

2006 Missouri Annual Report
University of Missouri and Lincoln University
Cooperative Extension and Research
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I. Planned Programs - Overview

1862 University of Missouri Extension

University of Missouri Extension 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 of Missouri 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 of Missouri Extension 21st Century Strategic Direction, <http://outreach.missouri.edu/about/21stcentury/index.html>.

University of Missouri 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 of Missouri 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

In the over-25-year history of Lincoln University’s Cooperative Research and Extension (LUCRE) programs, one goal continues to serve as the driving force for program development and implementation. That goal is reaching out to hard-to-reach Missouri citizens: rural and urban residents with limited social and economic resources. A significant sector of the state’s population still falls into this under-served group. Southeast Missouri, St. Louis and Kansas City are some specific areas of the state with higher percentages of underserved populations. In addition to this group, Missouri ranks very high in the nation in the percentage of older adults residing in the state. Minority individuals within this group have a much lower standard of living and have poor access to quality healthcare professionals. There is the need to provide necessary education to this audience, to ensure a healthy and productive life. In rural areas of the state the number of minority-owned farms has decreased significantly in the past decade. This has resulted in the migration of African Americans to urban areas around the country. This migration is believed to be a contributing factor to urban blight. There is a continuing need to provide educational programs on profitable farming methods and the benefits of a farming lifestyle to minority farmers to help stem the exodus of minority landowners from farming. This array of stakeholder needs among others, has helped shape the direction of Lincoln University’s Cooperative Research and Extension Programs.

As research and 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 is measured in terms of cost and time savings as it

relates to travel and reaching a broader audience. This new technology coupled with geographic information systems applications and our emphasis on collaborative research team efforts in the areas of animal science, human nutrition, plant and soil science and environmental science is helping our programs improve and grow to meet the unique needs of our stakeholders.

The 2005-2006 year was a time of continuing research projects and extensive planning and discussions to meet evolving and new stakeholder needs. Our primary focus is to reach more stakeholders than ever before with quality, life changing research results and applied programs.

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

University of Missouri Extension programming is based on the needs, aspirations and issues identified by the people in communities throughout the state. University of Missouri 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://osed.missouri.edu/>. University of Missouri 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 of Missouri Extension Strategic Direction.

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

- Economic Viability
- Strong Individuals, Families and Communities
- Healthy Environments

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

University of Missouri 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. These funds have been leveraged and integrated into priority programs in the five AREERA goal areas; therefore, this report includes program performance in the planned areas inclusive of federal, state, local and external funds.

Programs Addressing Underserved Learners

Several programs addressed the needs of underserved and under-represented populations of Missouri. 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 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 (e.g., discrimination, low pay, inadequate health insurance).

Diversity Accomplishments

The statewide Diversity Catalyst team continues to serve as a steering committee to assist the Director of Diversity with achieving diversity goals.

- Workforce Diversity - University of Missouri has continued to follow its recruitment and employment plan and as a result the workforce continues to diversify. In 2005, our workforce reflected 90 percent white and 10 percent minority. Currently, our workforce reflects 89 percent white and 11 percent minority. This shows an increase of the minority workforce of one percent.
- Climate Improvement - University of Missouri Extension employees participated in a statewide climate assessment approximately four years ago. The results of the survey indicated some issues existed that were impacting the workplace climate. To ensure a more positive workplace climate, Regional Climate Resource teams have been established in each of the eight regions in the state. The teams consist of administrators, regional faculty, paraprofessionals, and staff. Each team developed a climate improvement plan and they have begun implementation of their tailor-made plans. At monthly staff meetings, the team presents information or facilitates experiences that are designed to improve the workplace climate. A follow-up climate assessment will be disseminated to the workforce on February 26, 2007. Results will reflect changes to the climate in each of our state’s eight regions. Climate Improvement plans will be revised based upon assessment results.
- Audience Participation - We have designed a new reporting system to more accurately capture and assess audience participation data so we can ensure we are reaching the diverse audiences in our state. Each regional and state faculty member updated their plan of work to include specific strategies for reaching out to new or underserved audiences. State demographics indicate that 85.3 percent of the population is white, 12.6 percent is African American .4 percent is American Indian/Alaskan Native, .6 percent is Asian and 0 percent is Hawaiian or Pacific Islander. Hispanic populations make up 3.6 percent of the state’s population. Each statewide program director captured statewide data to determine our effectiveness in reaching out to all audiences within the state. An analysis of these data reveals all programs reach diverse audiences. We continue to move closer to reflecting the demographics of the state.
- Programs - We continue to expand our programming with Hispanic audiences. The Alianzas program, that is designed to reach Hispanic audiences and to increase the capacity of extension personnel to work with that audience, has expanded from serving three regions to serving all eight regions.

USDA Review and Future Goals

In July, 2006, the USDA Civil Rights Team conducted a week-long Civil Rights Review to assess policies, programs and employment practices. Results indicate the University of Missouri has been effective in achieving Civil Rights employment, training, programmatic, and outreach goals.

Goals for the coming year will be to 1) establish statewide training for all employees and volunteers, 2) reinstate internal civil rights reviews, and to 3) strengthen our data collection and reporting system to more accurately reflect learner demographics. A final goal will be to continue to strengthen our ties with Lincoln University, the other Missouri land-grant institution in our state. This will be achieved through the establishment of a work group to oversee joint programmatic efforts.

Stewardship of Resources

Table 1 and Chart 1 show the expenditures of University of Missouri Extension for the 2005-2006 programming year to be \$31,037,387 with \$8 million in federal Smith-Lever 3b & 3c funds. These dollars are critical to the core mission of University of Missouri Extension. This funding permits the flexibility to address emerging community issues, learner needs and to continue a relevant statewide community-based presence. The following report does not reflect the contributions of more than 16,000 volunteers involved in priority program development, implementation and evaluation.

| PROGRAMS | TOTAL |
|---|-------------------|
| Smith-Lever 3b&c | |
| Regular 3(b) and 3(c) | 7,663,741 |
| CSRS Retirement | 333,047 |
| Total 3b&c | 7,996,788 |
| Smith-Lever 3d | |
| Expanded Food and Nutrition | 1,624,429 |
| Cotton Pest Management | 1,674 |
| Integrated Pest Management | 203,808 |
| Total 3d | 1,829,911 |
| OTHER PROGRAM FUNDS: | |
| STATE | 14,001,543 |
| COUNTY | 4,882,825 |
| NON-TAX | 2,326,320 |
| LOCAL | 7,209,145 |
| FEDERAL (Other than Extension Administered) | 0 |
| TOTAL OTHER PROGRAM FUNDS | 21,210,688 |
| TOTAL ALL PROGRAMS | 31,037,387 |

Table 1: Cooperative Extension Expenditures of University of Missouri Extension for 2006

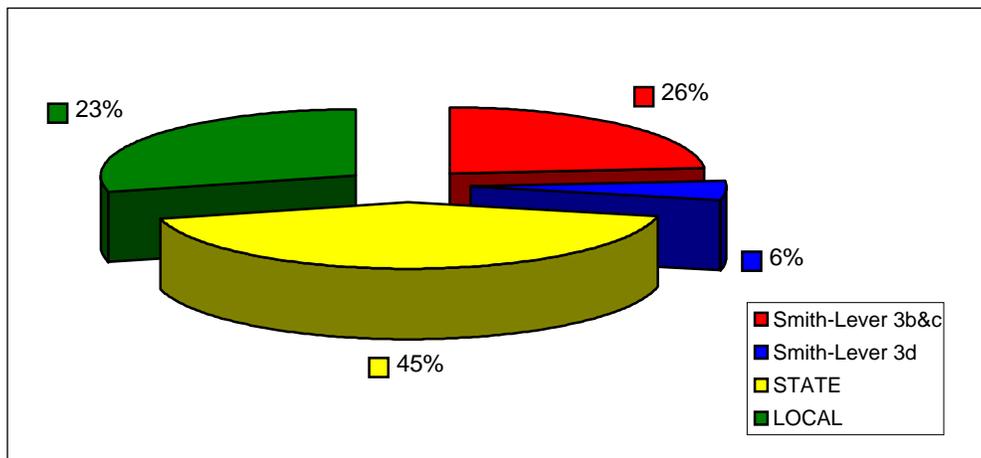


Chart 1: Cooperative Extension Expenditures of University of Missouri Extension for 2006 by Funding Source

Table 2 and Chart 2 show the overall expenditures of University of Missouri Agricultural Experiment Station for the 2006 programming year to be \$58,510,615 with \$3.6 million in federal Hatch funds.

| PROGRAMS (1862 Research) | TOTALS |
|----------------------------------|-------------------|
| FEDERAL | |
| CSREES | |
| Hatch | 3,644,417 |
| MRF | 767,757 |
| M-S | 442,829 |
| Grants | 5,069,143 |
| Other | 47,046 |
| Total CSREES | 9,971,192 |
| USDA | 8,979,874 |
| Other Federal | 7,052,975 |
| Total Federal | 16,032,849 |
| OTHER PROGRAM FUNDS: | |
| STATE | 21,409,487 |
| | |
| OTHER | |
| Income (fees) | 2,901,397 |
| Industry | 2,301,059 |
| Other Non-Federal | 5,894,631 |
| TOTAL OTHER PROGRAM FUNDS | 32,506,574 |
| TOTAL ALL PROGRAMS | 58,510,615 |

Table 2: Overall Expenditures of University of Missouri Agricultural Experiment Station for 2006

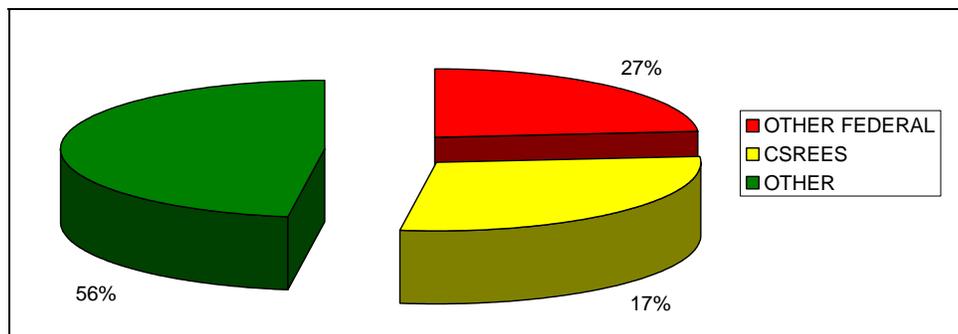


Chart 2: Overall Expenditure of University of Missouri Agricultural Experiment Station for 2006 by Funding Source

Table 3 and Chart 3 show University of Missouri Extension expenditures by Goal Area for 2006.

| | <i>2006 Planned</i> | <i>2006 Actual</i> |
|---------------------------------|---------------------|---------------------|
| Goal 1 | | |
| Integrated Cropping Systems | \$3,035,540 | \$3,153,750 |
| Forages | \$1,517,770 | \$1,576,875 |
| Prof Livestock Prod. | \$3,035,540 | \$3,153,750 |
| Total - Goal 1 | \$7,588,850 | \$7,884,375 |
| Goal 3 | | |
| Nutrition and Diet | \$988,500 | \$1,026,994 |
| Food Safety | \$131,800 | \$136,933 |
| Consumer Health | \$329,500 | \$342,331 |
| Total - Goal 3 | \$1,449,800 | \$1,506,258 |
| Goal 4 | | |
| Watersheds | \$461,930 | \$479,918 |
| Animal Waste | \$989,850 | \$1,028,397 |
| Nutrient Management | \$989,850 | \$1,028,397 |
| Total - Goal 4 | \$2,441,630 | \$2,536,712 |
| Goal 5 | | |
| Total Families programs | \$2,639,600 | \$2,742,391 |
| Total Youth and Vol. Leadership | \$3,035,540 | \$3,153,750 |
| Total - Goal 5 | \$5,675,140 | \$5,896,141 |
| TOTAL | \$17,155,420 | \$17,823,486 |

Table 3: University of Missouri Extension Expenditures by Goal Area for 2006
(This table represents expenditures of Smith Lever 3(b), 3(c), 3(d) and state match only.)

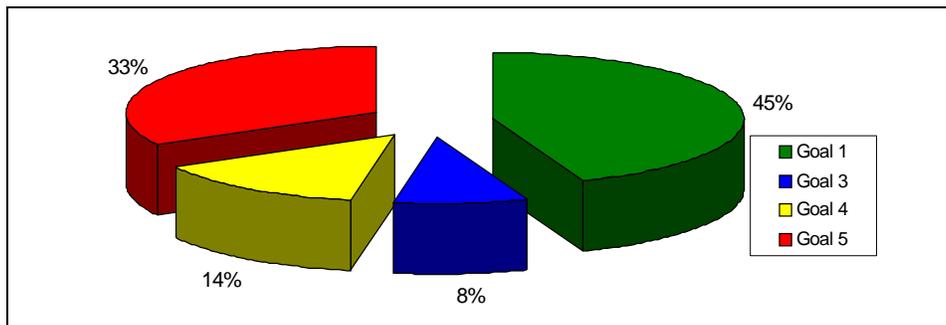


Chart 3: University of Missouri Extension Expenditures by Goal Area for 2006
(This table represents expenditures of Smith Lever 3(b), 3(c), 3(d) and state match only.)

Table 4 and Chart 4 show University of Missouri Agricultural Experiment Station expenditures by Goal Area for 2006.

| 1862 Research Expenditures by Goal Area | |
|--|--------------|
| Goal 1 | 42,595,728 |
| Goal 2 | 0 |
| Goal 3 | 1,696,808 |
| Goal 4 | 14,218,079 |
| Goal 5 | 0 |
| | \$58,510,615 |

Table 4: University of Missouri Agricultural Experiment Station Expenditures by Goal Area for 2006

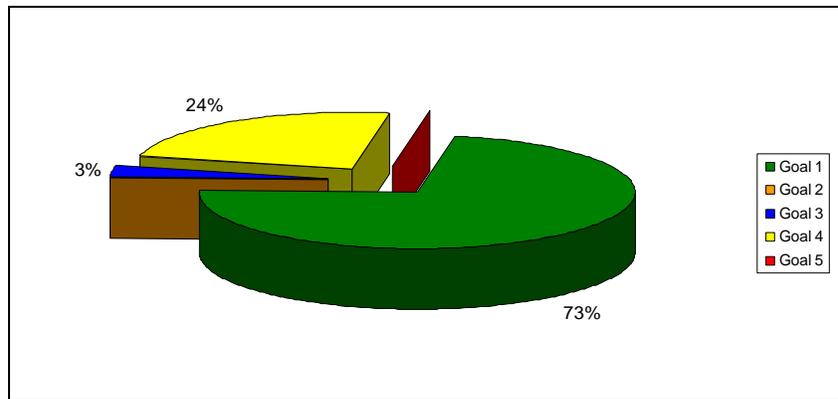


Chart 4: University of Missouri Agricultural Experiment Station Expenditures by Goal Area for 2006

Chart 5 shows the number and percentage of University of Missouri Extension faculty FTEs in each Goal Area for 2006.

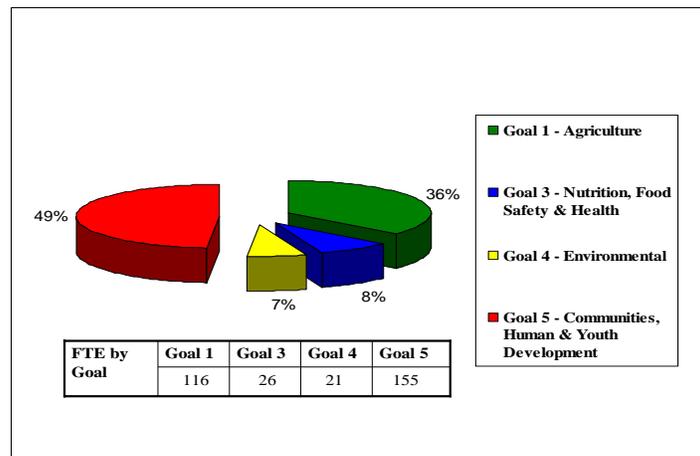


Chart 5: Percentage of FTEs by Goal

Chart 6 shows the total number of contacts with Missouri learners by Goal Area in 2006. 1.1 million contacts were documented. These contacts range from informational issues to major educational programs with sequenced learning over time. University of Missouri Extension has information, fact sheets and web-based series learning available on the web that are not reflected in this chart for 2006. In 2006, University of Missouri Extension distributed 1.5 million printed publications and web views of publications exceeded 20 million. Page views of other University of Missouri Extension web pages exceeded an additional 14 million.

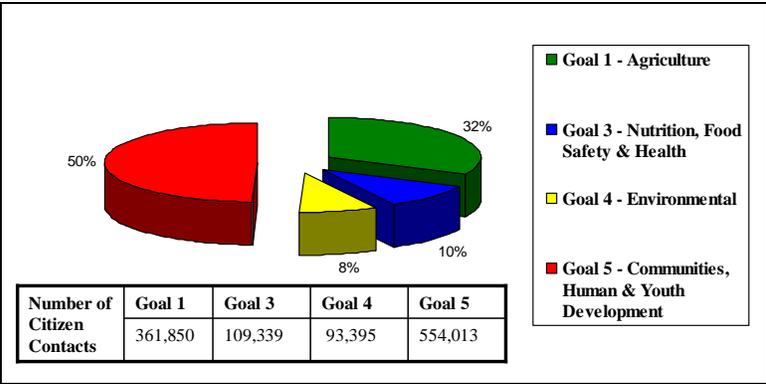


Chart 6: Percentage of Contacts by Goal

Chart 7 shows the total number of Missourians by Goal Area who were engaged in sequenced educational programming during 2006. The 223,718 learners represent approximately 4 percent of the state’s total population of 5.8 million. University of Missouri Extension has information, fact sheets and web-based series learning available on the web that are not reflected in this chart for 2006.

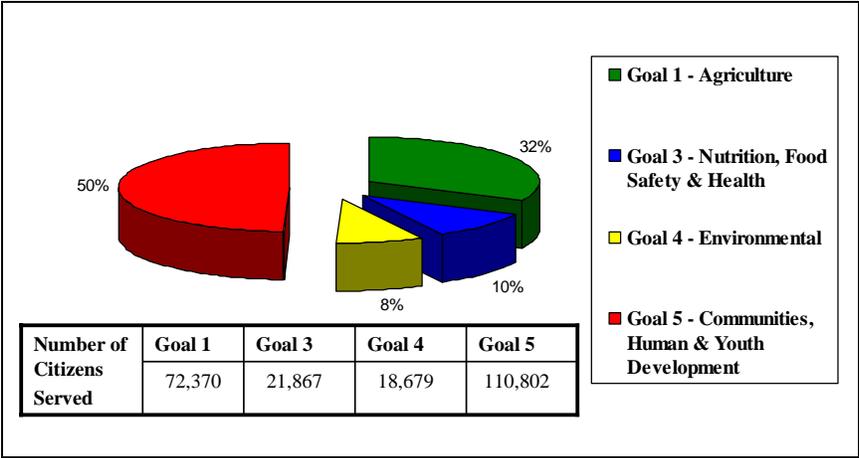


Chart 7: Percentage of Missourians Engaged in Sequential Learning by Goal

Lincoln University receives \$3,025,926 for Cooperative Extension and \$3,499,199 for Cooperative Research. In Cooperative Extension, these resources are allocated to Goals 1, 2 and 5. See Chart 8b. Table 8 and Chart 8a and 8b show Lincoln University 2006 Cooperative Extension funding by source and goal.

**Lincoln University Cooperative Extension FY2006 Financial Report
Extension Funding by Source**

| Programs | | Total |
|------------------------------|------------------------------------|-------------|
| Administration | Administration | \$1,229,142 |
| Goal 1: | Alternative Crops | \$168,613 |
| Goal 2: | Safe & Secure Food | \$116,219 |
| Goal 3: | Health & Well Nourished Population | \$0 |
| Goal 4: | Environmental Science | \$0 |
| Goal 5: | Quality of Life | \$1,511,952 |
| | Federal Extension Funds | \$2,000,340 |
| | State | \$662,313 |
| | Grant Funds | \$363,273 |
| Total all Programs/all Funds | | \$3,025,926 |

Table 8

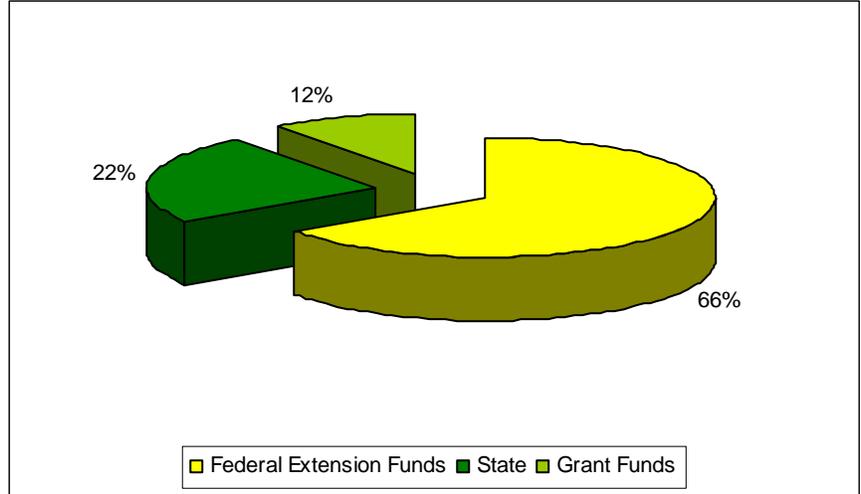


Chart 8a: Lincoln University 2006 Cooperative Extension funding by source

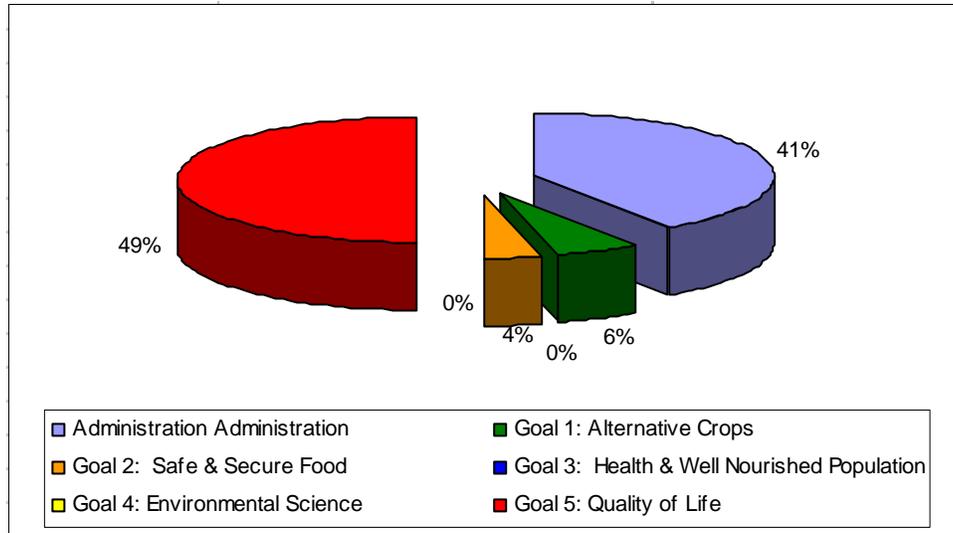


Chart 8b: Lincoln University 2006 Cooperative Extension funding by goal.

Table 9 and Chart 9a and 9b show Lincoln University 2006 Cooperative Research funding by source.

**Lincoln University Cooperative Research FY2006 Financial Report
Research Funding by Source**

| Programs | | Total |
|------------------------------|------------------------------------|-------------|
| Evans-Allen Funding | | |
| Administration | Administration | \$1,058,596 |
| Goal 1: | Alternative Crops | \$1,519,031 |
| Goal 2: | Safe & Secure Food | \$0 |
| Goal 3: | Health & Well Nourished Population | \$162,111 |
| Goal 4: | Environmental Science | \$759,461 |
| Goal 5: | Quality of Life | \$0 |
| | Federal | \$2,221,065 |
| | State | \$1,266,832 |
| | Grant Funds | \$11,302 |
| Total all Programs/all Funds | | \$3,499,199 |

Table 9

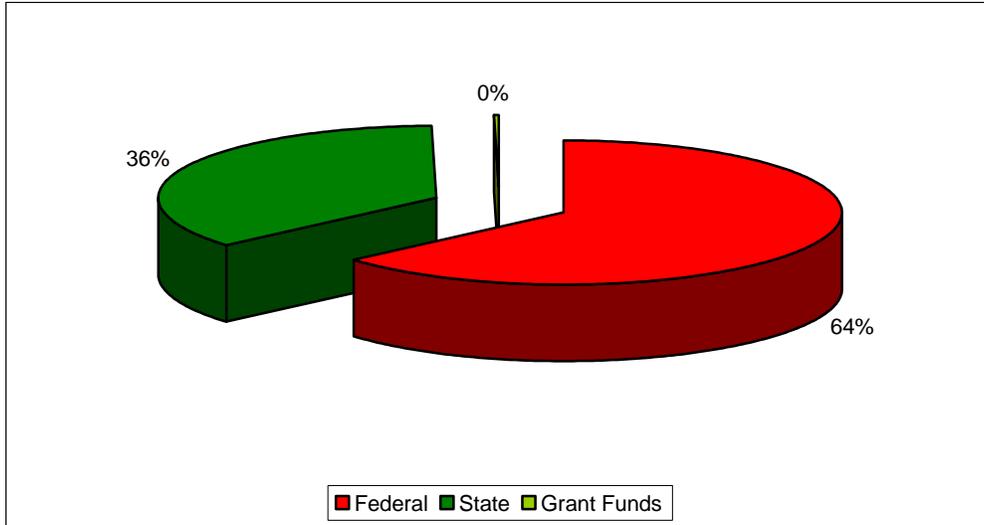


Chart 9a: Lincoln University 2006 Cooperative Research funding by source.

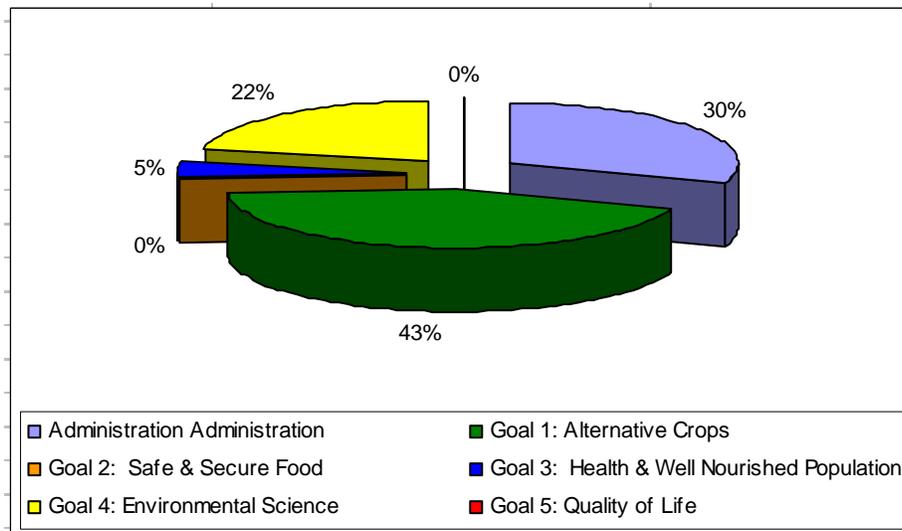


Chart 9b: Lincoln University 2006 Cooperative Research funding by Goal.

Table 10 and Chart 10 show the percentage of FTEs of faculty in each Goal for 2006.

**Lincoln University Cooperative Extension FY2006 Financial Report
Extension FTE % by Goal**

| Programs | | FTE% |
|----------------|------------------------------------|------|
| Extension | | |
| Administration | Administration | 24% |
| Goal 1: | Alternative Crops | 13% |
| Goal 2: | Safe & Secure Food | 2% |
| Goal 3: | Health & Well Nourished Population | 0% |
| Goal 4: | Environmental Science | 0% |
| Goal 5: | Quality of Life | 61% |

Table 10: Lincoln University Cooperative Extension Percentage of FTEs by Goal.

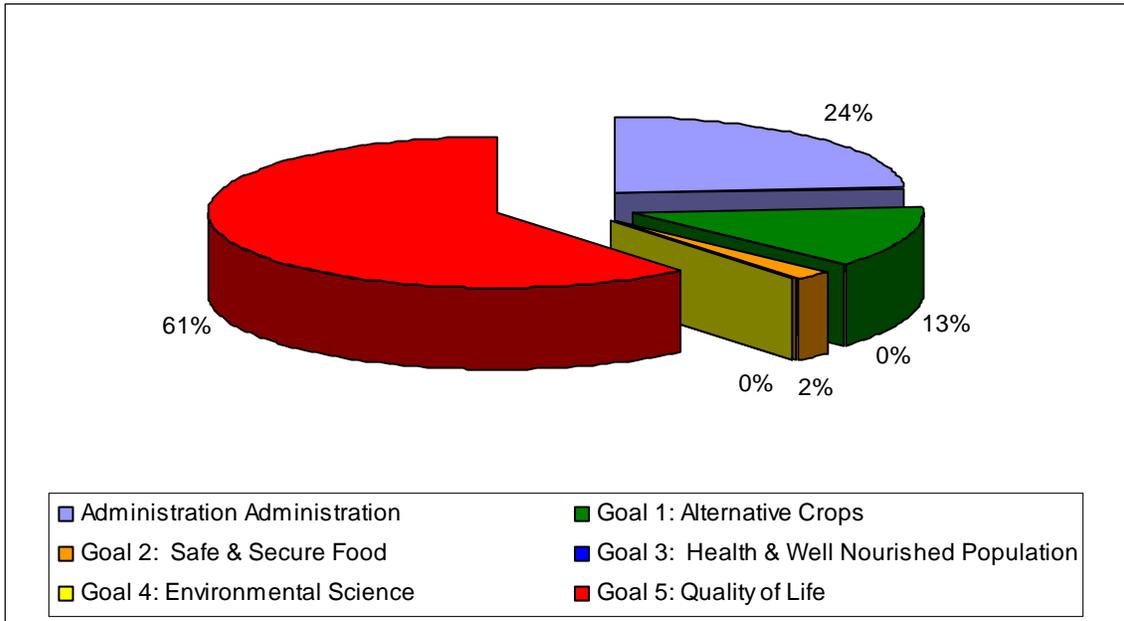


Chart 10: Lincoln University Cooperative Extension Percentage of FTEs by Goal.

**Lincoln University Cooperative Research FY2006 Financial Report
Research FTE % by Goal**

| Programs | | FTE% |
|----------------|------------------------------------|------|
| Evans-Allen | | |
| Administration | Administration | 19% |
| Goal 1: | Alternative Crops | 40% |
| Goal 2: | Safe & Secure Food | 0% |
| Goal 3: | Health & Well Nourished Population | 10% |
| Goal 4: | Environmental Science | 31% |
| Goal 5: | Quality of Life | 0% |

Table 11: Lincoln University Cooperative Research Percentage of FTEs by Goal

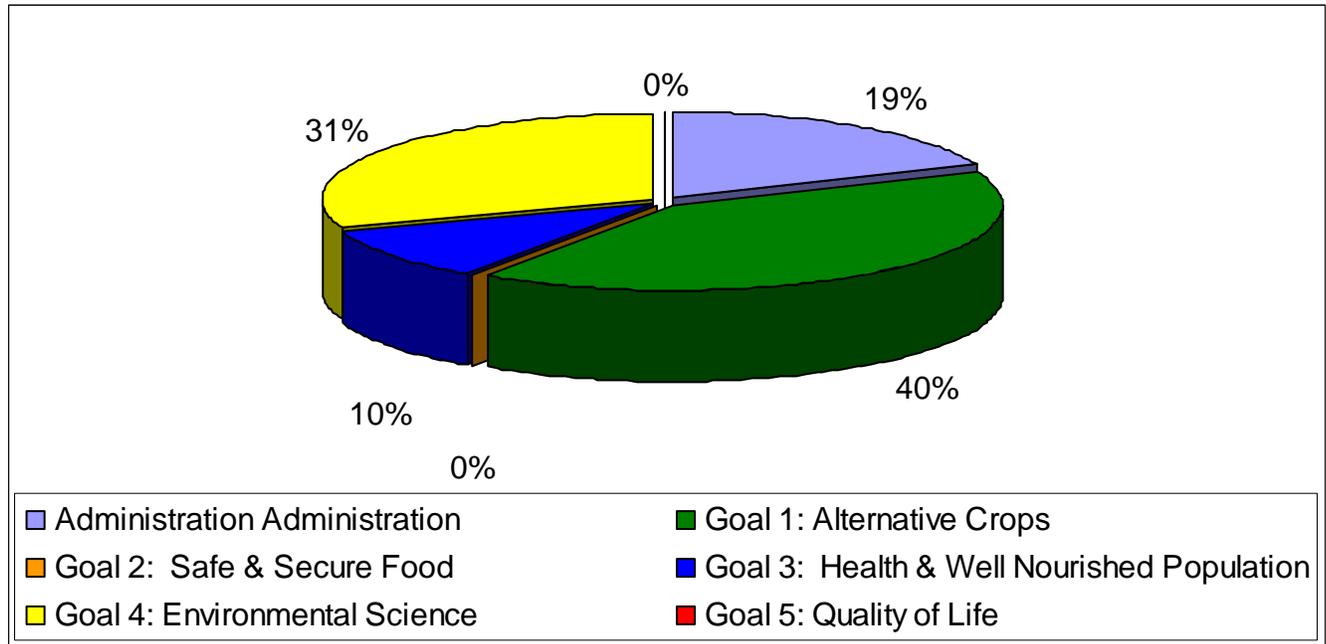


Chart 10: Lincoln University Cooperative Research Percentage of FTEs by Goal.

II. Report of Accomplishments

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

1862 Agricultural Experiment Station Research Overview

University of Missouri researchers work in animal and plant sciences to insure U.S. agriculture maintains its innovative position in a highly competitive global economy while at the same time incorporating environmental considerations into scientific development. In the area of animal production efficiency, researchers develop bovine diet formulations that improve feed efficiency as well as reduce waste volume and nitrogen excretion. Scientists investigate the use of phytase feed enzymes in swine feed to improve phosphorus absorption, thereby reducing the level of undesired phosphorus excretion into the environment. Investigators analyze the use of DDGS, a byproduct of ethanol production, as a protein feed supplement in feeding beef cattle. In the area of animal reproduction, scientists work to improve estrous synchronization in beef cattle to improve the usefulness of artificial insemination as a reproductive tool. Scientists conduct research work to better understand ovarian and follicular development in a critical step toward developing new treatments to improve fertility in domestic farm species.

In the area of plant production, researchers in plant genomics work to find genes for aflatoxin resistance in corn. Scientists study pollen recognition and rejection to improve understanding of how plants communicate with each other. Researchers work to develop alternative root rot resistance in soybeans. 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 high yield potential, while maintaining resistance to soybean cyst nematode. In forage crops, work is being done to increase pathogen resistance in grass and legume forages. In ornamental crop production, new methods that reduce cost and improve efficiency are being developed for trees and shrubs.

1890 Cooperative Research Overview

Lincoln University researchers continued work toward the goal of assisting Missouri farmers to compete successfully in the global economy. An ongoing issue for many of our small farm stakeholders is the changing markets in livestock production, economic crop markets and livestock maintenance costs. These issues helped direct the 2005 research projects of our animal and plant science research teams. These research teams are focusing on developing and testing alternative production options for small farms in the areas of aquaculture and alternative crops. They also initiated investigations on ways to help sheep and goat producers lower costs associated with the control of internal parasites by using herbs instead of traditional and more expensive commercial dewormers.

Trends over the past ten years reveal U.S. hog operations are declining steadily as production shifts from individual farmers to a relatively small number of very large firms. The number of swine operations in the United States has declined by about 5.7 percent per year, from over 1 million in 1967 to 157,450 in the last USDA survey conducted in the 1990s. This trend is reflected in the state of Missouri and many swine producers who have closed their operations are looking for alternative production operations. For this reason, Lincoln University Aquaculture research is taking a leadership role in the state in providing information and demonstrations of alternative production options for stakeholders seeking viable alternatives to traditional operations that are no longer economically feasible such as confined swine production. Indoor recirculating systems may

be a profitable option for farmers seeking alternative enterprises. This research will aid farmers in increasing productivity and in improving the economic viability of the small farm with the addition of an alternative crop – fish.

Not only are Lincoln University researchers providing information on fish production but also the diversity of our stakeholders requires additional work toward giving choices to small farm operators as to alternative and nontraditional crop production in Missouri. Our plant science research team focuses on investigating the viability of alternative crops to create niche markets that will aid the economic viability of Missouri's small farms. Results from this ongoing study will help farmers avoid trial and error losses by providing specific economic and production potential and best practices for various crops.

The maintenance of healthy animals is a major concern of small farmers investing in sheep and goat production. High quality meat, not contaminated with drugs and other compounds of concern to the consumer, is beneficial for promoting lamb and kid consumption. Using herbs for a dewormer will give the producer greater confidence in marketing lamb and goat meat that not only contains high quality protein and low fat content, but is also, drug-free.

1862 University of Missouri 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 under-served and under-reached agricultural producers of Missouri to enhance and maximize benefits from, and participation in, the global economy. Programming efforts under Goal 2 in 2004-2005 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 the use of new technology to open competitive markets to Missouri farmers.

1862 Agricultural Experiment Station Research – University of Missouri-Columbia

Key Theme: Animal Production Efficiency

- a. Description: Improving feed efficiency with reduced environmental impacts. University of Missouri researchers are investigating new diet formulations to improve feed efficiency in cattle. In addition, objectives include reducing waste volume, nitrogen excretion and malodor. Developing improved

rations that reduce feed costs and reduce nitrogen excretion have both economical and environmental benefits.

- b. Impact: Research was completed demonstrating improvements in feed efficiency and growth rate, and reduction in waste volume via diet formulation changes. Research also demonstrated the majority of feed efficiency differences among animals can be explained by mitochondrial respiration rate, and that respiration rate should be measurable via harvesting mitochondria from lymphocytes in the blood. Research also demonstrated effective energy equations were superior to net energy calculations in describing growth rate of cattle and predicting intake.
- c. Source of Funds: Hatch, Grants
- d. Scope of Impact: Multi State

Key Theme: Animal Production Efficiency

- a. Description: Evaluating low-phytic acid grains fed to swine. Investigators conduct experiments on weanling swine to evaluate the efficacy of a new phytase feed enzyme derived from e-coli for the purpose of reducing phosphorus supplementation in low-phosphorus diets, thereby reducing the excretion of phosphorus in swine manure.
- b. Impact: Performance criteria for evaluation included animal growth performance, bone breaking strength, and mineral balance for phosphorus, calcium, magnesium, iron, copper, and zinc. Results indicate the new phytase enzyme derived from e-coli was highly efficacious in significantly improving animal growth, bone and mineral balance. In addition, phosphorus excretion in manure was significantly reduced, thereby reducing the quantity of potential pollutants in animal waste.
- c. Source of Funds: Hatch, Grants
- d. Scope of Impact: Multi State

Key Theme: Animal Production Efficiency

- a. Description: Feed supplement. Distiller dried grain supplement (DDGS) is a byproduct of ethanol production and a protein feed supplement that can be substituted for soybean meal in cattle diets. DDGS is a common additive in dairy rations and research was conducted to evaluate its economical potential in beef heifer and steer production.
- b. Impact: Studies were conducted to evaluate DDGS in corn / corn silage diet. In addition, a grazing study was performed to determine optimal levels of DDGS for growing heifers grazing tall fescue. The main impact of DDGS was to improve the flow of amino acids post-rationally in steers fed a forage based diet. DDGS was found to be a more economical protein source than soybean meal in terms of gain and cost per pound of gain. Utilizing this byproduct of ethanol production has the potential to reduce cattle producers' costs while maintaining the rate of gain.
- c. Source of Funds: Hatch, Grants
- d. Scope of Impact: Multi State

Key Theme: Animal Production Efficiency

- a. Description: Improving reproductive efficiency. Reproductive rates are a key factor in the profitability of beef production. University of Missouri scientists conduct research to understand the endocrine, cellular and molecular mechanisms that regulate ovarian function in cattle. Ovarian follicular growth in cattle is a dynamic process which is characterized by waves of follicular growth whereby a cohort of follicles (usually 3 to 6 in number) are recruited to grow beyond 4 mm in diameter.
- b. Impact: New genes associated with follicular selection were found. Three clusters associated with major histocompatibility antigens, extracellular matrix remodeling and cell adhesion and migration were found. mRNA and protein for the estrogen receptors and P450aromatase enzyme were found to be expressed in fetal ovaries during ovarian and follicular development. Understanding ovarian and follicular development and mechanisms regulating their function are important to development of new treatments to improve fertility in domestic farm species.
- c. Source of Funds: Hatch, Grants
- d. Scope of Impact: Multi State

Key Theme: Animal Production Efficiency

- a. Description: Improving estrus synchronization in cattle. The inability to predict time of estrus for individual females in a group often makes it impractical to use AI because of labor required for estrous detection. The development of an economical method to artificially inseminate beef cows and heifers at a fixed time with high fertility will increase the adoption of AI in beef herds. Expanded use of AI and/or adoption of emerging reproductive technologies for beef and dairy cows and heifers will require precise methods of ovulation control.
- b. Impact: Effective control of ovulation requires synchronization of ovarian function. Scientists working to develop a more effective timed insemination protocol have focused recently on synchronizing follicular waves and ovulation by injecting GnRH followed 7 days later by injection of PG and a second GnRH injection two days after the PG injection. A deeper understanding of these mechanisms will lead to improved methods of synchronizing estrous and thereby improving the efficacy of AI in beef cows.
- c. Source of Funds: Hatch, Grants
- d. Scope of Impact: Multi State

Key Theme: Plant Genomics

- a. Description: Aflatoxin in corn. Aflatoxin is a chemical by-product of the growth of the fungus *Aspergillus flavus* on corn kernels. Because it can be harmful to animals ingesting it, corn containing high aflatoxin levels may be rejected at grain elevators. Research is being conducted to identify genes for *Aspergillus flavus* resistance and aflatoxin reduction in maize.
- b. Impact: Researchers have identified four compounds that affect *Aspergillus flavus* growth in culture. They have collected the samples and are currently processing them to perform association analysis on genes in one of these pathways. Reducing aflatoxin contamination in corn will reduce crop loss for producers and reduce the potential for liver cancer in humans with long-term exposure.

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

Key Theme: Plant Genomics

- a. Description: Analysis of pollen rejection to reduce unintended pollination between species. There is growing concern over the possibility that genetically modified plants in agricultural production will cross pollinate with wild plants. Researchers work towards understanding the molecular basis for pollen recognition and rejection. A major goal is to identify new factors that contribute to S-RNase-based pollen rejection.
- b. Impact: This research will lead to a better understanding of how plant cells communicate with each other. This knowledge is important in an agricultural context because such communication is central to plant growth and hence productivity. This work is focused on mechanisms that control pollen flow within and between species. Results are directly relevant to agricultural biotechnology where there is concern over gene flow between GMO crops and wild plants.
- c. Source of Funds: Hatch, Grants
- d. Scope of Impact: Multi State

Key Theme: Plant Health

- a. 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. University of Missouri scientists work in the selection and expression of defense peptides that disrupt life-stage progression in Phytophthora (Phytophthora root rot of soybean).
- b. Impact: Researchers succeeded in proving bioactive peptides selected against *P. capsici* can be applied as defense peptides in plants. The peptides were originally selected from combinatorial libraries and screened for their ability to disrupt the normal development of *P. capsici*. To prove their defensive nature, scientists fused them to a naturally occurring plant protein, cytokinin dehydrogenase, and introduced them into hairy root cultures of tomato, a host of *P. capsici*. Researchers were able to show the protein was expressed in roots, and it was secreted into culture medium where it accumulated to sufficient concentration to block pathogen development and significantly reduce root infection. 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.
- c. Source of Funds: Hatch, Grants
- d. Scope of Impact: Multi State

Key Theme: Plant Germplasm

- a. Description: Developing improved soybean lines. Scientists work to develop maturity Group IV and V soybean varieties and germplasm lines with high yield potential and resistance to soybean cyst nematode (SCN) as well as other diseases. Other improvements, including herbicide resistance, flood tolerance, and enhanced protein and oil properties are also being developed.
- b. Impact: Twenty three productive SCN resistant Roundup Ready lines with maturities ranging from late group III to mid-group V have been developed and selected for advancement to the 2006 Uniform Regional Preliminary Soybean trials for broad scale testing. Yield exceeded yield of popular varieties in 2005 Delta Center tests. Several lines have been developed which combine frogeye leaf spot resistance with broad SCN resistance and root knot nematode resistance. Development of productive, SCN resistant varieties and germplasm is aimed at reducing 150 to 200 M bushel losses per year in the USA. SCN resistant varieties and germplasm releases from our program are being widely used by soybean breeders to develop soybean cultivars for resistance to SCN races 1, 2 and 5 which are becoming prevalent in Missouri and other states.
- c. Source of Funds: Hatch, Grants
- d. Scope of Impact: Multi State

Key Theme: Plant Production Efficiency

- a. Description: Biochemical defense systems in forage crops. Researchers at the University of Missouri work to develop grass and legume germplasm with increased resistance to plant pathogens. The objectives are to identify natural plant products in endophyte-free tall fescue and birdsfoot trefoil that are markers and mechanisms against nematodes and fungal pathogens. Current objectives involve identification and quantification of antimicrobial chitinases, as well as the screening of tall fescue and birdsfoot trefoil germplasm with elevated levels of these and related defense products.
- b. Impact: Results will lead to more persistent endophyte-free tall fescue and birdsfoot trefoil. Both endophyte-free tall fescue and birdsfoot trefoil are highly nutritional to livestock, but they are also susceptible to a wide range of pathogens. Their increased persistence would come from natural plant products that are directly active against plant pathogens and/or that serve as markers for more complex defense systems.
- c. Source of Funds: Hatch, Grants
- d. Scope of Impact: Multi State

Key Theme: Ornamental/Green Agriculture

- a. Description: Developing bare root systems for ornamental plants. Researchers are using innovative approaches to producing nursery stock at lower costs. The Missouri Gravel Bed technique facilitates the planting of trees and shrubs bare root (without a soil ball). Bare root plants are less expensive to harvest and ship and are easier to handle than plants harvested with a ball of soil (balled and burlapped).
- b. Impact: Until recently, it was assumed bare root plants had to be planted while in the dormant condition, which greatly restricts the planting season. Results of this project have shown trees and shrubs can be placed in a bed of pea gravel when dormant and then removed for planting bare root at

any time of the year with survival rates equal to or better than those for container grown or balled and burlapped plants. The most recent results indicate incorporating kiln-fired clay particles into the gravel bed reduces water use and improves plant growth. This will make it easier to establish and manage a gravel bed and thus more attractive as a tool for planting of bare root nursery stock.

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

1890 Cooperative Research Programs — Lincoln University

Key Theme: Alternative Crops

- a. Description: An evaluation of the potential for the production of alternative and nontraditional crops in Missouri. The ongoing research by the Lincoln University Plant Science team is focused on increasing the viability of the limited resource farmer and the profitability of the small farmer who relies on the sales of horticultural crops as economic sources. Horticultural crops are most attractive to the small-scale producer because they produce high returns per unit land area. Basic research data in regard to management strategies for sweet potato production in Missouri is compiled annually and is shared with our small-farm stakeholders. Background investigations of irrigation and fertilization regimens at various stages of growth for more than fifteen varieties of sweet potato have been conducted. Results revealed a sweet potato variety known as *Beauregard* performed superior to all other varieties including the commonly grown varieties of *Jewel* and *Centennial* under Missouri conditions. In addition to our sweet potato studies, growing season investigations of the growth potential for selected medicinal plants were initiated and will continue to determine the potential growth and adaptation to central Missouri climatic conditions. Preliminary results indicate fifty percent of the plants studied showed some positive adaptation to Central Missouri.
- b. Impact: Research data revealed continuous irrigation during the growth cycle of any tested variety had no significant effect on yield. However, irrigation started at least 90 days into the growth cycle promoted better yield when compared with the economic investment. This finding is significant because continuous irrigation of any crop can have negative economic impacts for the small farmer. Irrigating later in the growth cycle had a positive impact on yields resulting in more positive economic returns in terms of cost savings for water usage and decreased crop loss from root rot. Results of this research were presented to more than one hundred stakeholders at state and regional conferences and workshops. Small farmers adopting the recommended irrigation regimen conserve considerable amounts of water and reduce associated utility costs.

Medicinal herbs when marketed in niche markets will provide small farmers with information on herbs suitable to cultivate in Missouri, potential for developing into health food supplement with medicinal values, and cultivation and processing tips. This project will impact small farmers on the decisions made on the alternative crops and potential incomes.

- c. Source of Federal Funds: Evans-Allen, State
- d. Scope of Impact: Statewide and Regional

Key Theme: Aquaculture

- a. **Description:** Investigating an indoor water recirculating aquaculture system for the production of bluegill sunfish, *Lepomis* species. Re-circulating aquaculture systems have low water requirements, low land requirements and provide the ability to control water temperature and water quality. Because the system is indoors it provides independence from adverse weather conditions. The initial work of the aquaculture research team was to design and test the most economic and efficient indoor recirculating system that will provide an environment that will promote production of bluegill at an optimum rate. Factors studied include: water quality and fate throughout a re-circulating system; relationship of water quality to fish production and consumption rates as a basis for quantifying efficiency of feed utilization by selected fish populations. Results of this study have been compiled for dissemination at conferences and stakeholder workshops. The aquaculture facility is open for stakeholder demonstrations. Comparative studies of how an indoor system can be utilized to compliment or increase production in pond aquaculture systems have been initiated.
- b. **Impact:** Demonstrations and workshops have provided new and useful information to small-farm stakeholders in central and southeast Missouri and more than fifteen (15) Cole County, Missouri students participating in a high school agriculture technical program. Small farmers who have abandoned indoor swine production operations as a result of economic losses are now considering alternative utilizations for their swine facilities. Demonstrations and guidance by the Lincoln University aquaculture team can help these farmers save up to 50 percent of the initial start-up cost which can range from as low as \$25,000 for small systems to more than \$100,000 for larger systems. This research has shown such high start-up cost and associated fish loss risks can be reduced by incorporating the methods and technologies developed by the Lincoln University aquaculture research team. Our research has shown low-input recirculating systems can be economically and efficiently designed for minimal fish loss and maximum production to serve as new economic sources for small farmers desiring to enter niche fish markets.
- c. **Source of Funds:** Evans-Allen and State Funds
- d. **Scope of Impact:** State Specific

Key Theme: Grazing Animal Health

- a. **Description:** A study of the control of internal parasites and coccidia in small ruminants through the use of herbs and natural plants treatments. Sheep, goats, wool, mohair and the associated industries are growing agricultural enterprises in Missouri and many stakeholders are looking for ways to increase economic returns for their investments in small ruminants. Sheep and goats are great foragers of browse plants that grow all over the state of Missouri and in some cases are considered a nuisance by farmers. Sheep prefer forbs (weeds) to grass and they can clean up weeds in areas that then allow grass to grow effectively, making the small farmers more money. That leaves acreages for cattle to come in and graze grass and graze comfortably with the sheep and goats with the farmer benefiting and ultimately the consumer getting high quality meat on the table. Unfortunately, internal parasites are a big problem in sheep and goats. Parasites can cause death and they are expensive to control because of the high costs of commercial dewormers. Internal parasites are especially serious problems in sheep and goats during the summer months when temperature and humidity is high. To address the health concerns and cost associated with parasites in small ruminants a novel investigation has been initiated to determine if selected herbal treatments could have deworming abilities. The effectiveness of selected herbs, a blend of wormwood (*Artemisia* sp.), fennel (*Foeniculum vulgare*), gentian (*Gentian* sp), psyllium (*Plantago* sp.), and quassia (*quassia* sp.) were compared to the commercial dewormer, ivermectin (Ivomec).

- b. **Impact:** Internal parasites pose a real threat to sheep and goat producers in the Midwest, especially in the summer months. The strongylid parasite worm *Hoemonchus contortus* is the big killer due to its blood sucking in the abomasum that results in anemic animals that are then victims to many diseases. Stakeholders have interest in this research because of the potential to improve animal health and produce high quality meat without the use of commercial dewormers. Some commercial dewormers reduce reproductive rates and many require one to two week withdrawal periods prior to the butchering of animals. Natural herbs may not have these associated effects and could be very economical when farmers raise their own herbal crops. Early results of the investigations indicate that different breeds of sheep and goats are reacting differently to the commercial Ivomec and herbs over time with the herbal blend showing some positive deworming results. Many goat producers in Missouri have started growing herbs and feeding them to their animals for the purpose of deworming. In some cases the expense associated with the cost of commercial dewormers has been cut 50 percent thus, providing savings to the producer. Additionally, the labor (catching, and restraining animals; injection of drugs) required to administer commercial dewormers is eliminated because herbs can be fed directly to the animals.
- c. **Source of Funds:** Evans-Allen and State Funds
- d. **Scope of Impact:** State Specific

1862 University of Missouri Extension

Key Theme: Adding Value to New and Old Agricultural Products

- a. **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 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 six 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.
- b. 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 in 2005 and 2006 amounted to \$3.7 million.
 - Missouri producers have obtained 63 producer value-added grants over the past five years. Only producers in Iowa and California have been awarded more grants.
 - Provided advisory board support for the start-up of the 45 million gallon/year Missouri Ethanol plant in Laddonia, MO.
 - Provided advisory board support for the capitalization of the 20 million gallon/year Prairie Pride Biodiesel plant in southwest Missouri.
 - Assisting in planning stages of a co-located ethanol processing facility near the Prairie Pride Biodiesel plant.
 - Facilitated the relocation and expansion of New Zealand dairies into southwest Missouri.
 - Provided goat meat marketing assistance, which indicated an infeasible market.
 - Provided grant writing for Northern Missouri Pecan in their efforts to build a processing/cleaning plant in southwest Missouri.
 - Provided facilitation support for central Missouri goat producers interested in capitalizing a goat auction.
 - Received grant dollars and oversaw development of a business plan for a producer-owned rice processing facility in southeast Missouri.
 - Developed a local road map for developing a producer-owned soybean crushing plant in southeast Missouri.
 - Assisting in market development of Missouri Show-Me Heifers to expand markets beyond Missouri border.
 - Providing technical assistance for developing niche market for paddlefish flesh. Also working to enhance water owner ability to contract water for paddlefish ranching.
 - Assisted large Missouri cooperative with strategic planning for developing a quality and sourced focused beef supply chain.
- c. Source of Funds: Smith-Lever, NRI, State, USDA-Rural Development, Kellogg Foundation
- d. Scope of Impact: Missouri

Key Theme: Animal Production Efficiency

- a. 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:

- 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, websites, 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/>).
- 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>).
- 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. Impact: The Profitable and Sustainable Livestock Production Utilization System is a multistate extension program. The following impacts of the program are specific to Missouri:
- Ten Premier Beef marketing cooperatives are active in Missouri, representing 150 farms and 7,000 feeder cattle annually. Marketing feeder calves through the cooperatives has added \$45 per head to the value of those feeder calves. The total net economic impact of the program is estimated at more than \$315,000 annually. A website has been developed for beef producers interested in learning about Premier Beef: http://agebbfp.missouri.edu/commag/beefanddairy/pb_index.htm.
 - A comprehensive audit of the Missouri beef industry was completed in 2005. The primary purpose of the audit was to identify competitive advantages and challenges facing the beef industry and beef producers in Missouri: (<http://agebb.missouri.edu/commag/beef/audit/index.htm>).

- 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, 50 regional meetings have been conducted, through which 400 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.
- Forage Systems Research Center (FSRC) Grazing Schools teach curricula related to livestock nutrition on pasture, pasture management and herd health. Each three-day school reached a broad target audience of 40 to 60 people, including beef, sheep, and dairy producers; extension specialists; conservation agents; and veterinarians. This educational event is internationally recognized, with participants from 43 states and 9 foreign countries.
- The Byproduct Feed List is a weekly compendium of prices and delivery options provided by approximately 40 retailers of byproduct livestock feeds from Missouri and neighboring states. It was created to assist livestock producers in locating and exploiting low-cost feed ingredients. Associated with the Byproduct Feed List is a downloadable spreadsheet - Comparative Feed Value Calculator - that compares the monetary value of byproduct feeds with standard reference feedstuffs (corn, soybean meal, limestone and dicalcium phosphate). This allows beef and dairy producers to calculate the economic value of a byproduct feed purchase in relation to current market prices and the nutrient content of the standard reference feedstuffs. Both the feed list and the feed value calculator are available online at <http://agebb.missouri.edu/dairy/index.htm>.
- The MO-Pork program provided educational programs and on-farm consulting to more than 200 Missouri family swine operations, representing nearly 80 percent of Missouri’s pork production. The MO-Pork program resulted in an estimated 25 percent reduction in total feed costs and a corresponding economic boost of more than \$5 million to the Missouri economy.
- A comprehensive audit of the Missouri swine industry was completed in 2005. The primary purpose of the audit was to identify competitive advantages and challenges facing the swine industry and pork producers in Missouri:
(<http://agebb.missouri.edu/commag/swine/audit/index.htm>).
- More than 90 Missouri pork producers and young people attended a short course on “In the Show Ring: Topics for Youth 4-H and FFA Exhibitors” about Food Safety and Quality Assurance, Showmanship, Nutrition, Genetic Selection/Evaluation and Health during the Missouri Pork Expo.
- More than 1,000 young people participated in swine educational programs, including the Pork Institute, Youth Pork Quality Assurance, MO Pork Expo Quiz Bowl and the Swine Skillathon. The Pork Institute has been in operation for 19 years and has awarded 38 scholarships. Of the students who received those scholarships, 28 used the scholarships to attend the University of Missouri College of Agriculture Food and Natural Resources and 20 have graduated, 5 are current students and 3 plan to enroll within the next two years.
- The Missouri Show Me Quality Assurance Program has been developed to educate all Missouri youths (4-H and FFA) who exhibit food-producing animals (beef, swine, dairy, sheep, goats, poultry, and rabbits) about raising a high-quality, safe food product for consumers. More than 50 University of Missouri Extension specialists and 400 career and technical agriculture instructors have been trained to provide the educational training to Missouri young people. The estimated audience will exceed 10,000 in 2006.
- The 2006 Missouri State Fair Growth and Quality Barrow Classic added a new component of pork quality to lean gain per day and live placing components to the contest. The Classic combines aspects of pork production to ensure profitability for producers and a high-quality food product for consumers. The Classic is for both youth and adult pork producers. Participation increased by 23 percent from last year (2005), and nine different purebred breeds

were exhibited (one more than last year). Growth performance of the pigs has improved by 8 percent (29 percent since the initiation of the program), and carcass merit has improved by 20 percent from last year (40 percent since the initiation of the program).

- 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 500 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.
- Those Missouri pork producers who have developed and implemented a CNMP for their operations are optimizing feed efficiency and avoiding over-formulation of diets. These changes have 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.
- Producers who implement a CNMP are eligible to receive cost-share dollars from the Environmental Quality Incentives Program (EQIP) administered by the Natural Resources Conservation Service. In 2005, Missouri allocated more than \$15 million to producers to incorporate enhanced environmental stewardship.
- It is estimated well over 80 percent of Missouri farms use artificial insemination. Missouri is ahead of the national average. This procedure has become common on the majority of commercial farms, but still remains problematic for small farms. Nearly all pigs representing rare breeds are on small farms, many with only one boar. Additionally, many of the noncommercial breeds have become rare enough that finding other breeders at all, much less in the same state, can prove difficult. A two-day workshop was offered in the collection and processing of semen for small farms with one to ten boars and only one full-time pig farmer. As payment for the two-day workshop, participants agreed to take the practical experience they gained and use it to collect semen to send to the USDA National Animal Germplasm Preservation laboratory in Fort Collins, Colorado. Additionally, they learned to collect, extend and ship swine semen among themselves, facilitating artificial insemination among breeders.
- The University of Missouri Integrated Project (research and extension) is exploring the “development and application of precise methods of boar semen evaluation” methods. The extension component is focused on development of a comprehensive educational program for veterinarians, AI staff, veterinary students and animal science students in boar semen evaluation. The U.S. pork industry will be the major benefactor of this project, as the increase of average litter size by one piglet can generate an additional revenue of \$135 million for producers annually. Additionally, the reduction of seasonal losses in reproductive performance due to heat stress can save the same producers an additional \$41 million annually.
- University of Missouri Veterinary Extension was funded by USDA-APHIS to collect samples from 12 participating pork production units in Missouri as part of the Collaboration in Animal Health and Food Safety Epidemiology (CAHFSE) study. The objective of the study is to monitor pathogen resistance patterns and their changes in the presence of approved antimicrobial compounds over the course of time. Traditionally, the state veterinarian’s office in each state has participated in these studies. This is a unique opportunity for the Missouri extension program to partner with swine practitioners in Missouri and to educate the 30 participating producers on the principles of epidemiology and pathogen surveillance.
- The goal for the Show-Me-Select (SMS) program is to raise genetically superior animals that bring higher prices and create a reliable source of replacement heifers. Since the beginning of the program in 1996, extension specialists have worked with a total of 184 veterinarians, 73,022 heifers and 612 producers. During this time, 17,598 heifers have been sold through Show-Me-

Select replacement heifer sales across Missouri, with gross sales of \$18,769,917. In addition, 5,965 producers have registered to buy heifers at the SMS replacement heifer sales.

- Producers from 102 of the 114 (90%) counties in Missouri have enrolled heifers in the Show-Me-Select Program. Producers from 104 of the 114 (97%) Missouri counties have purchased heifers from Show-Me-Select Replacement Heifer Program sales.
- 60 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.
- At the 2006 Show-Me-Select replacement heifer sales, 1,873 heifers sold for an average of \$1,269 per heifer.
- The cost of producing the 73,022 SMS heifers enrolled in the program to date exceeds \$50 million. Because this money flows back to input suppliers, rural businesses and sale barns, the program stimulates economic activity on farms and in rural communities in many ways. The overall economic impact of the program exceeds \$3.5 million annually.
- Reproductive management workshops were held during the winter of 2006 at Chillicothe, Cameron, Marshall, Concordia, Savanna, and the Southeast and South Central Regions. These workshops reviewed newly developed protocols to synchronize estrus before artificial insemination for replacement beef heifers and postpartum cows.
- D. J. Patterson and M. F. Smith were the recipients of the first USDA-NRI (2005) competitive grant in Reproductive Efficiency (\$367,806) with a proposal entitled “An integrated approach to development and application of precise methods of estrous cycle control for beef heifers and cows.” This proposal integrates research, outreach, and education objectives to augment current understanding of reproductive biology and manipulation of the estrous cycle in the beef heifer, concomitant with the transfer of existing methods that precisely control the time of ovulation relative to fixed-time AI in postpartum beef cows. The specific aims of the proposal facilitate implementation of integrated animal production systems that will contribute to sustainability of the animal production unit and are a key to future application of biotechnologies in the beef cattle sector. Result demonstrations included fixed-time insemination were conducted on ten farms in Missouri involving more than 1,500 cows.
- Two educational workshops hosted by the North Central Region Bovine Reproductive Task Force and supported by the Beef Reproductive Leadership Team, entitled “Applied Reproductive Strategies in Beef Cattle (ARSBC)” were held in 2006. These workshops are designed to improve understanding of the physiological processes of the estrous cycle, the procedures available to synchronize estrus and ovulation, and the proper application of the various estrus synchronization systems. The workshops are also designed to improve understanding of methods to assess male fertility and how it affects the success of AI programs. ARSBC is coordinated and presented by the North Central Region Bovine Reproductive Task Force; a multistate extension activity in cooperation with the North Central Agriculture and Natural Resources Program Leaders Committee and the Cooperative States Research, Education and Extension Service. The primary goals of these workshops are 1) to optimize the productivity and improve the profitability of cow-calf operations by facilitating the adoption of cost-effective, applied reproductive technologies, and; 2) to educate beef cattle producers on sustainable reproductive management systems to maintain U.S. leadership and competitiveness in the world beef market. The North Central Region Bovine Reproductive Task Force is made up of specialists from the following universities: the University of Illinois, Iowa State University, Kansas State University, Michigan State University, the University of Minnesota, the University of Missouri, the University of Nebraska, the Ohio State University, South Dakota State University, Virginia Tech, and the University of Wisconsin. The two workshops in 2006 were held August 30-31 in St. Joseph, MO, and October 3-4 in Rapid City, SD. Program information pertaining to these workshops and those planned for 2007 may be accessed at

(<http://westcentral.unl.edu/beefrepro>). More than 320 participants attended the meeting held in St. Joseph, including veterinarians, producers and allied industry representatives.

- 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 and competitive bidding, the group realized additional feed savings of more than \$1 million annually, or nearly \$20,000 per operation. For example, vitamin and trace mineral premix costs have decreased from \$0.80 to \$0.50 over the past 10 years.
- 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: 1) Retool and reinvest in existing on-farm infrastructure. 2) 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>.
- The Southwest Missouri Family Dairy Farm Program has enabled 70 family dairies to remain in business by lowering production costs while improving their financial skills in a pasture-based system. The producers are organized into four core groups of 12 to 20 members per group. A group learning style has helped producers to develop a written business plan, use a computerized record system and adopt management-intensive grazing techniques. Data indicates producers who adopt the program techniques have increased profit per cow by \$279 per year; this represented a \$23,157 increase in net income per participating program dairy.
- More than half of the 1,600 family dairies in Missouri access current dairy information through the Internet. Dairy information transfer for Missouri dairy producers has been enhanced with the building of two dairy web pages: <http://agebb.missouri.edu/modbu/index.htm> and <http://agebb.missouri.edu/dairy/>.
- With the leadership and assistance of the University of Missouri Extension Pasture Based Dairy Team, during the last three years, 25 new pasture-based dairies were established in southwest Missouri. The estimated economic impact of these new operations is estimated to be \$5.3 million, or \$17.2 million total economic impact on the region.

c. Source of 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. 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 enhanced profitability of grain, fiber and forage production and 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:

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.

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.

b. Impact: Integrated Cropping Systems is a multistate, integrated research and extension program.

The following impacts are specific to Missouri:

- Two hundred (200) crop advisers attended the three-day Crop Management Conference. Presentations were made in one general session and 14 concurrent sessions. Session topics included life sciences, nitrogen management, energy savings, soybean rust, herbicide injuries, biofuels, sunflowers, soybean management, and weather information sources. These crop advisers influence decisions on more than 7.5 million acres and will have an impact on production efficiency, economic development and environmental quality.
- During the reporting period, 7,000 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.
- About 45 percent of Missouri soybean producers use no-till technology at present, compared with 6 percent in 1990.

- A similar shift has occurred among Missouri corn producers, 41 percent of whom currently use no-till, compared with 14 percent in 1990.
- 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.
- A survey of Missouri cotton producers found that, as a result of University of Missouri Extension scouting programs, 83 percent of the cotton producers hired professionals to scout 92 percent Missouri cotton acres for pests during 2005 compared with 5 percent scouted in 1982 and the 78 percent scouted in 1996.
- The use of this pest control decision tool increased production by 50 pounds of lint per acre. Cotton production was 23 million pounds of lint greater during 2006 because of scouting for pests than if the acres were not scouted. At a price of 55 cents per pound of cotton, this increase in yield was worth \$12.7 million.
- About 75 percent of Missouri's rice producers have adopted the new technologies as presented in the University of Missouri Integrated Crop Management Program.
- In the 1990s a team of extension specialists from the cotton-producing states was established to develop a program that would educate U.S. cotton producers about nematode identification and control. A recent survey of Missouri cotton producers found 80 percent of the farmers were "knowledgeable about the identification of nematode-infested fields and nematode management," an increase from 20 percent in 1990.
- Five hundred copies of "Economics of Specialty Corn Production," a publication developed by members of the agricultural economics faculty, were distributed to interested producers.
- Forty-five programs on the economics of identity-preserved (IP) production were conducted with a total attendance of 1,500.
- 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.
- A 2006 survey of Missouri rice producers showed that 96 percent of their acreage was treated for pests based on weekly pest scouting results; 56 percent of acres were scouted by the producer, and 40 percent were scouted by a professional. The percentage of Missouri rice acres treated on the basis of weekly scouting reports has grown from 88 percent in 1999.
- The percentage of rice acres scouted for pests by a professional increased dramatically from 11 percent in 1999 to 40 percent in 2006. 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.
- Glyphosate systems currently account for more than 95 percent of soybean and cotton weed control and more than 50 percent of the corn weed control programs. During 2006, extension implemented alternative weed control programs that addressed glyphosate-resistant horseweed control. Missouri growers adopted the use of new, alternative burn down programs on approximately 85 percent of the conservation tillage acres.
- Palmer amaranth is an extremely difficult weed problem in southeast Missouri. Glyphosate-resistant Palmer amaranth has been reported in Georgia. In 2005 new educational efforts were made to educate Missouri growers about weed control programs that would prevent the development of resistance. Approximately 40 percent of the Missouri growers who attended the educational programs have made plans to use the alternative chemistry in 2007.

- 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.
- University of Missouri Extension has taken a multi-faceted approach to informing producers of the risks and interventions associated with a potential outbreak of soybean rust in Missouri. Extension agronomy faculty members have developed a soybean rust guide sheet (<http://muextension.missouri.edu/explore/agguides/crops/g04442.htm>), conducted a train-the-trainer in-service workshop for regional extension specialists, developed an IPM website on soybean rust, (<http://www.psu.missouri.edu/agronx/index.html>) and conducted a number of educational workshops for producers. The vast majority (98%) of soybean producers attending these workshops during 2006 indicated their knowledge about this pest and its management increased because of the educational information presented.
- The “Missouri Pest Management Guide” (M171) represents a collaborative effort among weed scientists, entomologists, and plant pathologists at the University of Missouri. This publication provides current recommendations for controlling the most problematic weeds, insects and diseases encountered in Missouri corn, soybean and winter wheat cropping systems. This information is based on research conducted at the University of Missouri and elsewhere. This publication will be revised annually to reflect label updates, name changes and the entry of new herbicide, insecticide, or fungicide active ingredients into the marketplace.
- During 2006, 98 percent of Missouri soybean producers surveyed indicated they learned more about soybean rust management as a result of work by the University of Missouri Extension Soybean Rust Management Team (SRMT). These producers felt the most useful sources of information about soybean rust were the University of Missouri Extension newsletters and e-letters, followed by University of Missouri Extension meetings, the University of Missouri soybean rust website, and then private consultants. The Certified Crop Advisors in Missouri indicated their preferred source of information about soybean rust during 2005 was the University of Missouri Extension rust website, followed by University of Missouri newsletters and e-letters, private company websites, and then other consultants. They indicated their preferred source of information about soybean rust during 2006 would be the University of Missouri Extension rust website, followed by University of Missouri Extension newsletters or e-letters, a University of Missouri Extension hotline to call about rust if available, then University of Missouri Extension meetings, and then private company representatives.
- One hundred seventy-five young people successfully completed the Garden & Grow (GnG) program at seven locations in Missouri, GnG participants grew 8,000 pounds of fresh produce and donated half of it to food donation agencies. The GnG program provided educational opportunities for at-risk youths in Jasper County and home-schooled youths in St. Francis and Washington Counties.
- In 2006, Master Gardeners provided 106,000 hours of volunteer service. The average amount of volunteer time per Master Gardener was 47 hours. Fifteen counties have reported the average number of volunteer hours exceeds 50 hours per Master Gardener. For example, Cape Girardeau Master Gardeners volunteered 3,665 hours, or an average of 76 hours per volunteer.
- The average number of contacts per Master Gardener was 194. The average number of contacts per county was 1,937. Jasper County reported a total of 10,168 contacts. Five individual Master Gardeners reported more than 500 contact hours.
- Specific activities on a per county basis vary from location to location. Reported as an average per county, the number of volunteer hours submitted per activity were:
 - Phone answer service/hotline: 205 hours
 - City beautification: 536 hours

- Working with youth: 40 hours
- Teaching classes or short courses: 128 hours
- Staffing booths at fairs/shows: 69 hours
- Continuing education: 406 hours
- Working with the elderly: 98 hours
- During 2006 University of Missouri Extension trained 675 new Master Gardeners.
- The University of Missouri Extension faculty, with support from USDA, developed for the Extension Disaster Education Network (EDEN) a new train-the-trainer course for extension educators. The eight-hour online course is entitled “Plant Biosecurity Management – Resources to Engage Agricultural Producers in U.S. Biosecurity Efforts.” Through five lessons, the course enables extension educators to teach agricultural producers:
 - about the threat of both intentional and unintentional introduction of pests and pathogens to crops;
 - how to mitigate plant biosecurity hazards and security risks to farm operations and agribusinesses;
 - how to prepare for a rapid and appropriate response to a suspected plant biosecurity problem;
 - what recovery activities to expect in the event a plant biosecurity problem is confirmed; and
 - how to reduce the impact of a biosecurity event on humans, crops, property, and the environment.

Access to this course is through the EDEN homepage at <http://www.agctr.lsu.edu/eden>.

- Two hundred twenty-five (225) sports turf managers attended the Sports Turf AdvanTage (STAT) educational programs during 2006. The summary of STAT participants evaluations were:
 - Overall quality of the program had 100 percent reported good/outstanding.
 - Program provided new knowledge that can be used - 96 percent reported good/outstanding
 - Program provided new skills, which can be used - 95 percent reported good/outstanding.
 - Plan to adopt new practices - 98 percent reported yes.
 - Would be interested in attending another session of this type - 95 percent reported yes.

c. Source of Funds: Smith-Lever, State, Grants

d. Scope of Impact: Missouri, National

Key Theme: Rangeland/Pasture Management

- a. Description: Forages for the 21st Century. Forages represent a significant renewable natural resource for Missouri with more than 12 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 21st 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 cost is for livestock feed during January, February and March. Hay represents about 90 percent of the cost for winter feed.

Missouri’s dairy producers are struggling. Since 1993, 51 percent of Missouri’s family dairies have

exited the dairy business due to high feed costs, expensive capital investment and low profit margins. To respond to this trend, dairy producers are adopting the pasture-based dairy model so they can lower feed costs, minimize capital investments, increase profit and protect the environment.

Forages for the 21st Century has focused on three major program thrusts:

- Winter Feeding and Stored Forages for Beef Cattle. This program educates producers about stockpiling tall fescue, adapting winter annuals in Missouri, grazing crop 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, Internet and guide sheets are effective.
 - 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 toxicosis and legume establishment into pastures. The methods used include regional grazing schools, special field days, guides and mass media.
 - 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.
- b. Impact: Forages for the 21st Century is a multistate, integrated research and extension program. The following impacts are specific to Missouri.
- More than 4,000 producers attended educational programming on "Winter Feeding Systems for Beef Cattle." The adoption rate of practices outlined in these programs was about 45 percent. From 1998 to 2006, the percentage of producers using stockpiled tall fescue for winter feeding has doubled, from 26 percent to more than 52 percent. The increased use of stockpiled tall fescue saves the state's beef producers \$19 million dollars annually.
 - Another outcome of the "Winter Feeding Systems for Beef Cattle" program is the increased use of winter annual pastures in Missouri. Based on seed sales of annual ryegrass, acreage of winter pastures in Missouri has increased more than a thousand fold since 1998. Economic analyses show producers using annual ryegrass were able to reduce the cost to winter a beef cow by \$36 per year. If adopted by just half of the beef operations in Missouri, producers could save more than \$36 million dollars annually.
 - More than 1,000 producers have attended the grazing schools taught at Linneus and throughout the eight regions of the state; in 2006 alone, 30 multi-day regional grazing workshops were held in Missouri. More than 80 percent of the producers who attended these workshops indicated they plan to adopt fencing, watering and pasture management changes as presented in the schools. 50 percent of those producers implemented these changes without cost-share assistance. From 1997 to 2004, Missouri producers spent \$42 million implementing new grazing systems. Although the numbers are not calculated for 2006, we can estimate producers will spend \$5 million.
 - The curriculum for the "Tall Fescue Toxicosis and Management" workshop was developed in 2003, and workshops were held in 2004, 2005 and 2006. The University of Missouri plant scientists have developed management practices to reduce toxins present in the grass and consumed by the animal. The practices, taught at the workshops, involve cautious fertilization of pastures, moving cattle to nontoxic pastures during the late spring, and seeding in new plant varieties. Missouri farm families are beginning to adopt these management practices, which

increase calf gains by a half-pound per day. If only half of the cattle producers adopt the management practices, Missouri's beef industry would realize an additional \$30 million in profits. If the state's cattlemen plant the forthcoming plant varieties on one-third of Missouri's pastures, the state will increase revenue to the beef industry by \$183 million annually; Missouri would see additional profits to other Missouri livestock industries, including dairy cattle and horses.

- During 2006, the pasture-based dairy team made more than 2,000 audience contacts. The pasture-based dairy curriculum was "customized" for the four dairy pasture-based core groups. The core group method was based on the highly successful New Zealand educational model.
- During 2006, several next-generation, larger-scale pasture-based dairies owned by three New Zealand investment groups began development and operation in Missouri. The largest of these dairies contains more than 3,000 cows and the smallest 500 cows. The New Zealand groups have invested more than \$50 million to date and more farms are being developed. One of the investment groups will begin operating a 500-cow operation in February 2007. By 2008, expansion and growth already planned by these new dairies are expected to increase the total new investment to \$63 million, generate \$28 million in annual milk sales, add \$87 million in total annual economic impact and sustain 777 additional jobs in the state of Missouri. These dairies were attracted to Missouri by the on-going dairy grazing research and extension efforts being conducted by the University of Missouri.
- The first Missouri Dairy Grazing Conference was held in 2006. Almost 200 attendees from 21 states took part to learn about the impact of pasture-based dairying in Missouri and about on-going research. Speakers included members of the Missouri pasture-based dairy team as well as speakers from New Zealand and Ireland.
- Pasture-based dairy farmers produced milk for less than \$12.00/cwt in operating expenses in 2005, 20 percent less than conventional dairies in Missouri.
- More than 70 percent of the core group producers adopted accounting practices that split their personal finances from the dairy's finances.
- 40 percent of participating producers reported they renovated or expanded their dairy facilities since converting to a pasture-based system.
- More than 90 percent of the participating producers report using their business plans has helped them to make better financial decisions.
- Almost 60 percent of participating producers indicate they have more leisure time and a better quality of life.
- "Pasture-based Dairy" educational programs have been conducted by the Missouri team in Iowa, Texas, Oklahoma, Arkansas, Kansas, Tennessee, Illinois, and Kentucky.
- Financial data from the Missouri pasture-based dairies participating in the financial summaries showed the average farm is expanding in cow numbers. In 2005 the average farm in the group marketed \$2,102 of milk per cow, had total income of \$2,310 per cow, with operating expenses averaging \$1,587 per cow. Operating margins per cow in 2005 were \$723.

c. Source of Funds: Smith-Lever, State

d. Scope of Impact: Iowa, Texas, Oklahoma, Arkansas, Kansas, Tennessee, Illinois, Kentucky and 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.

1862 University of Missouri 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 one of the most basic of skills, hand washing, regional nutrition specialists and paraprofessional educators work with clients each day to ensure 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 address the consumer issues of food safety.

1862 Agricultural Experiment Station Research – University of Missouri-Columbia

Key Theme: Food Quality

- a. Description: Improving flavor analysis of food products. Research at the University of Missouri 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), mouthfeel and aftertaste.
- b. 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 profile of ice creams have also been determined. Results provide information that can be used to reformulate lower fat ice cream that is better tasting and establish a more economical way of determining the changes required in flavorings when fat levels are reduced. Inferences from this work has broader application to other food products as well.
- c. Source of Funds: Hatch, Grants
- d. Scope of Impact: Multi State

1862 University of Missouri Extension

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

- a. 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 2006. These specialists provided educational programs, newsletters, radio interviews, television interviews, newspaper interviews, Internet-based programming and individual consultations. These specialists reached over 4,600 direct educational contacts throughout the state. This does not include impressions from a weekly radio segment which airs in northeast Missouri. These specialists logged over 1,000 hours in addressing this issue so critical to human health and well being.

Approximately 130 paraprofessionals in the Family Nutrition Education Programs also address the issues of food safety. This program reaches over 250,000 people in all 114 counties and the city of St. Louis. From pre-school, paraprofessionals begin to teach young people the proper techniques for hand washing through adulthood where individuals are taught food preparation techniques to ensure a safe food supply.

- b. 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. Some examples of education leading to positive behavior change are below:
- “I increased the pressure in the canner slightly. I check my freezer more often to check dated foods. I keep a file of these newsletters for easy reference.”
 - “I preserve foods more safely than in the past.”
 - “I throw a lot of things out that I probably would have eaten before. When in doubt, throw it out.”

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-grade 8, receives a minimum of one lesson on food safety. In 2006, over 210,000 children pre-K-grade 8 received information on hand washing, and among 2,956 reporting teachers, 82 percent reported students improved their frequency and/or skills in hand washing.

- c. Source of Funds: Smith-Lever, Grants
- d. 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 in order to ultimately develop new cancer therapies.

1890 Cooperative Research Program Overview

During the past 20 years there has been a dramatic increase in obesity in the United States. Centers for Disease Control statistics over the past twenty years show an increase in obesity rates in the U.S. from below 20 percent in most states to thirty-five states having obesity rates ranging from 20 to 25 percent in 2003. It is known that overweight and obesity and their associated health problems such as hypertension, non-insulin-dependent diabetes mellitus, atherosclerosis and cardiovascular disease have significant economic impacts on the U.S. healthcare system. Medical costs associated with obesity and associated health problems may involve direct and indirect costs. In response to these observations, the Surgeon General of the United States recently issued a challenge in [The Surgeon General's Call to Action to Prevent and Decrease Overweight and Obesity](#) (U.S. Department of Health and Human Services, 2001). A significant component of this challenge is to increase research efforts to improve our understanding of the causes, prevention and treatment of overweight and obesity.

Why has there been such a dramatic increase in obesity? Are there specific dietary factors and levels of exercise associated with risks for obesity and coronary heart disease, hypertension, non-insulin-dependent diabetes mellitus and atherosclerosis? One possible answer to these questions has been observed in epidemiological studies which suggest a disproportionate consumption of foods containing high levels of fat at the expense of foods containing complex carbohydrates, fiber, and trace essential nutrients can be correlated with obesity, cardiovascular health and exercise.

The long-term goal of the Human Nutrition Research Program is to examine how dietary factors such as dietary fat, energy level, fiber, antioxidants and other nutrients, and physical exercise contribute to development and prevention of cardiovascular diseases. This work is significant for our stakeholders since cardiovascular health problems are more prevalent in under-served populations. Research conducted by the Human Nutrition team is providing information for the under-served populations in the state of Missouri to help prevent diet-related cardiovascular diseases and promote better health.

1862 University of Missouri 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 healthcare 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.

University of Missouri Extension faculty address the major nutrition, health and sedentary lifestyle issues through a variety of educational programs. These programs have a broad scope ranging from basic nutrition, physical activity, health education to chronic disease prevention. Faculty provide education across the lifespan in every county throughout the state.

1890 Cooperative Extension Service Overview

Substantial improvements have been made in the nation's health profile in the last twenty years. However, not all groups have benefited equally from these improvements. Because of this inequity, many nutrition and health programs in Missouri are now emphasizing the need to assist minority populations that have been impacted by these inequities that affect the quality of life.

In light of these disparities a scientific consensus on the relationship between diet and chronic disease has emerged that shows an increase in risk for these diseases within these communities. To reduce disease risk, scientific panels emphasize the importance of a low-fat and low-cholesterol diet that can be achieved through an increase in the intake of fruits and vegetables, complex carbohydrates and fiber and a decrease in the intake of fatty foods. Recommendations for the public also include limiting sugar, alcohol and salt intake.

1862 Agricultural Experiment Station Research — University of Missouri – Columbia

Key Theme: Human Health

- a. 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 the University of Missouri is directed toward the ability to interfere with these binding mechanisms as part of an overall therapy that inhibits the spread of disease. Scientists also explore possible combinatorial drug therapies with beta-galactoside glycoconjugates, in conjunction with current chemotherapeutic drugs, that inhibit metastatic spread of prostate cancer cells.
- b. Impact: The synergistic effects of relatively biologically benign ketosamines with current cytotoxic chemotherapeutic drugs promise to dramatically reduce the amount of the cytotoxic drug given to a patient during chemotherapy. Knowing how different types of bacterial pathogens work together to cooperatively survive respiratory drug therapies in cystic fibrosis, and other forms of chronic obstructive pulmonary disease, will help with the development of effective treatments that can eradicate them.
- c. Source of Funds: Hatch, Grants
- d. Scope of Impact: Multi State

1890 Cooperative Research Programs — Lincoln University

Key Theme: Human Nutrition

- a. Description: Nutrition, exercise and health risks are associated with overweight and obesity. The primary objectives of this project are: 1) to study the effects of race, obesity and weight reduction on risk factors of cardiovascular disease such as plasma leptin levels, and C-reactive protein levels, insulin resistance and lipid profiles; and 2) to study the effects of diet energy levels and exercise on energy balance and biomarkers of cardiovascular health in diet-induced obese rats.

Basic research data revealed exercise treatments significantly reduced the weight gain in the diet-

induced obese (DIO) rats. They gained only half as much weight compared with the non-exercised DIO rats. Exercise did not significantly affect the weight gain of the diet-resistant (DR) rats. There was a significant interaction between the effects of diet and exercise on energy intake. Exercise increased the energy intake of rats fed the low-fat diet. In contrast, exercise decreased the energy intake of rats fed the high-fat diet. This interaction was more pronounced in the DIO rats than in the DR rats. As shown in other studies, these early results indicate an interesting relationship between diet, and exercise.

In addition to conducting basic research, the Human Nutrition Research team is updating and providing information and guidance to the local campus community.

- b. Impact: The present project will produce information leading to recommendations for diet and exercise modifications to reduce obesity-related cardiovascular diseases in the United States. Recent data indicate the economic cost of obesity in the United States was about \$117 billion in 2000. Dietary factors and obesity are associated with 5 of 10 leading causes of death: coronary heart disease, some types of cancer, stroke, type II diabetes, and atherosclerosis. Preventive interventions will improve the general health of the population and reduce costs of medical treatments in the United States.
- c. Source of Funds: Evans-Allen
- d. Scope of Impact: State Specific

1862 University of Missouri Extension

Key Theme: Human Health

- a. Description: Dining with Diabetes. As Missouri's population ages it is becoming increasingly important to address issues related to chronic disease prevention and management. Individuals and families affected by diabetes regularly struggle with understanding complicated diet recommendations and separating them from myths and outdated advice. Dining with Diabetes is a three-session series which 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 are invited to provide additional information and answer participants' questions during at least one of the three sessions. The long-term intended outcome of this series is improved quality of life and health for those with diabetes. The series' comprehensive approach, which includes dietary factors for heart disease and high blood pressure, is consistent with current recommendations from diabetes experts. The series was evaluated using a pre and post session survey. The process was approved by the Institutional Review Board and participants were informed they did not have to participate in the evaluation and they could skip questions they did not want to answer. As a result, the N varies for each question.
- b. Impact:

Outputs: Based on available data approximately 950 Missourians were reached through Dining with Diabetes workshops. In addition, over 300,000 individuals were reached through mass media efforts including radio, press releases, TV, newsletter, community and church fliers, and a web-based community calendar.

Short-term outcomes: The intended short term outcome for this program was increased knowledge about healthy foods and about diabetes and nutrition. Participants were quite knowledgeable prior to taking the series. The data below reflects some of the most notable changes.

| Participants reported they knew: | Survey I % | Survey II % |
|--|---------------|----------------|
| Sugar and Sweets do not raise blood glucose more than other foods that are rich in carbohydrates (Survey I N = 173, Survey II N= 167) | 39.4 | 58.6 |
| Dividing carbohydrate servings between three or more meals will help to keep blood sugar at a constant level throughout the day (Survey I N = 308, Survey II N= 281) | 81.8 | 87.1 |
| Monounsaturated oils may lower LDL (bad) cholesterol (Survey I N = 165, Survey II N=191) | 41.5 | 62.9 |
| Fiber helped the body get rid of some cholesterol (Survey I N = 271, Survey II N=261) | 68.4 | 84.3 |

Intermediate outcomes: The intended intermediate outcomes were increased confidence about one’s ability to prepare healthy meals for someone with diabetes and improved food preparation practices.

- Prior to taking the series, 70 percent of participants reported they were confident about their ability to prepare healthy meals; after completing the series 90 percent reported being confident.
- Participants also reported improved food preparation practices:
 - 65 percent reported use of nutrition labels on package foods to prepare healthy meals for people with diabetes prior to the workshop; this increased to 88.6 percent by the end of the series and to 96.9 percent at 3-month follow up.
 - 64.3 percent reported use of herbs and spices instead of salt in cooking prior to the series; this increased to 75.7 percent by the end of the series.
 - 87 percent reported use of canola oil or olive oil in cooking prior to the series; this increased to 90 percent by the end of the series.

Some of the real impact is reflected in the words of the participants:

- “Healthy foods can be cooked without too much trouble and taste ok.”
- “It is easy to cook and prepare meals for a person with diabetes. There are a variety of foods that a person with diabetes can eat; you don’t have to eat just certain things.”
- “I didn’t know that (carbs) played such an important role in diabetes.”
- “This class has been very helpful to me. I have had diabetes for 10 years, have gone to a nutritionist, doctors; but I have learned more in these three weeks than all the other years combined.”

c. Source of Funds: Smith-Lever, Grants

d. Scope of Impact: Statewide

Key Theme: Human Health

a. Description: A New You: Health for Every Body. This multi-session workshop is designed to move participants away from diets to a non-diet or health promotion approach to living in a healthy body. The health promotion approach to weight management is one that is appropriate for most audiences. The program focuses on three factors -- appreciating self and others, healthful eating, and active living. 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. Concepts taught in the workshops are reinforced and marketed through a series of newsletters. The program is evaluated using an IRB approved process and a new evaluation strategy was implemented in 2004-05.

- b. Impact: Statewide program efforts reached in excess of 4,000 individuals. The program focuses on three primary topics: pleasurable and healthful eating; physically active living; and respecting body size differences in yourself and others.

Some of the real impact is reflected in the words of the participants:

- “I have a new line of thinking about food and your being.”
- “Make a plan, accept yourself, be active.”
- “It is just as expensive to throw things away as to overeat.”
- “Enjoy food and eat slowly.”
- “There were a lot of things I knew, but it is very helpful to get a ‘shot in the arm’ to refocus on being healthy.”

- c. Source of Funds: Smith Lever

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

Key Theme: Human Health

- a. Description: The Stay Strong Stay Healthy program is focused on improving the health and well-being of middle-aged and older adults. The goal of this program is to provide a safe, structured, and effective strength training program for aging adults. Participation in regular strengthening exercises will help build muscle and increase bone density, thereby helping to prevent frailty and osteoporosis. The curriculum used for this program is modeled after the Strong Women program designed by Dr. Miriam Nelson and Rebecca Seguin, MS, CSCS from Tufts University. Each Stay Strong Stay Healthy session includes a warm-up, simple strengthening exercises, with or without weights, and cool down stretches. The Stay Strong Stay Healthy program sessions are ten weeks long and led by a team of University of Missouri Extension faculty.

- b. Impact: In 2006, 815 participants ranging in age from 40-90+ enrolled in the Stay Strong Stay Healthy program. Of these participants, 123 (15%) were male and 629 (77%) were female. Following the program, 79 percent of all participants indicated they felt their health was better due to participation in the program. Seventy-five (75%) percent felt they were physically stronger following the class. Sixty-five (65%) percent of the participants felt their flexibility had increased as a result of the program. Since it is known the long-term benefits will only be reaped if participants continue to exercise, each participant was asked how confident they were if they could continue the exercises following the program. Sixty-four (64%) percent indicated they were either confident or very confident they could continue the exercises following the class. Since the conclusion of some of the first class sessions, groups have continued to meet without the leadership of Extension. The community leaders and participants themselves have ensured sustainability of this program.

- c. Source of Funds: Smith-Lever

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

Key Theme: Human Nutrition

- a. Description: Nutrition and Health—Family Nutrition Education Program. The Family Nutrition Education Programs (FNEP) are an important part of University of Missouri 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 May 2004, 702,657 Missourians in 281,467 households received food stamps¹ In 2000, about 15 percent of Missouri's youths were in poverty, and in 2003, about 39 percent of students were enrolled in free/reduced price lunch.² Research has shown families in poverty often have difficulty with the following:

- Securing an adequate amount of food for their families;
- Preparing and storing foods safely, and
- Purchasing a diet rich in whole grains, fruits and vegetables.

FNEP addresses all of these areas for low-income Missourians by teaching food resource management, food safety, and healthy food choices balanced with physical activity. Each participant attends an average of six sessions with a nutrition educator. Sessions vary from 30-60 minutes in length. In FY 2006, FNEP educators enrolled 250,000 participants, resulting in approximately 1.5 million direct educational contacts. The FNP program also made over 500,000 indirect contacts through parent newsletters that went home with children who were taught in the classroom setting. In addition, this year University of Missouri Extension conducted a media campaign as part of their Food Stamp Nutrition Education programming. The media campaign resulted in over 2 million media impressions statewide.

FNEP provides nutrition programming that meets learners' needs considering their abilities, age, culture, and reading level. Lessons with hands-on activities are designed for youth and the adults who support them, pregnant teens, adults, and immigrant populations.

FNP uses the newly developed Show-Me Nutrition curricula, which include lessons for Pre-K through grade 8. Lessons address healthy food choices balanced with physical activity, food safety, and food resource management. Each grade level has up to 12 lessons with an average of seven lessons taught during a series.

EFNEP is designed for adults, and clients who may participate in up to 20 lessons. Lessons address healthy food choices balanced with physical activity, food safety and food resource management. Additional topics include nutrition during teen and adult pregnancy, breastfeeding, feeding infants and children, and food preservation. Programming is collaborative with North Central Region states.

¹ Missouri Department of Social Services website. Available at: <http://www.dss.state.mo.us/mis/clcounter/history.htm> Accessed 1-19-05.

² Office of Social and Economic Data Analysis website. Available at: <http://oseda.missouri.edu/kidscount/04/index.html> Accessed 1-19-05.

- b. Impact: The Family Nutrition Education Program includes 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 nationally. 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 242,088 youth and adult participants in FY 2004. Following the FNP program in their school classrooms, teachers were asked to fill out program feedback forms and return them to nutrition educators. Two thousand nine hundred sixteen (2,916) forms were returned. Ninety-nine percent (99%) of teachers reported one or more changes among students after FNP. Ninety-five percent (95%) reported students were more aware of nutrition. Sixty-two percent (62%) reported students were making healthier meal and/or snack choices. Eighty-two percent (82%) reported students improved their hand washing. Forty-five percent (45%) of teachers reported they were more aware of nutrition themselves. Thirty-eight percent (38%) of teachers made healthier meal and/or snack choices, and among those teachers, 67 percent talked about or modeled those changes in front of students. Ninety-seven percent (97%) of teachers wanted FNP in their classrooms again.

EFNEP adult participants filled out a behavior checklist prior to receiving lessons, and again after the last lesson. Results for FY 2006 revealed after the program, 49 percent of participants more often thought about healthy food choices when deciding what to feed their families. Sixty-one percent (61%) more often used the food label to make food choices. Fifty percent (50%) more often planned meals in advance. Forty-eight percent (48%) more often followed the practice of not thawing foods at room temperature. Forty-four percent (44%) more often compared food prices.

Testimonial about a youth FNP participant from Eva Gaskins, Nutrition Program Assistant: “I’ve worked with a student for five years. She used to hide candy under her pillow and eat it during the night—and ate very few fruits and veggies. This year she informed me she ate very few sweets, and more fruits and veggies. She looks better, makes better grades, and is more active. I am so proud of her.”

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

Key Theme: Human Nutrition

- a. Description: Nutrition and Health—Food Power. In 2006, this program was delivered to 47,039 elementary students at 169 schools. It involved 2,649 classroom teachers and 3,103 volunteers. Teachers commenting on the impact of this program on elementary children have reported that approximately 95 percent of participants are making healthier meal and/or snack selections, and approximately 82 percent of participants are increasing their physical activity level.
- b. Impact: “All the teachers who went through the Food Power Adventure said the stations are age appropriate and the props helped the students to understand how to eat the correct foods,” reported one school administrator. A teacher stated, “We had a great discussion after the students went through the Food Power Adventure. The kids loved going through the Food Power Digest. I liked the fact the Digest reinforced what was stressed at each station.” 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.

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

Goal 4: Harmony Between Agriculture and Environment

1862 Agricultural Experiment Station Research Overview

A critical area on the environmental front is animal waste management. University of Missouri researchers are developing rations that reduce nitrogen in pig manure while maintaining growth and carcass composition. Scientists work with bacteria to develop possible biological applications to clean up contaminated environments. Scientists are using innovative technologies to evaluate soil properties, an important step in improving soil quality. Investigators work to develop new products from small-diameter trees to make forest management economically viable and pave the way for a sustainable, higher-value, forest industry.

1890 Cooperative Research Programs Overview

Links between agriculture and the environment, especially with regard to weather variability, climate change, vectors and pollutants and health impacts is the focus for Lincoln University's research under goal four; "Greater Harmony between Agriculture and the Environment." Agriculture is the backbone of many rural communities in Missouri and it plays an important role in the quality of life of all Missourians. The impact of agricultural practices and its associated industries on the environment can, not only affect future agricultural sustainability, but also human health and well-being. This research focus is in line with issues recognized by USDA such as: the need to evaluate impacts of agricultural chemicals and wastes at multiple geographic sites, developing pest-control alternatives and managing growing crops that use nutrients more efficiently, and detailing the science behind land-use management policies for reducing agricultural runoff, controlling carbon emissions and conserving biodiversity.

Several research projects were developed based on stakeholder input and overall USDA goals. In regard to environmental pollutants and contaminants, Lincoln researchers are investigating greenhouse gas emissions and absorption from corn and soybean crop fields and forest areas. Lincoln's commitment to responding to public needs is also seen in the development and support of the only Cole county allergen monitoring system. Research data is being compiled on seasonal pollen and mold counts and distributed to doctors and the public. This information is needed in an area that has a reported emergency room rate of respiratory cases of 59.3 percent during 2002. Data has also been generated on the occurrence of toxic trace elements in drinking water and soil samples collected from rural communities in southeast Missouri. These same communities are also the sites of very high mosquito counts and residents have asked for assistance in mosquito control. This request is being addressed by researchers investigating alternative biological strategies for mosquito control.

1862 University of Missouri 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. 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

- a. Description: Reducing nitrogen in pig manure. Odor-producing compounds, such as ammonia, are formed when microorganisms break down nitrogen compounds, such as proteins, 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.
- b. 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 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. Use of synthetic amino acid additions saved between \$.80 and \$3.50 per pig in feed cost.
- c. Source of Funds: Hatch, Grants
- d. Scope of Impact: Multi State

Key Theme: Biological Control

- a. Description: Bioremediation. Environmental contaminants are a major threat to public health and long term viability of natural systems. Researchers are exploring the energy generating mechanisms and pathways of the sulfate-reducing bacteria. These bacteria are known primarily for their role in iron metal corrosion in anaerobic environments. In addition, these bacteria are able to change the oxidation state of uranium, converting it from U(VI) to U(IV) and thereby making it nearly insoluble. This process offers the possibility of using bioremediation to clean up uranium contaminated environments.
- b. Impact: The goal is to develop bacterial strains that can clean up toxic metals and radioactive material. Researchers have established cytochrome c3 is on the pathway of electron transfer to uranium in *Desulfovibrio desulfuricans*. If cytochrome c3 is the rate-limiting step for the conversion of uranium to an insoluble species, scientists may be able to alter the expression of the cytochrome to increase the rate of removal of uranium from contaminated groundwaters. Determining what compounds compete with uranium for electrons will allow predictions regarding the likelihood of natural bioremediation. In addition, microbes in the natural environment are constantly under stress. Understanding these responses will allow an understanding of the versatility of the metabolism and how it might be controlled.
- c. Source of Funds: Hatch, Grants
- d. Scope of Impact: Multi State

Key Theme: Forestry

- a. Description: Utilizing small diameter trees to improve forest management. Missouri's non-industrial private forest (NIPF) lands are overgrown with small-diameter (6-12") trees and there are vast acreages sick and dying due to many decades of neglect. From a utilization perspective, stands in this condition do not attract new industry due to their poor quality. From a forest management perspective, there is no incentive to manage these stands because there are no viable markets for this small-diameter, low-grade material. University of Missouri researchers work in both traditional and novel forest research that has the potential to add sufficient value to Missouri hardwood stands that would make forest management economically viable and pave the way for a sustainable, higher-value, forest industry.
- b. Impact: Alternative forest products from small diameter trees under investigation include fuel for wood-burning power plants, poultry and bedding litter, and compressed biofuel logs. A prototype biomass compactor was developed and has a production rate of 0.5 ton/hr that is acceptable for compacting periodic biomass such as chicken litter. Commercially produced wood pellets (from extrusion process) were successfully test-marketed as litter in production poultry houses and small animal kennels, and also as an absorbent in auto mechanic shops. However, high production costs relative to currently used products are the main barrier to expanding these markets. Development of products from small-diameter trees and their associated markets will have the potential to provide real incentives to both landowners and the forest products industry for increasing the amount of Missouri's forests under active management.
- c. Source of Funds: Hatch, Grants
- d. Scope of Impact: Multi State

Key Theme: Soil Quality

- a. 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 toward ultimately improving soil characteristics.
- b. 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. In addition, the inability to measure and account for this macropore-scale spatial variability is one of the weakest links in understanding and predicting porous media transport processes. The insight and methodologies derived from this research can be used to develop, verify and modify porous media transport theories.
- c. Source of Funds: Hatch, Grants

- d. Scope of Impact: Multi State

1890 Cooperative Research Programs — Lincoln University

Key Theme: Air Quality

- a. Description: There was no official aeroallergen related air quality monitoring data collected for Jefferson City Missouri before 2003. The closest pollen counting station to Jefferson City locates in Columbia, Missouri, 30 miles north of Jefferson City. Compared to Columbia, Jefferson City is surrounded by rural farming communities. Therefore, there is a higher degree of vegetation in and around Jefferson City. Seasonal pollen quantity is potentially higher in Jefferson City than that in Columbia. The aeroallergen counting station at Lincoln University (LU) is the first certified pollen counting station among Missouri universities and colleges. This station functions as a facility providing air quality related educational materials for LU environmental program majors as well as providing allergy related health resource and services to the public. Rotorod air sampler, a popular air sampling device used by many allergists across the country, is used at LU aeroallergen ID and counting station for monitoring local aeroallergens. LU contributes aeroallergen ID and counting data to national pollen reports and forecast (data are available at <http://www.pollen.com>) mediated by Multidata Inc.
- b. Impact: Over 30,000 area residents received information regarding pollen counts as a result of the daily data submitted to Multidata Inc. for national pollen forecasts and reports. In addition, the data are shared daily with the Jefferson City Allergy and Asthma Clinic to serve the local community with current pollen counts. Lincoln University personnel participated in a pollen and mold ID training workshop organized by Aerobiology Laboratory at Harvard University in August 2004. At least 4 pollen warning statements alerting LU families and the community were issued. This work is providing a resource for physicians and the public that is assisting them in developing preventive strategies and treatments to lower the severity of seasonal allergies.
- c. Source of Funds: State
- d. Scope of Impact: State Specific

Key Theme: Biological Control of Pests

- a. Description: A special plant collection of *Pelargonium* cultivars exhibiting various insect resistance and growth characteristics has been maintained at LU Dickinson greenhouse to support research on identifying natural compounds of insect deterrent potential. Some *Pelargonium* cultivars resist and repel insects at the whole plant level. Leaf extracts produced by crushing leaves of a resistant cultivar also demonstrated potent insect deterrent properties against greenhouse insects, mosquitoes (*Aedes aegypti*), and paper wasps (*Polistes fuscatus*) in the preliminary studies. Based on these results, the research during 2003-2004 focused on examining morphological and biochemical characteristics of *Pelargonium* cultivars and identifying traits for grouping cultivars with insect resistance.
- b. Impact: A collection of over 20 scented geranium cultivars are being maintained in Dickinson greenhouse and observations have begun concerning their resistance and susceptibility to insect infestation and damage. A collaborative project with Dr. Agnes Rimando at USDA ARS Natural Product Utilization Research Lab has been initiated to analyze chemicals present in one scented

geranium cultivar of known insect resistance. Preliminary observations were shared with stakeholders at Lincoln's 2004 Small Farm Family Conference in Sikeston, Missouri during a workshop presentation of Lincoln's research programs. Ten of the workshop participants reported they would purchase scented geraniums to use as mosquito repellants around their homes. Future studies will focus on developing formulations and educational information for stakeholders who are interested in controlling a variety of pests, including mosquitoes, using natural or biological control methods.

- c. Source of Funds: State
- d. Scope of Impact: State-wide, Regional and National

Key Theme: Biological Control of Pests

- a. Description: A second project under the theme of biological control of pests is concerned with evaluating the effectiveness of a mixed formulation of *Bacillus thuringiensis* and *Bacillus sphaericus* in the control of mosquitoes in New Madrid county Missouri. The formulation consisted of a 5:1 ratio of *Bacillus thuringiensis* to *Bacillus sphaericus*. In preliminary trials mosquito counts have been made and a small area was treated with the formulation. Results of the trials are being used to direct procedures that will be effective in lowering mosquito counts in the area. These include providing sufficient formulations to be distributed at major mosquito breeding sites; identifying geographical obstacles to breeding sites and synchronizing initial spraying with mosquito breeding cycles to obtain accurate mosquito counts before and after spraying. Interviews with residents of the target area indicate that the majority of the population are seriously concerned about the high mosquito population and are looking forward to some relief in future seasons for mosquito infestations.
- b. Impact: The immediate impact of this work has generated an increased level of optimism among the residents of New Madrid County, Missouri as documented during individual interviews. This work has also led to strengthening collaborative agreements between the New Madrid County Health Department, county volunteers and the Lincoln research team. The New Madrid County Health Department provided help in mobilizing its human resources to assist in the trial sprayings and is looking forward to continuation of the alternative control effort. This cooperation shows that the local health department understood the need for alternatives to chemical control of insect vectors and was willing to use alternative control methods. Long-term impacts will result in a substantial reduction in mosquito populations in the area and a proportional reduction in the human risks of contracting mosquito vector diseases. Because of the global nature of mosquito vector diseases, the impact of this study will not be restricted to the local community in Missouri and the United States, but also to the global community at large especially areas where mosquitoes are posing serious human threats.
- c. Source of Funds: State
- d. Scope of Impact: County

Key Theme: Geographic Information Systems/Global Positioning Satellite Systems

- a. Description: The geographic information team plays a major role in collaborating with all research teams. They have assisted in generating maps and compiling data to be used by our researchers to more effectively provide information to our stakeholders in the Bootheel area of Missouri. The

GIS/Remote sensing team is creating a geospatially referenced, digital database for the Bootheel region of southeastern Missouri. This area is the region targeted for a large percentage of Lincoln's Cooperative Research and Extension programs. This data bank will be used to provide data for environmental monitoring, modeling, and natural resource management activities in the region.

- b. Impact: Seventy-five percent (75%) of the project as outlined in the original proposal has been completed. Various geospatial data layers for 11 counties in the Bootheel region of Southeast Missouri have been assembled. The data layers include agriculture, census, wetlands, DEM (both at 10m and 30m resolution), satellite images (Thematic Mapper), Land use/Land cover, soils, etc. Depending on availability, additional data layers, such as TERRA satellite images, drinking water sources for the various urban areas in the region, etc. will also be compiled.
- c. Source of Funds: State
- d. Scope of Impact: Statewide

Key Theme: Organic Waste Reduction

- a. Description: Implementation and evaluation of an in-vessel composter for managing organic waste. The traditional means of disposing food waste by cafeterias and large restaurants have been through garbage disposals or through discharge as part of the solid waste stream. These practices are known to contribute to increased organic loads for waste water treatment systems and increased and offensive odors in landfills. This research focused on designing, constructing and evaluating an in-vessel composting facility that would effectively process food waste generated by the campus cafeteria into a usable less offensive product. An in-vessel composter facility has been constructed at the Busby farm and was fully operational by August of 2004. This facility will serve as a model for the area communities and the state.
- b. Impact: This work has had a local impact by reducing the volume of organic waste from the campus cafeteria. The facility and outlined waste handling procedures are serving as a model for the development of similar efforts by restaurants, other college campuses and local communities. The compost generated by the facility is an odorless organic product that is being used to enrich landscape areas on Lincoln's campus and farms and therefore reducing costs for commercial fertilizers. There has been a 100 percent reduction in the amount of food waste entering the public wastewater sewer system of Jefferson City, Missouri from Lincoln University's cafeteria. Prior to the implementation of this project a large percentage of food waste generated (108 tons/year) from Lincoln's cafeteria was discarded in garbage disposals which emptied into the wastewater system of the city.
- c. Source of Funds: Evans Allen and State Grant- Missouri Department of Natural Resources
- d. Scope of Impact: State Specific

Key Theme: Soil Management, Greenhouse Gases, Carbon Emissions

- a. Description: Soil management practices and greenhouse gases emissions from Agricultural Fields. In our attempt to understand how many greenhouse gases (CO₂, CH₄, N₂O) are being emitted from soils in our farms; how these emissions vary throughout the year; how soil management practices such as tillage, crop and vegetation type and fertilization affect these emissions and finally what soil chemical, physical and thermal properties are the main controlling factors for CO₂, CH₄, N₂O

emissions from soils, we are presently involved in intensive campaigns of monitoring greenhouse gases emissions at Lincoln University's Carver, Busby and Freeman farms. We are also monitoring physical, chemical and thermal changes in soil properties at all of these research farms. For 2004, intensive samplings were conducted from May to December in a grassland site at Carver farm, in corn and soybean fields at Freeman farms and in two forest sites at the Busby farm. Sampling for greenhouse gases and soil properties monitoring will continue through 2005. We have found the following interesting trends: Firstly, there are emissions (positive fluxes) of CO₂ and N₂O and uptake (negative fluxes) of CH₄ from soils at all of our experimental sites. The highest emission rates were 238.02 mg CO₂-C m⁻² h⁻¹ for CO₂ in the soybean field and 57.23 ug N₂O-N m⁻² h⁻¹ for NO₂ in the cornfield. The highest soil uptake for CH₄ (-97.02 ug CH₄-C m⁻² h⁻¹) was observed in the forest site at Busby farm. Secondly, we expected to see a decrease in emissions or uptake as soil temperature decreased from May to December. Unfortunately, this was only true for CO₂ emissions in the corn and soybean fields and for both CO₂ and CH₄ in the grassland site at Carver farm, which decreased with decreasing soil temperature. In opposite, NO₂ emissions increased with decreasing soil temperature in the cornfield, soybean field and grassland. We also found strong linear relationship between CO₂, CH₄, NO₂ and soil thermal resistance, conductivity and diffusivity especially in the forest site.

- b. Impact: This work shows stakeholders that many factors can be involved in the emission and absorption of greenhouse gases (GHG) in agriculture. The type of crops, the soil's physical, chemical and thermal properties are all factors related to GHG emissions and removal from the air. This work also shows agricultural practices can contribute to the reduction of GHG emissions and that gases such as carbon dioxide can be removed from the air and stored in the soil. Recorded changes in various soils' physical, chemical and thermal properties as it relates to crops and greenhouse gas absorption or emission provides information that is used to direct tillage practices and crop selections that will either result in lowered GHG emissions or increased absorption of GHG from the air.
- c. Source of Funds: State
- d. Scope of Impact: State Specific

Key Theme: Soil Quality and Human Health and Well-Being

- a. Description: In situ lead immobilization in contaminated urban soil by phosphates in Jasper County Superfund site. The study site is a historic mill tailings impoundment located northwest of Joplin City within the Jasper County Superfund Site, Missouri. The experiment consisted of 2- by 4-m plots in randomized complete block design with four replicates of three levels of H₃PO₄ treatments at rate of 0 (control), 7,500 and 10,000 mg P kg⁻¹. Each plot was bounded by installing 25-cm tall plastic edging to prevent cross-contamination between plots. Predetermined amounts of 85 percent H₃PO₄ that treated 15-cm soil depth were applied to the surface of soil and then rototilled into the soil. Soil samples at each plot were collected from the treated zone 90 and 180 days after treatment and analyzed for in vitro bioavailability, leachability, and chemical speciation of soil Pb.
- b. Impact: The H₃PO₄ treatment substantially reduced in vitro Pb bioavailability and leachability in contaminated mining waste. The reductions increased with increasing amounts of added and treatment time. Transformation of exchangeable-Pb, carbonate-Pb and Fe-Mn oxide-Pb to residual-Pb induced by P treatment was primarily responsible for the reductions of Pb bioavailability and leachability. This study demonstrates that in situ immobilization through H₃PO₄ application would effectively stabilize Pb and reduce the health risk of contaminated mining wastes, which may be

used as a cost-effective remedial alternative to safeguard human health and the ecosystem from the environmental contamination in mining areas.

- c. Source of Funds: U.S. Environmental Protection Agency (USEPA), Region VII, Missouri Department of Natural Resources (MDNR)
- d. Scope of Impact: State Specific

1862 University of Missouri Extension

Key Theme: Agricultural Waste Management

- a. 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 of Missouri 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. Many operations are highly concentrated and located in areas where soil conditions are not suitable for heavy land application of livestock manure. University of Missouri 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 of Missouri 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.

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/>).

b. Impact:

- Over 80 agricultural professionals including private consultants and USDA Natural Resources Conservation Service and Missouri Department of Natural Resources (MDNR) personnel completed two days of hands-on training using computer software to write a nutrient management plan.
- University of Missouri Commercial Agriculture Program collaborated with the Missouri Department of Natural Resources and Missouri Department of Agriculture to submit a consensus assessment of proposed revisions to the U.S. Environmental Protection Agency’s rules for Concentrated Animal Feeding Operations.
- Members of the University of Missouri collaborated with peers from Nebraska, Iowa and Kansas to submit an assessment of proposed revisions to the U.S. Environmental Protection Agency’s rules for Concentrated Animal Feeding Operations.
- University of Missouri Extension representatives joined university, state regulatory, and Natural Resources Conservation Service representatives from Missouri, Iowa, Kansas and Nebraska, as well as representatives from EPA Region 7, for numerous Heartland Animal Manure Management Meetings to discuss nutrient management planning (NMP) efforts, NMP software and technologies, and experiences in developing Comprehensive Nutrient Management Plans (CNMP). The core goal of this group is to facilitate a more uniform regulatory approach across the region and facilitate transfer of innovative solutions and successful programs among the states. University of Missouri faculty members serve on the coordinating committee.
- The Nutrient Management Resources website (<http://nmplanner.missouri.edu>) serves as a central clearinghouse for information needed by planners, including links to web-based land assessment tools, nutrient management software, decision support tools, and related information and references.
- Commercial Agriculture Program faculty members collaborated with the Center for Agricultural Resources and Environmental Systems (CARES) to expand the capabilities of the web-based site assessment tools, Animal Feeding Operation Site Assessment Tool (AFOSite) and Business Environmental Risk Assessment Tool (BERM). These unique tools help producers make smart decisions about locating agricultural operations using an Internet browser to access an Internet geographical information system (GIS).
- Commercial Agriculture Faculty participated in a national effort by USDA-Natural Resources Conservation Service (NRCS) to define a comprehensive nutrient management plan (CNMP) that meets NRCS and U.S. Environmental Protection Agency (EPA) requirements. This effort included multiple meetings with other groups supporting nationally available software supporting nutrient management planning to facilitate connectivity among software packages and facilitate writing of CNMPs.
- Through an EPA grant, the University of Missouri has been cooperating with MDNR and NRCS to develop a nutrient management plan template that meets the needs of regulators and NRCS

and is accessible to farmers. The grant has supported writing software code so the template plan is automatically generated once the farm information has been entered into Purdue's Manure Management Planner and Missouri's Spatial Nutrient Management Planner.

- University of Missouri Extension faculty led an ongoing monthly interagency meeting to discuss technical issues affecting animal feeding operations. The meetings also include representatives from Missouri Department of Natural Resources and Natural Resources Conservation Systems. Key issues addressed in 2006 included state and national rule making efforts for concentrated animal feeding operations, nutrient removal values for Missouri crops, and the Missouri plant available nitrogen calculation.
- Commercial Agriculture faculty collaborated on an extension publication providing a comprehensive analysis of using pig slurry manure from grow-finish or wean-finish operations as a fertilizer for crops. The publication provides detailed information on land needs, equipment needs, time requirements, recommended management practices and net value of manure.
- Commercial Agriculture Program faculty members led an effort to promote the expansion of pig grow-finish and wean-finish operations on farms with substantial crop production. The effort included meeting with major farm credit providers in the state and educational programs for interested farmers.
- Through a collaborative effort with DNR, MDC, NRCS, SWCD and University of Missouri Extension, an extensive educational program and watershed planning assistance have been carried out in southwest Missouri. The collaborative effort was designed to respond to water quality concerns about nutrient runoff from livestock and poultry manure. Proper NMP education and nutrient crediting of livestock and poultry manure resulted in a reduction of commercial phosphorus purchases by 40 percent over five years. Through proper nutrient crediting, excess phosphorus runoff is being controlled to improve water quality, and producers have reduced commercial fertilizer inputs by \$2.3 million with no decrease in hay or pasture production.

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. 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 of Missouri 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 of Missouri 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 of Missouri 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/>) and Missouri Watershed Information Network (<http://www.mowin.org>)

b. Impact:

- With Missouri's increase in rural populations, on-site sewage systems are seen as a major issue affecting water quality. In four years, more than 650 realtors and appraisers have attended the course "On-site Sewage Education for Real Estate Professionals." The focus of the course has shifted to include more information on water quality concerns and regulations that affect on-site sewage systems. The course provides lenders and real estate professionals with first-hand accounts of how these systems can affect property transfers and water quality. Participants evaluated the course as follows:
 - 95 percent of the participants reported the information learned was above average and were very satisfied with the training and materials.
 - 94 percent increased their ability to understand and communicate information to clientele.
 - 100 percent would use the information in their work.
 - 100 percent would share information with others.
- Home inspectors, on-site sewage installers and wastewater treatment professionals attended a course sponsored cooperatively by the Marion County Health Department and University of Missouri Extension. The course focused on on-site sewage systems, new technologies for on-site sewage systems, maintenance of on-site systems and the role of soils in selection of a site for an on-site sewage system.
- The "Creating a Healthier Home" program was offered to county nurses, day-care providers and private citizens to help people identify possible asthma triggers and hazards that may be found in the home. The program focused on identification of the triggers and what could be done to reduce, control or eliminate them. Mold and other hazards associated with water, moisture and air movement were identified as high-priority areas affecting human health.
- The University of Missouri offered a one-day seminar and field day to the Bradford Farm for members of the Watershed Committee of the Ozarks. This field day allowed participants to review on-site training areas and materials used to teach installers about the different systems available for on-site sewage use and how effective they are under different soil and climate conditions. From this seminar the Watershed Committee of the Ozarks wrote and received a

grant through the Missouri Department of Natural Resources for \$1.2 million to develop a demonstration and training area for on-site sewage installers and homeowners.

- Several Missouri communities have recently been hit with several major storms and tornadoes. This prompted a release of news articles on how to manage household materials destroyed by the storms. Working cooperatively with the Missouri Department of Natural Resources and the Missouri Department of Health and Senior Services, University of Missouri Extension provided news articles and informational materials in the areas affected by the storms on proper handling and disposal of residues left after the passing of the storms. Many of the materials associated with household debris are listed as hazardous materials and must be properly disposed of to protect water quality and human safety.
- c. Source of Funds: Smith-Lever, State, EPA/DNR 319 Water Quality
- d. Scope of Impact: Missouri

Key Theme: Land Use, Natural Resource Management, Water Quality

- a. Description: Water Festivals – Water and Natural Resources Education for Youth and Educators. A 1999 University of Missouri 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 of Missouri 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 of Missouri 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 website, 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/>) and Missouri Watershed Information Network (<http://www.mowin.org>)

- b. Impact:
- Over the last five years more than 30,000 third- to fifth-grade students have participated in water festivals and water awareness education co-sponsored by University of Missouri Extension. These students learn the basics of non-point source pollution, aquatic habitat loss, watershed stewardship and groundwater movement. The hands-on activities promote individual commitment and learning for the students. Testing before and after these activities showed a 78 percent increase in awareness of water quality issues among students who participated in the program.

- In southwest Missouri, more than 1,200 students participated in water quality educational events (water festivals). The events used representatives from different state agencies and local watershed groups to promote watershed stewardship and increase awareness of local issues with stream bank erosion, nutrient management, groundwater movement and the identification of different sources of contamination in the watershed. The water festival used the “listen – see – do” approach to working with the students and getting them involved in the educational activities. Southwest Missouri is a major tourism and agricultural production area and has a unique set of water quality educational needs.
- Three schools were used as a pilot test group to determine whether the water festivals resulted in improvement in MAP test scores in areas of science and environment. MAP test scores were compared for several years before and after water festivals were held to determine if there was a direct correlation between increased knowledge of water quality issues and science-based education. Topics concerning the hydrologic cycle, groundwater movement, watersheds, and soil erosion were used to help participants learn about water quality and watershed management. The test scores indicated an increase in MAP scores for those students that had participated in a water festival. This increase was due not only to a one- or two-day intensive educational effort for water quality but also to an increase in teacher participation in water quality education and science. Teachers found the activities educational, science based, easy to replicate and of high interest to the students.
- University of Missouri Extension developed a set of web-based environmental programs (<http://extension.missouri.edu/mowin/Project31903/interacmowin.html>) designed to increase awareness and knowledge of nonpoint-source pollution in specific watersheds. The web-based materials cover areas generally taught at the third to seventh grade levels and are based in the student’s home watershed. The project has two basic components: a series of preset educational materials that can be used in all schools and a second component that incorporates information about local watersheds so students feel more connected with their local watershed area and what is happening in it. Math, human health, writing and science skills are incorporated into the learning program. More than 300 teachers have received training on web-based water quality tools for the classroom. A follow-up survey shows that 70 percent of the teachers are still using the web-based water quality education tools in the classroom.

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

d. Scope of Impact: Missouri

Key Theme: Natural Resources

- a. Description: Natural Resources. Citizens own approximately 94 percent of the land in Missouri, 35 percent of which is forested. As a result, they are responsible for the management of most of the natural resource base within the state. Missouri’s forests and associated farmlands provide innumerable economic, aesthetic, ecological and recreational resources. These forest and farm landscapes provide for viable ecosystems that support biological diversity and wildlife habitat, contribute significantly to local economies, are fundamental elements of urban and rural communities, and are integral to the quality of life for all the citizens of the state. Missourians expect a safe and healthy environment as well as agricultural and forestry industries that serve as stewards of the natural resource base.

Recent surveys indicate that less than 10 percent of the 350,000 private forest landowners in the state actively manage their woodlands. Approximately 13 million acres of forestland are producing less than half of their potential wood product output. Reduced tree vigor is also reflected in serious

outbreaks of widespread oak mortality in the heavily forested areas of the state. In addition, Missouri is losing critical wildlife habitat as a result of increased fragmentation of the rural landscape, where many new landowners have little or no knowledge of natural resource management.

Expanded educational programs have been developed to enable landowners to make informed decisions regarding the stewardship of their farms and woodlands.

b. Impact:

- During 2006, the Missouri Woodland Steward Program reached more than 200 landowners statewide, representing 130 distinct parcels of land. The total area affected was 28,000 acres; approximately 50 percent of which was forested. Eighty percent of these individuals were new to any type of natural resource Extension programming.
 - Across all forestry and wildlife concepts presented in the short course, participants reported an average knowledge gain of 1.5 (2.1 before vs. 3.6 after) on a 1-5 Likert rating scale.
 - Six-month follow-up surveys show that 8,000 acres have been placed under management. Sample inventory data from this timbered acreage yields a projected NPV of \$14.2MM (\$1,775/ac). If left unmanaged, the timber on this same acreage would only have a cumulative NPV of \$3.3MM (\$412/ac). The projected measurable economic impact from the Woodland Steward Program is an increased NPV of \$10.9MM (\$1,365/ac).
 - Enhanced wildlife habitat on the entire property as a result of implementing recommended practices would have the added benefit of providing an annual income of \$12/ac. The cumulative NPV over the 25 years of periodic annual hunting lease payments (same period as active forest management on the timbered acres) would be \$513,700 (\$64/ac); this is in addition to the \$1,365/ac generated from timber production.
- In 2006, the Missouri Master Wildlifer Program (in partnership with the Missouri Department of Conservation) reached more than 200 landowners and natural resource professionals, affecting 200,000 acres. Renewable Resource Extension Act (RREA) funds were used to leverage additional funding of approximately \$80,000 for program development and implementation. Over \$2MM in revenue and cost-saving benefits are expected as a result of knowledge gained and implementation of management practices learned.
- During 2006, the Missouri Master Naturalist Program (in partnership with the Missouri Department of Conservation) resulted in formation of seven Master Naturalist Chapters across the state and the training of more than 250 volunteers. RREA funding was used to leverage additional resources of approximately \$150,000 for program development and implementation. Collectively, these individuals contributed over 8,000 hours of service (worth approximately \$136,000) to promote citizen stewardship of natural resources in their communities.

c. Source of Funds: Smith-Lever, RREA, State

d. Scope of Impact: Missouri

Key Theme: Pesticide Application

- a. 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 web at <http://agebb.missouri.edu/commag/beef/premierbeef/index.htm>.

University of Missouri 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 of Missouri Extension; Oklahoma State University; and private industry.

b. Impact:

- A total of 1,939 commercial applicators and approximately 7,000 private applicators attended University of Missouri Extension Pesticide Applicator Training sessions during 2006. A survey of commercial applicators who attended certification sessions reported "planned" changes in their behavior as a result of the training:
 - 96 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.
 - 96 percent plan to familiarize themselves with their company's emergency plan.
 - 93 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.

- 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.
- Three one-day pest management workshops were held in 2006. Tests before and after the workshops indicated that participants significantly increased their knowledge of pests and integrated pest management by attending the training sessions.

- 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

- a. 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.

A 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. Impact:
- In six years more than 40 watershed communities have received assistance in watershed planning by University of Missouri Extension personnel. In that period more than \$6 million has been secured by these watershed groups to implement BMPs to protect water quality.
 - More than \$3 million in grants to provide information and education on water quality concerns from on-site sewage, nutrient runoff and stream bank degradation has been acquired by watersheds groups. These groups have received assistance from University of Missouri Extension in developing watershed plans that demonstrate a need for public participation and education.
 - Total Maximum Daily Loads (TMDLs) have been set in many watersheds in the state. Eight of these TMDL watersheds have responded to the TMDL by developing a watershed management plan that identifies BMPs and implementation strategies to reduce bacteria, pesticide loading, livestock manure nutrient runoff, and habitat loss in selected streams and lakes.

- Through a collaborative effort with DNR, MDC, NRCS, SWCD and University of Missouri Extension, an extensive educational program and watershed planning assistance have been carried out in southwest Missouri. The collaborative effort was designed to respond to water quality concerns from livestock and poultry manure nutrient runoff. Proper NMP education and nutrient crediting of livestock and poultry manure resulted in a reduction of commercial phosphorus purchases by 40 percent over five years. Through proper nutrient crediting, excess phosphorus runoff is being controlled to improve water quality, and producers reduced commercial fertilizer inputs by \$2.3 million with no decrease in hay or pasture production.
- The Shoal Creek and Elk River watersheds in southwest Missouri have developed watershed plans to reduce levels of bacteria, sediment and livestock nutrients from local streams and lakes. Both groups have applied for 501(c)(3) status and have demonstrated a change in behavior based on the knowledge and awareness created by working with University of Missouri Extension in watershed planning. Besides acquiring \$1.4 million through local Soil and Water Conservation Districts to implement management practices to improve water quality, the group has applied for an EPA Water Quality Section 319 grant to provide information/education programming, and address urban and nonfarm issues. The three counties affected in the watersheds produce more than \$4 billion in livestock and poultry revenues yearly. By implementing a watershed management plan that addresses the nutrient and bacteria loading into water bodies, the livestock industry can remain strong and viable for the local economy.
- The Jack's Fork watershed in south central Missouri is a designated national scenic waterway that has more than 1.5 million visitors each year. It is also an area of rolling hills and pasture that supports a \$13.5 million livestock industry. Local leaders in the tourism and agriculture industries worked together with environmental groups to develop a watershed management plan that would reduce bacterial loading in the Jack's Fork River. Based on a locally developed watershed management plan, the watershed group identified sources of bacteria in the watershed and developed a plan of action to reduce, control or eliminate the sources and at the same time protect the viability and productivity of tourism and agriculture in the area.
- University of Missouri Extension has been asked to help facilitate a 12-county watershed planning event that will focus on water quality and quantity. The northwest region of Missouri has deep loess soils but little useable groundwater. Testing in shallow-drilled private wells has shown high levels of bacteria in more than 81 percent of the wells. The water supply in these wells is directly associated with seasonal rainfall and the subsurface soil moisture conditions. A nonprofit wholesale water commission is being discussed as a way of providing water that is of high quality and sufficient quantity. University of Missouri Extension is working cooperatively with the Missouri Department of Natural Resources to facilitate public meetings and get public input concerning the development of the commission.
- The Heartland Water Coordination Initiative is a USDA-CSREES 406 Water Quality grant in which the University of Missouri is collaborating with Kansas State University, Iowa State University, the University of Nebraska and EPA Region 7 on the topics of nutrient pesticide management, animal manure management, and community involvement in watershed management (CIWM). Missouri in particular is providing leadership for Region 7 in aspects of CIWM. Through the project a CIWM workshop was held in March 2004, highlighting community development principles and practices used to assist local watershed communities in organizing a watershed management process. Case studies from area watersheds were used as tools for learning and sharing of experiences and expertise. From this workshop, participants' evaluations identified a clear need for more resources and tools to address conflict mediation and public deliberation associated with local watershed management activities.
- In June 2005 the Heartland CIWM team hosted a training workshop to build capacity for identifying and managing conflict associated with citizen's involvement in watershed management efforts. The workshop was structured for university extension professionals from

the four-state region who have worked with local watershed groups. This provided an opportunity to strengthen the regional network of extension professionals involved in local watershed management activities and to facilitate exchange of water quality information, research and activities in the Heartland four-state region. Participants strengthened their community development skills by learning to identify different types and sources of conflict and by learning how to mitigate and address contentious watershed groups. The training also addressed the role of extension professionals in local watershed management activities, as well as the role scientific and technical information plays in the formation and sustainability of local community watershed management groups. Forty-six regional professionals, from four state land grant universities, participated in the conflict management training.

- The next phase of the Heartland CIWM project will be addressing partnership and coalition building among local, state and regional watershed professionals. Case studies and surveys are being continually developed in the four states to document social processes and indicators related to successful watershed management in our area.
- Many of the small communities in Missouri are unincorporated and many are un-sewered communities. Three of these small communities in northeast Missouri worked with University of Missouri Extension to become a 501(c)(3) organization to look at possible solutions to sewerage issues within the communities. The organization received a \$1.5 million grant from USDA Rural Development and the Missouri Department of Economic Development to study the feasibility of creating a rural sewer district and to install “low cost” waste treatment centers in each community. Once completed, the reduction of improper on-site sewage disposal should improve human health and water quality in the region.
- The University of Missouri Watershed Science and Stewardship Center received a grant through the Soil and Water Conservation Program to develop a systematic approach to model watersheds and determine the effectiveness of implemented watershed practices for improving water quality. A computerized modeling tool has been designed and field tested in five pilot watersheds. Through the Missouri Department of Natural Resources, a grant has been received to develop the training courses needed to educate selected agency personnel involved in watershed management planning. The model will assist these watershed managers in the evaluation of practices and help determine cost effectiveness of the practices being installed that improve water quality.

For additional program information see: Water Resource Information (<http://www.fse.missouri.edu/waterquality/>) and Missouri Watershed Information Network (<http://www.mowin.org>).

- 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 University of Missouri Extension Overview

Human Environmental Sciences

The University of Missouri Human Environmental Sciences Extension program is committed to creating educational programs to improve the lives of Missouri families. Through a wide variety of delivery methods, University of Missouri Extension assisted children, youth and adults in learning ways to improve their personal, family and community health and well being. In 2004, faculty continued to address major issues facing Missouri families, including child abuse, adolescent pregnancy, financial problems, poor quality childcare, inadequate housing and divorce. Through these programs faculty reached more than 250,000 Missouri citizens. In addition, over 300,000 unique visitors accessed the MissouriFamilies.org website. The Internet presence averaged **six page views every minute of every day!**

4-H Youth Development

4-H Youth Development faculty from University of Missouri and Lincoln University provided program leadership, training, curricula and technical assistance to 4-H youth specialists and youth program assistants in county University of Missouri Extension offices. Our field faculty collaborated with over 12,720 youth and adult volunteers to plan, implement and evaluate local youth development programs. 4-H Youth Development Programs reached 118,302 Missouri youth in 2006.

4-H Youth Development Programs reached young people in every Missouri county. About 25 percent of the youths reached were enrolled in the 4-H club program, a yearlong educational experience that included learning by doing in projects, community service, and family involvement. Others participated in 4-H school programs, seminars, conferences, camps, or childcare programs. In addition, faculty worked with parents, caregivers, educators, and youth professionals to improve the systems that support young people.

4-H Youth Development Programs collaborated with diverse agencies, organizations and partners to expand public and private resources available to meet the needs of Missouri's youth and families. In 2005, 4-H Youth Development Programs generated over \$1.7 million in grants, contracts and awards in support of outreach programs. In addition, the Missouri 4-H Foundation provided \$1.3 million in private support. External support of 4-H Youth Development Programs totaled over \$3 million.

4-H Youth Development Programs address the broader developmental needs of youth, in contrast to single issue or deficit-based models that focus solely on youth problems. Programs are grounded in research and based on articulated citizens' needs and concerns. 4-H Youth Development Programs strive to influence the "environments" or multiple systems that impact young people at the family, community, state and national levels. The following are highlights of the 2006 4-H Youth Development Programs.

- Missouri's 12,720 4-H volunteers provided over \$46 million in volunteer services in 2006. National studies suggest volunteers donate an average of 208 hours annually, valued at \$17.55 per hour.
- For every \$1 invested from public resources for Missouri 4-H programs, 4-H leveraged \$8.48 more resources to serve children, youth and families in every county of the state.
- 3,427 4-H volunteers and 4,285 youth professionals, human service providers, and volunteers participated in professional development offered by University of Missouri 4-H Youth Development faculty.

- Youth Futures - College Within Reach program impacted 87 adolescents aged 14-19 through an intensive college orientation conference and a mentoring program. The program helped youth (minority, low-income, first generation college students) view college as an obtainable goal. Of participants who graduated from high school during 2002 to 2005, 64 percent are currently enrolled in college, 7 percent joined the military and 15 percent entered the workforce.
- Children of criminal offenders are six times more likely to be incarcerated at some point in their lives. One youth leaving school for a life of crime and drug abuse costs society \$1.7 million. 4-H Living Interactive Family Education program engaged 59 incarcerated fathers, 106 caregivers of 141 youth in positive youth and family development experiences. If just ten percent of these youth stay in school, \$17 million would be saved.
- Missouri 4-H is committed to keeping youth safe. A comprehensive volunteer screening process was implemented requiring every applicant to be screened for criminal activity and child abuse and neglect. Keeping youth safe is expanding to other University of Missouri Extension programs. The Master Naturalist program, a partnership of the Missouri Department of Conservation and Agriculture and Natural Resources Extension; the AmeriCorps*VISTA volunteers for Extension and all families hosting youth through the International Youth Exchange. As of fall 2006, more than 8,833 volunteers successfully completed the process.
- Through a cooperative agreement with the University of Missouri-Columbia Student Financial Aid office, students are hired as 4-H community service assistants (CSAs) and assigned to County University of Missouri Extension Centers for summer work. Since 1997, the value of the 4-H CSAs work in Missouri communities is over \$680,000. During summer 2006, 31 University of Missouri students worked as 4-H CSAs.
- Of the 61,700 4-H'ers involved in the school enrichment program, over 29,000 of these youth in grades 2 through 6 participated in the Agriculture Education project called Hatching Chicks in the Classroom. This school enrichment project uses pre-incubated chicken eggs, brought to the classroom for a week, to teach basic scientific concepts in egg development and life and death cycles.
- Incorporating technology into 4-H projects helped 300 4-H youth understand how classroom subjects like science and math are part of our everyday world and are linked to potential careers. The U.S. Department of Labor predicts science, engineering and technology jobs will account for half of the fastest growing occupation between now and 2014.
- The 4-H Shooting Sports program involved 5,444 youth and 906 adult volunteers. Other environmental stewardship programs reached 7,526 youth, including forestry, soil conservation, sport fishing, wildlife, ecology, environmental science, outdoor skills, water riches, and conservation.
- 19 4-H Camp groups participated in a statewide evaluation in 2006. Over 300 youth, ages 10 to 13 agreed most strongly that while having a wealth of fun, 4-H Camp afforded them the opportunities to learn skills to work out differences with others, to complete jobs they were responsible for, to make new friends and to follow directions. These attributes are considered necessary to be successful in high skill, high wage professions by the U.S. Department of Labor.
- Over 140 teachers of the Special School District of St. Louis learned about integrating 4-H curricula and teaching methods into their classrooms. The Special School District provides educational services to 30,000 students. More than 1,000 youths from the Special School District have enrolled in 4-H Aerospace and Foods Projects.
- Missouri's 4-H Global Education program objectives are to assist young people, families and communities to learn more about other countries and cultures, develop an appreciation of the social, economic, political and cultural contributions of all people and better understand how culture influences values, beliefs and attitudes. Exchanges with Japan, Russia and Ukraine were coordinated.

Community Development

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

Five areas have been especially emphasized this past year. First, leadership development in local communities through the Community Development Academy has demonstrated many positive impacts in communities across the state. Second, creating inclusive communities to particularly address the rapid in-migration of Hispanic families into Missouri has involved outreach to Hispanics and works to foster multicultural communities across the state. Third, community decision making efforts have focused on increasing the number of communities engaging in public dialogue around important issues and on providing sound decision support and planning assistance to communities through collaborative learning. Fourth, community emergency management programs have focused on building resilient communities capable of responding to natural disasters and prepared for homeland security threats. Fifth, development of community food systems has increased local food sources and provided new opportunities for local producers.

The Community Development Program draws upon resources from several departments in the four campuses of the University of Missouri and works collaboratively with Lincoln University to reach out to diverse audiences as well as support a number of other extension programs. These programs include grassroots watershed plan development, community gardening and food systems, and community housing programs among others.

Program Highlights

- The Community Development Academy (CDA) attracts from across the nation and around the world. The international component has grown in importance to CDA, accounting for 25 percent of the enrollments. Of the eighty participants in 2006, twenty were internationals from Kenya, Australia, Thailand and the Philippines. Eighteen people from Kenya have completed at least two of the three CDA courses. Participants report having the ability to relate their experiences to those of people from different cultures as a result of the course as they encounter more diversity in the communities in which they work. In exit and follow-up evaluations, participants in the 2006 CDA reported they had increased knowledge and understanding of community processes and had changed their practices in their communities. The interactive courses helped them build relationships with fellow community development practitioners from across the state and around the world. Many comments indicated this was one of the most important assets of the course in both the short-term and the long-term. When surveyed at one year or later, 95 percent of the CDA participants reported using what they learned, and nearly 50 percent reported using what they learned “a great deal.” 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 to work on issues of importance to citizens.
- Seventy-two people from sixteen states and the District of Columbia participated in the first component of the North Central Region’s Foundations of Practice. In a survey of the most recent course, all of the participants reported gaining in knowledge from the program with 57 percent reporting they gained a lot of information/knowledge. Sixty-seven percent found some of the information new and an additional 27 percent found most of the information new. Eighty-six

percent said the program met their expectations and found it a worthwhile experience. Overall, 86 percent of the participants had a favorable reaction to the program.

- As a result of the public deliberation programming, the University of Missouri has leveraged at least \$42,000 and nearly \$2,000 in in-kind monies. Deliberative dialogue has been incorporated into two major grants from the Ford Foundation and the Pew Trust at the University of Missouri. During the last year, approximately forty new facilitators and moderators have been trained in processes that engage people in an unbiased venue to dialogue and assist public policy decision making on the issue at hand. An evaluation study revealed the development of new community networks as a major impact of planning and convening community forums.
- The Community Emergency Management Program in partnership with the Fire Rescue and Training Institute provided 44 classes to 1,002 participants from State Emergency Management, State Fire Marshal, State Department of Agriculture and local elected officials, police, fire, EMS, health, public works, transportation and emergency management. In addition, programs conducted by regional faculty reached approximately 5,005 persons directly, involved 173 partners and 160 volunteers.
- In the midst of six Presidential disaster declarations in Missouri during the year, community emergency management 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 (SEMA), team members worked with COADs and FEMA to support recovery efforts, including working directly with SEMA and FEMA in Disaster Recovery Centers throughout the region in providing research-based disaster recovery information from University of Missouri Extension and affiliated EDEN institutions. The team was crucial in supplying agricultural disaster assessment and meeting the needs of victims, and disaster workers. In the first days following these events, Extension workers went from home to home in rural areas, which had no phone service or power, to check on people, answer questions, and find out what they needed. In the first week, they worked with local farmers and producers to supply SEMA and USDA with information on agricultural impacts of the storm's winds, hail and heavy rains. Local Extension offices and employees were impacted by these storms, but preparedness efforts directed toward offices and employees made a substantial impact on mitigating the effects of these weather disasters.
- As part of the Alianzas Program, community collaboration in St. Joseph has successfully identified needs and provided services for the new immigrant population associated with the opening of a food processing plant. As a result of the Bi-National Health Week, at least 25 organizations continue to meet in the Kansas City area and make available educational offerings and health screenings for Hispanics/Latinos at the Mexican Consulate on a monthly basis.
- The "Cambio de Colores (Change of Colors) – Latinos in Missouri" conference served as a catalyst for the community-at-large conversations with 227 state, university and local attendees from 150 organizations, exploring an array of Latino and community-based issues and learning best practices for interacting with the Latino community.
- The estimate of the impact of the August Sales tax holiday on state and local revenues was used by the Missouri Municipal League and the Missouri Association of Counties in their legislative activity, was the subject of several newspaper articles, and was used by local government to make decisions to participate or to opt-out of the tax holiday.
- More than thirty organizations, in various stages of their organizational development were served as they worked to develop effective organizational structures that best suited the purposes of their organizations. At least eight obtained their 501(c) 3 status successfully.
- Community decision making programs engaged over 400 partners in programming and involved over 45,000 local contacts. Two key examples of results include:
 - The City of Herculaneum (pop. 2,000), noted for its serious environmental and health problems from a lead smelter that operated in the town for over 100 years, formally adopted the master

plan which was developed with facilitation by Extension. The plan includes development goals for the future of the community, identifies areas that cannot be developed due to lead contamination and outlines a course of action for future development.

- Work with mayors from twenty St. Louis County municipalities over an 18-month period to develop a plan to reduce the costs of trash hauling and increase the amount of recycling resulted in a cooperative bidding program that established a uniform level of service including recycling options and a common price for all communities. The program will be bid in 2007 with three communities leading the way. As the other communities' service contracts expire they will be able to join the cooperative bid at the same price and level of service as the original communities. During the process of developing the plan several of the mayors became strong advocates for recycling.
- The three year planning process with the Missouri Soil and Water Districts Commission resulted in the adoption of the plan which guided development of program priorities for the next ten years and served as an educational tool in garnering more than 70 percent "yes" votes in the successful passage of a statewide ballot initiative in 2006. In particular, the organization is focusing on changing land use and education for future research and program development as a result of the statewide planning process.
- The descriptive analysis of the status of Missouri's Medicaid Program produced by the Office of Social and Economic Data Analysis and the Community Policy Analysis Center (OSED) which has contributed to a major transformation of the Missouri Medicaid Program now underway to address coping with increasing health care costs is a critical economic development objective. A new three-year project led by the Center for Health Policy and OSED) was awarded to the University of Missouri to build the capacity to analyze the Missouri Medicaid Program in ways that will foster improved cost efficiency and enhanced professional practice. An OSED) team is building an extensive data warehouse of Medicaid transactions. As a result, clinical and data analysis specialists are now framing projects where timely information will be used to inform Medicaid transformations and improvements.
- The quality of public education in Missouri was improved. Together with Missouri Department of Elementary and Secondary Education, the Office of Social and Economic Data Analysis played an integral role in the redesign of the Missouri School Improvement Program – the process through which Missouri School Districts are accredited. The analysis of school improvement data from thousands of Missouri teachers, students and parents is now incorporated in state accreditation decisions and provides a foundation for local school improvement planning.
- Community collaboration was increased and information integrated in a timely way. Community Connection provided over 350,000 web pages of health and human service resource information. Approximately 150,000 unique visitors sought information from the statewide directory. Every county in the State of Missouri and the City of St. Louis has resources listed in the directory. The application was one of the first "Go local" sites at the National Library of Medicine.
- Evaluation of participants of leadership programs continue to indicate participation has resulted in personal growth and self-efficacy, community commitment, a shared future and purpose for the community, community knowledge, and civic engagement. Over the past 22 years, more than 7,190 participants from two-thirds of Missouri's counties in the Experience in Community Enterprise and Leadership (EXCEL) program are actively engaging in local, regional, and state roles to benefit their communities. The fastest growing aspect is the development of specific community youth leadership development programs, with 34 having been conducted this past year. Highlights from across the state included:
 - Leadership Northwest Missouri graduates worked to correct income guidelines established by the 2000 Census that excluded all of Northwest Missouri for eligibility for Rural Development funds with the result that almost all of the counties and many communities now qualify for

Rural Development funds. To date, eight communities received \$57,408 funding for early warning systems.

- Lafayette County Commissioners use the LEAD roster to aid them in selecting citizens for county boards and county committee appointments.
- Dent County Youth Leadership Academy (YLA) reported the addition of three participants to the City of Salem's Youth Advisory Committee, which provides a youth perspective to community issues facing Salem. Two youth were added to the Salem Area Community Betterment Association board. Salem School District educators indicated an increased level of involvement and leadership skills by those who have completed the YLA. Funding for YLA was provided by the family of a youth YLA graduate who was tragically killed. The positive affect that YLA had on their son inspired them to make sure other youth had the opportunity to experience this leadership program.
- Since 1992, Leadership RAP has built skills and leadership capacity among nearly 600 juvenile offenders at the Boone County Juvenile Justice Center. This is a small program in which only 44 juveniles per year (approximately 12 percent of the juvenile justice center residents each year) are able to participate. By reducing recidivism, Leadership RAP saves public money. Four years after attending Leadership Rap, recidivism is reduced 48 percent. The costs savings of reduced retention of juveniles from four years of Leadership Rap after juveniles have been out four years is estimated at \$218,880. In addition the program reduces court costs, policing costs, and costs for detention of offenders as adults. These savings are likely much larger than the reduced costs of juvenile detention.
- In St. Louis, the Old North Neighborhood Partnership served as an effective vehicle to connect the university and the community, to engage faculty and students in applied research and community-based learning projects, and to create and/or facilitate positive changes in an urban neighborhood.
- As a condition of federal funding, community action agencies are required to include the constituents they serve on their boards of directors. Step-Up to Leadership! is generating a new cadre of local leaders to serve on Community Action Agency boards and affect change in their communities.

1890 Cooperative Extension Overview

Lincoln University Cooperative Research and Extension efforts toward accomplishing Goal 5 embraced and implemented programming which addressed such issues 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 University of Missouri Extension

Key Theme: Aging

- a. Description: Successful Aging. The 65 and over population in Missouri is 13.5 percent; however, it is projected to reach 15 percent by 2010 and 18 percent by 2020. Ranking among the top one-third of states in proportion of the population over age 65 and with 25-30 percent of some rural counties in this age range, the Aging Program has continued its focus this year on Successful Aging and on Relatives as Parents. Seniors are living longer and can use resources to maintain both physical and mental well being in order to live independently. The Successful Aging project provides

programming and resources to help older adults lower their risk of disease and disease-related disability, improve mental and physical function, prepare for social role changes (e.g., retirement), and remain engaged in life. Key materials have been delivered through a comprehensive website – the Center on Aging Without Walls (<http://cas.umkc.edu/casww/>) a correlated curriculum on “Aging Well,” the Missouri Families website, and in several other areas critical to successful aging. New content areas added to Successful Aging this past year are a new curriculum in Mental Health and Aging and another on Creativity and the Aging Brain.

- b. Impact: During 2006, regional specialists spent 2,025 hours providing educational support to over 9,253 contacts. Successful Aging hours spent were 1,568.5 with 8,335 contacts. Topics included aging well, disease prevention, strength improvement, chronic disease self-management, memory training, driver safety, preserving family traditions, Medicare drug benefits, emergency management training, life histories, and spirituality and aging. In general, response of citizens to programs was highly positive, and they asked for more such programs in their communities. In southwest Missouri, 60 older adults attended train-the-trainer sessions on Successful Aging and Creativity and the Aging Brain in order to provide this information to members of their clubs. Several of the participants commented the information encouraged them about growing older. Older adults reported they would use information learned to initiate changes and action steps – e.g., making healthier eating choices, increasing exercise, improving memory, updating wills, selecting a Medicare drug program, and making specific life-style changes to care for or cope with chronic disease. Where follow-up studies (3-12 months) were done, program participants still found value in what they had learned and reported having made relevant changes. Some specific comments were:
- “Learning that I can help my memory by things that I can do has changed my attitude about growing older and feeling less control in my life.”
 - “I learned that there are many exercises, etc. that will help me with forgetting so many things. Thank you so much.”
 - “I plan to pay more attention and be focused on what I want to remember.”

A small grant from the Brookdale Foundation in 2003-2005 focused on building support groups for grandparents and other relatives raising grandchildren (particularly in rural communities) throughout the state of Missouri, as well as facilitating collaboration through a state-wide network. Over twenty regional Extension specialists facilitated local support groups in their assigned counties and cultivated the program needs of their clients. Regional specialists have continued to focus on this theme and spent 457 hours providing educational support to 918 contacts. The formation and support for a Coalition on Grandparent and Relative Caregivers has also been a successful outgrowth of this work, with regional specialists playing a leadership role. A proposal is being developed to the Brookdale Foundation for an additional two-year grant to strengthen this coalition and further enhance this program area. A grandparent in Kansas City reported she was “at the end of her rope” and feared she would have to put her grandchildren in foster care as they were in trouble at school and she felt she had lost control of them. The support she received from other grandparents in the grandparent support group not only gave her renewed hope but led her to additional resources that worked directly with her and her children.

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

Key Theme: Childcare/Dependent Care

- a. Description: Childcare. University of Missouri Extension is striving to relieve Missouri’s “silent crisis” in childcare through targeted childcare provider professional development opportunities. Based on the recent Plan of Work process, stakeholders identified several focus areas for ongoing and new program efforts: 1) childcare provider and program improvement, 2) workforce preparation, and 3) the socialization of children’s health, nutrition, and physical activity in childcare facilities. Extension faculty will continue offering training opportunities that support current statewide initiatives, such as the MO Department of Elementary and Secondary Education’s Pre-Kindergarten Standards, MO Extension’s Building Strong Families modules, and specialized workshops (e.g., “Child Observation”) while also developing several new programs. To address issues associated with early childhood workforce preparation, Extension faculty will deliver programs designed specifically for entry-level childcare providers (e.g., Penn State’s New Staff Orientation) and program administrators (e.g., “Everything but the Children: Childcare Program Administration”). Lastly, in an effort to improve young children’s early eating and activity experiences, Extension faculty will provide training to state agency staff and childcare providers. Several programs are already in place (e.g., “Healthy Start”, “Socializing Healthy Habits: Children’s Nutrition and Physical Activity”) and will continue to be offered.

Childcare 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, childcare participation has become the norm for Missouri children and families. Research indicates the quality of children’s childcare experiences contributes to their immediate and long-term well being. Moreover, childcare provider preparation and ongoing training are the best predictors of quality early care and education. However, national assessments depict a system of mostly poor to adequate childcare programs. Missouri cannot recruit and retain a well-prepared childcare workforce, support families’ workplace success and promote healthy child development without addressing the problem from multiple perspectives.

- b. Impact: During 2006, 4,853 individuals were touched by University of Missouri Extension’s efforts to improve the provision of quality early care and education. For instance, childcare providers and other early childhood professionals attended the workshops: Child Observation, Promoting Early Literacy in Young Children, and Socializing Healthy Habits in Young Children: Nutrition and Physical Activity. Although the evaluation results are not quantifiable, anecdotal evidence suggests childcare providers value our educational programs and typically report acquiring new knowledge and skills.
- c. Source of Funds: Smith-Lever, State, Grants
- d. Scope of Impact: Missouri

Key Theme: Children, Youth and Families at Risk

- a. Description: Adolescents At-Risk Program. The troublesome adolescent years have been a source of social concern for decades. The years from puberty to early adulthood have been viewed as risky and problematic. Based on the *Youth Risk Behavior Survey* data for Missouri teens in 2003, 63.3 percent of high school students have smoked tobacco, 77.8 percent have consumed alcohol during their lifetime, 30.5 percent have engaged in binge drinking, and 41.3 percent have smoked marijuana. Large percentages of youth also 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, the teen birth rate was 23 per thousand aged 15–17 in

2001. When asked about sexual behavior in 2003, 52.2 percent of high school students reported having had sexual intercourse, and 38.4 percent are sexually active on a regular basis.

The Human Development Programs and 4-H Youth Development 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 of Missouri Extension prevents youth from becoming involved in problem behaviors. In addition to these efforts, the Center on Adolescent Sexuality, Pregnancy and Parenting (CASSP) developed several major programs designed to prevent teen pregnancy and provide support to new adolescent parents. These were:

- Missouri Volunteer Resource Mothers Program. Staff have developed a program for teen parents that matches them with an adult mentor. Throughout the course of the program, the adolescent parent and her family are encouraged to attend educational programs designed to reduce child abuse, increase educational opportunities for the adolescent mother and the baby, increase parenting skills, reduce repeat pregnancies and increase maternal feelings of well being.
- HIV/STD and Pregnancy Prevention. University of Missouri Extension regional specialists train school personnel, juvenile justice, DYS, alternative school staff, students and parents 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 personnel working with high risk youth to disseminate valuable safe sex information to the target population as well as to increase Missouri school administrators and teachers to implement one or more of the Center for Disease Control's HIV-risk reduction curricula in their schools.
- 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.
- For additional information see Adolescents (<http://www.missourifamilies.org/adolescents/index.htm>) and Missouri 4-H (<http://mo4h.missouri.edu/>).

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

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 2005-2006, over 200 adolescent mothers and their infant children participated in Missouri Volunteer Resource Mother programs throughout the state. 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 their infants.

The Adolescent Mother Journaling Program (AMJM) teaches techniques to use as alternatives to physical or verbal abuse. Since 1998, 38 Resource Mothers programs have been established in Missouri and five states: New York, Hawaii, New Mexico, South Carolina and Georgia. Over 200 teen mothers received mentoring through Missouri MVRM (Missouri Volunteer Resource Mother) programs in 2006.

Three regional HIV information workshops were presented to professionals around the state. These workshops reached DYS faculty, juvenile justice staff, school teachers, administrators and community service professionals. These workshops provided CDC-approved training of the Making Proud Choices 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.

In addition to the programs for professionals, HIV/STD and pregnancy prevention programs for teens and their parents across the state were also held. There is a particular flurry of action in the Southeast region where regional specialists worked with over 1,000 students on sexual education and related high risk behaviors. Parent meetings were also held throughout the state where information related to talking to kids about sexual activities was presented. Finally, literature was disseminated to parents of teens through the Missouri families website and newspaper articles.

Maltreatment and Adolescent Pregnancy and Parenting (MAPPP) program was also delivered to over 30 young parents throughout the state. This program allows individuals who currently work or anticipate working with high risk youth valuable information about the likelihood of abuse for pregnant or parenting adolescents.

- c. Source of Funds: State, Federal Grants
- d. Scope of Impact: State

Key Theme: Children, Youth and Families at Risk

- a. Description: Building Strong Families. The program outcomes for Building Strong Families are to help families develop stronger relationships, improve their communication and thrive within their communities. Demographic trends indicate the need for this type of programming is greater than ever before. Recent research has looked at the expanded roles of fathers in the home and shows a new kind of father emerging – a more involved one whose responsibilities reach farther than his career. As women continue to balance work and family responsibilities, they look for ways to alleviate family stress. Children continue to face a number of issues, as well. In Missouri, 15 percent of children live below the poverty line. Over the past thirty years, the obesity rate for children has more than doubled.

In addition, the Missouri Department of Corrections indicates, “97 percent of all the men and women committed to prison will someday be released from incarceration. During 2005 more than 18,000 individuals were released from Missouri correctional institutions. 32 percent were returning parole violators who failed to transition successfully and were returned to confinement.”

University of Missouri Extension’s Building Strong Families: Challenges and Choices program (<http://extension.missouri.edu/bsf>) helps families find their strengths, build on those strengths, and learn skills to create stronger families, improve relationships, and increase communication. The program draws from an interactive, 13-topic curriculum to provide a series of life skills workshops for families. Building Strong Families targets working families with children, but it can be and has been adapted to reach many different audiences (e.g., teens, grandparents, and childcare providers).

Supplemental materials were developed for lower-level readers, and a parallel curriculum for youth (ages 5-12) is being developed. Individual groups can customize the multi-session program by choosing from the following topics: Family Strengths, Communicating, Managing Stress, Child

Self-Care, Food and Fitness, Working, Setting Goals, Positive Discipline, Money Matters, Balancing Responsibilities, Consumer Beware, Healthy House, and Kids and Self-Esteem.

In 2006, an additional 78 facilitators from Missouri were trained to implement the program in their communities. The Building Strong Families program design team has certified a total of 603 Extension specialists and paraprofessionals and community agency educators from Nebraska, North Dakota, South Dakota, Illinois, and Minnesota. To date, 5,497 family members have participated in the program.

The Missouri Department of Corrections contracted with University of Missouri Extension to implement the Building Strong Families Program in eleven correctional facilities as part of the Missouri Re-entry Process. This effort works to better prepare offenders to go back to communities with the goal to also lower the recidivism rate. Building Strong Families Facilitators reached 652 offenders.

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

Early findings indicate family members are benefiting from this program. Overall, a large percentage of the adults participating in this program report 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 they have gained new information or learned a new skill. 75 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%).

Family members (n=51) shared their experiences with the Building Strong Families Program in five focus groups around the state of Missouri. Participants reported several changes they made after attending Building Strong Families workshop sessions. Many shared they feel better about themselves, they think about situations differently, they positively changed the way they act, and they learned new skills and information.

The change program participants most often brought up was a positive change in their parenting style and an improvement in the way they interact with their children. Their relationships with their children are better now than they were before they attended the program.

A mom talked about the strategies she tried with her young daughter. At the time of the class, her daughter was under 2, and the mom didn't always know what she should and should not do. The mom now feels like her parenting skills have greatly improved. “So if they (kids) don't know that they're not supposed to do that, so you couldn't explain it, and it was really frustrating around wasting my time. But when I used positive reinforcement, when I redirected her attention, she got it a little bit better and it was easier for both of us, it saved us a lot of time. I felt that my parenting

skills were getting better. And I feel that they're a lot better now."

Other comments from focus groups include:

- "I try not to hide my feelings now."
- "I am more likely to ask [for help or ideas from others in the group]. I wouldn't do this before [the program]."
- "I spend more time with my children."
- "We turn the TV off during supper. We talk to each other more."

Feedback from the Department of Corrections about the work in Missouri correctional facilities has been positive. Several inmates are asking for future sessions of Building Strong Families.

After a self-esteem workshop, one prisoner said, "We are mirrors for our kids." He realized what he does makes a difference to his children. Another inmate said, "If I can learn fun things to do with my kids, I can help them stay out of trouble." Children who have an incarcerated parent are five to seven times more likely to go to prison themselves compared with children who do not.

For each person who does not return to prison because of Building Strong Families and the Missouri Re-entry Process, Missouri taxpayers save approximately \$14,500 per year.

Follow-up with a number of the offenders will take place in 2006 to assess the impact of the program. Additional series are being planned in the eleven correctional facilities as well as in new sites.

Short- and medium-term outcomes indicate 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/>); Center on Adolescent Sexuality, Pregnancy and Parenting (<http://extension.missouri.edu/hdfs/caspp.htm>) and Family and Community Resource Program (<http://extension.missouri.edu/fcrp/>).

- c. Source of Funds: Smith-Lever, State, Participant Fees
- d. Scope of Impact: Missouri, Nebraska, North Dakota

Key Theme: Children, Youth and Families at Risk

- a. Description: Children of Offenders – 4-H Living Interactive Family Education (LIFE) Program. One of the most challenging issues facing state government in Missouri and across the nation today is the reduction of recidivism rates of adult and juvenile offenders. Children of offenders frequently grow up in environments marked by poverty, isolation, and substance abuse. These conditions place the children at risk of generational incarceration.

In 2006, the Missouri Department of Corrections reported a total of 30,141 men and women committed to state prisons in Missouri. Of those, 17,577 had one or more dependent children. While female offenders represent nine percent of the total offender population, the majority (81%) of female offenders report dependent children. Approximately 15,478 or 56 percent of male offenders report they have dependent children.

Several studies have shown continued contact with family members during and following incarceration can reduce recidivism and foster successful integration back into the community. Seventy percent of offenders who received three continuing visitors were arrest-free during their first year of release.

Missouri's correctional system has not historically focused on family relationships or creating social support systems for offenders and their families. One program has focused on responding to the needs of the entire family (i.e., the incarcerated parent, the offenders' children, and the caregiver raising them). The name of the program is the 4-H Living Interactive Family Education (LIFE).

The initial 4-H 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 three state correctional centers in Missouri, including the original pilot program at the Potosi Correctional Center (PCC), a maximum-security prison; and three medium security correctional centers. One of the medium security prisons is for female offenders and the other two are for male offenders. As a partnership between University of Missouri Extension and the Missouri Department of Corrections, the 4-H LIFE program is funded by a five-year grant from the Children, Youth and Families at Risk (CYFAR) initiative of CSREES-USDA.

The overall objective of the 4-H LIFE program is to promote a strong, healthy and nurturing family environment for children of incarcerated parents. The 4-H LIFE program provides children and their incarcerated parents with a low-stress, child-friendly environment in which they work together on 4-H activities based during enhanced or non-traditional visitation sessions. All incarcerated parents who participate in the 4-H LIFE family visitation program are required to participate in weekly parenting skills classes and monthly planning meetings.

- b. Impact: As of September 20, 2006, the 4-H LIFE program has positively impacted a total of 758 Missourians, including 111 incarcerated parents, 341 children and youth, and 306 caregivers since it was started in 2000. In November 2005, the 4-H LIFE Program was recognized as a National 4-H Program of Distinction by USDA, CSREES. That honor led to the 4-H LIFE Program being selected as one of the five programs receiving the Family Strengthening Award from the Anne E. Casey Foundation for improving outcomes for rural, disadvantaged families. In Missouri, the 4-H LIFE staff serve on the Missouri Restorative Justice Coalition, the Missouri Department of Corrections Faith and Reentry Subcommittee. In addition 4-H LIFE staff help provide ongoing assistance and support to two, grassroots caregiver groups in Missouri: Kairos Outside and Missouri Citizens United to Rehabilitate Errants (MO CURE).
- c. Source of Funds: Smith-Lever, CYFAR/NCP, Grants
- d. Scope of Impact: State and National (CYFAR project)

Key Theme: Children, Youth and Families at Risk

- a. Description: Children of Deployed Military Personnel. 4-H is responding to the needs created by the deployment of soldiers from active military, National Guard and Reserves by developing programs and partnerships to support youth of these military families. In 2005 Missouri 4-H continued to work with staff, children and families at our two military installations – Whiteman Air Force Base and Fort Leonard Wood – by organizing clubs, enrolling members, training leaders and integrating military 4-H clubs into 4-H/Extension programming. Clubs are being organized and

military youth are participating in county and state educational events and leadership roles.

Missouri's Operation: Military Kids (O:MK) program serves the widely distributed National Guard and reserve families. The state partnership team has grown to more than 15 statewide organizations. In addition to the Missouri National Guard and Reserve, 4-H is partnering with veteran's groups, other youth serving organizations, service clubs, and schools. The partners play an active role in creating awareness, training, fundraising, and reaching families who may not self-identify as military and find their lives are seriously disrupted through prolonged and multiple deployments.

- b. Impact: The programs of O:MK provided opportunities for National Guard and Reserve families through several methods:
- 900 Hero Packs from Department of Defense were distributed to youth and deemed so successful that additional packs were provided by our partners and Missouri 4-H'ers.
 - Ambassadors for Speak Out for Military Kids were trained and made presentations at several statewide conferences and at local schools and community groups. They have reached more than 750 "suddenly military" youth through trainings at Family Readiness Group meetings.
 - Since August of 2005, the Mobile Technology Lab has been used to keep young people in touch with Missouri soldiers who are serving away from home. The lab has been used at Family Readiness Group meetings, National Guard and Reserves and Active Duty Military youth events, conferences, county fairs, the Missouri State Fair and County training events.

Testimonials

"This is greatly needed for school counselors to understand the behavioral changes we are seeing in some of our students." (School Counselor, Kansas City, MO)

"I am glad we had this training and am glad to help these suddenly military children as they struggle with their loved ones being deployed." (School Counselor, St. Joseph, MO)

"It is nice to know that there are others who understand and will listen. It was hard when my dad was deployed, because of our family owned hardware store. We all had to pitch in." (Speak Out for Military Kids Youth Participant)

"The challenge team activities that you have taught us are terrific and we will be doing them at some of our Family Readiness Group Events." (Family Readiness Group Youth Leader)

"Thank you for recommending me to participate in the National Guard Youth Symposium in Philadelphia! It was awesome!" (Speak Out for Military Kids Youth Participant)

"Thank you so much for the honor you gave to my children and for the Hero Packs. It makes them feel important in this difficult time of their father being gone." (Parent of two children who were honored at a Homefront Hero School Assembly)

- c. Source of Funds: Smith-Lever, CYFAR/NCP, Grants
- d. Scope of Impact: State and National (CYFAR project)

Key Theme: Community Development

- a. Description: Community Development Academy (CDA). The Community Development Academy provided 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.

Likewise the Foundations of Practice: Community Development Core Competencies for Extension

Professionals is a program developed by the North Central Regional Center for Rural Development in collaboration with North Central states to provide a common language and understanding of community development work, recognizing states and regions offer a wide breadth of educational programs in this area. There are three major components to the program. The first is Understanding Communities and their Dynamics, a distance learning program that addresses seven core competencies focusing on the ability to understand community of place, the nature of public issues, the dynamics and interdependencies of the various segments of the community and the basics of community development work. The seven core competencies include: a basic understanding of community, community demographics, community economics, community power structure, natural resources and sustainability, community situational analysis, and community development process. The second component focuses on the ability to carry out community development processes to achieve measurable impacts. The program was designed as a train-the-trainer program for representatives from the north central region to develop a core set of process skills. The third component is still under development but will focus on developing specific content areas of community development.

Built on the Principles of Good Practice adopted by the Community Development Society, the Academy and the Foundations of Practice provide a framework for approaching work in communities that maximizes human interaction to the benefit of all and ensures the highest likelihood the results of community development will benefit the broadest spectrum of the community. These Principles of Good Practice are:

- Promote active and representative participation toward enabling all community members to meaningfully influence the decisions that affect their lives.
- 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.
- Incorporate the diverse interests and cultures of the community in the community development process; and disengage from support of any effort that is likely to adversely affect the disadvantaged members of a community.
- Work actively to enhance the leadership capacity of community members, leaders, and groups within the community.
- Be open to using the full range of action strategies to work toward the long-term sustainability and well-being of the community.

The CDA and the Foundations of Practice provide 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 the Community Development Academy:

<http://www.communitydevelopment.missouri.edu/commdev/cda/cda.htm>

- b. Impact: The Community Development Academy and the Foundations of Practice are Multi-State Extension programs.
- The CDA attracts from across the nation and around the world. The international component has grown in importance to CDA, accounting for 25 percent of the enrollments. Of the eighty participants in 2006, twenty were internationals from Kenya, Australia, Thailand and the Philippines.

- Participants report having the ability to relate their experiences to those of people from different cultures as a result of the course as they encounter more diversity in the communities in which they work.
 - In order to sustain international involvement, programs have been conducted in South Africa, Brazil, Guyana, and Canada based on the CDA. In 2005 a collaborative agreement was developed between the University of Missouri and Charles Stuart University in Australia to develop an ongoing exchange program in community development based in part on the CDA curriculum with faculty from Charles Stuart University traveling to Missouri to participate in the CDA in 2005 and 2006. In 2006 they developed their first community development course with plans to develop a second. Additional exchanges are scheduled for 2007. Eighteen people from Kenya have completed at least two of the three CDA courses.
 - Plans are being developed to assist universities and nongovernmental organizations in Kenya with the development of a support system that would make it possible for them to have a CDA program in Kenya.
 - In exit and follow-up evaluations, participants in the 2006 CDA reported increased knowledge and understanding of community processes and changes in their practices in their communities. The interactive courses helped them build relationships with fellow community development practitioners from across the state and around the world. Many comments indicated this was one of the most important assets of the course in both the short-term and the long-term.
 - When surveyed at one year or later, 95 percent of the CDA participants reported using what they learned, and nearly 50 percent reported using what they learned “a great deal.” 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 to work on issues of importance to citizens.
 - CDA participants reported applying skills and “internalizing” what they learned, using specific planning techniques and group process skills learned in CDA. Participants also reported positive organizational and community change and impact, attributed to applying skills learned through the Academy. These included organizing effective local groups, the development of local plans, the generation and leverage of funding for community projects, and the establishment of a variety of local programs to address community issues and improve the local economy.
 - In 2006, 72 people from sixteen states and the District of Columbia participated in the first component of Foundations of Practice. The course development faculty and teaching team came from Purdue University, University of Wisconsin, Iowa State University, the University of Illinois, and the University of Missouri. In a survey of the most recent course, all of the participants reported gaining in knowledge from the program with 57 percent reporting they gained a lot of information/knowledge. Sixty-seven percent found some of the information new and an additional 27 percent found most of the information new. Eighty-six percent said the program met their expectations and found it a worthwhile experience. Overall, 86 percent of the participants had a favorable reaction to the program.
- c. Source of Funds: Smith-Lever, State, Fees
- d. Scope of Impact: Missouri, Illinois, Texas, Kentucky, Tennessee, Oklahoma, Wyoming, District of Columbia, Pennsylvania, North Dakota, Vermont, Maryland, Ohio, Kentucky, New York, Nebraska, Minnesota, South Dakota, Virginia, West Virginia, Iowa, Wisconsin, Michigan, Arkansas, and International

Key Theme: Community Development, Conflict Resolution

- a. Description: Community Deliberation Program. The Discovering Common Ground: Missouri Communities Deliberate program provides communities with collaborative support as they identify and make decisions about high-priority and controversial public issues. It yields increased local knowledge, communication, leadership and citizen engagement for community empowerment and enhancement. Through public deliberation, people learn more about each other's viewpoint and discover they have things in common—"common ground." They weigh the pros and cons, trade-offs and consequences of their choices. This leads to a collective effort to address the issue—even though people do not necessarily agree with each other.
- b. Impact: Discovering Common Ground: Missouri Communities Deliberate is part of a Multi-State Extension program in conflict resolution. The following impacts are state specific to Missouri:
 - University of Missouri has leveraged at least \$89,000 and nearly \$2,000 in in-kind monies.
 - During the last year, approximately forty new facilitators and moderators have been trained in processes that engage people in an unbiased venue to dialogue and assist public policy decision making on the issue at hand.
 - Findings from an evaluation research project gained an understanding of the impact of public deliberation training in Missouri. Important findings were:
 - Moderator training fills a need for a process to use on public policy issues in communities.
 - Moderators wanted more training on specific skills and applying the skills and mentoring.
 - Moderators cited the development of new community networks as a major impact of planning and convening community forums.
 - Deliberative dialogue has been incorporated into two major grants at the University of Missouri – a Ford Foundation grant and a Pew Foundation grant to the Center for the Study of Religion, the Professions and the Public to use deliberative dialogue to deal with contentious issues in classrooms and communities related to diversity issues.
 - Provided workshops and training in deliberative dialogue for fourteen University of Missouri faculty fellows in Difficult Dialogues program and over 60 FIG peer advisors.
 - Community forum in Columbia, Missouri held on "God and the Commons" for public input into the issue of separation of church and state.
 - Increased civic engagement has resulted from the use of deliberation specifically in Northeast Missouri, Springfield, Kansas City and St. Louis with people attending deliberative forums. Civic engagement and deliberative democracy is gradually gaining acceptance. Public forums have been held in a number of Northeast Missouri communities, Springfield, Kansas City and St. Louis on the question of how to increase citizen engagement in the political process from elections to public policy issues.
 - Local policy on fireworks has either changed or is being reviewed as a result of community forums in several Missouri communities: Republic, Battlefield, Strafford, and Rogersville. The discussion guide has been requested by several other communities for a community process to review local ordinances.
 - Deliberation training materials from Missouri's program have been used nationwide.
- c. Source of Funds: Smith-Lever, State, Grant, Contract
- d. Scope of Impact: Missouri, Texas, Oklahoma, Arizona, Pennsylvania, Iowa and Maryland, and International (Australia, Thailand)

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

- a. Description: Community Emergency Management Program (CEMP). The Community Emergency Management Program provides resources, personnel, educational programs, and materials to support the mission of the Missouri disaster recovery partnership and 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 of Missouri Extension and provides educational programming and technical assistance to federal, state, and local entities, communities, professional organizations, businesses, and educational institutions. The program coordination is a joint venture between community development extension and the University of Missouri's Fire Rescue and Training Institute.

The program made a significant contribution this year to extension professionals, emergency management and allied services. In cooperation with University of Missouri Extension's Fire and Rescue Training Institute the CEMP program coordinator has been teaching the new required courses within the National Incident Management System (NIMS). The CEMP program coordinator has taught or provided 44 classes to 1,002 participants. These participants include representatives from State Emergency Management, State Fire Marshal, State Department of Agriculture and local elected officials, police, fire, EMS, health, public works, transportation and emergency management. In addition, programs conducted by regional faculty reached approximately 5,005 persons directly, involved 173 partners and 160 volunteers.

Local faculty have distributed educational materials and provided training in individual and family preparedness for disaster, hazards and risks, daycare facility planning and numerous others have been offered to local audiences. Faculty has played key roles in providing the Community Emergency Response Team (Citizen Corps-CERT) training delivered to citizen volunteers to teach them how to respond to support local government disaster operations.

In cooperation with EDEN, Purdue University and the Department of Homeland Security, CEMP program coordinator worked with a multidisciplinary team to develop new national courses for businesses and industries on preparedness. The Business Ready course and the Pandemic Preparedness for Business are now available to extension professionals and businesses and citizens at no cost. Access to this course is available on the EDEN homepage at <http://www.agctr.lsu.edu/eden>.

2006 was an extremely active year for disaster in Missouri. Storms and heat waves gave Missouri six presidential disaster declarations for the state. University of Missouri Extension was a key partner in local Community Organizations Active in Disaster (COAD). University of Missouri CEMP Team member provided leadership in training and education for public officials, citizens and businesses on disaster planning, response, recovery and mitigation strategies.

Builders are learning about incorporating safe rooms into construction. The FEMA Safe Room exhibit has been handed over to University of Missouri Extension for use as a mobile exhibit. In spring 2006, FEMA paid to have the safe room completely rehabilitated and ready for use with the new storm season. The CEMP coordinator did multiple radio and television interviews to promote the idea of building safe rooms into existing and new homes. This reached tens of thousands of

Missouri's citizens. The exhibit was taken to affected communities after severe weather events to take advantage of interest levels. The exhibit and new literature is being taken to fairs, county extension council meetings, 4-H youth fairs, safety fairs, county meetings, etc.

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

Disaster Work – 2006: Six Presidential Disaster Declarations. Disaster season started very early in Missouri with a huge storm with massive hail damage across central Missouri. It continued a few weeks later with another strong set of storms, through the summer with storms and heat waves and concluded with a massive storm that destroyed most of the city of Caruthersville. 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 (SEMA), team members worked with COADs and FEMA to support recovery efforts, including working directly with SEMA and FEMA in Disaster Recovery Centers (DRCs) throughout the region to provide research-based disaster recovery information from University of Missouri Extension and affiliated EDEN institutions. The team was crucial in supplying agricultural disaster assessment and meeting the needs of victims, and disaster workers. In the first days following these events, Extension workers went from home to home in rural areas, which had no phone service or power, to check on people, answer questions, and find out what they needed. In the first week, they worked with local farmers and producers to supply SEMA and USDA with information on agricultural impacts of the storm's winds, hail and heavy rains.

Local Extension offices and employees were impacted by these storms but preparedness efforts directed toward offices and employees made a substantial impact on mitigating the effects of the incident.

- c. Source of Funds: Smith-Lever, State, Fees
- d. Scope of Impact U.S.: 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

Scope of Impact Globally: Indonesia, Australia, Canada

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

- a. Description: Alianzas - Building Inclusive Communities. Between 2000 and 2005, Missouri's Latino population increased to 2.7 percent of total population in 2005 compared to 2.1 percent in 2000. This increase also represents a 31.1 percent change between 2000 and 2005 compared to 3.7 percent change in total population for the same period (OSED). Ukrainian, Bosnian, and others continue to add to the array of diverse new immigrants among the state's residents. With such rapid growth, immigrants and communities continue to face many challenges. For example, immigrants have encountered discrimination, low-pay employment, inadequate health insurance, difficulty in

finding adequate, affordable housing, and communication problems. Also, schools have needed to refocus their resources to non-English speakers. Social services must find food and shelter for the new families. Community residents encounter communication and cultural understanding difficulties.

Alianzas (<http://www.alianzas.us>) is a collaborative program of University of Missouri Extension, the University of Missouri-Kansas City, and the UMKC Institute for Human Development, which strives to foster inclusive communities that recognize and address the unique qualities and challenges of Hispanic/Latino residents using a community-based collaborative learning approach. This is done through a Latino center, university, and community partnership utilizing a community-based, shared-learner approach on a statewide level.

During the past year:

- Assistance in translation of the Dining with Diabetes curriculum allowed faculty to inform Latino audiences of healthy food choices for people with diabetes and healthy versions of traditional foods and cooking techniques that use new or more healthful ingredients.
 - In Southwest Missouri festivals highlighting Latino culture fostered multicultural understanding and significant work was accomplished with community emergency management among the Latino population.
 - Faculty partnered with the Latino Center in Columbia, MO, to offer the Stay Strong, Stay Healthy Program for Hispanic/Latino residents in Boone County.
 - Alianzas maintained and strengthened collaborative partnerships with a host of community organizations and institutions to enhance their capacity and resources to respond to the targeted challenges of the Hispanic/Latino population more effectively; to integrate activities that support diversity, inclusiveness and respect; and to improve the quality of life for Hispanics/Latinos and the communities that receive them in Missouri. Among these organizations and institutions are University of Missouri Extension, the University of Missouri-Kansas City (UMKC), the UMKC Institute for Human Development, and the Mexican Consulate in Kansas City. In addition to the Cambio conference, Alianzas worked with 145 partners.
 - Alianzas assisted Missouri Children, Youth, and Families at Risk (CYFAR) in developing the fourth module of its Self Study Learning Opportunity, “Partnering with Hispanic/Latino Audiences,” <http://outreach.missouri.edu/fcrp/selfstudy/latino>. University of Missouri Extension specialists who completed this module were provided information on the general topic of immigration in the United States and the specific issue of Latino immigration to Missouri.
- b. 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 state specific to Missouri:
- As a result of the Bi-National Health Week, at least 25 organizations continue to meet in the Kansas City area and make available educational offerings and health screenings for Hispanics/Latinos at the Mexican Consulate on a monthly basis. Planning for the 2007 Bi-National Health Week (now including Canada, Guatemala, and El Salvador) is already underway. Alianzas leverages support through statewide coordination efforts. It is anticipated the event will be expanded to five cities in Missouri.
 - Community collaboration in St. Joseph has successfully identified needs and provided services for the new immigrant population associated with the opening of a food processing plant.
 - The 2006 “Cambio de Colores (Change of Colors) in Missouri” conference expanded the capacity of University of Missouri Extension and other Missouri organizations to better serve

Hispanics/Latinos and the communities in which they both live and work. The conference also brought together approximately 227 researchers, teachers/instructors, and practitioners and continued to build the agenda for engagement of the university in addressing the issues faced by all Missourians with the influx of Hispanics/Latinos. As a result, participants have been able to build organizational capacity to better serve Latinos and the communities in which both live and work, to learn best practices for interacting with the Latino community, and to launch a regional Cambio conference in Southwest Missouri.

- c. Source of Funds: Smith Lever, State, Local organizations
- d. Scope of Impact: Missouri, Iowa, Illinois, Nebraska, Kansas

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

- a. Description: Community Decision Support.

The Community Policy Analysis Center (CPAC) (<http://www.cpac.missouri.edu>) provided research, outreach and training to support improved policy decisions at both the local and state levels. The Show-Me Model provided valuable data and information and facilitated learning among community participants. Work during the last year has included community impact studies regarding state investment in conservation facilities, the state agricultural sector, and childcare. CPAC continued to work with researchers in eleven European countries to measure the economic and social impacts of changes in agricultural policy on rural communities. In addition, CPAC:

- Began investigating the economic and environment impacts of activities by the Missouri Department of Natural Resources funded by a dedicated sales tax – estimating the economic impacts of loss of consumer income due to the tax in order to provide a net estimate. The project will provide useful information when the tax is up for voter renewal.
- Provided economic baselines and scenario analyses to support the planning processes of five pilot communities/regions in a community entrepreneurship program.
- Developed detailed estimates of county level economic impacts of agriculture in Missouri.

The Office of Social and Economic Data Analysis (OSED) conducted projects, often in conjunction with state agency partners that focused on important public policy issues such as transportation, health and community services, and public education. During the past year, OSED analyzed additional Census data and prepared numerous reports now posted on the web for easy access (<http://www.oseda.missouri.edu>). Users may access demographic information and analysis in many ways including by extension region or by state agency regions. Other activities this past year included the following.

- Community planning and health promotion for Missouri Seniors was dramatically increased. The aging of the baby boom is increasing the size and economic impact of the senior population. Together with the Missouri Department of Health and Senior Services in 2006 OSED developed the first annual *Missouri Senior Report* profiling the status of the senior population across Missouri and highlighting significant public policy issues (<http://missouriseniorreport.org/>). Follow up with Area Agencies on Aging regarding Senior Report planning led to the development of a regional application that showcases how the needs of seniors and services for seniors can be integrated <http://www.oseda.missouri.edu/careconnection>. This application demonstrates to other AAA the value of web-based integration of information. Also, through OSED the Care Connection in Warrensburg is now introducing the use of Geographic Information Systems to improve the delivery of services (including meals) to seniors.

- Community Connection (<http://www.communityconnection.org>), an OSEDA project, is a statewide directory of health and human service resources dynamically linked to the world wide web. Community Connection in partnership with the Missouri Foundation for Health, state agencies, Mid-continental region of the National Network of Libraries of Medicine and the J. Otto Lottes Health Sciences Library are collaborating with the National Library of Medicine/National Institutes of Health in their MedlinePlus “Go Local” project that links their national health topics with local Missouri resources. See (<http://www.nlm.nih.gov/medlineplus/golocal/about.html>). Community Connection expanded its work with Missouri Corrections to help reduce recidivism.

The Local Government Resource Group negotiated the donation of the papers of a well-known expert in local government. The group is working to update the manuals on local government included in this collection. Several of the manuals will be published in the next year. In addition, a regional specialist, through the Local Government Partnership, worked with the East-West Gateway Council of Governments, the University of Missouri-St. Louis, and the St. Louis Chapter of the American Planners’ Association to offer training and a certificate in planning and zoning for zoning commissioners. The program is well received and is being offered for a third year with increasing enrollment each year. This is offered for both Missouri and Illinois. Several specialists have worked with communities on various stages of planning, from considering whether or not to adopt planning to considering implications of potential modifications to the state planning statutes.

Local governments have been assisted in decision-making on:

- Planning and zoning
- Requirements for local government meetings: notice given in advance, closed sessions and the open meetings law
- Township organized counties and rules about closing roads and annexing roads
- Impacts of retirees on the local economy
- Analysis of wealth as a basis for forming community foundations
- Estimate the potential revenues from adoption of a local option use tax
- Organization of candidate forums
- Conduct of focus group to determine how county government efficacy is viewed
- Impact of a community festival
- The ranking of Missouri relative to other states on taxes and expenditures – the subject of two extension publications
- Financing economic development initiative
- Impact of the retail sector on the county: retail wages relative to other wages, retail attraction into the county, retail out-shopping, potential local option sales tax revenues, etc.
- Analysis of sales tax holiday

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

Local programs engaged 149 partners in programming and involved over 45,000 local contacts.

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

Economic analyses are being used to inform local and state decisions.

- The toolkit developed by CPAC is aiding rural electric cooperatives across the country in making decisions related to renewable biomass fuels for generation.
- The Socioeconomic Benefits Assessment System (SEBAS) to assess impacts of the existing USDA Rural Development loans programs and to project impacts of proposed projects developed by CPAC is now integrated into the USDA's intranet system and functioning nationwide. CPAC continues to work on the program in order to extend its application to other USDA programs.
- The descriptive analysis of the status of Missouri's Medicaid Program (<http://www.oseda.missouri.edu/medicaid>) produced by OSEDA and CPAC has contributed to a major transformation of the Missouri Medicaid Program now underway to address coping with increasing health care costs. This is a critical economic development objective. A new three-year project led by the Center for Health Policy and OSEDA was awarded to the University to build the capacity to analyze the Missouri Medicaid Program in ways that will foster improved cost efficiency and enhanced professional practice. An OSEDA team is building an extensive data warehouse of Medicaid transactions. Using this data clinical and data analysis specialists are now framing projects where timely information will be used to inform Medicaid transformations and improvements.
- An OSEDA application developed for the MO Department of Transportation has become the state's authoritative source for demographic data used for transportation planning. On average over 9,000 pages of information per month are downloaded from this award-winning application.
- Collaboration was increased among teachers and support staff who work with 'at risk' children. As a result of the publication of the annual Kids Count Report (by OSEDA with its partners The Children's Trust Fund and Citizens for Missouri's Children) <http://oseda.missouri.edu/kidscount/> together with a survey conducted by OSEDA of those who work with "at risk" Children (Missouri Student Success Network) <http://www.mssn.org> the entire focus of the Missouri Pathways Conference involving nearly 2,000 Missouri professions was reoriented toward enhancing collaboration for "at risk" children.
- The quality of public education in Missouri was improved. Together with Missouri Department of Elementary and Secondary Education, OSEDA played an integral role in the redesign of the Missouri School Improvement Program – the process through which Missouri School Districts are accredited (<http://www.dese.mo.gov/divimprove>). New student, teacher and parent questionnaires were integrated into the process and information about academic achievement linked in ways to foster improvement planning <http://www.dese.mo.gov/schooldata/>. The analysis of school improvement data from thousands of Missouri teachers, students and parents is now incorporated in state accreditation decisions and provides a foundation for local school improvement planning.
- Community Collaboration was increased and information integrated in a timely way. Community Connection provided over 350,000 web pages of health and human service resource information. Approximately 150,000 unique visitors sought information from the statewide directory. Every county in the State of Missouri and the City of St. Louis have resources listed in the directory. The application was one of the first "Go local" sites at the National Library of Medicine (<http://www.nlm.nih.gov/medlineplus/golocal/about.html>).
- Employment opportunities were expanded and engaged for displaced workers. OSEDA provided information applications to support workforce development and employment opportunities. With the Division of Workforce Development OSEDA developed and supports the Missouri Career Exploration Tool. It is providing civilian employees affected by Base Realignment and Closure (BRAC) assistance to continue Missouri careers or pursue other endeavors (<http://apps.oseda.missouri.edu/MOCareerExplore/Default.aspx>).

- The estimate of the impact of the August sales tax holiday on state and local revenues was used by the Missouri Municipal League and the Missouri Association of Counties in their legislative activity, was the subject of several newspaper articles, and was used by local government to make decisions to participate or to opt-out of the tax holiday.

Planning processes have had the following results:

- The three year planning process with the Missouri Soil and Water Districts Commission resulted in the adoption of the plan which guided development of program priorities for the next ten years and served as an educational tool in garnering more than 70 percent “yes” votes in the successful passage of a statewide ballot initiative in 2006. In particular, the organization is focusing on changing land use and education for future research and program development as a result of the statewide planning process.
- More than thirty organizations, in various stages of their organizational development were served as they worked to develop effective organizational structures that best suited the purposes of their organizations. At least eight obtained their 501(c)(3) status successfully.
- The City of Herculaneum, comprised of 2000 people, has serious environmental and health problems from a lead smelter operated in the town for over 100 years. A steering committee consisting of residents of the City of Herculaneum, MO have been doing research and writing a master plan, with a goal of completing it in June 2006. Extension partnered with many groups in the community of Herculaneum, federal and state government agencies to facilitate the development of the master plan to address the issues resulting from this over 100 year history as a lead mining community and chart a course for their future. The plan includes development goals for the future of the community, identifies areas that cannot be developed due to lead contamination and outlines a course of action for future development. The plan was formally adopted in the summer of 2006.
- Extension partnered with the Worth County Progress Association and other local groups to update the Grant City comprehensive plan. A diverse group of forty people were invited to participate in the development of the plan. Plan outcomes included the development of a niche marketing program in business, agri-business, agri-tourism and tourism.
- Jefferson County started a tourism and convention office with assistance from Extension and the Missouri Division of Tourism. They are taking the opportunity to tie into the Regional Cuisines project of Extension. The community has done the research for a tourism brochure and is promoting itself regionally as a destination.
- Atchison County police reported training has helped them save money as they are more effective interrogators as they deal with increasing drug-related crimes.
- Work with mayors from twenty municipalities over an 18-month period to develop a plan to reduce the costs of trash hauling and increase the amount of recycling resulted in a cooperative bidding program that established a uniform level of service including recycling options and a common price for all communities. The program will be bid in 2007 with three communities leading the way. As the other communities’ service contracts expire, they will be able to join the cooperative bid at the same price and level of service as the original communities. During the process of developing the plan several of the mayors became strong advocates for recycling.

c. Source of Funds: Smith-Lever, State, Contracts, Grants, Fees

d. Scope of Impact: Missouri, Illinois, Louisiana, Nebraska, Washington, Texas, National and International. The Community Policy Analysis Center also actively participates in national Community Policy Analysis Network.

Key Theme: Community Development, Youth Development, Leadership

- a. Description: Missouri Local Government CECH-UP. One of the primary goals of the state-wide Local Government CECH-UP Program is to provide middle school students with the opportunity to learn what local government does, to talk to local government officials, to study and make recommendations on local issues, and to take action on local government issues facing communities.

The CECH-UP handbook and website (www.cech-up.org) provides cross-curricular lessons aligned with the Missouri Department of Elementary and Secondary Education Show-Me Standards. The CECH-UP Program provided access to lesson plans and a variety of government and community resources for teachers of approximately 600 students throughout the state. Programs in 2006 involved 266 partners and 890 volunteers locally.

The Missouri Municipal League (MML), which has endorsed the program since the beginning, became a statewide partner in 2006. Among the responsibilities the MML will undertake is promoting the program to expand area of coverage in the state.

As a result of the partnership with the MML, the CECH-UP Program began the process of creating a reference guide for newly elected government officials based on the CECH-UP curriculum.

- b. Impact: The CECH-Up Program provided opportunities for students to become familiar with the jobs of local officials as possible career choices. Approximately 500 students participated in the site visit to their local city hall or county courthouse. Students were introduced to various government officials and had the opportunity to learn about the job duties and job requirements of each position. For example, students from Saeger Middle School spent time on the city of St. Peter's computers learning about GIS mapping from planning and zoning officials. Teachers report students are now more familiar with the jobs of local officials as possible career choices.
- Two teacher workshops were held this year (St. Louis and Douglas County). Both workshops were funded by a grant from State Farm Insurance. Twenty-eight teachers participated. The overwhelming response from teachers is that the teacher workshops were very useful in "jump-starting" the program and should become a routine part of the CECH-Up Program.
 - Examples of student projects included:
 - Working with city officials increasing awareness of recycling (appliances, computers, TVs...) by hosting a recycling fair. The recycling fair was such a success high school students will make it an annual event.
 - Collaborating with city officials and community leaders to develop a shared electronic sign to display school and community events.
 - Developing a walking path on school property.
- c. Source of Funds: Smith-Lever, State, Grant
- d. Scope of Impact: Missouri

Key Theme: Community Development, Managing Change in Agriculture

- a. Description: Community Food Systems and Sustainable Agriculture Program (CFSSA). 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.

CFSSA has continued being a source of information for farmers and consumers interested in sustainable practices and local food systems. Through its website, emails and phone calls, CFSSA has provided information and referrals to hundreds of producers and consumers. Since 2004, CFSSA has reached out and served minorities in agriculture. Also since 2004, the Food Circles Networking Project, with funding support from the W.K. Kellogg Foundation, has focused on the I-70 Corridor between Kansas City and St. Louis.

b. Impact:

Locally produced food is available in greater volume and variety in the St. Louis and Kansas City metro areas because thriving, entrepreneurial businesses, including processors, distributors, grocers, chefs and food services, feature locally produced food products.

- We established two new farmers' markets this year, one of which is already very successful, attracting eighteen vendors. One long-established farmers' market doubled the number of vendors supplying it. We tripled the number of CSAs serving mid-Missouri from last year and have also seen big increases in the number of producers, grocers, farmers' markets and processors listed in our guides in each regional area (e.g., 68 percent increase in restaurants and bakeries serving mid-Missouri since fall 2004). Two broad line distributors have started sourcing locally produced foods since our project started. One major natural foods retailer in St. Louis is sourcing product from eight local farmers.
- Connections between vendors and farmers, farmers and supermarkets, and farmers and chefs are creating new markets for farmers in the region.
 - The establishment of the "Farmer/Chef Connection" through a website that went "live" in May 2006 (<http://extension.missouri.edu/jefferson/FoodCirclesindex.htm>). Through June 30, there were 38 postings since it went online with an estimated 1,000 hits. Thirteen farmers attended an initial meeting to set-up the website, with most posting at least once. Stories about the website have appeared in the Sunday *St. Louis Post-Dispatch*, *Columbia Daily Tribune*, *Jefferson County Business Journal*, and on the AP wire. Two TV stations from St. Louis have interviewed farmers and chefs, and University of Missouri Extension released a short news clip (available at <mms://etcs.ext.missouri.edu/chefandfarmer.wmv>). This clip was picked up by KY-3 in Springfield, Missouri, and the national TV programs AG Day and the Farm Report. Interest has been expressed by practitioners in California, Alabama and Arkansas.
 - We connected researchers from Lincoln University with a chef in Kansas City to supply Missouri raised bluegill. In return, the chef will provide Lincoln University with pricing information so researchers can determine the feasibility of this form of aquaculture for Missouri farmers.
 - The north Kansas City stores of regional retailer Hy-Vee are connected with a Northwest Missouri natural meats producer. One store featuring mostly local produce opened in an outlying suburb of Kansas City in spring 2006.
- Changes are occurring in sourcing for school systems to include local foods.
 - Work with the University of Missouri Campus Dining Service added 1,800 in-season apples per week to our Mid-Missouri distribution network. Five Missouri producers of pecans, cheeses, and grape juice were featured for the "Taste of Missouri" meal served to over 3,500 residence hall students in March. Partnering with the University of Missouri Campus

Dining, encouraged their prime vendor, U.S. Food Service, to add locally grown tomatoes and other vegetables from one St. Louis based farmer to their inventory.

- Students in the University of Missouri Hotel and Restaurant Management Program sourced Missouri products (including farm-raised trout, cheeses, mushrooms and fruit) for the student-run dining series (80 white table cloth meals were served).
- Work with the food service director at Columbia Public Schools (approximately 17,000 student enrollment) helped source Missouri grown apples for school food service.
- A partnership is emerging with the Rock Bridge High School Culinary Arts (Columbia) program to source locally grown food.

Farmers serving the St. Louis and Kansas City metro areas and Mid-Missouri have increased the economic viability and diversity of their farming operations and understand the development of local food systems represents an economic opportunity for the future of their operation.

- A survey of vendor numbers and visitors at various farmers' markets indicated a long-established farmers' market in St. Louis area doubled their vendors in the 2006 season, one newly formed market has attracted 18 vendors (both older, established farm businesses and new ones), and the 25-year old market in Columbia is averaging 3,000 or more customers per Saturday.
- One farmers' market is sourcing products for year-round marketing, making it the second year-round retail venue for locally grown products in St. Louis.

- c. Sources of Funds: State, Smith-Lever (SARE), Grant
- d. Scope of Impact: Missouri with multi-state collaboration through the North Central Regional SARE Program (Iowa, Illinois, Indiana, Kansas, Michigan, Minnesota, Nebraska, North Dakota, Ohio, South Dakota, Wisconsin)

Key Theme: Family Resource Management

- a. Description: Family Financial Management. According to the 2004 Survey of Consumer Finances, families' net worth rose an average of 6.3 percent from 2001. However, it is important to note the survey also found the number of people saving money fell 3.1 percent (only 56.1 percent of people are saving). The number of families with debt also rose 1.3 percent during 2001-2004. The survey also found the number of families with checking accounts fell 2.1 percent.

The 2006 Retirement Confidence Survey shows more than half (52%) of U.S. workers report the value of their total savings and investments, excluding the value of their home, is less than \$50,000. Those who have not put money aside for retirement have less than \$10,000.

The American Bankruptcy Institute reported over 2 million non-business bankruptcy filings nationwide in 2005. This is quite an increase from 2004 (nearly 1.6 million filings); however, most believe the spike in filings was a result of the new bankruptcy law that went into effect in October 2005.

In Missouri there were more than 52,000 non-business bankruptcy filings in 2005. Again, this is an increase from 2004 (over 37,000 filings) which may be a result of the new bankruptcy law.

According to the Center for Responsible Lending, about \$4.2 billion are lost every year in payday loans fees. In 2005, the average annual percentage rate of interest on such loans was slightly more than 408 percent. Predatory mortgage lending costs families more than \$9.1 billion nationwide each

year.

Most financial experts and educators agree people need access to financial management education at a young age in order to develop the skills needed to be successful money managers as adults. Recent studies and surveys indicate 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 and taxpayer education. Program development continues for very low-income families and for families filing for bankruptcy. Research is underway to target programming to young adults. Other audiences include youth and their teachers, young families, women, individuals who are incarcerated or on probation or parole, parents, and professionals working with low income families.

In 2006 approximately 82,500 educational contacts were made through family financial management programs. This programming involved around 250 partners and 300 volunteers.

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 are also used directly in educational programs with low-to-moderate income families. Three thousand seven hundred ninety (3,790) educational contacts resulted from implementation of the Money Action Plan curriculum.

Approximately 470 individuals on probation or parole, mainly for financially related offenses, participated in basic financial management classes conducted by University of Missouri Extension. Participants are often required to attend classes by the judge or their probation officer in an effort to reduce the probability 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.

Money Action Plan is in the process of merging with another University of Missouri Extension Program called Financial Fitness (see more information further in the report). This merger will allow for greater focus and a more far-reaching program to meet the needs of Missourians.

b. Impact: The Money Action Plan program resulted in the following impacts:

- Set financial goals
- Started or increased savings
- Developed a spending plan
- Practiced recordkeeping
- Reduced credit card
- Reviewed credit reports

Three to six months after Money Action Plan workshops, the following impacts were documented:

- Made positive changes in spending habits
- Lived within a spending plan
- Paid bills on time
- Established a savings plan

Participants who attended a six-week women's financial management program reported over the course of the program they:

- Shared some of what they learned with other people
- Calculated their net worth
- Said financial records were more organized than before the class
- Tracked spending for at least 30 days
- Reviewed their insurance coverage, with 24 percent making changes;
- Increased the amount they were saving
- Reviewed their beneficiaries and reported they were up to date
- Discussed their estate plan and their wishes with their heirs
- Were more confident about saving and investing
- Wanted to continue to learn more about financial management and would recommend Women and Money to others

c. Source of Funds: Smith-Lever, State

d. Scope of Impact: Missouri

Key Theme: Leadership Training and Development, Youth Development

- a. Description: Community Leadership Development: EXCEL (Experience in Community Enterprise and Leadership) Neighborhood Leadership Academy; Step-Up to Leadership!

As the Association for Healthy Cities and Communities has stated, one of the seven pillars of a healthy community is generating leadership. The future of a community is closely tied to building a critical mass of community leaders for the future. 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 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 communities have the capacity to move forward as current leaders retire from public life. The handbook "Community Leadership Development: The EXCEL Approach" and an extensive website (<http://muextension.missouri.edu/explore/guidebks/cb0016.htm>) and training for Extension specialists provides program guidance. During 2006 evaluation instruments were shared with Minnesota and Illinois, and an online version of the survey instrument was developed (<http://www.ssu.missouri.edu/faculty/kpigg/eval.htm>).

Fostering new leadership voices among youth, elderly, new immigrants and low-income is critical through the development of Community Leadership Development Organizations because they are located in communities and are more responsive to local needs. Source: Engaging New Leadership Voices for Catalyzing and Sustaining Community Change, Kellogg Foundation. Step-Up to Leadership! (<http://extension.missouri.edu/explore/guidebks/cb0017.htm>) is being used to develop community action agency board members drawn from the population of people served by the agency and for other community-minded people wanting to make a difference. The intended audience is people who are willing to assume the responsibilities of board membership; who seek understanding about group process and the complexities of collaboration; and are ready to take on the challenge of leadership. Mini-grants up to \$500 (via the Community Action Agencies' funding

sources) were available to participants by application to support their efforts to take a lead in promoting activities that directly benefit low-income people or help to strengthen their community. Participants focused on working with food pantries, spouse and child abuse, housing policies, weatherization, and a number of critical community issues. The guide and manual have been sold across the U.S., Canada and Australia.

Developing community leadership means University of Missouri Extension works collaboratively with the local community and its leaders. In St. Louis, the Neighborhood Leadership Academy (http://pprc.umsl.edu/base_pages/cnd/programs_opportunities.htm) 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 & Leadership Program and University of Missouri Extension.

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

Almost two-thirds of Missouri's counties and communities, over 7,190 people, have participated in locally driven leadership programs over the past 23 years. The number of counties expanding to develop a specific community youth leadership development program has grown in the past year to 34 and additional interest is high. Four hundred and forty-four new residents completed leadership programming in 2006: 208 Missouri adults and 102 youth participated in community leadership programs using the EXCEL approach in 2006, and Step-Up to Leadership! conducted by Community Action Agencies in partnership with University of Missouri Extension involved 134 additional residents.

Evaluation continues to indicate participation has resulted in personal growth and self-efficacy, community commitment, a shared future and purpose for the community, community knowledge, and civic engagement among participants. In evaluations of the EXCEL program, over 90 percent of participants indicated they consider their participation to have been worth their time and effort. Additionally, over 95 percent of the participants stated they felt their learning experience was worth the resources Extension expended to support the program in the community. Evaluations indicated 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. Outcomes were consistent across gender, ethnic background levels of education and income, and length of residence in the community.

Other specific impacts include:

- Northland Neighborhoods, Inc. (CDC in Clay and Platte Counties) is working with University of Missouri Extension to develop and implement a Neighborhood Leadership Program in 2007. The counties of Harrison, Warren, Morgan and Montgomery are planning future programs.
- Leadership Northwest Missouri graduates worked to correct income guidelines erroneously established by 2000 Census which excluded Northwest Missouri from eligibility for Rural Development funds as a result a majority of counties and communities are now qualifying. As a direct result of their actions, a class project to help local communities find funding for placing emergency sirens in their communities was successful in obtaining \$57,408 funding for early warning systems in eight rural communities.
- Phelps County citizens who completed the Leadership Phelps County program had this to say about their experience. "I gained a better understanding of the local government institution and its importance in the community. Not only do these institutions create employment opportunities, but they provide support for community members that need assistance." and "I

have already used most of the leadership activities presented during LPC with employees in the organization where I am employed.” Past graduates are currently serving in several community organizations and have given credit to LPC for providing them with additional knowledge and encouragement to take the next step in strengthening their community leadership responsibilities. These organizations include the Rolla Chamber of Commerce, St. James Chamber of Commerce, Boys and Girls Town of Missouri, Phelps County Community Partnership and volunteers with several not-for-profit groups.

- Leadership Miller County completed its third class in 2006. A common theme emerges from participants when asked what they got out of the program. Graduates unanimously agree the program motivated them to become involved in specific aspects of their community. Like many other counties near recreation areas, there is a constant in migration of residents who wish to learn about the community and make contacts.
- Lafayette County LEAD continues to produce individuals to serve on local boards and committees. The local Extension council was able to recruit a minority to serve as a member.
- Dent County Youth Leadership Academy (YLA) reported the addition of three YLA graduates to the Youth Advisory Committee of Salem. This committee is intended to provide a youth perspective to community issues facing Salem. Two youth were added to the Salem Area Community Betterment Association board. Informal follow-up with Salem School District educators indicates an increased level of involvement and leadership skills by those who have completed the YLA. Funding for YLA was provided by the family of a youth YLA graduate who was tragically killed. They indicated the positive affect YLA had on their son and wanted to make sure other youth had the opportunity to experience this leadership program.
- Henry County LEAD program reached freshmen and sophomores who were identified as having leadership potential, but were not utilizing it. Youth participants had the opportunity to have their voices heard by community leaders regarding issues they are concerned about in addition to leadership development skill development.
- Owensville Youth Experience (Gasconade County) program participants experienced the value of teamwork, self-awareness and networking to get things done while learning about city and county government and civic organizations that provide leadership for people. When asked how they planned to use the skills learned, one youth said, “To better myself and to help others and to achieve goals and daily tasks in my life.”
- Since 1992, Leadership RAP has built skills and leadership capacity among nearly 600 juvenile offenders at the Boone County Juvenile Justice Center. This is a small program in which only 44 juveniles per year (approximately 12 percent of the juvenile justice center residents each year) are able to participate. By reducing recidivism, Leadership RAP saves public money. Four years after attending Leadership Rap, recidivism is reduced 48 percent. The cost savings of reduced retention of juveniles from four years of Leadership Rap after juveniles have been out four years is estimated at \$218,880. In addition the program reduces court costs, policing costs, and costs for detention of offenders as adults. These savings are likely much larger than the reduced costs of juvenile detention.
- As a result of Step Up to Leadership!
 - Missouri Valley Community Action Corporation participants identified the following projects they plan to pursue: providing school supplies to low income children, providing aid to those victimized by unscrupulous service providers, assisting the homeless, promoting bio-diesel fuel, assisting with alcohol and drug recovery, continuing education and becoming a teacher, promoting self esteem among young girls, educating the community about poverty, helping people out of poverty, ending abuse of food stamps and helping recipients use food stamps wisely, teaching respect and honesty in the school system, assisting low income youth with participation in sports, changing the family care registry to conduct more extensive background checks, and establishing a national family care registry.

- Ozark Area Community Action Corporation in partnership with Southwest Regional Extension staff was successful in reaching a diverse audience with their programming resources regardless of participant’s social, ethnic or cultural status. Fifteen females, three African Americans and nine persons with disabilities were reached. Over 90 percent of the participants indicated they were enthusiastic about becoming a board member with the OACAC board or other local community board.
- c. Source of Funds: Smith-Lever, State, Fees, Local sponsors
- 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, and Indiana), Mississippi, Louisiana, Arkansas, and Wyoming.

Key Theme: Leadership Training and Development, Youth Development

- a. Description: Food Safety. *Fight BAC!* ® Food Detectives software* is designed to teach youth ages 8 to 12 about food safety and bacteria through an interactive computer game. The computer game format is intended to be a fun and educational way for youth to learn about food safety issues (e.g., importance of washing hands, food temperature and food contamination).
- b. Impact: The design of the computer games makes a difference in how well youth like it and how much they learn. Over 50 adults worked with 328 youth to evaluate what they learned from the software. The results indicate youth with the lowest scores on pre-tests regarding food safety showed the most improvement as a result of their game experience. This occurrence highlights the positive impact educational computer games can have on learning, particularly learners who are low achievers in a particular subject matter.

* *Fight BAC!* ® Food Detectives software was developed by New Mexico State University.

Testimonials

- “The game is good because some people really don’t know much about bacteria.”
 - During the character introductions, youth exclaimed “He’s dancing!” While reading the riddles, she covered her hand over the punch line to surprise herself. “This is cool!” and laughed when the tomato splattered the screen.
 - “This is tight!” she said on washing her hands game. “Ugh!” on the diarrhea part.
 - “The kids learned more because it was fun, not just a teacher standing in front of them, but more hands-on for them.”
- c. Source of Funds: Smith-Lever, Grants
- d. Scope of Impact: State and National

Key Theme: Leadership Training and Development, Youth Development

- a. Description: Healthy Lifestyles. A 2002 Missouri Department of Health and Senior Services report reveals that 21.3 percent of Missouri youth are overweight. Research states for adults, obesity is a risk factor for 64 percent of Missouri deaths. A pattern of physical inactivity begins early in life, making the promotion of physical activity among youth critical. Young people can build healthy bodies and establish healthy lifestyles by including healthy eating and physical activity in their daily

lives. 4-H Projects and Activities in Foods, Nutrition and Physical Activity (golf, bicycling, and bowling) contribute to young people and families learning healthy behaviors.

- b. Impact: More than 3,700 Missouri 4-H'ers participated in nutrition/foods and physical activity projects (golf, bicycling, and bowling). In addition, over 3,100 youths participated in 4-H camps (overnight and day) and in general, experience significant physical activity (e.g., swimming, hiking, outdoor initiatives and more). Other county, regional and state initiatives, such as 4-H Camp Food and Fitness, encourage lifelong physical activity and good nutrition.

Testimonials

- “Thanks for the pedometer because I’ll wear it everyday.”
- “Cooking was the best part. I want to come back next year.”
- “I loved cooking in the kitchen with the chefs! I learned how to cook a dinner.”
- “My club will use the couch potato challenge papers (Couch Potato Challenge is a physical activity guide).”

- c. Source of Funds: Smith-Lever, Grants

- d. Scope of Impact: State and National

Key Theme: Parenting

- a. Description: Parenting Education Programs. A diverse array of parent education programs and services was offered to meet the needs of Missouri parents in 2006 including: Focus on Kids, Students In the Middle, Basic Parenting, Programs for Parents, and ParentLink’s Parenting Services (trainings, conferences, “WarmLine”, Parenting Corners and web). In addition parenting information was provided through extension publications distributed at parent fairs, newsletters and the MissouriFamilies website.

- b. Impact:

Focus on Kids – Focus on Kids is a 2.5-hour educational program for divorcing parents that emphasizes conflict management and co-parenting strategies that will assist children in dealing with their parents’ divorce. Focus on Kids uses a video-based curriculum, which consists of a series of 4 common, problematic situations faced by divorced parents and their children. Participants watch each video vignette and discuss solutions to the problems portrayed, then watch a brief vignette modeling one healthy way of handling the situation. The video and accompanying discussion guide were updated and distributed to all program sites in 2006.

The Focus on Kids program is provided in partnership with Missouri circuit courts to meet Missouri’s requirement that divorcing parents with a child under age 18 attend a parent education class. In 2005 approximately 3,198 parents from 33 Missouri counties attended the Focus on Kids program. Evaluation data indicate the success of Focus on Kids in several areas measured on a 5-point scale (5 = strongly agree). Most parents reported they better understand the benefits of cooperating with the other parent in support of their children (4.3); understand more about how children are affected by divorce (4.3); and plan to avoid arguing or fighting with the other parent in front of the children (4.6). Participant comments include:

- “This class made me realize how important it is to pay attention to what is going on with my kids during this stressful time for our family.”

- “This program made me aware that I need to look more at the needs of the kids and put my needs later.”
- “Every parent should have to attend. I came out of the program feeling better equipped as a parent.”
- “It was helpful to learn how to discuss topics with the other parent in an appropriate manner.”
- “[The program] helped me know how to answer some of the questions my children are asking.”

General Parenting Workshops and Information – A variety of general parenting workshops and information were provided to Missouri parents in 2006 with the goals of improving parents’ skills and reducing child abuse and neglect. Two curricula used for parent education workshops were *Basic Parenting* and *Programs for Parents*. *Basic Parenting* is a six-session program that helps parents strengthen their skills in caring for themselves, understanding, guiding, nurturing, motivating and advocating for their children. *Programs for Parents* includes 14 sessions on a variety of topics, such as positive guidance and discipline, children’s ages and stages, and raising responsible children.

In 2006, 1280 parents attended a ‘general parenting’ workshop. Many of the parents were mandated to attend by children’s services or the court because of child abuse or neglect; some attended as a training requirement for foster parents or childcare licensing; and many attended because it was an educational component of a grandparent support group.

- Initial Response to Program – One parent said, “It’s nice to have something new in my ‘tool box’” on a post-session survey. Another parent indicated learning “several new ideas for dealing with misbehavior.” Another post-program survey indicated: 98 percent of the parents learned or re-learned at least one new discipline technique and 60 percent reported they would try at least one new thing that was presented.
- Changes as a Result of Attending – One parent indicated she shared program materials with her husband who could not attend resulting in them talking about mealtime, bedtime and discipline issues. Another parent said, “I watch (my child) more to learn about her.”

ParentLink’s Mass Distribution of Materials and Information.

- Parenting Corners – ParentLink’s Parenting corners are available in multiple locations (shopping mall, Head Start Facilities and other agencies). They offer parents direct access to parenting materials via hard copy and in some cases computer kiosks. In 2006 approximately 13,000 materials were distributed through these Corners.
- Web Service – ParentLink’s web service is available to parents, providers, and community members seeking parenting information. During 2006 approximately 16,000 hits were received.

ParentLink’s Parenting Services – ParentLink’s Outreach for Professionals and other Community Members.

- ParentLink staff hosted a Fetal Alcohol Prevention event at the Columbia Mall parenting corner in February 2006. Professionals displaying replica babies with Fetal Alcohol Syndrome (FAS) showing a short video on FAS were on hand as well. 81 contacts by staff members with parents, teens, and children were made. A sample of family situations are as follows:
 - A mother of a newborn was concerned about her child and whether her baby had FAS. She was referred to the Central Missouri FAS Center.
 - Three African American teens were invited to learn about FAS and one inquired about whether the father’s use of drugs and alcohol could affect a child.
 - A college woman was concerned about a friend who was early in her pregnancy and was drinking.

- ParentLink staff participated in a parenting fair at the Vandalia women’s prison in November 2006. 750 women stopped by the ParentLink information table to pick up materials or to make a connection about ParentLink services. 178 women requested materials from ParentLink or inquired about specific questions about their situation.
 - Frequent topics included workforce development, domestic violence, child development, how to maintain a relationship with your child while incarcerated, stress, and anger management.
 - Three women were in tears as they viewed domestic violence/partner abuse materials. One had visible signs of abuse.

ParentLink’s WarmLine Phone Assistance – In 2006 ParentLink’s WarmLine services were provided to over 2,100 parents and community service providers who work with parents. Due to the significant number of contacts through ParentLink’s outreach efforts in 2006, approximately 70 percent of the total contacts were from parents or other caregivers. The WarmLine phone service provides supportive conversation, research-based information, and resource information to callers. Many calls are complex with multiple issues being addressed and range from topics on child tantrums to adult depression as it relates to parenting. Examples of callers’ comments follow:

- “Thank you so much. I feel like I have some ideas to try. It is helpful knowing this is normal.” (Parent calling regarding her 5 year old throwing tantrums.)
- “Thanks so much for thinking of me. I read the article and one particular point that hit home is to make small changes. I think I try to achieve too much and it becomes overwhelming or just too difficult. Because when I think about it, we have already implemented some great strategies- getting more physical exercise and improving our snack choices are two. It is good to get that reinforcement because it makes you find patience when perhaps you might give up.”

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

Students In the Middle – Students In the Middle grew out of the Focus on Kids and Families and Divorce programs, which provide information about children’s adjustment to divorce for parents and teachers, respectively. The parents and teachers who participated in these programs indicated a need for a program to assist their children in adjusting to parental divorce. In response to this need, the Students In the Middle program was developed in partnership with Kids In the Middle, a St. Louis-based nonprofit agency that provides therapy, education and support to children and families coping with divorce and other transitions. Students In the Middle is a school-based program in which school counselors provide support groups for students who have experienced family transitions including divorce, separation, and remarriage. University of Missouri Extension specialists and Kids In the Middle staff train the school counselors, provide them with a curriculum for facilitating weekly support groups, and provide ongoing consultation for the counselors as they implement the support groups.

In 2006, the Students In the Middle support groups were piloted, with 7 counselors implementing groups at schools in Pike, Lincoln, and St. Louis counties. Approximately 30 children (pre-K through middle school) participated in the groups. Counselors who participated in the pilot program said:

- “Children say they like coming to group and hate missing it when they’re not in school. One parent said it made a noticeable impact on his son.”
- “The kids love coming and the parents express they are glad the schools offer this for their children.”

- “The students and a couple of parents really enjoyed the group. I had one parent tell me she felt her daughter really benefited from the sessions, especially since they were newly separated.”

Students were asked at the end of the group series to list 3 goals they had accomplished in the group. Some of the accomplishments they listed were:

- “Sometimes I can talk to my mom easier.”
- “I’m not afraid to talk about my feelings.”
- “I don’t yell as much.”
- “I don’t have as bad an attitude.”

In addition, 14 counselors at schools in Montgomery, St. Charles, Lincoln, Pike, Gasconade counties participated in a Students in the Middle training. They will begin implementing their support groups in 2007.

- c. Source of Funds: Smith-Lever, State funds, Charitable Trust
- d. Scope of Impact: Missouri

Key Theme: Promoting Housing Programs

- a. Description: Affordable Housing and Housing Revitalization programming informs consumers about national and statewide financial and environmental incentives for homeownership, home maintenance, energy efficiency, and healthy homes. Homeowner education is an important aspect of any attempt to stabilize the economics of the regional and statewide housing market and provide community revitalization. Through Extension programs, homeowners and home buyers of low or moderate income, without adequate resources for a down payment or resources for refinancing, 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.

At the community and town scale, 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.

University of Missouri 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 aging in place. The scale of these programming efforts ranges from the individual interested in buying his/her first home to entire communities interested in identifying and taking inventory of their existing and anticipated housing stock.

- b. Impact: In Fiscal Year 2006, slightly more than 10,000 indirect and 4,000 direct educational contacts were made through sustainable housing and community revitalization programming efforts. These efforts included 41 partner organizations. The following outputs and outcomes were included:

HomeWorks and HOME are practical courses that have helped over 1,500 first time and long-term homeowners successfully maintain homeownership through knowledge of basic home care, maintenance and financial management.

Short-term outcomes: Evaluations completed following the sessions indicated participants felt they had increased their knowledge and skill levels related to the topics covered. 50 percent of participants felt the program exemplified excellent quality. 50 percent of participants felt the value of the program in terms of time, money and energy was of excellent use.

Rent Smart is a program that assisted over 130 administrators, caseworkers and other social service agency providers, trainers, and landlords in working with renters to obtain and keep rental housing. The program covers all aspects of renting from determining the amount of rent a family can actually afford to keeping housing clean and safe. A portion of the workshop is about legal aspects of rental housing, the rights, and responsibilities of both landlords and tenants.

Short-term outcomes include: Evaluations completed following the sessions indicated participants felt they had increased their knowledge and skill levels related to the topics covered.

Stepping Through the Gateway to Financial Fitness is a collaborative program developed and presented by Architectural Studies 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 peoples' housing conditions.

Short-term outcomes include: Participants completed a series of five workshops, set financial goals and developed spending plans. Train-the-trainer materials were developed and volunteer instructors attended workshops to become aware of how adults learn and how to apply that information to teaching this material.

Medium-term outcomes include: Evaluations are completed at the end of each workshop. An evaluation committee that includes University of Missouri 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 and Healthy Homes programs helped over 1,900 consumers improve the environmental quality of the air and rooms in their homes. Information provided during educational programs helps people identify common 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. Educational offerings include programs on carbon monoxide, asbestos, lead, radon, 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 most participants in these offerings have made at least one change to improve the air quality and safety in their home.

Energy Efficiency, Weatherization, and Alternative Energy programs enabled over 350 consumers to permanently reduce their energy bills and their impact on the environment by making their homes more energy efficient. Special workshops were supplemented which covered alternative home energy systems (passive solar, active solar, photovoltaics, wind power) for consumers interested in making deep reductions in the overall impact on the environment.

Short-term outcomes include: Responses to follow-up evaluations indicate most participants in these workshops have made at least one change to improve the energy efficiency and energy use in their home.

c. Source of Funds: State, Federal

d. Scope of Impact: Missouri

Key Theme: Volunteer Development

a. Description: Volunteer Outreach and Development Program. A positive relationship with caring adults helps to create connections and a sense of belonging for young people. Missouri's 4-H volunteers provided many of these connections. Missouri's 11,850 4-H volunteers provided an estimated \$43 million (based on Independent Sector hourly volunteer contribution of \$17.55 and an estimated 208 hrs/yr/volunteer) in volunteer services in 2006. 4-H volunteers provide service in a number of ways including teaching skills to children, managing the work of other volunteers, mentoring teens, working with teachers and schools, coordinating county and state events and promoting 4-H.

b. Impact:

- **Volunteer Screening:** In fall 2003, volunteer screening became the 4-H standard. All individuals applying to serve as a 4-H volunteer are first screened for child abuse and neglect through the Missouri Department of Social Services and for criminal convictions through Choice Point, a national screening company endorsed by the National Collaboration for Youth. Over 8,800 volunteers for the club program were successfully processed. Less than 0.1 percent of the applicants were rejected.
- **Research on Volunteer Competencies:** The national volunteerism study, *Identifying the Core Competencies Necessary for Volunteers to Deliver 4-H/Youth Development Program*, continued to move forward. The results of this study will: 1) provide guidance in determining appropriate and needed volunteer training and 2) serve as a professional reference of knowledge for specialists working in volunteer development.
- **Volunteer Certification:** Missouri instituted three certification programs to help meet the need of specific subject matter training as well as provide needed safety precautions for these specific project areas.

Shooting Sports – 4-H Shooting Sports program continues to be one of the fastest growing 4-H projects. The success of 4-H Shooting Sports is directly proportional to the effort put into equipping leaders for success. Volunteer leader training and certification in 4-H Shooting program is the foundation for success. Training volunteers are recruited to attend a national workshop. The Training volunteers return to Missouri and serve to conduct statewide

certification for other volunteers. Two leader certification workshops are conducted per year at various sites around the state. Local 4-H county and club volunteers are required to successfully complete a leader certification workshop prior to working directly with youth. The workshop consists of more than 20 hours of training in 4-H philosophy, youth development principles, safety, risk management strategies, as well as shooting discipline lesson plans and teaching methods. 169 local volunteers were certified as Missouri 4-H Shooting Sports Leaders in 2006.

Sportfishing – Currently Missouri conducts one leader training workshop per year for volunteers in the 4-H Sportfishing program. In 2006, 61 volunteers were trained.

Horse Bowl – Missouri 4-H began to certify volunteers to conduct Horse Bowl education events in 2004. There are currently 81 certified horse bowl coaches in the state. Missouri 4-H has 3,300 youth enrolled annually in Equine Science projects and an estimated 2,000 youth and adults were impacted this year by the certified horse bowl coaches. The Missouri certification was modeled after the Illinois Horse Bowl certification. In an evaluation survey the certified bowl leaders made the following comments when asked, “How has the 4-H horse project helped my child?”

- “My children are leaders and are involved in horse training, showing and lessons. My son is an Equine Dentist. My daughter works for a thoroughbred trainer. My kids will ask questions where others sit there.”
- “Is more responsible with time, patience and practice.”
- “Are more confident, and interested in learning more, they have both taken interest in finishing things (even if it is just cleaning their room) when they are asked.”

Testimonials

“The most important thing my child learned in the horse project which includes daily care, project and club meetings, showing and participation in contests like bowl, hippology, judging and public speaking this year is:”

- Becoming more self confident
 - Sportsmanship; public speaking skills; the amount of commitment that goes with horse care
 - She has learned you have to do the work first then get rewarded. She has learned to share her knowledge with those with less experience. She has also learned other disciplines and levels to compete in and achieve.
 - How to set a goal and complete it; both children did well on their project forms and completed themselves and took the responsibility to finish it on time
 - To be prepared, on time, responsible
 - Responsibility and sportsmanship
 - Speak in front of a group and take initiative to try new things
- 4-H Choices – Special School District of St. Louis County. The Special School District provides special education to students with disabilities. The District educates more than 30,000 students and performs more than 100,000 hearing, speech screenings and diagnostic evaluations annually. In 2006, a new partnership with the 4-H Center for Youth Development, St. Louis County University of Missouri 4-H Youth Programs and Special School District began.

Over 140 Special School District teachers have been trained as 4-H Project Leaders for Aerospace and Foods and Nutrition. Currently, over 1,000 youth are enrolled.

Testimonials

- “This is the best training I’ve ever attended.”
- “I look forward to using the 4-H resources in my classroom.”

- “I was in 4-H as a child and I’m glad I can use 4-H in my classroom.”

- c. Source of Funds: Smith-Lever, Grants, Fees
- d. Scope of Impact: State and National

Key Theme: Workforce Preparation

- a. Description: Access to College: Youth Futures – College Within Reach Program. Many colleges and universities are increasing their efforts to recruit and retain non-traditional students such as first-generation college students, ethnic minority groups and students from working-class families (Padron, 1992). Many of these non-traditional students, though, are less prepared for college – academically, psychologically and financially – than students who come from college-educated families. They may have weaker reading and math skills as well as lower degree aspirations (Terenzini et al, 1995). Tinto (1987), however, found only 15 percent of students drop out of college because of academic failure; most leave because of personal, financial, or social problems. The ability to handle these new demands during the first year of college is critical to success in college and to eventual graduation.

The 2006 Youth Futures – College Within Reach Conference, held on the University of Missouri (MU) and Missouri Western University campuses, provided an extensive college orientation for non-traditional students. Lincoln University (LU) and MU Extension 4-H Youth Development staff planned and implemented the conference with a pre/post conference mentoring program. The purpose of the program was to promote college attendance as an obtainable goal for youth and to provide support for youth to stay in college.

During the conference youth became aware of academic and student life activities and programs. They also learned about financial assistance and received resources and information regarding campus life and college attendance. Residing in college dorms, attending workshops, and participating in MU, Missouri Western, and community activities provided youth the experiences needed to prepare for and be successful in college. In addition a practice ACT test was given to prepare youth for this important step toward college enrollment.

Following the conference, LU and MU staff members served as mentors to youth to provide a continuous support system. Mentors have contact with youth at least quarterly to discuss college preparation (e.g., grades, study skills, applications and scholarship forms, ACT tests) Youth progress toward preparation for college is tracked via a database. Items such as changes in grades, applications for college and scholarship, ACT preparation and more are updated yearly. Youth activity is tracked from the time the youth attend the conference until their sophomore year in college.

The conference was attended by 35 youth from Kansas City, St. Louis, Jefferson City, Columbia, and Mississippi County. The participants were 50 percent were female and 50 percent male. The mean age was 16. Participants were 90 percent African American, 8 percent Hispanic, and 2 percent Caucasian.

- b. Impact: Before the conference a significant number of youth (42%) reported they had not thought of going to college. These attitudes changed after the conference when all participants (100%) reported having learned:
 - They must make their own decisions if they want to go somewhere in life

- They felt more positive about going to college
- They will take their school work more seriously

One hundred percent of participants reported knowing what they need to do to go to college, where to find financial assistance for college and who to consult for help regarding college.

Of the participants graduated from high school, 66 percent are currently enrolled in college. Many parents have reported the conference had a strong impact and their adolescent(s) is more serious about high school, setting goals and improving behavior.

Testimonials

“This conference has shown me how important it is to continue with higher education and the many possibilities there are to go to college and to get a degree. My future is important to me. Thank you for helping me see that.”

Quotes from participants about what they learned from the conference:

- “I really, really thank you for coming because we need more Latinos to come to speak to us because then we know that if you did it, we can too.”
- “I learned that if I think about failure I will fail, but think about success I will succeed.”

- c. Source of Funds: Smith-Lever, State, Gifts
- d. Scope of Impact: State

Key Theme: Workforce Preparation

- a. Description: College Scholarships. 4-H participation and involvement leads young people to explore various careers and educational options. The Missouri 4-H Foundation offered college scholarships that helped support 4-H members pursue their educational dreams.
- b. Impact: In 2006, thanks to generous donor support, the Missouri 4-H Foundation offered 52 college scholarships totaling more than \$50,000. Of these 52 scholarships
 - 17 scholarships were available to 4-H members who resided in any county in the state of Missouri
 - Upperclassmen were eligible to apply for 20 of these scholarships
 - 40 of these scholarships could be used while attending any public institution in the state of Missouri and 23 could be applied toward a Missouri two year college or technical school

Testimonials

“4-H has taught me to have better leadership skills that I will use all my life.”

- c. Source of Funds: Gifts
- d. Scope of Impact: State

Key Theme: Workforce Preparation

- a. Description: Information Technology - 4-H members put Missouri landmarks on the map. Scientific literacy is rapidly becoming critical to a well-prepared workforce. The U.S. Department of Labor predicts the science, engineering and technology jobs will account for half of the fastest-

growing occupations between now and 2014. Jobs in geospatial technology are among the top three in this fast growing science, engineering and technology job category.

4-H youths know where it's at. Last summer 300 4-H members spent part of their time at summer camp brushing up on their geography without using compasses and paper maps. Instead they used handheld Global Positioning System (GPS) units to locate landmarks by longitude and latitude. The coordinates are then used to create computer-generated maps.

Missouri 4-H and the University of Missouri Department of Geography have partnered in these efforts and are creating a community mapping curriculum as a response to the popular demand. The curriculum funded by the U.S. Department of Agriculture and NASA will help youth learn geospatial technology while contributing relevant information to their communities.

- b. Impact: Incorporating technology into 4-H projects helped the 300 4-H youth understand how classroom subjects like science and math are part of the everyday world. Related careers using geospatial technology were explored.

Testimonials

"These related technologies are rich with possibilities for 4-H Youth Development," said Bill Pabst, State 4-H Youth Development Specialist. "GPS, GIS (Global Information System) and remote sensing add new dimensions to traditional 4-H agriculture, community and environmental projects."

- c. Source of Funds: Smith-Lever, Grants, Gifts

- d. Scope of Impact: State and National

Key Theme: Workforce Preparation

- a. Description: Summers @ Mizzou – Opening Doors to the Future. The 4-H program annually links thousands of young people, parents, volunteers, and professionals to the University of Missouri. Last year, nearly 1,900 persons visited the University of Missouri campus for educational events including State 4-H Congress, State 4-H Teen Conference, and contests that provide opportunities for young people to test knowledge and demonstrate their skills. 4-H is working with University of Missouri Enrollment Management, University of Missouri Conferences Office and University of Missouri Student Services to create Summers @ Mizzou for junior and senior high school students.

Summer camps planned for 2007 are Entrepreneurship Camp and Geospatial Camp. 4-H is working the College of Engineering to enhance the youth development environment through counselor training, helping faculty with experiential learning methodology and understanding the needs of youth and underserved audiences.

- b. Impact: The first camps for youth are planned for summer of 2007. To date, the impact has been organizationally. Planning the camps has positioned 4-H in a strong partnership with other University of Missouri Divisions, Colleges and Departments – Enrollment Management (Admissions, Residential Life, Dining Services, Student Financial Aid), MU Student Services (Career and Success Center, Student Life), Conference Office, Colleges of Engineering and Arts and Sciences.

- c. Source of Funds: Smith-Lever, Gifts, Fees
- d. Scope of Impact: State

Key Theme: Youth Leadership Development

- a. Description: 4-H Camp. In the summer of 2006 4-H youth development staff across Missouri assisted in an effort to evaluate 19 different 4-H camps statewide. Over 300 youth, ages 10-13 were targeted for evaluation purposes. The evaluation survey sought to identify the role of 4-H Camp in helping youth develop four life skills (Hendricks, 1996). Life skills identified and evaluated were: Learning to Learn, Social Skills, Teamwork, and Self-responsibility. Campers completed a written survey instrument at the conclusion of their camp session. Parents were mailed a similar evaluation form approximately 2 weeks after their child returned from camp.
- b. Impact: Responses from both youth and parents showed a very high number of positive perceptions about the ability of 4-H Camping Programs to develop life skills. Youth agreed most strongly they learned skills to work out differences with others, to complete jobs they were responsible for, to make new friends and to follow directions. Parents reported their child was more confident after attending 4-H camp and strongly agreed they were glad they sent their child to camp. The responses of parents and of youth were very similar and highly correlated. Parents and youth alike feel the 4-H Camp experience provides a wealth of fun and learning experiences for campers.

Testimonials

Responses to open-ended questions provide testimonials to 4-H Camp.

The most important thing I learned about myself at 4-H Camp this year is:

- “It was easy to make new friends when you are just being yourself.”
- “Respect all people even if they are different.”
- “It’s okay to make mistakes.”
- “Always pay attention in order to do things right.”
- “I know I can work in a team if I try hard, even working with people I don’t know.”
- “I used to think my opinion didn’t matter, but now I know it could help my group.”
- “How hard it is to take care of myself and picking up after myself.”
- “Being late really slows things down and slows others, too.”

The most important thing I learned to do at 4-H Camp this year is:

- “Respect others and yourself.”
- “To have fun no matter what – even if it rains.”
- “Listen to camp leaders, counselors, and all the other leaders.”
- “To keep healthy and fit.”
- “To have fun and to be careful while you have fun.”
- “Doing more and not complaining.”
- “To set a good example.”
- “To be responsible around younger campers.”

Because of 4-H Camp this year I know I can...

- “Make friends wherever I go.”
- “Just go up to people, talk to Them, and have a good conversation.”
- “Have fun in new environments.”
- “To be myself without being embarrassed or afraid.”

- “Treat others as I want to be treated.”
 - “Be a public speaker.”
 - “Teach others what I know.”
 - “Finish projects with other people without arguing.”
 - “Manage time and be ready to go.”
 - “Take care of myself on my own and be more responsible.”
- c. Source of Funds: Smith-Lever, Grants, Fees
- d. Scope of Impact: State and National

Key Theme: Youth Leadership Development

- a. Description: 4-H Community Service. An important aspect of 4-H clubs is community service. Activities included not only the typical road clean-up and beautification projects, but writing letters to soldiers in Iraq, assembling Hero Packs, organizing a veterans appreciation event, using GPS devices to collect community data, assisting with the renovation of a downtown building for a youth center, helping launch a children’s center for abused children, making weighted blankets for autistic children, and filling suitcases with personal items for the clients of abused women and children shelters.

Reaching out to others through service is a longstanding 4-H tradition. Each year clubs throughout the state conducted service projects to help others in their communities. Community service-learning couples the knowledge young people have of community issues with hands-on experience to promote civic awareness and responsibility.

- b. Impact: Totals from club service logs show on average every club conducts at least 7 service projects each year with at least 25 members participating in each service project. Using these averages, during the 2006 club year, the 1,514 clubs throughout the state conducted 10,598 service projects with 264,950* youth participants. (*Duplicates not removed. Most youth participated in multiple projects.)

The State 4-H (youth) Council began a focused campaign, Kids Helping Kids, where 4-H members collected money to provide to other members who are in need of support due to natural disasters or health conditions. To date the Council has raised about \$36,000 toward the \$60,000 endowment goal. In 2004-05 \$4,500 was distributed to 4-H members in need which results in a net of about \$31,500 in this fund. The 2005-06 State 4-H Council has resumed working toward a goal of \$45,000 which the Foundation will match with a gift of \$15,000 to create a Kids Helping Kids endowment fund. In addition to the endowment campaign, the State 4-H Council is coordinating a Hurricane Relief campaign in the name of Kids Helping Kids.

Testimonials

“Service projects help teach youth of the community the responsibility they have to improve the place in which they live by caring for it and the people around them. These projects also help them see that they can make a difference. These projects require teamwork to accomplish the tasks at hand. It also requires cooperation between the adults and the youth of the group which provides a family opportunity and a development of respect between adult and youth members. Service projects provide an opportunity to display good citizenship.”

- c. Source of Funds: Smith-Lever, Grants, Gifts
- d. Scope of Impact: State and National

Key Theme: Youth Leadership Development

a. Description: 4-H Global Education. Missouri’s 4-H Global Education program assists young people, families and communities to learn more about other cultures and countries, develop an appreciation of the social, economic, political and cultural contributions of all people and better understand how culture influences value, beliefs and attitudes. In 2005-2006 exchanges were coordinated with Japan, Russia and Ukraine. Two 4-H members traveled to Japan for the summer program. One of these young people participated in the Nihongo program which is an intensive 4 week language study session prior to her 4 week host family stay. Missouri hosted 10 young Japanese delegates and one chaperon for the month-long host family stay. The high school exchange program hosted two Japanese students and two students from the Eurasia countries. The Eurasian students are here on the FLEX (Freedom Leaders Exchange) which focuses on giving the participants first hand experience in our democratic process. The students returning to their countries will be equipped for leadership roles in their society and government. Funding for the Global Education Exchange programs are through administrative fees based on the number of program participants.

b. Impact:
Two Missouri young people learned more about the culture and country of Japan by traveling to Japan.

10 Japanese youth learned more about the culture of mid-west United States by staying with Missouri 4-H Families for four weeks.

Four youth, two from Japan and two from Eurasia, learned leadership skills and democratic processes in the United States by staying with Missouri 4-H families for one year and attending Missouri high schools.

Testimonials

“Upon my return home, I realized a true international experience involves ups and downs. If you don’t experience something new, whether you end up enjoying it or not, you haven’t truly ‘experienced’ anything. In one word, my trip was amazing.” 2006 Delegate to Japan.

“The time passed quickly as we enjoyed hosting our student through the FLEX program. She was from the Ukraine and was able to share much of her culture with us. She quickly became involved with school and community activities and adjusted well to our family lifestyle. I would recommend hosting to other families.” 2006 Host Family Mom.

- c. Source of Funds: Grants, Fees
- d. Scope of Impact: State, National

Key Theme: Youth Leadership Development

a. Description: Extension Council Youth Leadership. With the University of Missouri State Extension Council and Leadership Development Committee, 4-H received funding through National 4-H

Council and Surdna Foundation to launch a youth in governance initiative aimed at changing the way University of Missouri Extension as an organization involves young people in decision-making. The project focused on expanding youth/young adult participation on county extension councils to: 1) support extension councils in engaging youth in non-voting capacities; 2) support extension councils in engaging young adults in voting capacities; and 3) integrate youth/young adult representation into ongoing council leadership development.

Twelve County Extension Councils applied and were selected as pilot counties for the Surdna Project. Pilot councils received training materials to assist their councils with implementation, and indicate they have gained knowledge, tools, and more favorable attitudes for building youth-adult partnerships.

- b. **Impact:** Two hundred and twenty-nine University of Missouri Extension Council members participated in twelve workshops designed to begin work with youth and young adults as partners in council decision-making. As a result, 355 youth and adult project partners were formed. Participants were also asked to give a self-assessment of what they gained from the training experience, in terms of more, less, or no change:

- 86% said they are more motivated to start the implementation of ECYL with their councils
- 90% reported they are more aware of resources and practices for involving youth in councils
- 86% indicated they are more convinced youth and adults can work together effectively on councils
- 82% said they have more skills for facilitating the council toward a youth-adult partnership
- 84% reported they are more ready to engage other youth and adults in their ECYL project

Seven youth and young adults have been identified by Extension Council members and Regional Directors to serve on University of Missouri Extension County councils. Two counties have installed young people as non-voting members of their councils. As a result, University of Missouri Extension administrators, regional directors, and State Extension Council members are voicing their support for continuing youth/young adult involvement at all levels of council decision-making.

Testimonials

“I am so impressed with the resources available. I think other segments of the University could benefit from a similar packet and training. Particularly, I am thinking about the Audrey Walton Youth Leadership Conference, which took place on campus last weekend.”

- c. **Source of Funds:** Smith-Lever, Grants
- d. **Scope of Impact:** State

Key Theme: Youth Leadership Development

- a. **Description:** Youth Civic Leaders Summit. The Youth Civic Leaders Summit is a statewide weekend retreat for young people who are active or aspiring leaders and decision-makers in their communities, and their adult sponsors. Young people (ages 13-18) active with 4-H Councils, Junior/Senior Leaders, Youth EXCEL, Youth Summit, and similar leadership programs are encouraged to attend. Counties send up to 8 youth and 2 adults (10 people total) as a team. The Summit engages young people in meeting, learning alongside, and having fun with youth and adult leaders from around the state. Participants choose from a variety of workshop tracks, such as Civic Engagement (Hurricane Katrina), Youth-Adult Partnerships, 4-H Leadership Clubs, and Civic

Education. Other highlights include a youth project showcase, outdoor challenge course and recreation, and team action planning.

- b. Impact: Youth and adult team members were surveyed about what difference their participation in the Youth Civic Leaders Summit made, in terms of educational outcomes related to leadership (n=38).
- 78% said they are more motivated to serve their communities in a decision-making role
 - 84% reported they are more aware of resources and practices for youth involvement in decision-making
 - 81% indicated they are more convinced youth and adults can work together effectively
 - 84% said they have more skills for strengthening a club, program, or organization in their community
 - 78% reported they are more ready to invite other youth and adults from their community to work together

Testimonials

During the youth project showcase on Saturday evening, one teen from Laclede County stood up and thanked the whole group for the experience, calling the Summit “the best weekend of my life.”

A 4-H youth specialist who attended the Summit as the Moniteau County team leader reported hearing afterward from a mother of one of the older teen participants. The parent reported her daughter had an outstanding time at the Summit, and realized the 4-H program is alive and thriving. According to the parent, the teen is now re-energized to work with her club and community.

An adult team member from Adair County went home with his team’s action planning results and immediately worked with the local YMCA board of directors, where he serves, to secure a board seat for a young person. Youth representation on local boards and councils is the focus of the team’s plan.

- c. Source of Funds: Smith-Lever, Grants
- d. Scope of Impact: State and National

1890 Cooperative Extension Service — Lincoln University

Key Theme: Aging

- a. Description: The mission of the Paula J. Carter Center on Minority Health & Aging (PJCCMHA) is to provide leadership in addressing the health, social, and economic needs of minority, disabled and underserved elderly populations in Missouri. This is accomplished through education, dissemination of research-based information, policy analysis and the use of technology as strategic tools. The Center is a health advocacy entity. It takes a proactive role in building capacity to identify resources to develop and implement health-related programs for the underserved senior populations.

The Center improves the quality of life for minority and underserved older adults throughout Missouri by reducing disparities and inequities in access to healthcare and promoting health literacy and healthy behaviors. It disseminates culturally appropriate health care information and materials that will empower the underserved populations to participate in improving their health. The Center identifies barriers to preventative health care and works to reduce racial and ethnic bias in research

and practice. Diversity training, health education and resource information are provided through conferences and workshops.

The health education program, Improving Access to Healthcare for Missouri Underserved Minority Seniors (IAHMUMS), targets the 50+ underserved minority and senior populations. Four Community Outreach Workers target St Louis City, Pemiscott, Cole, Callaway, and Moniteau counties in collaboration with several agencies and organizations. Outreach workers provide advisement, technical assistance and program development to clients.

The Center develops, publishes and disseminates two quarterly newsletters: Healthy Aging and Elderly Expression. Both newsletters serve as resource tools for culturally appropriate health care, aging programs and summaries of minority health and aging research.

- b. Impact: The PJCCMHA improved the delivery of healthcare services and quality of life for minority older and underserved elderly populations through the Missouri Institute on Minority Aging (MIMA). Health professionals and educators presented evidence-based data to practitioners, academicians, students and the senior population regarding health issues and concerns applicable to underserved older adults. Training, educational presentations and panel discussion groups dedicated to improving the quality of life of minority elders were provided for over 200 participants. Participants reported their knowledge was increased and they had integrated what they had learned professionally and personally.

Through the program, Improving Access to Healthcare for Missouri Underserved Minority Seniors (IAHMUMS) ninety percent of program participants reported increased knowledge of health behaviors, disease prevention, disease symptoms, and the importance of seeking medical treatment. Program participation progressively increased from 119 to 310 participants.

Healthy Aging and Elderly Expression newsletters were distributed to more than 5000 clients and stakeholders throughout the year.

- c. Source of Funds: State
- d. Scope of Impact: State Specific

Key Theme: Children, Youth and Families at Risk

- a. Description: Central Missouri. 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 23rd in the United States for childhood poverty. For Jefferson City, 24.3 percent of the youth live in single parent families. Missouri has a high school drop out rate of approximately 13 percent; the average grade for completion is 11.1 for high school dropouts. For Missourians residing in diverse communities, the statistics are much higher. The percentage of single parents in the Jefferson City Housing Authority is 70.1 percent; 100 percent of the families are considered living below the poverty level.
- b. Impact: Forty percent of the youth participants of the Collaborative Tutoring Program increased their grades by 1-2 letter grades during the 2003-2006 academic school year. Four (4) youth served in leadership roles in their local clubs by serving as trained officers. Youth also learned how to be positive role models for the youth in their community. Ten youth participated in 4-H camp and gained skills in outdoor education, conflict resolution and leisure time management. Twenty-two

volunteers served as volunteer helpers in identified high-risk communities. Six youth participated in the annual Youth Futures Program, a collaborative effort between Lincoln University and the University of Missouri.

- 70% of the participants in 4-H camp reported gains in skills in outdoor recreation. If they remained home they reported spending their time watching television or playing.
- 100% of the participants in the outdoor cookery contest reported gaining skills in food safety and kitchen safety.
- 80% reported an increase in knowledge regarding biology and micro-organisms as they relate to food-borne illnesses.

Approximately 75 youth participated in the educational workshops associated with the Annual Youth Outdoor Cookery. 60 percent of the parents reporting indicated an increase in their child's self-discipline as a result of participating in the overall youth development program in Central Missouri.

- c. Source of Funds: Smith-Lever, State, National 4-H After-School Alliance Grant
- d. Scope of Impact: State Specific

Key Theme: Children, Youth and Families at Risk

- a. Description: The Bootheel of Missouri is located in the southeast corner of the state which is comprised of a number of counties; Butler, Mississippi, Scott, New Madrid, Dunklin, Pemiscot, and Stoddard. The total population in the Bootheel according to 2000 census data is approximately 180,000 people of which 30 percent are minorities. About 25 percent of the population lives below the poverty level. 17 percent single parent households. Some of the highest teen pregnancy rates and high school dropout rates exist in two of the counties in the Bootheel. Unemployment rates average around 13 percent.

Lincoln University's Cooperative Extension Programs in southeast Missouri have the following objectives:

- To provide educational opportunities to the underserved and hard to reach youth in the Bootheel.
- To help youth seek and set goals for their lives.
- To provide life skills, prevention, tutorial assistance, computer access in the after school program.
- To provide arts and crafts classes, character development, physical education/fitness, theatre and dance production, nutrition education, and field trips in the summer enrichment program.
- To collaborate and advocate with other organizations and schools on the behalf of youth.
- To partner with other youth oriented organizations to bring about a greater degree of opportunity and change in the lives of the targeted youth.

Programs include: The LU Cooperative Extension After-School Program that provides tutoring, homework completion, computer lab, life skills training, reading, ACT preparation, Teen Talk, recreation, and 4-H.

- b. Impact:
 - 85% of parents with participating children reported an increase in their child's leadership ability as a result of participating in the program.

- 50% indicate an increase in their children's self-discipline.
- 65% increase in knowledge and skills with nutrition, character education, and computer skills.
- 80% of the parents reported a more positive attitude of their children toward school.
- 55% of students made honor role.
- 65% increased their grades by at least one letter. Prior to participating in the program they were experiencing academic failure.
- 95% increase in homework completion as reported by teachers and report cards.

4-H Activities

- 7 teens and 2 volunteers participated in the Teen Conference.
- 1 teen from the Bootheel holds a state office.
- 5 youth participated in 4-H Congress.

Summer Enrichment Camp: Over 100 students were enrolled in the Sikeston program, 75 in Lilbourn and 60 youth in Caruthersville for a total of 235 youth were served in the summer program daily.

- After-school Programs were available in Sikeston and Caruthersville with an average daily attendance of 50 students in Sikeston and 35 students in Caruthersville. 70 out of 85 students improved their grades in one or more subjects.
- 62 out of 85 reading above grade level.
- 58 out of 85 showed no unsatisfactory behavior.
- Student progress reports show 90 percent of the students enrolled in the program improved their grades.

The financial impact the program has is extraordinary with savings for after-school care for latchkey children and daycare expenses for the summer months. Average cost of after-school care for one child is \$20 per day. The after-school program is saving households \$80 per week per child and \$5,000 per year per child. These programs were offered approximately 250 days during the past year.

- c. Source of Funds: Smith-Lever, State, National 4-H After-School Alliance Grant
- d. Scope of Impact: State specific

Key Theme: Children, Youth and Families at Risk

- a. Description: Kansas City Urban Impact Center (KCUIC) Youth Futures Program. Many colleges and universities are increasing their efforts to recruit and retain nontraditional students such as first-generation college students, ethnic minority groups and students from working-class families. Many nontraditional students though are less prepared for college – academically, psychologically and financially than students who come from college-educated families. They may have weaker reading and math skills as well as lower degree aspirations.

Research has found only 15 percent of students drop out of college because of academic failure; most leave because of personal, financial or social problems. The ability to handle these new demands during the first year of college is critical to success in college and to eventual graduation. But many nontraditional students must overcome additional obstacles on the path to a college

degree. One of the most popular methods used to help all students make a smooth transition to college is an orientation course.

- b. Impact: Survey results indicate there was some level of individual transformation among youth. 25 percent of the youth reported they had not thought of going to college while an overwhelming majority, 58 percent, said they were not sure they could go to college. These attitudes changed after the conference when all participants (100%) reported having learned:
- They must make their own decisions if they want to be going somewhere.
 - They felt more positive about going to college.
 - They will be taking their schoolwork very seriously.

A significant percentage (55%) was in agreement that it is hard to make friends one can rely on. Consequently, 31 percent reported they often get in trouble. Combining these two points emphasizes one of the conference goals; to provide an opportunity for making friends on which one can rely. It is hoped this goal will be reached with time.

Over 90 percent of participants reported having learned what they need to do to go to college, where to get college money and who to consult for help regarding college. In addition, 97 percent were in agreement they now had a better understanding about college. The students enjoyed attending the conference. All (100%) reported being satisfied with the overall conference while the majority (77%) indicated they would attend the conference next year. Ten students from KCUIC attended the 2005-2006 Conference. A KCUIC Youth Futures newsletter was developed and distributed in 2005-2006.

- c. Source of Funds: Smith-Lever, State, National 4-H After-School Alliance Grant
- d. Scope of Impact: State specific

Key Theme: Children, Youth and Families at Risk

- a. Description: Urban 4-H Programs. Lincoln University Cooperative Extension has worked in Kansas City to organize four 4-H clubs over the last year, with an approximate total membership of 40 youth. KCUIC had approximately 200 additional youth participate in 4-H activities through in-school programs and projects. These clubs with their adult volunteers and Lincoln University Urban Impact Center staff meet on a weekly or monthly basis and conduct various programming activities aimed at enhancing and developing youth in various leadership areas. KCUIC 4-H youth participated in 4-H Youth Congress (10 students attended-June 2006); Youth Futures Conference (15 students attended-July-Aug. 2006); One youth leader attended National Conference in Washington, D.C. (William Lane was selected to attend and is a regional representative on the State 4-H Council).

The KCUIC implemented 4-H after-school tutorial program, Read 180, in collaboration with JH Clark Middle School Ace Academy. Fifty youth are enrolled in the after-school program. Weeks Elementary and a 4-H group at metropolitan missionary Baptist Church are served with 40 to 50 youth each.

- b. Impact: Lincoln University works collaboratively with the Kansas City school district to establish 4-H clubs. Current feedback suggests positive impacts in the following areas:
- Leadership skills improvement;
 - Behavioral improvements;

- Academic improvements as measured by grade reports, parental reports, and volunteer observations.

The St. Louis Urban Impact Center provides programs for youth in Computer Literacy, Financial Literacy, Science, Arts Education, Communication Skills, Decision-Making, Conflict Resolution, and Health and Nutrition.

Forty-five to fifty students completed the majority of the programs. Discussions and activities taught students to improve the quality of life through their participation.

- c. Source of Funds: Smith-Lever, State, National 4-H After-School Alliance Grant
- d. Scope of Impact: State specific

Key Theme: Children, Youth and Families at Risk

- a. Description: The St. Louis Urban Impact Center provides several programs focused on reducing the number of children, youth, and families at risk. The 2000 Census data show the youth in St. Louis under 18 years of age as 25.2 percent of the population. The median income per household was \$28,172 compared to Missouri median income of \$40,870. The percentage of persons below poverty level was 21.3 percent compared to the state percentage of 11.6 percent. Black or African American comprised 51.70 percent of the St. Louis city population. In 2004, for every three students graduating from St. Louis Public Schools, two others of their freshmen classmates dropped out of school before graduation. Fewer than 70 percent of the freshmen entering St. Louis Public Schools actually graduated with their classmates in the past five years. Most of St. Louis students who dropped out of school do so between their freshman and sophomore years.

Because of these statistics the Urban Impact Center of St. Louis, focuses on Youth Development, Adult Development, and Community Revitalization programs:

- The Lincoln University Cooperative Extension – Urban Impact Center of St. Louis has worked collaboratively with St. Louis Public Schools to establish after-school and in-school programs in seven schools. Some schools participated in the 2005-06 and 2006-07 school years. The Center also hosts the Teen Drop-In program which is an after-school program for teens providing a safe-haven for students, life skills training, and opportunities to discuss teen issues, skills games, and homework assistance.
- The Summer Youth Enrichment Program held for the second year facilitated workshops that engage students in experiential and hands-on learning activities using guest speakers, field trips, and classroom experiences.
- The goal of the St. Louis 4-H Urban Extension Leadership Academy held in the spring and fall is to provide youth with an opportunity to participate in a high quality program that will prepare them for the future. Participation in this program will expose youth to a variety of leadership opportunities and individuals that will increase their chances for future success.
- The Black History Program provides awareness of the African-American culture and increased sense of pride.
- The Youth Futures Program places college within the reach of many students and introduces them to the college experience.
- Senior Series assisted seniors with their health concerns, developing and improving their computer skills, personal development.
- Parenting classes helped parents and guardians with the development and guidance of their children.

- The Financial Literacy program helps adults attain self-sufficiency and economic stability through focusing on the Get Checking Program, credit management, fraud awareness and resource management.
 - The Career Development Series provides direction for participants to improve their professional life skills.
 - The Urban Garden Project provides neighborhood residents with a renewed sense of pride that will enhance their knowledge and interest to improve their property and promote social capital.
- b. Impact: St. Louis Urban Impact Center Programs have provided social impact of 794 youth and adults (361 adults and 433 youth).
- Eight 4-H clubs have been formed and are being cultivated to be a part of the mainstream 4-H organization.
 - Seven youth from the St. Louis Center participated in the Youth Futures Program.
 - A Lincoln University youth was elected as the 4-H Regional Representative.
 - The Senior Series increased seniors' knowledge of healthier living via active productivity to reduce and manage weight, reduce blood sugar and blood pressure level, and healthy management of their cholesterol. Seniors learn computer skills to improve their productivity and enhance their lives.
 - Adults have increased their knowledge of personal finances and have made restitution with local banks and open bank accounts in their names.
 - Two hundred volunteers have contributed efforts to improve neighborhood beautification and increase opportunities for neighborhood sustainability.
- c. Source of Funds: State, Evans-Allen
- d. Scope of Impact: State Specific

Key Theme: Communications Skills

- a. Description: The State 4-H Communication Program for Extension has been in existence for over forty-six years with Lincoln University taking the lead for over twenty-three of those years. Youth participate in the program by preparing their speeches at the local level and may be selected to participate at the regional and then the state level. Each county prepares two youth for the Junior Division and two for the Senior Division.
- b. Impact: The Missouri State Communication Program reaches approximately 250 youth from September of last year through September of the current year. Approximately twenty workshops have provided assistance to youth of various economic levels, rural and urban, ages 8 to 19 from all over the State of Missouri. They developed positive life skills in speaking, self-esteem and self-confidence.
- c. Source of Funds: Smith-Lever
- d. Scope of Impact: State Specific

Key Theme: Community Development

- a. 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.

Communities, Youth and Families at Risk (CYFAR) New Communities Project is a collaborative effort between Lincoln University Cooperative Extension and the University of Missouri Family and Community Resource Program. The Family and Community Resource Team has three community projects. The purpose of the program is to involve the total community with a special focus on the faith based community in programs and activities offered by LU Extension and local partners. The programs are designed to enhance or improve the quality of life for children and youth in the southeast portion of Missouri.

Programs were provided to Caruthersville Missouri which was devastated by a category 4 tornado.

- b. Impact: In Southeast Missouri, programming efforts reached more than 2,000 people in grades K-12, low-income youth and over 350 adult volunteers participated. Over 362 children and youth had adult supervision in a safe environment.

Approximately 40 youth and adult participants acquired knowledge in the following areas: parenting skills, communication skills, stress management techniques and character identification and development.

Over 1,200 citizens were assisted in the Caruthersville region with clothing, food, and personal hygiene products following the destructive category 4 tornado.

- c. Source of Funds: Smith-Lever
- d. Scope of Impact: State specific

III. Stakeholder Input Process

University of Missouri Extension programming is based on the needs, aspirations and issues identified by the people in communities throughout the state. University of Missouri 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% of participants were youth under 18.
- Half were men, half women.
- 10% were minorities.
- 40% had little or no experience with extension educational programs.

The county 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>). 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://osedamissouri.edu/>.

Trend analysis, regional profiles and county-based data were available to faculty, extension councils and stakeholders using the Office of Social and Economic Data Analysis website <http://osedamissouri.edu/>. Place-specific county data are continuously updated to be used for community decision making, program planning and monitoring change. See <http://www.osedamissouri.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 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 21st 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 of Missouri 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 of Missouri Extension 21st Century Strategic Direction. Relevancy was determined through evaluation of local listening and comparing these data to trends identified through databases and analysis by the Office of Social Economic and Data Analysis (OSEDAMISSOURI).

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 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 Extension 21st 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. 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 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 (e.g., discrimination, low-pay, inadequate health insurance).

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 of Missouri Extension:

Multi-State and Integrated Activities

| | Key Theme | Program Description | Multi-State Extension (Smith-Lever) | Multi -State Integrated Research & Extension (Smith-Lever) | Multi-State Integrated Research & Extension (Hatch) |
|---------------|-------------------------------|---|--|---|--|
| Goal 1 | Animal Production Efficiency | Improving feed efficiency with reduced environmental impacts | | | X |
| | Animal Production Efficiency | Evaluating low-phytic acid grains fed to swine | | | X |
| | Animal Production Efficiency | Feed supplement | | | X |
| | Animal Production Efficiency | Improving estrua synchronization in cattle | | X | |
| | Ornamental/Green Agriculture | Developing bare root systems for ornamental plants | | | X |
| | Plant Genomics | Aflatoxin in corn | | | X |
| | Plant Genomics | Analysis of pollen rejection to reduce unintended pollination between species | | | X |
| | Plant Germplasm | Developing improved soybean lines | | | X |
| | Plant Health | Developing alternative root rot resistance in soybeans | | | X |
| | Plant Production Efficiency | Biochemical defense systems in forage crops | | | X |
| | Plant Production Efficiency | Integrated Cropping System | | X | |
| | Rangeland/Pasture Management | Forages for the 21 st Century | | X | |
| Goal 2 | Food Quality | Improving flavor analysis of food products | | | X |
| Goal 3 | Human Health | A New You: Health for Every Body | X | | |
| | Human Health | Improving cancer therapies | | | X |
| | Human Health | Stay Strong Stay Healthy | X | | |
| Goal 4 | Agricultural Waste Management | Animal waste management | X | X | |

| | Key Theme | Program Description | Multi-State Extension (Smith-Lever) | Multi -State Integrated Research & Extension (Smith-Lever) | Multi-State Integrated Research & Extension (Hatch) |
|---------------|---|---|--|---|--|
| | Agricultural Waste Management | Reducing nitrogen in pig manure | | | X |
| | Biological Control | Bioremediation | | | X |
| | Forestry | Utilizing small diameter trees to improve forest management | | | X |
| | Soil Quality | Evaluating soil properties with x-ray CT | | | X |
| | Water Quality | Watersheds Resource Education | X | | |
| Goal 5 | Children, Youth and Families at Risk | Building Strong Families | X | | |
| | Children, Youth and Families at Risk | Children of Deployed Military Personnel | X | | |
| | Children, Youth and Families at Risk | Children of Offenders | X | | |
| | Community Development | Community Development Academy | X | | |
| | Community Development, Conflict Resolution | Community Deliberation Program | X | | |
| | 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, Youth Development | EXCEL | X | | |
| | Leadership Training and Development, Youth Development | Food Safety | X | | |
| | Leadership Training and Development, Youth Development | Healthy Lifestyles | X | | |
| | Volunteer Development | Volunteer outreach and development program | X | | |

| | Key Theme | Program Description | Multi-State Extension (Smith-Lever) | Multi -State Integrated Research & Extension (Smith-Lever) | Multi-State Integrated Research & Extension (Hatch) |
|--|------------------------------|---|--|---|--|
| | Workforce Preparation | Information technology – 4-H members put Missouri landmarks on the map | X | | |
| | Youth Leadership Development | 4-H Camp | X | | |
| | Youth Leadership Development | 4-H Community Service | X | | |
| | Youth Leadership Development | 4-H Global Education | X | | |
| | Youth Leadership Development | Youth Civic Leaders Summit | X | | |

U.S. Department of Agriculture
Cooperative State Research, Education, and Extension Service
Supplement to the Annual Report of Accomplishments and Results
Actual Expenditures of Federal Funding for Multistate Extension and Integrated Activities
(Attach Brief Summaries)
Fiscal Year: 2006

Select One: Interim Final

Institution: University of Missouri

State: Missouri

| | Integrated Activities (Hatch) | Multistate Extension Activities (Smith-Lever) | Integrated Activities (Smith-Lever) |
|---|--|--|--|
| <i>Established Target %</i> | 5.5% | 7.5% | 10.0% |
| <i>This FY Allocation (from 1088)</i> | 4,412,172 | 7,663,741 | 7,663,741 |
| <i>This FY Target Amount</i> | 242,669 | 574,781 | 766,374 |
| <u>Title of Planned Program Activity</u> | | | |
| Goal 1 Forages and Livestock | 139,400 | | 224,779 |
| Goal 1 Integrated Cropping Systems | 137,500 | | 387,333 |
| Goal 1 Livestock Systems | | 267,340 | |
| Goal 3 Human Nutrition and Health | 65,300 | | |
| Goal 3 Improving Human Nutrition and Health | | | 57,173 |
| Goal 3 Nutrition and Health | | 29,732 | |
| Goal 4 Animal Waste Mgmt | | 15,288 | |
| Goal 4 Livestock Production Systems | 30,520 | | 169,127 |
| Goal 4 Water Quality | 31,630 | | |
| Goal 4 Watershed Resource Education | | | 16,721 |
| Goal 5 Adolescents at Risk | | 9,635 | |
| Goal 5 Affordable Housing | | 0 | |
| Goal 5 4-H Youth | | 245,269 | |
| Goal 5 Leadership Development | | 167,963 | |
| Total | \$404,350 | \$735,227 | \$855,132 |
| Carryover | | | |

Certification: I certify to the best of my knowledge and belief that this report is correct and complete and that all outlays represented here accurately reflect allowable expenditures of Federal funds only in satisfying AREERA requirements.

Director

Date

Form CSREES-REPT (Revised 09/04)

Attachment D

