/turf are beginning.

Dr. Tom Warner of the KSU Horticulture Department is also assisting KDA/Kansas Agricultural Statistics with the horticulture/turf survey scheduled to begin May 2000.

We appreciate the opportunity to update the Committee on our cooperative efforts. I will stand for any questions you may have at the appropriate time.



State Conservation Commission


109 SW 9th Street
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Telephone: (785) 296-3600 • Fax (785) 296-6172



Memorandum

To: Senate Agriculture Committee
House Agriculture Committee

From: Tracy Streeter, Executive Director 

Date: January 12, 2000

Re: Collaborative Activities with Kansas State University

Joint activities between Kansas State University and the State Conservation Commission existed as early as 1937 when the State Conservation Committee was created by the Kansas Legislature. At that time, the University provided office facilities and a staff person in Manhattan to assist the Committee in the formation of conservation districts across the state. Current state law provides for KSU to have two ex-officio members on the State Conservation Commission, representing the Experiment Station and Research and Extension.

Over the years, KSU and SCC have worked together on a number of research issues aimed mainly at solving water quality and water quantity problems. Since the inception of the Governor's Water Quality Initiative and subsequent Buffer Initiative, the collaboration has been even more pronounced. Below are examples of projects involving both KSU and the Commission:

1. Mission Lake Atrazine - KSU provided Best Management Practice (BMP) research and the Brown County Extension Agent took the lead in communicating with landowners in the lake's watershed. The State Conservation Commission provided incentive payments to landowners to adopt the BMP's. As a result, participation levels were very high and atrazine levels in the lake have been reduced.
2. Upper Black Vermillion Dairy - KSU Research and Extension engineers and County Agent worked with a cluster of dairy producers on waste management issues. The Commission, local conservation districts and NRCS provided cost-share assistance to install the needed practices.

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3. The Governor's Buffer Initiative contains an information and education element in which Research and Extension and KCARE took a leadership role in providing materials and hosting meetings with landowners in the targeted areas. This effort is ongoing with buffer contracts being written as we speak.
4. Total Maximum Daily Load Implementation - The State Conservation Commission and KSU have been given roles in the implementation of TMDL's. Both entities have been active with the Kansas Agriculture TMDL Working Group, a coalition of Ag organizations providing information to its members. The Commission and KSU role in TMDL's will be similar to those described previously.
5. Fecal Coliform Bacteria Study - KSU is currently researching the effect of various practices in reducing fecal coliform bacteria runoff. The study is looking at sources of this prevalent NPS pollutant and the effect of various BMP's. The results of this study will be critical to the targeting of funding and practices involved in the implementation of TMDL's.

In closing the State Conservation Commission has enjoyed a very positive relationship with Kansas State University and I will be happy to respond to questions.



KANSAS
DEPARTMENT OF HEALTH & ENVIRONMENT
BILL GRAVES, GOVERNOR
Clyde D. Graeber, Secretary

**Testimony presented to
Senate Agriculture Committee**

by

**Kansas Department of Health and Environment
Bureau of Consumer Health
Stephen N. Paige, Director**

Title: Cooperative Endeavors With Kansas State University Promoting Food Protection

Mr. Chairman and members of the Committee. Thank you for the opportunity to appear today to mention some of our cooperative endeavors with Kansas State University promoting food protection in Kansas.

Food protection is a shared responsibility between industry, regulatory agencies, academia and the consumer. Each plays an important role in contributing to a safe, global, food protection system. The role of industry is to produce safe products that meet, and routinely exceed, minimum science based standards established by regulatory agencies. Academia provides the mechanism for providing educational information regarding food safety to industry and consumers as well. Consumers contribute by learning and applying basic food safety rules in their home kitchens.

Early in my career with the Kansas Department of Health and Environment, I recognized the importance of partnering with KSU Extension as a technical resource and as a means of promoting understanding and compliance with our food safety standards. We have collaborated

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in standards development. When KSU Extension staff served as a member of the Secretary's Food Code Review Task Force. The result of that group's consensus was adoption of the FDA 1999 Food Code by the Secretary in August of last year.

With the standards in place, we looked to KSU as a means of educating the industry regarding the new standards. September is National Food Safety Month. KSU's network of Extension Agents participated in many food safety seminars, in 23 counties targeting 2,585 food service workers and helping to disseminate information on the new Food Code through out the state.

Every two years the National Conference for Food Protection is convened. This conference is the forum where industry and regulators come together to provide input to the FDA regarding Food Code standards. The conference is typically out of state limiting attendance by Kansans. While attending one of these conferences, I thought a Kansas Conference for Food Protection would provide a similar forum for open discussion of food protection issues. Again, KSU Extension was there to co-sponsor the conference and chair the Education Council at each of the Kansas conferences held in 1997 and 1999.

In 1998, The Kansas Health Foundation awarded a Handwashing Education grant to the KDHE. The purpose of the grant is to instill life long behavior changes regarding handwashing as an intervention in disease transmission. KSU Extension was an obvious source for disseminating information regarding the need for proper handwashing. The target audience of the grant is preschoolers and food service workers.

Probably our most effective partnership has been centered around ServSafe, an educational program for food service personnel. KSU Extension initiated offering ServSafe classes to food service managers at the county level in 1993. Our KDHE Food and Drug

Inspectors were certified. . what was possibly the first class taught away from the KSU Campus in April that year. Since that time, KDHE Food Protection staff has participated with Extension Agents in presenting dozens of presentations regarding food protection standards and HACCP. This cooperation has also been extended to the local health departments contracting with KDHE for inspection services. Through these classes offered by the Extension Service, hundreds of food service workers and managers have received first rate food protection training.

Thank you for letting me appear today and thanks also to Dean, Marc Johnson and his creative Extension staff. I look forward to working with KSU faculty and staff in the future. Mr. Chairman, I will be happy to address any questions you may have.