FY2003

Annual Report of Accomplishments and Results

Kentucky

University of Kentucky
Kentucky State University

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Cooperative Extension Service (1862)
Agricultural Experiment Station (1862)
Cooperative Extension Program (1890)
Agricultural Research Programs (1890)

Accomplishments and Results for CSREES Goal 1

Goal 1

An agricultural system that is highly competitive in the global economy. Through research and education, empower the agricultural system with knowledge that will improve competitiveness in domestic production, processing, and marketing.

Overview

The Kentucky Cooperative Extension Service made 1,038,249 contacts (including duplications) with clientele related to improving production, processing, and marketing. Additionally, 253,409 contacts were made with clientele related to the adoption of resource management technologies. 307,461 contacts were related to home gardening and landscape. Kentucky State University's Small Farm Program made 14,318 contacts with limited resource farmers. Twenty-nine percent of these contacts were with women.

These efforts resulted in 22,166 farmers adopting one or more production practices recommended by Extension. Adoption of these practices resulted in $22,097,171 of additional profits to farmers. 10,662 producers utilized new marketing opportunities while 31,535 Kentuckians learned about the impact public policy on agriculture and the environment.

The Kentucky Agricultural Experiment station conducted 71 projects related to this goal. These projects focused on such topics as developing and understanding of the genomic control of plant productivity, quality traits and adaptability of agricultural products, understanding the forage-animal interface, addressing mechanisms of transmission and incidence of the West Nile Virus, and the role of the Eastern Tent Caterpillar in Mare Reproductive Loss Syndrome (MRLS).

External funds to support research within the University of Kentucky College of Agriculture have increased 70 percent over 2001. More than $4 million of this extramural support was secured by faculty who have a primary appointment to Extension.

Small farm diversification and the search for alternative crops or new uses of existing crops remains the central focus of the research conducted at Kentucky State University. Kentucky State University currently supports six research projects. This report features a project which focuses on clonal propagation and preservation of pawpaw germplasm.

Expenditures	Federal Extension Funds (UK)	$2,077,380
	Federal Extension Funds (KSU)	$425,000
	Federal Research Funds (UK)	$2,578,954
	Federal Research Funds (KSU)	$616,194

FTEs	Extension (UK)	155.0
	Extension (KSU)	12.5
	Research (UK)	53.5
	Research (KSU)	10.0

Key Theme – Agricultural Profitability

The purpose of the AIM program is to encourage the formation of local alliances or cooperatives to enable producers to lower input costs of production and create a greater demand for their product. The goal is to provide producers with information to help them organize and develop collective production and marketing plans. The AIM concept encourages producers to form a county- or area-based alliance. Currently, three AIM alliances are functioning in Kentucky. Together they encompass 187 producers who own approximately 12,000 cows. Purchased costs of these products were from 20-30% lower than available over the counter. Financial analyses have indicated that production costs were reduced **$45 per cow** in the first year alone. Cooperative marketing efforts have also been successful. Feeder calf sales have generated a $5-12 / cwt. premium over other cattle sold in Kentucky that same day. The cooperative marketing has **increased net returns per cow by $28**. If revenues increase approximately $75 per cow, then AIM has increased profitability by approximately **$900,000**.

Source of Federal Funds: Smith-Lever
Scope of Impact: State Specific

Key Theme – Agricultural Profitability

Most small producers simply have neither the time nor the separate handling facilities to properly develop heifers. The Kentucky Heifer Development Program was designed to give both large and small beef producers the opportunity to develop their heifers by establishing regional heifer development centers. Currently, three heifer development centers have been established and over the past three years approximately 1600 heifers have been developed. The first heifer development center established was the Eastern Kentucky Heifer Development Center (EKHDC). The EKHDC has developed 925 heifers since its inception. The EKHDC's first three sales have been successes as the heifers averaged $687, $870, and $890 in the first, second, and third year, respectively. The added value to each heifer sold ranged from $100-250 so the economic impact of this center ranged from **$92,500 to $231,250**. The total economic impact of KHDP ranges from **$160,000 to $400,000**. Over the last 4 years, five additional sales have been developed. In 2000 alone, approximately 1,500 heifers were marketed in 6 promoted heifer development sales in Kentucky. All heifers in these sales were developed under guidelines established by myself and other personnel of the Beef Extension Group. Heifers in these sales averaged approximately $940 and sale averages ranged from $850-$1,065. Producers in these sales likely increased their profitability by $100-250 per head. Thus, the economic impact of heifer development sales in Kentucky this year was approximately **$1.41 million** and profitability on these operations likely increased about **$300,000**.

Source of Federal Funds: Smith-Lever
Scope of Impact: State Specific

Key Theme – Agricultural Competitiveness

A key to the long-term economic viability of independent pork producers is maintaining access to market space. To address this issue, Swine Specialists with Kentucky Cooperative Extension Service have provided assistance and leadership to a group of independent producers in the Central Kentucky area in the development and implementation of a marketing cooperative. The size of operation for producers in the cooperative ranges from 50-600 sows. Programs and projects targeting improved genetics have resulted in added carcass premiums of about $5 per pig for the approximately 25,000 pigs marketed annually. The nutritional program that is tailored specifically for these producers has lowered feed costs by close to $5 per ton. Taken together, these programs have resulted in a total economic impact of approximately $180,000 for producers in the marketing cooperative. To help with targeting specific markets with their pork, present programs and educational efforts are helping these producers move towards antibiotic-free pork production.

Source of Federal Funds: Smith-Lever
Scope of Impact: State Specific

Key Theme – Agricultural Profitability

In 2003, 31 sales were conducted at 13 locations across Kentucky for calves which had met the CPH-45 health requirements. Approximately 30,000 feeder calves were marketed in these sales, receiving an average premium of $7.27 per hundredweight over the average sale prices reported by the KDA. Using a partial budget to account for the increased value of calves less costs (feed, vet cost, interest, and initial value of calves), the net income realized per head was $77.49. When this is multiplied by 30,000 head, the net increase is **$2,324,700** for 2003 for Kentucky farmers. By retaining ownership of these feeder calves for additional time in Kentucky, there is also an increased business for veterinarians, farm supply stores and stockyards.

Source of Federal Funds: Smith-Lever
Scope of Impact: State Specific

Key Theme – Animal Production Efficiency

An adequate labor force has become a major issue for swine operations. Swine producers are exploring ways to reduce labor needs without sacrificing pig performance. To help address this need, Swine Specialists with Kentucky Cooperative Extension Service have begun evaluating swine finishing facilities designed to house pigs in groups of 500 head (finishing pigs have traditionally been penned in groups of 20-30 head per pen) in a commercial operation. In conjunction with the large pen design, the effectiveness of an electronic sorting scale has also been evaluated. These evaluations have looked at the optimal penning and gating designs, feeder and waterer space needs, and protocols for training pigs to utilize the electronic sorting scale. Results to date have shown that pigs can be grown in pens housing very large group sizes without reductions in performance. Also, the use of the electronic sorting scale to sort those

animals that have reached market weight significantly reduces the labor needed to sort and load pigs at the end of the feeding period.

Source of Federal Funds: Smith-Lever
Scope of Impact: State Specific

Key Theme – Agricultural Profitability

Kentucky continues to diversify its agricultural base in response to recent changes in the tobacco economy. Although income from tobacco has stabilized somewhat in recent years, the current economic environment provides a major financial challenge to thousands of small family farms across the state. In response to the current situation, farmers, farm group leaders, health group officials, policymakers, and educators are working together across the tobacco growing regions for a tobacco quota buyout which provides economic relief for existing tobacco quota owners and growers to exit the industry, while modifying the current tobacco policy to enable expanded market opportunities for those who chose to remain. Economic analysis is important in identifying likely consequences of various policy options within or outside a buyout and to assist tobacco farmers with various diversification and investment options from potential buyout proceeds.

Source of Federal Funds: Smith-Lever
Scope of Impact: State Specific

Key Theme – Precision Agriculture

With the development of the Global Positioning System and its implementation into agriculture, farmers are now able to use Site-Specific Information in Site-Specific Management. With the introduction of Variable-Rate Technology, farmers have the capability to decrease input costs, increase output or both. Due to the substantial costs associated with this variable-rate technology, not all farmers can justify purchasing the equipment, therefore relying on agribusiness firms to provide precision farming services to them. Based on capital expenditures, fixed and variable costs, varying farm size, and pricing strategies, a study is being conducted to determine the feasibility of operating such an agribusiness. We are attempting to determine if an agribusiness providing precision farming services in Kentucky could make a profit.

Source of Federal Funds: Hatch
Scope of Impact: State Specific

Key Theme – Adding Value to New and Old Agricultural Products

Methanethiol and dimethyl trisulfide are major contributors to the undesirable flavor of soybean protein products. This project is designed to elucidate the post-harvest mechanisms by which these odorants are synthesized so that methods can be devised to minimize their occurrence. Soybeans are the second largest food-crop grown in the US, with about 3 billion bushels produced in 2001. Only a small percentage of soy proteins are used in human foods. The ability to produce soy protein products with improved flavor characteristics would provide

several benefits. A better tasting soy protein would have added-value because it would be more desirable to humans. Increased consumption of soy protein by humans would likely contribute to a healthier population. Also, if for any reason the supply of animal proteins could not meet the demand, soy proteins with improved flavor could be a suitable alternative.

Source of Federal Funds: Hatch
Scope of Impact: State Specific

Key Theme – Agricultural Profitability

The Kentucky Master Cattleman Program is an integral part of the comprehensive effort underway to replace diminishing tobacco revenue by improving Kentucky's expanding beef-forage operations. It is a collaborative effort of the University of Kentucky College of Agriculture, Kentucky Cattlemen's Association, and Kentucky Beef Network. The program consists of 10 4-hour sessions that focus on Management Skills, Forages, Nutrition, Facilities and Animal Behavior, Environmental Stewardship and Industry Issues, Genetics, Reproduction, Herd Health, End Product, and Marketing and Profitability. Each session is developed by subject matter specialists from the University of Kentucky, who either deliver the program or train other extension personnel. Since its start in 2000, the program has reached over 1000 beef cattle producers in 101 Kentucky counties. In 2003, the program consisted of 15 groups attending 150 county sessions and 3 field days. Five hundred and eleven beef producers participated and 440 completed 8 of the ten sessions. The economic impact of this training can be substantial. Previously, about 75% of beef cows in Kentucky, which are exposed to breeding, wean a calf. Top producing herds should attain a 90% calf crop through proper management. Improving sire selection and culling poor-producing cows can increase the quality and value of the calf crop. Proper weaning and vaccination of calves, along with group marketing like CPH sales, can increase income from feeder calves. Efficient use of pastures and home-raised forages can have a dramatic effect on lowering production cost and raising our level of efficiency. Implementation of existing technology (such as implants, dewormers, feed additives, etc.) can add to producer income. Master Cattleman participants in 2003 indicated that they owned an average of 102 cows each. With 500 participants that is a total of 51,000 cows which were impacted in one year. Economic analyses revealed that the program resulted in more than **$6,000,000 in economic benefits to producers.**

Source of Federal Funds: Smith-Lever
Scope of Impact: State Specific

Key Theme – Adding Value to New and Old Agricultural Products

Research conducted was a combination of studies contributing to both the W-181 Multistate Project, "Modifying Milk Fat Composition for Improved Manufacturing Qualities and Consumer Acceptability" and the NC-119 Multistate Project, "Management Systems for Improved Decision Making and Profitability of Dairy Herds." A project was conducted to evaluate the effects on health and performance of dairy cows of long-term feeding (150 days) of a diet designed to enhance the concentration of conjugated linoleic acid (CLA) in milk. Conjugated linoleic acid is a fatty acid involved in inhibition of cancer. A concurrent study was

conducted to evaluate the effects of feeding milk containing elevated concentrations of CLA on health and performance of dairy calves. Results indicate that long-term production of enhanced CLA dairy products is a viable option without adverse effects on health or performance of dairy cows. Additionally, feeding milk with enhanced CLA concentrations did not adversely affect health and performance of calves. These studies provided essential information for Kentucky dairy producers who want to be able to take advantage of potential niche markets in CLA enhanced dairy products.

Source of Federal Funds: Hatch
Scope of Impact: Multi-State

Key Theme – Adding Value to New and Old Agricultural Products

Lipid and color oxidation are major causes of quality deterioration in meat products during storage, costing the industry over $700 million annually. These reactions lead to off-flavor, discoloration, and loss of nutritive value, ultimately decreasing consumer confidence in the product. The University of Kentucky Muscle Foods Lab has begun to enhance meat product quality and shelf life through the use of natural antioxidants, such as honey or olive pulp extract. Not only are these natural antioxidants viewed favorably by consumers, but they also effectively offset many negative qualities of oxidation. Studies show that honey could delay off-flavor development in pre-cooked meat products, a sector of industry seeing enormous growth. In fact, a local value-added meat company is considering the addition of small amounts of honey to their broiled beef patties, thereby decreasing product wastage and consumer dissatisfaction.

Source of Federal Funds: Hatch
Scope of Impact: State Specific

Key Theme – Precision Agriculture

Funding was secured to create a mobile training lab for Global Positioning System (GPS) and Geographic Information System (GIS) technologies. Trainings have been conducted for various audiences including Government and Utility Officials, County Agents, Farmers, and College, High School, and Middle School students, as well as 4-H Youth Development programs. Applications of these technologies range from production agriculture ("precision agriculture") to land use planning, zoning and permitting. The College's GIS instructor provides training for the entire state.

Source of Federal Funds: Smith-Lever
Scope of Impact: State Specific

Key Theme – Plant Production Efficiency

In 2003, 66 counties were approved to participate in the Kentucky Agricultural Development Board's model program for hay, straw, and commodity storage. County boards committed over $7.4 million and participating farmers agreed to match that amount with an additional $7.4 million to construct on-farm storage facilities. Extension engineers from the

Biosystems and Agricultural Engineering Department worked with county extension agents and other college faculty to develop a package of educational materials that would provide planning and construction guidance for program participants. Teaching presentations were developed and a web page (http://www.bae.uky.edu/ext/HayStorage/) was created to help provide quick and easy access to the materials. As counties learned about the program, requests for information about planning, designing, and constructing storage structures escalated rapidly. During the year we provided training programs for approximately 30 county extension agents and educational programs in 26 counties for over 1,100 producers who are building storage structures on their farms. Upon completion of their projects, those producers will be able to realize a savings of over $1,000,000 per year as a result of reduced storage losses.

Source of Federal Funds: Smith-Lever
Scope of Impact: State Specific

Key Theme - Biofuels

Corn stover is a potential feedstock for the production of fuels and chemicals. Annually it is estimated that 2.8 ton/acre of stover could be removed that would generate additional farm revenue of $70/acre. Experiments have been conducted to characterize corn stover and have determined that the leaves, husks, and cobs are the most valuable components for the production of fermentable sugars. Re-engineering of combines to allow for the collection of the leaves, husks, and cobs during grain harvest has been accomplished; this should decrease costs of corn stover collection, and reduce negative environmental impacts from soil erosion by leaving less valuable plant components in the field. It is expected that the research will decrease the collection cost by 40% relative to existing operations and increase the value of the corn stover by 20% by increasing the sugar concentration.

Source of Federal Funds: Hatch
Scope of Impact: Multi-State

Key Theme – Biobased Products

Scientists from the Department of Biosystems and Agricultural Engineering and the Center for Applied Energy Research are currently working on a biomass conversion project. The thermochemical conversion of agricultural and forestry biomass into value-added chemicals and materials holds great promise for improving industrial sustainability and increasing markets available for US crop producers. This project investigates the conversion of biomass to value-added chemicals and materials by catalyst moderated liquefaction (CML). In CML, a heavy solvent is utilized to directly convert biomass to liquid products, gases, and solid chars without the need for hydrogen overpressure at conditions which favor the formation of heavy products such as pitch. Several catalysis systems are being considered in an effort to optimize biomass conversion and solvent recovery, while producing a variety of chemicals and materials.

Source of Federal Funds: Hatch
Scope of Impact: State-Specific

Key Theme - Plant Genomics

Using mutant screens of tomato and *Arabidopsis,* a series of mutations were discovered in tomato that have uncovered communication between the embryo/endosperm and the testa. One of the pleiotropic effects of the mutation in tomato is a larger seed size. An unrelated mutant screen using activation tagged lines of *Arabidopsis* has recovered mutants that complete germination in cold conditions faster than wild type seeds. Two of these mutations also result in larger than normal seedling size. Both of these discoveries are of practical use in increasing seed size in one instance and increasing the size and therefore, competitive ability, of the seedling in the other.

Source of Federal Funds: Hatch
Scope of Impact: State-Specific

Key Theme - Plant Production Efficiency

The earliest stage of apple fruit development, termed fruit set, is the least studied and yet the most critical for defining crop yield and quality. A key event during apple fruit set is a natural fruit drop phase that is often manipulated to balance total yield with fruit quality. We have discovered that activity of the key enzyme sorbitol dehydrogenase reaches a maximum within 2 weeks after growth starts, and then declines at a time just preceding the drop phase, suggesting a decline in a fruit's ability to acquire sorbitol may result in cessation of growth and eventual drop.

Source of Federal Funds: Hatch
Scope of Impact: State-Specific

Key Theme – Alternative/Diversified Agriculture

One of the fastest growing crops in Kentucky is blueberries. There are currently 65 farms with 42 acres of blueberries in production. Blueberries currently net Kentucky producers $3,500/acre. This currently represents about $126,000 dollars in net income to Kentucky farmers and the value will increase rapidly over the next 4-5 years as young plantings come into production. Data from two Robinson Station plantings are providing new growers with information needed to make investment decisions. Fruit from these plantings also provided agricultural economists with a product for evaluating container preferences (type, size) at the Lexington Farmers Market. It also provided information on consumer demand and pricing of Kentucky blueberries.

Source of Federal Funds: Smith-Lever
Scope of Impact: State Specific

Key Theme - Plant Genomics

Bean pod mottle virus (BPMV) is an economically important pathogen of soybean. A recent increase in the incidence of BPMV in many Southeastern and North Central soybean-

growing regions has resulted in significant production problems. Investigations demonstrated the occurrence of two distinct subgroups of BPMV that can be distinguished upon nucleic acid hybridization and nucleotide analyses. Several naturally occurring reassortants and recombinants between subgroups I and II were identified. The reassortant strains so far examined induced severe symptoms on soybean, whereas strains in either subgroup induced only mild or moderate symptoms. Presently, no commercially available soybeans are resistant to BPMV. It is therefore essential to unravel the extent of diversity among BPMV isolates and to gain an understanding of the molecular basis of symptom severity. Success in elucidating the nature of diversity among BPMV isolates and the genetic basis of symptom severity should allow development of soybeans with resistance to BPMV.

Source of Federal Funds: Hatch
Scope of Impact: State-Specific

Key Theme - Plant Genomics

Seed-transmissible endophytic fungi occur in several grasses, and produce metabolites responsible for protecting the grasses from drought and herbivory. Some metabolites, however, are detrimental to livestock. Others are antagonistic to insect pests. Approximately 180,000 basepairs of sequence was determined in four regions of endophyte genomes rich in genes for synthesis of anti-livestock and anti-insect metabolites. A cluster of nine genes was identified as likely to control production of the anti-insect loline alkaloids. In research on anti-livestock ergot alkaloids, the gene for the first step in ergot alkaloid biosynthesis was identified. Two alleles of the gene were found in the tall fescue endophyte; one was eliminated in an effort to engineer a livestock-friendly endophyte. Removal of the ergot alkaloids could alleviate the 600 million dollar annual loss to the beef industry, and likewise benefit other livestock enterprises. Loline alkaloid production genes may be introduced into plants to enhance insect resistance.

Source of Federal Funds: Hatch
Scope of Impact: State-Specific

Key Theme – Animal Genomics

The success of this program attests to the value of using comparative mapping strategies for mapping the horse genome. Physical mapping of genes has shown that the location of genes in horses could be predicted by projected homologies between horse and human genome structure. The DNA sequences for TCRB and the distribution of sequences and gene families were similar to what has been observed in humans. However, differences between the species were instructive. There may be fewer germline horse TCRB variable genes than occur in humans or mice. This may result in a decreased ability of horse T-lymphocytes to respond to antigens. However, the deficit in V genes is compensated for by a slight increase in the number of joining genes (D and J). Finally, and most importantly, gene arrays for humans and pigs were found to be useful for studying gene expression in horses. Results to date support the use of functional genomics (using gene sequences to investigate gene expression) to identify genes that encode important traits for horses and to investigate gene expression.

Source of Federal Funds: Hatch
Scope of Impact: Multi-State

Key Theme – Animal Health

Studies of the cellular responses to influenza infection of the horse will contribute to developing a solution to the problems of equine viral diseases in horses. Viral diseases, especially equine influenza, are widely recognized as the leading cause of acute infectious respiratory disease in horses. Emergent viral pathogens such as West Nile virus can significantly impact the economic wellbeing of the equine industry in Kentucky, freely regarded as the horse capital of North America. Greater understanding of the molecular mechanisms underlying the pathogenesis of these diseases is critical to achieving more rapid progress towards their control.

Source of Federal Funds: Hatch
Scope of Impact: State-Specific

Key Theme – Animal Health

Equine protozoal myeloencephalitis (EPM), a serious neurologic disease of horses, is exceedingly difficult to prevent, diagnose, and control because of a lack of information on the molecular biology of *Sarcocystis neurona*, the primary cause of EPM. A large-scale DNA sequencing project on *S. neurona* is in progress, which should produce 15000+ partial gene sequences from this parasite. Using this gene database, several molecules have already been identified that likely serve as virulence factors in *S. neurona*. Four are major surface proteins and two secreted proteins. The biological characteristics of these potential virulence factors are currently being investigated. In collaboration with investigators at The Ohio State University, immune responses to these parasite proteins are being examined in *S. neurona*-infected horses. The aim is to develop improved diagnostic assays for EPM and hopefully, a safe and more protective vaccine against the disease.

Source of Federal Funds: Hatch
Scope of Impact: Multi-State

Key Theme – Plant Germplasm

Pawpaw is a potential alternative fruit crop for tobacco farmers in the southeastern United States. Difficulties in clonally propagating superior pawpaw varieties true to type have been a major factor limiting development of a commercial pawpaw industry. Mound, trench, and pot-in-pot layering methods were compared with and without girdling and auxin application applied to shoots as clonal propagation systems for pawpaw varieties. Both trench and pot-in-pot layering methods yielded about a 10-fold increase in the number of rooted plants compared to mound layering. Trench and pot-in-pot layering methods will be utilized by the nursery industry and farmers as methods to clonally propagate pawpaw varieties. Pawpaw varieties clonally propagated via trench and pot-in-pot layering methods will assist farmers by ensuring in the production of pawpaw of high quality fruit, increasing uniformity of plantings, and

shortening time to flowering and fruiting. Pawpaw plantings have been established in at least 10 states. The clonal propagation methods developed will result in additional pawpaw plantings.

Source of Federal Funds: 1890 Capacity Building
Scope of Impact: Regional Research

Key Theme – Agricultural Competitiveness

Kentucky State University's ongoing Small Farm Program works annually with limited resource small farmers in the areas of new enterprise development, farm production practices, sustainable agriculture systems, budgeting, record-keeping, the use of USDA agencies, farm safety, and marketing, including alternative marketing systems. Currently, 200 families will receive one-on-one assistance in these areas, plus many more are reached through meetings, field days, and statewide activities. Historically, families enrolled in the Small Farm Program have increased their gross farm income while reducing their input costs. The Small Farm Program has been involved in the development of the Trigg County Farmers Market, the Breckinridge Graded Cattle Markets, and expansion of Cumberland Farm Products, Inc.

Source of Federal Funds: Smith-Lever
Scope of Impact: State Specific

Key Theme – Risk Management

Small Farmer Risk Management Education projects conducted by Kentucky State University provide educational resources for low literacy farmers. These projects target sustainable production and marketing systems, farm management, record-keeping, financial management, marketing, insurance needs, and goat and beef cattle production and marketing systems. One project focuses on retirement planning options and estate planning for farm families. These projects are sponsored through competitive projects with USDA-Risk Management Agency's Outreach, Education, and Under Served Commodities Programs and the USDA-CSREES Southern Region Risk Management Education Center.

Source of Federal Funds: Other Federal
Scope of Impact: State Specific

Key Theme – Apiculture

Kentucky farmers are planting more crops which require honey bee pollination. In response, Kentucky State University has played an instrumental role in the creation of the Kentucky State Honey Bee Pollination Association. This is the first time that Kentucky beekeepers have been organized to offer a professional pollination service for the crop growers of Kentucky. KSU also makes trailers available the local beekeeping associations for transporting bee hives to fields which require honey bee pollination. KSU also offers workshops to both crop growers and beekeepers on the importance of honey bees for crop pollination in the state of Kentucky. Increased crop pollination by honey bees will result in higher grade fruits and vegetables being produced. This in turn will increase the size of the Beekeeping industry,

creating more employment opportunities for Kentuckians. In 2004, Kentucky State University will distribute a questionnaire to extension agents in Kentucky to gather baseline information regarding honey bee pollination within Kentucky. This data will enable the Kentucky beekeepers anticipate the needs of crop growers and there for be able to considerably add to the increase, and improved the quality of crops grown by Kentucky crop farmers.

Source of Federal Funds: Smith-Lever
Scope of Impact: State Specific

Accomplishments and Results for CSREES Goal 2

Goal 2

A safe, secure, food & fiber system. To ensure an adequate food and fiber supply and food safety through improved science based detection, surveillance, prevention and education.

Overview

Despite the fact that America's food supply is the safest in the world, foodborne illness remains one of the greatest food safety threats. The annual cost of foodborne illness to our economy is estimated at over $10 billion. Consumers continue to display misconceptions about food safety. In a 1998 survey, only 55 percent of consumers perceived unsanitary handling, processing, or preparation of foods as a threat. Yet, the Centers for Disease Control and Prevention reports that 97 percent of foodborne illness could be prevented with good personal hygiene and improved food handling techniques.

During the past year, the 41,822 individuals indicated that they gained knowledge related to safe storage, handling, and preparation. Of these, 34,743 (or 83%) put what they learned into practice. In addition, 28,512 people adopted practices to increase access to food or make it more affordable.

The Kentucky Agricultural Experiment Station enhanced research efforts in pre- and post harvest food safety and quality. An antibiotic-free swine herd has been maintained for 30 years and has allowed researchers to study the nature of development of antibiotic resistance. In partnership with Extension, a value-added incubator allows application of research findings to small meat processors. Research also investigates the effects of diet on mechanism that control cardiovascular health.

Kentucky State University research projects discussed under Goal 2 in the FY00-04 Plan of Work are now reported on under Goal 3 and Goal 4.

Expenditures	Federal Extension Funds (UK)	$624,775
	Federal Extension Funds (KSU)	$102,000
	Federal Research Funds (UK)	$578,949
	Federal Research Funds (KSU)	N/A
FTEs	Extension (UK)	47.0
	Extension (KSU)	.5
	Research (UK)	4.5
	Research (KSU)	N/A

Key Theme – Food Safety

An important issue of tremendous interest in this country involves the environmental impacts and safety to humans associated with the feeding of genetically enhanced crops to food producing animals. Recent studies at the University of Kentucky have shown that soybean meal made from herbicide tolerant soybeans (Roundup Ready) is equivalent in composition and nutritional value to conventional soybean meal, and the genetically altered DNA and specific protein that makes the soybeans tolerant to herbicides are not transferred into pork following consumption of the genetically enhanced soybean meal by pigs. Other studies have shown that pigs and chickens fed diets containing low-phytate feeds (corn and soybean meal) and supplemented with phytase excrete 70% less phosphorus into the environment than their counterparts fed conventional corn and soybean meal. Environmentally-friendly diets containing such genetically enhanced crops are completely safe for animals as well as for humans consuming meat, milk, and eggs from these animals.

Source of Federal Funds: Hatch, Smith-Lever
Scope of Impact: State Specific

Key Theme – Food Safety

Last year, the University of Kentucky offered six workshops for food processors from across the United States. The first workshop was entitled Meat Science 101 and was conducted in conjunction with the Research Chefs Association. This workshop attracted 49 research chefs from not only around the region but as far away as California, Florida and Ontario, Canada. Topics included value-added processing with additional emphasis on quality attributes of local produced meat products from Kentucky. The second workshop was with the Mid-State Meat Association (35 meat processors from Kentucky, Ohio, and Tennessee) who specialize in value-added processing. This workshop focused on topics from safety and marketing to consumer's demands for enhanced products. The next workshop held was for the National Country Ham Association (approximately one-half of the 44 members are Kentucky firms) with emphasis being placed on producing high quality products from beginning to the marketplace. Discussions included future value-added marketing initiatives. The last three workshops were food safety related, dealing with HACCP, Validation and Verification and Pathogen Intervention. Approximately 72 people attended these workshops which dealt with meeting USDA regulatory requirements.

Source of Federal Funds: Hatch, Smith-Lever
Scope of Impact: Multi-State Extension

Key Theme – Foodborne Pathogen Protection

Rapid assay technologies are important to the manufacturing, regulatory, and medical sectors globally. Currently, rapid assay technologies are growing at a rapid rate and many startup companies are enjoying rapid growth due to financial opportunities that such technologies afford. Rapid assays are a multi-billion dollar industry globally. If the development of novel

phage peptide technology is successful for a non-pathogenic organism (model system) then the technology should work as well for pathogenic organisms. If the assay can measure 102 bacteria/ml or less and each assay costs between $10 and $15 this rapid assay system should replace most PCR assays that require a greater preparation time and higher skilled technicians. The value of a bio-active probe that is specific for a pathogen and that could measure a pathogen concentration of 102 bacteria/ml within 30 min without interference from other bacteria would be worth $30 to $35 per assay. Currently, companies pay identification laboratories from $19 (negative test) to $30 (positive test) per assay for a standard plate assay that requires 7 days to complete. ELISA tests cost about $25 per test and require 24 to 48 hours. PCR tests cost approximately $30 per test and take at least 12 hours. The authors believe that bio-active probe tests would replace all PCR and ELISA tests currently being used by testing laboratories if assay times could be cut to 30 minutes.

Source of Federal Funds: Hatch
Scope of Impact: State Specific

Key Theme – Food Quality

Cheese processing efficiency and product consistency could be improved if the coagulation process could be controlled accurately. In cheese manufacturing the current practice requires manual selection of coagulum cutting time based on subjective evaluation of curd texture. An optical sensor was developed to measure light backscatter during enzymatic coagulation. The sensor in combination with an algorithm to interpret the data has been shown to accurately predict cutting time and thus automate this step. The cutting time prediction technology has been commercially tested and is currently being used by three cheese plants. Our currents research is focused on expanding the technology for monitoring curd shrinkage during the cooking process. The moisture content of cheese could be standardized if a sensor was capable of monitoring whey release from the curd. Control of curd moisture content would reduce the damage to cheese during ripening and improve its final quality. Concepts for monitoring syneresis in a vat are being developed and tested. Commercial interest in controlling the coagulation process remains high as this step has a significant impact on product moisture content, quality and processing efficiency. Cottage cheese and yogurt manufacturers have also expressed an interest in using the technology.

Source of Federal Funds: Hatch
Scope of Impact: State Specific

Key Theme – Food Safety

The future success of Kentucky's diversified agricultural economy is dependent on building stronger producer consumer relationships. Consumption of Kentucky farm and value added food products can result in increased profits for farmers and a positive economic and social impact on surrounding communities. Resource materials and county programs are offered that showcase locally grown products and encourage the consumer-producer link. The University of Kentucky Cooperative Extension Service (UKCES), Kentucky Department of Agriculture and Kentucky Cabinet for Health Services are partnering to support farm friendly

legislation. House Bill 391 allows Kentucky farmers who grow and harvest produce to process value-added products and sell them from designated farmers markets, certified roadside stands, and the processor's farm. Over 80 farmers will be selling low risk items such as jams, jellies, cakes and pies. But to sell acidified or low acid foods, farmers must attend a Home-based Microprocessor Workshop. UKCES has been instrumental in the development and delivery of workshop materials. Over 70 farmers have studied food safety, sanitation, and USDA-recommended home canning procedures.

Source of Federal Funds: Smith-Lever
Scope of Impact: State Specific

Key Theme – Food Resource Management

The Food Stamp Nutrition Education Program provided nutrition education for limited resource seniors, adults, youth, and children in Jefferson and Franklin Counties. Information was delivered through a variety of interactive methods in community based settings, preschool education centers, public schools, boys and girls clubs, senior houses and public housing developments. Enrolled participants received information on a monthly basis regarding the effective use of the Food Guide Pyramid, the Dietary Guidelines for Americans, food safety, and diet-related illnesses. Participants were provided pre and post intervention assessments to determine knowledge, skill level and behavior change. Over 56,000 Nutrition Education contacts were made with over 90 percent of program participants indicating knowledge gain and 65 % percent indicating a behavioral change resulting from their participation in the program.

Source of Federal Funds: Smith-Lever
Scope of Impact: Multi-State Extension

Accomplishments and Results for CSREES Goal 3

Goal 3

A healthy, well-nourished population. Through research and education on nutrition and development of more nutritious foods, enable people to make health promoting choices.

Overview

During the past year, the Kentucky Cooperative Extension Service made 157,688 contacts related to promoting healthy lifestyle practices. An additional 62,293 contacts related to helping Kentuckians know and understand the Food Guide Pyramid. Agents and specialists made 81,883 contacts related to injury reduction and 18,488 contacts related to the development of comprehensive health management systems. Extension collaborated with other organizations and agencies to co-sponsored 1,224 different events or activities which focused on comprehensive health maintenance.

These efforts resulted in 37,796 citizens making lifestyle changes for the purpose of improving their health. An additional 26,512 individuals implemented personal health protection practices appropriate for their life cycle stage (preventive health practices, participation in screening and detection opportunities, immunizations, etc.) and 25,445 people adopted at lease one new safety practice (bicycle helmets, fire extinguishers, tractor roll bars, radon testing, smoke detectors, proper ATV operation, etc.).

Human nutrition and health is a focus area of research and extension at Kentucky State University. Diet modifications, the use of functional foods to improve human health, and determine the effect of human exposure to pesticides are long range goals. Kentucky State University supports three research projects related to this goal. This report features a project related to the modulation of the metabolic effects of pesticide exposure in rats by toxic and essential metals.

Expenditures	Federal Extension Funds (UK)	$968,402
	Federal Extension Funds (KSU)	$105,000
	Federal Research Funds (UK)	$684,212
	Federal Research Funds (KSU)	$353,412
FTEs	Extension (UK)	72.0
	Extension (KSU)	6.5
	Research (UK)	4.0
	Research (KSU)	7.0

Key Theme - Nutricueticals

Kentuckians are experiencing a high incidence of nutrition-related health problems, such as obesity, cardiovascular disease, diabetes and hypertension. These and related health problems may be due in part to over-consumption of refined foods, and lack of protective nutrients such as antioxidants. Sufficient consumption of micronutrients, including minerals like zinc can provide effective protection against the harmful effects of refined high-calorie diets. Dietary zinc has potent antioxidant and anti-inflammatory properties. Our research suggests that diet-derived zinc can provide protection against cardiovascular diseases such as atherosclerosis by preventing metabolic and physiologic dysfunction of the vascular endothelium. Foods in the meat group (beef) contribute to about 50% of the zinc available in the daily food supply. Beef cattle operations are rapidly expanding in Kentucky, contributing significantly to the total economic impact. Our research contributes to a more positive nutrition message about beef, thus alleviating consumer confusion and uncertainty about beef-related diet and health advice.

Source of Federal Funds: Hatch, Smith-Lever
Scope of Impact: State Specific

Key Theme – Human Health

The Health Education through Extension Leadership (HEEL) Program developed county profiles and state mortality maps to illustrate the leading causes of death on a county, regional and state level. Cardiovascular disease is the leading cause of death in Kentucky, followed by cancer. In addition, one in every two adult Kentuckians is at increased risk for developing diabetes because of the risk factors of age, obesity and sedentary lifestyle. Lifestyle and behavioral risk factors contribute greatly to the onset of the chronic diseases that are the leading causes of death for Kentuckians. HEEL provided training, background information and partnership opportunities for field personnel in all 120 counties. County staff in 114 counties have been instrumental in the establishment of local health coalitions, partnering with other community agencies to address issues such as breast, cervical and other cancers, diabetes, nutrition and physical activity. As a result of these collaborative efforts over 1,224 joint health education programs have been offered, reaching over 77,600 Kentuckians.

Source of Federal Funds: Other Federal, Smith-Lever
Scope of Impact: State Specific

Key Theme – Human Health

Approximately 1 in 10 Kentucky adults have been diagnosed with diabetes. Type 2 diabetes, formerly seen only in adults, is now diagnosed in Kentucky's overweight children. Diabetes is more common among overweight adults, with an expected increase in prevalence as our population ages. Kentucky Extension Food & Nutrition programs partnered with the Kentucky Department for Public Health to sponsor training and resources for field personnel in all 120 Kentucky counties. *The Wildcat Way to Wellness ~ Control Your Diabetes for Life* was presented in 94 counties and *Dining with Diabetes* was presented in 82 counties, reaching an estimated 9,000 citizens. A live broadcast call-in show with a diabetes expert panel was hosted

on Kentucky Educational Television reaching an estimated 25,000 Kentuckians. The one hour show received over 300 calls from five states. Partnerships and education programs focused on the prevention and control of diabetes offer hope for a better future to thousands of Kentuckians.

Source of Federal Funds: Smith-Lever
Scope of Impact: State Specific

Key Theme – Human Nutrition

It is twelve o'clock noon. Do you know where your lunch is? For many Kentucky children the answer may be "no." 648,894 children receive free and reduced priced school meals. These children rely on school meals as their main source of nutrition. When school is not in session, many of these children experience hunger. The Cooperative Extension Service has recruited and trained sponsors (responsible for food preparation and distribution to sites), secured sites (where children are served meals), trained volunteers to teach nutrition and food safety and provided leadership in the counties to increase the number of children being fed. The Department of Education has reported that the partnership with the Cooperative Extension Service has resulted in an increase in sites to 1,668 and an increase in the number of children served to 65,996. One child who received a lunch said, "The summer food program is fun, and I think that someone cares for the community and me." The Kentucky Department of Education cites the Cooperative Extension Service as a major partner assisting with the award-winning success over the last three years. Kentucky will be given an award by USDA FNS for increase in services, and Cooperative Extension has been nominated as a champion/partner in the program.

Source of Federal Funds: Other Federal, Smith-Lever
Scope of Impact: State Specific

Key Theme – Human Nutrition

Lunch in Jackson County Schools is always hearty on Friday since most of the students will not have another meal until Monday morning. Similar situations exist throughout Kentucky. Fifteen counties have adopted a "Backpacks for Hunger" campaign to sustain children's diets on the weekend when school meals are not available. Backpacks are filled with child-friendly foods that are non-perishable, nutritious, and can be opened by children and eaten without any preparation. A three-day supply of food is provided in each backpack. Children can return the backpack for a refill whenever needed. Extension agents, high school students, and EFNEP paraprofessionals have provided leadership to community partners who have provided food and other resources for the project. In eight of the fifteen counties, the backpack program is coordinated and implemented almost exclusively by teen 4-H club members. One backpack recipient stated, "I share my backpack with my daddy when there is no food in the house." Nicholas County teachers reported that children who received backpacks have demonstrated an increase in class participation and daily class work scores have raised 20 percent.

Source of Federal Funds: Smith-Lever
Scope of Impact: State Specific

Key Themes -Human Health

Pesticides such as organophosphates and carbamates have the ability to bind calcium, zinc and copper. As diets of Americans are low in zinc and copper, the goal of this study was to evaluate effects of a pesticide mixture on absorption of calcium, zinc and copper when fed at different levels to rats. The results suggest that the pesticide mixture modified antioxidant enzymes in certain tissues. The interaction between minerals and pesticides was minimal when mineral levels were normal, but when zinc and copper intakes were low level, exposure to pesticides increased copper concentrations in the kidney by 30% and zinc in the liver by 20%. Toxic metal cadmium could induce similar changes as it is chemically similar to zinc and copper. Thus, long term pesticide exposure may increase tissue content of copper and result in harmful changes in organs such as liver and kidney. Such changes could pose a significant risk to the three million or more US farm workers (over 15,000 are in Kentucky) who are exposed to mixtures of various pesticides.

Source of Federal Funds: 1890 Evans-Allen
Scope of Impact: Regional Research

Accomplishments and Results for CSREES Goal 4

Goal 4

Greater harmony between agriculture and the environment. Enhance the quality of the environment through better understanding of and building on agriculture's and forestry's links with soil, water, air, and biotic resources.

Overview

During the past year, the Kentucky Cooperative Extension Service made 121,706 contacts related to promoting the effective stewardship of natural resources. Cooperative Extension also made 14,827 contacts related to the management of waste through reduction, reuse, or recycling and 19,480 contacts related to the management of forests and woodlands.

As a result of these efforts, 23,687 individuals adopted practices that protect the water. 3,469 individuals began using new forest management practices. 29,799 individuals adopted one or more practices related to conserving, sustaining, or protecting soil resources. Conservation tillage practices were used on an additional 725,356 acres of land.

The Kentucky Agricultural Experiment Station conducts research on environmental aspects of animal agriculture with respect to concentrated animal feeding operations for poultry and cattle as well as riparian zones for grazing animals. For crops, effects of vegetative buffers for mitigating effects of agricultural chemicals are studied using precision agriculture techniques. Decisions relating to economics of conservation practices are analyzed for all farm sizes.

Research into water quality on small farms, use of integrated pest management, and the use of sustainable cropping practices remains an active goal area at Kentucky State University. Kentucky State University currently supports three research projects related to the goal. This report features two of these projects. One focuses on bioremediation through the use of soil amendments. The other examines the impact of transgenic grain on pest and beneficial insect populations under different storage conditions on small farms.

Expenditures	Federal Extension Funds (UK)	$577,917
	Federal Extension Funds (KSU)	$103,000
	Federal Research Funds (UK)	$1,315,793
	Federal Research Funds (KSU)	$400,665
FTEs	Extension (UK)	43.0
	Extension (KSU)	.8
	Research (UK)	16.0
	Research (KSU)	8.0

Key Theme - Recycling

A recent natural resources priority issues survey indicated that solid waste was a major concern in 30% of Kentucky's counties. In response to this need, the University of Kentucky's Environmental and Natural Resource Issues Task Force (ENRI) joined forces with the Kentucky Department of Waste Management, Solid Waste Coordinators of Kentucky, and Bluegrass PRIDE to conduct a professional development workshop on solid waste issues. The workshop brought together county solid waste coordinators, conservation district personnel, PRIDE coordinators, extension agents, formal and non-formal educators, and other county officials. Participants worked in county teams to build partnerships and identify target issues to address with educational programs in their counties. By attending the workshop, participants gained a better understanding of specific solid waste issues and received resources for effective education and outreach programs.

Source of Federal Funds: Smith-Lever
Scope of Impact: State Specific

Key Theme – Water Quality

As part of the Kentucky Watershed Framework, each basin team chooses three watersheds as priorities for the basin during that framework cycle based on several factors such as need for assistance, feasibility of project implementation, and water quality. The Salt River Team, a group consisting of agencies, citizens groups and organizations, facilitated by the basin coordinator, choose Sinking Creek as one. The basin coordinator is charged with then organizing a watershed council, developing goals and objectives, and implementing projects. Councils are made up of NRCS agents, extension agents, RC&D agents, DOF representatives, DOW representatives, Watershed Watch Volunteers, KWA members and others from the tri-county watershed. The watershed council has met monthly, developed a watershed plan (included), and has begun implementing activities focusing on identified objectives. One focus of the council's work is helping local residents learn and implement best management practices. Development of this council has the citizens of the watershed thinking about water issues and pulling resources together in order to help protect and restore the water quality in the area.

Source of Federal Funds: Smith-Lever
Scope of Impact: State Specific

Key Theme – Agricultural Waste Management

Kentucky has more beef cattle and more stream miles than any other state east of the Mississippi River. Since most of Kentucky's grazed land contains streams, cattle are generally given free access to the streams. We are studying management methods such as alternative shade, off-stream water, pasture enhancement, and low level herbicide treatments to reduce the impact of cattle on Kentucky's streams. These management strategies have been applied on small pastures at the Animal Research Center while cattle have been tracked with GPS collars. By tracking the animals in this way, cattle position can be obtained every 5 minutes for up to 18

days. The data are being analyzed to determine which management strategies are the most effective for altering cattle position in the field. If these management strategies are successful and implemented by farm managers, stream health can be improved.

Source of Federal Funds: Hatch, Smith-Lever
Scope of Impact: State Specific

Key Theme – Soil Quality

A mechanical system has been designed and fabricated (U.S. Patent 6,056,066) that can reconstruct soil up to 4 feet deep without any surface vehicle traffic. A method has been devised whereby organic material or other amendments can be mixed with the soil during reconstruction. Research is being conducted to determine the rate at which soil can be reconstructed with the system and to determine the productivity of reconstructed soil. This work can lead to successful reclamation of prime farmland and other cropland subjected to surface mining or similar disturbance.

Source of Federal Funds: Hatch
Scope of Impact: State Specific

Key Theme – Forest Resource Managenment

High-value hardwood trees are being established on surface-mined lands in Eastern and Western Kentucky while reducing carbon dioxide (CO_2), flooding and sedimentation of streams and lakes. Since 1980, an estimated 1.2 million acres were permitted for coal mining representing nearly 5 percent of the state's total land area. Hundreds of acres of high-value hardwood trees, on currently mined and reclaimed areas, are being established and monitored for survival and growth. Reclamation methods are being modified by changing current practices, which result in compaction and low tree survivability, to loose dumped spoil which produces a surface topography with 3- to 5-ft depressions. Monitoring at 11 sites concluded that peak flow and runoff volume, infiltration rates, sediment loading and effluent sediment and water quality concentrations are resulting in much lower environmental impacts. Kentucky has influenced policy development nationwide and approximately 20 percent of new mining permits granted in the state have adopted this new reclamation technique.

Source of Federal Funds: Hatch, Smith-Lever
Scope of Impact: State Specific

Key Theme – Biological Control

The use of bacterial-induced sterility as a biologically-based, species-specific control strategy for insects that include both plant and animal pests is being investigated. Current work includes surveying natural bacterial infections, characterizing infection dynamics in both laboratory and field populations, improving means for the transfer of bacteria between insect

species, and conducting population cage experiments to test control strategies. The long-term benefits of this work will be new and novel approaches to suppress a wide range of insect pests.

Source of Federal Funds: Hatch
Scope of Impact: State Specific

Key Theme - Global Change and Climate Changes

Because much of Kentucky is forested, the health of Kentucky forests is important to the economy and quality of life in Kentucky. An important process in forests, one that affects forest productivity, is the release to the soil of nutrients from the decomposition of leaf litter. This long-term experiment is uncovering how altered rainfall, predicted by models of global climate change, may affect interactions among arthropods inhabiting forest floor leaf litter. These interactions ultimately have an impact on the rate of litter decomposition and the release of nutrients to the forest ecosystem. The long-term benefit of this research is a better understanding of the ecological processes influencing forest health in Kentucky.

Source of Federal Funds: Hatch
Scope of Impact: State Specific

Key Theme – Biological Control

Previous studies of evolutionary changes in chemical communication in pest insects have focused on laboratory studies. These studies are limited because the field environment is more complex, and because effective communication, by definition, involves both signalers and receivers. Under field conditions, we investigated the impact of mating disruption on male and female cabbage loopers. Results of these experiments demonstrate for the first time that the effects of a mating disruptant on mating success can be complex, with the pheromone blend having counteracting effects on insect populations and sexes. Our experiments give us new insights into appropriate ways to use mating disruptants for management of several insect pests in Kentucky.

Source of Federal Funds: Hatch
Scope of Impact: State Specific

Key Theme – Natural Resource Management

Kentucky's forests cover approximately 50 percent of the state. Rural private landowners owning 25 acres or less are in control of over 95 percent of these forests. However, less than 10 percent of these rural small-scale forest landowners have a forest management plan for their land. Often forestry decisions are left to women after the death of a spouse and are made to meet immediate economic needs. Simple key issues, such as selling timber in a way to claim capital gains, having a contract, collecting multiple bids, knowing the future economic impact of arson to their hardwood forest, and having a plan for their forest, could save and generate thousands for forest landowners ($5000-$90,000 per landowner). A new approach for forestry education and extension was designed to target youth and women focusing on forestry as a family economic

issue. The program has reached over 800 youth, 100 teachers, and 100 homemakers across the state of Kentucky and has developed partnerships between the UK Cooperative Extension Service, the EPA, the Division of Forestry, the Kentucky Board of Education, Kentucky Educational Television, the Department of Fish and Wildlife Resources, and the Department of Forestry. Starting in the fall of 2003, the "What is Forestry" program materials for couples and women have been adopted by the Kentucky State Homemakers Environmental Committee. The program is expected to reach hundreds of women and families across the state of Kentucky over the next three years.

Source of Federal Funds: Smith-Lever
Scope of Impact: State Specific

Key Theme – Forest Crops

Northern Kentucky Cedar (NKC) is located on the Fleming and Mason County line. NKC has been a long-standing sawyer of Eastern Red Cedar. The trend for NKC has been to export the best part of the Red Cedar log to Europe where much higher prices can be yielded from the lumber. Because the export market has demanded such high quality material, there is a great deal of lower quality material that has been left over from the sawing process that could be used for other products. These other products require secondary operations that NKC has not done in the past and did not have experience in processing. By providing NKC with technical information and support on secondary processes, primarily on grinding and molding, NKC has been able to begin processing secondary wood products instead of burning or grinding all of it into mulch, which has little or no monetary gain. NKC has doubled their number of employees in order to complete the vertical integration process. The first order they produced was for an overseas market worth over $250,000. Diversifying their product lines has also created higher demand on their green lumber, giving NKC the ability to command higher prices. Much of the Red Cedar logs that NKC purchases come from local farms. Higher demand on Red Cedar lumber will eventually filter down to higher prices for the farmer who supplements his income by logging Red Cedar from his farm.

Source of Federal Funds: Smith-Lever
Scope of Impact: State Specific

Key Theme – Forest Crops

In the past year, great strides have been made in the development of shiitake mushroom production as a viable alternative commodity. In collaboration with the Kentucky Department of Agriculture's Marketing Division, funds were invested in a marketing survey that determined that natural log-grown shiitake is a viable product for market, especially if it is produced organically, which is fairly easy to do. The UK specialist has written eight sections of the production manual which are now in print, most of them in their second or third printing of 2,000 copies each. The UK specialist produced a video (in VHS, DVD, and CD formats for easy access to all clientele), which was distributed on demand to half of the counties in the state. Many hands-on workshops have been held by the specialist, averaging 20-25 people in each; additional workshops have been initiated by members of the original shiitake growers steering

committee. Many counties are now requesting workshops on a regular basis. Active growers with modest commercial operations (1,000-5,000 logs) are successfully marketing their crop at a good price. A Kentucky Shiitake Growers Association has been formed and incorporated. Federal and state grant funds monies have been obtained to do a feasibility study and business plan for a state-wide production and marketing plan.

Source of Federal Funds: Smith-Lever
Scope of Impact: State Specific

Key Theme – Forest Crops

The Kentucky Master Logger program is a statewide comprehensive continuing education program for timber harvesting professionals. The forest industry in Kentucky contributes approximately 3.5 to 4 billion dollars to Kentucky's economy. The front end of this industry is the timber harvesting professional working in as many as 3,000 logging firms. The Kentucky Master Logger program is only continuing education program for loggers in Kentucky and is mandated by state law for timber harvesting operations. The training and education program provides training to loggers in sustainable forestry, water quality and best management practices, and timber harvesting safety. This ongoing program has trained over 5,071 loggers that harvest 1.1 billion board feet of timber on 436,0000 acres annually. This timber is worth $164 million to over 12,000 landowners each year. In 2003, 372 new loggers started the program and 1,321 Kentucky Master Loggers participated in continuing education programs.

Source of Federal Funds: Smith-Lever
Scope of Impact: State Specific

Key Theme – Air Quality

Recent research has found that the quality of indoor air in homes can be worse than outdoor air. Many new and remodeled homes are more tightly constructed and prevent fresh air from entering the home. In addition, consumers are using more products and furnishings containing compounds sensitive to occupants. Health impacts from indoor air pollutants contribute to illnesses ranging from headaches and discomfort to respiratory diseases (asthma, allergies) to more serious ailments and death. The most susceptible to health impacts from pollutants include young children, the elderly, and those who are immune suppressed from disease, chemotherapy, and organ transplants. These illnesses add to the already strained health costs of individuals, families and the state. The goal of the Kentucky indoor air quality program is to protect public health by reducing risks associated with indoor air contamination. The program provides a wide variety of information to help consumers recognize and correct potential problem areas throughout their homes. Over 29,000 people have participated in various educational activities during the past two years with follow-up data indicating a significant impact on knowledge gained and actions taken to improve their homes and health.

Source of Federal Funds: Smith-Lever
Scope of Impact: State Specific

Key Themes - Water Quality, Pesticide Application

The use of pesticides in plant protection potentially releases large quantities of pesticides into rivers and streams through runoff water and sediment and into groundwater through infiltration (seeping). Soil amendments (yard waste compost and sewage sludge) and cultivation of turf (living fescue) across the contour of the land slope and between vegetable rows, successfully reduced runoff water and sediment and pesticide movement at the edge of the field and provided acceptable yield. Grass filter strips planted between plant rows, reduced sediment loss by 6% in pepper and 68% in pepper intercropped with tomato. Utilization of vegetative filter strips reduced the transport of pesticides (e.g., thiodan by 56%, dacthal by 85%, clomazone by 81%) into runoff water that would otherwise have been transported down hill. Residues of the herbicide "Devrinol" in surface runoff was also reduced by 62.9 and 44.2% in yard waste and sewage sludge treatments, respectively, compared to bare soil. The project has provided Kentucky farmers with models that can be used for growing vegetables on erodible lands and increasing productivity and profitability, while reducing environmental pollution by pesticides and fertilizers.

Source of Federal Funds: 1890 Evans-Allen
Scope of Impact: State Specific

Key Theme – Sustainable Agriculture

Laboratory and field experiments were conducted to determine the impact of Bt corn on pest and beneficial insects in storage and feeding to goats. Information gathered in this research indicates that Bt grain reduces Indianmeal moth and Angoumois grain moth populations and associated damage by 80% in on-farm grain bins. The reduction in damage improved the grade of the corn from U.S. No. 5 to U.S. No. 2, thus increasing its value $0.10 per bushel. Populations of beneficial parasitoids, which further reduce populations of these moths, are not negatively impacted by the Bt grain. Storing Bt grain reduces the need for treating the grain with Actellic, an expensive insecticide. This reduces worker exposure, environmental contamination, and chemical residues on kernels. Finally, feed rations for goats containing the Bt corn were preferred by goats probably due to less insect damage, which would be detectable via reduced quality feed (foul odors or aflatoxin contamination).

Source of Federal Funds: 1890 Evans-Allen
Scope of Impact: State-specific Research

Accomplishments and Results for CSREES Goal 5

CSREES Goal 5

Enhanced economic opportunity and quality of life for Americans. Empower people and communities, through research-based information and education, to address economic and social challenges facing our youth, families, and communities.

Overview

The Kentucky Cooperative Extension Service made 652,861 contacts related to the development of life skills in youth and adults. 473,448 contacts related to community capacity building, 222,797 related to decision-making, and 130,858 related to the development of communication skills. An additional 157,256 contacts focused on character education.

More than 225,000 Kentucky youth participated Extension 4-H Youth Development programs and nearly 21,000 individuals were members of Extension Homemaker Clubs affiliated with the Kentucky Extension Homemaker Association.

As a result of these efforts, 80,428 individuals demonstrated informed and effective decision-making. 86,395 youth and adults demonstrated the application of practical living skills. 71,228 youth reported the acquisition of one or more life skills as a result of participation in non-formal youth development programs conducted by Extension.

Extension helped and additional 10,790 prepare to enter the workforce. 10,448 dependent care providers (adult or child care providers) reported changes in knowledge, opinions, skills, or aspirations as a result of programs conducted by Extension. 19,100 individuals reported changes in knowledge, opinions, skills, or aspirations related to parenting or personal relationships and 21,511 individuals adopted one or more practices to improve their financial wellness.

Kentucky State University research projects discussed under Goal 5 in the FY00-04 Plan of Work are now reported on under Goal 3 and Goal 4.

Expenditures	Federal Extension Funds (UK)	$3,561,221
	Federal Extension Funds (KSU)	$137,000
	Federal Research Funds (UK)	$105,263
	Federal Research Funds (KSU)	N/A
FTEs	Extension (UK)	265.0
	Extension (KSU)	5.5
	Research (UK)	5.2
	Research (KSU)	N/A

Key Theme – Leadership Training and Development

The social, economic and political changes affecting agriculture and rural communities continue to pose challenges to the future agriculturalists and leaders. The food and fiber sector is important because it represents approximately16% of national output and more than 18% of total employment. More than ever agriculture needs effective leaders who understand local, state, national and international issues. The Philip Morris Agricultural Leadership Program was initiated in 1985 to help identify and train effective agricultural leaders. Six classes have graduated representing more than 170 individuals from the burley tobacco producing states. The seventh class of 30 is currently in the middle of their two-year leadership training program. A survey of alumni revealed that 98% considered the program worthwhile in terms of the time and expense of being away from families and their jobs for more than 50 days over the two-year training program. The development of more effective communication networks, increased leadership skills, expanded knowledge and increased awareness of problems and issues were cited by more than 80% of the alumni as being "benefits" received from participating in the program.

Source of Federal Funds: Smith-Lever
Scope of Impact: State Specific

Key Theme – Agricultural Financial Management

The Department of Agricultural Economics conducted 15 tax education seminars during November and December attended by 1,400 accountants, tax preparers attorneys, bankers, and enrolled agents. These participants prepared 224,000 individual and business tax returns and over 57,000 farm tax returns in 2002. The seminar instructors included farm management specialists, accountants, IRS agents, and Kentucky Revenue Cabinet personnel. Utilizing a special 768-page instructional workbook plus materials from the IRS and KRC, these seminars provide 16 hours of professional continuing education for participants which not only prepares them to prepare tax returns but also conduct tax planning with clients. Most farm and business taxpayers in Kentucky can save 10 percent or more in Federal income taxes with tax management strategies designed to take full advantage of new depreciation rules, carefully manage end-of-year expenses and income, and properly report different government program payments. Evaluations of the seminars indicate a high rate of satisfaction with subject matter and instructional presentations.

Source of Federal Funds: Smith-Lever
Scope of Impact: State Specific

Key Theme – Community Development

In response to changes in residential patterns and economic conditions, more and more communities see planning as a key to development. Facilitated strategic planning moves from an evaluation of local assets (the resources and strengths of the people and the community), to a vision for the future, and then a plan that serves as a road map for implementing the vision. A clearly drawn plan tied to a vision for the future is a key to seeking funding for major projects

from regional, state and federal agencies. During 2003, groups (e.g., economic and industrial development agencies, tourism commissions, and chambers of commerce, citizen's advisory committees) in Jackson, Marion, Nelson, Hardin, Wolfe, Carroll, Garrard, Pulaski, Mason, Green, and Taylor counties engaged in strategic planning. From these efforts, new partnerships among community organizations developed; grant proposals for main street redevelopment and an industrial park were submitted and funded; planning and tourism commissions were established; and the number of residents and organizations involved in community and economic development efforts increased.

Source of Federal Funds: Smith-Lever
Scope of Impact: State Specific

Key Theme – Land Use

The Washington County Extension Office and the fifth year Landscape Architecture advanced studio students in the Department of Landscape Architecture in collaboration with Washington County public officials produced "Footprints for Tomorrow" a master plan that will serve as a planning tool for the most efficient use of resources for future growth. Students work with program faculty, local officials, representatives of community organizations and residents to identify and evaluate community resources, to assess socio-economic and demographic trends and to identify opportunities and patterns for development that will build on the unique qualities of the county. Students review and assimilate existing information and with the assistance of the county Extension office contact and interview residents about their perspectives on the future. Students then present the master plan to the community in a public forum. Recommendations in the plan have been incorporated by local organizations in their planning efforts. The document has been used in industrial recruitment and the development of grants for development efforts.

Source of Federal Funds: Smith-Lever
Scope of Impact: State Specific

Key Theme – Family Resource Management

Results of a survey indicted that the High School Financial Planning Program (HSFPP) was taught mostly by Family & Consumer Sciences (FCS) teachers, whose classes are electives for most students. To avoid duplicating the work of the teacahers, the Kentucky Cooperative Extension Service decided to develop weekly financial lessons based on mass-media stories appearing in newspapers, magazines, and on the Web. Lessons are distributed not only to FCS teachers, but also to Social Studies, Math, Business, and Agriculture teachers. This program is used not only by teachers in the schools, but also by 4-H agents and credit union educators. Each Monday, via e-mail, over 300 educators now receive the weekly financial lessons. This educational program has received both state and regional awards as an innovative way of addressing the financial illiteracy of today's youth. To view lessons go to the following website: http://www.ca.uky.edu/agcollege/fcs/hsfp/UPDATE.HTM.

Source of Federal Funds: Smith-Lever
Scope of Impact: State Specific

Key Theme - Parenting

New scientific electronic imaging techniques conclusively show that wise parenting is essential from birth onward for the optimal development of young children's brain functioning and thus their future success in school and life. Under the guidance of an extension child development specialist, extension agents teach new parents and parent substitutes to be their children's most important educators. Parents especially need such skills when difficult times arise and great stress results. In 2002, there were nearly 54,000 reports of child abuse in Kentucky (Kentucky Youth Advocates). In 2002-2003, to make the most of children's early years and to help prevent child abuse, Extension agents in 51 counties reported educating well over 1500 parents, 1800 childcare providers, and large numbers of Kentucky Extension Homemakers. Agents utilized recent research-based Kentucky Extension programs such as *Keys to Great Parenting: Fun and Learning with Your Baby or Toddler*, *Parent Express Newsletters, Grandparents Raising Grandchildren*, and *Project StoryTime*. The *Keys to Great Parenting* Website registered 65,078 hits during 2003, more than any other Family and Consumer Sciences Extension program. This figure indicates the strong continuing need for research-based, concise, user-friendly parenting education materials.

Source of Federal Funds: Smith-Lever
Scope of Impact: Multi-State

Key Theme - Aging

Kentucky will soon witness a huge growth in older persons that will spark major changes in families, health care, the workplace and the economy. Healthy and positive aging has never been more important. To prepare for this unprecedented age wave, we created an in-depth, web-based curriculum called *Aging Gracefully: Making the Most of Your Later Life Adventure.* Over the last two years, an estimated 17,500 Kentuckians have participated in *Aging Gracefully* group learning sessions. Follow-up evaluations were mailed to a convenience sample of participants from 23 geographically diverse counties. With a response rate of approximately 61 percent, post-session evaluations were received from some 145 individuals. Close to 70 percent of the respondents reported making positive behavioral changes as a direct result of their participation. Reported practice changes range from "made will, power-of-attorney, and living will" and "my husband and I have started walking for exercise" to "taught program to church group—best feedback ever." During the last 12 months, the Aging Gracefully website has received 20,000 hits.

Source of Federal Funds: Smith-Lever
Scope of Impact: State Specific

Key Theme - Home-Based Business Education

Because most micro-businesses are diverse in the types of products and services they offer, there is often no organized group to address their problems and needs. They have no advocates to represent their interests to decision making groups and to legislative bodies. They are often

either overlooked or victimized by laws and regulations. Keeping up with the latest developments in technology and business issues that directly affect the success of the business may be a problem as well as marketing their products and services. Being a member of a network that will address these issues can give a micro-business clout that cannot be achieved alone. There is a strong need for supportive networks of business people and organizations that nurture these small businesses and Kentucky Cooperative Extension has served as sponsor for these organizations in several counties. The Small Business Owners Association of Northern Kentucky was formed in 2001 with support of the Boone and Campbell County CES. Membership includes business owners from Northern Kentucky, Southeastern Indiana and Southwestern Ohio. On a survey, forty-six percent indicated their business had increased as a result of their participation, with increases ranging up to $5000. Ninety-five percent indicated they had benefited from the educational presentations at the monthly meetings. The Greater Louisville Home-Based Business Association, supported by Jefferson County CES, presents a Showcase for the membership each year. Last year 43 businesses participated and over a hundred people attended. Comments ranged from "my company has three new clients thanks to the showcase" and a "whole list of new contacts" to a "very positive personal growth experience for me as a business owner."

Source of Federal Funds: Smith-Lever
Scope of Impact: State Specific

Key Theme – Consumer Management

Sewing is not just your grandmother's pastime; it is alive, well, and growing in Kentucky according to information gathered from agents and volunteers across the Commonwealth. Agent impact statements reported in excess of 4,437 individuals were reached through programs and activities in twenty counties. Participants completed approximately 2,550 items including garments, items for the home, clothing, and accessories. The estimated value of these items exceeds $92,600. In addition to agents, trained volunteers and Certified Master Clothing Volunteers contributed over 7,584 hours of teaching time at a savings of $125,440. The counties reporting suggest an increased interest in sewing. The reasons stated for this increase follow national trends which include "a sense of accomplishment" (39%), relaxation and stress reduction (32%), and saves money (31%).

Source of Federal Funds: Smith-Lever
Scope of Impact: State Specific

Key Theme – Leadership Training and Development

The Kentucky Extension Homemakers Association continues to be a strong community leadership organization dedicated to community service. Membership in 2002 totaled more than 21,000 and included clubs in 119 of Kentucky's 120 counties. Extension homemakers are actively involved in their communities, giving their time, money and skills to local, regional and state endeavors. The value of volunteer service time averaged $175,000 per county in 2002. This would equate to a statewide impact of more than $21,000,000 in the value of volunteer and community service. During 2002, Homemakers continued fundraising for the Ovarian Cancer

Screening Program, raising more than $850,000 in funds. Each county, working with their extension agents, offered leadership development training in addition to monthly educational programs.

Source of Federal Funds: Smith-Lever
Scope of Impact: State Specific

Key Theme – Estate Planning

At death, property owned and controlled by the deceased passes to others. Too often, people are uninformed or do not make plans for an orderly transfer of property. This issue addresses both titled and untitled property. Having a plan saves time, money and is less emotional for those left behind. Therefore, it is critical that everyone, no matter the size of their estate to have a valid plan for the transfer of their estate at death. Families in Kentucky have participated in a program entitled, "Who Gets Grandma's Yellow Pie Plate?" This program is taught from a perspective of celebrating life and helps people think about different ways to transfer non-titled property while they are still living. It encourages people to communicate with family members about death and their wishes for the transfer of property. Discussions with family members can relieve tensions concerning death. Participants relate stories about destroyed family relationships because of personal item distribution at the time of death. Ninety-seven percent (97%) of participants stated they know how to distribute non-titled property that will develop good family relationships. Participants expressed confidence in discussing with family members different ways to distribute personal items. One participant commented, "This lesson contained some of the best information on a topic that effects everyone at some point in time that I have ever received from the Kentucky Cooperative Extension Service."

Estate planning programs that discuss the transfer of titled property are usually taught in a three- to four- part workshop over three to four weeks. Local professionals along with extension professionals are included in teaching the sessions. Participants are motivated after attending the workshops. Eighty-seven to eighty-nine percent of participants in eight counties indicated in follow-up surveys that they felt more prepared to meet with an estate planning professional such as an attorney, CPA and a financial planner and were in the process of starting an estate plan or updating their estate plan. In another county, prior to the workshop, 80% of the participants did not have an estate plan. One year later, 60 % of the same participants had an estate plan in place. All participants indicated that they had personal questions answered and that the programs were professionally done.

Source of Federal Funds: Smith-Lever
Scope of Impact: State Specific

Key Theme – Consumer Management

Consumer debt tends to increase the most during the winter holidays due to expensive gift giving. Through extension programs and media outlets, consumers are encouraged to think of keeping gift giving within their spending plans. Efforts include ways to provide inexpensive

or no-cost gifts. Participants indicated a savings range from $1,125 to $6,750 by making gifts instead of purchasing them in a store. Ninety percent felt their gift giving had improved.

Source of Federal Funds: Smith-Lever
Scope of Impact: State Specific

Key Theme – Family Resource Management

Programs across Kentucky addressed the importance of consumers being in control of their finances. Participants indicated that they plan to do such things as set aside money for savings, invest money for a higher interest return, keep better records, set financial goals, make a shopping list, and use coupons wisely when shopping. In one area of the state, participants received a candy bar at the end of the session if they could tell one specific thing they were going to do to improve their finances. Eighty-one percent stated that they had learned the importance of paying bills on time and avoiding late charges.

Source of Federal Funds: Smith-Lever
Scope of Impact: State Specific

Key Theme – Agricultural Financial Management

A major emphasis of the IRM team has been to obtain software packages for production and economic analyses and encourage the use of these packages by Kentucky beef producers. For herd production analyses, the IRM committee chose CHAPS (Cow Herd Appraisal Performance Software, created by NDSU). Data will be used to create a database of Kentucky beef production. The IRM team is also heavily involved in economic enterprise analysis of beef cattle operations. The Iowa State University Standardized Performance Analysis (beef cow business records) package was chosen for economic analyses of beef production systems. Our team has developed a pocket record book to help with collection of data on-farm. Also our team has produced a beginner beef cow business record book designed to measure the cow calf enterprise, harvested forages enterprise and pasture enterprise. Our team developed a beef backgrounding business record book. Our goal is to develop state-wide production and economic databases that we can use to aid in our education. These databases can be used to help demonstrate the “real world” economic impact of incorporating certain beef production practices. We have developed and distributed 275 basic instructional workbooks and 275 copies of CHAPS have been mailed out to Kentucky producers. We have received 325 herd records from producers. Over 3,000 pocket record books and over 500 cow-calf business records books were distributed. Eighty-five producers are actively using this record system. Also over 70 beef backgrounding business record books have been distributed.

Source of Federal Funds: Smith-Lever
Scope of Impact: State Specific

Key Theme – Agricultural Financial Management

The Outreach and Assistance to Socially Disadvantaged Farmers and Ranchers Program (OASDFR) uses competitive grant funds from USDA-CSREES to work annually with small, limited resource, women, and minority farmers in 19 counties in the areas of farm production practices, financial management, sustainable agriculture systems, marketing, farm safety, health screenings, and the use of USDA agencies. This program serves over 500 families one-on-one annually, plus many more through field days, meetings, and outreach activities. This program was instrumental in the development of the Fairview Produce Auction, Inc., and has assisted farm families in improving their houses and farms. Partially as a result of the program, Kentucky has the lowest USDA-FSA loan delinquency rate in the South. Historically, families enrolled in the OASDFR have increased their gross farm income while reducing their input costs.

Source of Federal Funds: Other Federal
Scope of Impact: State Specific

Key Theme – Family Resource Management

The Kentucky State University Cooperative Extension Program played a vital role in the Earned Income Credit and the Child Tax Credit campaigns during the past tax season by providing information to Kentucky families who are eligible for this special tax program. The Earned Income Tax Credit (EITC) is a special tax benefit for working people who earn low to moderate incomes, and file a federal tax return. Many low-income families can also claim a Child Tax Credit (CTC) if they earned income and claimed dependent children. Kentucky State University distributed information about these credits through a training session for FDM and NEP program assistants. These program assistants in turn work shared resource materials received with family resource center coordinators, churches, elder care centers, and nursing homes. It is estimated that Kentucky clientele families received more than $1,000,000 through EITC and CTC.

Source of Federal Funds: Smith-Lever
Scope of Impact: State Specific

Key Theme – Family Resource Management

The Kentucky State University Family Development and Management (FDM) Program helps limited resource Kentuckians achieve self-sufficiency. This goal is accomplished through a comprehensive service delivery system, implemented by program personnel, in collaboration with county Extension staff and local service providers. FDM program staff provide training on food and nutrition, consumerism and budgeting, home management, parenting, employability, family literacy and self-advocacy. Over 1, 300 families received program services through FDM during FY03. In addition, more than 80,000 citizens were reached through exhibits and displays. More than 15,000 youth were reached through group meetings, demonstrations, and summer day camps.

Source of Federal Funds: Smith-Lever
Scope of Impact: State Specific

Stakeholder Input Process

Every four years, each county in Kentucky is expected to conduct an assessment of local needs and program opportunities. County Extension staff engaged members of local advisory councils and other citizens in collecting data about the community and establishing program priorities for the coming years. Annual modifications and adjustments to plans are allowed.

Strengthening Advisory Leadership

Kentucky's program development process is based on a six-stage model which begins with the establishment of strong linkages with the publics the organization is charged to serve. During 2003, Kentucky Cooperative Extension hired its first Advisory Leadership Coordinator. The incumbent in this position is charged with helping county extension councils become more broadly representative of the population they represent. Through the efforts of the Advisory Leadership Coordinator, each county conducted an assessment of the current composition of their County Extension Council (CEC). As a result, many counties added members to the council from underrepresented groups. Counties adding members were encouraged to conduct orientation sessions for new members using materials developed by the Advisory Leadership Coordinator.

Situation Analysis

Prior to the commencement of county analyses, a state level Program Development Work Group was established to develop support materials for county extension agents to use in conducting a broad-based assessments analysis of the local situation. Support materials were developed on how to use secondary data sources, key informant interviews, focus groups, community forums, questionnaires, media scans to learn about the community. Agents were expected to involve members of the CEC in utilizing at least one of the data collection methods in conducting their county analysis.

Establishing Local Program Priorities

After data collection activities were completed, those involved in data collection activities presented the findings to the broader Council. The CEC then established program priorities for which program plans would be written. In all, an estimated 3,600 people were involved in the process of establishing local program priorities for FY05-08.

Enhanced Response Mechanisms

Also in 2003, Kentucky Cooperative Extension completed and administrative restructuring designed to help the organization more quickly respond to the rapidly changing needs of Kentucky's citizens. Now, high priority issues and needs identified by these rejuvenated County Extension Councils will either be acted upon locally by county extension staff or shared with one of three newly-created Regional Issues and Programming Committees. These regional committees will be composed of county, district, regional and state extension faculty and staff. Instead of waiting for state-level groups to respond, these regional committees

will be empowered to create ***Quick Response Teams*** which will identify or catalyze development of resources needed to address issues and concerns that affect a significant number of counties in a given region.

Experiment Station

As a full partner with the Extension Service, the Experiment Station sets priorities for research activities with information from the County and State Extension Councils and the Kentucky Council for Agricultural Research, Extension and Teaching (UK-CARET). In addition, the Experiment Station meets formally with other entities: quarterly with the Kentucky Tobacco Research Board to set priorities for research by the Kentucky Tobacco Development Center to assist in the transition from the tobacco-based economy; biannually with the Gluck Equine Research Center Board to discuss priorities for the equine industry; and regularly with the Tracy Farmer Center for the Environment on conservation-based research. We also receive input through the Community Farm Alliance, the Sierra Club, and other environmental groups through the UK Biotechnology Research and Education Initiative.

Beginning in the fall of 2003, UK-CARET began functioning as a new advisory and advocacy group for the College of Agriculture. Members have an opportunity to advise in the development of college priorities and assist in generating public support for those priorities at state and national levels.

UK-CARET is representative of the full scope of the land grant mission: extension, research, instruction, and service. Membership is composed of active and progressive leaders in agricultural and natural resource enterprises. UK-CARET provides a direct link to the national CARET organization managed by the National Association of State Universities and Land Grant Colleges (NASULGC). Two members of UK-CARET will be designated as national CARET representatives.

Program Review Process

The process of organizational renewal described in the section on Stakeholder Input is expected to strengthen the process by which Kentucky Cooperative Extension conducts merit reviews of its programs. While the current process includes the review by "experts" which is required by AREERA, we see the new organizational structure providing increased opportunities for external partners and private citizens to comment on the relevance and soundness of Extension programs.

As of now, however, there are no significant changes in the review processes described in the Plan of Work which has been approved by CSREES.

Evaluation of the Success of Multi and Joint Activities

Work across state lines and across functional boundaries is quickly becoming an expected mode of operation for faculty and staff of the University of Kentucky College of Agriculture. Issues such as the transition from a tobacco-dependent economy, economic development, obesity youth development, and agricultural profitability are not single-state issues. Nor can they be addressed by the research and knowledge base undergirding a single discipline. Addressing issues such as these requires that land grant universities work across disciplinary, functional, and state boundaries to deploy resources in a planned and systematic manner.

Kentucky has a unique opportunity to work across state lines. It shares borders with West Virginia, Virginia, Tennessee, Missouri, Illinois, Indiana, and Ohio. These states represent three of the four Extension regions. The opportunity to work across state lines is clearly evident.

During FY03, the Kentucky Cooperative Extension Service supported more than 337 different Multi-State Extension activities. In planning and conducting each activity, key consideration was given to either increasing efficiency (through such things as economies of scale) or effectiveness (by contributing the resource each partner was best equipped to provide). For example, Kentucky frequently contributes the expertise and services of its award-winning Educational Media unit to multi-state projects. In other cases, Kentucky relied upon out-of-state expertise in subject areas not well supported by our current array of faculty and staff.

Approximately one-third of these multi-state activities were developed and implemented by county Extension agents working in border counties. The predominant state partners were Tennessee, Indiana, and Ohio. The grass-roots nature of this multi-state collaboration provides further evidence that multi-state activities addressed the needs and issues of stakeholders. Impacts and outcomes of most of these multi-state efforts are clearly documented in impact statements written by county Extension agents.

A large proportion of the multi-state efforts focused on the needs of under-served and under-represented populations. Examples include small business owners, small farmers, food stamp recipients, and loggers.

Research and Extension functions have been, and will continue to be, integrated to a unique extent within in the Kentucky system. The Dean of the College of Agriculture formally serves as Director of both the Kentucky Agricultural Experiment Station and the Kentucky Cooperative Extension Service. The Associate Dean for Extension and Associate Dean for Research have close working relationships. Extension, research, and teaching faculty are housed together within academic departments and all participate in regularly scheduled department meetings. Extension faculty conduct applied, collaborative research while research faculty participate in Extension and other outreach/service activities. Many faculty even hold joint appointments to both Research and Extension.

Yet, even with all of these structural and functional attributes which promote integration activities, Kentucky used the mandates of the AREERA legislation as a catalyst to bring

Research and Extension programs closer together. Extension staff are more cognizant of the need to support their activities with sound research. Research faculty are realizing the dissemination of findings involves more than publishing results in a scholarly journal.

Both the Kentucky Agricultural Experiment Station and Kentucky Cooperative Extension Service expended in excess of 25% of qualifying funds on integrated activities in FY03.

Brief Summary of Multi-State Activities

The University of Kentucky engaged in 36 Multi-State Regional Fund (MRF) projects, including 18 in the Southern Region, 4 in the Western Region, 10 in the North Central Region, 2 in the Northeastern region, and 2 National Research Support Projects, the National Animal Genome Research Program and the Species Coordinator for the Horse project. Over 100 College of Agriculture faculty members have some research effort devoted to these projects.

During FY03, the Kentucky Cooperative Extension Service supported 337 different Multi-State Extension activities. Approximately two-thirds of these multi-state activities were state-level partnerships led by state-level administrators, specialists, and associates. The remaining third were conducted by county Extension agents working across state lines. Virtually all of multi-state Extension activities involving state-level faculty and staff can best be characterized as on-going collaborations lasting a year or longer. These included such things as serving on national and regional committees, production of multi-state publications, and curriculum exchange agreements. County-level projects tend to be more short-term in nature. These included such things as study tours, exchange trips, and training schools in border counties.

Multi-state Extension activity is recorded in a Microsoft Excel spreadsheet. The following impact statements are a representative sample of some of the multi-state Extension activities involving the Kentucky Cooperative Extension Service.

Children's Environmental Health Issues

The University of Kentucky Cooperative Extension Service continues as a key contributor to an eight-state partnership addressing children's environmental health issues. The project, funded through the Region 4 Environmental Protection Agency Children's Environmental Health program, addresses key environmental health issues in Alabama, Florida, Georgia, Kentucky, Mississippi, North Carolina, South Carolina and Tennessee. For 2003, accomplishments in Kentucky included expansion of the multi-agency children's environmental health working group, development and distribution of a Spanish-language radio public service announcement packet, and the signing of a Governor's Proclamation for Children's Health Day on October 5 as part of the October Children's Health Month observance. The radio public service announcement packet has been distributed to all eight states within the region. A cornerstone event held was a one-day children's environmental health conference, which drew more than 50 registrants from a variety of agencies, organizations and universities. Three counties received funding support to conduct special programs during October, reaching more than 45 adults and 35 youth. Approximately 150 childcare providers participated in environmental health learning sessions during the year, and 86% indicated they would utilize information learned to make improvements in their facilities and indoor environments.

Five State Beef Initiative

The objective of the FSBI is to develop profit opportunities for beef producers through a vertical coordination of production management, genetics, marketing and information sharing within a segmented industry. Approximately 12,000 feeder cattle have been enrolled in the project to date. Producers are seeing an immediate impact upon feeder cattle prices due to project requirements of source verification and a verifiable management program to improve calf feedlot health. Longer term benefits include a carcass history for their cattle and producer certification to meet anticipated requirements created by consumer demand. Identification for source verification has utilized an electronic identification and data base. This effort has given Kentucky producers a distinct advantage and head-start on the new mandatory identification program advocated by USDA. Feedlot health reports show Kentucky cattle managed by FSBI requirements (CPH-45) to be far better than industry standards for morbidity and mortality. Carcass data collected to date show 63.5% Prime and Choice and 89.9% Yield Grades 1, 2 and 3. These results show that Kentucky cattle are higher quality than industry standards and better than many feeders believe. Based on the price spread between Choice and Select, carcass discounts for Yield Grades 4 and 5 and the impact of decreased sickness on feedlot gain, efficiency and carcass value, Kentucky cattle can easily command premiums of $50 to $70 per head based on the results of the Kentucky portion of the FSBI.

Enhanced Dairy Reproduction and Survival

Hybrid vigor resulting from dairy crossbreeding is expected to improve reproduction and survival. Four states are examining crossbreeding effects on lifetime performance of dairy cattle. The University of Kentucky and Virginia Tech are producing Holstein, Jersey, and both types of crossbreds of those breeds in a trial to compare purebred and crossbred females from birth throughout their lifetimes. Improved reproduction and survival will reduce culling and increase longevity and lifetime net returns.

Biltmore Value-Added Study Tour

The vision of the Biltmore Value-Added Study tour is to “facilitate the establishment of cooperative efforts and leadership to improve profitability of beef production by efficiently producing a product that meets or exceeds market demand”. The Biltmore Estate was chosen as the site for this effort because of the unique “pasture to plate” concept of agriculture on the Estate. The Biltmore Value-Added Study Tour lasts 4 days. Participants work to identify the factors most limiting beef production and to develop action plans. Once completed, each team has a new beef production action plan to implement in their county. Currently, 42 county teams, 42 county Agriculture Agents, 7 county FCS agents, and 84 beef producers have participated in the Biltmore Value-Added Study tour. This program has yielded some of the most successful county beef programs in Kentucky.

Stored Grain Management

An ongoing multi-state program involves a team of research and extension agricultural engineers and extension entomologists in Kentucky and Tennessee to lead educational efforts on stored wheat management issues. To identify focus topics, a survey of 52 wheat growers and stored grain managers was conducted to assess equipment sanitation practices, bin loading and unloading methods, aeration strategies, and grain monitoring tactics. Survey respondents managed a total of over 4.6 million bushels of wheat from 96,000 acres. As a result, farmers and elevator operators are modifying their storage practices that will result in higher quality grain and lower costs. Extension engineers on this multi-state team developed an animated PowerPoint® presentation to illustrate proven stored grain management practices. This presentation is posted on UK's BAE/Stored Grain web page (http://www.bae.uky.edu/ext/GrainStorage/) and received a Blue Ribbon Award by the American Society of Agricultural Engineers' educational aids competition in 2003.

Strengthening Extension Advisory Leadership

An outgrowth of a southern region multi-state initiative to identify knowledge and skills needed by leaders serving as members of advisory councils, the Strengthening Extension Advisory Leadership (SEAL) project involved advisory council members and professional staff in a regional conference. Following the conference a design team of state partners was convened to develop curriculum around critical competency areas. Four modules containing 20 lessons were developed to address the following topics: an overview of Cooperative Extension and the Extension Advisory Leadership system functions and purpose of advisory leadership councils including the roles and responsibilities of members, managing meetings, parliamentary procedure, resolving conflict, tools for facilitating discussion, assessing community needs, interpreting multiple types of data and setting priorities. Each lesson plan contains objectives, a list of materials needed, background information, learning activities, fact sheets, support material and an application section. Powerpoint presentations, learning activities, discussion guides, videos, etc. are included. The material will only be accessible via the Southern Rural Development Center web site and can be used for support in agent training and volunteer development. Additional topics for module development are being identified and will be added to the current modules for Advisory Council Leadership training. This project will lead to the development of advisory councils with knowledgeable, effective leaders throughout the country.

International Master Gardener Conference

The University of Kentucky and The Ohio State University hosted the International Master Gardener Conference in Covington, KY, on June 18-21, 2003 with over 850 in attendance representing all 50 states and the provinces of Canada. The conference consisted of educational and motivational sessions to equip Master Gardener volunteers to assist extension personnel with horticultural programming. Most Master Gardeners contribute at least 30 hours of volunteer service to the Cooperative Extension-related programs each year.

High School Financial Planning Program (HSFPP)

The 2002 Jump$tart Coalition survey shows that high school seniors know even less about credit cards, insurance, retirement funds, and other personal finance basics than they did five years ago. On average, 12th graders answered only 50.2% of the survey questions correctly, a failing grade on any scale. Cooperative Extension has partnered with the National Endowment for Financial Education and the Credit Union National Association to provide financial education to teenagers, mostly through school systems. Nationwide in 2003, 22,720 teachers and 3,253,875 teenagers have been involved. In Kentucky in the last 12 months, 82 teachers have taught the HSFPP program to 7045 teenagers. We provide teachers with a comprehensive teacher's manual and each student with a 120-page student workbook, free of charge. We also provide videos to go along with each unit. In a survey of 200 students in one of our larger counties, evaluating the program's impact, 95% of these students said their financial knowledge had increased. On a pre-test, 50% said they understood the cost of credit; upon completion of the course, that figure increased to 98%. The follow-up survey revealed positive practices, with significant increases in the number of students keeping track of their expenses, comparing prices when shopping, using a budget, and saving money**.**

CYFERNet

The University of Kentucky works in collaboration with CSREES, the University of Minnesota, and the University of Arizona to provide collect, review, and disseminate research-based information and program resources which that support Extension staff working with limited-resource families and disadvantaged youth located in communities throughout the country. Materials are maintained as a part of the Children Youth and Families Education and Research Network (CYFERNet) and can be accessed at www.cyfernet.org. The University of Kentucky provides oversight to the process by which materials are collected and reviewed. In all, 2,025 fact sheets, abstracts, literature reviews, research summaries, books, and journal articles have been posted to the site. In the first half of 2003, CYFERnet had been accessed 243,134 times. CYFERNet has also sponsored 17 interactive telephone trainings on topics related to children, youth, and families.

Invasive and Alien Grasses

Invasive, introduced or alien species are now the number two reason behind population reductions of native flora and fauna. During the past decade we have conducted an applied research program evaluating the efficacy of using herbicides and no-till technology to kill a variety of exotic grasses including tall fescue, common bermuda grass, bahia grass, and quackgrass. The information generated from the research project has been extended to a variety of professional and non-professional audiences. The impact of this project has resulted in a majority of land management agencies throughout the eastern United States to use our establishment protocols. In the past year, two research projects were completed and our previous research information was provided to over 800 professional land managers and biologists in Kentucky, Indiana, Ohio, and Michigan at seven different training sessions. Ancillary information indicates at least 60,000 acres of exotic grasses have been converted to native warm

season grasses in Kentucky and at least 5,000 acres in Michigan have been converted using information we have generated in our applied research program.

Professional Forestry Workshops

The Professional Forestry Workshops Program is a multi-state cooperative education and training program responsible for impacting over 78,000 acres in 2003. The program developed by Cooperative Extension Specialists at the University of Kentucky and the University of Tennessee offers continuing education to forestry and natural resource professionals in Kentucky, Tennessee and surrounding states. The program focuses on delivering up-to-date research based technical training to resource professionals allowing them to effectively assist nonindustrial private forest landowners and farmers in the region. In 2003, over 90 natural resource professionals from state and federal agencies and the private sector in Kentucky, Tennessee, and Indiana graduated from four multiple day training workshops. Post training evaluations indicate that over 2,322 landowners directly benefited from this training. 56,650 acres of woodlands was impacted through improved forest practices and improved tree plantings were established on 23,323 acres of marginal and riparian farmland.

Nutrition Education

The Expanded Food and Nutrition Education Program (EFNEP) paraprofessionals in Kentucky teach limited-resource families skills to improve the nutritional quality of meals, how to safely prepare meals and to maximize food-related resources to feed their families. Of the 1,559 EFNEP graduate families, 97% showed a positive change in their food intake as a result of learning and developing skills and behaviors taught through EFNEP. The economic benefits of these changed behaviors resulted in an annual cost savings of $80,304 to program participants. Reported behavior changes that brought about the increase in healthier eating habits include cutting back on use of expensive snack foods and drinks, preparing and serving more fruits and vegetables, drinking milk instead of sodas, eating more meals together as a family, and reading food labels. According to data from University of Kentucky specialists, every person (child and adult) that received education regarding some aspect of food borne illness prevention saves their state an estimated $1,000. Food safety programming including *Glo-Germ, Operation Risk, Poison Panther, and Keeping Food Safe to Eat* reached 15,394 Kentucky youth and adults. Potential savings to Kentucky citizens, businesses, and government due to these food safety programs is $15,394,000.

Parent Education

As a member of a task force composed of family life specialists in 20 states, Dr. Carole Gnatuk is helping to develop a national Extension online age-paced parenting newsletter. When available, states and counties will be able to utilize and customize it for their unique audiences. Its Website can be visited at www.parentinginfo.org. Kentucky's *Parent Express* newsletter is one of only eight online state newsletters linked to this site. Dr. Gnatuk and Kentucky Extension Specialist Dr. Suzanne Badenhop are collaborating to create monthly financial education inserts for the national newsletter. Dr. Gnatuk continues to partner with Cornell University Extension

family life specialist Jennifer Birckmayer in overseeing the *Keys to Great Parenting* program and outcome comparisons with selected New York and Kentucky County Extension educators. The *Keys to Great Parenting* Web page has attracted requests for its publications and educational posters from family service professionals in 14 states, Mexico and Canada. Dr. Gnatuk has recently been invited to join the 15-member National Bi-Lingual Pre-K Financial Literacy Project Task Force. Its purpose is to develop curriculum guidelines and age-appropriate parent-child learning activities for parent educators, who will then work with parents on teaching their preschool children long-term wise saving and spending habits.

Summary of Integrated Research and Extension Activities

Activities of Research and Extension faculty were considered to be integrated if at least one of the following conditions were met.

- The leadership team for the Research project or Extension program was comprised of both Research and Extension faculty.

- An Extension program is directly related to dissemination of the findings of Experiment Station research projects.

- The program component falls within the scope of one of the College's formally established teams or work groups which integrate Research and Extension Activity.

Integrated Research and Extension Activity is recorded in a Microsoft Excel spreadsheet. The following impact statements are a representative sample of some of the integrated research and Extension activities of the University of Kentucky College of Agriculture.

Forages

Kentucky's vast pasturelands provide the basis for our major livestock industries. Ruminant animals, such as cattle, sheep, and goats, provide the most efficient means of converting that forage into valuable products. However, because of normal fluctuations in the quantity and quality of pasture throughout the year, this conversion process is not always as efficient as possible. One way to increase the efficiency of converting forage into animal product, and thereby increase the economic incentives associated with livestock production, is to supply grazing animals with dietary supplements to meet their nutritional requirements. Our work with high-fiber by-products, soybean hulls in particular, has precisely defined the effects of digestible fiber supplementation on forage intake and utilization, as well as on growth performance of beef steers. This information will help Kentucky's beef cattle producers maximize profitability, and will help ensure the efficient utilization of one of the Commonwealth's most abundant and valuable natural resources, namely forages.

Effects of Prescribed Fire

Suppression of forest fire has been fairly effective in the southern Appalachian region since the 1930s. However, poor regeneration of oak species, combined with knowledge of widespread prehistoric burning, has convinced many forest managers that prescribed fire can be used to regenerate oaks, restore upland sites to more open, savanna-like conditions, and to manage fuels. Experimentation to test the effectiveness of prescribed fire in achieving these management objectives is very limited, and yet necessary to the development of forest and fire management in the southern Appalachian region. Researchers in the University of Kentucky Department of Forestry are collaborating with USDA Forest Service researchers in North Carolina to examine the effects of annual and infrequent prescribed fire on forest stand structure, seedling response, and fuel consumption on a landscape scale on the Daniel Boone National

Forest. This project includes an important outreach component and is contributing to the regional dialogue on hardwood forest management using prescribed fire.

Beef Marketing

More than ever before, Kentucky's agricultural producers and food processors need to be aware of consumers' perceptions of value for various food attributes. Food demand research at UK addresses a wide spectrum of information needs. For products moving through traditional supermarkets, demand analysis of scanner data answers questions about consumer sensitivity to price changes, and strategic positioning of competing brands. Recent studies informed manufacturers of butter, frozen dairy products, and the rapidly-growing single-serve milk products. At the international level, recent research determined the impact of BSE (mad cow disease) on demand for U.S. beef in our largest export market, Japan. For new value-added products, taste-testing and willingness-to-pay experiments help determine how viable new products will be in the marketplace. Recent examples include experiments testing consumer receptiveness to dairy products with cancer-fighting potential, locally-produced beef, and guaranteed-tender steak. Marketing research is currently underway to support and report on the progress of a prominent value-added entrepreneurial venture, the Green River Cattle Company.

Ammonia Emissions from Poultry

Agricultural air quality has received increasing focus in the past few years. A multi-state, multi-disciplinary project to quantify ammonia emissions has resulted in over 16 months of high quality emissions data. Ammonia is being regulated as a contributor to poor air quality, and agriculture is one possible source of ammonia. The Environmental Protection Agency is required as part of the Federal Clean Air Act to determine sources and quantities of key air pollutants including ammonia. The poultry industry's contribution to the economies of Kentucky (broilers), Iowa (eggs) and Pennsylvania (both) is substantial, and objective, science-based measurements are a critical missing element. The grant is funded by the USDA IFAFS program, with the University of Kentucky as leader; it involves the acquisition, analysis and dissemination of ammonia emissions information to all stakeholders. A key contribution to the science to date was the development, fabrication and release of ten units capable of determining building ventilation rates; and a portable, low-cost means of measuring total building emissions.

Precision Agriculture in Grain Production

An interdisciplinary team of researchers from Agricultural Economics, Agronomy, and Biosystems and Agricultural Engineering have developed production practices that enable Kentucky producers to improve profit margins through precision management of inputs for grain production. Most notably algorithms have been developed to guide grain producers in removing marginal land from production to improve profitability; managing zinc in-furrow at planting to improve the profitability of corn production by an average of $15 per acre; and managing nitrogen and seeding rates to improve the profitability of corn production by up to $25 per acre on eroded landscapes.

Yield Monitor Test Facility

A yield monitor test facility was developed to aid in the ongoing refinement of grain yield monitoring devices used in agriculture. This is the most sophisticated test facility of its kind in the world. Two major manufacturers will be introducing product upgrades made possible through use of the UK facility. Data from this facility was also used in the development of a yield monitor test standard that is being approved by the ASAE. This test facility is also helping university extension specialists provide guidelines for the adoption and use of yield monitoring technology by Kentucky and US producers.

Post-Harvest Grain Processing

Applied research projects include a multi-state project to assess stored grain management practices for wheat in Kentucky and Tennessee, an investigation of post-harvest processing of specialty grains, the development of alternate energy resources from grain crops, a study on merging precision farming tools with NIR instruments that rapidly measure grain quality properties, an experiment to convert soybean oil to hydrogen gas, and the development of software to enhance identity preservation of grain lots for assured quality and security. Experiments are being conducted to improve the mathematical models available for predicting airflow resistance in stored grain. This will lead to modifications to the aeration system design that will minimize the cost and quality deterioration of grain during storage. Grain deterioration leads to mold and insect development that change the flow pattern and loads in the bin. Collaborative research between the Institute of Agrophysics in Lublin, Poland and UK is being conducted to determine the loads created by grain that have spoiled.

Welfare Reform

Since the original welfare reform legislation in 1996, a tremendous amount of research has been conducted on urban areas. By comparison, much less is known about welfare reform in rural areas. The S298 multi-state project brings together researchers from many disciplines across the South and focuses on a diverse range of concerns and structural issues faced by recipients in the rural South. This research is important for understanding the regional context within which welfare reform is unfolding. As Congressional reauthorization of welfare reform continues to proceed, understanding disproportionate impacts in the South are critical. Research from this project has been published in national and regional academic outlets as well as publications intended for a policy and general audience.

Management Options for Eastern Tent Caterpillars in Kentucky

The recent discovery that exposure to eastern tent caterpillars induces foal abortions consistent with Mare Reproductive Loss Syndrome (MRLS) created an urgent need for control tactics suitable for use on horse farms. The Entomology Department responded with two years' research evaluating non-hazardous treatment strategies including novel, reduced-risk insecticides, trunk injections, winter egg mass treatments, and barrier sprays that prevent caterpillars from entering pastures. It also provided accurate information on hatching of tent

caterpillar populations to guide area-wide timing of control options. This research provided timely guidelines that helped the Equine Industry reduce economic losses from MRLS from more than $330 million in 2001, to almost no losses in 2003.

Vegetable Production in Tobacco Greenhouses

Results of undergraduate student research projects on the low intensity production of greenhouse leaf lettuce and edible greens, supported by the USDA New Crop Opportunity Center, are being used by farmers in Central Kentucky. These farmers are growing lettuce in their underutilized tobacco transplant greenhouses and selling to the local vegetable marketing cooperative. The cooperative is developing a market at salad bars in schools in Central Kentucky for this fresh, nutritious produce.

Tomato Production

There are 500 acres of fresh market tomatoes grown annually in Kentucky. With gross sales of $12,800/acre, that represents $6.4 million gross and $1.9 million net income to Kentucky farmers. Bacterial diseases have become a serious problem for fresh-market tomato production with few options beyond clean transplants and sanitation available to producers. Infection levels as low as one in 10,000 transplants can result in an epidemic with yield losses as high as 80 to 90%. Research at the Robinson Station on Actigard, a novel plant immunity booster, demonstrated that growers could protect against serious losses during epidemic conditions. Application rates and timing for Kentucky growers resulted.

Sweet Corn Production

There are currently 2,250 acres of commercial sweet corn produced in Kentucky. The gross value of this crop is about $1,955/acre and represents about $4.4 million in annual sales for Kentucky producers. Sweet corn is a key draw to grower sales at roadside stands and farmers markets across Kentucky. A season-long supply of fresh sweet corn helps maintain customers and income for Kentucky growers. Growers in many areas of Kentucky have had problems producing a late season sweet corn crop due to fungal leaf spot and Maize Dwarf Mosaic Virus (MDMV). Johnson grass a common weed in and near many of the sweet corn field serves as the perennial host of the virus. Often late-planted sweet corn suffers 100% loss when aphids carry the virus from Johnson grass into the field. In 2003, 48 super-sweet sweet corn cultivars were evaluated at two planting dates (early and late) to determine if they were suitable for season long planting. As a result of this trial growers can now select cultivars that have tolerance/resistance to late season diseases and ensure that they have a steady supply of sweet corn.

Turfgrass Runoff

High maintenance turfgrass swards frequently receive fungicide applications in order to preserve turf health when diseases are active, especially on golf course greens and tees, and sometimes fairways. Computer simulations were used to address the question, “Do fungicide programs commonly used on turfgrasses in Kentucky pose a significant risk to water quality in

surface runoff?" In the simulations, although actual amounts of fungicide predicted to move into surface runoff were relatively low, the results suggested that turfgrass applications of fungicides which are highly toxic to indicator species could pose a risk to the health of aquatic ecosystems. As a result of this research, Extension programs have been initiated to educate turfgrass managers in Kentucky and elsewhere about practices for reducing the risks of fungicide movement in surface runoff.

Wheat Disease

Fusarium head blight (AKA scab) is one of the most destructive diseases of wheat, and can prove an economically devastating disease to wheat growers. Participation in national, uniform, fungicide trials provided information to determine whether the benefits of treatment are financially justified. The knowledge gained benefits Kentucky farmers by providing a sound, scientific foundation for disease management decisions. The U.S. Wheat and Barley Scab Initiative has continued to shed light on the value of biological, as well as chemical, disease control options.

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

Institution: University of Kentucky
State: Kentucky

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

	Actual Expenditures				
Title of Planned Program/Activity	**FY 2000**	**FY 2001**	**FY 2002**	**FY 2003**	**FY 2004**
Community Development	46,914	48,087	49,337	56,376	
Sustainable Agriculture	445,620	456,760	468,635	536,231	
Leadership Development	47,667	48,858	50,128	57,330	
Nutrition and Health	66,491	68,153	69,924	79,976	
Life Skill Development	264,734	271,352	278,408	318,353	
Environment and Natural Resources	119,429	122,415	125,597	143,622	
Total	990,858	1,015,625	1,042,028	1,191,888	

M. Scott Smith
Director

4/1/04
Date

Form CSREES-REPT (2/00)

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____Integrated Activities (Smith-Lever Act Funds)

	Actual Expenditures				
Title of Planned Program/Activity	**FY 2000**	**FY 2001**	**FY 2002**	**FY 2003**	**FY 2004**
Social and Economic Opportunity	46,000	47,150	48,375	39,500	
Competitive Agriculture	546,000	559,650	574,200	475,685	
Safe Food and Fiber	213,000	218,325	224,001	184,211	
Agriculture and Environmental Quality	707,000	724,675	743,516	618,723	
Total	1,512,000	1,549,800	1,590,092	1,318,119	

M. Scott Smith — Director
4/1/04 — Date

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_X_ **Integrated Activities (Smith-Lever Act Funds)**

	Actual Expenditures				
Title of Planned Program/Activity	**FY 2000**	**FY 2001**	**FY 2002**	**FY 2003**	**FY 2004**
Sustainable Agriculture	2,714,712	2,782,579	2,854,926	2,903,460	
Nutrition and Health	299,442	306,928	314,908	320,261	
Environment and Natural Resources	598,884	613,856	629,816	640,523	
Total	3,613,038	3,703,363	3,779,650	3,864,244	

M. Scott Smith
Director

4/1/04
Date

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