

# 2003 Missouri Annual Report

## University of Missouri and Lincoln University Outreach and Extension

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# **I. Planned Programs - Overview**

## **1862 University Outreach and Extension and Agricultural Experiment Station**

University Outreach and Extension (University of Missouri and Lincoln University) is positioning itself to meet unprecedented opportunities and challenges in the 21st century. It is a time of technological revolution and shifting demographics; constrained resources and increased demand for access; new issues facing our learners; and renewed demands for accountability. University Outreach and Extension is poised to meet these challenges and opportunities and to provide a level of excellence in programming that is recognized nationally as well as in Missouri. Guiding programming and performance is the University Outreach and Extension 21<sup>st</sup> Century Strategic Direction, <http://outreach.missouri.edu/about/21stcentury/index.html>

University Outreach and Extension, in its “Design for the Future,” set priorities to focus on improving student learning and achievement; increasing research and scholarship capacity and productivity; ensuring program access and quality; and broadening outreach capabilities.

University Outreach and Extension programs are designed to serve diverse populations, including people of all ages as co-learners. Current program areas include:

- Agriculture, food and natural resources
- Business and industry
- Community development
- Human environmental sciences
- 4-H youth development.

These programs are congruent with the USDA Cooperative State Research, Education and Extension Service goal areas.

## **1890 Lincoln University Cooperative Research and Extension**

Lincoln University Cooperative Research and Extension (LUCRE) has one goal that continues to serve as the driving force for program development and implementation. That goal is reaching out to hard-to-reach Missouri citizens and rural and urban residents with limited social and economic resources. A significant sector of the state's population falls into this underserved group.

Missouri has a high percentage of older adults residing in the state. In addition, minority individuals within this group have a much lower standard of living and poor access to quality health care professionals. The need to provide necessary education and information to this audience to ensure a healthy and productive life is great.

The number of minority-owned farms has reduced significantly in the past decade. This has resulted in the migration of African Americans to urban America. It has been stated that this is a contributing factor to urban plight. Profitable farming methods by minority farmers, coupled with education about the benefits of a farming lifestyle, will help to stem the exodus of minority landowners from farming.

As extension programs continue to be implemented under our current Plan of Work, we are integrating distance-learning technology to facilitate workshops and information dissemination when applicable. The increased use of this technology results in cost and time savings related to travel and also in reaching a broader audience.

As our research programs move forward, emphasis is being placed on collaborative team efforts in the areas of animal science, human nutrition, plant and soil science, and environmental science, with new and innovative approaches coming to the forefront.

### **Continuous Improvement of Planned Programs and Critical Issues of Strategic Importance to Missourians**

University Outreach and Extension programming is based on the needs, aspirations and issues identified by the people in communities throughout the state. University Outreach and Extension program priorities are based on substantial stakeholder input. During 1998-99, a deliberative group process involved 7,012 citizens in 275 sessions in each of Missouri's 114 counties. This process resulted in identification of issues, concerns and educational aspirations of Missourians.

In addition, ongoing annual stakeholder listening occurs through the County Extension Council infrastructure, 4-H councils, partnership program teams, as well as through priority program evaluations and survey information collected in program content areas. Continuous listening to learners and stakeholders creates an environment of continuous improvement. These data are correlated with the information gleaned from the Office of Social and Economic Data Analysis related to each county, region and issue area. See <http://oseda.missouri.edu/>. University Outreach and Extension faculty and staff work with County Extension Councils to annually update county, regional and state Plans of Work to address the highest priorities for Missouri learners, partners and communities. In 2002, this process led to revised planning at all levels, including a revision of the expected outcomes and performance indicators for the critical success factors in the University Outreach and Extension Strategic Direction.

Within the context of University priorities, University Outreach and Extension is focusing resources on three overall priorities:

1. Economic Viability
2. Strong Individuals, Families and Communities
3. Healthy Environments

Implementation strategies to support program priorities include: internal and external public and private partnerships; effective outreach and extension councils; a flexible, diverse faculty reaching diverse audiences; finance and resource development; and the integration of information technology.

University Outreach and Extension helps improve people's lives through research-based education in high-priority areas. Federal Smith-Lever 3b & c resources have been essential to provide ongoing community-based non-formal education meeting local needs and aspirations. These funds have been leveraged and integrated into priority programs in the five AREERA goal areas; therefore, this report includes total program performance in the planned areas inclusive of federal, state, local and external funds. State priority programming supports the following areas:

- Biotechnology – (Goal 1 & 3)
- Business Development (Partially, goal 1)
- Citizen Engagement (Goal 5)
- Community-Based Infrastructure (Goal 5)
- Environmental Quality (Goal 4)
- Healthy Families (Goals 3 & 5)
- Healthy Living (Goals 3)
- High-Growth Companies and Target Industries (Partially, goal 1)
- Leadership Development (Goal 5)

- Natural Resources and Environment (Goal 1)
- Pre-Business Planning (Partially, Goal 1)
- Production Agriculture (Goal 1)
- Workforce Preparation (Goal 5)
- Youth Development (Goal 5)

## **Programs Addressing Underserved Learners**

Several programs addressed the needs of underserved and under-represented populations of Missouri. Many of these programs are mentioned under Goals 3 and 5. A few examples include:

- The Family Nutrition Education Program provides low-income citizens with the latest nutrition information. Programs include EFNEP, FNP, School-enrichment programs, Food Power, Health for Every Body, etc.
- The 4-H/Youth Development activities in Goal 5 describe a variety of programs, including those working with “Adolescents at Risk.” Many programs are scheduled out of school, including those focusing on workforce preparedness.
- Alianzas: Building Inclusive Communities program, under the Community Development umbrella, describes education to assist immigrants in meeting the challenges they face (i.e., discrimination, low pay, inadequate health insurance, etc.).
- Lincoln University programming includes the Small Family Farms Program; Animal Production Efficiency; Grazing; Animal Health; Adding Value to New and Old Agricultural Products; Diversified/Alternative Agriculture; Small Farm Viability; Aging; Children, Youth and Families at Risk; Food Stamp; Kid’s Beat; Community Skills; Community Development; Community Gardening; Conflict Management; and Family Resource Management.

## **Diversity Accomplishments**

Missouri has made strides this fiscal year to achieve diversity, affirmative action and equal employment goals. We are making progress toward ensuring that diversity in staffing, advisory groups, County Extension Councils, audiences and programming becomes a reality; however, with a loss of funds, we have hired only 11 regional specialists this year. This is only one-third of the number hired in a typical year; thus, workforce diversity goals have been impaired. Following are examples of what has occurred in the past fiscal year:

- As a participant in the “Change Agent States for Diversity” (CASD) project; an organizational profile was completed and reviewed to determine the make-up of our workforce. This profile indicated that we have made some progress in recruitment and hiring efforts. Overall, there were 1,298 employees (professional, paraprofessional, education assistants, etc.). Just fewer than 10 percent are minorities, and 64 percent of them are women.
  - As part of the CASD project, **in 2002** University Outreach and Extension completed a Climate Assessment of Diversity in University Outreach and Extension involving a random sample of 381 employees. We are using these results to improve the workplace climate relative to understanding and valuing diversity.
  - Outreach and Extension re-appointed a Diversity Catalyst Team for Missouri. This team will develop a strategic plan and implement the CASD objectives for 2004.

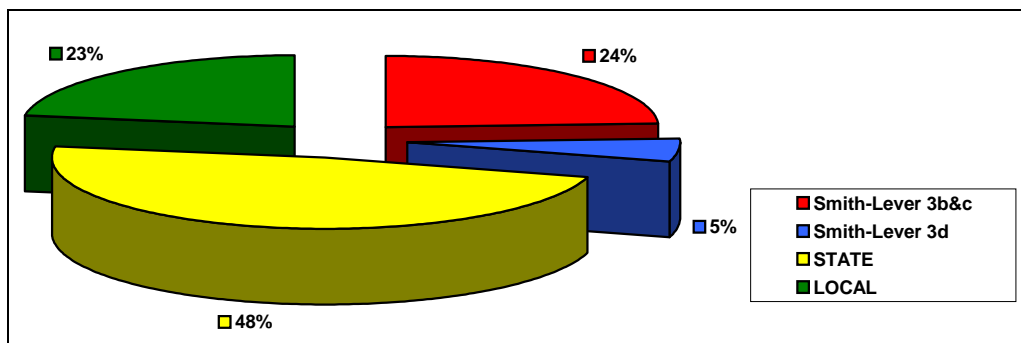
- Outreach and Extension continued to use the electronic recruitment system to recruit a diverse pool. This system consists of an award-winning CD ROM, graphics and visuals that have appeal. We continue to train all faculty and County Extension Council members serving on search committees using PowerPoint slides that focus on nondiscrimination and securing a diverse workforce.
- Outreach and Extension leaders reviewed diversity, affirmative action and equal employment organizational performance twice this year to determine progress and discuss actions for improved performance. Those participating in this leadership team included administrators, regional directors and campus program leaders. Statistics related to performance in recruitment, interviewing, hiring and retention of faculty were carefully evaluated along with County Extension Council memberships. These reports and ensuing continuous learning dialogues were very successful in improving performance.
- University Outreach and Extension hosted a statewide conference entitled “Cambio de Colores.” This conference focused on ways of reaching and working effectively with the growing Hispanic population.
- A statewide educational website was developed to serve as a ready reference to all faculty on diversity issues. (See: <http://outreach.missouri.edu/staff/eeo> )
- University Outreach and Extension has entered into a partnership with a host of community organizations and institutions to provide programming in three regions to serve Hispanic populations using a co-learning approach.
- Workforce profile:
  - Twenty-five percent (25%) of the regional directors are minorities (two of eight are black), and 50 percent are female.
  - Sixty-four percent (64%) of the workforce is female, reflecting an increase of 1 percent this year.
  - Thirty-six percent (36%) of the workforce is male, representing a decrease of 1 percent.

## **Stewardship of Resources**

Table 1 and Graph 1 show the overall expenditure of University of Missouri Outreach and Extension for the 2002-2003 programming year to be \$31,544,799 with \$7.6 million in federal Smith-Lever 3b & 3c funds. These dollars are critical to the core mission of University Outreach and Extension. This funding permits the flexibility to address emerging community issues, learner needs and aspirations and to continue a relevant statewide community-based presence. The following report does not reflect the contributions of more than 18,000 volunteers involved in priority program development, implementation and evaluation.

PROGRAMS	TOTAL
<b>Smith-Lever 3b&amp;c</b>	
Regular 3(b) and 3(c)	7,022,850
CSRS Retirement	267,310
Expanded 4-H	217,504
Expanded Part-Time Farmer	29,395
Rural Development	73,116
<b>Total 3(b)&amp;(3c)</b>	<b>7,610,175</b>
<b>Smith-Lever 3d</b>	
Expanded Food and Nutrition	1,391,927
Farm Safety	22,878
Food Safety & Quality (Carryover only)	25,000
Cotton Pest Management	15,840
Integrated Pest Management	207,100
Urban Home Gardening	0
Pesticide Impact Assessment	0
Water Quality (Carryover only)	0
<b>Total 3(d)</b>	<b>1,662,745</b>
<b>OTHER PROGRAM FUNDS:</b>	
STATE	<b>15,163,216</b>
COUNTY	4,797,363
NON-TAX	2,311,300
<b>LOCAL</b>	<b>7,108,663</b>
FEDERAL (Other than Extension Administered)	0
<b>TOTAL OTHER PROGRAM FUNDS</b>	<b>22,271,879</b>
<b>TOTAL ALL PROGRAMS</b>	<b>31,544,799</b>

Graph 1: Overall Expenditure of University of Missouri Outreach and Extension for 2002-2003



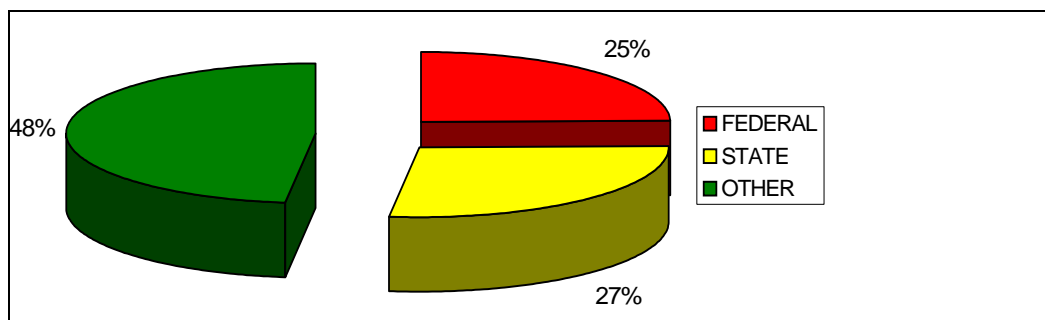
Graph 1: Overall Expenditure of University of Missouri Outreach and Extension for 2002-2003

Table 2 and Graph 2 show the overall expenditure of University of Missouri Agricultural Experiment Station for the 2002-2003 programming year to be \$48,919,276 with \$3.6 million in federal Hatch funds.



PROGRAMS (1862 Research)	TOTALS
<b>FEDERAL</b>	
CSREES	
Hatch	3,687,039
MRF	776,513
M-S	441,988
Grants	2,507,551
Other	48,756
<b>Total CSREERS</b>	<b>7,461,847</b>
USDA	8,967,395
Other Federal	5,099,723
<b>Total Federal</b>	<b>14,067,118</b>
<b>OTHER PROGRAM FUNDS:</b>	
STATE	15,638,368
OTHER	
Income (fees)	2,827,836
Industry	3,596,088
Other Non-Federal	5,328,017
<b>TOTAL OTHER PROGRAM FUNDS</b>	<b>27,390,309</b>
<b>TOTAL ALL PROGRAMS</b>	<b>48,919,274</b>

Table 2: Overall Expenditure of University of Missouri Agricultural Experiment Station for 2002-2003

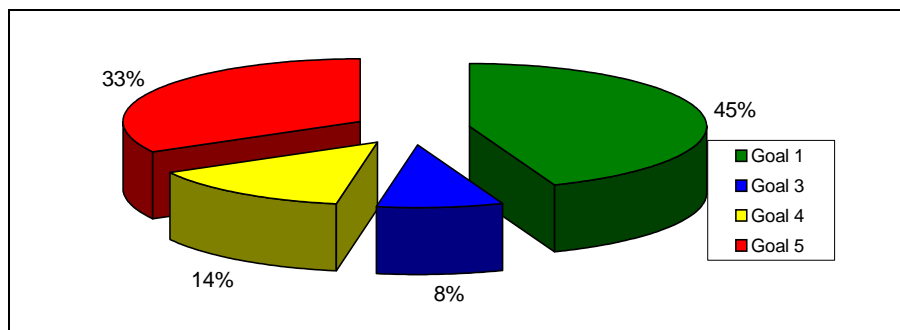


Graph 2: Overall Expenditure of University of Missouri Agricultural Experiment Station for 2002-2003

Table 3 and Graph 3 show University of Missouri Outreach and Extension expenditures by goal area for 2003.

	<i>2003 Planned</i>	<i>2003 Actual</i>
<b>Goal 1</b>		
Integrated Cropping Systems	\$3,035,540	\$3,281,566
Forages	\$1,517,770	\$1,640,783
Prof Livestock Prod.	\$3,035,540	\$3,281,566
<b>Total - Goal 1</b>	<b>\$7,588,850</b>	<b>\$8,203,914</b>
<b>Goal 3</b>		
Nutrition and Diet	\$988,500	\$1,068,616
Food Safety	\$131,800	\$142,482
Consumer Health	\$329,500	\$356,205
<b>Total - Goal 3</b>	<b>\$1,449,800</b>	<b>\$1,567,304</b>
<b>Goal 4</b>		
Watersheds	\$461,930	\$499,369
Animal Waste	\$989,850	\$1,070,076
Nutrient Management	\$989,850	\$1,070,076
<b>Total - Goal 4</b>	<b>\$2,441,630</b>	<b>\$2,639,520</b>
<b>Goal 5</b>		
Total Families programs	\$2,639,600	\$2,853,535
Total Youth and Vol. Leadership	\$3,035,540	\$3,281,566
<b>Total - Goal 5</b>	<b>\$5,675,140</b>	<b>\$6,135,101</b>
<b>TOTAL</b>	<b>\$17,155,420</b>	<b>\$18,545,840</b>

Table 3: University of Missouri Outreach and Extension Expenditures by Goal Area for 2003



Graph 3: University of Missouri Outreach and Extension Expenditures by Goal Area for 2003

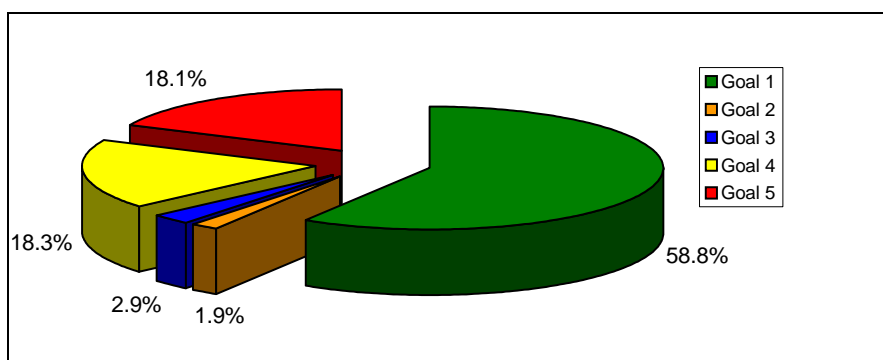
Table 4 and Graph 4 show University of Missouri Agricultural Experiment Station expenditures by goal area for 2003.

### 1862 Research Expenditures by Goal Area

Goal 1	\$28,764,534
Goal 2	\$929,466
Goal 3	\$1,418,659
Goal 4	\$8,952,228
Goal 5	\$8,854,389

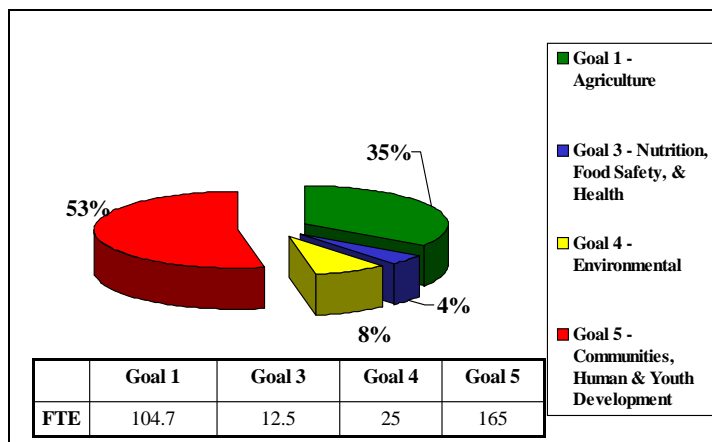
\$48,919,276

Table 4: University of Missouri Agricultural Experiment Station by Goal Area for 2003



Graph 4: University of Missouri Agricultural Experiment Station Expenditures by Goal Area for 2003

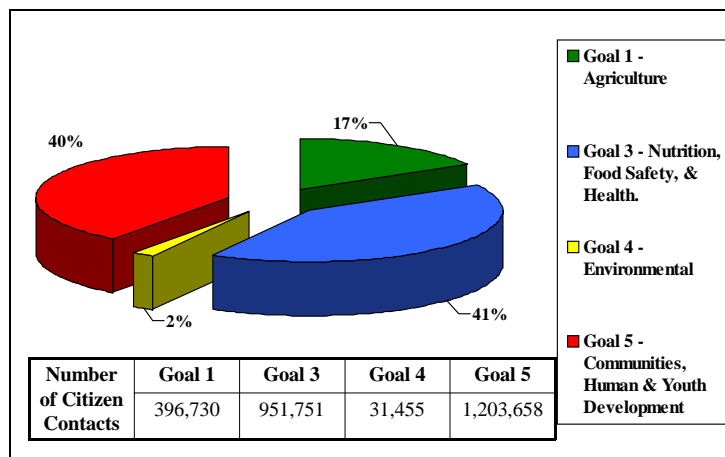
Graph 5 shows the percentage of FTEs of professional faculty/staff in each goal area for FY03.



Graph 5: Percentage of FTEs by Professional Staff

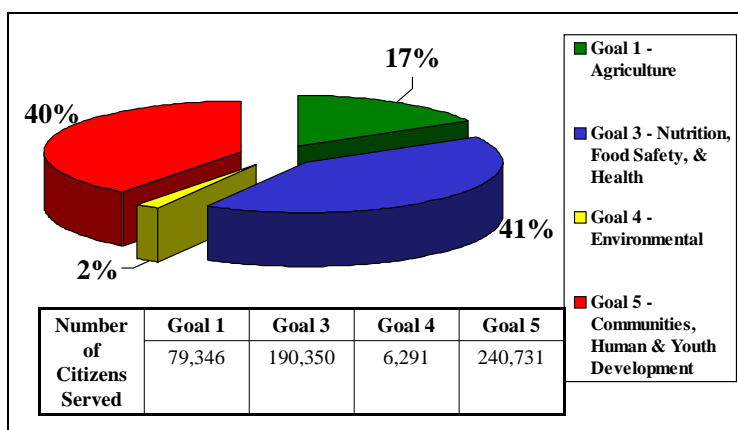
Graph 6 shows the total number of contacts with Missouri learners by goal area in FY03. Over two million contacts were documented. These contacts range from informational issues to major educational programs with sequenced learning over time. These contacts do not include web-based learner contacts.

University Outreach and Extension has information, fact sheets and web-based series learning available on the web that is not reflected in this chart for 2003. Continuing education and cooperative extension programs are marketed to more than 800,000 virtual visitors. Virtual visitors viewed more than 7,500 extension publications a day (<http://muextension.missouri.edu/>)



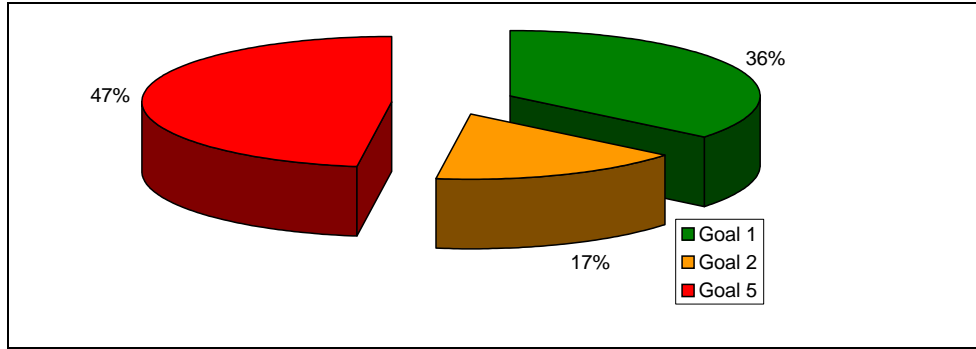
Graph 6: Percentage of Contacts by Goal

Graph 7 shows the total number of Missourians by goal area who were engaged in sequenced educational programming during FY03. The 516,718 learners represent more than 9 percent of the state's total population of 5,595,211. These contacts do not include web-based learner contacts. University Outreach and Extension has information, fact sheets and web-based series learning available on the web that is not reflected in this chart for 2003.



Graph 7: Percentage of Missourians Engaged in Sequential Learning by Goal

Lincoln University receives \$2,400,000 for Cooperative Research and \$2,600,000 for Cooperative Extension. In Cooperative Extension, these resources are allocated to Goals 1, 2 and 5. See Graph 8.



Graph 8: Lincoln University Allocated Resources by Goal

## **Goal 1: An Agricultural System that is Highly Competitive in the Global Economy**

### **1862 Agricultural Experiment Station Research Overview**

Desires to improve U.S. agricultural production and competitiveness in a world economy should be balanced with consideration of both short- and long-term consequences on natural resources and the environment. To address these alternative objectives, AES researchers at MU develop novel approaches in plant production systems (disease resistance) and animal production systems (decreased nutrient waste). In the area of **plant germplasm**, improved marker assisted gene selection techniques help plant breeders develop improved soybean lines that have desirable properties, such as improved protein and oil characteristics, while maintaining resistance to soybean cyst nematode. Researchers in **plant genomics** work to improve drought tolerance in plants. Scientists work to develop alternative modes of soybean resistance to root rot by identifying novel biomolecules that disrupt disease processes. Strategies to slow resistance in corn borer to bacillus thuringiensis (Bt) transgenic corn are being developed. Plant production systems are being tailored to site-specific conditions using **precision agriculture** to reduce negative environmental impacts from overuse of inputs.

In the area of **animal production efficiency**, scientists investigate new diet formulations to improve feed efficiency with the added benefit of reducing the negative environmental impact from manure. Fundamental research on reproductive efficiency continues and gives rise to improvements in conception rates in farm animals.

### **1890 Cooperative Research Overview**

Lincoln University researchers continued work toward the goal of assisting Missouri farmers to compete in the global economy. Of key importance is the planning and implementation of an aquaculture research and demonstration facility. This research will aid small farmers in increasing productivity and economic viability of the small farm with the addition of an alternative crop – fish. Further Lincoln University programs explore the viability of alternative crops to create niche markets that will aid the economic viability of Missouri's small farms.

### **1862 University Outreach and Extension Overview**

Education to cope with the increasingly competitive agriculture and food sector focused on the fundamentals of enterprise development, new crop production systems, new beef and pork production and marketing systems, and increased use and income from forage. The Value-Added Development Center and its network of regional specialists worked to enhance producer profitability and sustain rural community economic vitality through education on business development fundamentals. Animal production was enhanced through targeted educational programs on reproductive efficiency in beef and swine as well as alternative marketing strategies with beef calves. Crop production profitability was improved through educational programs to enhance input-use efficiency and to develop new systems, including identity preservation of higher value grains. Lastly, the forage-based animal agriculture that represents much of Missouri's livestock industry was impacted through educational programs on improving pasture management and further development of smaller, seasonal grass-based dairy operations.

### **1890 Cooperative Extension Overview**

Lincoln University continues its long tradition of programs designed to aid underserved and under-reached agricultural producers of Missouri enhance and maximize benefits from, and participation in, the global economy. Programming efforts under Goal 2 in 2002-2003 continue to meet Plan of Work performance goals of delivering pertinent, stakeholder requested information, training and participation in activities leading to increased benefits and profit from present and previous activities. In addition, because many Missouri farmers fear venturing into unfamiliar enterprises, efforts continued to emphasize education and use of new available technology to open competitive markets to Missouri farmers.

## **1862 Agricultural Experiment Station Research – University of Missouri-Columbia**

### **Key Theme: Animal Production Efficiency**

- . Program Description: Improving feed rations with reduced environmental impact

Researchers at MU are investigating new diet formulations for cattle to improve feed efficiencies and reduce nitrogen effluent in manure. Analysis includes predicting microbial amino acid flow to the small intestine of the ruminant.

- a. Program Impact:

Equations developed in the laboratory were used to calculate substrate (fiber, nonfiber carbohydrates, and protein) specific microbial amino acid production in the rumen. Existing NRC equations, which relate the percentage of protein needed in the ration, were used to calculate rates of substrate fermentation, and this information was then used to derive the mass of substrate fermented and calculate microbial amino acid production. In a comparison of over 90 experiments reported in the literature, this method of calculating microbial amino acid production was superior to the present NRC model. Further, investigators demonstrated that the NRC model could be used to predict all facets of rumen kinetics, and using equations for microbial amino acid production was very accurate in predicting microbial amino acid flow to the duodenum. Developing improved rations that reduce feed cost and reduce nitrogen excretion have both economical and environmental benefits.

- b. Source of Funds: Hatch, Grants

- c. Scope of Impact: Multi State

### **Key Theme: Animal Production Efficiency**

- . Program Description: Improving reproductive efficiency

Researchers are working to develop methods of improving reproductive efficiency in cattle and sheep. More specifically, the development of improved and economical methods of controlling livestock reproduction depends upon an increased understanding of the physiological mechanisms regulating ovarian function.

- a. Program Impact:

Efforts are focused on investigating mechanisms regulating ovarian follicular maturation,

ovulation, and corpus luteum function in cattle and sheep. Researchers have characterized the gene expression in progesterone receptors in luteal tissue. They continue to investigate the regulation of ovarian extracellular matrix remodeling by matrix metalloproteinases and their inhibitors. A deeper understanding of these mechanisms should result in the development of improved methods of controlling reproductive events (e.g., decreasing postpartum interval length and improving the synchronization of ovulation).

- b. Source of Funds: Hatch, Grants
- c. Scope of Impact: Multi State

### **Key Theme: Plant Genomics**

- . Program Description: Plant adaptation to drought

Regulation of root growth and development under water deficits is an important feature of plant adaptation to drought, but it is poorly understood. Research is being conducted to increase the understanding of the mechanisms regulating root and shoot growth using genomic and proteomic approaches.

- a. Program Impact:

Investigators are conducting water stress experiments, cell wall protein extraction and physiological analysis, and collecting plant tissue for gene expression profiling. Researchers are investigating the roles and mechanism of action of abscisic acid (ABA) and other hormones in water-stressed roots. Results show that ABA-deficiency under water stress results in substantially increased relative oxygen species (ROS) levels specifically in the root elongation zone. Preliminary studies suggest that the increase in ROS is causally related to the inhibition of root growth caused by ABA deficiency.

Gaining a greater understanding of the key mechanisms underlying root growth regulation in water-stressed plants is an important step towards the goal of improving crop performance in drought-prone environments.

- b. Source of Funds: Hatch, Grants
- c. Scope of Impact: Multi State

### **Key Theme: Plant Germplasm**

- . Program Description: Developing improved soybean lines

Researchers are working to improve soybeans on many fronts, including herbicide resistance, flood tolerance, and enhanced protein and oil properties. All efforts are superceded with consideration of soybean cyst nematode (SCN) resistance since genetic resistance is the best defense to this leading cause of yield reduction.

- a. Program Impact:

Plant breeders at MU have made more than 160 crosses to address goals in the broad scope of the



program which include genetic diversity, yield potential, flood tolerance, early maturing, food uses, fatty acid content, protein content, herbicide tolerance, and disease and nematode resistance. Soybean lines were developed in maturity group IV and V with tolerance to the herbicide glyphosate and with resistance to SCN races 3 and 14. Several lines with less than half the linolenic acid and half the saturated fats as conventional soybean were developed. Soybean lines are also being evaluated to determine if there is genetic diversity for flood tolerance in maturity groups III and later.

The SCN resistant varieties and germplasm releases with broad resistance to SCN populations are being widely used by soybean breeders in the development of soybean cultivars in all maturity groups with broad resistance to SCN races.

- b. Source of Funds: Hatch, Grants
- c. Scope of Impact: Multi State

### **Key Theme: Plant Germplasm**

- . Program Description: Breeding for soybean cyst nematode resistance

Reductions in yield from soybean cyst nematode (SCN), a major cause in soybean yield loss, have been achieved primarily through the breeding of resistant soybean strains. Since over 90 percent of the soybean varieties grown in the United States trace their resistance to two plant introductions, finding new sources of resistance is of paramount importance.

- a. Program Impact:

Researchers are working to discover new genes for resistance to study their inheritance. They have identified and mapped a number of molecular markers associated with resistance, some of which will be used in marker-assisted selection research. Soybean lines with different sources of resistance to SCN will help to make soybean less genetically vulnerable, by broadening the genetic base for pest resistance.
- b. Source of Funds: Hatch, Grants
- c. Scope of Impact: Multi State

### **Key Theme: Plant Health**

- . Program Description: Developing alternative root rot resistance in soybeans

Phytophthora root rot in soybeans is caused by the soilborne fungus, *Phytophthora*. This pathogen develops through a series of life stages from dormant propagules to infective zoospore cysts, in the course of infecting a plant root. The transition from one life stage to the next depends on environmental signals, particularly those generated by host plants. Researchers at MU are working to identify and express, in a plant tissue-specific fashion, novel biomolecules that disrupt life stage progression that depends on environmental signals.

- a. Program Impact:

Collaborators are using a phage display approach to identify and characterize combinatorial peptides that interfere with pre-infectious life-stage development of two *Phytophthora* species. They demonstrate that peptide-carrier constructs produced the same disruption as did the peptide when displayed on phage clones or as synthesized free molecules. This research lays groundwork for alternative modes of resistance that can be incorporated into soybean germplasm, which is especially important since root rot resistant soybean cultivars lose their effectiveness over time.

- b. Source of Funds: Hatch, Grants
- c. Scope of Impact: Multi State

### **Key Theme: Plant Production Efficiency**

- . Program Description: Delaying onset of corn borer resistance to Bt

*Bacillus thuringiensis*, a naturally occurring bacterium, is also used as an insecticide because it produces a toxin that kills damaging insects. Using biotechnology, corn breeders have developed Bt corn, which has genes for the toxin engineered into the corn plant to kill corn borers that feed on it. Researchers are developing strategies to slow down resistance in Southwestern corn borer to Bt in transgenic corn.

- a. Program Impact:

Six field populations of Southwestern corn borer were collected from Texas, Kansas, Missouri, Kentucky and Tennessee and reared in the lab for assay. Feeding bioassay was used to determine LC50 and EC50 values at 7 and 14 days after treatment for 6 field populations and 1 lab colony. Resistance management strategies to delay the onset of resistance of SWCB to Bt depend on the effectiveness of a resistance-monitoring program capable of early detection of resistance. Early detection will allow selected management strategies to be implemented before control failure occurs. The data from this project will provide basic information for selection of the best management strategies for insect pest control in transgenic corn field.
- b. Source of Funds: Hatch, Grants
- c. Scope of Impact: Multi State

### **Key Theme: Plant Production Efficiency**

- . Program Description: Improving wheat production management

Soft red winter wheat is grown in several distinct environments within Missouri. The environmental variability among production regions results in differences in the predominant pest complex, yield potential, and growers' evaluation of production risk. Therefore, statewide, generalized production recommendations do not provide growers with enough information to get the most out of their production systems.

- a. Program Impact:

Research is conducted to develop a framework for timely and accurate assessment of production issues. Initial research has yielded baseline information from which to create developmental

models for winter wheat production systems. Results of this modeling will be used to develop an interactive web-based system that will provide growers with precise and timely crop and pest management recommendations on a local scale.

- b. Source of Funds: Hatch, Grants
- c. Scope of Impact: Missouri

### **Key Theme: Precision Agriculture**

- . Program Description: Site specific agriculture

By combining contemporary information technology with crop production practices, precision agriculture allows crop management systems that are customized for areas within fields. By matching the kind and amount of inputs with actual crop needs, this more finely-tuned type of management not only makes better use of costly inputs but also reduces negative environmental impacts from overuse of inputs. This research focuses on determining what information and measurements are important to achieve precise farming.

- a. Program Impact:

Focus groups were interviewed regarding the perceived benefits, concerns, and needs of adopting precision agriculture technology. Fields to be used for variable rate input experiments were selected and data on imagery, soil electrical conductivity and elevation were collected. Geo-registered historical aerial photographs dating back to 1939 were used to augment our understanding of within-field variability. Current research will be used to sort out which surrogate measurements are the most meaningful to producers in implementing precision agriculture.

- b. Source of Funds: Hatch, Grants
- c. Scope of Impact: Multi State

## **1890 Cooperative Research Programs — Lincoln University**

### **Key Theme: Aquaculture**

- . Program Description:

The demand for high quality fish products is increasing because of increasing population and a shift to low fat proteins. Traditionally most seafood and fishery products were harvested from the oceans. Stocks of fishery resources are declining and cannot provide sustainable harvest at today's levels. The demand for products will have to come from aquaculture. Some international organizations indicate that aquaculture output will need to increase by substantial amounts to meet increasing needs. There is a great need to develop sustainable aquaculture methods that are more suitable to the north central states. Blue gill is one of the species that has the potential of making a significant contribution to aquaculture in the Midwest.

Research is designed to investigate the methods and economics of producing bluegill sunfish (*Lepomis macrochirus*) for commercial sales. Growth, density, and breeding studies are being conducted to determine economic feasibility of transferring methods and technology to

commercial applications. Growth and density studies are conducted at Lincoln's recirculation aquaculture system at Carver farm. Fingerling bluegills are stocked in the eight-tank system at four different densities with one replication of each. Fish are fed similar high protein diets and sampled bi-weekly for performance. Performance characteristics include, specific growth rate, percent gain, conversion rate, and increase in length. An economic analysis is conducted at the completion of the trial. Each test lasts approximately 120 days. Brood fish from each test are selected on the basis of growth, body confirmation, and disease resistance. Selected fish will be mated during the spring of 2004 and progeny will be subjected to growth challenges in the recirculation system.

Bluegill sunfish were selected for the trials because they are a native species that have good market recognition. Previous market studies show demand for the fish if it is available in desirable forms. In addition the bluegill shows good potential as a commercial species. However, there is a lack of significant studies that investigate proven, profitable, and sustainable production technologies for the fish. Current research results do not clearly show which growth strategies or methods for fingerling production and grow out will be most cost effective. These studies will add to the body of knowledge in determining effective technologies and determine cost effectiveness of the methods.

a. Program Impact:

The first performance test was completed during September. Young of the year Bluegill were grown at four different densities to marketable fingerling size, 4" to 6" in four months. Preliminary results indicate that bluegill can be cultured in recycle systems at higher densities than reported in the literature. A demonstration system at Lincoln University's Carver Research Farm facility containing 8 research tanks presently stocked with ornamental fish and one sample re-circulating system, which farmers can affordably purchase, has been established. The demonstration system's cost is under \$5,000. This project has resulted in a regional conference with the Missouri Aquaculture Association, University of Missouri and interested stakeholders.

b. Source of Federal Funds: Evans-Allen

c. Scope of Impact: Missouri

## **Key Themes: Animal Production Efficiency, Grazing, and Animal Health**

. Program Description:

The cost of feed required to produce a pound of live hog is 60 to 80 percent of total production costs. Reducing feed costs per pound of gain while maintaining rapid daily gains and acceptable carcass quality has always been the major focus of the pork industry.

The growing-finishing phase of swine production involves the major feed consumption stage and offers the greatest opportunity for improving feed efficiency and savings. Growing-finishing pigs can be fed alternative energy and protein sources. However, decisions to change diets from the typical corn-soybean meal based feeds to the alternative feed sources depends on comparative costs of gain, availability of alternative feeds, effects on carcass quality, and special feed handling considerations.

Two independent feeding trial conducted at the Lincoln University Swine Research Facility using weaning pigs and a third one using growing-finishing pigs clearly indicated that the pigs fed diets containing WM were more efficient, and gained faster than the corn soybean meal-based control diet fed pigs. However, this project was designed differently in that all 48 pigs in the study were fed the same control diet until the average weight of the pigs was 88.40 kg at which time the pigs were randomly assigned to their respective diets for additional 6 weeks until they reach 115.68 kg. The pigs were housed in raised-floor pens (4/pen) with pens serving as experimental units (EU; 3 pens/treatment). Diets used were: corn-soybean meal based control diet (D-1), D-1 plus microbial phytase (MP; Natuphos, BSF Corp.; D-2), D-1 plus 25 percent wheat WM as a source of IP (D-3), and D-3 plus MP, (D-4). The diets were also identified as either low (D-1 and D-2) or high (D-3 and D- 4) fiber diets, respectively. Commercial limestone and dicalcium-P were used as sources of Ca, and P. All other nutritional ingredients were added at/or exceeded NRC, (1998) recommendation. At the end of the experiment a total of 16 finishing pigs (4 pigs/ diet) of a comparable weight ranges were randomly picked and slaughtered at the University of Missouri meat lab.

a. **Program Impact:**

It was found that replacing 25 percent of the corn in the diet with equal amounts of wheat middlings reduced feed cost. Second, performance of pigs fed diets containing wheat middling was comparable to the control diet fed pigs. In addition, the fiber in wheat middlings has the potential to selectively promote growth of fiber digesting microorganisms resulting in increased concentration of short chain volatile fatty acids (VFA) in the hindgut. Short chain VFA produced in the hindgut stimulates epithelial cell proliferation in such a way that it would increase the absorptive surface area of the large intestine. Also, reduction of ammonia, VFA, and, Phosphorus concentrations in the feces as was mentioned in our earlier reports indicates that a substantial amount of these byproducts were reabsorbed by the host animal. Reduction of nitrogenous compounds such as ammonia and phosphorus and some of the other minerals in feces may assist in easing the most recent mandatory EPA manure application rates put to work.

b. **Source of Federal Funds:** Evans-Allen

c. **Scope of Impact:** Missouri

**Key Theme: GIS/GPS**

. **Program Description:**

At the Stakeholder Symposium sponsored by Lincoln University held in Jefferson City in August 2001, stakeholders from the Bootheel region of Southern Missouri raised major environmental concerns which included, among others, the presence of elevated metal, pesticide or chemical concentrations in soil, surface and ground waters and air pollution. Environmental studies that address such problems were therefore initiated to improve the quality of life in the area and to safeguard the stakeholders from health problem caused by soil, water and air contamination. This project targets one of environmental problems in the area as they related to greenhouse gas emissions from agricultural fields. The study is an attempt to find solutions through the integration of laboratory and field studies.

The first year of this multi-year project focused on acquiring equipment such Gas Chromatograph, thermal properties meter; setting up experimental sites; collecting data on farms,

designing and building gas sampling chambers, installing these chambers in chosen sites, monitoring plant growth and finally collecting soil samples to characterize initial soil chemical, physical properties and thermal properties in these sites. Sampling sites for this project were chosen at Freeman Farm (Agricultural fields site) where a corn, soybean and cotton fields were initiated; Carver Farm (Grassland site) where a field plot was set on a permanent pasture, Busby Farm (forest site) where two plots were set inside the forest, LU-Lilbourn and a cotton field in the Bootheel. Experimental plots at each of the 5 sampling sites were mapped using global positioning sites (GPS). Thermal properties were directly measured and soil samples were collected for analysis of initial soil chemical and physical properties. A GIS database is in construction for each of the experimental sites. GPS coordinates of each sampling location will enable long-term monitoring of nutrients. Maps will be produced to portray areas of high and low soil properties and will be contrasted with greenhouse gas emissions.

a. Program Impact:

Initial soil thermal properties measured are soil thermal conductivity, thermal diffusivity and thermal conductivity. Soil physical properties studied were soil air and water contents, bulk density, total pore space, gas diffusivity and pore tortuosity. Soil chemical properties were pH, acidity, organic matter and N, P, K, Ca, and Mg. These properties were measured because they have an impact on the production and escape of greenhouse gases from soil to the atmosphere. Most of these properties differed among experimental sites and showed high spatial variability within each sampling site. They were, however, in the range of normally reported values. For plant growth, soybean growth was monitored over a three-month period and final yield for both soybean and corn is being recorded. As for soil properties, soybean and corn growth also varied tremendously across fields.

b. Source of Funding: State

. Scope of Impact: Missouri

**Key Theme: GPS**

. Program Description: Establishing a Geospatial Digital Database for the Bootheel Region of Southeastern Missouri

The goal of this project is to create a geospatially referenced, digital database for the Bootheel region of southeastern Missouri, a region serviced by the Cooperative Research and Extension Programs at Lincoln University. This data basis will provide the basis for environmental monitoring, modeling, and natural resource management activity in the region.

The core of the digital database will consist of digital elevation models (DEM), land use/land cover, digital orthophotos, geology (bedrock, surficial, structures), soil, hydrography, and groundwater. Ancillary data such as transportation networks, census, and Landsat Thematic Mapper images and TERRA satellite's ASTER images will also be part of the database. The database will be designed to allow the addition of various thematic layers as required including results from completed research projects as they become available physical properties and thermal properties in these sites. Sampling sites for this project were chosen at Freeman Farm (Agricultural fields site) where a corn, soybean and cotton fields were initiated; Carver Farm (Grassland site) where a field plot was set on a permanent pasture, Busby Farm (forest site) where two plots were set inside the forest, LU-Lilbourn and a cotton field in the Bootheel. Experimental

plots at each of the 5 sampling sites were mapped using global positioning sites (GPS). Thermal properties were directly measured and soil samples were collected for analysis of initial soil chemical and physical properties. A GIS database is in construction for each of the experimental sites. GPS coordinates of each sampling location will enable long-term monitoring of nutrients. Maps will be produced to portray areas of high and low soil properties and will be contrasted with greenhouse gas emissions.

a. Program Impact:

Data is being collected for individual counties. To date, the following data have been obtained from the Missouri Spatial Data Information Service for all the counties in the southeastern lowlands of Missouri: a) Land use/Land cover, b) digital orthophotos, and c) digital elevation model (DEM). The data collection process will continue for all the themes identified. The project area falls under a single physiographic region and as a result, viewing the region as a whole rather than individually on county-by-county basis may be necessary. In this regard the available county based data set may have to be merged to form a single continuous layer covering the entire region of the southeastern lowlands of Missouri, probably at a coarser spatial resolution. The database design phase of the project has begun, and the database design will be conducted in consultation with the Center for Agricultural Resource and Environmental Systems (CARES) at the University of Missouri, Columbia.

b. Source of Funding: Evans-Allen

c. Scope of Impact: Missouri

## **1862 University Outreach and Extension — University of Missouri System**

### **Key Theme: Adding Value to New and Old Agricultural Products**

. Program Description:

Two trends have dominated agriculture over the past decade. First, the number of farms has decreased substantially. Second, the value of price received on the farm has declined relative to the consumer price paid. In an effort to combat these trends, agricultural producers are seeking innovative and profitable means to enhance their portion of the end-user dollar. The Missouri value-added effort was established to help producers with the business aspects of value-added ventures. Though the statistics indicate that 80 percent of start-up businesses fail, attempting to do something is better than doing nothing. Thus, the Missouri value-added effort is concentrated on helping Missouri and national constituents with the business aspects of planning, organizing and operating the value-added business to increase the success rate.

Missouri Value Added Development Center is (<http://valueadded.missouri.edu/index.htm>) unique in its structure. Although headquartered in Columbia, its efforts extend throughout the state via approximately 45 Agricultural Business Counselors (ABCs), who maintain local connections with producers. Once contact is made, ABCs assist individual producers or producer groups by facilitating the business development process.

Value added is globally defined to be the process of agriculture producers capturing a greater portion of the end-user dollar. The purpose of the Center and Agricultural Business Counselors is

to enhance Missouri agri-producer profitability and sustain rural community economic viability by assisting agricultural entities in the business development and economics of value-added ventures.

The mission of the Center and Agricultural Business Counselors is met through:

- Value-added producer educational programs delivered through the ABCs
- Value-added professional development programs delivered through the Center
- Put-to-action applied research directly applicable to value added
- Collaboration with research faculty to produce high-quality, relevant information
- Assistance to entrepreneurs and entrepreneurial groups in start-up, marketing and distribution of agricultural products
- Assessment of potential and actual impact of value-added ventures at the farm, community and regional levels.

a. Program Impact:

During the past year, the Missouri Value Added Development Center has played a critical role in the following business start-up activities throughout the state:

- USDA value-added grants awarded to Missouri agricultural producers increased nearly \$1 million from \$2.8 million (2002) to more than \$3.7 million in 2003.
- With completion of Mid-Missouri Energy's fund drive, a 40-million-gallon-per-year, producer-owned ethanol plant is under construction in central Missouri. The potential annual economic impact to the state by the Mid-Missouri Energy Ethanol Plant is estimated to be \$154 million.
- The Mississippi Valley Processors are using a USDA value-added grant to analyze the feasibility of processing soybeans into soybean meal, biodiesel and vegetable oil.
- East Central Ag Products, a joint producer effort, received a USDA grant for working capital and nearly completed their capital fund drive for construction of a 20-million-gallon-per-year, producer-owned ethanol plant in east central Missouri.
- Farm Foods Inc., a new-generation beef-canning cooperative, completed plant construction and began operations in 2003.
- Seven west central Missouri producer-investors started "Missouri Pecan Growers" in 2000. This business cleans, processes and merchandises locally produced pecans. In 2002, the cooperative began selling these pecans in Schnucks and Hy-Vee grocery stores. The organization is now producing certified organic pecans and is proceeding with expansion plans to include additional growers in central Missouri.
- Beef cow/calf producers are assuming ownership of a statewide Show-Me-Select Heifer program (reputation brand replacement heifers), demonstrated to return price premiums of \$100 per head relative to standard replacement heifers.
- Livestock producer groups (Alma Meats, Ozark Mountain Pork) are using USDA value-added grant funds to develop and expand producer-owned meat processing and marketing facilities.

b. Source of Funds: Smith-Lever, NRI, State, USDA-Rural Development, Kellogg Foundation

c. Scope of Impact: Missouri

**Key Theme: Animal Production Efficiency**



a. Program Description: Profitable and Sustainable Livestock Production Utilization System

Several factors have influenced the type of livestock production systems currently practiced in Missouri. Climate; soil types and terrain; location; availability of markets; environmental regulations; renewable resources such as grain, forages and water; governmental policies; and its people have all contributed to structure and viability of animal agriculture in the state.

Missouri ranks sixth in the United States in swine production with nearly 4,000 operations producing a total of 6.3 million pigs. The total number of Missouri swine enterprises has declined rapidly from 10,500 operations in 1994 to 5,000 operations in 1998. Another 20 percent were lost by 2000. However, total average inventory of pigs has changed very little.

Missouri ranks second in the nation in total number of beef cows in production, with 2,062,000 cows on nearly 60,000 farms. Revenue generated from cattle production in 1999 contributed \$890 million to Missouri's economy. Over a 10-year period, the value of Missouri cattle production is nearly tied with the value of Missouri soybean production as the number one commodity in the state. Beef enterprises are finding it increasingly difficult to compete in a global marketplace where large producers use economies of scale to be more profitable. This is especially true for producers in Missouri, given the average herd size of 34 cows.

Some major factors impacting the livestock industry are lack of quality labor; greater demands from consumers for a wholesome product; biosecurity and air quality issues; waste management and water quality; business management; and new technology. To address these trends and issues, the Livestock Production Systems program has focused on three major program thrusts:

- 0) **Improved/Enhanced Production Efficiency of Beef Herds in Missouri.** This program educates beef producers about breeding strategies, genetic predictions, EPD (Expected Progeny Differences), AI (artificial insemination), economics, animal health and the selection of replacement heifers. The educational methods used include workshops, livestock seminars, demonstrations, field days, producer tours, computer programs, web sites, mass media, guide sheets, and individual consultation. The major Named Program related to this thrust is the [Show-Me Select Heifer Program](http://agebb.missouri.edu/select/) (<http://agebb.missouri.edu/select/>).
- 0) **Improved Marketing and Financial Strategies for Beef Cattle Producers in Missouri.** This program educates beef producers about retaining ownership; production and nutritional management; animal health record keeping; operational assessment; alternative marketing; and feedlot management. The major educational methods used include feedlot tours, marketing programs, distance learning, ultrasound demonstrations, stocker seminars, workshops, producer tours, guide sheets and the mass media. The major Named Program related to this thrust is the [Premier Beef Marketing Program](http://agebb.missouri.edu/commag/beef/premierbeef/index.htm) (<http://agebb.missouri.edu/commag/beef/premierbeef/index.htm> ).
- 0) **MO-Pork: Increasing Pork Production in Missouri.** This program educates pork producers about current production practices to improve productivity and profitability. Focus of the program is on genetics, nutrition, herd health, reproductive performance and environmental management. The major educational method used involves individual consultation, seminars, workshops, guide sheets and mass media.

Missouri is a member of the **Livestock Marketing Information Center**, which is a collaborative effort among USDA, state extension specialists and industry cooperators. This program involves a coalition of 24 states including Missouri. (see: <http://www.lmic.info/> )

b. Program Impact:

The Profitable and Sustainable Livestock Production Utilization System is a multistate extension program. The following impacts of the program are specific to Missouri.

- 1) The Premier Beef Program was initiated to educate small-herd beef producers in the concept of value-based feeder calf marketing and to institute regional feeder calf marketing alliances. Currently, 15 marketing cooperatives are active in Missouri, representing 153 farms and 7,000 feeder cattle annually. Marketing feeder calves through the cooperatives has added \$45.31 per head to the value of feeder calves, for an average net profit of \$1,764 per farm. A web site has been developed for beef producers interested in learning about Premier Beef: [http://agebbfp.missouri.edu/commag/beefanddairy/pb\\_index.htm](http://agebbfp.missouri.edu/commag/beefanddairy/pb_index.htm)
- 2) The Missouri Ration Balancing System for Beef Cattle is Windows-based ration-balancing software for beef cattle producers. Two computer programs, “Grower” and “Balancer,” were developed for use by the regional extension specialists to train producers to balance feed rations. To date, 41 regional meetings have been conducted, through which 387 Missouri beef producers have acquired the software and have become proficient in its use. Regional livestock extension specialists indicate that they are spending significantly less time balancing rations for beef cattle clients since the software and training were offered.
- 3) An on-farm assessment of farming operations is under development by the Commercial Agriculture Beef Focus Team and has no reportable accomplishments during the period.
- 4) The MO-Pork program provided educational programs and on-farm consulting to more than 210 Missouri family swine operations, representing nearly 80 percent of Missouri’s pork production. The MO-Pork program resulted in an estimated feed savings of more than \$1.00 per pig marketed, resulting in an estimated economic boost of \$4 million to the Missouri pork industry.
- 5) Through individual consultation and troubleshooting, an independent pork producer in east central Missouri converted a 25-year-old building and outdoor housing of sows into a one-of-a-kind building over concrete flooring to allow for better manure management, increased sow productivity and closer supervision. The total cost of construction was only \$50 per pig space, while new construction approached \$600 per pig space -- a savings of more than \$175,000. Other individual consultations with Missouri pork operations have resulted in a \$25/pig potential profit through an improved farrowing rate from 68 percent to 80 percent.
- 6) Nearly 700 young people participated in swine educational programs, including the MPA Pork Institute, Youth Pork Quality Assurance, Missouri State Fair Production Derby Contest, MO Pork Expo Quiz Bowl and the Pork Skillathon.
- 7) The **Nutrient Management Program** is a farm-level, systems-based model incorporating engineering, animal production, nutrition, agronomy and economics. This program has allowed more than 400 Missouri producers to gain knowledge about the benefits of having a comprehensive nutrient management plan (CNMP). Through education and development of individual CNMPs for operations, producers are adopting better management strategies, such as using manure as a fertilizer, alternative storage and manure application practices, and further refinement of nutrient concentrations in the diet.
- 8) Seven Missouri pork producers have developed and implemented a CNMP in their operations. Optimizing feed efficiency and avoiding over-formulation of diets has resulted in a nutrient savings valued in excess of \$1 million dollars. Additional savings of nearly \$9 to \$10 per acre are due to improving application rates to meet crop nutrient requirements by using manure rather than a commercial fertilizer.

- 9) Producers who implement a CNMP are eligible to receive cost-share dollars from the Environmental Quality Incentives Program (EQIP). In 2003, Missouri allocated more than \$15 million to producers to incorporate enhanced environmental stewardship.
- 10) The Commercial Agriculture Dairy Focus Team conducted a Competitive Dairy Audit of the dairy industry in Missouri. The audit was developed to analyze historical trends, Missouri's competitive position and economic opportunities for the industry. The audit identified two basic strategies for developing a more profitable and sustainable dairy industry in Missouri:
  - Retool and reinvest in existing on-farm infrastructure
  - Increase the scale of new and existing dairies.The focus team will use the audit as the basis for developing a strategic program plan. The complete audit report is available on the web at:  
<http://agebb.missouri.edu/commag/dairy/audit/index.htm>
- 11) During the 2003 reporting period, 215 herds were enrolled in the Show-Me-Select (SMS) program with 8,691 heifers. Twenty-two regional livestock specialists and 93 veterinarians participated in the program statewide.
- 12) Sixty percent of the participants in SMS replacement heifer sales indicated they were willing to pay a \$100-per-head premium for SMS heifers relative to standard pregnant heifers.
- 13) Show-Me-Select cattle bring higher prices at market sales. Beef producers are netting greater profits at market through Show-Me-Select replacement heifers. Extension faculty specialists have worked with a total of 166 veterinarians, 53,652 heifers and 493 producers since the beginning of the program with the goal to raise genetically superior animals that bring higher prices and create a reliable source of replacement heifers. During this time, 12,200 heifers have been sold through Show-Me-Select replacement heifer sales across Missouri with gross sales of \$11,644,107. In addition, 3,975 producers have registered to buy heifers at these sales.
- 14) At the 2003 Show-Me-Select replacement heifer sales, 1,728 heifers sold for an average of \$1,122 per heifer.
- 15) The cost of producing the 54,652 SMS heifers enrolled in the program to date is around \$50 million, with money flowing back to input suppliers, rural businesses and sale barns. Economic activity on farms and in rural communities is stimulated through multiple venues as a result of this program. The overall economic impact of the program exceeds \$3.5 million annually.
- 16) In 2003, SMS participants selected board members from their respective regions; an official slate of officers was elected; and articles of incorporation were filed for Show-Me-Select Replacement Heifers Inc. as a not-for-profit organization in Missouri.
- 17) The Show-Me Buying Cooperative consists of 54 independent pork producers who market more than 300,000 pigs annually. The cooperative's members implemented the use of dietary phytase and decreased the inorganic phosphorus content in all premixes and diets purchased. The use of phytase and lower phosphorus inclusion rates has resulted in more than a 30 percent reduction in phosphorus concentrations of manure. By buying in economy-size batches, the group realized additional feed savings of more than \$1 million annually, or nearly \$20,000 per operation.
- 18) The Premier Beef Management Program had an estimated total impact of \$231,084 on the state economy in 2002.
- 19) The Show-Mo Dairy Heifer Growers Association is organized to assist producers in locating and developing dairy heifers in Missouri. In 2003, the organization established contact with a 7,000-cow dairy and 35,000-heifer-development group, which is interested in having their dairy heifers contract raised. The first load of heifers arrived in Missouri in December 2003, and an additional 2,000 head will arrive in 2004. This project will involve 20 growers and will affect the development of the contract heifer raising industry in Missouri.

- 20) The Southwest Missouri Family Dairy Farm Project has enabled 48 family dairies to remain in business by lowering production costs while improving their financial skills in a pasture-based system. A group learning style has taught producers to develop a written business plan, use a computerized record system and adopt management-intensive grazing techniques.
- 21) Dairy information transfer has been enhanced with the building of two dairy web pages:  
<http://agebb.missouri.edu/modbu/index.htm>  
and <http://agebb.missouri.edu/dairy/>  
More than half of the 1,600 family dairies in Missouri have access to current dairy information on the Internet.

- c. Funds: Smith-Lever, State
- d. Scope of Impact: Arkansas, Colorado, Georgia, Idaho, Iowa, Kansas, Kentucky, Michigan, Minnesota, Mississippi, Missouri, Montana, Nebraska, North Dakota, Oklahoma, Oregon, South Dakota, Tennessee, Texas, Utah, Virginia, Washington and Wyoming.

### **Key Theme: Plant Production Efficiency**

- a. Program Description: Integrated Cropping System

Production agriculture in Missouri and the entire U.S. is undergoing structural changes that challenge the viability of many rural communities. Increased production efficiency and global competition have given rise to a marketplace where profit margins are paper thin, favoring consolidation of smaller farms into larger operations that can benefit from efficiencies of scale. Often these larger farm managers own only a portion of the land in their operation, renting additional acres from owners who often are absent. Thus, farmers often know little about the management history of the fields they are farming. Added to this constraint is the fact that time is at a premium for farmers who often manage 2,000 or more acres. So, at a time when accurate, timely information is needed more than ever, many farmers are in a poor position to capture that information.

The economic well being of all Missourians depends on a healthy and vibrant agriculture. Nearly 80 percent of Missouri's 29 million acres are devoted to crop and rangeland. In addition, crop sales account for nearly 50 percent of total agricultural cash receipts (nearly \$5 billion). The science and technology associated with crop management change at an increasingly rapid pace. Identified trends, issues and concerns include increased environmental awareness; crop management in the information age; biotechnology; identity preserved and niche marketing; unintended consequences of technology adoption; consolidation in the input industry; small profit margins and global economy; and competition among information sources.

The major program priorities for the Integrated Crop Program (ICM) are:

0. Enhanced profitability of grain, fiber and forage production; and
2. Reduced negative impacts of grain, fiber, and forage production on the environment.

During this reporting period, the major program thrusts for these Integrated Crop Program (ICM) priorities have focused on:

- 1) Enhanced profitability of grain, fiber and forage production
  - Management of seven major or emerging crops (soybean, corn, wheat, forages for grazing, alfalfa, cotton, rice)

- Comparative cropping systems that incorporate transgenic cultivars with those that use traditional cultivars
  - Precision agriculture and remote sensing
  - Improved marketing that incorporates global and consumer perspectives
  - Alternatives to traditional cropping systems; improved profitability and income stability
  - Value-added, niche markets, including organic crop production.
- 2) Reduced negative impacts of grain, fiber and forage production on the environment
- Integrated pest management
  - Pesticide applicator training
  - Alternatives to traditional pest and nutrient management practices
  - Soil management programs, including soil conservation
  - Best management practices for nutrients, including appropriate development of nutrient management plans
  - Role of GMO cultivars in pest management.

For additional program information, see [Getting There From Here - Strategic Directions to Guide Missouri's Agriculture and Natural Resource Outreach and Extension Effort!](http://www.cafnr.missouri.edu/outreach/statewideplan.asp) (<http://www.cafnr.missouri.edu/outreach/statewideplan.asp> )

#### Program Impact:

Integrated Cropping Systems is a multistate, integrated research and extension program. The following impacts are specific to Missouri.

- 0) During the reporting period, 7,500 Missouri agricultural producers attended programs on new production practices and technology. As a result of these efforts, the use of no-till or reduced-till technology to conserve soil and water has increased over the past 10 years.
- 0) About 45 percent of Missouri soybean producers use no-till technology at present, compared with 6 percent in 1990.
- 0) A similar shift has occurred among Missouri corn producers, 41 percent of whom currently use no-till, compared with 14 percent in 1990.
- 0) In the early 1990s, Missouri cotton producers began adopting weed control programs with newer technology that reduces costs per acre by \$5 to \$10. During 2003, more than 1,000 of Missouri's cotton producers used the new technologies to reduce their use of herbicides by two to five pounds per acre. This decline in herbicide use per acre resulted in two million pounds less herbicide used by Missouri cotton producers.
- 0) About 85 percent of Missouri cotton producers and 75 percent of rice producers have adopted the new technologies as presented in the University of Missouri Integrated Crop Management Program.
- 0) In addition, 50 weekly summaries of crop market data were posted on the University's Agricultural Electronic Bulletin Board to assist producers in making timely marketing and strategic planning decisions.
- 0) Five hundred copies of "Economics of Specialty Corn Production," a publication developed by members of the agricultural economics faculty, were distributed to interested producers.
- 0) Twenty-five programs on the economics of identity-preserved (IP) production were conducted with a total attendance of 750.
- 0) Extension and Natural Resources Conservation Service (NRCS) staff members worked with minority farmers in the southeast region to establish a minority farmer-owned cooperative.

- The team producer training and technical assistance focused on production, business planning, decision-making, organizational structure, marketing and governmental assistance.
- 0) A recent survey of 2,200 Missouri cotton producers found that 82 percent of their acreage was treated based on scouting results. The use of this pest control decision tool increased production by 50 pounds of lint per acre.
  - 0) A recent survey of Missouri rice producers showed that 93 percent of their acreage was treated for pests based on weekly pest scouting results during 2003; 54 percent of acres were scouted by the producer, and 39 percent were scouted by a professional. This is up from 88 percent in 1999.
  - 0) The percentage of rice acres scouted for pests by a professional increased dramatically from 11 percent in 1999 to 39 percent in 2003. This increase is largely due to efforts begun in 1996 to educate producers about the benefits of scouting reports. This increase in pest management decisions based on weekly pest surveys resulted in less wasteful use of all agriculture chemicals and an increase in yield.
  - 0) A major accomplishment of the (Integrated Pest Management) IPM Weed Control Program was increased adoption of alternative herbicide modes (non-ALS inhibitors) -- from 11 percent of Missouri's soybean acres in 1994 to more than 95 percent in 2002.
  - 0) The most recent survey by the USDA-ARMS (Agricultural Resource Management System) found that 80 percent of Missouri's corn acres were scouted.
  - 0) One hundred professional crop advisers from Missouri, Arkansas, Tennessee and Mississippi attended a 16-contact-hour continuing education seminar on weed identification and herbicide symptomatology at the Delta Center. These advisers were responsible for providing advice and technical assistance to a client base ranging from 50 to 1,000 farmers, who managed a total of 25,000 to 10 million acres.
  - 0) Five pest management workshops were conducted for 150 producers. Results of tests taken both before and after the workshops indicated that more than 70 percent of those attending improved their knowledge of pest management.

. Source of Funding: Smith-Lever, State

a. Scope of Impact: Missouri, Arkansas, Tennessee and Mississippi

## **Key Theme: Rangeland/Pasture Management**

. Program Description: Forages for the 21<sup>st</sup> Century

Forages represent a significant renewable natural resource for Missouri with more than 9.7 million acres in pastures and harvested forages. This represents approximately 33.5 percent of the total land in farms in Missouri. Missouri produces 7.1 million tons of hay (including alfalfa hay) or 4.7 percent of the total hay produced in the United States. This ranks Missouri fourth nationally for total hay production. The agronomic practices associated with the Forages for the 21<sup>st</sup> Century program will enhance water quality, reduce soil loss and produce wildlife habitat while feeding Missouri's livestock industry.

Missouri ranks second in the nation for the total number of beef cows with over two million head on 60,000 operations. Nearly half of the beef producer's production costs is for livestock feed during January, February and March. Forages represent about 90 percent of that cost for winter feed.

Missouri's dairy producers are struggling. Since 1991, almost 30 percent of Missouri's family

dairies have gone bankrupt because of high feed costs, expensive capital investment and low profit margins. To respond to this trend, dairy producers are adopting the grass-based dairy model so they can lower feed costs, minimize capital investments, increase profit and protect the environment.

Forages for the 21<sup>st</sup> Century has focused on three major program thrusts:

- 0) **Winter Feeding and Stored Forages for Beef Cattle.** This program educates producers about stockpiling tall fescue, adapting winter annuals in Missouri, grazing residues, winter grazing management, lowering feeding losses, ammoniation of low-quality hay, forage quality and prudent use of supplemental feed. The methods used include workshops, livestock seminars and demonstrations at the regional research centers. In addition, mass media and Internet and guide sheets are effective.
- 0) **Grazing Systems and Pasture Management.** This program educates producers about management intensive grazing, new forages for grazing, nutrient cycling, forage quality, summer forages, legume persistence, warm-season grass establishment, tall fescue endophyte and legume establishment into pastures. The methods used include regional grazing schools, special field days, guides and mass media.
- 0) **Grass-Based Dairies.** This program educates dairy producers about grazing management, forage quality for dairies, balancing rations on pasture versus dry lot, low-cost system design, record keeping, seasonal versus year-round dairies, fencing and watering systems, fertilization of pastures, improving soil resources and improving the families' quality of life. Methods used include pasture walks, dairy schools, cow colleges, lender meetings, "core-groups," manuals, guides, demonstrations, seminars and mass media.

a. Program Impact

Forages for the 21<sup>st</sup> Century is a multistate, integrated research and extension program. The following impacts are specific to Missouri.

- 0) More than 4,000 producers attended educational programming on "Winter Feeding and Stored Forages for Beef Cattle." The adoption rate of practices outlined in these programs was approximately 46 percent. From 1998 to 2003, the percentage of producers using stockpiled tall fescue for winter feeding has doubled, from 26 percent to more than 50 percent.
- 0) More than 1,000 producers attended the grazing schools taught at Linneus and throughout the eight regions of the state; in 2003 alone, 31 multi-day regional grazing workshops were held in Missouri. More than 80 percent of the producers who attended these workshops indicated that they plan to adopt fencing, watering and pasture management changes as presented in the schools. Fifty percent of those producers implemented these changes without cost-share assistance.
- 0) The entire curriculum for a new workshop, "Tall Fescue Toxicosis and Management," was planned in 2003 and will be held in September 2004. If a few simple practices of this workshop are adopted, the net income of a typical beef farm will increase by 10 percent each of the following 10 years.
- 0) The pasture-based dairy team made more than 1,500 audience contacts. During 2002, the pasture-based dairy curriculum was developed, and the ensuing educational program was "customized" for six core dairy groups. Each core group consists of 15 to 20 producers. The core group method was based on the highly successful New Zealand educational model.



- 0) Pasture-based dairy farmers produced milk for \$8.03/cwt, 20 percent less than confinement dairies.
  - 0) More than 60 percent of the core group producers adopted business plans that split their personal finances from the dairy's finances.
  - 0) Forty percent of participating producers reported that they renovated or expanded their dairy facilities.
  - 0) More than 90 percent of the participating producers report that using their business plans helped them make better financial decisions.
  - 0) Almost 60 percent of participating producers indicate that they have more leisure time and a better quality of life.
  - 0) "Grass-Based Dairy" educational programs were conducted by the Missouri team in Iowa, Texas, Oklahoma, Arkansas, Kansas, Tennessee, Illinois and Kentucky. A multistate grass-based dairy program based on the Missouri model is being developed in cooperation with Tennessee and Arkansas.
  - 0) Financial data from 12 pasture-based dairies showed that the average dairy had 95 cows marketing \$2,097 of milk with an operating expense of \$1,237 per cow. Total farm milk sales for these producers were \$199,215 with operating expenses of \$117,515, leaving a net operating margin of \$81,700 to cover family living, interest and capital purchases.
  - 0) To date, the Missouri Winter Feeding and Stored Forages Program reached more than 20,000 producers, reducing the cost of winter feeding by an average of 40 percent.
- b. Source of Funding: Smith-Lever, State
  - c. Scope of Impact: Iowa, Texas, Oklahoma, Arkansas, Kansas, Tennessee, Illinois, Kentucky and Missouri

## **1890 Cooperative Extension Service — Lincoln University**

### **Key Theme: Adding Value to New and Old Agricultural Products**

- . Program Description: Value Added Fiber

Many breeds of small animals, producing meat, wool, mohair and milk are raised by small farmers in Missouri. The potential for growth and increase in the number of these small ruminants is great and profitability this year has been great. The market for the off spring, lamb and kids, born this year has been from 85 cents to a dollar a pound. Since 46% of the land in Missouri is not suitable for tillage, the ruminants are best suited to harvest the forage to convert into meat, fiber and milk. The value-added fiber program not only serves producers of sheep, goats and woolled rabbits, but also llama and alpaca producers. Educational programs are requested for not only the rural population but also the urban dwellers. The programs in general area to help stakeholders help themselves in utilizing their resources.

- a. Program Impact:

A statewide sheep conference was held in December to provide cutting edge information to sheep producers in our state. The Missouri State Fair holds a sheep fitting competition for youth to encourage them to fit their own sheep and decrease adult participation in their 4-H projects. Forty-four youth signed up for the program and over \$2,200 was given by donors and the Missouri Sheep Producers for prize money for this event. Activities this year have focused on market development for dairy and meat goats. An order for \$,500 head of dairy goats by Tony Clayton



marketed in Mexico (country) has given the dairy goat producers and opportunity with prices in the profitable range.

- b. Source of Federal Funding: Smith-Lever
- c. Scope of Impact: Missouri

### **Key Theme: Small Farm Viability**

- . Program Description:

Missouri, with more than 98,000 farms, is only second to Texas in the total number of farms. A large percentage of these could be classified as small farms. The Small Farm Family Program is now active in 20 counties in southern Missouri. Sixteen (16) Small Farm Family Program Education Assistants, or EA's, provide program assistance to farm families.

The number of participants varies from one month to another. However, at any given time, the Program works with approximately 700 farm families. Regarding ethnicity, approximately 25 of these families are African American, 5 are Native American Indian, and another 5 are Hispanic/Asian American families. In the central Missouri area, we work with several Amish families.

- a. Program Impact:

In Madison county 73 3-4<sup>th</sup> grade students participated in the county's Master Gardener program, a collaboration with a University Outreach and Extension state extension specialist. The children were recruited through the summer school program and were required to work 2 days per week in the garden over a 10-week period. The Polk county EA, working with local producers and the Mayor of Bolivar helped organize a farmers' market. Twenty-five (25) producers sell locally grown fruits and vegetables to 150 consumers each week. In Dallas County, farmers Ardie and Cheryl Compton started "pick your own" vegetable and berry operation a few years ago. Last year, the Comptons diversified their revenue sources with "free range poultry" production. In 2001, they raised, processed and sold 400 birds. In 2003, they have raised and sold 1,000 chickens at \$2.00 per pound. They are also raising about 30 turkeys this year on a trial basis.

- b. Source of Federal Funding: Smith-Lever
- c. Scope of Impact: Missouri

## **Goal 2: A Safe and Secure Food and Fiber System**

### **1862 Agricultural Experiment Station Research Overview**

Food scientists are developing improved methods of analyzing flavor in food. Scientific methods of evaluation can improve and speed up the process of developing new foods targeted for desirable characteristics, such as improved nutritional value.

### **1890 Cooperative Extension Overview**

Even though the U.S. food supply is among the most plentiful in the world, it is neither equally distributed nor equally available to all Missourians. Sadly, for a percentage of Missourians, reliable access to safe, affordable, culturally relevant food is not always a reality. According to the 2000 census, 11.7 percent of Missourians are living below the poverty level. While poverty is prevalent throughout the state's population, it is more predominant among minorities, people living in rural areas, children the elderly and female-headed single parent households. Twenty-five percent of children 18 and under are food stamp recipients. Food, Nutrition and Health programming within LU Cooperative Extension can be divided into three broad areas: nutrition education of food stamp recipients; food safety education in two distinct programs; and general nutrition and health programming statewide. A description and evaluation of each follows.

Lincoln University provides nutrition, food safety and food resource management education to food stamp recipients using a curriculum developed by a consortium of 1890 institutions, including Lincoln University.

### **1862 University Outreach and Extension Overview**

Annually the media report thousands of cases of food-borne illnesses from around the globe. Each year thousands of Missourians are exposed to potentially harmful organisms. Proper selection, preparation, storage and handling can reduce the threat to human health. Beginning with the most basic of skills -- hand washing -- regional nutrition specialists and paraprofessional educators work with clients each day to ensure that their food supply continues to be safe.

Food safety affects everyone from producer to consumer. University of Missouri Extension faculty provide education to each targeted audience. Livestock and Veterinary Medicine faculty address this producer issue. Food Science faculty assist those in the food processing and retail industries. Human Environmental Sciences faculty, namely Nutritional Sciences faculty, address the consumer issues of food safety.

## **1862 Agricultural Experiment State Research – University of Missouri**

### **Key Theme: Food Safety**

- Program Description: Improving flavor analysis of food products

Research at MU is directed at characterizing food components with important functional properties, such as flavorful compounds. In particular, flavor and other attributes are being analyzed for reduced-fat ice cream, including appearance, flavor (aroma and taste), mouth feel and aftertaste.

a. Program Impact:

Research is focused on developing a scientific approach to analyzing flavor in lower-fat ice creams by determining the release of flavor volatiles from ice creams with different fat levels. Sensory thresholds and vapor liquid partition coefficients have been determined. The instrumental and sensory flavor profiles of ice creams also have been determined. Results provide information that can be used to reformulate lower-fat ice cream that is better tasting and to establish a more economical way of determining the changes required in flavorings when fat levels are reduced. Inferences from this work have broader application to other food products as well.

b. Source of Funds: Hatch, Grants

c. Scope of Impact: Multi-State

## **1890 Cooperative Extension Service — Lincoln University**

### **Key Theme: Food Accessibility and Affordability**

. Program Description:

This project is being conducted with the assistance of a food safety National Integrated Food Safety Initiative (NIFSI) grant from USDA. In FY 2003, we were awarded \$171,000 for this three-year project. Project objectives are: 1) to engage well-known and effective community volunteers to locate participants and assist in conducting a series of focus groups for hard-to-reach, limited resource audiences including primarily Latino and African American groups and senior citizens; 2) to use information gained from focus groups to develop specifically targeted materials and methods for reaching the hard-to-reach audiences with food safety and nutrition information, particularly regarding fresh produce; 3) to use well-respected community volunteers to deliver a series of effective food safety and nutrition messages to groups composed primarily of hard-to-reach, limited resource audiences; 4) to work with teachers, and pertinent personnel from the Department of Health and Senior Services and the Department of Elementary and Secondary Education to develop a set of age-appropriate food safety and nutrition materials for elementary school age children; and, 5) to teach safe handling and preparation of fresh produce in addition to nutrition education to kindergarten, first, second, third and fourth grade children using materials developed, including flash cards, game boards, information brochures and coloring pages in the classroom.

a. Program Impact:

Workshops were presented to 25. Approximately 500 sheets on recipes encouraging greater consumption of fruits and vegetables were distributed at the Missouri State Fair. At the Missouri State Fair, the only venue where the developed materials have been tested, food safety information was given to over 4,000 youth and close to 2,500 adults. Their knowledge of food safety, nutrition and growing and harvesting were also tested. Of the people who visited our booth, about 98 percent (about 3,920 youth and 2,450 adults) were white, ages ranged from 1 year to 85 years.

b. Source of Federal Funds: Smith –Lever, USDA Food and Nutrition Service NIFSI grant

- c. Scope of Impact: Missouri

**Key Theme: Food Safety**

- . Program Description:

Under the encouragement of the 1890 Administrators and through the generosity of Virginia State University, this group has been holding monthly toll-free conference calls to discuss projects for potential collaboration. We have been greatly strengthened by the pre-existing FF-NEWS Consortium – a coalition of twelve 1890 institutions that uses primarily Food Stamp Nutrition Education Program monies to conduct nutrition, food safety and food resource management education to Food Stamp recipients.

Very highly publicized outbreaks of food borne illness over the past 10 years have been attributed to microbial contamination of eggs, beef and fresh fruits and vegetables. Both restaurants and catered meals have also been implicated in cases of food borne illness affecting large numbers of people. In addition, food that may be uncontaminated when brought into the home can be handled, stored or prepared in ways as to allow the development of dangerous levels of illness-causing pathogens. Extension has a very important role to play in helping achieve the goals of the President's 1997 Food Safety Initiative.

- a. Program Impact:

The Nutrition, Food Safety and Wellness Team has focused on Childhood Obesity prevention. A conference session on this topic was conducted at the AEA Summer meeting in June 2003. A collaborative proposal is being submitted to USDA-CSREES for Childhood Obesity Prevention initiative funds.

- b. Source of Federal Funds: Smith-Lever

- c. Scope of Impact: Missouri

## **Goal 3: Healthy and Well-Nourished Population**

### **1862 Agricultural Experiment Station Research Overview**

In the area of **human health**, scientists are investigating the process by which cancer cells metastasize to ultimately develop new cancer therapies. Researchers are investigating the effects of certain fats in the human diet to improve recommendations, thereby promoting better health.

### **1890 Cooperative Research Program Overview**

Food, Nutrition and Health programming within LU Cooperative Extension can be divided into three broad areas: nutrition education of food stamp recipients; food safety education in two distinct programs; and general nutrition and health programming statewide.

Project objectives under this goal are to provide nutrition information to food stamp recipients and food stamp-eligible seniors and others in St. Louis City and the Bootheel region of Missouri; to provide food safety information to food stamp recipients and food stamp-eligible seniors and others in St. Louis City and the Bootheel region of Missouri; and to provide food resource management information to food stamp recipients and food stamp-eligible seniors and others in St. Louis City and the Bootheel region of Missouri.

### **1862 University Outreach and Extension Overview**

Chronic diseases such as cancer, diabetes, heart disease and strokes continue to be major health problems in Missouri. In the most recent report by the Missouri Department of Health and Senior Services (2000), more than 56 percent of deaths of Missourians were caused by chronic disease. Despite major advances in health care and the development of new treatment procedures, Missourians continue to face a high-risk of dying from one of these diseases. Increasingly, scientists and health professionals are interested in addressing the prevention of these diseases rather than simply trying to stop their deadly progress at the end.

Although there are no simple preventive measures that can assure Missourians escape from chronic diseases, significant new research in nutrition sciences and exercise physiology indicates that dietary behaviors and fitness activities play a major role in the prevention of heart disease, cancer and diabetes. In particular, scientists have concluded that childhood and adolescence are critical times in the development of eating and fitness habits that can lead to lifelong positive or negative health outcomes. Research indicates that healthy eating patterns in childhood and adolescence promotes health and intellectual development and can prevent such childhood health problems as iron deficiency anemia, obesity, eating disorders and dental cavities. Likewise, researchers have found that regular physical activity builds and maintains healthy bones and muscles, controls weight and reduces feelings of depression.

The Missouri Department of Elementary and Secondary Education has been tracking youth risk behaviors in the state throughout the 1990s. These data suggest that our children are at significant risk due to poor eating habits and limited physical activity. For example, less than 25 percent of Missouri young people report eating five or more servings of fruits and vegetables each day. Alarming, the trend between 1995-1999 is towards lower consumption of these foods. This report also indicates that the rate of obesity among children and adolescents in Missouri has doubled in the past decade. Almost one-third of Missouri high school students report that they are overweight. Also troubling are the inappropriate methods that adolescents are using to control their weight. Rather than changing eating habits or increasing physical activity, about 1 of 5 took diet pills, laxatives or vomited to keep from gaining

weight. The rate of physical activity among Missouri teens is also a concern. About two-thirds of young people are getting regular exercise, but the trend has shown no increase during the late 1990s.

These trends among Missouri children and adolescents indicate that there is an important need to increase healthy eating patterns and improve fitness. Researchers also have found that low-income and ethnic minority children are at even greater risk for poor diet and lack of exercise. A combination of community and family factors result in the lack of money to purchase food; a lack in the availability of healthy foods; difficulty in preparing food safely; limited safe community resources for physical activities; and many other factors. Many Missouri families are in this limited-resource group. The Missouri Department of Social Services reports in 2002 that 418,631 households received food stamps. One of five Missouri children are living in households that receive food stamps. Additionally, more than one of three (36.1%) qualify for the free or reduced meal program provided through the schools.

### **State of Missouri Families 2003**

University of Missouri Outreach and Extension's annual report provides a look at the conditions affecting family life. [State of Missouri Families](#) examines trends in health care, nutrition and other measures of well being. Reports on every county and the city of St. Louis are available.

The Nutritional Sciences faculty of University Outreach and Extension developed a comprehensive nutrition and fitness education curricula "Show Me Nutrition," for all children (pre-school through high school), which teaches age-appropriate dietary and fitness knowledge and skills. Each level of the program provided a minimum of 12 teaching lessons of at least 30 minutes. These teaching materials were designed to be interactive and to engage children so they can understand and practice appropriate eating and exercise habits. The children's program was conducted in school classrooms as a supplement to the regular science and health curriculum. Examples of high performing 21<sup>st</sup> century programs follow, and these are linked to web sites for additional information.

In addition to this work, faculty developed an interactive teaching exhibit that allows children to learn about where their food is grown, how it is processed, and how the food is used by the body to provide energy to be physically active. As the students exit the exhibit, they are taught the importance of hand washing to prevent the spread of disease. Specialized programs for parents, with a particular emphasis on pregnant and parenting teens, are shown below. Also, multi-session programs were conducted in schools, community centers, health clinics and other locations that were easily accessible to parents who lived in impoverished rural and urban areas of Missouri. News media and information technology were used increasingly by the University of Missouri to deliver educational information.

The University of Missouri Outreach and Extension Human Environmental Sciences program is committed to creating educational programs to improve the lives of Missouri families. Through a wide variety of delivery methods, University Outreach and Extension (UO/E) assisted children, youth and adults in learning ways to improve their health and well being. This year, UO/E continued to address major issues facing Missouri families, including child abuse, obesity, diabetes and poor nutrition. Through a variety of methods, Human Environmental Sciences faculty totaled over 1.5 million educational contacts throughout Missouri in the Health and Human Nutrition program areas. Here are just a few of the major efforts:

- The Family Nutrition Education Program brings the latest research-based information to low-income Missourians statewide. More than 120 paraprofessional educators worked with clients individually and in small groups in their homes, schools and at agencies. More than 199,000 Missourians learned ways to prevent heart disease and cancer through nutrition and fitness.

- Food Power is a fun, interactive program that taught elementary students about nutrition and health. Over 20,000 elementary students in 80 schools participated during the first four months of this program. The program also engaged 1,332 teachers and 1,741 volunteers during this time.

### **1890 Cooperative Extension Service Overview**

Food, Nutrition and Health programming within LU Cooperative Extension can be divided into three broad areas: Nutrition education of food stamp recipients; Food safety education in two distinct programs; and general nutrition and health programming statewide.

Project objectives under this goal are to provide nutrition information to food stamp recipients and food stamp eligible seniors and others in the St. Louis City and the Bootheel region of Missouri; To provide food safety information to food stamp recipients and food stamp eligible seniors and others in St. Louis City and the Bootheel region of Missouri; To provide food resource management information to food stamp recipients and food stamp eligible seniors and others in St. Louis City and the Bootheel region of Missouri.

### **1862 Agricultural Experiment Station Research — University of Missouri – Columbia**

#### **Key Theme: Human Health**

- . Program Description: Improving cancer therapies

While primary cancer tumors are often curable, currently there is no satisfactory treatment for cancer that has metastasized. The binding of metastatic cancer cells to sites remote from the primary tumor is the critical phase in the spreading and persistence of disease in humans. Research at MU is directed toward the ability to interfere with these binding mechanisms as part of an overall therapy that inhibits the spread of disease.

- a. Program Impact:

Researchers study the binding of human metastatic cancer cells to human endothelial cells. They have increased their cancer culture library and cell lines to include PC-3 (prostate cancer)PC-LN4, DU145, LNCAP, PC3M-LN4, JURAK (acute leukemia), HMBE (bone endothelial cells), BDME (bone cell line) and MATLyLu (Rat prostate cancer cell). These scientists are synthesizing inhibitors based upon a lactosamine structure. These compounds are being tested for their ability to destroy cancer cells and to work synergistically with current cancer drugs. Results will ultimately lead to the development and testing of new products for inhibition of cancer metastasis.

- b. Source of Funds: Hatch, Grants

- c. Scope of Impact: Multi State

#### **Key Theme: Human Health**

- . Program Description: Impact of dietary fats on human immune system.

Researchers at MU are investigating the influence of dietary fats on immune cell function and

infectious disease resistance. Investigators use mice injected with the gram-positive bacteria *Listeria monocytogenes* as an experimental animal model of infectious disease.

a. Program Impact:

The consumption of certain fats, such as fish oils, is known to have certain health benefits (e.g., reduced risk of fatal heart attack), however, these same fats may impair infectious disease resistance. Using this animal model, researchers demonstrated that fish oil consumption can adversely affect host infectious disease resistance. Results are important both in terms of understanding the possible health effects of such diets on domestic animals and also on the humans consuming n-3 PUFA-enriched animal products. Ultimately, researchers hope to be able to make recommendation for n-3 fatty acid intake that will promote better health without increasing the risk of infection.

b. Source of Funds: Hatch, Grants

c. Scope of Impact: Multi State

## **1890 Cooperative Research Programs — Lincoln University**

### **Key Theme: Human Nutrition**

. Program Description:

This project examines how dietary factors such as dietary fat, dietary energy level and dietary antioxidants, and physical exercise contribute to the development and prevention of cardiovascular diseases. Cardiovascular health problems are more prevalent in under-served populations. The studies will produce information for healthful dietary recommendations to prevent diet-related cardiovascular diseases and maintain better health for the under-served populations in the state of Missouri as well as general public in the United States.

In 2001- 2002 seventeen (17) people participated in an experimental groups and 9 subjects complete the experiment. As a result of this phase of the project, the Cooperative Research food science laboratory developed over 20 recipes and several menus were created which effectively combined dishes containing the five servings of fruits and vegetable, at least 2500 antioxidant units. Data collected in this phase of the project is being use to develop specific preventative intervention strategies to reduce risks of hypertension, coronary heart disease, obesity and certain types of cancer.

a. Program Impact:

The participants in the intervention study responded positively with improvement of their health, general well being and eating habits indicated in the survey of participants' opinion for the study. Antioxidant-rich recipes developed in our laboratory during the phase I of objective 3 were well accepted by the participating African-American women subjects. No difference was found in plasma glucose, triglycerides, total cholesterol and



HDL-cholesterol concentrations between experimental and control groups. The HDL-cholesterol was increased in the experimental group and decreased in the control group at the end of intervention period as compared with the initial values even though the differences were not statistically significant. Assays for biomarkers for lipid peroxidation and antioxidant status are not completed at this time.

- b. Source of Federal Funding: Evans-Allen
- c. Scope of Impact: Missouri

## **1862 University Outreach and Extension — University of Missouri System**

### **Key Theme: Human Nutrition - Food Safety and Food-Borne Illness**

- . Program Description: Food Safety

Food safety affects everyone from producer to consumer. University of Missouri Extension faculty provide education to each targeted audience. Livestock and Veterinary Medicine faculty address this producer issue. Food Science faculty assist those in the food processing and retail industries. Human Environmental Sciences faculty (namely Nutritional Sciences faculty) address the consumer issues of food safety.

The following paragraphs focus on the consumer and food service educational efforts.

Twenty regional specialists conducted Food Safety programming during 2003. These specialists provided educational programs, newsletters, radio interviews, television interviews, newspaper interviews, Internet-based programming and individual consultations. These specialists provided 28,201 educational contacts in 48 counties throughout the state. They logged over 1,875 hours in addressing this issue so critical to human health and well being.

Extension specialists also assisted in conducting a statewide survey, "Attitudes Toward Agriculture and Food Safety Among Missourians—2003." This survey was a joint effort of University Outreach and Extension, Missouri Department of Agriculture and the Center for Advanced Social Research. This study used random telephone interviews of 524 individuals. Survey results were presented at the Governor's Conference on Agriculture Nov. 24, 2003. They will be used to direct food safety education efforts by the University of Missouri and the Missouri Department of Agriculture.

- a. Program Impact:  
Education about proper selection, preparation, storage and handling does lead to behavior change among program participants. The following statements are just a few examples of how education leads to positive behavior change.
  - "I threw out 20 quarts of tomatoes because they were not done correctly—thank you!"
  - I am now "pressure canning instead of water-bath for certain foods."
  - I "have less food in the freezer and eat food before the freezer time expires."

In the Northeast Region, approximately 40 food handlers attended ServSafe courses in 2003. Following the course, the environmental sanitarian for a two-county area reported, "Whenever I inspect a facility after the employees have completed a class, the facility usually scores better on their safety inspection." Improved safety during commercial preparation and handling can be directly linked to reduced food-borne illness. Educating food handlers about the proper techniques will guard against future health risk and medical costs.

Children, too, are learning at a young age about the importance of hand washing and food safety. Each child who participates in the Show Me Nutrition Curriculum, grades pre-K- 8, receives a minimum of one lesson on food safety. In FY03, 158,738 children pre-K-Grade 8 received this information, and of 2,279 teachers reporting, they estimate 71 percent of participants improved their frequency and skill in hand washing. One report from a Northeast Missouri elementary school custodian stated that six-months following the program the soap use in the boys' restrooms was doubled. He was quite frustrated that he was having to refill the soap dispenser so often!

b. Source of Federal Funds: Smith-Lever, Grants

c. Scope of Impact: Missouri

### **Key Theme: Human Health**

. Program Description:  
Health Wise is a 90-minute educational workshop for individuals age 50 and older. It is designed to improve the confidence and skill of participants to make decisions that promote improved health status and appropriate use of the health care system. Rather than expecting participants to remember large amounts of health information over extended periods of time, participants are taught how to use a self-care reference to improve health decision-making. "Healthwise for Life," published by Healthwise Inc., is the self-care reference used in the workshop. After five years of slow growth, U.S. health care spending resumed its upward climb in 1998. The national health bill is projected to double by 2007, hitting 2.1 trillion. Helping consumers reduce unnecessary and inappropriate use of the health care system is one strategy for controlling costs. Americans spend an estimated \$200 billion a year on unnecessary and inappropriate health care. Individuals and families can control health care costs by learning how to make better health and health care decisions.

a. Program Impact:  
Outputs: Between October 2002 and March 2003, 63 individuals participated in five workshops conducted by five specialists. Sixty participants completed end-of-session evaluations; 19 agreed to participate in follow-up evaluations; and 11 participated in follow-up evaluations. No workshops have been conducted since March. In general, participants were pleased with the overall quality of the workshop; felt it was a good value in terms of their time, energy and money; and thought the workshop provided them with information they could use. The evaluation tracked three outcome measures: use of a health care reference, health care use and perception of dollars saved on health care. Evaluation results are descriptive.

Participant Reactions: Some lessons learned or relearned as a result of participating in the class include:

- *Where and how to look for information*
- *Help with decision when my grandchildren need doctor's attention.*
- *Be more proactive*

- *How much more I can do for myself/family.*
- *I learned to look at two sides of things and if I can care for it at home first.*

#### Outcomes

Short-term outcomes (learning): (The following results are based on available evaluation data.) (N-63)

- 53 thought the workshop and reference would help them better manage health problems (88%).
- 45 thought that the information would help improve the quality of self care (75%).
- 38 thought it would improve communication with their doctor (63%).
- 30 thought it would help increase their involvement in making treatment decisions (50%).
- 41 planned to adopt new practices (65%).

Medium-term outcomes (action): Changes at three months (N-11)

- 9 reported increased use of health reference. Average use prior to the workshop was one use in three months. Average use after the workshop was three times in a three-month period.
- 8 reported that the workshop and reference did help improve the quality of self-care provided at home (73%).
- 9 reported that the workshop and reference helped them improve communication with their doctors (82%).
- 4 reported that the workshop and reference helped them decide if a doctor visit was necessary (36%).
- 6 reported adoption of new practices (55%)
- 3 reported savings; only one was able to attach a dollar amount to those savings -- \$200.

b. Source of Funds: Smith-Lever

c. Scope of Impact: Missouri

### **Key Theme: Human Nutrition**

a. Program Description: Nutrition and Health—Family Nutrition Education Program

The [Family Nutrition Education Programs](#) (FNEP) are an important part of University Outreach and Extension, bringing the latest nutrition information to low-income Missourians. FNEP helps clients achieve lifelong health and fitness. Paraprofessional nutrition educators work with clients individually and in groups in their homes, schools and at agencies. The primary goal of this program is to help program participants to achieve lifelong health and fitness. Programs include EFNEP (Expanded Food and Nutrition Education Program) and FNP (Family Nutrition Program).

In April 2001, 810,278 Missourians in 418,631 households received food stamps. Almost 19 percent of Missouri's children under the age of 18 received food stamps, and more than 36 percent participated in the free/reduced lunch program at schools. Research has shown families in poverty often have difficulty in securing an adequate amount of food for their family; in purchasing a diet rich in whole grains, fruits and vegetables; and in preparing and storing foods safely.

FNEP brings nutrition information to life for low-income Missourians. Each participant attends an average of six sessions with a nutrition educator. Sessions vary from 30-60 minutes in length.

In FY03, FNEP educators enrolled 199,603 participants, resulting in approximately 1.2 million direct educational contacts. The FNP program also reached an additional 360,000 indirect contacts through parent newsletters that went home with children who were taught in the classroom setting. Total educational contacts for FNEP in FY03 was in excess of 1.56 million educational contacts.

FNEP provides nutrition programming that meets learners' needs considering age, culture, reading level and abilities. Lessons with hands-on activities are designed for youth and the adults that support them, pregnant teens and immigrant populations. FNP uses the newly developed Show Me Nutrition curriculum. This curriculum allows an educator to work with a youth from pre-K through grade 12 building on basic nutrition, food safety, food resource management and physical activity components. Each grade level has up to 12 lessons with the average of six being taught during the series. An EFNEP participant may participate in up to 20 lessons. EFNEP is designed for adults; however, it covers the same core elements of basic nutrition, food safety, food resource management and physical activity. Additional lessons and/or curricula may address food groups, eating responsibly, nutrition during pregnancy, feeding infants and children, and food preservation. Lessons for pregnant and parenting teens on healthy nutrition habits for improved birth outcomes also are available. This targeted education covers breast-feeding and feeding infants and toddlers. Programming is collaborative with North Central Region states.

#### Program Impact:

The Family Nutrition Education Program involves both the Expanded Food and Nutrition Education Program (EFNEP) and the Family Nutrition Program (FNP)—or the Food Stamp Nutrition Education Program (FSNEP), as it is known in some states. Both programs are targeted to limited-income audiences. In Missouri, EFNEP focuses on the adult population, and FNP focuses on youths. Evaluation data from both programs are represented below.

FNP reached 191,932 adults and youths in 2003. A feedback form was given to teachers following the nutrition education program. The teachers were asked to complete the form and return it to the educator. Two thousand two hundred seventy-nine (2,279) forms were returned.

Seventy-six percent (76%) of teachers reported one or more changes among students or themselves after FNP. Eighty-six percent (86%) of teachers indicated that they were more aware of nutrition. Of those teachers, 65 percent say they will spend more time on nutrition education.

Of those teachers who are making healthier food/beverage choices, eighty-three percent (83%) talk about or model changes in front of students while eighty-nine percent (89%) are more willing to try new foods.

Preschool students participate in the “Let's Read and Learn” about the variety of foods that fit in the Food Guide Pyramid. Books spark discussion about foods, hand washing and active play. Tasting foods is integral to encouraging youngsters to choose healthy foods. Activities allow students to practice the healthy behaviors about which they learn. Based on teachers' evaluations:

- 93 percent of students are trying new foods
- 71 percent improved their hand washing skills
- Many were talking more about the foods they choose.

*Testimonial:* Sharon Trammell, a paraprofessional from the Southeast Region wrote: “I had the joy of teaching a child who was deaf. I worked to have activities he could participate in. The

highlight came when we played “Food for Me Bingo” He was the only one to bingo that class period. I get a lump in my throat when I think of him. He taught me new words in sign language and opened a special place in my heart.”

- . Source of Funds: Smith-Lever and USDA Food Stamp Program
- . Scope of Impact: State of Missouri

### **Key Theme: Human Nutrition**

- a. Program Description: Nutrition and Health—Food Power

Food Power brings together food and physical activity in a fun and exciting way. Through Food Power Classroom Activities, the Food Power Adventure and the Food Power Daily, elementary school students learn the importance of healthy food choices and regular physical activity. As students travel the path food takes from the farmer’s field to the sports field, they learn where the food they eat comes from and how it gives them energy to grow and play.

Food Power is a program offered by University Outreach and Extension in cooperation with the Department of Nutritional Sciences, College of Human Environmental Sciences and University of Missouri –Columbia. It adds unique activity-based experiences to the University of Missouri Family Nutrition Education Programs funded in part by USDA’s Food Stamp Program.

For additional program information, see the MissouriFamilies.org web site (<http://missourifamilies.org/>) and the Food Power web site (<http://outreach.missouri.edu/hesfn/foodpower/>).

- . Program Impact:

Food Power began as a new program in August 2003. In the first four months, this program has been delivered to 20, 619 elementary students; it also has involved 1,332 classroom teachers and 1,741 volunteers.

Teachers commenting on the impact of this program on elementary children have reported that approximately 64 percent of participants are making healthier meal and/or snack selections, and approximately 53 percent of participants are increasing their physical activity level.

*"The kids are running more on the playground trying to elevate their heart rate,"* reported one teacher. This program is one example of how the University of Missouri is focusing its efforts on the lifelong health and fitness of Missouri citizens and combating the recent increase in childhood overweight and obesity.

- a. Source of Funds: Smith Lever, USDA Food Stamp Program, Program Fees
- d. Scope of Impact: State of Missouri

### **Key Theme: Human Nutrition**

- a. Program Description Dining with Diabetes

Dining with Diabetes is a three-session series that provides nutrition education, food demonstrations and tasting of foods for individuals with diabetes and their families. Participants learn how to better choose and prepare tasty, nutritious foods that are low in sugar, fat and sodium. Guest diabetes educators provide additional information and answer participants' questions during at least one of the three sessions. The long-term outcome of this series is improved quality of life and health for those with diabetes. The short-term outcome is increased knowledge about healthy foods and about diabetes and nutrition. Intermediate outcomes are increased confidence about one's ability to prepare healthy meals for someone with diabetes and improved food preparation practices. The series' comprehensive approach, which includes dietary factors for heart disease and high blood pressure, is consistent with current recommendations from diabetes experts.

b. Program Impact

Outputs -- Dining with Diabetes workshops have been taught in Butler, Cass, Carter, Reynolds, Ripley, Scott, St. Charles and Wayne counties and other locations in the St. Louis area. A 90-minute introduction to Dining with Diabetes was taught in Kansas City reaching Hispanic populations. About 423 individuals have been reached.

Participant reactions:

- *This class really helped me stop and think. I need to get with my doctor and keep a check on myself.*
- *I took the class because I have friends and family who are diabetic, and I wanted to know some of the basics.*
- *I'm pleased that this class was offered in my county. Usually, residents have to go to other cities for info of this type. Thank You.*
- *Diabetic meals can be planned and prepared without a hassle if you want to do it.*
- *You can use common, everyday food—make it attractive but still good for anyone.*
- *I learned more about carbohydrates than what I knew before.*
- *The more I told to other people, the more I learned how to keep the blood sugar down,*

Short-term outcomes (learning): (The following results are based on available evaluation data.)  
Increase in knowledge -- Based on pre/post test data (Pretest N= 139, Posttest N=97)

- There was a 55 percent increase in the percentage of participants who knew that the sweetening power of artificial sweeteners could be increased without negative effect by using two artificial sweeteners (SI =56% and SII = 87%).
- There was a 22 percent increase in the percentage of participants who correctly identified olive oil as being high in monounsaturated fat (SI=64% and SII=78%).
- Change in attitude -- Based on pre/post test data (Pretest N= 139, Posttest N=97). There was an 11 percent increase in the percentage of participants who reported being confident that they could prepare healthy meals for someone with diabetes (SI 75% and SII = 83%).

Medium-Term Outcome: action

[Based on three-month follow-up data (N=34)]

- 21 participants reported making at least one new recipe demonstrated during the Dining with Diabetes series (62%).

- 32 participants reported using information learned in the Dining with Diabetes class to prepare healthy meals for someone with diabetes.
- [Based on comparison of data from pretest (N= 139) and three-month follow-up (N=34)]
  - There was a 47 percent increase in the percentage of participants who reported knowing how to use Nutrition Facts labels found on packaged foods to prepare healthy meals.
  - There was a 25 percent increase in the percentage of participants who reported frequently using herbs or spices to reduce salt in recipes.
  - There was a 14 percent increase in the percentage of participants who reported that they usually used canola oil or olive oil in cooking
- c. Source of Funds: Smith-Lever and Grant funds from the Missouri Department of Health and Senior Services
- d. Scope of Impact: The following Missouri Regions -- East Central, West Central, South Central and Southeast

### **Key Theme: Human Nutrition**

- a. Program Description    Nutrition and Health—Health for Every Body  
Health for Every Body beyond Scales and Mirrors is a four-session workshop designed to move participants away from diets to a non-diet or health promotion approach to living in a healthy body. The audience includes adults interested in learning basic principles related to eating healthfully and incorporating physical activity into their daily lives. The program also is appropriate for those who have been unsuccessful with dieting and want to reduce health risk factors through a different approach to eating healthfully and being physically active. Using a variety of educational strategies, such as small-group discussion, lectures, journaling, worksheets and goal setting, individuals gain new attitudes, learn new information and develop new skills for healthy living. The program focuses on three factors -- appreciating self and others, healthful eating and active living. Concepts taught in the workshops are reinforced through a series of newsletters.
- b. Program Impacts  
  
 Outputs: Based on available data, about 100 Missourians were reached through educational programming. Eight workshops were conducted. Newsletters were mailed to more than 160 individuals to increase awareness and reinforce key concepts.  
  
 Participant Reactions:
  - *The program materials are not put up and forgotten. This is one of the few classes I've taken where I pull out the materials and look at them when I want to refer to good materials or use them as a resource.*
  - *I am glad I took the class and definitely enjoy receiving the newsletter each month. Thanks! I also read and re-read the literature you gave us at the class. I learn something else each time I read it.*
  - *I am now very much aware of what I am eating, nutrition wise, serving size, and try to eat when hungry rather than just because food is available. I have recently been diagnosed with high cholesterol (4 months ago) and put on Lipitor for 3 months, but I have used a lot of your suggestions and now able to get off Lipitor!! Thank You!*
  - *Feel I am healthier physically and “ mentally”*

## Outcomes

Short-term outcomes (learning): (The following results are based on available evaluation data.)

- 261 program participants have increased awareness of strategies for promoting health and reducing health risk factors.
- 123 program participants reported that they had learned new information.
- 122 program participants reported that they had gained new skills.
- 103 program participants planned to adopt new behavior.

Medium-term outcomes (action): Changes at 3-6 months

- 58 program participants adopted new practices.
- 22 continued to work on health goals set during the workshop series.
- 20 workshop participants established new health goals.

- c. Source of Funds: Smith-Lever
- d. Scope of Impact: Illinois, Indiana, Iowa, Kansas, Michigan, Minnesota, Missouri, Nebraska, North Dakota, Ohio, South Dakota, Colorado, Utah, Montana, and Wisconsin.



## Goal 4: Harmony Between Agriculture and Environment

### 1862 Agricultural Experiment Station Research Overview

An important area of research relating to agricultural production and the environment is **animal waste management**. Researchers are developing rations that reduce nitrogen in pig manure and phosphorus in poultry litter. Scientists are using innovative technologies to evaluate soil properties, an important step in improving **soil quality**.

Researchers assess **wildlife management** strategies to improve the conservation efforts of threatened bird species. Investigators are working to develop new opportunities for **forest crops**, such as chestnuts.

### 1890 Cooperative Research Programs Overview

The main objectives of Cooperative Research Programs' activities under Goal 4 were to screen water, soil and air quality in several rural areas of the state of Missouri. These activities will result in recommendations for actions to rectify poor environmental conditions in the state's Bootheel area.

### 1862 University Outreach and Extension Overview

The extension educational approach to enhancing environmental quality in Missouri focused on several themes, but all used an interagency, problem-solving approach to guide policy and educate citizens. State departments of Natural Resources, Conservation, Agriculture as well as federal agencies located in Missouri worked together on the educational effort. Coping with animal wastes from confined animal feeding operations dealt with both point and watershed-based tracking and management of nutrients. Also, hands-on education of planning, installation and operation of individual home sewage treatment systems was an important component in maintaining the overall state program to improve water quality. Public events, such as water festivals, were the forum to educate the public on the complex water cycles found across the state. And lastly, pesticides used in agricultural, industry, home and roadside environments are an ongoing focus of the statewide pesticide applicator training program.

## 1862 Agricultural Experiment Station Research — University of Missouri-Columbia

### Key Theme: Agricultural Waste Management

- . Program Description: Reducing excess nutrients in poultry feed

Excess nutrients in animal waste can negatively impact the environment, with phosphorus (P) being a significant concern in poultry production. Researchers are analyzing alternative feed sources to reduce the quantity of potential pollutants in animal waste. An *in vitro* study was conducted to determine whether phosphorus availability was improved in low phytate acid grains and the resulting impact on manure composition.

- a. Program Impact:

Results indicate that chicks fed low phytic acid barley mutants were able to utilize more dietary zinc (Zn) than chicks fed wild type barley. Because of the increased P and Zn availability in low phytic acid barley, diets containing low phytic acid barley will not need to be supplemented with as much inorganic P and Zn. The combination of lower supplementary inorganic P and Zn and increased availability of both P and Zn in low phytic acid barley will result in a significant

reduction of P and Zn in manure. Reduction in poultry manure minerals will significantly reduce the potential for environmental pollution.

- b. Source of Funds: Hatch, Grants
- c. Scope of Impact: Multi State

### **Key Theme: Agricultural Waste Management**

- . Program Description: Reducing nitrogen in pig manure

Odor-producing compounds, such as ammonia, are formed when microorganisms break down nitrogen compounds, such as proteins, that are present in a pig's digestive tract and manure. Odor intensity is directly related to the amount of available nitrogen, which is determined by what the pigs eat. Researchers have developed a diet that uses synthetic amino acids to reduce nitrogen excretion without decreasing growth performance or carcass composition.

- a. Program Impact:

Synthetic amino acids have been tested in both a controlled laboratory setting and at commercial hog farms in Missouri and Iowa. Performance indicators such as daily gain, feed efficiency and feed conversion all show that synthetic amino acids provide the same benefits as amino acids found in corn and soybeans. In addition, the cost of supplementing with synthetic amino acids is offset by savings that result from the reduction in crude protein, which makes their use economical for hog producers. If producers reduce crude protein from 18 to 14 percent and supplement with synthetic amino acids, nitrogen excreted could be reduced by 30 to 50 percent. This reduction would significantly reduce odor.

- b. Source of Funds: Hatch, Grants
- c. Scope of Impact: Multi State

### **Key Theme: Forest Crops**

- . Program Description: Chestnut production as an alternative crop

Chestnuts offer new opportunities as an alternative crop using agroforestry practices. Researchers are working to develop a viable chestnut industry in Missouri. Work includes cultivar testing and improvement, coupled with associated horticultural management practices. Work will expand to include harvest and processing technology, and marketing.

- a. Program Impact:

Improvements were made on the replicated, 3 cultivar, research/demonstration orchard at a horticultural research farm. Electric fencing was installed to reduce deer predation and trickle irrigation was installed for use during stress periods and to maximize early growth and development. Chestnut production yield and nut descriptor data were collected on all producing cultivars during the fall. Data collection includes harvest dates, nut weight/size, crop load and yield. Research results, disseminated through the MU Center of Agroforestry website and

publications, conferences, and meetings, provide producers with both horticultural and management information for establishing this crop alternative.

- b. Source of Funds: Hatch, Grants
- c. Scope of Impact: Multi State

### **Key Theme: Soil Quality**

- . Program Description: Evaluating soil properties with X-ray CT

Soil structure is a very important soil property which affects surface and subsurface water quality as well as crop growth and productivity. Good soil structure enhances water infiltration and decreases surface water runoff thus improving the productive capacity of the soil and enhancing surface water quality. Investigators are using new methods to improve the procedures for evaluating soil properties in the step towards ultimately improving soil characteristics.

- a. Program Impact:

Characterization of the spatial variability of soil properties and processes is essential for effective soil management to improve runoff and ground water quality. Investigators use X-ray computed tomography to evaluate soil physical properties and processes which influence soil hydraulic processes. X-ray computed tomography (referred to as CT, or computer-assisted tomography, CAT) is extensively used as a diagnostic tool in medicine to non-destructively measure three-dimensional variations in density and atomic composition inside opaque objects. Use of the techniques developed in the tomography studies will assist land managers by identifying management techniques which improve soil structure.

- b. Source of Funds: Hatch, Grants
- c. Scope of Impact: Multi State

### **Key Theme: Wildlife Management**

- . Program Description: Assessing wildlife management of piping plovers.

The Great Plains population of piping plovers (*Charadrius melodus*) is listed as threatened or endangered and continues to decline. A research team has developed population models that assess the likelihood of the species surviving under the current conditions compared to recently initiated management to exclude predators.

- a. Program Impact:

Investigators estimated fledging success rates and revised a stochastic simulation model of plover demography to simulate population growth scenarios, with and without predator exclusion. The results suggest that active management of piping plovers nesting areas can be effective in slowing the decline of the population in the Great Plains and even reversing the trend. This feasibility of success should encourage management agencies and managers to proceed with management to exclude nest predators at piping plover breeding sites.

- b. Source of Funds: Hatch, Grants
- c. Scope of Impact: Multi State

## 1890 Cooperative Research Programs — Lincoln University

### Key Themes: Soil Quality

- . Program Description: In situ Lead immobilization in contaminated urban soil by phosphates in Jasper County Superfund site

Overall goal of this proposed project is to determine whether the health risk reduction and stabilization of soil metals by *in situ* phosphate treatment are nearly permanent or long-term, and the impact of the soil treatment on ecosystem is minimum. The research tasks include: 1) Long-term bioavailability assessment that include *in vitro* bioavailability test, phyto-availability test, and micro-toxicity test; 2) Leachability/Stability assessment under various chemical and biological conditions; 3) Identification of chemical species responsible for metal or phosphate stability and mobility; 4) Evaluation of soil microbial community alteration upon the soil treatment; and 5) Long-term monitoring of water quality upon the soil treatment. This project will combine both field and laboratory investigations, and primarily focus on two pilot field treatment sites that have been established by the Missouri Department of Natural Resources and are located in the urban and mining areas, respectively, in the Jasper County Superfund Site, Missouri.

- a. Program Impact:

Field investigation has begun in the Superfund areas to identify treatment plots and make sampling plan. This project targets the residents living in the contaminated areas in the Jasper County Superfund site. Over 100,000 residents in the area will benefit from this project in term of quality of life. The large-scale implementation of this phosphate-based remedial technology in Missouri as well as nationwide will have significant impact on even larger population of the residents who are affected by such metal contamination. The results from this project will also contribute to our knowledge on lead immobilization processes in soil.

- b. Source of Funds: U.S. Environmental Protection Agency (USEPA), Region VII, Missouri NCER
- c. Scope of Impact: Missouri

### Key Themes: Air Quality

- . Program Description:

There is no field data available to present aeroallergens related air quality in Jefferson City Missouri. The closest counting station is located at University of Hospital in Columbia Missouri. The data collected from this project serve dual functions as educational materials for environmental program majors as well as a public health resource and service. A Rotorod sampler is used for this project because its popular use by many allergists across the country for monitoring aeroallergens. Air samples collected by a Rotorod sampler can represent the aeroallergen quality in the area within 50-mile radius from where the sampler is located. East side of Dickinson Research Greenhouse at Lincoln University Lilbourn was chosen as the

collection site for its convenient location and less tree obstruction and traffic.

Aeroallergen data collected at LU will be submitted to Multidata Inc. for compiling and processing national pollen report and forecast available at [www.pollen.com](http://www.pollen.com). The public can access the information and take preventive measures to avoid allergy symptoms or asthma during high pollen and mold season.

a. Program Impact:

The aeroallergen counting station at LU is the first certified station among Missouri universities and colleges. The data collected from this project is serving dual functions as educational materials for environmental program majors, as well as a public health resource and service. Data collected so far reflects the diversification and dynamics of the vegetation and environment in central Missouri. Several high peaks of total pollens (over 1,600 counts) were observed this year contributed by different types of plants. The majority pollens collected in the spring were tree pollens.

b. Source of Funding: State

c. Scope of Impact: Missouri

**Key Theme: Biological Control**

. Program Description:

Nature derived insect deterrent compounds are gaining public attention and favor due to increased health and environment awareness. Scented geraniums have been known and used by tribes in southern Africa to deter undesirable insects.

The leaf juice of some *Pelargonium* was demonstrated effective in controlling adult mosquitoes (*Aedes aegypti*) in the preliminary tests. Mosquitoes are responsible for transmitting the West Nile virus (WNV). This viral infested encephalitis has claimed numerous human fatalities and uncountable wild and domestic animal lives across the U.S. in the year of 2002. The identification of botanical active ingredients in *Pelargonium* cultivars will be of great value in preparing the strategy against the spreading of mosquito-transmitted diseases. These compounds would be also useful in controlling pests for greenhouse and agricultural practices.

Special interests have been focused on scented geraniums for their insect deterrent potentials. Robert's Lemon Rose geranium was first observed free of insects in a whitefly and aphid infested greenhouse environment. The juice made from crushing leaves of this plant demonstrated to kill whiteflies and aphids instantly. This plant juice also demonstrated to adversely affect the behavior of other insects including houseflies, bees, and wasps caught and tested in the spring and summer of 2002. All insects demonstrated irritability and weaken mobility upon contacting the plant juice. Mosquitoes (*Aedes aegypti*) were tested with the plant juice recently. All mosquitoes were killed within 5- 15 minutes after exposing to the plant juice. Male mosquitoes were killed in a lesser time than female's mosquitoes probably because of their smaller body size.

a. Program Impact:

One of the scented geraniums in our collection demonstrated potent insecticidal effects against

various insects. The juice produced by pressing leaves is more potent in controlling insects than the whole plant. We observed a “knock down” effect on small and soft body insects and adversely affect the behaviors of larger insects in close contact with the plant juice.

*Pelargonium* cultivars vary in the flower development and flowering periods. Some cultivars have not developed flower, another flower one or twice a year, and the other have long flowering season. Most of the cultivars have less flower frequency also have a less than one-week blooming time. Flowers vary in colors and sizes. Some *Pelargonium* cultivars have distinct leaf morphology but showed to have identical GC/MS volatile compound profiles. Several cultivars showed to have identical volatile profiles in leaves as that of the mosquito plant (*Citrosa*). This finding is important for revealing more scented geranium might possess similar insect deterrent properties as *Citrosa*. Furthermore, similar chemical makeup also indicates the close genetic relationship among these plants.

- . Source of Funding: State
- a. Scope of Impact: Statewide, regional and national

## **1862 University Outreach and Extension — University of Missouri System**

### **Key Theme: Agricultural Waste Management**

- a. Program Description: Animal Waste Management

Livestock manure management covers a variety of approaches for working with water and air quality concerns created by livestock manure. Programming efforts for extension specialists and other agency personnel has become a major component of developing a holistic approach to proper livestock manure management. The concept of private individual consultations is still very important, but interagency cooperation and education are mandatory if livestock manure management is to have statewide success.

In Missouri, livestock production represents approximately 50 percent (\$2.4 billion) of the income from agricultural commodity sales. A major producer of livestock, Missouri ranks seventh in swine, eleventh in poultry, and second in cattle production. The number of confinement operations and Missouri’s diverse topography can create water quality concerns from over-application of livestock manure.

The Missouri Department of Natural Resources (MoDNR) has several water bodies listed on the state 303(d) list as being impaired because of nutrient overloading from livestock manure. The 303(d) list also has identified several water bodies with nutrient loading from unknown sources. This influx of nutrients, such as phosphorus and nitrogen, comes from many sources -- livestock production and land application of manure being critical sources.

The Interagency Technical Working Group (ITWG) was formed with personnel from University Outreach and Extension, Natural Resources Conservation Service and the Missouri Department of Natural Resources. The group reviews literature and information on manure management issues so the agencies are presenting approved information that meets the state’s environmental goals for conservative manure use.

The economic viability of Missouri’s livestock industry is at stake if social and environmental

issues are not addressed. Confined livestock operations have been listed as a major environmental and health concern from odor and mishandling of manure. University Outreach and Extension understands the importance of protecting the economic viability of Missouri agriculture, but also understands the need for maintaining a safe and healthy environment.

University Outreach and Extension provides partnering agencies and producers with information on land use management, application equipment and approved management practices for maximum manure utilization and reduced environmental degradation.

Missouri is a major livestock producer, ranking seventh in swine, eleventh in poultry and second in cattle production. Many operations are highly concentrated and located in areas where soil conditions are not suitable for heavy land application of livestock manure. The economic viability of Missouri's livestock industry is at stake if social and environmental issues are not addressed. Confined livestock operations have been listed as a major environmental and health concern for odor and mishandling of manure.

The Interagency Technical Working Group (ITWG) has been formed with personnel from University Outreach and Extension, Natural Resources Conservation Service and the Missouri Department of Natural Resources to ensure that information that meets the state's environmental goals for conservative manure use.

The "Comprehensive Nutrient Management Planning" and "Livestock and Poultry Environmental Stewardship" curricula have been developed.

Training courses provided agency personnel and extension specialists with information on comprehensive nutrient management planning procedures for producers. The program has been delivered to 900 producers.

An analysis by University engineers assisted the EPA in re-evaluating cost estimates for manure management on farms; proposed regulations on confined animal feeding operations now reflect the average costs for full compliance.

For additional program information see: [Environmental Quality](http://www.eq.missouri.edu/) (<http://www.eq.missouri.edu/>)

b. Program Impact:

- 1) University of Missouri Extension faculty members participated in a comprehensive, collaborative effort involving 37 animal scientists and agricultural engineers from 21 universities and agencies. This team of scientists developed diet-based manure production models that reflect modern animal genetics and feeding practices. Data and procedures are published through ASAE Standards, Midwest Plan Service and Natural Resources Conservation Service (NRCS).
- 2) University of Missouri Extension, in collaboration with Missouri NRCS and the Missouri departments of Natural Resources and Agriculture, conducted a series of work sessions to investigate technical and regulatory barriers to incineration as a means of disposing dead animals. Issues included permit/exemption requirements, emission/combustion efficiency requirements, stack testing requirements, temperature control and required management procedures. As a result of this effort, noncommercial incineration of dead animals is exempt from the permitting process required for industrial incineration.

- 3) Thirty professionals from 15 land-grant universities -- including the University of Missouri -- USDA, MWPS and the EPA Ag Center planned, authored and pilot tested a Livestock and Poultry Environmental Stewardship (LPES) Curriculum. The curriculum, nationally developed and regionally piloted, includes 26 lesson plans grouped into six modules. Each lesson includes teaching outlines, environmental stewardship and/or regulatory compliance assessment tools and PowerPoint presentations. The curriculum was funded by EPA.
  - 4) The 10-member Southeast Missouri Dairy Producer Cooperative Group was established as a means of sharing information related to dairy production systems. The group meets every six weeks at a different member's farm to view a management practice that the producer has used on the farm. The meetings encourage discussion of successes and concerns about all aspects of dairy production. As a result of the meetings, one producer constructed a concrete manure catchment basin for a freestall barn and open lot area; another producer improved his manure collection and storage system; and another is working with extension specialists to design a settling basin.
  - 5) The Commercial Agriculture Swine Focus Team conducted producer meetings throughout Missouri to educate livestock producers on Comprehensive Nutrient Management Plans. Workshops were conducted in 16 locations. The goal is to train and assist producers to determine whether they need or want a CNMP.
  - 6) Thirty professionals representing NRCS, MDNR and private vendors attended the 2003 Nutrient Management Planner Training Course. The intensive five-day course included a three-day classroom course followed by a two-day field exercise. Completion of the course is a requirement for certification as a technical service provider (TSP) in Missouri. Participants who complete the course are eligible to write portions of a nutrient management plan.
  - 7) The Missouri Manure Management Action Group (MoMMAG) <http://outreach.missouri.edu/mommag> and the Agricultural Electronic Bulletin Board (AgEbb)/Commercial Agriculture web site provide updated information on management practices, laws and regulations, as well as links to web sites in other states with similar livestock manure issues.
- c. Source of Funds: Smith-Lever, EPA, Natural Resource Conservation Service, State
- d. Scope of Impact: Missouri, Indiana, Minnesota, Iowa, Ohio, Oklahoma, Illinois

### **Key Theme: Hazardous Materials, Water Quality**

- a. Program Description: On-site Sewage and Solid/Household Waste

With increasing population and changing land-use trends, waste disposal practices associated with private property can be a source of pollution problems. Private landowners, rural residents and county officials need assistance in making management decisions about on-site sewage construction and maintenance and proper solid and household waste disposal to insure water quality. Recent changes in the Missouri Department of Health regulations for on-site sewage set new limits on private landowners. Additionally, individual county health codes, which surpass state regulations for on-site sewage, accelerated the need for educational programs that meet the diverse land cover.

Through a series of programming efforts, University Outreach and Extension trained on-site sewage installers to identify correct ways to perform soil percolation tests for on-site sewage systems. State and regional specialists have sole responsibility for offering this training to private and commercial on-site sewage installers. Since 1998, more than 1,600 installers have attended



the two-day course for soil percolation testing. Class participants must pass a certification test with a score of 80 percent or better to obtain certification. In four years, more than 1,500 installers completed the course and passed the certification test.

In Warren County, University Outreach and Extension offered a series of classes on farm pesticide and household hazardous waste. Participants were motivated to write a grant to conduct farm pesticide collection.

In Jefferson, Texas, Hickory and Webster counties, University Outreach and Extension held classes for on-site sewage systems and disposal of solid and household waste. In Saline and Cooper counties, educational programs were conducted using the Farmstead Assessment System (Farm-A-Syst) to help local landowners and rural residents identify potential water quality problems associated with on-site sewage systems, on-site solid waste disposal, drinking water well condition and hazardous waste management; 100 percent of participants indicated they would make changes on their personal property.

Through the educational programming efforts, participants indicate they will do the following:

- Adopt disposal practices that are environmentally safe and protect human health.
- Make decisions based on the information learned to meet new regulatory standards.
- Implement practices that are economically and environmentally sound.
- Control, reduce or eliminate on-site solid waste disposal.

For additional program information see: [Water Resource Information \(http://www.fse.missouri.edu/waterquality/\)](http://www.fse.missouri.edu/waterquality/) and [Missouri Watershed Information Network \(http://outreach.missouri.edu/mowin/\)](http://outreach.missouri.edu/mowin/)

b. Program Impact:

- 0) A standardized class on soil percolation testing was developed and offered to extension regional specialists and system installers as the result of a cooperative venture between the University of Missouri Extension Water Quality program and the Missouri Department of Health and Senior Services. The training should ensure the proper installation and functioning of septic tanks and drainage fields for on-site sewage systems. Systems that work correctly reduce nutrient and bacterial loading into groundwater and surface water, thus reducing environmental and water quality concerns related to health risks associated with sewage water.
- 0) A new train-the-trainer program entitled, "Creating a Healthier Home," for extension specialists and health educators was developed to assist citizens identify possible asthma triggers and hazards that may be found in the home.
- 0) A six-hour professional development, on-site sewage systems course was offered to more than 190 real estate professionals. Evaluations from the class show that 78 percent of the participants reported that they would evaluate soil information and ask questions about septic tank maintenance when developing a sales listing on a specific property. More than 90 percent thought the class was excellent and would take other classes on environmental issues and how they affect real estate transactions.
- 0) The nationally recognized program, "No More Trash," was implemented in Gasconade County to teach residents and 4-H members about being responsible for keeping the environment and natural landscape clean. Residents participated in stream and road cleanups and put up signs to increase awareness about illegal dumping.

- 0) Hazardous material collections for agricultural producers and urban residents were held in several key areas of the state. The collections netted more than 200 different unusable agricultural pesticides and household pesticide products. Total accumulation of hazardous materials was approximately 250 pounds of dry product and six 55-gallon barrels of liquids. More than 150 people from urban and rural areas participated by bringing in unused or unwanted pesticides.

- . Source of Funds: Smith-Lever, State, EPA/DNR 319 Water Quality
- a. Source of Impact: Missouri

### **Key Themes: Land Use, Natural Resource Management, Water Quality**

- c. Program Description: Water Festivals – Water and Natural Resources Education for Youth and Educators

A 1999 University Outreach and Extension needs assessment in Missouri's 114 counties revealed a strong need for programs and tools to protect water resources and provide environmental education. Ninety counties listed environmental quality, watershed management or natural resource conservation as a program theme, and 104 counties listed environmental issues education as a local need.

Water resources are one of Missouri's most valuable commodities for industry, tourism and agriculture. The goal of the Water Festivals program is to provide educators with materials and increase awareness of water quality issues.

University Outreach and Extension is part of a multi-agency team providing educators with environmental curricula that can be incorporated into day-to-day teaching activities. Student learning is enhanced by educational/informational lessons to support in-class teaching activities

University Outreach and Extension worked with 27 partners to create the Missouri Watershed Information Network (MoWIN). MoWIN is a public access program that offers watershed information through a web site, toll-free number, email or direct personal contact. MoWIN has continued to grow to provide watershed information.

For additional program information see: [Water Resource Information \(http://www.fse.missouri.edu/waterquality/\)](http://www.fse.missouri.edu/waterquality/) and [Missouri Watershed Information Network \(http://outreach.missouri.edu/mowin/\)](http://outreach.missouri.edu/mowin/)

- d. Program Impact:
  - 1) More than 1,000 fourth and fifth graders in southeast Missouri learned about ecological practices and management of natural resources to improve environmental quality. Tests administered to all participating students both before and after instruction showed a dramatic increase in students' knowledge of environmental issues and natural resource management.
  - 2) In Adair County, more than 470 junior high students participated in Water Awareness Day, a multiagency educational program. Twenty-two instructors from the Corps of Engineers, Soil and Water Conservation District, Missouri Department of Conservation and University of Missouri Extension offered a series of sessions throughout the school day to build students'

Missouri Achievement Program (MAP) skills, including mapping, graphing, sequencing events, and understanding cause and effect. Test scores in targeted MAP content areas showed an overall increase of 15 percent in comprehension skills and science-based knowledge.

- 3) More than 25 water festivals were held throughout the state during 2003. Each festival was designed to fit needs of the region and of the school. Teachers rated the program as follows:
  - 75 percent of all students gained new or enhanced knowledge.
  - On a scale of 1 – 10, 10 being excellent, the festivals received the following scores:
    - Overall program – 10
    - Methods used to present materials – 9.9
    - Content of sessions – 10
    - Presentation style for age group – 9.6
    - Overall session – 9.9
0. Five years of evaluation in several schools in the northwest region demonstrated an increase in Missouri Assessment Program (MAP) test scores. Test results showed increased knowledge and awareness of water quality issues. Ten Water Festival learning activities were matched with specific MAP skills and were rated by teachers for effectiveness. Eight of the 10 activities received a rating of 90 percent for effectiveness in reinforcing MAP skills and being useable by third-grade students.

e. Source of Funds: Smith-Lever, EPA/DNR, State

f. Scope of Impact: Missouri

### **Key Them: Pesticide Application**

- a. Program Description: Pesticide Applicator Training

Approximately 6,000 commercial and 35,000 private (farmer) pesticide applicators reside in Missouri. Anyone who applies any type of pesticide for commercial purposes must be certified by passing a mandatory initial exam. Missouri statutes require that these applicators be re-certified, by training, before being re-licensed on a three-year cycle for commercial applicators and a five-year cycle for private applicators. Environmental and health concerns about pesticides, the changing field of pesticide development, new laws and regulations, and registration make a responsive and intensive training program essential. The private applicator training program reaches into essentially all of Missouri's counties.

University of Missouri Extension provides educational programs to help those aspiring to obtain certification for commercial purposes. The program attracts nearly 500 attendees each year. Program attendance figures indicate that nearly 1,000 private applicators attend initial training, and approximately 7,000 attend for re-certification purposes. Public access to the Pesticide Applicator Training Program may be obtained through the World Wide Web at <http://ipm.missouri.edu/pat/>.

University Outreach and Extension regional specialists conduct private applicator programs. Commercial applicator training was conducted in five locations during January. Instructors who supported the program represented the Missouri departments of Agriculture, Conservation,

Natural Resources and Transportation; University Outreach and Extension; Oklahoma State University; and private industry.

b. Program Impact:

- 1) More than 2,000 commercial applicators and 6,000 private applicators attended University of Missouri Extension Pesticide Applicator Training sessions.

A survey of commercial applicators who attended the sessions reported “planned” changes in their behavior as a result of the training:

- 97 percent of the participants plan to spend more time reading the pesticide label when mixing or using chemicals.
- 85 percent plan “always” to use personal protective equipment when mixing and applying pesticides.
- 97 percent plan to familiarize themselves with their company’s emergency plan.
- 91 percent rated the overall training as “excellent or good.”

In a survey of the private applicator audience:

- 77 percent of participants indicated that the training heightened their awareness of pesticide laws and regulations.
- 86 percent indicated that the training had improved their comprehension of the pesticide label.
- 75 percent indicated that the training improved their knowledge related to protecting the environment.
- 94 percent indicated that the training improved their knowledge of personal protective equipment selection and use.
- 82 percent indicated that the training improved their calibration skills.
- 91 percent indicated that the training improved their skills and understanding related to proper transportation and storage of pesticides and cleanup of spills.

Society demands a cleaner and safer environment. Pesticide training programs educate producers in making environmentally sound decisions about the use of pesticides.

- 2) As a result of extension programming efforts, Missouri farmers have adopted integrated pest management programs on 80 percent of Missouri’s corn, soybean and cotton acreage.
- 3) Fifteen one-day pest management workshops were held in 2003. On average, participants increased their knowledge 29 percent by attending the training as indicated by test scores before and after the workshop.
- 4) Data from the 2002 Bootheel Irrigation Survey showed that 25 percent of irrigators growing corn under pivots were not applying all of their nitrogen in one or two applications but were using “chemigation” to apply small amounts as needed. The same growers also avoided leaching Nitrogen by applying small irrigation amounts more frequently.

c. Source of Funds: Smith-Lever, EPA, state

d. Scope of Impact: Missouri

**Key Theme: Water Quality, Soil Erosion, Land Use Planning, Natural Resources Management; Riparian Buffers**

a. Program Description: Watersheds Resource Education

In Missouri, private individuals own 93 percent of all land. Potential pollution sources from agriculture, industry, on-site sewage and water-based recreation are assessed for economic, environmental and social impacts relative to the communities involved.

The Missouri Department of Natural Resources is mandated to establish Total Maximum Daily Loads (TMDLs) in areas that have identified water quality degradation. Local watershed communities must look at the social, economic and environmental benefits offered by different management decisions to determine the feasibility of their plans. Watershed committee members need to receive education and instruction on the scientific principles involved and assistance in implementing watershed management strategies. The process takes significant time, but the final product -- the water quality management plan -- is one that is highly useable and acceptable with local watershed citizens.

Source Water/Watershed Protection and Watershed Design Planning program has been designed to integrate public participation and community capacity building with best management practices implementation for water quality protection. Individual watersheds/communities work directly with local resource agency personnel to develop and implement a watershed plan that reduces potential water quality problems. Science-based assessment and ongoing monitoring projects are being used to provide objective information for locally led decision making. State and regional extension specialists assisted community/watershed leaders in coordinating group meetings to discuss water quality issues and locally agreed upon management practices that could be implemented by area producers. Demonstration/research projects are being used to show local producers how they might benefit from alternative conservation practices.

b. Program Impact:

- 0) Through the Missouri Watershed Information Network (MoWIN), more than 350 citizens statewide received training on how to use the Internet to locate information about watersheds. Many of those attending the classes have used the information in writing grant proposals and developing watershed management plans.
- 0) The Maysville community has seen a direct improvement in water quality in the drinking water reservoir after implementing management practices to reduce soil erosion and nutrient and pesticide runoff into the reservoir. These environmental benefits reduce the expense involved in filtering the water to meet state standards. Producers have benefited from the Missouri Conservation Reserve Enhancement Program (MoCREP) program through increased yearly incomes on fields classified as environmentally sensitive.
- 0) The Missouri Watershed Initiative developed and tested a “model” comprehensive approach to community-based watershed management in the Long Branch Watershed. The project had the following effects on land use and community activities:
  - A community-based standing committee representing varied watershed interests was established to direct the watershed research priorities and intervention strategies.
  - Through the Missouri Conservation Reserve Enhancement Program (MoCREP), participating farmers will receive \$3.4 million in land deferral and incentive payments over next the 15 years.
  - The environmental impact of implementing MoCREP in the watershed is:
    - 17 percent of cropland in the watersheds was converted to grass or trees; nearly all of this cropland was located in the northern three sub-watersheds and was predominately corn and soybean acreage.

- The reduction in sediment yield from these sub-watersheds ranged from 10 percent to 27 percent.
    - Atrazine loss reduction ranged from 10 percent to 37 percent.
    - Phosphorous loss reduction ranged from 10 percent to 33 percent.
    - Nitrogen loss reduction ranged from 10 percent to 33 percent.
  - More than 200 individuals – farmers, resource professionals and students – have visited the stiff-stemmed hedge demonstration site. Evaluations indicated that visitors learned much about hedge establishment and maintenance, economic aspects and the potential impact for water quality. A majority of farmers have indicated that they would probably adopt this system of soil erosion control if government cost-sharing were made available.
  - More than 150 individuals – farmers, resource professionals and students – have visited the off-site livestock watering demonstration. Field trip evaluations have been positive, but considering that the project has been under way just one year, firm indications of potential impact are not available.
- 0) Total Maximum Daily Loads (TMDLs) are becoming a major issue in communities where pollutant limits are set by an agency, but local citizens must determine what they can do to help stay within the TMDL limit. Watershed teams are being developed in three communities to determine what they can do and how they can accomplish their goals. Improving water quality based on a TMDL through community commitment should ensure long-term success.
- 1) The Heartland Community Involvement in Watershed Management is a four-state effort to identify resource personnel who have experience in fostering locally led watershed management groups. Watershed communities having gone through this process are generally more successful over the long term and have fewer recurring environmental issues while protecting economic viability.

For additional program information see: [Water Resource Information \(http://www.fse.missouri.edu/waterquality/\)](http://www.fse.missouri.edu/waterquality/) and [Missouri Watershed Information Network \(http://outreach.missouri.edu/mowin/\)](http://outreach.missouri.edu/mowin/)

- c. Source of Funds: EPA/DNR; USDA/Missouri Environmental Quality Incentive Program, ARS, State, USDA/CSREES 406 grant
- d. Scope of Impact: Missouri, Kansas, Nebraska, Iowa

## Goal 5: Enhanced Opportunity and Quality of Life for Americans

### 1862 Agricultural Experiment Station Research Overview

Tourism is an important economic sector in Missouri. Investigators work to improve the ability to measure the quality of tourism services for economic consideration as well as quality of life benefits for citizens.

### 1862 University Outreach and Extension Overview

#### Human Environmental Sciences

The University of Missouri Outreach and Extension Human Environmental Sciences program is committed to creating educational programs to improve the lives of Missouri families. Through a wide variety of delivery methods, University Outreach and Extension assisted children, youth and adults in learning ways to improve their personal, family and community health and well being. This year, University Outreach and Extension continued to address major issues facing Missouri families, including child abuse, adolescent pregnancy, financial problems, poor quality child care, inadequate housing and divorce. Through a variety of methods, University Outreach and Extension Human Environmental Sciences faculty totaled more than 1,497,217 educational contacts throughout Missouri. An additional 317,172 unique visitors accessed the MissouriFamilies.org website. The Internet presence totaled 860,925 page views in 2003 or **two page views every minute of every day!** During 2003, 5,124 educational contacts were made in the area of Adolescent Pregnancy Prevention; 25,465 educational contacts were made in Family Financial Management; and 18,630 educational contacts were made in successful aging.

Access to learners was improved this year through the development of an extensive online delivery system. Through the creation of Missouri Families (<http://missourifamilies.org/>), many more people have access to practical, science-based information about health, human development, housing, personal finance and nutrition. In June 2002, the web site was accessed once every two minutes and averaged about 10 visitors per hour. In the short span of six months, findings from Internet search engines indicate that the site's information about nutrition and divorce is among the top sources on the web.

A statewide report on the condition of Missouri families was updated for 2003. This "Report on the State of Missouri Families" highlights the needs of Missouri families in family life, finances, aging, chronic disease and housing. The report informed citizens, policy makers and social service professionals about the critical needs affecting their communities. Through this report, we have engaged 5,000 Missourians in discussions about how to improve family life.

- This year, the "Report on the State of Missouri Families" highlighting the needs of Missouri families was released. This report included a web site, statewide brochure, fact sheet for every Missouri county, news releases and county-specific PowerPoint presentations. In FY03, 6,097 were reached through face-to-face programs and 1,275 were reached through newsletters. Additionally, the MissouriFamilies.org website, which houses the State of Missouri Families Report, is accessed once every 30 seconds.
- In an effort to extend program reach to more people, the Missouri Families web site was created. At present, this web site includes answers to over 1,600 questions about health, human development, nutrition, fitness, housing and personal finance. Findings from Internet search engines indicate that online readers regularly seek the site's information about nutrition and divorce. A unique visitor accesses this site twice every minute of every day.

- The Building Strong Families Program continued collaboration with internationally known family strengths researchers at the University of Nebraska. Currently, 89 facilitators are trained in Nebraska to offer the program. The Building Strong Families program design team certified 317 extension specialists and paraprofessionals and community agency professionals to offer the program in Missouri. The program has been taught to more than 2,700 individuals since its development in 1997. Facilitators reached 777 people in 2003.
- The High School Financial Planning Program is a curriculum targeted at high school students to teach financial planning basics. In the 2002-2003 school year, outreach more than doubled compared with the previous school year with a 150 percent increase in participating schools (216) reaching 120 percent more students (12,340). More than 350 teachers and counselors were provided information and resources at the Annual Missouri Association for Career and Technical Education Conference in Summer 2003.
- In excess of 50,000 MC+ children's health insurance brochures were distributed across all counties in Missouri.
- In 2000-2001, almost 2,000 people requested home ownership information through the Missouri Housing Partners Initiative (MHP) (<http://outreach.missouri.edu/mhp/>). An objective of MHP was to provide significantly enhanced program access by going online. The result is a 300 percent increase in requests for information.
- Web-based learning has been a central theme in the work of the Missouri Textile and Apparel Center (<http://outreach.missouri.edu/motac/>). The center expanded online outreach resources to textile manufacturers across the Midwest. During 2003, MO-TAC faculty also added consumer information to the MissouriFamilies.org web site.
- The Focus On Kids (<http://outreach.missouri.edu/cooper/fok/>) program was taught to divorcing parents in cooperation with local circuit courts. Twenty regional extension specialists taught the curriculum in 30 Missouri counties. During the last year, there were 3,000 participants. Most participants indicated that they planned to make a stronger effort to work with their former spouses for the sake of the children as a result of attending the program.
- Childcare providers were the critical link between program quality and children's experiences. Unfortunately, the field is plagued by alarmingly high rates of turnover. Missouri is pilot-testing a workforce development initiative (WIN) that pays biannual cash incentives to child care providers based on their educational attainment, ongoing professional development and continued employment in the same early childhood program. To date, 642 early childhood professionals from child care centers and family childcare homes in select rural, urban and suburban counties participated in the incentive program. Ultimately, the goal is to improve children's childcare experiences by strengthening the provider workforce.
- On Sept. 19, 2002, Maltreatment & Adolescent Pregnancy and Parenting Program (MAPPP) offered a national satellite presentation in which 3,600 viewers were present; 333 viewers were professionals from across Missouri, 155 of which represented 16 of the counties with the highest rates of child abuse. An additional 39 professionals were trained in MAPPP, 13 of which attended a cultural MAPPP training on the Hispanic perspective to address the needs of the growing Latino community.



#### 4-H Youth Development

Three major program teams in Missouri focused on improving the well being of youth, families and communities. A major focus for the youth programming was through the Missouri 4-H Youth Development (<http://mo4h.missouri.edu/>) program that helped communities create opportunities for young people to be valued, contributing members of their families, schools and communities. The National Research Council in “Community Programs to Promote Youth Development” (2002) recommends the following characteristics for effective programs: physical and psychological safety, appropriate structure, supportive relationships, opportunities to belong, positive social norms, support for efficacy and mattering, opportunities for skill building, and integration of family, school and community efforts. University Outreach and Extension’s 4-H Youth Development Programs combined these elements in all programs, connecting youth with caring adults for learning-by-doing experience in organized clubs, enrichment programs, special-interest groups, camps and school-aged child care programs. 4-H Youth Development programs at the local, regional and state levels emphasized the following key themes: School-Age Care/Opportunities for Youth during Out-of-School Hours; Workforce Preparation/Information Technology; and Character Education through Community Service Learning. A special emphasis was on targeting communities in St. Louis, Kansas City and the Bootheel with programs that addressed the unique social and educational needs of children and adolescents living in impoverished communities.

#### Character Education

- In a study of Missouri 4-H members, 86 percent agreed with the statement, “4-H teaches me to be responsible for my own actions.”
- 11,853 youth and adults participated in 4-H community service learning activities.

#### Science and Technology Education

- University Outreach and Extension faculty taught science education to 59,186 students through the Hatching Chicks in the Classroom school enrichment program.
- University Outreach and Extension faculty collaborated with local school districts to open 16 after-school computer labs.

#### Volunteer Leadership Development:

- 16,739 youth and adults worked with 203,099 youth as “recognized” 4-H volunteers.

#### Community Development

The University of Missouri Community Development Program focused on creating sustainable and viable communities for healthy families, youth, businesses, governments and organizations in urban, suburban and rural areas. Programs developed community capacity through collaborative learning to broaden inclusion, engender citizen participation and foster effective local decision making. Skills necessary for successful community dialogue, community decision-making, planning and policy development were taught.

Four areas were especially emphasized this past year. First, creating inclusive communities emphasized outreach to Hispanics and fostering multicultural communities across the state. Second, community emergency management programs responded to the devastating tornadoes in May and focused on building resilient communities capable of responding to natural disasters and prepared for homeland security threats. Third, community leadership development and training of people who work in a variety of organizations through the Community Development Academy and EXCEL demonstrated many positive impacts in communities across the state. Fourth, community decision-making efforts focused on

engaging communities in public dialogue around important issues and providing decision support analysis to communities through collaborative learning.

The Community Development Program drew on resources from several departments of the University of Missouri campuses to reach out to diverse audiences as well as support community gardening and food systems and community housing programs.

- University Outreach and Extension faculty who completed the Community Development Academy were engaged in new and expanded local leadership development. They involved citizens in planning and implementation of community-wide programs and adopted community-based approaches in all aspects of their extension programming. CDA participants from Newburg, Mo., indicated they have used their training to facilitate creation of a city economic plan; foster local city council training; rehabilitate the Historic Houston House Hotel for use as a community center; acquire 14 acres of land from the railroad to convert to community uses; schedule a voter registration and forum to educate the voters on issues; and assume responsibility for Newburg Days, a summer festival to celebrate the community.
- In Kansas City, facilitation of planning has led to collaboration between the Federal Deposit Insurance Corporation, the Hispanic Chamber of Commerce, the Hispanic Economic Development Council and the Northeast Chamber of Commerce. As a result, the local groups are co-located in a bank and working together to meet the rapidly growing business development needs in Northeast Kansas City. They are working with extension to develop culturally specific approaches to small business development, workforce development and support services. The Kansas City Office of International Trade and Regional Mexican Consulate also are involved in long-term planning to develop a thriving local economy.
- As part of the Local Government CECH-Up Program, junior high school students in Spickard, Mo., researched the social, economic and demographic make-up of the community and used this information to create a brochure promoting the community. The students did not think that there was anything in the small town to use in a brochure but discovered many aspects of the community they had taken for granted. Students distributed colored copies of the brochure.
- Local collaborative partnerships to address community issues through public deliberation have formed in Kansas City, Warrensburg, Columbia and Southwest Missouri as a result of moderator training for convening and moderating public deliberation forums. The Southwest Missouri group is focused on issues related to Hispanic immigrants and their assimilation into the community. Collaboration with the non-profit Kansas City Consensus resulted in Kettering Foundation funding to study the action teams developed after public deliberation forums as a model for other states.
- As a result of an online community economics training provided for extension personnel, citizens, and people across the nation, a director of multi-site mental health clinics in Missouri, who also serves on the Economic Development Commission and teaches at the community college, used the information he developed to enhance decision making with the local EDC.
- A state senator is using information on the variation in property tax rules across 15 states to examine and analyze Missouri's tax structure.
- The results of "The Laclede County Economic Analysis and Baseline", 2001-2011 and "The Impact of H.D. Lee Plant Closure in Laclede County" 2001-2011 enabled local officials from the

city of Lebanon to negotiate the purchase of an empty manufacturing facility from the H. D. Lee Corporation. Recently, the company had closed its operations and moved them to Mexico, resulting in the loss of about 750 local jobs. The MU Community Policy Analysis Center estimated the economic effects of this loss at approximately \$2.5 million in lost revenues to Laclede County government. City officials used this number as their negotiating point to purchase the empty facility for roughly half of its appraised value. The plant was converted to an industrial park. As a result, a subsidiary of Emerson Electric is adding 360 jobs over a two-year period. City officials are using the baseline report and the industrial park to recruit additional businesses.

- The Old North Neighborhood Partnership has strengthened the economic base and is preserving the character, quality and culture of an historic inner-city neighborhood through home ownership, housing rehabilitation, family financial literacy, neighborhood leadership and capacity building, environmental health and safety, and historic preservation. These projects combined with a bicycle historic tour and community museum are adding new optimism and economic vitality to this inner-city neighborhood. Partners include the Old North Neighborhood Partnership, University Outreach and Extension and University of Missouri-St. Louis faculty, staff and students, with funding from the U.S. Department of Housing and Urban Development.
- Because of its statewide presence and its ability to respond quickly with relevant, accurate information, University Outreach and Extension is recognized as a valuable partner in disaster recovery by local, state and federal officials. While often working behind the scenes, extension has a unique, essential role. Because of the Community Emergency Management Team's facilitation of COADs (Community Organizations Active in Disaster), local governments and relief agencies worked in a coordinated manner to identify and prioritize the issues facing their communities, to address the needs of victims and to develop long-term recovery plans after the tornadoes and other severe weather that affected 77 of Missouri's counties during the first week of May 2003.
- Evaluation of community leadership development program participants continues to indicate that participation has resulted in personal growth and self-efficacy, community commitment, a shared future and purpose for the community, community knowledge and civic engagement. During the past 20 years, more than 5,100 participants in the Experience in Community Enterprise and Leadership (EXCEL) program have engaged in local, regional and state roles to benefit their communities.

As a result of Lafayette County's community leadership program, the Chamber of Commerce executive directors and the local directors of economic development are meeting on a regular basis to share ideas and issues and coordinate economic development efforts. One of the county commissioners indicated the program has made it easier to gain the support needed for reinstating a regional planning commission for this four-county area adjacent to Kansas City, Mo.

Graduates of the Neighborhood Leadership Academy in St. Louis have created a community computer lab, planned and expanded neighborhood gardens, developed a church-based community needs assessment, proposed and implemented a street banner design competition, and inspired more community involvement in local government.

Nearly 77 percent of Leadership RAP participants in Boone County's Juvenile Justice Center reported they were better able to resolve conflicts constructively. This is particularly important since 55.8 percent of all juvenile admissions from 1997 through 2001 were for offenses against

people (murder, rape, assault, assault with a weapon, sex acts against a person and other acts against a person).

## **1890 Lincoln University Extension Overview**

Lincoln University Cooperative Research and Extension efforts toward accomplishing Goal 5 embraced and implemented programming which addressed such issues and topics such as aging, youth citizenship, academic enhancement, youth and community leadership development, military families, communication skills, horticulture and more.

All efforts under this goal were directed toward fulfilling and increasing family participation in parenting programs, increasing the number presented and participation in programs on career and life skills, job training, youth citizenship, enhancing youth academic performance and improving standards of living and quality of life for all Missourians.

## **1862 Agricultural Experiment Station Research – University of Missouri-Columbia**

### **Key Theme – Tourism**

- . Program Description: Measuring quality in tourism  
  
Tourism, which is in essence a service industry, is a major economic sector in Missouri. Researchers are investigating the relationship between service quality and satisfaction and how this relates to consumers' future behavior. Being able to measure quality and identify what consumers respond to provides meaningful information for improving quality.
- a. Program Impact:  
  
Quantitative research methods, utilizing survey instruments, are being developed and used to analyze tourist behavior and perceptions of their experiences. Investigators are examining a limited set of cultural and psychological constructs that potentially explain the variances in tourists' evaluations of services and their satisfaction judgments. Methods of increasing the response rate for surveys are also being explored to improve the quantity and quality of information being collected. Results will enable those providing tourism services to improve quality, thereby increasing the incidence of repeat customers that in turn share their positive experiences with other potential customers.
- b. Source of Funds: Hatch, Grants
- c. Scope of Impact: Multi State

## **1862 University Outreach and Extension — University of Missouri System**

### **Key Theme – Aging**

- . Program Description: Successful Aging

Dramatic increases in longevity in the United States and Missouri since 1900 led to a major shift in the age structure of the population. Missouri ranks among the "older" states (top one-third) in terms of the proportion of population over age 65. The most substantial growth from 1990 to 2000 occurred in the 85 and over age group. Virtually every Missouri county had a substantial increase in this age group, and 18 counties had an increase greater than 40 percent (Office of Social and Economic Data Analysis). Another 30 counties had increases between 20 and 40 percent. Even greater changes and demands will come as the Baby Boom cohorts (those born 1946-1964) move into the older age categories. Nearly every sector of community life is influenced in some way by these aging trends, including health care, housing, family and intergenerational relations, economic life and the types of jobs available.

The Aging Program and the Center on Aging Studies without Walls developed on the premises that 1) There are many things older adults and their families can do to influence their physical, cognitive and social function and encourage "successful aging" (i.e., maintain a low risk of disease and disease-related disability; high mental and physical function; and active engagement with life), and 2) There are many ways in which those in caregiving roles (i.e., either families and friends caring for older adults or older adults who are in the position of primary caregiver to grandchildren) can be supported through information and resources pertinent to those roles. The program has followed through on these premises by 1) developing a comprehensive web site, the Center on Aging Studies without Walls (<http://iml.umkc.edu/casww>), which includes extensive resources on caregiving and successful aging 2) developing instructional modules on each of the successful aging topics (activity/leisure/volunteerism; creativity; emotional well being; memory and intellectual function; nutrition and exercise; social relationships; retirement; work; sexuality/intimacy; and spirituality), 3) providing assistance to grandparents raising their grandchildren through educational programs and creation of local support groups and a statewide network of professional resources, and 4) providing programs in areas critical to successful aging (i.e., "Healthwise for Life" and "Grandma's Yellow Pie Plate").

a. Program Impact

The Successful Aging program is a Multi-State Extension Program. The following impacts are specific to Missouri.

During FY03, regional specialists spent 2,172 hours providing educational support to Missouri citizens. Successful Aging programs were delivered in 33 counties. MPPERS (Missouri Program Performance Evaluation and Reporting System) data indicate that 18,630 persons were reached through these programs. Fifty-seven counties reported programming in the area of "Family Financial Management," which included the use of the "Grandma's Yellow Pie Plate" program, and 26 counties conducted programming in "Financial Security in Later Life." Over 25,000 educational contacts were made in "Family Financial Management."

In 2003, program efforts in the area of grandparents raising grandchildren accelerated. The number of Missourians who are dealing with this issue firsthand has increased dramatically. These efforts have been assisted by a small grant from the Brookdale Foundation. In September, more than 300 persons attended the Gateway Grandparent Fair. During this time, UO/E regional specialists were trained to use the "Parenting The Second Time Around" curriculum. They also learned more about facilitating local support groups and were given information about the Missouri Grandparent/Kinship Caregiver Coalition. Seventeen regional specialists have since

joined the coalition. Seven local communities have applied for \$250 seed grants to assist in the development or expansion of their local support groups.

- b. Source of Funds: Smith-Lever, Grants
- c. Scope of Impact: Missouri

### **Key Theme: Child Care/Dependent Care**

- a. Program Description: Child Care

University Outreach and Extension is striving to relieve Missouri's "silent crisis" in childcare through program quality improvement and provider professional development. Extension faculty are assisting child care centers and homes with the program accreditation process and implementing the goals of OPEN (Opportunities for Professional Education Network), Missouri's career development initiative for child care providers. Because child care is plagued by such high rates of turnover, it is important to address the professional needs of the workforce. For instance, OPEN has implemented a Professional Achievement and Recognition System (PARS) for providers to document their training and education efforts. Additionally, OPEN's "Trainer Registry" has created an opportunity for early childhood trainers to make their credentials and efforts known. Most importantly, the Workforce Incentive Program (WIN) is paying biannual cash incentives to child care providers based on their educational attainment, ongoing professional development, and continued employment in the same early childhood program. Collectively, this information is being used to establish a database about Missouri's child care workforce and to monitor ongoing professional development activities. Additionally, because the Missouri Department of Health and Senior Services, Bureau of Child Care requires child care workers to complete 12 clock hours of training annually, extension faculty regularly provide relevant educational opportunities for child care workers.

Child care impacts most aspects of daily life for Missouri citizens. Because 64.5 percent of mothers with children under age 6 and 77.3 percent of mothers with children ages 6 to 17 are members of Missouri's workforce, child care participation has become the norm for Missouri children and families. Research indicates that the quality of children's child care experiences contributes to their immediate and long-term well being. Moreover, child care provider preparation and education are the best predictors of quality early education. However, national assessments depict a system of mostly poor to adequate child care programs, due in part to alarming rates of provider turnover. Turnover rates remain high because wages are low, benefits rare and opportunities for professional advancement limited. Missouri cannot recruit and retain a well-prepared child care workforce, support families' workplace success and promote healthy child development without addressing the problem from multiple perspectives.

#### **. Program Impact:**

As of Jan. 30, 2004, 2,256 child care providers from licensed child care centers and family child care homes were enrolled in "Missouri's Professional Achievement and Recognition System" (PARS). Of these individuals, 153 have increased their educational attainment in early childhood-related disciplines.

Additionally, 765 individuals were enrolled in Missouri's "Trainer Registry," a centralized database for data collection pertaining to individuals who provide training for early childhood

professionals. This information will assist state policy makers in understanding the credentials and work experience of those individuals who prepare our child care workforce.

As of Jan. 30, 2004, 642 early childhood professionals from child care centers and family child care homes in select rural, urban and suburban counties are participating in Missouri's "Workforce Incentive Program" (WIN). To assess whether such a costly effort increases workforce stability (i.e., reduces turnover) and educational attainment and improves child care quality and provider interactions with children, a longitudinal evaluation study is being conducted with a subgroup of program participants and a comparison group. Ultimately, the goal is to improve children's child care experiences by strengthening the provider workforce.

During 2003, 3,609 individuals attended extension child care provider educational workshops focused on the core competencies of providing quality early care and education. Although all of the results are not quantifiable, anecdotal evidence suggests that child care providers value UO/E's child care programs and typically report acquiring new knowledge and skills from participating.

- a. Source of Funds: Smith-Lever, State, Grants
- b. Scope of Impact: Missouri.

### **Key Theme: Children, Youth and Families at Risk**

- a. Adolescents At-Risk Program

The troublesome adolescent years have been a source of societal concern for centuries. The years from puberty to early adulthood have been viewed as risky and problematic. Based on the Youth Risk Behavior of Missouri teens in 1999, it was found that in any given month, about 16 percent of high schools students had been drinking alcohol, 30 percent had engaged in binge drinking, and 26 percent had smoked marijuana. Large percentages of youth also smoke, carry guns and have been involved in fighting.

Sexual activity is another area of significant concern. Although the birthrate for teens has been declining in Missouri for the past decade, there were still over 9,000 babies born to teen mothers in 2001. When asked about sexual behavior, 57 percent of high school students reported having sexual intercourse, and 42 percent are sexually active on a regular basis.

The 4-H Youth Development and Human Development Programs are engaged in a variety of programs designed to prevent youth from becoming involved in risky adolescent behaviors. Providing alternative youth activities and supervised after-school care programs are two important ways in which University Outreach and Extension prevents youth from becoming involved in problem behaviors. In addition to these efforts, the Center on Adolescent Sexuality, Pregnancy and Parenting developed several major programs designed to prevent teen pregnancy and provide support to new adolescent parents. These were:

- Maltreatment and Adolescent Pregnancy and Parenting (MAPP). The purpose of the MAPP Program is to increase professionals' awareness of three issues: (1) the relationship between childhood abuse and adolescent pregnancy, (2) the likelihood of abuse during adolescent pregnancy, and (3) the likelihood of abuse among children of adolescent parents.

- HIV Prevention. University Outreach and Extension regional specialists train teachers and school personnel from around the state in one or more of the Center for Disease Control's HIV-risk reduction curricula. The purpose is to increase the commitment of Missouri school administrators and teachers to implement one or more of the Center for Disease Control's HIV-risk reduction curricula in their schools.
- Missouri Volunteer Resource Mothers Program. Staff have developed a mentoring program for teen parents.
- For additional information see [Adolescents](http://www.missourifamilies.org/adolescents/index.htm) (<http://www.missourifamilies.org/adolescents/index.htm>) and [Missouri 4-H](http://mo4h.missouri.edu/) (<http://mo4h.missouri.edu/>).

b. Program Impact:

Adolescents at Risk is a Multi-State Extension program. The following impacts are state specific and relate to impact in other states.

In 2003, over 10,000 educational contacts were made throughout Missouri. Youth and their mentors participated in such programs as the Missouri Volunteer Resource Mothers Program, Adolescent Journaling and Adolescent Pregnancy Prevention programs. These programs have been shown to be highly effective in reducing the risk of child abuse, neglect and repeat unwanted pregnancies.

Past follow-up evaluation results of the mentoring program demonstrated that, compared with a nonmentored group of pregnant and parenting teens, the mentored group had (a) decreased child abuse potential, (b) no repeat pregnancy within one year, (c) decreased parenting stress, and (d) increased parenting knowledge. The long-term goal is to help adolescent mothers provide a loving, safe and developmentally appropriate environment for her infant. Since 1998, 35 Resource Mothers programs have been established in Missouri and five states: New York, Hawaii, New Mexico, South Carolina and Georgia. Over 90 teen mothers received mentoring through Missouri MVRM (Missouri Volunteer Resource Mother) programs this past year.

The success of the Missouri Volunteer Resource Mothers Program, a mentoring program model for pregnant and parenting teens, was demonstrated in a quasi-experimental research study (Pike, 1998) in Boone County.

In addition, regional one-day HIV information workshops were presented around the state. These six-hour workshops reached school teachers, administrators and community service professionals. These workshops provide CDC-approved curricula to professionals in the areas of abstinence, STD and HIV prevention. The programs are conducted and evaluated in partnership with the Missouri Department of Elementary and Secondary Education.

- c. Source of Funds: Smith-Lever, State
- d. Scope of Impact: Missouri, Georgia, Hawaii, New York, New Mexico, South Carolina

**Key Theme: Children, Youth and Families at Risk**

- a. Program Description: Building Strong Families

Demographic trends indicate that family well being is a matter of concern. In 2001, 16,453



deaths occurred due to heart disease, 12,289 deaths due to cancer, and 1,514 deaths due to diabetes in Missouri. Nearly 6,000 low-birthweight babies were born in 2001, and 9,426 births were to teen parents. These infants are at great risk of experiencing health and learning problems in their lives. Although the average income of Missourians grew during the 1990s, the number of children living in poverty remains high, about 15 percent. Many homes are unsafe and lack attention to repairs and other hazards that put adults and children in danger, and 32 percent of renters and 13 percent of homeowners find the cost of housing to be more than they can manage.

A 13-module curriculum was designed to help families find their strengths, face challenges and make choices. In addition to extension faculty, individuals from partner organizations were trained to facilitate the program in their communities. Curriculum was designed to be taught to either adult family members or to parents and children together. The curriculum is structured so that a series of three to 13 sessions can be taught focusing on the particular needs of families. Supplemental materials were developed for lower-level readers, and a parallel curriculum for young people is being developed.

In 2003, 88 new facilitators from Missouri and Nebraska were trained to implement the program in their communities. Missouri facilitators held more than 60 workshop programs and awareness sessions in every region of the state.

b. Program Impact:

Building Strong Families is a Multi-State Extension program. The following impacts are specific to Missouri.

Early findings indicate that family members are benefiting from this program. Overall, a large percentage of the adults participating in this program report that they are incorporating recommended practices into the daily lives of the families. For example:

Overall, 95 percent of participants who complete end-of-session evaluation forms after each workshop session state that they have gained new information or learned a new skill. Seventy-five percent say they will try the new skill or use the information with their families.

Most participants who responded to a three-month follow-up survey are making changes as a result of setting goals. Although they may not be making changes in every goal area they set, 54 out of 57 respondents checked “yes” to at least one area in which they were making changes. Many, in fact, mentioned several areas in which they were making changes.

In Cape Girardeau County, 84 percent of participants reported setting up meaningful time with their children, and 70 percent are spending quality time with them. Participants also reported making better discipline decisions (59%) and using better communication skills (79%).

A focus group participant said that by attending the program, she now has the confidence to talk to her husband about their finances. They actually sit and talk about things (and they didn't do that before she came to the program).

Short- and medium-term outcomes would indicate that the Building Strong Families curriculum will assist families in making sustainable changes that significantly improve their ability to live safer, healthier and better lives.

For additional program information see: [Missouri Families <http://www.missourifamilies.org/>](http://www.missourifamilies.org/) ([<http://www.missourifamilies.org/>](http://www.missourifamilies.org/)); [Center on Adolescent Sexuality, Pregnancy and Parenting <http://outreach.missouri.edu/hdfs/caspp.htm>](http://outreach.missouri.edu/hdfs/caspp.htm) (<http://outreach.missouri.edu/hdfs/caspp.htm>) and [Family and Community Resource Program <http://outreach.missouri.edu/fcrp/>](http://outreach.missouri.edu/fcrp/) (<http://outreach.missouri.edu/fcrp/>).

- c. Source of Funds: Smith-Lever, State, participant fees
- e. Scope of Impact: Missouri and Nebraska

### **Key Theme: Children, Youth, and Families at Risk**

#### **. Program Description: Family and Community Resource Program**

On any given day in the United States, there are more than 2 million minor children with an incarcerated parent. Parental incarceration and related trauma and separation interfere with child development, resulting in long-term outcomes, including intergenerational incarceration. In Missouri alone, there are at least 13,000 incarcerated adults who have one or more children. Two programs have focused on responding to the needs of children of offenders and their families: Living Interactive Family Education (LIFE) and Fathers for Life.

The LIFE program was developed jointly in 1999 between incarcerated fathers and local 4-H staff to address the needs of children of incarcerated parents. It is an enhanced visitation program operating at the Potosi Correctional Center (PCC), a maximum-security prison in Missouri. As a partnership between University Outreach and Extension and the Missouri Department of Corrections, the program is funded by a grant from the Children, Youth and Families at Risk (CYFAR) initiative of CSREES-USDA.

The overall objective of the LIFE program is to promote a strong, healthy and nurturing family environment for children of incarcerated fathers, while helping those fathers become positive role models and mentors. The LIFE program provides children and their fathers with a low-stress, child-friendly environment in which they work together on 4-H activities based on youth and family development curricula. All LIFE fathers also attend monthly parenting skills classes.

As part of the Fathers for Life Project, ParentLink placed Parenting Corners in two Missouri prisons: Western Region Diagnostic and Correctional Center in St. Joseph (Buchanan County), and Central Missouri Correctional Center in Jefferson City (Cole County). These sites have the potential to reach thousands of inmate fathers and their families with high-quality, research-based parenting information with the following additions:

- o Parenting Corner in each prison library
  - o Parenting Corner in each visiting room
  - o Parenting Corner in the lobby at WRDCC to reach staff and visitors to the prison
  - o Enhanced library at each facility with parenting resources: books, audiotapes and videotapes
  - o ParentLink Warmline to address inmates' parenting questions.
- a. Program Impact:

A total of 48 children have been positively impacted by the LIFE program. Fathers identified

several program characteristics that lead to positive impacts on children. The less restrictive visit setting allows everyone to move more freely, express themselves physically and interact spontaneously. The curricula-based projects and activities provide opportunity for fathers and children to work as teams to achieve constructive goals. Fathers attribute the following positive impacts to the program:

- o stronger relationships
- o improved communication
- o family unity
- o life skills and
- o improved behavior.

To monitor changes in the life skills of the children and youth participating in the LIFE program, a questionnaire was used to assess participants' life skills in seven categories. There have been two assessment rounds (July 2002 and January 2003). About half the children and youth who participate in the LIFE program were assessed in each round. Results indicate that their scores increased by about 12 percent between the first two rounds. They also indicate that several of the life skills categories are correlated.

The first assessment (July 2002) provided a baseline. The results were telling; with the maximum possible life skills assessment being 140 points, the average total score was only 67 percent (94 out of a possible 140 points). However, in the 2003 assessment, the average score increased to 75 percent (105 out of a possible 140 points). This indicates that there have been some improvements in life skills among the children and youth participating in the LIFE program. While there were improvements in every category, the greatest improvements came in social competencies (up 23%), communication (up 18%) and decision making (up 12%).

<b>Life Skills Category</b>	<b>Round 1: July 2002 (n=7)</b>	<b>Round 2: January 2003 (n=9)</b>	<b>Percent change in average scores</b>
Academics/learning	70	74	+6
Goal setting/achievement	62	67	+8
Decision making	69	77	+12
Problem solving	70	76	+9
Communication	60	71	+18
Social competencies	66	81	+23
Self esteem	75	80	+7
<b>Total Score</b>	<b>67</b>	<b>75</b>	<b>+12</b>

While the children of incarcerated parents face a number of challenges, the assessment results indicate that the LIFE program helps children and youth improve the life skills they need to more successfully meet these challenges. More specifically, the findings indicate that LIFE has helped children and youth improve their social competencies, communications skills and decision-making skills. These results are significant both for program managers and for parents and caregivers of the children.

The impact of the LIFE program is growing in Missouri. In 2003, the campus staff member associated with LIFE was asked to serve on the Missouri Children's Services Commission, Incarcerated Parents Subcommittee. In January 2004, the Director of Reentry Programs for the Missouri Department of Corrections verbalized her commitment to have the program replicated in all male and female facilities in the state. Campus and county staff are contacted monthly by

organizations and individuals from other states, inquiring about the program.

Testimonials:

Wade feels that the program has given him the opportunity to be a role model by demonstrating that good behavior has its rewards. He states, “To stay in the program, you must stay in good standing with the institutions. So it also makes us aware that, hey, if you want to continue this relationship with your children, you have to be on your best behavior, even under stressful conditions that we face on a daily basis ... You know, I haven’t had a violation for two years, trying to stay in this program – not even a small one.”

David shared his opinions about how the LIFE program and related activities contribute to the development of life skills among children by stating, “Not only do I see a difference in him, but I see a difference in every child that participates in the program. I’ve seen kids come into this program who were totally antisocial for the first couple of meetings ... and then they just open up, it’s really an amazing thing to see. Randy’s (my son) more assertive, I think. A little more outgoing, I think, because of this program. This program has kind of helped him with that social side.”

Robert believes the planned 4-H activities provide an opportunity for him to help his son develop a sense of how his (the son’s) actions affect others. He states, “As we sit back and analyze our kids, it gives us the chance to point out how they talk and interact with other people ... he’s learning to watch his own self, and I guess mature with the things he says and does. ... In the past few months he just popped off what was on the top of his head, and now he’s learning to control what he says. I think my son realizes how important the meetings are to me. I think that’s the biggest change ... that’s a big change for a kid to know that things are important to this father.”

The activities give fathers the opportunity to provide guidance to their children. One father stated, “It feels like being a father. You’re sharing a father-son relationship and accomplishing something with him.”

- b. Source of Funds: Smith-Lever, Grant
- c. Scope of Impact: National (CYFAR project)

**Key Theme: Children, Youth, and Families at Risk**

- . Program Description: School-Age Care and Out-of-School Time

After-school programs were identified as a high priority by the Missouri Legislature in 2002-2003. An Interim Joint Committee conducted hearings around the state to identify needs and public policy issues in this area. Faculty member Ina Linville and 4-H Youth Development Director Jo Turner provided testimony and background information for this committee. Linville and Turner also serve on the Missouri School-Age Care Advisory Committee, convened by the Missouri Department of Elementary and Secondary Education (See: [www.senate.state.mo.us/04info/comm/interim/ic03-outscho.htm](http://www.senate.state.mo.us/04info/comm/interim/ic03-outscho.htm) ).

Extension faculty and staff throughout Missouri are working to improve the quality and quantity of school-age care and after-school programs in Missouri communities. Missouri 4-H works with

local entities, state and national agencies to plan, implement and evaluate a variety of models for out-of-school programming. Partners include schools, churches, YMCA, YWCA, city parks and recreation departments, juvenile justice facilities and 21<sup>st</sup> Century Community Learning Centers. Technical assistance to assess local communities needs and resources to start new programs, curricula support, and/or staff training to enhance the quality of existing programs have been the recent emphases of 4-H's programming.

Linville provides national leadership in this area, serving on the national 4-H After School Leadership Team. The program, a partnership between National 4-H Council and JC Penney, packages resources and tools to help extension faculty start 4-H clubs in after-school programs, train after-school providers on relevant topics and infuse 4-H project curricula into after-school settings.

For several years, Missouri 4-H has partnered with the Department of Elementary and Secondary Education to develop a highly successful model for after-school computer lab programs. After-school computer labs couple the untapped potential of youth and computers in local communities. Labs provide upper elementary and middle school students with a safe place to go for fun, friendship and computer exploration during out-of-school time.

The National Outcomes Working Group (NOWG) of the Children, Youth and Families at Risk (CYFAR) program cites "presence and participation" as a key impact for programs serving children and youth. Children and youth must be present to benefits from program experiences, and their level of participation affects how much they benefit. The National Center on Educational Outcomes model adopted by NOWG includes presence and participation as one of two outcome domains that fall into a special category called the "Learning and Opportunity Process." Following NOWG's lead, presence and participation was selected as a primary impact indicator for three programs funded under the Missouri CYFAR New Communities Project: Caruthersville Housing Authority After-School Program, Irondale Community Computer Lab Program and St. Louis West-End After-School Program.

Professional development for youth workers is a key factor in program quality of school-age and out-of-school time programs. Missouri 4-H works with Missouri Accreditation and National School Age Care Alliance to improve the quality of existing programs through a process of accreditation.

For additional information on School-Age Child Care, see <http://4h.missouri.edu/programs/sacc.stm>

a. Program Impact:

School-Age Child Care and Opportunities for Youth During Out-of-School Hours is a Multi-State Extension program.

Missouri hosted the national 4-H After-school Conference in 2003. Teams from 43 states converged on St. Louis to learn about after-school programs developed nationally to aid local staff to work with community programs. Missouri sent a team of 26 representing the field and state faculty, VISTA workers and Community Development. In Fall 2003, 125 Missouri faculty were trained on this curriculum (see [www.4hafterschool.org](http://www.4hafterschool.org) ).

Since November 2002, 10 VISTA workers have worked with extension regional specialists to

support 12 new and 18 expanded after-school computer lab programs in 17 low-income communities. After-school labs provided at least 999 youth with adult supervision and access to computer technology.

There is evidence that the three Missouri New Communities Projects are having a positive impact on children and youth by providing them with adult supervision during out-of-school time.

The Caruthersville Housing Authority After-School Program has been in operation for 47 weeks. It provides adult supervision to a large number of children and youth, averaging 105 participants over the year. The children and youth who attend the program are doing so with increasing frequency. When the program first opened, children and youth attended an average of only four days over the quarter. However, they now attend an average of 10 days. This is a significant increase, and it indicates that the amount of adult supervision that children and youth receive from the program is increasing over time.

The Inrondale Community Computer Lab Program has been in operation for 38 weeks. Participation has increased steadily since it opened, plateauing at an average of 20 children and youth attending the lab. There has also been significant increase in participation intensity. When the lab first opened, participants attended an average of five times a quarter. Now, participants attend an average of 26 times per quarter, about two days per week. The lab is providing participants with a safe environment and an important amount of adult supervision during out-of-school time.

The St. Louis West End After-School Program has been in operation for 35 weeks. There are 40 children and youth participating in the program at a very high level of intensity. During the year, participants attended the after-school program an average of more than three days per week. This means that three days out of five, children and youth were in a safe environment under adult supervision. This program is clearly providing participants with a significant amount of adult supervision.

Alison Copeland and Ina Linville work with accreditation teams for local school-age care programs. Linville provided technical assistance to the Camdenton School Districts to secure \$1.5 million in 21<sup>st</sup> Century Community Learning Grants from the U.S. Department of Education. In addition, MU 4-H Youth development faculty collaborated with other agencies and groups to offer non-credit training to 2,092 youth and human services.

Testimonial:

“I have seen quite a change in my student since her beginning the Partners Assisting Student Success (P.A.S.S.) Program. She had a little bit of a chip on her shoulder and was very determined to have things her own way. She was low academically in all areas, and that was the reason for the referral. After attending P.A.S.S. and with the support of the classroom teacher, this student is excelling. She is reading well now and has great attitude as well as being able to work independently in all areas. I feel the P.A.S.S. Program has given this student strength in all areas. As a classroom teacher, the support given to me for the benefits of this student has been superior.”

- b. Source of Funding: Smith-Lever, State, Grants
- c. Scope of Impact: Nationwide (4-H After-school initiative; Extension Cares Initiative)

## Key Theme: Community Development

### . Program Description: Community Development Academy

The Community Development Academy provides a state-of-the-art, hands-on curriculum to prepare participants to assist communities effectively using democratic processes that give people voice and efficacy in determining and creating the future of their community.

This program is built on the principles of good practice adopted by the Community Development Society in 1985 and revised in 2000, to provide a framework for approaching work in communities that maximizes human interaction to the benefit of all and ensures the highest likelihood that the results of community development will benefit the broadest spectrum of the community. These principles of good practice are:

- 0) Promote active and representative participation toward enabling all community members to meaningfully influence the decisions that affect their lives.
- 0) Engage community members in learning about and understanding community issues, and the economic, social, environmental, political, psychological and other impacts associated with alternative courses of action.
- 0) Incorporate the diverse interests and cultures of the community in the community development process; disengage from support of any effort that is likely to adversely affect the disadvantaged members of a community.
- 0) Work actively to enhance the leadership capacity of community members, leaders and groups within the community.
- 0) Be open to using the full range of action strategies to work toward the long-term sustainability and well being of the community.

The Community Development Academy provides participants the opportunity to prepare themselves to be more effective working in community settings based on a shared set of principles and values that build on the Principles of Good Practice. The program provides opportunities for participants to try out new ideas, relate the work they do to current research in community development and create learning networks among peers.

For additional program information on Community Development Academy:  
<http://www.ssu.missouri.edu/commdev/cda/cda.htm>

### . Program Impact:

Community Development Academy is a Multi-State Extension program, and this impact recognizes examples of accomplishment. The CDA attracts from across the nation and around the world. Of the 65 participants in 2003, five were internationals from Kenya and the Republic of Georgia. CDA was contracted by USDA Rural Development of Kansas to provide training for 50 employees and partners and by the New Hampshire Extension Service to provide training for 23 people working with communities from the Northeast region. CDA faculty also are working with a university and a non-profit organization in Kenya to teach the first CDA course in Kenya.

Community Development Academy participants indicated that the interactive courses helped them build relationships with fellow community development practitioners from across the state and around the world. Many comments indicated that this was one of the best assets of the course to them, both initially and down the road.

CDA participants from Newburg, Mo., indicate they have used their training to:

- Facilitate creation of a city economic plan
- Arrange for city council members to participate in training
- Obtain through their non-profit corporation a state tax credit to purchase and rehabilitate the Historic Houston House Hotel for use as a community center, offering GED and computer classes, and providing an after-school computer facility
- Acquire 14 acres of land from the railroad to convert to a community park adjacent to Little Piney Creek to provide access to water for recreational purposes; acquire a grant from the Heart Association to create a walking trail; begin work with the local school to plan a running track in the park
- Schedule a voter registration and forum to educate voters on issues
- Assume responsibility for Newburg Days, a summer festival to celebrate the community.

Testimonial:

Vicki Simmons, a graduate of all three CDA courses, had this to say about her CDA experience: "You and the other instructors at CDA inspired me to return to school. I am majoring in Sociology, minor in Criminal Justice. After I see how it goes and I earn my bachelor's degree, then I will decide whether or not to pursue a master's in Rural Sociology. I am grateful for the chance to go to school and at my age to still be able to be inspired and motivated to take on this challenge!"

Within University Outreach and Extension, those who completed the program demonstrated engagement in development of new and expanded local leadership training, involvement of citizens in planning and implementation of community-wide programs, adoption of community-based approaches in all aspects of outreach and extension work, cooperative and partnership efforts to achieve community success. New partnerships -- both formal and informal -- have formed internally within extension and with external groups to work on issues of importance to citizens.

The University of Missouri held a conference on Hispanic Immigration Issues in Missouri March 12-14, 2003, in Kansas City. As part of that program, University Outreach and Extension staff facilitated discussions among very diverse groups of people to help establish networks around the state that facilitated the development of plans to address a range of issues. All of the facilitators were graduates of the Community Development Academy. Many of these same people are engaged in ongoing programs with Alianzas, a University Outreach and Extension program working on issues related to the growth of the Hispanic community in Missouri. Community Development Academy-South Africa was established in 1998 as a partnership between the University of Missouri and the University of Pretoria and Medunsa University in South Africa. The Grassroots Community Development Academy in South Africa has become an independent non-governmental organization and serves as the educational resource in community in South Africa. This partnership continues to play a critical educational role in shaping the future of development in South Africa. Teams from South Africa have participated in all three courses in Missouri. These teams were built through collaboration among several universities to offer the program in South Africa and continue to provide leadership to the development of a Community Development Academy in South Africa. Courses One and Two are now being conducted



regularly in South Africa, and the impact continues to grow as does demand for the training. Faculty from the University of Missouri assisted with development and implementation of the program.

- c. Source of Funds: Smith-Lever
- d. Scope of Impact: Missouri, North Dakota, Pennsylvania, Michigan, Oklahoma, Nebraska, Arkansas, South Carolina, Louisiana, New Hampshire, Minnesota and International

## **Key Themes: Community Development, Conflict Resolution**

- . Program Description: Discovering Common Ground: Missouri Communities Deliberate

Public deliberation programming provides communities with collaborative support as they identify and make decisions about high-priority and controversial public issues, and deliberation yields increased local knowledge, communication, leadership and citizen engagement for community empowerment and enhancement.

Local government officials and community leaders and groups continue to request decision assistance and support from University Outreach and Extension. Current research suggests that such support is provided effectively through the use of community-based decision making methodologies. They have indicated the need to identify the specific local issues they wish to address, recognize the capabilities and assets within their communities, and become familiar with the challenges they face at the local level. Additionally, they indicated the need to master skills to use specific community-driven methods that allow them to come together, foster productive communication, identify common ground, and take action in ways that support collective issue resolution. In the medium-term, Missouri learners expressed the need to put their knowledge into action by employing the methods of deliberation just described. By doing so, they will come together as a community, communicate effectively, and address their priority issues as a cohesive and empowered group. In the long-term, they aspire to develop a “habit” of deliberation and community-driven problem-solving. This will directly result in enhanced and enriched communities throughout the state, greatly improving the lives of Missouri learners. Local communities will become empowered and able to affect change effectively, direct their future growth, and successfully address priority issues within their community base.

- a. Program Impact:

Discovering Common Ground: Missouri Communities Deliberate is part of a Multi-State Extension program working in conflict resolution. The following impacts are specific to Missouri:

- As the result of a forum on Racial and Ethnic Tensions in Kansas City, a study circle was formed to explore approaches to racial and ethnic tensions in the city.
- As a result of moderator training in Southwest Missouri, a citizen working group organized to convene and moderate forums in communities to increase the awareness of issues related to Hispanic immigrants and their assimilation into the community. Deliberation training materials translated into Spanish resulted in higher Latino participation in a moderator training program and are paving the way for bilingual forums.
- The deliberation training manual developed in Missouri is being used nationwide to train community members on how use deliberation in public forums.

- Collaborative partnerships of community organizations have been formed as a result of people being trained in how to convene and moderate public forums; those trained will use this process to address community issues (Warrensburg, Southwest Missouri and Columbia)
  - Collaboration with the non-profit Kansas City Consensus resulted in Kettering Foundation funding to study the action teams developed after public deliberation forums as a model for other states.
- b. Source of Funds: Smith-Lever, State, Grant
- c. Scope of Impact: Missouri, Illinois, Indiana, Iowa, Kansas, Michigan, Minnesota, Nebraska, North Carolina, North Dakota and Ohio.

### **Key Theme: Community Development, Farm Safety, Fire Safety, Workforce Safety**

- . Program Description: Community Emergency Management Program

The Community Emergency Management Program provides resources, personnel, educational programs and materials to support the mission of the Missouri disaster recovery partnership and to develop the capability of extension to assist communities and citizens in all areas of emergency management and homeland security. Training is being provided to emergency service providers, government officials, citizens, businesses and local leaders.

The Community Emergency Management Program serves as the disaster mitigation, preparedness, response and recovery point of contact for University Outreach and Extension and provides educational programming and technical assistance to federal, state and local entities, communities, professional organizations, businesses and educational institutions. Program coordination is a joint venture between community development extension and the University of Missouri's Fire and Rescue Training Institute.

One item that has been distributed on a mass scale has been the template for a family's disaster plan. This template can be filled out in a few minutes by a family and contains valuable information for the family to use in an emergency. It also can be downloaded from the CEMP web site to allow for an electronic version to be kept and changed as needed by the family.

Special outreach to Hispanics also has occurred. New Spanish resources from FEMA have been put on extension and other emergency management web pages. Additionally, 20,000 tornado brochures in Spanish and English have been distributed in Southwest Missouri, and work with the media has included Spanish versions.

The CEMP has become a model across Missouri and many land-grant universities that belong to the Extension Disaster Education Network (EDEN).

For additional program information see <http://www.mufrti.org> and <http://outreach.missouri.edu/cemp>.

- b. Program Impacts:

Community Emergency Management is a Multi-State Extension program. The following impacts are specific to Missouri.

The University Outreach and Extension Community Emergency Management Program has a unique role in the state's response to disasters -- organizing and supporting local coalitions of relief agencies, and providing relevant education and science-based information to aid recovery. That mission was to put to the test when a series of tornados and severe storms struck Missouri in May 2003. Since then, University Outreach and Extension's Community Emergency Management Team in southwest Missouri, one of the hardest-hit areas of the state, has been pivotal in the region's recovery.

Immediately, the multidisciplinary team -- comprised of regional extension specialists and campus-based faculty and staff -- moved into action. Team members worked with local relief-agency coalitions -- called COADs (Community Organizations Active in Disasters) to coordinate recovery efforts among agencies. At the request of Missouri's State Emergency Management Agency, team members established COADs in four of the seven counties. Within 48 hours, team members gathered contact information for more than 50 organizations and disseminated a flyer containing more than 100 phone numbers. The flyer was updated at least daily for six weeks. During that time, the extension team distributed more than 5,000 printed copies through extension centers and to other disaster organizations, which distributed additional copies to farmers, families and businesses. The numbers also were printed on the web (<http://www.outreach.missouri.edu/swregion/news/tornado2.shtml>) and distributed to media in the region.

The team was crucial in identifying the needs of victims and disaster workers. In the first week following the disaster, extension workers went from home to home in rural Cedar County, which had no phone service, to check on people, answer questions and find out what they needed. Also in the first week, more than 200 publications on 15 topics, including chain saw safety, debris removal, drinking water and food safety, and general clean-up information were distributed. Later, the team distributed publications on casualty taxation issues, financial recovery, reconstruction and insurance, and mold and mildew removal and prevention.

Using its established relationships with local media, the team distributed more than 30 news releases, including releases in Spanish for the immigrant population. Through the encouragement of University Outreach and Extension, the Springfield, Mo., News-Leader (circulation 100,000) produced and distributed 130,000 copies of a recovery guide. Newspapers in Ozark and Bolivar produced similar recovery guides using news releases provided by University Outreach and Extension.

Working with state faculty, the following also was accomplished:

University Outreach and Extension recorded and distributed a radio public service announcement in Spanish about safety during the storms after a young Latino mother died after being given incorrect information.

Extension responded to agricultural producers regarding disposal of the 1,000 head of dead livestock from the storms and the safety of feeding 98,000 acres of hay covered with insulation and other debris.

Extension faculty linked two manufacturers in northern Missouri to provide clean-up crews with much-needed work gloves.

As the initial crisis wound down, the focus changed to long-term recovery. Months later, University Outreach and Extension is still addressing the needs of disaster victims. Although relief agencies and volunteers have left the region, University Outreach and Extension remains a part of those communities where much of the clean up and rebuilding is ongoing. Regional specialists are helping farmers deal with the 2,200 miles of fence, 2,000 buildings and 900 pieces of machinery lost. Workshops have addressed a number of recovery topics with an eye toward preparing for future disasters— building homes with safe rooms, building barns to withstand storms and preparedness training for day care providers. Specialists are serving in an advisory capacity to the community-based, long-term recovery committees to answer questions that arise. A new bilingual WMD/HASMAT planning specialist for the Springfield-Greene County Office of Emergency Management was hired.

- c. Source of Funds: Smith-Lever
- d. Scope of Impact: Alabama, Alaska, Arizona, Arkansas, Colorado, Connecticut, Florida, Georgia, Idaho, Illinois, Indiana, Iowa, Kansas, Kentucky, Louisiana, Maine, Maryland, Michigan, Minnesota, Mississippi, Missouri, Montana, Nebraska, Nevada, New Hampshire, New Jersey, New Mexico, New York, North Carolina, North Dakota, Ohio, Oregon, Pennsylvania, Puerto Rico, South Carolina, South Dakota, Tennessee, Texas, Utah, Virginia, Washington, West Virginia, Wisconsin

### **Key Theme: Community Development, Impact of Change on Rural Communities**

- . Program Description – Alianzas: Building Inclusive Communities

Missouri's Latino population has grown from 61,702 residents in 1990 to 118,592 in 2000. This represents a 92.2 percent increase while the total population of Missouri increased only 9.3 percent. In six Missouri counties (Moniteau, Pettis, Saline, Barry, Lawrence and McDonald), the increase has been 400 percent or more. With such rapid growth, immigrants and communities face many challenges. Immigrants face discrimination; low-pay employment; inadequate health insurance; difficulty in finding adequate, affordable housing; and communication problems. Schools must refocus resources to non-English speakers. Social services must find food and shelter for the new families. Community residents encounter communication and cultural understanding difficulties. The Alianzas project involves multi-campus representatives from the four University of Missouri campuses, Lincoln University, University Outreach and Extension, and community partners, applying the co-learner model and facilitating the creation of a learning community at the statewide level. The goal of this project is to enhance the ability of communities to collaborate with the growing immigrant Latino populations through a Latino, university and community partnership using the community-based, co-learner approach.

Three University Outreach and Extension regions (Central, Southwest and West Central) were selected as target areas for the implementation of this project. The three areas were selected because of the increase in immigrant population over the past few years. It should be noted that area service providers believe that the actual numbers of Latinos is even greater than what is reported in the Census, especially in those counties with a more migrant Latino population.

Educational materials have been created or translated, including a Spanish resource manual for health professional and medical interpreters; a directory of Latino organizations and contacts in Kansas City; extension nutrition guide sheets; a tornado safety sheet in Spanish and English; a

resource/referral manual on domestic violence; and Spanish information capsules on healthy air on Spanish radio in Kansas City.

During its third year, Alianzas established collaborative partnerships with a host of community organizations and institutions. The establishment and maintenance of such working partnerships represents a significant change in practice from the scattered, individual, past efforts to identify and address the needs of the Latino population.

Through a partnership with the government of Mexico, three educational centers (one each in Missouri's West Central, Central and Southwest Regions) have been opened to provide Mexican citizens completion of validated Mexican secondary education, via distance learning.

Alianzas, in collaboration with the University of Missouri-Kansas City, hosted the second "Cambio de Colores: Neighbors in Rural and Urban Communities," a conference attended by approximately 300 state, university and local people who explored the array of Latino and community issues. As a result, a Center for Latino Studies is being considered at the University of Missouri and the planning for third conference. "Cambio de Colores 2004: Latinos in Missouri: Gateway to a new Community," March 10-12, 2004, will be held in St. Louis. The program is truly a multi-campus collaboration. Changes to the 2004 conference include the submission of abstracts as part of a formal peer review process for presentations and workshops. Selected papers will be compiled in a monograph highlighting the issues discussed at the conference and of these, a few may be considered for publication in a peer review journal.

Work with the Missouri Attorney General's Office led to development of materials for Latinos and is aiding in their education regarding legal rights and consumer protection issues.

In the West Central Area, Spanish "Command Language" training was provided to area service agencies and organizations, and a summer language and culture camp was developed with a focus on children of new immigrant families and established families.

In Kansas City, a study conducted by Extension for the Hispanic Economic Development Council regarding Hispanic businesses is informing business education in the state ([http://www.missouribusiness.net/bridg/latino\\_business\\_kc.pdf](http://www.missouribusiness.net/bridg/latino_business_kc.pdf)).

In Southwest Missouri, festivals highlighting Latino culture took place last fall, and significant work was accomplished with community emergency management among the Latino population.

A program emphasizing literacy in the home for parents and young children took place in Central Missouri. Nutrition and parenting programs were also conducted. Students in Veracruz, Mexico, and Hallsville, Mo., are learning about each other's culture, geography and history. Of most importance will be the assessment of the videoconferencing's impact on student learning outcomes.

The Alianzas director has been appointed to the Advisory Council to the Institute for Mexicans Abroad (IME) formed by Mexican President Vicente Fox. The IME makes program recommendations that will benefit Mexican communities in Missouri; proposes ways in which Mexican communities in Missouri and their places of origin can strengthen ties; and suggests programs that should be implemented in the Mexican communities.

A grant proposal was co-authored with Iowa extension, and staff are working with Illinois extension to use radio programming for Hispanic audiences.

For additional program information see [Alianzas](http://www.alianzas.us/main/) (<http://www.alianzas.us/main/>)

a. Program Impact:

Alianzas: Building Inclusive Communities is a part of the North Central Regional Spanish Speaking Populations effort—a multi-state program. The following impacts are specific to Missouri.

In Kansas City, the facilitation of planning has led to collaboration between the Federal Deposit Insurance Corporation, the Hispanic Chamber of Commerce, the Hispanic Economic Development Council and the Northeast Chamber of Commerce. The local groups are co-located in a bank and working together to meet the rapidly growing business development needs in Northeast Kansas City. They are working with extension to develop culturally specific approaches to small business development, work force development and support services. The Kansas City Office of International Trade and Regional Mexican Consulate also are involved in the long-term planning to develop a thriving local economy in the area.

Two key partnerships have developed: A partnership with the Missouri Department of Elementary and Secondary Education's Program for Migrant English Language Learning (MELL) is delivering high-quality, comprehensive and collaborative educational programs for migrant and immigrant children and youth. Second, a partnership with the Mexican Consulate in Missouri and participation in the Advisory Council of the Institute for Mexicans Abroad has enabled Alianzas to bring distance learning programming to Missouri.

In Southwest Missouri, Alianzas has helped to awaken the community to a new component of society, which already there was little understood and often ignored. Outcomes include:

- The number of people in public service now learning Spanish has increased tenfold, and Spanish literacy for those who never understood or spoke the language is improving.
- Citizens in Missouri's Ozarks now care about a new, growing component of their community.
- Latinos are establishing ownership and volunteering in the community.
- All media outlets have been alerted and given tools to reach Spanish speakers, and volunteers—assigned to different media outlets—are interpreting and translating materials.
- English literacy for Latino students is improving throughout Southwest Missouri.

Alianzas has worked closely with the Kansas City Missouri School District, the Migrant English Language Learning Program in Monett and the Mexican Consulate to implement Plazas Comunitarias. Mexican education programs on literacy -- elementary through college level -- can be taught via distance learning and/or Internet. As a result, Mexican nationals have furthered their education while living in the United States, and Mexican parents have been to take a more active role in the education of their children.

A local leader working in Southwest Missouri had this to say about the Cambio de Colores Conference: "The Cambio de Colores events were splendid. Every workshop you have held or open house or community event has had an impact. It has truly helped me save my life. I was trying to do the whole thing by myself and going under, under the load, then you folks came

along and I had some real help. Now there are more of us helping in Noel, it isn't a one-woman show anymore.”

Alianzas has been in existence for three years; long-term outcomes are not yet available.

- b. Source of Funds: Smith Lever, State, local organizations
- c. Scope of Impact: Missouri, Iowa, Illinois.

**Themes: Community Development, Impact of Change on Rural Communities**

- a. Program Description: Community Decision Support

Community decision support enhances local capacity to make sound policy choices. Rapid changes in technology, economic and social patterns require a greater depth of analysis and understanding if local decision makers are to make sound policy choices. Tools include economic models, demographic analysis, Geographical Information System (GIS) mapping, participatory community action planning and local government support.

The Community Policy Analysis Center provides research, outreach and training to support improved policy decisions at both the local and state levels. The Show Me Community Impact Model not only provides valuable data and information, but also facilitates learning among community participants. The Center conducts community economic baselines, develops scenario-based economic impact studies, and summarizes voter responses to legislation impacting Missouri. The CPAC also supports training for extension staff. Work during the past year has included community impact studies regarding retail, transportation, economic development and entrepreneurial climate and statewide impact regarding transportation taxation and the wine industry. Work also includes an ongoing partnership for economic analysis of the Border-Midlands-Western Region of Ireland. For more information, see <http://www.cpac.missouri.edu>

The Office of Social and Economic Data Analysis (OSEDa) conducts projects, often in conjunction with state agency partners, that focus on important public policy issues, such as transportation, health and community services, and public education. During the past year, OSEDa analyzed the 2000 Census and prepared numerous reports now posted on the web for easy access (<http://www.oseda.missouri.edu>). At OSEDa, users may access demographic information and analysis in many ways, including by extension region or by state agency regions. As a lead unit of the Missouri Census Data Center, OSEDa hosted workshops and conferences for regional and local officials about demographic trends and Census data applications. Presentations have been conducted via videoconference and streaming video. Collaborative programming with the Missouri Community Development Society and USDA-Rural Development used telephone conferences to reach nearly 120 community and agency leaders across the state to discuss the following three topics: demographic changes and the implications for communities, tax structure for Missouri, and planning for community emergencies.

Together with its partners -- The Children's Trust Fund and Citizens for Missouri's Children -- OSEDa recently updated the annual Kids Count Report summarizing the status of children across Missouri and highlighting those communities where children are especially "at risk." Economic analysis in Missouri has shown the relationship between the structure of local economies and the welfare of children simulating economic development initiatives.

Together with the Missouri Department of Elementary and Secondary, OSEDA plays an integral role in the state system of school district accreditation. The analysis of school improvement data from thousands of Missouri teachers, students and parents is incorporated in the state accreditation decisions and provides a foundation for school improvement planning. Enhancing the quality of Missouri schools and increasing academic achievement is a cornerstone of future economic development in a global economy increasingly rooted in human capital. A new OSEDA web application has further enhanced school improvement planning by making Census and other social and economic information available for small areas within Missouri's 524 school districts. Web-based maps of Missouri districts now overlay school locations on thematic maps of key social and economic indicators highlighting the contextual factors that schools must address to design effective instructional strategies.

Working with the Missouri Department of Transportation (MoDOT), OSEDA has created an award-winning planning application used by state, regional and local officials. This new web-based tool quickly gives planners the regional and small-area demographic information they need for transportation planning. It is providing fact-based resources inexpensively and is saving valuable time and tax dollars. It promotes better transportation planning, spurring sound economic and industrial development. The American Association of State Highway and Transportation Officials gave OSEDA and MoDOT their 2003 "Trailblazer Award" for leading the way.

A statewide team of regional and state specialists focused on training and programming to better serve local government officials. Local extension specialists and extension council members attended the county government finance training conducted via interactive telephone and web sessions. Participants reported increased understanding of the county budget process. Of particular use to participants was the spreadsheet to summarize the county budget. Extension specialists used the spreadsheet to compare several counties. In Southeast Missouri, training for elected officials was co-sponsored by government associations and other agencies. One particular focus included how local government and economic development officials could work collaboratively and regionally in the Bootheel.

Assistance with development of comprehensive plans and citizen input, participatory community and organizational planning, and organizational development is provided in a number of communities.

b. Program Impact:

Community Decision Support is a Multi-State Extension program. The following impacts are specific to Missouri.

As a result of the availability of OSEDA's new transportation planning tool (SEIR) and the success of local planners in applying that information, MoDOT has convened a new statewide team of regional and local planners to adapt additional data sources to the "SEIR" framework—extending its impact and the scope of the network of collaborating local planners.

Following up on school improvement plans, school districts in Mid-Missouri and in East Central Missouri have developed with OSEDA, and successfully implemented, new instructionally oriented student information systems that bring important learner information to teachers easily and securely on their workstations.



As a result of an on-line community economics training provided for extension personnel, citizens and people across the nation, a director of multi-site mental health clinics in Missouri -- who also serves on the Economic Development Commission and teaches at the community college -- used the information he developed to enhance decision making with the local EDC. A Louisiana extension specialist used the information in a workshop to give potential entrepreneurs an insight into the local economy. The analysis developed by the specialist also was shared with the director of the Louisiana State University's Small Business Development Center and a local economic development foundation, who both are now using it in their work. An Illinois extension specialist has used the analysis developed in the course for tourism planning.

In Missouri's Bootheel, county, municipal and economic development professionals identified areas where they can work regionally and have begun several small collaborations.

A state senator is using information on the variation in property tax rules across 15 states to examine and analyze Missouri's tax structure.

The Old North Neighborhood Partnership has strengthened the economic base and is preserving the character, quality and culture of an historic inner-city neighborhood through home ownership, housing rehabilitation, family financial literacy, neighborhood leadership and capacity building, environmental health and safety, and historic preservation. These projects, combined with a bicycle historic tour and community museum, are adding new optimism and economic vitality to this inner-city neighborhood. Partners include the Old North Neighborhood Partnership, University Outreach and Extension, and University of Missouri-St. Louis faculty, staff and students, with funding from the U.S. Department of Housing and Urban Development. For more information, see: <http://pprc.umsi.edu/onnp/index.html>

Southeast Missouri Area Agency on Aging directly impacts the lives of over 25,000 seniors and serves approximately 1.5 million meals per year through its 38 affiliated centers. When the centers were at risk for closing due to limited funding, extension facilitated a planning retreat with the agency's board to address the issues of increased demand and diversity of seniors, flat federal funding, and impending closure of some centers. The centers have changed their names to *The OAKS—Older Adults Keep Serving* to reflect that seniors both serve and are served by the agency. The centers are now tapping the media more efficiently for marketing, sharing with each other, and partnering with other organizations to maintain services to seniors in the community and to use public dollars wisely.

As a result of facilitation of participatory community planning, residents of Herculaneum have a united voice in expressing health and environmental concerns created by operation of an active lead smelter over the past 100 years. Although residents disagree on how much harm is caused by lead smelter operations, all want community revitalization. The Herculaneum Community Action Group is working with EPA, community conveners and other stakeholders to help create the city's master plan. While once only reactive, now residents are taking a proactive role in shaping their community's future.

As a result of facilitating a planning retreat for the City of Greendale Council -- a small municipality (pop. 722) located close to the University of Missouri-St. Louis campus comprising mostly minority residents -- work has commenced on identified priorities: sidewalk, curb and driveway apron construction and repair; organizing the office and equipping it with appropriate technology; and creating three community committees to organize events, set up block units and enhance the city's appearance with landscaping and gardens.

The City of Hollister wished to implement three phases of proposed road construction to improve traffic patterns, minimize congestion, improve safety at school entrances and in residential neighborhoods, lessen the emergency time response, expand opportunities for developers and protect the environment. However, the Missouri Department of Transportation did not have any money allocated to this project in its five-year plan. As a result of the Community Policy and Analysis Center's (CPAC) assessment of future growth under current transportation conditions and proposed road improvements, the city was able to secure \$3 million by unanimous approval from the Taney County Commission (\$1 million a year for three years) to complement the \$6.5 million the city had put aside for transportation needs. The \$9.5 million served as the matching funds in an agreement with MoDOT to begin working on the proposed road improvements in 2004 versus prior projection of the earliest date in 2008. The early completion of the road improvement is expected to increase tax revenues for the county. For more information on the project, visit <http://www.cpac.missouri.edu/hollister/index.html>

The results of "The Laclede County Economic Analysis and Baseline, 2001-2011" and "The Impact of H.D. Lee Plant Closure in Laclede County: 2001-2011" reports enabled local officials from the city of Lebanon to negotiate the purchase of an empty manufacturing facility from the H.D. Lee Corporation. Recently, the company closed its operations and moved them to Mexico, resulting in the loss of about 750 local jobs. The Community Policy Analysis Center estimated the economic effects of this loss and quantified it at roughly \$2.5 million in lost revenues to Laclede County government. City officials used this number as their negotiating point in purchasing the empty facility for roughly half of its appraised value. The city then converted the facility to an industrial park. Using the industrial park as a tool for business recruitment, the city convinced a subsidiary of Emerson Electric to expand its operations with the plant, adding 360 jobs over a two-year period. City officials are using the baseline report to promote the area to other businesses and have incorporated the baseline report into their 10-year economic development plan.

The "Camden County Economic Baseline and Highway Congestion Analysis, 2001-2011" report quantified the negative economic effects of highway congestion in the Lake of the Ozarks area. Local citizens used the report to lobby for more federal and state monies for highway construction and funding in their area to improve and sustain economic growth in the region. During the past year, the Camden County Transportation Committee made numerous presentations based on the results of the CPAC study in an ongoing effort to secure funding for transportation improvements.

- c. Source of Funds: Smith-Lever, State, contracts, grants
- d. Scope of Impact: Missouri, North Carolina, Pennsylvania, Louisiana, Illinois and International. The Community Policy Analysis Center also actively participates in national Community Policy Analysis Network.

### **Key Themes: Community Development, Youth Development, Leadership**

- . Program Description: Missouri Local Government CECH-UP

A primary goal of education is to prepare students to become more informed, active and responsible citizens. Citizenship education challenges students to practice civic participation and address problems in their community. By applying academic learning to real-life issues, students

strengthen their civic attitude, skills for active citizenship and workforce skills.

The Missouri Local Government CECH-Up handbook was developed, along with a video, web site (<http://www.umsi.edu/cech/local>) and listserv. Educational materials meet Missouri Department of Elementary and Secondary Education curriculum standards.

Missouri Local Government CECH-UP provides Missouri middle school students with the opportunity to observe politics and policy-making firsthand; to talk with local officials, study and make recommendations on local issues; and to take action on local government issues facing their communities.

a. Program Impact:

Three former students of the Local Government CECH-UP Program presented their project at the 40<sup>th</sup> Annual Missouri Community Betterment Conference on Oct. 27, 2003.

As part of the CECH-Up Program, junior high school students in Spickard, Mo., researched the social, economic and demographic make-up of the community and used this information to create a brochure promoting the community. The students did not think that there was anything in the small town to use in a brochure but discovered many aspects of the community they had taken for granted. Copies of the brochure were printed in color and given to the students to distribute.

b. Source of Funds: Smith-Lever, State

c. Scope of Impact: Missouri

**Key Themes: Community Development, Managing Change in Agriculture**

. Description of Program: Community Food Systems and Sustainable Agriculture Program

The Community Food Systems and Sustainable Agriculture Program's major objectives are to:

- Enhance opportunities for Missouri communities and citizens to participate in community food systems and consumer-farmer linked programs.
- Increase the economic viability of farms and communities across Missouri through the integration of sustainable production and marketing practices into current and new farm operations.
- Conserve and improve Missouri's natural resources through the application of sustainable production practices.

Through the development of a direct-market meat directory, a new direct year-round marketing channel between 23 producers in the Southwest and South Central Extension Regions and more than 400 consumers in Springfield and surrounding communities has been created. Farmers can receive \$250 or more per beef animal from direct-marketing meat as opposed to selling live animals.

Through the "What's New with Sustainable Food and Farming?" seminars and the Sustainable Agriculture listserv (150 subscribers), a shared understanding of "sustainable agriculture" has been created for University of Missouri students, educators and citizens. Through educational outreach demonstrating how wheat is ground into flour and becomes bread, 8,500 elementary and junior high students across the state have gained a hands-on understanding of what a wheat plant

looks like, how to grind wheat into flour, the benefits of whole wheat flour versus white flour, how wheat is used in many food products, and the different taste of whole wheat bread (baked by artisan bakers). Parents and/or grandparents often accompanied children to events, and while many were educated about the nutritional benefits of whole wheat bread, the exhibit also encouraged intergenerational sharing of how food was produced and preserved in earlier times. The creation and display of an interactive sustainable farm and community model that incorporates integrated pest management practices, rotational grazing, pasture-based dairying, pastured pork, riparian buffers, agroforestry, cover crops, market gardening, extended season hoophouses, free-range poultry, farmers' markets, and stores and restaurants featuring locally-produced foods has produced new knowledge for 450 FFA students and their instructors and for 12,500 consumers of how sustainable agriculture and rural development can be integrated.

CFSSA has established strong working relationships with the sustainable agriculture coordinators of 12 states of the North Central Region-SARE program. CFSSA is now an integral player in the NCR-SARE Professional Development Program and has reviewed and scored more than 35 sustainable agriculture research and education grant proposals. In addition, CFSSA has helped develop and distribute a sustainable agriculture survey for extension educators in the North Central Region and the state. Results from the survey are being integrated into the program to better address the educational needs of extension educators on sustainable agriculture.

CFSSA coordinated the 2003 "Farmers Forum" at the National Small Farm Trade Show and Conference in Columbia. More than 35 presenters and 1,450 attendees participated in three days of presentations.

a. Program Impact:

A group of Latino girls and their families in Marshall established a community organic garden in 2003. The girls acquired gardening skills, provided nutritious and fresh food to their families, and donated fresh food to the women's shelter in town, thus creating a bridge of understanding and compassion in Marshall. One participant said, "I learned about health, nutrition and peer pressure; now we are working in a community garden; we are learning how to grow organic food." Another wrote, "I learned [through the community garden project] that if you work together as a team you can do a great job."

Through increased consumer demand and increased farmer supplies, Local Harvest, a food retailer and distributor in Kansas City featuring locally produced foods, opened one new store and expanded distribution to restaurants.

Gateway Beef LLC, a beef processing cooperative featuring prime Angus beef for sale to high-end restaurants, was established in December 2002. Through CFSSA efforts, they received a grant of \$182,500 to determine the market potential of an internal branded beef program offered to independent, regional grocers and to develop a non-hormone treated cattle program for exporting meat to Japan. In October, they established a kosher slaughter program with sales to a New York area kosher supermarket and began exporting beef to Japan. Through these efforts, they are able to offer producer members at least \$125 more per head for their cattle than prevailing market prices. Additionally, by providing another competitor in the beef market in Missouri, farmers selling fat cattle in the open market in the eastern part of the state net \$25 more per head.

b. Sources of Funding: State, Smith-Lever (SARE)

- d. Scope of Impact: Missouri with multi-state collaboration through the North Central Regional SARE Program.

## **Key Theme: Family Resource Management**

### **. Program Description: Family Financial Management**

According to the 2002 Survey of Consumer Finances, 25 percent of U.S. households have less than \$10,000 in net assets.

The 2002 Retirement Confidence Survey shows that 15 percent of all U.S. workers have no retirement savings, and 47 percent of workers report savings under \$50,000.

The American Bankruptcy Institute reported more than 1.4 million bankruptcy filings nationwide in 2001 and more than 1.5 million in 2002.

In Missouri, there were more than 30,000 filings in 2001, rising to almost 34,000 in 2002; and the number of Missouri filings is still rising, with 18,975 in the first two quarters of 2003 alone.

In spite of the healthy economy of the late nineties, many families are showing signs of financial stress during the current recession. Higher rates of unemployment resulting from layoffs and plant closures, tighter job markets for new graduates, and losses and lower returns from financial markets have left some families struggling.

Most financial experts and educators agree that people need access to financial management education at a young age to develop the skills they need to be successful money managers as adults. Recent studies and surveys indicate the young people today have access to and spend a significant amount of money. Having access to money does not translate to the ability to make wise financial and spending decisions.

To meet these needs, educational programming continues to focus on specific financial management topics, such as money management, insurance, credit, saving and investing. Programs are under development for two specific target groups—young adults and very low-income families. Other audiences include youth and their teachers, young families, women, individuals who are on probation or parole, parents, and professionals working with low-income families.

In FY03, 27,921 educational contacts were made through family financial management programs. This programming involved 179 partners and 168 volunteers. Following are examples of outputs and outcomes.

The Gateway to Financial Fitness program is a collaborative effort in the St. Louis area involving University Outreach and Extension; Catholic Commission on Housing; Neighborhood Housing Services; Federal Deposit Insurance Corporation; the Federal Reserve Bank of St. Louis; Fannie Mae; Housing and Urban Development - St. Louis, and banking, financial services and insurance industries. The purpose of the program is to help people learn and practice personal financial skills and in the long run, improve their housing situation. The program involves individual counseling and a series of five workshops. More than 110 workshops have been held since October 2001 reaching 390 participants and using 60 volunteer instructors.

Money Action Plan is a financial management education program targeted at human services and other professionals working with low-to-moderate-income families. Program objectives include training participants to be better prepared to assist their clients and increase their personal knowledge and skills in money management. Materials also are used in educational programs with low-to-moderate-income families directly. Three-hundred (300) educational contacts resulted from implementation of the Money Action Plan curriculum. This included training 45 professionals.

Financial Management for Women programs resulted in 500 educational contacts. These programs target mid-life to older women to increase the financial management skills of this audience. Topics include goal setting, record keeping, credit and debt management, insurance, saving and investing, and estate planning. These programs typically involve a community coalition in planning and development.

Four-hundred (400) individuals on probation or parole, mainly for financial related offenses, participated in basic financial management classes conducted by University Outreach and Extension. Participants often are required to attend classes by the judge or their probation officer in an effort to reduce the probability that they will be repeat offenders. Programs focus on differentiating between wants and needs, setting financial goals, tracking income and expenses, planning spending to stay within income, developing the savings habit, establishing or rebuilding a credit history, and maintaining a checking account.

a. Program Impact:

As a result of the Gateway to Financial Fitness program, 10 percent of participants enrolled in an Individual Development Account program; participants plan to implement recommended financial management practices to become free of credit card debt, increase emergency fund savings, track expenses, use automatic bill paying, evaluate insurance coverage, reassess retirement needs and make a will.

Results of the Money Action Plan training of professionals indicate that participants plan to implement recommended financial management practices. Over half of participants set financial goals, one in five plan to conduct a personal property inventory, and nearly two-thirds plan to develop a plan to reduce debt. One participant commented that "I appreciate information provided about my personal finances; once learned personally, I won't forget to use the info professionally." A follow-up to this training indicated that of those responding, over two-thirds had made progress toward their goals; the majority had increased the amount of money they saved and reduced their debt level.

Most participants in the Financial Planning programs for women indicate that after completing the series, they feel more confident about the way they handle their money and more comfortable and confident with financial decision making and dealing with financial professionals. They also report they can better identify their financial goals and feel more positive about managing their money. By the end of the series, participants report having made some changes in their financial behavior. Results indicate that at the end of the series, one in five had set up an effective system for organizing and storing financial records; eight of 10 developed the confidence to achieve financial goals; more than half developed the ability to set money priorities and had developed written financial goals; more than half revised spending and saving goals; nearly two-thirds had reduced debt or had made a plan to reduce debt; three-fourths had established investment goals;

one in three reviewed retirement goals; and more than half had started saving on a regular basis or increased the amount saved.

End of session reports from individuals on probation or parole for financial related offenses and reports from probation officers in Jackson County indicated that nine of 10 indicated they would track their expenses; all participants had at least three written goals and identified at least one change in their financial behavior. All participants began developing a spending plan. Probation officers reported positive changes in the financial behavior of their participating probationers. Participants reported they had developed more self-discipline, understood the importance of record keeping and improved financial communication skills.

b. Source of Funding: Smith-Lever, State

c. Scope of Impact: Missouri

### **Key Theme: Leadership Training and Development**

. Program Description: EXCEL (Experience in Community Enterprise and Leadership)

Community leaders are the central force in effectively mobilizing people to address local issues. Frequently, community leaders wonder how to achieve the kind of success they dream about and recognize that they cannot be successful alone or without greater personal capabilities. Effective citizen leaders translate knowledge and commitment into hands-on action to engage in building community networks, make well-informed community decisions and find real solutions to real problems. Ongoing leadership development ensures that communities have the capacity to move forward as current leaders retire from public life.

A handbook, “Community Leadership Development: The EXCEL Approach,” an extensive web site and training for extension specialists provides program guidance.

One-third of Missouri’s counties and communities – more than 5,100 people – have participated in locally driven leadership programs. The number of counties expanding to develop a specific community youth leadership development program has grown in the past year to 15, and additional interest is high.

Effective citizen leaders translate the knowledge they’ve gained and the commitment they feel into hands-on action with participation in meeting the challenges facing their communities. They can convert words and ideas into action – instinctively “talk the talk” and “walk the walk.” They use insights and skills learned in community leadership programs such as EXCEL to engage in building community networks, make well-informed community decisions and find real solutions to real problems.

Accomplishing EXCEL’s purpose means that University Outreach and Extension works collaboratively with the local community and its leaders. In St. Louis, the Neighborhood Leadership Academy is a collaborative training initiative bringing together the unique expertise from across the University of Missouri — the Community and Neighborhood Development unit of the Public Policy Research Center, the Nonprofit Management and Leadership Program, and University Outreach and Extension.

For additional program information about Community Leadership Programs, see <http://www.ssu.missouri.edu/commdev/cld/cld.htm>. Information about the Neighborhood Leadership Academy in St. Louis can be found at: [http://pprc.umsi.edu/base\\_pages/cnd/programs\\_opportunities.htm](http://pprc.umsi.edu/base_pages/cnd/programs_opportunities.htm).

b. Program Impact:

EXCEL is a Multi-State Extension program. The following impacts are specific to Missouri.

The EXCEL program demonstrated effectiveness in achieving community development. The program provides a flexible design that any community can use effectively.

In evaluations of the EXCEL program, more than 90 percent of participants indicated they considered their participation to have been worth their time and effort. Additionally, more than 95 percent of participants stated they felt their learning experience was worth the resources that extension expended to support the program in the community. This is a strong endorsement of efforts to meet the needs of Missouri's citizens and communities.

Evaluations indicated that the elements and successful outcomes of the EXCEL program did not depend on the characteristics of the participants or on the unique features involved in different locations. Participants from different genders and ethnic backgrounds experienced the same kinds of benefits, as did those with different levels of education and income or length of residence and family ties in the community.

A graduate of Leadership Northwest Missouri said: "I feel the most important thing I have gained from Leadership NWMO is the network of professionals/colleagues/friends I now have to work with to help people in our region. Also, I think being a part of Leadership Northwest has helped me direct my focus more on my place in the community as a leader and/or a team member and has given me inspiration to give my best."

A participant of the Camden County T.E.A.M. (Together Everyone Achieves More) program said: "It meant a lot to me to be in this program. It meant that teachers regarded me as something more. I hope that this happens with the teachers that I get in later years."

Graduates of the Neighborhood Leadership Academy in St. Louis have created a community computer lab, planned and expanded neighborhood gardens, developed a church-based community needs assessment, proposed and implemented a street banner design competition, and inspired more community involvement in local government.

Graduates in a number of the programs have kept the program going through the formation of 501(c) 3 organizations. In many communities, local governmental and non-governmental boards look to EXCEL graduates as a pool of new members.

EXCEL has been tapped as a resource for development of other leadership programs across the state.

c. Source of Funds: Smith-Lever, State



- d. Scope of Impact: Missouri with multi-state collaboration through the leadership team within the North Central Region (Minnesota, Wisconsin, Iowa, Nebraska, South Dakota, North Dakota, Illinois, Kansas, Michigan, Ohio, Indiana).

### **Key Theme: Parenting**

- a. Program Description: Parenting Education Programs

Parenting Education efforts are concentrated in two primary areas: 1) Parenting after Divorce and 2) General Parenting Programs. In addition, parenting information is provided through parent fairs, newsletters, the MissouriFamilies website and other parenting workshops. Approximately 5,500 Missouri parents were served by Parenting Education programs in 2003.

In 2000 in Missouri, more than 20,000 children experienced parental divorce. Parental divorce is associated with increased risk of behavioral, psychological and academic difficulties for children. However, research has demonstrated that if divorcing parents can provide consistent, nurturing parenting and reduce the amount of conflict to which children are exposed, their children are more likely to adjust well to the divorce. In Missouri, parents who are divorcing and have at least one child under the age of 18 are required to attend a 2.5 hour parent education class. Therefore, there is a statewide need for divorce education programs that educate parents about children's responses to divorce and the importance of minimizing co-parental conflict.

There is also an increasing demand from professionals for information that will help them meet the needs of children experiencing parental divorce. Of 71 schools surveyed in Missouri in 2001, 55 (78%) expressed a need for training on working with children whose parents have divorced. Schools can provide an important source of support for children whose parents are divorcing. To provide that support, teachers need to understand children's responses to divorce and factors that foster positive adjustment to family transitions.

Many Missouri parents also need resources to help them meet more general, everyday parenting challenges and issues, such as discipline, anger management and understanding child development. Kids Count data illustrate this need for general parent education. For example, rates of child abuse/neglect and out-of-home placement have increased since 1998. These are complex problems that cannot be solved by parenting education alone, but increases in these indicators of serious parenting difficulties suggest the need for general parent education. Participants in parenting education programs reflect this trend. Program participants are increasingly parents who have been mandated to attend parent education classes. Many parents get their education as parents "on-the-job" or depend on their experiences of being parented. For some, these opportunities are not enough to increase their knowledge of positive parenting practices and to strengthen their skills to care for and nurture their children.

### **OUTPUTS:**

Since 1996, the University of Missouri, with leadership by the Human Development faculty, have been providing the Focus on Kids program to divorcing parents. Focus on Kids emphasizes conflict management and co-parenting strategies that will assist children in dealing with their parents' divorce. It is a 2.5 hour video- and discussion-based curriculum. Participants view a series of video segments that depict common situations faced by divorcing parents and their children. Following each segment, the facilitator leads a group discussion about the behaviors viewed on the tape, their effects on children, and better alternatives. The program is court-

mandated in Missouri and was provided in 28 counties in 2003 to more than 3,000 parents.

The Families and Divorce program was developed in 2003 to meet the needs of professionals working with children experiencing parental divorce or separation. The program objectives are: to familiarize participants with research on divorce and families, to increase participants' understanding of children's responses to divorce, and for participants to learn strategies for supporting children who are experiencing parental divorce. A curriculum consisting of two two-hour sessions was developed, piloted and revised to meet these objectives. In-service training was provided to 22 extension specialists in the spring of 2003, and during the fall of 2003, more than 200 professionals, including childcare providers, foster parents, K-12 teachers, Head Start staff, 4-H staff and mediators participated in the Families and Divorce program at nine sites. In addition, a new extension guide sheet, "Helping Children Adjust to Divorce: A Guide for Teachers," was created.

Two key programs used to provide general parenting education for Missouri parents are Basic Parenting and RETHINK anger management. Both are standard curricula that have been evaluated and found to be successful in increasing parents' knowledge and skills. Basic Parenting is a six-session program with goals of helping parents strengthen their skills in caring for themselves, as well as understanding, guiding, nurturing, motivating and advocating for their children. RETHINK is an anger management curriculum consisting of six two-hour sessions, with the goals of helping parents identify constructive ways to deal with anger, develop better relationships with their children, use healthy discipline strategies and better understand their children's behavior at different ages. These general parenting programs have been presented to a range of audiences, including parents mandated to attend parent education by the court system or Division of Family Services, and parents attending WIC voucher clinics.

For additional program information see [ParentLink](http://outreach.missouri.edu/parentlink/) (<http://outreach.missouri.edu/parentlink/>) and [Missouri Families](http://www.missourifamilies.org/) (<http://www.missourifamilies.org/>).

b. Program Impact:

Evaluation data from parent education programs demonstrate increases in learners' ability to manage stress, knowledge of child development and use of positive parenting behaviors.

Post-test evaluations of the Focus on Kids program show repeatedly that most parents "agree" or "strongly agree" that they better understand the benefits of cooperating with the other parent in support of their children (average rating of 4.3 on a 5.0-point scale, where 4 = agree and 5 = strongly agree); understand more about how children are affected by divorce (4.3/5.0); and indicate that they plan to avoid arguing or fighting with the other parent in front of the children (4.6/5.0). Numerous positive comments have been received from both parents and court personnel. A sampling includes, "I am glad I came to this class - I found it to be very helpful"; "When my child is old enough to ask questions of what happened, I feel I will know now more of what to say"; "Being able to talk to each other about putting children in the middle - it was helpful to understand how the kids feel"; "I believe that this program and any like it are helpful, useful and needed to help parents make a very hard transition"; and "reaffirmed to me that the child is the important issue".

A six-month follow-up evaluation of 143 parents who participated in the Focus on Kids program demonstrated that more than 90 percent continued to report that the program helped them understand the impact of divorce on their children, and 94 percent indicated that the program

influenced the decisions they made about parenting their children. Furthermore, six months after attending Focus on Kids, almost 92 percent of participants agreed with the statement, "As a result of the program, I plan to make a stronger effort to work with my ex-spouse for the children's sake." Sixty-three percent reported that they were more cooperative with their ex-spouses as a result of the program, and 78 percent indicated that they were acting in ways to assure that their ex-spouse continued to have a positive and ongoing relationship with the children. Finally, 80 percent indicated that the program influenced decisions they made regarding their children.

The Families and Divorce program also has had a positive impact on participants, as shown by end-of-session evaluation data. Most participants have "agreed" or "strongly agreed" that the program helped them better understand the needs and reactions of children of various ages to divorce (4.2/5.0); offered helpful suggestions for providing support to children who have experienced parental divorce (4.2/5.0); and that they plan to use at least one suggestion from this program for providing support to children who have experienced parental divorce (4.3/5.0). Participant comments indicated that the program is "very much needed, as we deal with all types of families." Participants learned "how to help children with a divorced family," and "detailed information regarding various reactions among age groups." Finally, one participant commented, "I like the whole idea of the program. It's the future and good for kids."

Evaluation data also demonstrated positive results for the general parenting programs. A sample of 21 parents participating in Basic Parenting sessions at WIC voucher clinics completed a voluntary evaluation survey. Results indicated that participants' knowledge increased as a result of the parenting sessions, primarily in the areas of discipline (86%); nurturing and loving children (80%); and helping children learn (84%). One parent said, "I've learned it's important to be a good role model for my daughter." Most participants reported using discipline more effectively (82%); growing closer to their children (88%); and doing more to help children learn (88%). Parents appreciated the opportunity to attend parenting sessions at the WIC clinic because "...it's hard to find time to have a parenting session away from WIC."

The RETHINK anger management program also has been found to have positive results. Participants who were mandated to attend RETHINK by the court system because of aggression problems indicated that they gained knowledge that will help them manage their anger in a more positive way. Participant comments included, "I know now why I get so angry and now I can work to control it"; "I feel I'm more in control after learning coping techniques"; and "I wish I'd had this information when I was a teenager, then maybe I wouldn't have been in so much trouble." Further, previous evaluation results confirm the extensive evaluation data from other states showing that more than 90 percent of RETHINK participants who completed evaluations made positive behavioral changes.

- . Source of Funds: Smith-Lever
- a. Scope of Impact: Missouri

### **Key Theme: Promoting Housing Programs**

- . Program Description – Affordable Housing and Housing and Community Issues

More than a quarter of a million new jobs have been established in Missouri since 1993. With these new jobs, unprecedented demands for affordable housing have followed. Many of the newly established jobs are entry level and represent low annual incomes. During this same

period, many rural communities have expressed an interest in attracting businesses to boost slumping economic conditions. The arrival of businesses to any area increases the demand for affordable housing.

Sustainable Housing and Community Revitalization programming informs consumers about national and statewide financial incentives for homeownership. Post-purchase education is an important aspect of any homeownership program to facilitate home maintenance and retention. Through Missouri Housing Partners, first-time home buyers of low or moderate income without a down payment are linked with state agencies and lenders who will work with them to find financing to buy or rehabilitate a home. People with disabilities, senior citizens, veterans or any other vulnerable segment of the population also are included in the target audience.

Another component of Sustainable Housing and Community Revitalization programming efforts includes a national consumer education program focusing on increasing awareness among consumers and helping in improving the quality of indoor air in homes.

Community revitalization and sustainability is based on a community participatory process training program. Extension specialists work with the community to enable residents to take charge and make decisions about their own communities. This, in turn, leads to enhanced community sustainability and improved environmental stewardship in both residential and commercial sectors of the community. Community participants typically have the resource materials, skills and experience necessary to plan and execute a sustainable community planning process from conception and diagnosis through implementation. Extension personnel facilitate the sustainable revitalization community assessment process in communities in their respective regions using these resource materials and processes. Through University of Missouri Outreach and Extension Outreach Development Funding (ODF) funding, these procedures will soon to be available for statewide distribution.

University Outreach and Extension sustainable housing and community revitalization programs provide participants with the knowledge and skills necessary to obtain and maintain environmental stability and security, manage human and material resources, while increasing consumer awareness. This is accomplished through educational programs focusing on home ownership, community revitalization, environmental quality, affordable housing and environmental stewardship. Audiences have ranged from high school students to senior citizens interested in nursing home options. The scale of these programming efforts ranges from the individual interested in buying his/her first home to entire communities interested in identifying and inventorying their existing and anticipated housing stock.

For additional program information see [Missouri Housing Partners \(http://outreach.missouri.edu/mhp/\)](http://outreach.missouri.edu/mhp/) and [HomeWorks \(http://outreach.missouri.edu/edninfo/homeworks/index.htm\)](http://outreach.missouri.edu/edninfo/homeworks/index.htm)

a. Program Impact:

In Fiscal 2003, slightly more than 7,600 educational contacts were made through sustainable housing and community revitalization programming efforts. These efforts included 24 partners and more than 45 volunteers. The following outputs and outcomes were included:

Missouri Housing Partners Initiative provided homeowner information to more than 1,500 people. Electronic versions of the request forms are now available.

Short-term outcomes include: More than 21 percent of those receiving information purchased a home. The majority of request forms were obtained at local University Outreach and Extension Centers and USDA Rural Development Centers throughout Missouri.

HomeWorks is a practical course that helps homeowners successfully maintain homeownership through knowledge of basic home care and financial management.

Short-term outcomes include: Evaluations completed following the sessions indicated that participants felt they had increased their knowledge and skill levels related to the topics covered. Fifty percent of participants felt the program exemplified excellent quality. Fifty percent of the participants felt that the value of the program in terms of time, money and energy was of excellent use.

Stepping Through the Gateway to Financial Fitness is a collaborative program developed and presented by Environmental Design and Consumer and Family Economics regional extension specialists, the Catholic Commission on Housing (CCH), Neighborhood Housing Services (NHS), the Federal Deposit Insurance Corporation (FDIC), the Federal Reserve Bank of Saint Louis, Fannie Mae, HUD -- Saint Louis, and banking, financial services and insurance industries. This effort focuses on financial education that leads to improving people's housing conditions.

Short-term outcomes include: 180 participants enrolled and 50 participants completed a series of five workshops, set financial goals and developed spending plans. Train-the-trainer materials were developed, and 60 volunteer instructors attended workshops to become aware of how adults learn and how to apply that information to teaching this material. More than 75 workshops have been offered during this reporting period

Medium-term outcomes include: Evaluations are completed at the end of each workshop. An evaluation committee that includes University Outreach and Extension, the Catholic Commission on Housing (CCH) and Neighborhood Housing Services (NHS) is developing a long-term evaluation to be completed this summer and again in two years. Information from a questionnaire and individual credit reports that contain income, employment and debt information will be used to determine program effectiveness.

Indoor Air Quality programs help consumers improve the quality of the air in their homes. Information provided during educational programs help people identify common indoor air pollutants, how they get into the home, their potential effect on the family's health, and the steps to take to control or eliminate hazards. Indoor air quality educational offerings included programs on carbon monoxide poisoning; radon in the home; smoke-free commercial and retail settings; controlling humidity in the home; detecting and removing mold, mildew and other biological hazards; and selecting and using household products and home pesticides wisely.

Short-term outcomes include: Responses to follow-up evaluations indicate that all participants in these offerings have made at least one change to improve the air quality in their home.

Medium-term outcomes include: It is anticipated that the USDA will continue to fund state efforts in this programming effort. Missouri intends to be at the forefront of this set of environmental issues to reduce their negative impact on Missouri citizens.

The Housing Profile Protocols: Partnering to Develop Tools that will Foster Community

Revitalization and Citizen Empowerment project is a three-year Outreach Development Fund project that uses a participatory process to develop a set of procedures and resource materials that will assist community leaders and citizen housing task groups to self-determine their local housing needs. In addition, it is creating a housing profile that specifies and can communicate the community's housing needs and opportunities to public and private stakeholders. It accomplishes these goals by linking the articulated needs to an action agenda that will stimulate a progressive housing program directed at sustaining affordable housing in the community. This process is intended to assist communities to allocate resources effectively to address their specific housing needs and issues.

Short-term outcomes include: Almost half way through year two of a proposed three-year process, two communities in Northwest Missouri have are serving as pilot test sites for protocols and profiling procedures. The project team includes members and leaders from the two communities supported by staff from the Northwest Missouri Regional Council of Governments; staff from the Community Policy Analysis Center on the Columbia campus; CARES -- The Center for Agricultural, Resource and Environmental Systems on the Columbia campus; and University Outreach and Extension State Environmental Design Extension Specialist.

Medium-term outcomes include: In year three, if funding is awarded, a procedure for implementing the Housing Profile Protocols statewide will be developed. Evaluations of the participatory process will be conducted in each of the pilot-tested communities. Opportunities for interstate expansion of the profile protocols are being negotiated with the Federal Home Loan Bank in Kansas.

- b. Source of Funds: Smith-Lever, Federal grant
- c. Scope of Impact: Missouri

### **Key Theme: Youth Development**

- . Program Description: Workforce Preparation/Information Technology Education for Youth and DESE After-school Computer Labs

The Missouri Department of Elementary and Secondary Education (DESE) identifies technology education as critical for Missouri's youth. The DESE web site states: "The overarching mission of Technology Education in Missouri is to build citizen understanding and to develop math and science competency through technology. This enables students to attain appropriate education/employment objectives, fulfill citizenship responsibilities, and pursue meaningful leisure activities in a technological society."

Missouri 4-H has identified five factors that enable non-formal youth technology learning efforts- computer access, digital content access, technology support, educational support and an appropriate setting. 4-H has created innovative models that build these factors into programs for youth. The models include after-school computer lab programs, software-based projects, technology contests and events, technology leadership teams and computer recycling. These models are being implemented in Missouri and many other 4-H programs nationally.

The project goals increased:

- access to computers by establishing after-school computer labs, community computer labs and recycling computers for educational use,

- access to quality computer-based content by a) creating software-based projects that combine computer software with web-based information and off-computer activities, b) creating a lending library of quality software
- technology support by recruiting IT professionals to work with youth and programs. Supporting the technology becomes part of the educational program.
- educational impact by designing projects and conducting training for leaders and teachers, and
- opportunities by organizing youth, adults, computers and educational content into 4-H project groups and after-school computer programs.

A website for after-school computer lab resources has been developed:

(<http://4h.missouri.edu/go/vista/afterschool.htm>)

For additional information on 4-H Technology Team activities, see Missouri 4-H (<http://mo4h.missouri.edu/>); for workforce preparation, see (<http://4h.missouri.edu/programs/workprep.stm>).

a. Program Impact:

Workforce Preparation/Information Technology Education for Youth and DESE After-school Computer Labs is a Multi-State Extension program. The following impacts are specific to Missouri.

Low-resource youth are getting access to information technology as school and community centers are opening computer labs for youth in out-of-school hours. After-school computer lab research is finding that teachers are reporting a greater interest in learning and improved school performance by program participants. Teachers and project leaders are learning to use computers to teach in non-formal settings. Youth are learning with and about computers, which enables more effective learning of other information. Youth and adults are learning to use information and communication technology to become more effective leaders.

- 418 youth and 264 adults enrolled in 4-H software-based projects for non-computer curricula.
- 840 youth participated in 42 after-school computer lab programs.
- 140 youth attended the 4-H/UMR Aerospace Camp.
- The Youth/Adult GIS/GPS team attended ESRI Conference.
- The Vista Project continues to prosper:
  - Vista developed 12 new after-school computer lab programs.
  - 18 existing after school computer lab programs were expanded by Vista.
  - 377 youth participated in lab sites in the last quarter (in safe environments after school with adult supervision, learning technology skills for school and the workplace).
  - 85 percent of the youth participating in the Vista project are from low-income families.
  - Through Vista, 17 communities increased their capacity to deliver lab programs.
  - There are 37 community sites where computers *could* be used for lab programs.

After-school computer lab resources have generated the following:

- 49 volunteers were recruited and trained (by Vista) to deliver lab programs.

- A total of 127 volunteer hours were reported in lab programs this quarter alone.
- \$4,800 of in-kind donations were made to lab programs this quarter.

Testimonial:

One of the women residents at the apartment complex at first knew nothing of the computer. But, knowing she liked to sew, the 4-H computer lab leader, using Missouri 4-H software, showed her how to use Disney's Magic Artist Deluxe to construct her designs. The woman is now cruising the Internet. When youth in the lab saw the woman using the Magic Artist software, they took an interest and wanted to learn it too. Now several other youth have seen those original youth using it and have asked to use it as well.

Since our November training on software installation, and because we were able to provide more software at that training, and providing different software titles at the same time, another lab instructor told me that he was using the simulation games, such as Sim Town, Monopoly Tycoon and Rollercoaster Tycoon, to have competitions in his lab. The kids compete and win prizes for creating the town with the most people or money. This is from an instructor who had quit using the computer lab with the kids because of his original frustration with working in the lab and getting the software to run.

- . Source of Funds: Smith-Lever
- a. Scope of Impact: Idaho, Ohio, Michigan and Missouri

### **Key Theme: Youth Development/4-H, Leadership**

- . Program Description: Youth Civic Engagement, Community Service-Learning and Leadership Development

#### Conversations on Youth Development

In the fall of 2001, Missouri's County Conversations on Youth Development involved more than 1,138 citizens from 61 counties. More than 200 persons also participated in the State Conversation on Youth, Jan. 22, 2002. At these grassroots meetings, policy recommendations were developed. Highest priority was given to the establishment of local, state and national youth advisory boards and the involvement of young people in policy and decision making roles.

As a result of the Conversations on Youth development, Missouri 4-H began working closely with Governor Holden to develop strategies to promote youth engagement. Missouri 4-H faculty advised the Governor's staff on youth empowerment and processes for creating a youth cabinet. Preliminary results of the conversations were shared with the Governor's youth policy team, a group of cabinet-level officials from all state agencies. Recommendations included the following goals:

- o Provide opportunities for the young people of Missouri to make their voices heard on important issues facing the state,
- o Engage young Missourians in service to their schools, communities and the state of Missouri, and
- o Achieve better results for youth by helping to improve youth programs.

#### 4-H/Community Youth Development VISTA Program

The 4-H/Community Youth Development VISTA Program was formed to connect youth to



technology and to their communities. AmeriCorps\*VISTA members work in partnership with county extension offices and community organizations to build local programs. After-school computer labs offer upper elementary/middle school students a safe environment and adult supervision after school. Labs provide access to play-based learning, expanding the technological abilities of youth to success in school and career. Youth civic engagement projects team middle school/high school age youth with municipal leaders to identify and solve problems together. While learning about local government, analyzing community issues and implementing civic projects, youth gain knowledge and skills to become citizen leaders. The program is a three-year partnership between University Outreach and Extension and the Corporation for National and Community Service.

#### Martin Luther King Jr., Mini-Grants

The Martin Luther King Jr. Mini-Grant project is a statewide initiative that started in the fall of 2002. The project consisted of competitive mini-grants that would be awarded to extension specialists to implement one of two community programs that exemplify Dr. King's philosophy of non-violence and community service. Those two projects are the Carry-On Suitcase Project and RETHINK (anger management program). The grants, given by University Outreach and Extension, were approximately \$400 each with counties to match these funds. Together, the nine counties contributed \$6,400 in-kind funds toward these projects

#### Program Impact:

This is a Multi-State Extension program. The following impacts are specific to Missouri.

Following the local and state Conversations on Youth Development, a team of 19 Missourians attended the National Conversation on Youth Development. This team worked tirelessly to keep the positive youth development agenda in the public eye. Among their accomplishments: development and distribution of 1,000 copies of Missouri's recommendations to key decision makers, elected officials and youth throughout Missouri; hosting a VIP breakfast at the Governor's mansion to share the recommendations and express appreciation for support; press releases, interviews and other media coverage for the conversations; and development of an action plan to build strategic alliances to advance the agenda on youth development.

Building on the Conversations' recommendations, Missouri 4-H entered an agreement with the Corporation for National and Community Service to place up to 20 AmeriCorps\*VISTA members in county extension offices in collaboration with Community Development Extension. A program coordinator was hired to lead the initiative. AmeriCorps\*VISTA members are focusing on youth and civic engagement and working closely with state and local partners to broaden the involvement of Missouri youth in public policy work.

In the first year, eight AmeriCorps\*VISTA members developed 12 new after-school computer lab programs and expanded 18 existing programs in 17 low-income communities of Missouri. Close to 1,000 youth participated in labs, the majority of whom are from low-income families.

In the first six months, four AmeriCorps\*VISTA members developed four new youth civic engagement programs and expanded three existing programs in 14 low-income communities of Missouri. Nearly 165 youth participated in civic programs, the majority of whom are from low-income families.

Combined, VISTA members generated a total of 448 hours from community volunteers to

support implementation of local programs. Projects raised \$15,500 in grant funding and cash donations. VISTA members also leveraged \$8,110 of in-kind equipment, materials and supplies for implementation of local programs.

The Martin Luther King Jr. Mini-Grant project proved to be extremely worthwhile. The Carry-On Suitcase Project enabled volunteers to learn more about the effects of domestic violence and the needs of others. Additionally, it helped teenage volunteers develop leadership and organizational skills. Those who participated in the RETHINK series learned many necessary skills to help them deal with anger.

- Since participating in the Carry-On Suitcase Project, members of the Christian County 4-H Club have now “adopted” a single mother who was a victim of domestic violence. They are raising money for school supplies for her children and have been collecting food and clothing for the family.
- The RETHINK program in Christian County was conducted with nine juveniles, ages 13-17, offering them an opportunity to learn new anger management skills as well as to get involved in their community. At the beginning, all nine participants resented the fact that they had to attend the class; however, by the end of the program, the participants didn’t want the program to end. Participants learned that there are people who are really trying to help them. One participant stated, “The program helped me get along better with my parents, to solve problems without fighting or yelling.” The specialist was able to contact five of the nine participants in follow-up interviews with participants reporting fewer fights and much better relationships with parents. These five participants said they would go through the program again if they could.
- Two youth serving on the MLK Jr. Mini-Grant Advisory Committee were asked to serve on the National Children, Youth and Families at Risk (CYFAR) 2004 Conference Teen Committee. They continue to serve on the Teen Committee and will work with a multi-state committee to plan fun, teen-focused activities at the CYFAR Conference in Seattle, Wash., May 12-14. (See: <http://www.reeusda.gov/4h/cyfar/cyfar2004/announcement.htm>)
- Cass County’s Wal-Center Club Jr. Leaders submitted a proposal to the CYFAR Conference and were consequently invited to participate in the CYFAR Share Fair during the conference. The youth group will have an opportunity to present information and resources about the Carry-On Suitcase Project to more than 850 participants attending the Conference Share Fair.

VISTA member Jonathon Bishop has dazzled his local supporters by starting two new after-school computer lab programs in rural Polk County in one quarter. The programs with Halfway and Morrisville, Mo., schools enroll 29 kids in after-school lab sessions two days a week. In Morrisville, the program is receiving tutoring assistance from junior and senior members of the school’s National Honor Society. These programs also have been bolstered by a \$10,000 grant from the J.C. Penney Afterschool/4-H Afterschool program.

In October 2003, a Callaway County VISTA member organized a Lights On Afterschool open house event for the community of Fulton, Mo. The event sought to showcase the STARS afterschool program and included a computer lab component developed by VISTA. The mayor of Fulton signed a proclamation calling on citizens of the community to ensure every child has access to after-school programs and declaring October 9 as Lights On Afterschool Day in Fulton. Missouri House Republican Danie Moore also presented the organizers with a resolution wishing success with the celebration and for the future. The event was covered by KRCG-TV 13 and

KOMU-TV 8 on the 10 p.m. news. More than 60 guests came out for the open house, including 25 kids enrolled in the program.

- . Source of Funds: Smith-Lever, Grant
- a. Scope of Impact: Michigan and Wisconsin

## **1890 Cooperative Extension Service — Lincoln University**

### **Key Theme: Aging**

- . Program Description:

The mission of the *Paula J. Carter Center on Minority Health and Aging* is to provide leadership in addressing the health, social, and economic needs of Missouri's minority, disabled, and elderly populations through education, training, applied research, policy analysis, and the use of technology as strategic tool; to disseminate culturally appropriate health care information and materials that will empower the minority populations to participate in improving their health. Identify barriers to preventative health care and combat racial and ethnic bias in research and practice. The Center also provides diversity-training programs through conferences, workshops, and videoconferences.

- a. Program Impact:

An Advisory Board for the Paula J. Carter Center on Minority Health and Aging was established and met for the first time in October of 2002. The Board's responsibility is to provide input regarding future goals for the Center. Members are composed of representative from various local and state agencies, surrounding community, the University of Missouri-Columbia. PJCCMHA developed and published, statewide, the *PJCCMHA Healthy Aging Newsletter*. The *PJCCMHA Healthy Aging Newsletter* provides information regarding health issues and concerns of aging consumers, and is published quarterly. A publication entitled *Minority Health News Fact Sheet* developed, published and distributed to Jefferson City Public Schools. The fact sheet focuses on the accomplishments of minority doctors/scientist and also provides information that is relative to minority health. The Minority Health News fact sheet is printed quarterly.

#### Missouri Institute on Minority Aging (MIMA)

As a result of attending the Lincoln University Cooperative Extension sponsored training, 95 percent of participants reported feeling that the 2003 Minority Institute extended their knowledge of the social, economic and health issues impacting older minority individuals, as well as resources available in the state for older minorities. According to the 2003 MIMA Overall Evaluations (44) submitted, most of the participants stated that the Diversity workshops and the information by the speakers were presented in proper format and provided valuable training in terms of learning about various health issues and programs in Missouri.

#### Computer Literacy Training Project

Since the project's inception in 1998, the **Computer Literacy Training Project**, formerly *Computer Entrepreneurial Skills Training (CEST)* has trained over 300 individuals in Mid-Missouri in computer literacy and has trained more than 50 individuals in entrepreneurial skills development. In 2003 the Computer Literacy Training Project saw several individuals complete the ten-week computer literacy training and earn a certificate of completion. Limited-resource

individuals have gained working knowledge of Microsoft Office, word processing, databases, and navigating the World Wide Web. Participants' report feeling more confident using computers, as well as interest in attending more training.

- b. Source of Federal Funding – Smith-Lever
- c. Scope of Impact – State Specific

## **Key Theme: Children, Youth, and Families at Risk**

### **. Program Description:**

In Missouri, 19.5 percent of the youth population is from single-parent families; 21.6 percent live at incomes below the federal poverty line. Missouri ranks 23<sup>rd</sup> in the United States for childhood poverty. In addition, Missouri has a high school dropout rate of 13 percent, and the average grade for completion is 11.1 for high school dropouts. In diverse communities, with large concentrations of minority populations, the statistics are much higher. LUCRE programs have been designed to reduce the myriad of risks that youth residing in high risk.

#### Kansas City

- o *Head Start Horticulture*  
This was the third year of an ongoing partnership between LUCE and Kansas City Missouri School District Head Start. This program is for 3-5 years olds at 4 full day head start centers, Clymer Head Start, Guinotte Head Start, Lindwood Head Start and Switzer Head Start. The objectives of the program were: to provide students with horticulture information that was easy to understand and retain; to help students understand the plant parts and their functions; to demonstrate how compost is made using worms in a worm bin; to help students understand that “bugs” are necessary for plant reproduction; to help students understand and remember the difference between fruits and vegetables
- o *MAP test preparation for 3<sup>rd</sup> grade classes at Ladd Elementary School and Weeks Elementary School*  
This program had as its goal the improvement of MAP science test scores by 4<sup>th</sup> grade students at Ladd and Weeks Elementary schools through instruction in horticulture. A curriculum was developed and reviewed by the third grade instructors. The objectives of the program were: to aid students in preparing for the science portion of the MAP test; to help students gain a better understanding of terms and concepts related to ecology; to teach students about the importance of recycling; and to help students understand the chain of events which enable humans to obtain food.

### **a. Program Impact:**

#### Kansas City

- o *Head Start Horticulture* -- 14 lessons were delivered to 10 head start classes at 4 head start sites, with over 150 students participating. Students planted seedlings of eggplant, tomatoes, basil, and sweet peppers in containers, and new horticulture curriculum is being developed for incorporation with the head start program. As a result of instruction 54 percent of the students are able to use horticulture terms. 70 percent of the students can identify the four major parts of a plant. 77 percent of the students

know the difference between a fruit and a vegetable, 70 percent know the five major plant needs. 66 percent know what earthworms do for the soil, and 65 percent knew about compost as part of the soil.

- o *MAP test preparation for 3<sup>rd</sup> grade classes at Ladd Elementary School and Weeks Elementary School*

Approximately 15 lessons were taught to six third grade classes at both schools using the curriculum. At Weeks Elementary School 67 students took the MAP test. In 2003, 56 reported took the test. At the LND (Level Not Determined), the percent of students testing in that level for science dropped from 11.8 percent to just 1.8 percent. At the progressing level, the percent of students rose from 16.4 percent to 35.7 percent. At the advanced level, the percent of students dropped from 3.0 percent to 0.0 percent. At Ladd Elementary School, 66 students took the test. In 2003, 56 students took the test. At the LND level, the percent of students testing in that level dropped from 4.3 percent to 1.8 percent At the Nearing proficiency level, the percent rose from 39.4 percent to 53.6 percent. At the Advanced level, the percent dropped from 3.0 percent to 0.0 percent.

b. Source of Federal Funding – Smith-Lever, State

c. Scope of Impact - State specific

### **Key Theme: Children, Youth, and Families at Risk**

. Program Description:

In Missouri, 19.5 percent of the youth population is from single-parent families; 21.6 percent live at incomes below the federal poverty line. Missouri ranks 23<sup>rd</sup> in the United States for childhood poverty. In addition, Missouri has a high school drop out rate of 13 percent, and the average grade for completion is 11.1 for high school dropouts. In diverse communities, with large concentrations of minority populations, the statistics are much higher. LUCRE programs have been designed to reduce the myriad of risks that youth residing in high risk.

#### *Central Missouri*

A total of 265 youth ages 5-19 participated in training and educational programs designed to educate students, during non-school hours, in the areas of character education, conflict resolution, anger management, valuing differences, decision making, goal setting, problem solving, leadership, teamwork, plant and soil science, foods and nutrition education, and self-esteem building. Programs were offered weekly in a club setting and or workshop setting with the assistance of parent helpers as volunteers. Curriculum included nationally juried 4-H curricula and other research-based curriculum. The programs are designed to assist youth in realizing that other positive options exist and they are exposed to the larger society other than their native community.

#### *Collaborative Tutoring*

Seven (7) youth participated in a newly developed one-on one tutoring program designed to assist youth who are performing at one to three grades below grade level. The tutors were trained in a collaborative effort with Lincoln University Cooperative Extension and the Lincoln University College of Education. Adult volunteers were trained with a minimum of 50 to 100 contact hours. Trained adult volunteers contributed 365 hours to this effort to improve educational outcomes of the youth participants. Some 47 percent of the youth participants increased their grades by 1-3

letter grades during the 2002-2003 academic year.

#### *4H*

Four (4) youth served in leadership roles in their local club by serving as trained officers. Fourteen (14) youth participated in 4-H camp and gained skills in outdoor education and conflict resolution, and leisure time management. Five (5) youth participated in the Missouri State 4-H Congress, a statewide program designed to develop youth leadership potential. 23 volunteers served helpers in identified high-risk communities. 86 percent of the participants in 4-H camp reported gains in skills in outdoor recreation.

#### *Outdoor Cookery Contest*

100 percent of the participants in the outdoor cookery contest reported gaining skills in food safety and kitchen safety. 88 percent reported an increase in knowledge regarding biology and micro-organisms as it relates to food-borne illnesses. Some 12 percent reported a change in food-handling behavior.

100 percent of the parents reporting indicated an increase in their child's leadership ability as a result of participating in Central Missouri Youth programs. 65 percent indicated an increase in their child's self-discipline as a result of participating in the program. 57 percent indicated a change in the attitude of their youth toward schoolwork. Some of the comments of parents of participants include: "The program really helped my son in math a whole lot." "She was failing everything, now, she is passing everything." "If it was not for the program, her would have failed the eighth grade." "The program gave her what she needed."

#### *Southeast Missouri*

Lincoln University Youth Development/Kids Beat program uses proactive solutions to address issues that affect students in Southeast Missouri. Youth are confronted with alcohol, tobacco, illegal drug abuse, teenage pregnancy, crime and violence among their peers. The program empowers youth and communities through educational and cultural experiences. Lincoln University Youth Development/Kids' Beat networks throughout Southeast Missouri with communities, organizations, and agencies to help with the implementation of programs and activities in this economically depressed area in the Missouri Bootheel. Other youth development programs conducted in Missouri's Bootheel were: After School Life Skills/Character Development; Homestown Life Skills/Character Development, Gear Up Mathematics Tutoring, Computer Skills Enrichment, MLK Jr. Carry On Suitcase Project, Earth Day Festival Fair, Summer Camp

a. **Program Impact:**

In Central Missouri, five (5) workshops for the Juvenile Youth Attention Center for the 19<sup>th</sup> Circuit Court Region. Approximately 85 youth participated in valuing differences workshops. Designed to assist with changing attitudes toward youth of different races.

In *Kids Beat*, over 1,000 youth developed leadership and, conflict resolution skills. 90 percent of youth participating in the *Life Skills* program reported having better knowledge of strategies needed to avoid at-risk behaviors. Over 220 area youth and adults attended the *Earth Day Festival*, thereby being exposed to issues concerning the environment. In the *Computer Skills* program, 60-90 percent of the 40 participants were able to identify the basic parts of a computer and successfully print a document as opposed to a 0 percent rate at the beginning of the program. Thirteen (13) of 22 students participating in one session of the Life Skills program reported that

had learned how to better manage their anger and the importance of honesty. In the *Carry On Suitcase* project, 16 area youth collected and donated over 677 individual personal items to two battered women shelters in the area. The program received a grant of \$200 and students subsequently raised an additional \$1,400 in donations from area residents, businesses and physicians. 23 suitcases were donated to the shelters. At the end of the project 12 of the 16 students remained active in youth programming.

- b. Source of Federal Funding – Smith-Lever
- c. Scope of Impact – State specific

### **Key Theme: Community Development**

- . Program Description:

Lincoln University Cooperative Research and extension programming in community development seeks to reduce those factors that can expose youth and their families to potential abuse of alcohol and other drugs while also enhancing protective factors existing in the individual, family unit and community. Programs seek to provide teens with peer-to-peer counseling and mutual support, offer interactive learning activities and strategies for coping with abuse and neglect, and offer non-formal education programs for citizens of the state of Missouri.

#### ***Kansas City***

It is well known that if an area is beautified with growing plants, people begin to feel better about it. According to the Kansas City Focus Neighborhood prototypes Plan, open space can provide a variety of amenities for active or passive recreational use, visual focus or a place to gather. This program came from stakeholder Brenda Garrett and the SPENA neighborhood group. There is a neighborhood park on the corner of 56<sup>th</sup> and Norton, and was used as a trash and debris site. Lincoln University Kansas City Impact Center was contacted and became involved in efforts to develop and beautify the neighborhood.

- a. Program Impact:

Two African American neighborhood residents received education and training in planting perennials as ornamental plants. The residents also found areas in the neighborhood where plants were needed. In cooperation with the LU plants were obtained and planted in the neighborhood park. The aesthetic appearance of the park was improved.
- b. Source of Federal Funding: Smith-Lever
- c. Scope of Impact: State specific

### **III. Stakeholder Input Process**

University Outreach and Extension programming is based on the needs, aspirations and issues identified by the people in communities throughout the state. University Outreach and Extension program priorities are based on substantial stakeholder input. During 1998, a deliberative group process involved 7,012 citizens in 275 sessions in each of Missouri's 114 counties. This process culminated in 1999 and resulted in identification of issues, concerns and educational aspirations of Missourians.

- 10 percent of participants were youth under 18.

- Half were men, half women.
- 10 percent were minorities.
- 40 percent had little or no experience with extension educational programs.

The county outreach and extension council in each county reviewed program status and deliberative group process data. Council members worked with field-based regional extension specialists and drafted a [county program plan](http://outreach.missouri.edu/about/fy00-03/index.html) (<http://outreach.missouri.edu/about/fy00-03/index.html>). These are updated annually with extension specialists and County Extension Council members. This process includes review of program priorities based on county-based listening results with stakeholders and data obtained from the Office of Social and Economic Data Analysis. See <http://osed.missouri.edu/>

Trend analysis, regional profiles and county-based data were available to faculty, extension councils and stakeholders using the University Outreach and Extension Office of Social and Economic Data Analysis web site. <http://osed.missouri.edu/>. Place-specific county data are continuously updated to be used for community decision making, program planning and monitoring change. See <http://www.osed.missouri.edu/countypage/>.

Program plans include performance goals, indicators and expected learner outcomes. Each program identified key components, curricula, partnerships and targeted learners. All 114 county outreach and extension councils reviewed new input and revised their annual plans of work as needed.

Campus faculty members annually review the county plans, identify trends within their areas of expertise and suggest new program direction that addresses the issues identified in the county plans.

Each content-based program area developed a 21<sup>st</sup> century program and resource plan in alignment with the organizational strategic direction and guided by stakeholder input. Each plan defines current priority programs, expected outcomes and indicators. Plans indicate resources needed to fund program priorities as well as revenue generation leveraged funding. Content-based program areas include:

- Agriculture, food and natural resources
- Business and industry
- Community development
- Human environmental sciences
- 4-H youth development

Each of the eight University Outreach and Extension regions worked closely with county and regional extension councils to revise the regional program and resource plans. These plans guide programming, staffing and allocation of resources. All planning was based on stakeholder input, continuous improvement and evaluation of results. Each plan was in organizational alignment with the University Outreach and Extension 21<sup>st</sup> Century Strategic Direction. Relevancy was determined through evaluation of local listening and comparing these data to trends identified through data bases and analysis by the Office of Social Economic and Data Analysis (OSEDA).

Ongoing stakeholder listening continuously occurs through the County Extension Council infrastructure, 4-H councils, advisory groups and partnership program teams as well as through priority program evaluations and survey information collected in program content areas. Efforts are made in all stakeholder input approaches to ensure that the stakeholders involved represent the population diversity of the community involved. This includes representation of the total community of learners, ethnicity, geographic representation, family status, income level, age, gender, disability status and users/nonusers of existing educational programs. Continuous listening to learners and stakeholders creates an environment



of continuous improvement and leads to the timely development of new programs to address local priorities.

The Missouri Agriculture Research stakeholder input process continues to be the same as reported in the 1999 Plan of Work (POW). Several advisory committees represent all regions with members from industry, government, academics and producers. They meet regularly and provide input into program needs.

## **IV. Program Review Process**

Missouri made no significant changes in the merit review processes or scientific peer review program since the Five-Year Plan of Work.

## **V. Evaluation of the Success of Multi and Joint Activities**

***Did the planned programs address the critical issues of strategic importance, including those identified by the stakeholders?***

Yes, the University of Missouri Outreach and Extension 21<sup>st</sup> Century Strategic Direction identified and revised the critical success factors (see <http://outreach.missouri.edu/about/21stcentury/factors.html>):

- Access and Learning
- Learning and Achievement
- Innovation
- Human Resources
- Stewardship of Resources

These success factors are based on stakeholder recommendations and input from stakeholders, including public and private partners.

All programming is based on the needs and assumptions identified by stakeholders and the critical success factors. Program planning includes and encourages multi-state program partnerships and joint activities. See Section III, Stakeholder Input Process.

***Did the planned programs address the needs of underserved and under-represented populations of the state?***

Yes, many programs addressed the needs of underserved and under-represented populations of Missouri. Many programs are mentioned under Goals 3 and 5. A few examples include:

- The Family Nutrition Education Program provides low-income citizens with the latest nutrition information. Programs include EFNEP, FNP, school-enrichment programs, Body Walk, Health for Every Body, etc.
- The 4-H/Youth Development activities in Goal 5 describe a variety of programs, including Adolescents at Risk, Out-of-School Hours and Workforce Preparation

- The Alianzas: Building Inclusive Communities program under the Community Development theme describes programming to immigrants and the various challenges they face (i.e., discrimination, low-pay, inadequate health insurance, etc.).
- Lincoln University offers programming, such as Small Family Farms Program; Animal Production Efficiency; Grazing; Animal Health; Adding Value to New and Old Agricultural Products; Diversified/Alternative Agriculture; Small Farm Viability; Aging; Children, Youth and Families at Risk; Food Stamp Nutrition Education; Kid's Beat; Community Skills; Community Development; Community Gardening; Conflict Management; and Family Resource Management.

***Did the planned programs describe the expected outcomes and impacts?***

Yes, outcome and impact indicators were described in the Missouri Plan of Work, and all programs are developed using the program logic model. (example: <http://outreach.missouri.edu/fcrp/irondale/>)

***Did the planned programs result in improved program effectiveness and/or efficiency?***

Yes, see impacts in Goal Areas under Section II, Report of Accomplishments.

**University of Missouri (1862)**

Agricultural Experiment Station Research  
and University Outreach and Extension

**Multi-State and Integrated Activities**

	<b>Key Theme</b>	<b>Program Description</b>	<b>Multi-State Extension (Smith-Lever)</b>	<b>Multi -State Integrated Research &amp; Extension (Smith-Lever)</b>	<b>Multi-State Integrated Research &amp; Extension (Hatch)</b>
<b>Goal 1</b>	Animal Production Efficiency	Improving feed rations with reduced environmental impact			X
	Animal Production Efficiency	Improving reproductive efficiency			X
	Animal Production Efficiency	Profitable and Sustainable Livestock Production Utilization System	X		
	Plant Genomics	Plant adaptation to drought			X
	Plant Germplasm	Developing improved soybean lines			X
	Plant Germplasm	Breeding for soybean cyst nematode resistance			X
	Plant Health	Developing alternative root rot resistance in soybeans			X
	Plant Production Efficiency	Delaying onset of corn borer resistance to Bt			X
	Plant Production Efficiency	Improving wheat production management			X

	<b>Key Theme</b>	<b>Program Description</b>	<b>Multi-State Extension (Smith-Lever)</b>	<b>Multi -State Integrated Research &amp; Extension (Smith-Lever)</b>	<b>Multi-State Integrated Research &amp; Extension (Hatch)</b>
	Plant Production Efficiency	Integrated Cropping System		X	
	Precision Agriculture	Site-specific agriculture			X
	Rangeland/Pasture Management	Forages for the 21 <sup>st</sup> Century		X	
<b>Goal 2</b>	Food Safety	Improving flavor analysis of food products			X
<b>Goal 3</b>	Human Health	Improving cancer therapies			X
	Human Health	Impact of dietary fats on human immune system			X
	Human Nutrition	Nutrition and Health—Health for Every Body	X	X	
<b>Goal 4</b>	Agricultural Waste Management	Reducing excess nutrients in poultry feed			X
	Animal Waste Management	Animal waste management	X	X	
	Forest crops	Chestnut production as an alternative crop			X
	Soil Quality	Evaluating soil properties with X-ray CT			X
	Water Quality, Soil Erosion, Land Use Planning, Natural Resources Management; Riparian Buffers	Watersheds Resource Education		X	
	Wildlife Mgmt	Assessing wildlife management of piping plovers			X
<b>Goal 5</b>	Children, Youth and Families at Risk	Adolescents at risk program	X		
	Children, Youth and Families at Risk	Building Strong Families	X		
	Children, Youth and Families at Risk	Family and Community Resource Program	X		
	Children, Youth and Families at Risk	School-Age Child Care & Out-of-School Time	X		
	Community Development	Community Development Academy	X		
	Community Development, Conflict Resolution	Building Community Through Public Deliberation	X		

	<b>Key Theme</b>	<b>Program Description</b>	<b>Multi-State Extension (Smith-Lever)</b>	<b>Multi -State Integrated Research &amp; Extension (Smith-Lever)</b>	<b>Multi-State Integrated Research &amp; Extension (Hatch)</b>
	Community Development, Farm Safety, Fire Safety, Workforce Safety	Community Emergency Management	X		
	Community Development, Impact of Change on Rural Communities	Alianzas: Building Inclusive Communities	X		
	Community Development, Impact of Change on Rural Communities	Community Decision Support	X		
	Community Development, Managing Change in Agriculture	Community Food Systems and Sustainable Agriculture Program	X		
	Leadership Training and Development	EXCEL	X		
	Tourism	Measuring quality in tourism			X
	Youth Development	Workforce Preparation/Information Technology Education for Youth and DESE After-school Computer Labs	X		
	Youth Development/4-H, Leadership	Youth Civic Engagement, Community Service-Learning and Leadership Development	X		

**Institution** University of Missouri  
**State** Missouri

### Actual Expenditures

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## Appendix C

**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 Missouri  
**State** Missouri

**Check one:** ☐ 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
Goal 1 (A) Integrated Cropping Systems	\$553,000	\$553,000	\$525,500	\$533,687	
Goal 1 (B) Forages and Livestock	\$170,000	\$170,000	\$157,700	\$126,770	
Goal 3 Improving Human Nutrition and Health	\$47,000	\$47,000	\$ 8,716***	\$ 12,500	
Goal 4 Watershed Resource Education	\$42,000	\$42,000	\$ 63,000	\$ 47,185	
Goal4 (B) Animal Waste Management	\$144,000	\$144,000	\$152,000	\$156,425	
<b>Total</b>	<b>\$956,000</b>	<b>\$956,000</b>	<b>\$906,916</b>	<b>\$876,567</b>	

\*\*\*includes: Family Nutrition Program

**Director**

Date \_\_\_\_\_

Form CSREES-REPT (2/00

## Appendix C

**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 Missouri  
**State** Missouri

Check one: ☐ 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
Goal 1 Integrated Cropping Systems	\$140,965	\$140,965	\$133,900	\$127,200	
Goal 1 Forages and Livestock	\$140,684	\$140,684	\$133,200	\$145,000	
Goal 3 Human Nutrition and Health	\$73,212	\$73,212	\$ 69,550***	\$ 72,000	
Goal 4 Water Quality	\$33,929	\$33,929	\$ 32,230	\$ 35,600	
Goal4 Animal Waste Management	\$37,340	\$37,340	\$ 35,470	\$ 39,250	
<b>Total</b>	\$426,130	\$426,130	\$404,350	\$419,050	

\*\*\*includes: Family Nutrition Program

Director

Date \_\_\_\_\_

**Form CSREES-REPT (2/00)**