

2004 Missouri Annual Report
University of Missouri and Lincoln University
Cooperative Extension and Research
Table of Contents

I.	Planned Programs Overview.....	1
	1862 University of Missouri Extension	1
	1890 Lincoln University Research and Extension	1
	Continuous Improvement of Planned Programs and Critical Issues of Strategic Importance to Missourians.....	2
	Programs Addressing Underserved Learners.....	3
	Diversity Accomplishments.....	3
	Stewardship of Resources	4
II.	Report of Accomplishments	
	Goal 1 – An Agricultural System that is Highly Competitive in the Global Economy	11
	1862 Agricultural Experiment Station Research – University of Missouri –Columbia	12
	Key Themes	
	Adding Value	12
	Animal Production Efficiency.....	13
	Plant Genomics	14
	Plant Germplasm.....	16
	Plant Health.....	16
	1890 Cooperative Research Program – Lincoln University	16
	Key Themes	
	Alternative Crops	16
	Aquaculture	17
	Grazing, Animal Health	18
	1862 University of Missouri Extension	19
	Key Themes	
	Adding Value to New and Old Agricultural Products.....	19
	Animal Production Efficiency	20
	Plant Production Efficiency.....	24
	Rangeline/Pasture Management	27
	1890 Cooperative Extension Service — Lincoln University	29
	Key Themes	
	Small Farm Viability	29
	Goal 2 – A Safe and Secure Food and Fiber System	30
	1862 University of Missouri Extension	30
	Key Themes	
	Human Nutrition – Food Safety and Food-Borne Illness.....	30
	1890 Cooperative Extension Service — Lincoln University	31
	Key Themes	
	Food Accessibility and Affordability	31
	Food Safety.....	32
	Goal 3 – Health and Well-Nourished Population.....	33
	1862 Agricultural Experiment Station Research – University of Missouri-Columbia	34
	Key Themes	

Human Health.....	34
1890 Cooperative Research Programs — Lincoln University	35
Key Themes	
Human Nutrition.....	35
1862 University of Missouri Extension	35
Key Themes	
Human Health.....	36
Human Nutrition.....	37
1890 Cooperative Extension Service — Lincoln University	40
Key Themes	
Human Health.....	40
Goal 4 — Harmony Between Agriculture and Environment	41
1862 Agricultural Experiment Station Research – University of Missouri-Columbia	41
Key Themes	
Forestry.....	41
1890 Cooperative Research Program — Lincoln University.....	42
Key Themes	
Air Quality.....	42
Biological Control of Pests.....	43
Geographic Information Systems/Global Positioning was goal 1	44
Organic Waste Reduction.....	45
Soil Management, Greenhouse Gases, Carbon Emissions	45
Soil Quality and Human Health and Well-Being	46
1862 University of Missouri Extension	46
Key Themes	
Agricultural Waste Management.....	46
Hazardous Materials, Water Quality	49
Land Use, Natural Resource Management, Water Quality	50
Natural Resources.....	52
Pesticide Application.....	54
Water Quality	55
Goal 5 — Enhanced Opportunity and Quality of Life for Americans	58
1862 University of Missouri Extension	63
Key Themes	
Aging	63
Childcare/Dependent Care.....	63
Children, Youth and Families at Risk.....	65
Community Development.....	69
Community Development, Conflict Resolution	71
Community Development, Farm Safety, Fire Safety Workforce Safety.....	72
Community Development, Impact of Change on Rural Communities.....	74
Community Development, Youth Development, Leadership	80
Community Development, Managing Change in Agriculture.....	81
Family Resource Management	82
Leadership Training and Development	84
Parenting.....	86
Promoting Housing Programs	88
Volunteer Development.....	90
Workforce Preparation	92

Youth Leadership Development	95
1890 Cooperative Extension Service — Lincoln University	97
Key Themes	
Aging	97
Children, Youth and Families at Risk.....	97
Communications Skills.....	101
Community Development.....	101
III. Stakeholder Input Process	102
IV. Program Review Process	103
V. Evaluation of Success of Multi- and Joint Activities	104
Appendix C	
Multi-State Extension Activities	108
Integrated Activities (Smith-Lever Act Funds).....	109
Integrated Activities (Hatch Act Funds)	110

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 that have 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 health care 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 2003-2004 year was a time when many new research and extension projects and programs were initiated and old projects and programs were either terminated or expanded 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://osedata.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).
- Lincoln University programming includes the Small Family Farms Program; Animal Production Efficiency; Grazing; Animal Health; Adding Value to New and Old Agricultural Products; Diversified/Alternative Agriculture; Small Farm Viability; Aging; Children, Youth and Families at Risk; Food Stamp; Kid’s Beat; Community Skills; Community Development; Community Gardening; Conflict Management; and Family Resource Management.

Diversity Accomplishments

In January, 2004, Outreach and Extension consolidated administratively with the University of Missouri Columbia Extension campus. A full time Director of Organizational Development was appointed to lead AA/EEO efforts and other diversity initiatives. With this new administrative structure, a task force was established to develop a plan to guide the consolidated approach to our EEO goals. We have developed processes to continue to gather EEO data and attain affirmative action goals.

The director of extension established a Diversity Catalyst Team to oversee diversity efforts. This team developed a Strategic Diversity Plan that will guide statewide diversity efforts. Focus is placed on seven areas of diversity:

- Workforce Diversity
- Climate
- Programs and Services
- Audience
- Professional Development
- Recognition and Awards
- Compliance

Selected highlights of accomplishments appear below:

- Extension continued to use the electronic recruitment system to recruit a diverse pool. This system consists of an award-winning CD ROM, graphics and visuals that have appeal. We continue to train all faculty and County Extension Council members serving on search committees using PowerPoint slides that focus on nondiscrimination and securing a diverse workforce.
- Extension leaders reviewed diversity, affirmative action and equal employment organizational performance this year to determine progress and discuss actions for improved performance.

Statistics related to performance in recruitment, interviewing, hiring and retention of faculty were carefully evaluated along with County Extension Council memberships. These reports and ensuing continuous learning dialogues were very successful in improving performance.

- As part of the CASD project, Extension completed a Climate Assessment of Diversity. The team polled a random sample of 381 employees. These results will be used to improve the workplace climate relative to understanding and valuing diversity. Regional resource teams are developing and implementing experiences that seek to improve workplace climate. This team provides support and technical assistance to staff, county councils and volunteers in their ongoing efforts to create a diversity friendly climate.
- Funds were provided for programs to reach out to the growing Hispanic population in our state. A primary program, called "Alianzas" is valuable in including this audience in extension programs (<http://www.alianzas.us>).
- The Statewide Diversity Catalyst team which includes extension administrators, specialists, paraprofessionals and others was provided with training to increase skills in working in the areas of diversity.
- Extension hosted a statewide conference entitled "Cambio de Colores." This conference focused on ways of reaching and working effectively with the growing Hispanic population.
- A statewide educational website was developed to serve as a ready reference to all faculty on diversity issues. (See: <http://outreach.missouri.edu/staff/diversity/index.html>).

Stewardship of Resources

Table 1 and Chart 1 show the expenditures of University of Missouri Extension for the 2003-2004 programming year to be \$31,459,807 with \$8.1 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)	7,486,323
CSRS Retirement	267,310
Expanded 4-H	217,504
Expanded Part-Time Farmer	29,395
Rural Development	73,116
Total 3b&c	8,073,648
Smith-Lever 3d	
Expanded Food and Nutrition	1,539,455
Farm Safety	21,933
Food Safety & Quality (Carryover only)	0
Cotton Pest Management	23,559
Integrated Pest Management	149,790
Urban Home Gardening	0
Pesticide Impact Assessment	0
Water Quality (Carryover only)	0
Total 3d	1,734,737
OTHER PROGRAM FUNDS:	
STATE	14,646,808
COUNTY	4,674,472
NON-TAX	2,330,142
LOCAL	7,004,614
FEDERAL (Other than Extension Administered)	0
TOTAL OTHER PROGRAM FUNDS	21,651,422
TOTAL ALL PROGRAMS	31,459,807

Table 1: Cooperative Extension Expenditures of University of Missouri Extension for 2004

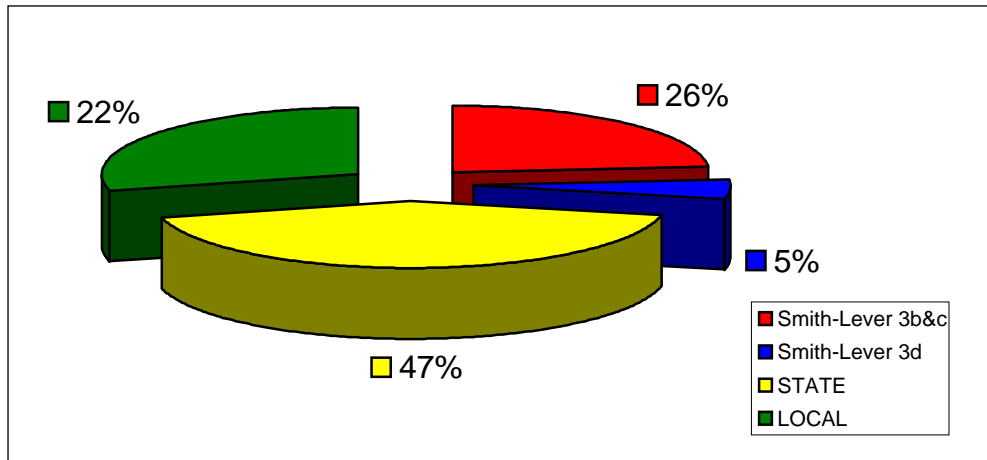


Chart 1: Cooperative Extension Expenditures of University of Missouri Extension for 2004 by Funding Source

Table 2 and Chart 2 show the overall expenditures of University of Missouri Agricultural Experiment Station for the 2004 programming year to be \$59,072,216 with \$3.7 million in federal Hatch funds.

PROGRAMS (1862 Research)	TOTALS
FEDERAL	
CSREES	
Hatch	3,689,798
MRF	776,922
M-S	441,463
Grants	3,393,648
Other	43,834
Total CSREES	8,345,665
USDA	8,612,094
Other Federal	6,593,495
Total Other Federal	15,205,589
OTHER PROGRAM FUNDS:	
STATE	18,174,965
OTHER	
Income (fees)	2,861,854
Industry	9,211,433
Other Non-Federal	5,272,710
TOTAL OTHER PROGRAM FUNDS	35,520,962
TOTAL ALL PROGRAMS	59,072,216

Table 2: Overall Expenditures of University of Missouri Agricultural Experiment Station for 2004

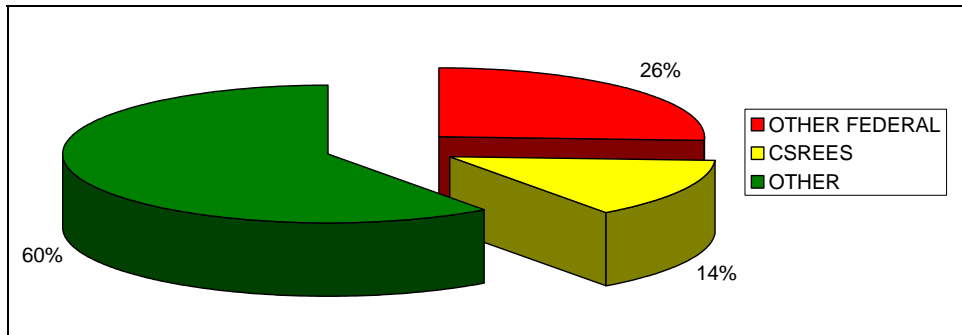


Chart 2: Overall Expenditure of University of Missouri Agricultural Experiment Station for 2004 by Funding Source

Table 3 and Chart 3 show University of Missouri Extension expenditures by goal area for 2004.

	<i>2004 Planned</i>	<i>2004 Actual</i>
Goal 1		
Integrated Cropping Systems	\$3,035,540	\$3,164,109
Forages	\$1,517,770	\$1,582,055
Prof Livestock Prod.	\$3,035,540	\$3,164,109
Total - Goal 1	\$7,588,850	\$7,910,274
Goal 3		
Nutrition and Diet	\$988,500	\$1,030,368
Food Safety	\$131,800	\$137,382
Consumer Health	\$329,500	\$343,456
Total - Goal 3	\$1,449,800	\$1,511,206
Goal 4		
Watersheds	\$461,930	\$481,495
Animal Waste	\$989,850	\$1,031,775
Nutrient Management	\$989,850	\$1,031,775
Total - Goal 4	\$2,441,630	\$2,545,045
Goal 5		
Total Families programs	\$2,639,600	\$2,751,400
Total Youth and Vol. Leadership	\$3,035,540	\$3,164,109
Total - Goal 5	\$5,675,140	\$5,915,509
TOTAL	\$17,155,420	\$17,882,033

Table 3: University of Missouri Extension Expenditures by Goal Area for 2004
(This table represents expenditures of Smith Lever 3(b), 3(c), 3(d) and state match only.)

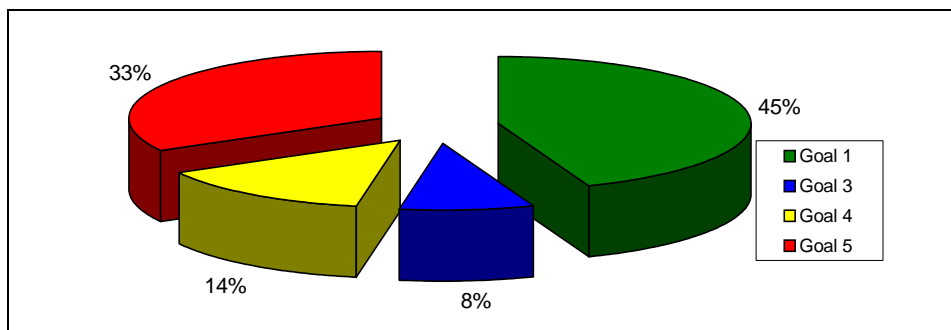


Chart 3: University of Missouri Extension Expenditures by Goal Area for 2004
(This table represents expenditures of Smith Lever 3(b), 3(c), 3(d) and state match only.)

Table 4 and Chart 4 show University of Missouri Agricultural Experiment Station expenditures by goal area for 2004.

1862 Research Expenditures by Goal Area	
Goal 1	34,734,463
Goal 2	1122372
Goal 3	1713094
Goal 4	10810215
Goal 5	10692072
\$59,072,216	

Table 4: University of Missouri Agricultural Experiment Station Expenditures by Goal Area for 2004

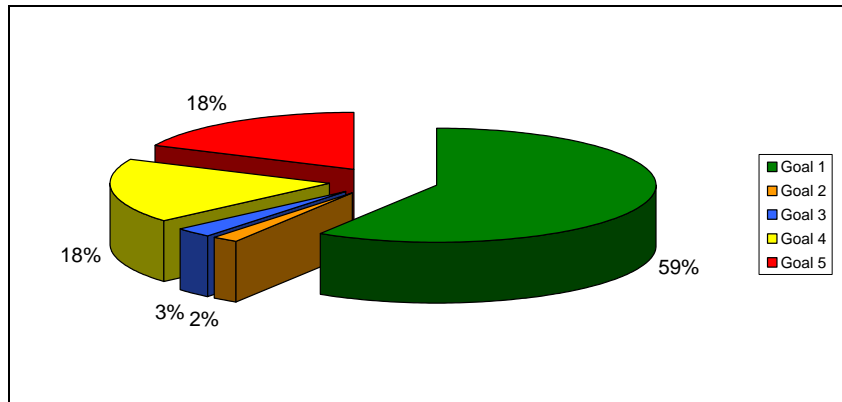


Chart 4: University of Missouri Agricultural Experiment Station Expenditures by Goal Area for 2004

Chart 5 shows the number and percentage of University of Missouri Extension faculty FTEs in each goal area for 2004.

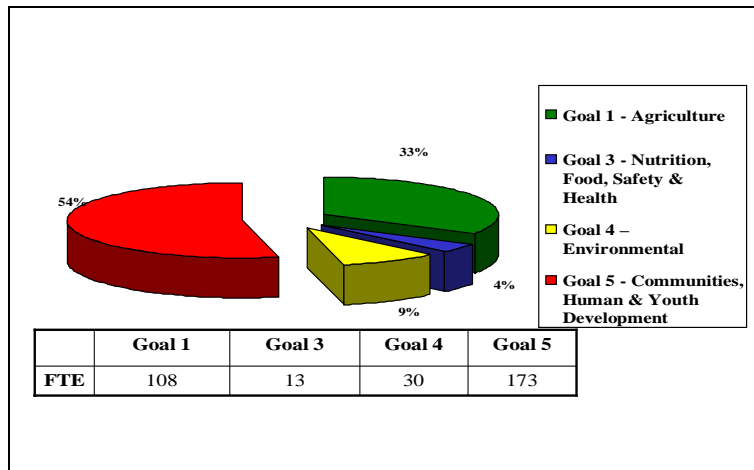


Chart 5: Percentage of FTEs by Goal

Chart 6 shows the total number of contacts with Missouri learners by goal area in 2004. Over two 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 2004. In 2004, University of Missouri Extension distributed 896,726 printed publications and web views of publications exceeded 5 million. Page views of other University of Missouri Extension web pages exceeded and additional 8 million.

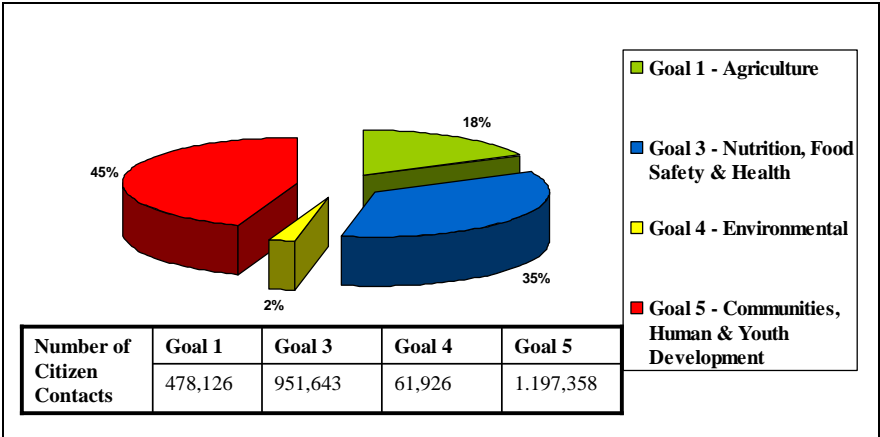


Chart 6: Percentage of Contacts by Goal

Chart 7 shows the total number of Missourians by goal area who were engaged in sequenced educational programming during 2004. The 537,811 learners represent more than 9 percent of the state’s total population of 5,754,618. 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 2004.

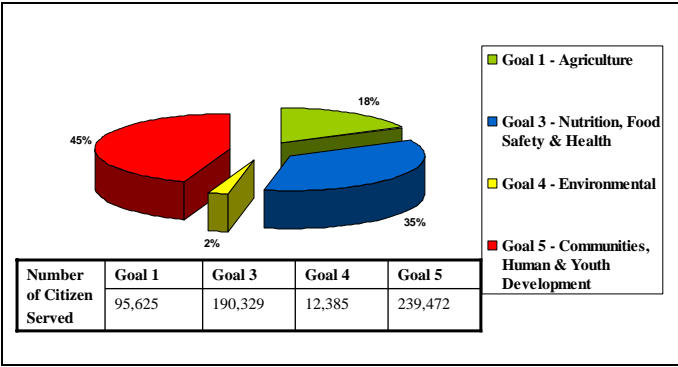


Chart 7: Percentage of Missourians Engaged in Sequential Learning by Goal

Lincoln University receives \$2,393,946 for Cooperative Research and \$2,344,349 for Cooperative Extension. In Cooperative Extension, these resources are allocated to Goals 1, 2 and 3. See Chart 8.

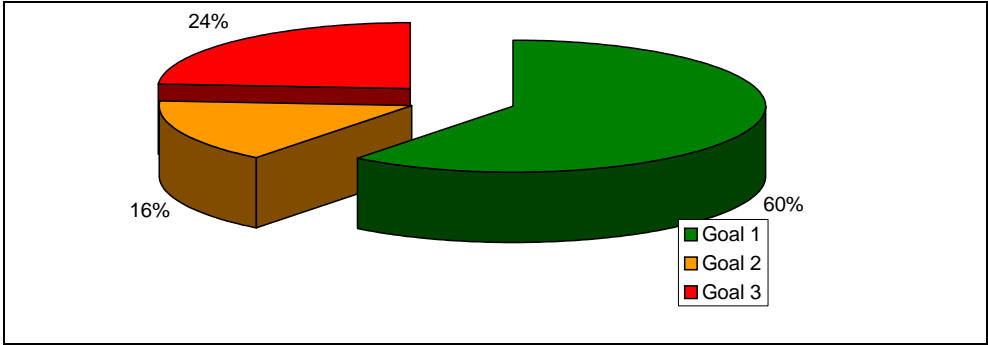


Chart 8: Lincoln University Allocated Resources by Goal

Chart 9 shows the percentage of FTEs of faculty in each goal for 2004.

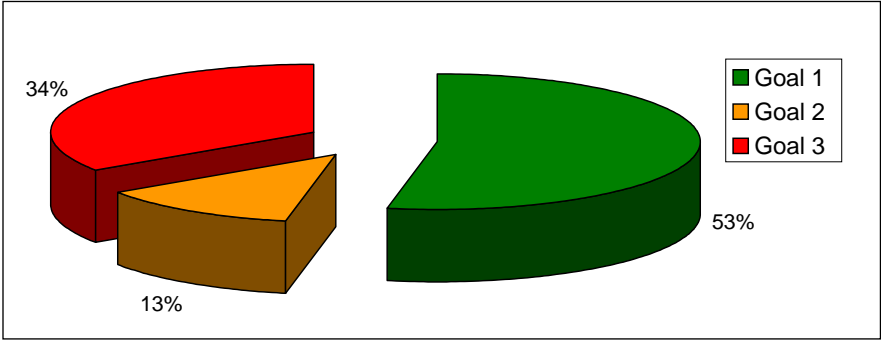


Chart 9: Lincoln University Percentage of FTEs by Goal

II. Report of Accomplishments

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

1862 Agricultural Experiment Station Research Overview

MU 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 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. Scientists analyze zinc supplementation in growing pigs to find feeding strategies that maintain performance while reducing zinc excretion in manure. Researchers work to determine the effect of nutrient conditions on sex determination of offspring for improved efficiency in livestock production. Gene sequencing of bovine reproductive tissue is used to increase the understanding of embryonic growth and development at the cellular level.

In the area of **plant genomics**, investigators gain insight into auxin-responsive gene expression, thereby providing new tools to modify plant growth and development. Scientists study pollen recognition and rejection to improve understanding on how plants communicate with each. Researchers study iron translocation in plants that could lead to food based strategies for dealing with iron deficiencies in humans. Researchers in **plant health** investigate plant disease resistance signaling pathways and plant breeders develop improved wheat varieties. Scientists **add value** to soybeans by analyzing extrusion cooking methods.

1890 Cooperative Research Overview

Lincoln University researchers continued work toward the goal of assisting Missouri farmers to compete 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 2004 research projects of our animal and plant science research teams. These research teams are focusing on developing and testing alternative production options for small farmers 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.

Recent 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 hog farms has declined by about 5.7% per year, from over 1 million farms back 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 economic alternatives to traditional operations that are no longer economically feasible such as confined swine production. Indoor recirculating systems may be a very lucrative option for farmers seeking alternative enterprises. This research will aid small farmers in increasing productivity and 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 farmers 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 small farmers avoid trial and error losses by providing specific economic and production potential and best practices for various crops to small farmers looking for new crop production options.

The maintenance of healthy animals is a major concern of small farmers investing in sheep and goat production. Since the consumption of lamb and goat meat with high quality protein content is of very great concern to consumers, having meat healthy and not contaminated with drugs and other compounds of concern to the consumer is of great help in promoting lamb and kid meat. 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 2003-2004 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 available technology to open competitive markets to Missouri farmers.

1862 Agricultural Experiment Station Research – University of Missouri-Columbia

Key Theme: Adding Value

- a. Description: Extrusion cooking of soybean. Soybean is a potential source for fulfilling the protein requirements of the growing population in the world. However, it contains antinutritional factors that must be inactivated before its protein content can be safely and efficiently utilized. Researchers at MU study the effect of extrusion conditions on trypsin inhibitor activity (TIA) and nitrogen solubility index (NSI).

- b. Impact: A laboratory size single screw extruder was used for extrusion cooking of the soybean implementing a 4x4x4 full factorial design. TIA and NSI of the soybean were found to be 47.0 TIU per mg and 78% respectively. Trypsin inhibitor inactivation ranged from 90% of that of raw soybean at lower screw speeds and higher temperatures to 50% for higher screw speeds and lower temperatures. Results indicate that reduction in TIA occurred mainly in the compression and metering sections of the extruder and confirm the efficiency of extrusion cooking for trypsin inhibitor inactivation. This model can be used to optimize extrusion conditions for food and feed purposes, thereby adding value to raw soybeans.
- 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 that 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: Zinc supplementation in growing pigs. The required trace element, zinc, is essential for normal growth and development in swine production. A zinc deficiency can reduce growth rate, reduce feed intake and cause a skin disorder called parakeratosis. Researchers at MU work to determine the ideal ration of trace mineral supplementation in growing pigs.
- b. Impact: The factor affecting zinc requirements is the variation in percentage absorption of zinc from different dietary sources, presence of phytate, and the inclusion rates of other trace minerals such as copper and iron. Preliminary research during the nursery phase has focused on evaluating the interaction between zinc and biotin supplementation on growth performance, nutrient digestibility, and as a possible mechanism to reduce antibiotic usage. Ration supplements with lower levels of organic zinc that replace the higher levels of inorganic zinc sources, were found to maintain growth performance and reduce zinc excretion by 70% in the fecal material. Results impact feeding strategies and producer returns.
- c. Source of Funds: Hatch, Grants
- d. Scope of Impact: Multi State

Key Theme: Animal Production Efficiency

- a. Description: Effect of diet on sex of offspring born. Evidence in several mammals species indicate that the sex of the offspring can be influenced by the diet consumed by the mother. Research is being conducted to investigate the direct or indirect influences that nutrient conditions have on sex allocation. Experiments are underway to understand the mechanisms involved and whether a similar phenomenon occurs in sheep.
- b. Impact: Researchers hypothesize that diet, either directly or indirectly through hormonal changes in the mother, influences the nutrient conditions within the reproductive tract early in pregnancy. These changes could alter the relative abilities of either X or Y-sperm to effect fertilization. Alternatively, an altered uterine environment might lead to preferential survival of embryos of one sex over the other. In mice litters, diets high in lard produce significantly more sons than daughters, whereas low fat, high carbohydrate diets produce more daughters than sons. An ability to manipulate sex of offspring through diet has potentially important application in the livestock industry.
- c. Source of Funds: Hatch, Grants
- d. Scope of Impact: Multi State

Key Theme: Animal Production Efficiency

- a. Description: Global analysis of genes expressed in reproductive tissues. Several technological advances have allowed the characterization of changes in transcription of thousands of genes at the same time. MU researchers are working to create EST libraries from bovine reproductive tissues that can be normalized, subtracted and sequenced. These arrays will be used to examine how transcript levels change in the placenta and uterus during the first month of pregnancy.
- b. Impact: Two bovine EST libraries, oviduct and endometrium, have been produced. These libraries are currently being sequenced in-depth and annotated. Once complete, microarrays will be created from the resulting unigene set. Global analysis of transcripts within the conceptus and endometrium will dramatically increase our understanding of what is taking place at the cellular level during embryonic growth and development. The EST project will result in extremely useful reagents and equipment for researchers at MU and elsewhere.
- c. Source of Funds: Hatch, Grants
- d. Scope of Impact: Multi State

Key Theme: Plant Genomics

- a. Description: Improving the understanding of auxin-responsive gene expression. Plant hormones play important roles in nearly all growth and developmental processes in the life cycle of plants. One of these hormones, auxin, elicits a highly diverse range of growth and developmental responses. The molecular mechanisms involved in auxin action, including signal transduction pathways involved in auxin-regulated gene expression, are still largely unsolved. Researchers work to unravel at least a part of the network involved in auxin-regulated gene expression.

- b. Impact: Investigators have developed new techniques to analyze transgene and endogenous gene expression and discovered a domain in Aux/IAA proteins that functions as a transferable repression domain that is dominant over activation domains. Results have provided new insight into mechanisms involved in auxin-responsive gene expression. The novel transcription factors provide new tools to modify plant growth and development in response to auxin or some other chemical.
- 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 Genomics

- a. Description: Understanding iron translocation and homeostasis in plants. Iron is the third most common nutrient that limits plant growth. Furthermore, iron deficiency in humans is the most prevalent nutritional problem in the world today. The World Health Organization estimates that as many as 4-5 billion people are iron deficient; approximately 2 billion of those suffer from anemia, a consequence of severe iron deficiency. The primary focus of this research is to understand iron translocation and homeostasis in plants.
- b. Impact: This research involves characterizing an Arabidopsis mutant called frd3 (ferric reductase defective) which constitutively expresses its root iron uptake responses and mislocalizes iron in the leaf tissue. In frd3 mutants, iron accumulates in the extracellular portion of the leaf and does not reach the chloroplast for iron utilization and storage. Arabidopsis is an ideal model plant in which to make rapid progress due to its sequenced genome and short generation time. Discoveries made in Arabidopsis can be easily transferred to agronomically important plant species. Food-based strategies offer sustainable solutions to problems of malnutrition.
- c. Source of Funds: Hatch, Grants
- d. Scope of Impact: Multi State

Key Theme: Plant Germplasm

- a. Description: Developing improved wheat varieties. Plant breeders work to develop and release to the public varieties of soft red winter wheat and/or enhanced germplasm with improved grain yield, grain quality, and resistance to disease, insect and weather hazards.
- b. Impact: A milestone in the breeding program was achieved with the release of ‘Truman’ soft red winter wheat. The 3-year average yield data for Truman places it in the top yield group compared to all commercial varieties, public and private, available to Missouri growers. Truman has very good test weight and is among the most scab resistant varieties known in North America. It was also one of only 2 entries tested that were considered resistant in all 7 categories of resistance. Wheat improvement will improve grower returns in Missouri and surrounding states.
- c. Source of Funds: Hatch, Grants
- d. Scope of Impact: Multi State

Key Theme: Plant Health

- a. Description: Engineering durable pathogen resistance in crop plants. Plants are exposed to a wide variety of pathogens including viruses, bacteria, fungi, nematodes and protozoa but have evolved multiple defense mechanisms to restrict pathogen growth. Researchers at MU focus on characterizing resistant genes and manipulating plant disease resistance signaling pathways in order to engineer durable pathogen resistance in crop plants.
- b. Impact: Gene-for-gene disease resistance is a highly specific plant defense mechanism in which a particular plant resistance gene governs the resistance response against only those pathogen strains expressing a corresponding avirulence gene. Scientists use an Arabidopsis resistance gene called RPS4 to understand the protein action and identify additional proteins that trigger a plant defense response. Researchers have ascertained the biological relevance of splice variants of RPS4 encoding truncated RPS4 proteins and identified a second resistance gene related to RPS4. Understanding the way plant resistance proteins work can be used to improve engineering of durable innate pathogen resistance in crop plants, with significant benefits to sustainable agricultural production and the environment.
- 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

regimes at various stages of growth for more than fifteen varieties of sweet potato have been conducted. Results revealed that a sweet potato variety known as *Beauregard* performed superior to all other varieties including the commonly grown varieties of *Jewel* and *Centennial*, under Missouri environmental 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 that fifty percent of the plants studied showed some positive adaptation to Central Missouri.

- b. Impact: Research data revealed that 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 regime 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% of the initial start-up cost which can range from as low as \$25,000 for small systems to more than \$100,000.00 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 *Haemonchus contortus* is the big killer due to its blood sucking in the abomasums 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 deworming effects. 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% 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 that 80 percent of start-up businesses fail, attempting to do something is better than doing nothing. Thus, the Missouri value-added effort is concentrated on helping Missouri and national constituents with the business aspects of planning, organizing and operating the value-added business to increase the success rate.

Missouri Value Added Development Center is (<http://valueadded.missouri.edu/index.htm>) unique in its structure. Although headquartered in Columbia, its efforts extend throughout the state via approximately 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 decreased in 2004 to \$1 million from \$3.7 million in 2003.
- With completion of Mid-Missouri Energy's fund drive, a 40-million-gallon-per-year, producer-owned ethanol plant is under construction in central Missouri. The potential annual economic impact to the state by the Mid-Missouri Energy Ethanol Plant is estimated to be \$154 million.
- The Mississippi Valley Processors are using a USDA value-added grant to analyze the feasibility of processing soybeans into soybean meal, biodiesel and vegetable oil.
- East Central Ag Products, a joint producer effort, received a USDA grant for working capital and nearly completed their capital fund drive for construction of a 20-million-gallon-per-year, producer-owned ethanol plant in east central Missouri.

- Farm Foods Inc., a new-generation beef-canning cooperative, completed plant construction and began operations in 2003.
 - Seven west central Missouri producer-investors started “Missouri Pecan Growers” in 2000. This business cleans, processes and merchandises locally produced pecans. In 2002, the cooperative began selling these pecans in Schnucks and Hy-Vee grocery stores. The organization is now producing certified organic pecans and is proceeding with expansion plans to include additional growers in central Missouri.
 - Beef cow/calf producers are assuming ownership of a statewide Show-Me-Select Heifer program (reputation brand replacement heifers), demonstrated to return price premiums of \$100 per head relative to standard replacement heifers.
 - Livestock producer groups (Alma Meats, Ozark Mountain Pork) are using USDA value-added grant funds to develop and expand producer-owned meat processing and marketing facilities.
- 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.
- The Premier Beef Program was initiated to educate small-herd beef producers in the concept of value-based feeder calf marketing and to institute regional feeder calf marketing alliances. Currently, 10 marketing cooperatives are active in Missouri, representing 150 farms and 7,000 feeder cattle annually. Marketing feeder calves through the cooperatives has added \$45.00 per head to the value of those feeder calves. The total net economic impact of the program from July 2003 to June 2004 is estimated at more than \$250,000. A website has been developed for beef producers interested in learning about Premier Beef: <http://agebb.missouri.edu/commag/beef/premierbeef/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 210 Missouri family swine operations, representing nearly 80 percent of Missouri's pork production. The MO-Pork program resulted in an estimated feed savings of more than \$1.00 per pig marketed, resulting in an estimated economic boost of \$4 million to the Missouri economy.
- More than 40 Missouri pork producers attended a short course on ventilation and made use of a model building to demonstrate ventilation principles and methods.
- More than 800 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 2004 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 46% from last year (2003), and seven different purebred breeds were exhibited.
- 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 2004, Missouri allocated more than \$15 million to producers to incorporate enhanced environmental stewardship.
- It is estimated that well over 80% of Missouri farms use artificial insemination. Missouri hosted the second Midwest Boar Stud Managers Conference in St. Louis. The conference was coordinated in collaboration with The Ohio State University, Purdue University and the University of Illinois. The program was a great success, attracting 135 paid registrants from 18 states, Canada, Mexico, Spain and Australia. The conference managers represented 10,264 boars in stud and 250,000 semen doses per week.
- 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.
- University of Missouri Veterinary Extension will serve as the domain editor for the Swine Health, Animal Care/Welfare and Food Safety sections of the National Pork Board (NPB) - Pork Information Gateway. The domain editor will form a peer advisory committee to meet each year for the purpose of suggesting current topics of interest to the pork industry. The domain editor will identify experts in the suggested topics, thereby ensuring creation of a quality fact sheet (including frequently asked questions). Fact sheets will be reviewed by a panel of experts.

Once reviewed and approved, the fact sheets will be placed on the NPB website to serve as web-accessible educational materials. This effort will further expand the contact audience for the educational materials once prepared for the Pork Industry Handbook.

- 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 172 veterinarians, 60,078 heifers and 517 producers. During this time, 13,869 heifers have been sold through Show-Me-Select replacement heifer sales across Missouri, with gross sales of \$13,864,702. In addition, 4,638 producers have registered to buy heifers at the SMS replacement heifer sales.
- During the 2004 reporting period, 165 herds comprising 6,043 heifers were enrolled in the Show-Me-Select program. Twenty-two regional livestock specialists and 86 veterinarians participated in the program statewide.
- Sixty percent of the participants in SMS replacement heifer sales indicated they were willing to pay a \$100-per-head premium for SMS heifers relative to standard pregnant heifers.
- At the 2004 Show-Me-Select replacement heifer sales, 1,649 heifers sold for an average of \$1,347 per heifer.
- The cost of producing the 60,078 SMS heifers enrolled in the program to date is around \$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 through multiple venues. The overall economic impact of the program exceeds \$3.5 million annually.
- During 2004, SMS participants selected board members from their respective regions; an official slate of officers was elected; and articles of incorporation were filed for Show-Me-Select Replacement Heifers Inc. as a not-for-profit organization in Missouri.
- Reproductive management workshops were held during the winter of 2004 at Mount Vernon, Maryville, Palmyra the MU Forage Systems Research Center at Linneus, the MU Thompson Farm at Spickard, and the Greenley Center at Novelty. These workshops reviewed newly developed protocols to synchronize estrus prior to artificial insemination for replacement beef heifers and postpartum cows. In addition, a fall workshop was held at the Joplin Regional Stockyards in October. This workshop reviewed newly developed protocols that can be used to facilitate fixed time AI for postpartum beef cows.
- The North Central Region Extension Bovine Reproduction Task Force hosted a symposium entitled “Applied Reproductive Strategies in Beef Cattle” at North Platte, Nebraska. The workshop was attended by eight Missouri regional extension livestock specialists, in addition to faculty from the Division of Animal Sciences.
- The Show-Me Buying Cooperative consists of 54 independent pork producers who market more than 300,000 pigs annually. The cooperative’s members implemented the use of dietary phytase and decreased the inorganic phosphorus content in all premixes and diets purchased. The use of phytase and lower phosphorus inclusion rates has resulted in more than a 30 percent reduction in phosphorus concentrations of manure. By buying in economy-size batches, the group realized additional feed savings of more than \$1 million annually, or nearly \$20,000 per operation.
- 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 Show-Mo Dairy Heifer Growers Association was organized in 2003 to assist producers in locating and developing dairy heifers in Missouri. The association established contact with a

7,000-cow dairy and 35,000-heifer-development group, which is interested in having their dairy heifer's contract raised. During 2004, the project involved 20 growers raising 2,000 heifers in Missouri.

- 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 taught producers to develop a written business plan, use a computerized record system and adopt management-intensive grazing techniques. Preliminary data indicates that 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/>

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.

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

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

- During the reporting period, 8,000 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.
- About 85 percent of Missouri cotton producers and 75 percent of rice producers have adopted the new technologies as presented in the University of Missouri Integrated Crop Management Program.
- Five hundred copies of "Economics of Specialty Corn Production," a publication developed by members of the agricultural economics faculty, were distributed to interested producers.
- Thirty-five programs on the economics of identity-preserved (IP) production were conducted with a total attendance of 975.
- 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 survey of 2,200 Missouri cotton producers found that 82 percent of their acreage was treated based on scouting results. The use of this pest control decision tool increased production by 50 pounds of lint per acre.
- A survey of Missouri rice producers showed that 93 percent of their acreage was treated for pests based on weekly pest scouting results; 54 percent of acres were scouted by the producer, and 39 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 39 percent in 2004. 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.
- A major accomplishment of the (Integrated Pest Management) IPM Weed Control Program was increased adoption of alternative herbicide modes (non-ALS inhibitors) -- from 11 percent of Missouri's soybean acres in 1994 to more than 95 percent in 2002.
- During the period from 2002 to 2004, glyphosate-resistant horseweed has spread across the majority of the Missouri Delta. As the result of Delta Center research and extension efforts, 75% of the no-tillage cotton and soybean acres in the Bootheel have been shifted to new preplant herbicide programs that offer additional herbicide modes of action for managing horseweed and preventing development of additional herbicide-resistant species.
- The most recent survey by the USDA-ARMS (Agricultural Resource Management System) found that 80 percent of Missouri's corn acres were scouted.
- 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 indicated their knowledge about this pest and its management increased because of the educational information presented.
- A new publication in 2004 entitled "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.
- 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>.

c. Source of Funding: 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 9.7 million acres in pastures and harvested forages. This represents approximately 33.5 percent of the total land in farms in Missouri. Missouri produces 7.1 million tons of hay (including alfalfa hay) or 4.7 percent of the total hay produced in the United States. This ranks Missouri fourth nationally for total hay production. The agronomic practices associated with the Forages for the 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. Forages represent about 90 percent of that cost for winter feed.

Missouri’s dairy producers are struggling. Since 1991, almost 30 percent of Missouri’s family dairies have gone bankrupt because of high feed costs, expensive capital investment and low profit margins. To respond to this trend, dairy producers are adopting the grass-based dairy model so they can lower feed costs, minimize capital investments, increase profit and protect the environment.

Forages for the 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 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 endophyte 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 and Stored Forages for Beef Cattle." The adoption rate of practices outlined in these programs was approximately 46 percent. From 1998 to 2003, the percentage of producers using stockpiled tall fescue for winter feeding has doubled, from 26 percent to more than 50 percent.
 - To date, the Missouri Winter Feeding and Stored Forages Program reached more than 20,000 producers, reducing the cost of winter feeding by an average of 40 percent.
 - More than 1,000 producers attended the grazing schools taught at Linneus and throughout the eight regions of the state; in 2004 alone, 31 multi-day regional grazing workshops were held in Missouri. More than 80 percent of the producers who attended these workshops indicated that they plan to adopt fencing, watering and pasture management changes as presented in the schools. Fifty percent of those producers implemented these changes without cost-share assistance.
 - The curriculum for the "Tall Fescue Toxicosis and Management" workshop was developed in 2003, and first workshop was held in September 2004. Forty producers attended the first three-day workshop. If a few simple practices of this workshop are adopted, the net income of a typical beef farm will increase by 10 percent each of the following 10 years.
 - During 2004, the pasture-based dairy team made more than 1,700 audience contacts. The pasture-based dairy curriculum was "customized" for the four core dairy pasture-based core groups. The core group method was based on the highly successful New Zealand educational model.
 - Pasture-based dairy farmers produced milk for \$8.03/cwt, 20 percent less than confinement dairies.
 - More than 60 percent of the core group producers adopted business plans that split their personal finances from the dairy's finances.
 - Forty percent of participating producers reported that they renovated or expanded their dairy facilities.
 - More than 90 percent of the participating producers report using their business plans helped them make better financial decisions.
 - Almost 60 percent of participating producers indicate that they have more leisure time and a better quality of life.
 - "Grass-Based Dairy" educational programs were conducted by the Missouri team in Iowa, Texas, Oklahoma, Arkansas, Kansas, Tennessee, Illinois and Kentucky.
 - Financial data from 12 pasture-based dairies showed that the average farm had 95 cows, marketed \$2,097 of milk per cow, and had an operating expense of \$1,237 per cow. Farm milk sales for these producers totaled \$199,215 with operating expenses of \$117,515, leaving a net operating margin of \$81,700 to cover family living, interest and capital purchases.
- c. Source of Funding: Smith-Lever, State

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

1890 Cooperative Extension Service — Lincoln University

Key Theme: Small Farm Viability

- a. Description: Small farmers in Missouri are in desperate need of alternative cropping opportunities. These alternative opportunities will enable them to obtain a profit from their farms. Small farmers in general and limited resource minority farmers in Missouri have seen little or no relief from the farm crisis of the 1990s. To maintain economic profitability limited-resource farmers in Missouri must diversify their product base. Traditional farming methods have a high dependence on chemical inputs. The concerns over health and environmental issues related to pesticide use and genetically modified organisms have caused a re-examination of traditional production techniques. The use of horticultural crops; (new vegetables cultivars, exotic vegetables and specialty herbs (medicinal and culinary) is one such method by which product base may be widened. The primary objective of this program is to render Missouri's small limited resource farmers in general, and minority farmers in particular, better information about the benefits associated with the production of specialty horticulture crops.
- b. Impact: The Small Farm Family Program staff conducted at least 30 workshops during the year. One of the workshop topic areas focused on Beekeeping. A series of five workshops on Beekeeping were presented to 15 individuals, some of whom are experienced beekeepers. As a result of these activities, honey production in Douglas County has increased 131 percent in just one year, from 3,500 lbs. in 2001 to 8,090 lbs. in 2002 (which translates into an increase in gross sales from \$4,375 to \$10,112).

Another example of program implementation was in Laclede County. The Educational Assistant in Laclede County helped one small farm family launch a goat dairy farm. With the assistance of the SFFP staff, this venture has proven profitable and the family started making goat milk cheese and selling the product at a local farmers' market.

Additional assistance from the SFFP staff enabled one farmer to start a fresh water shrimp farm, and had a successful harvest last summer. The entire harvest of 200 lb at \$8.00 per lb. (12-14 count per lb.) was sold right at the pond site.

- c. Source of Funding: Smith-Lever
- d. Scope of Impact: State Specific

Goal 2: A Safe and Secure Food and Fiber System

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 that their food supply continues to be safe.

Food safety affects everyone from producer to consumer. University of Missouri Extension faculty provides 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.

1890 Cooperative Extension Overview

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

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

1862 University 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 2004. These specialists provided educational programs, newsletters, radio interviews, television interviews, newspaper interviews, Internet-based programming and individual consultations. These specialists reached 24,973 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 1,800 hours in addressing this issue so critical to human health and well-being.

- Approximately 120 paraprofessionals in the Family Nutrition Education Programs also address the issues of food safety. This program reaches over 215,000 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.

In the Northeast Region, 49 childcare providers attended in-service education which included food safety training. Following the course, one provider stated “. . . that anti-bacterial soap is not needed and that regular soap and water are just as effective. This will save me money.” Of the 49 participants, 22 (45%) indicated that they increased their awareness for preventing food borne illness in their daycare.

In Northwest Missouri, 29 Senior Center foodservice workers, representing 17 counties, attended a food safety in-service. The participants, who must wash their hands regularly, learned how they could improve their hand-washing technique when they participated in a demonstration using a black light and fluorescing lotion. Participants said they were going to share this information with volunteers in their centers who also assist with food preparation and service. Eight participants indicated they would purchase nail brushes to increase the effectiveness of hand washing in their center.

Children, too, are learning at a young age about the importance of hand washing and food safety. Each child who participates in the Show Me Nutrition Curriculum, grades pre-K- 8, receives a minimum of one lesson on food safety. In 2004, 184,573 children pre-K - Grade 8 received this information, and of 2,634 teachers reporting, they estimate 82 percent of participants improved their frequency and skill in hand washing.

In Kansas City, 190 children participate in the Kids in the Kitchen program co-sponsored by University of Missouri Extension and the Kansas City Parks and Recreation Department. Following the program, 93% of participants indicated that hand washing was the first step in meal preparation compared to only 65% prior to the program. This program is not only providing information that young people can use today but also in the future. As one participant indicated, “I like to cook. When I get older, I will be a mother and have to cook.”

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

1890 Cooperative Extension Service — Lincoln University

Key Theme: Food Accessibility and Affordability

- a. Description: Work in this area is being conducted with the assistance of a Food Stamp Nutrition Education Program (FSNEP) grant from USDA/FNS. The program is coordinated through 2 sites, St. Louis City and the Southeast Missouri office in Caruthersville. In St. Louis City, two nutrition paraprofessionals conduct nutrition education with groups of senior citizens in low-income residential sites around the city. One paraprofessional conducts some home visits. One

paraprofessional conducts programs with low-income youth.

In Southeast Missouri, nutrition paraprofessionals, one in each of five Bootheel counties – Dunklin, Mississippi, New Madrid, Pemiscot and Scott Counties, conduct home visits and work with groups of senior citizens, especially with grandparents providing childcare for grandchildren. Some of the paraprofessionals work with youth in LUCE’s Kid’s Beat program and other after school programs, as well.

- b. Impact: Of the 2546 contacts made. 46 % reported they moved closer to the recommended number of servings of the Food Guide Pyramid; 22 % increased their level of physical activity; 38 % moved closer to the recommendations of the Dietary Guidelines for Americans; 41% indicated that they used a spending plan more often; 33% indicated that they shopped from a list more often; 58% indicated that they less often let food sit out more than 2 hours; 61% indicated that they washed their hands more often before touching food; 28% indicated they kept raw meat separate from other foods more often.
- c. Source of Funds: Smith –Lever, USDA Food and Nutrition Service
- d. Scope of Impact: State specific

Key Theme: Food Safety

- a. Description: Very highly publicized outbreaks of food borne illness over the past 10 years have been attributed to microbial contamination of eggs, beef and fresh fruits and vegetables. Both restaurants and catered meals have also been implicated in cases of food borne illness affecting large numbers of people. In addition, food that may be uncontaminated when brought into the home can be handled, stored or prepared in ways as to allow the development of dangerous levels of illness-causing pathogens. Extension has a very important role to play in helping achieve the goals of the President’s 1997 Food Safety Initiative.
- b. Impact: One approach that proved successful in developing food safety concepts among our young people was their participation in one of our Outdoor Cooking exhibitions. In this program, young people learn various food safety and sanitation rules and concepts. More importantly these practices are exhibited when they participate in the actual outdoor cookery exhibitions. During one such exhibition, ninety percent (90%) of youth who participated in the Outdoor Cookery exhibited behaviors revealing awareness and practice of food safety and sanitation rules. More specifically, participants washed their hands before and after handling raw meat, and they washed hands each time they touched something not related to cooking. They cooked the meats until they were well done and they made sure they cleaned their workspaces before and after cooking.
- c. Source of Funds: FSIS/USDA
- d. Scope of Impact: State Specific

Goal 3: Healthy and Well-Nourished Population

1862 Agricultural Experiment Station Research Overview

In the area of human health, scientists are developing a new oral contraceptive that utilizes the body's immune system to prevent fertilization. On the cancer front, researchers work to develop new nontoxic carbohydrate-based drugs that stop cancer from metastasizing.

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. health care 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 that 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 health care and the development of new treatment procedures, Missourians continue to face a high-risk of dying from one of these diseases. Increasingly, scientists and health professionals are interested in addressing the prevention of these diseases rather than simply trying to stop their deadly progress at the end.

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: Non-hormonal contraceptive. Traditional hormone-modulating contraceptives, while effective at preventing pregnancy, have negative side effects. Investigators at MU work to develop a new method of contraception that would use the body's immune system to prevent pregnancy rather than manipulating hormone levels.
- b. Impact: Scientists have uncovered the role of sperm head proteasomes during fertilization in mammals. A new pathway has been discovered that could lead to a reversible way to use the body's immune system to prevent sperm from penetrating the egg's protective coating, which is necessary for fertilization. Using this technology, a contraceptive for women could be developed that would be in the form of a vaccination with an annual booster rather than a daily birth control pill. Undesirable side effects of contraceptives using estrogen and progestin would be avoided.
- c. Source of Funds: Hatch, Grants
- d. Scope of Impact: Multi State

Key Theme: Human Health

- a. Description: Developing antimetastatic cancer drugs. Scientists work to develop a new class of low- or nontoxic carbohydrates as potential antimetastatic drugs that would target cancer cells and prevent them from spreading throughout the patient's body. The objective is to design and synthesize galectin-specific glycoaminoconjugates and evaluate their ability to inhibit cell adhesion and drug resistance of highly metastatic human cancer cells.
- b. Impact: Research efforts are focused on optimizing both in vitro and vivo prostate cancer models to validate antimetastatic activity of synthetic glycoaminoconjugates. An immunocompetent animal model of spontaneous prostate cancer metastasis with GFP-labeled tumor has been established and is currently being used in the drug activity experiments. Positive results in animal studies could be translated to clinical trials involving human patients.
- 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 associated with overweight and obesity. The primary objectives of this project are: 1) to study the effects of nutrition education and exercise on improvement of eating habits and body mass index in children; 2) 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 3) 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 that 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: While basic research is being conducted the research team has initiated a Health Challenge program on Lincoln's campus. During 2004 seventy (70) faculty and staff participated in the program. Participants gained awareness, knowledge and new skills. They learned about reasons to become more active and the long-term health benefits of walking and how to use pedometers. More than 70 % of the participants monitored their weight, diet and activity over a five-month period. The programs focus on increased activity and healthy eating provided the following benefits to the participants: increased energy levels; feeling more relaxed; increased calories burned; enhanced self esteem and weight lost. Fifty of the participants expressed a desire to continue in the program for five additional months.
- c. Source of Funding: 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. In 2004, MU Extension Specialists had 9,052 contacts related to this issue. Programs were conducted in collaboration with 23 partners and 3 volunteers. One evaluated program was Dining with Diabetes.

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 a 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 and a 3-month follow-up survey.

b. Impact:

Outputs: Based on available data 421 Missourians were reached through educational programming. Fourteen workshops were conducted.

Short-term outcomes: The intended short term outcome for this program was increased knowledge about healthy foods and about diabetes and nutrition.

Participants reported they knew:	Survey I	Survey II
	%	%
In order to control blood sugar, it was important to divide carbohydrate servings between three or more meals (Survey I N = 320, Survey II N= 266)	73	92
Common sources of saturated fats and trans-fats are fries, snack crackers, cookies, chips and baked goods (Survey I N = 320, Survey II N= 266)	66	87
Fiber helped the body get rid of some cholesterol (Survey I N = 421, Survey II N=342)	62	76
Sugar and sweets do not raise blood glucose more than other foods that are rich in carbohydrates (Survey I N = 266, Survey II N= 219)	42	57

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, 61% of participants reported they were confident about their ability to prepare healthy meals, after completing the series 91% reported being confident (Survey I N = 421, Survey II N=342).
- Participants also reported improved food preparation practices: (Survey I N= 421, Survey III N = 122).
 - 64% reported use of nutrition labels on package foods to prepare healthy meals for people with diabetes prior to the workshop; 81% reported use of nutrition labels 3 months later.
 - 66% reported use of herbs and spices instead of salt in cooking prior to the series; 75% reported use of herbs and spices 3 months later.
 - 83% reported use of canola oil or olive oil in cooking prior to the series; 85% reported use of these oils 3 months later.

Other indicators of behavior change resulting from this workshop series include the fact that 3-months after the class 100% reported use of the information provided to prepare healthy meals and 96% had used the provided recipes at least once (Survey III N = 122). Participants also reported a decrease in the hassle factor. Prior to taking Dining with Diabetes, 37% reported that preparing healthy meals for someone with diabetes was a major hassle or a hassle. Three months later only 14% considered food preparation a major hassle or a hassle (Survey I N= 266, Survey III N = 66).

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

- “You can still lead a normal life with diabetes. You just have to cook more healthy...”
- “Have been able to lower hypertension to normal.”
- “This [series] inspired me to do different things after being a diabetic for 26 years.”
- “Feel more confident about the way I cook...”
- “Awareness of nutrition facts is greatly increased – also more careful about food preparation.”
- “I am much more aware of what I should and should not be eating. I have started an exercise program...”
- “I watch labels, bake food and walk everyday.”
- “I used the new recipes and felt sure I had prepared a healthy meal for my husband, the diabetic, and myself.”
- “Been able to prepare tasty meals now. Have been able to change eating habits.”
- “I have been getting more exercise and eating less sweets and carbs.”

c. Source of Funds: Smith-Lever, Grants

d. Scope of Impact: Southeast, South Central, Southwest, East Central and West Central Missouri

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 that families in poverty often have difficulty with the following:

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.

- 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 2004, FNEP educators enrolled 218,067 participants, resulting in approximately one million direct educational contacts. The FNP program also made 393,858 indirect contacts through parent newsletters that went home with children who were taught in the classroom setting. Total educational contacts for FNEP in FY04 exceeded 1.4 million.

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 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.

- 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 211,048 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 six hundred thirty-four (2,634) forms were returned. Ninety-eight percent (98%) of teachers reported one or more changes among students after FNP. Ninety-four percent (94%) reported students were more aware of nutrition. Fifty-eight percent (58%) reported students were making healthier meal and/or snack choices. Eighty-two percent (82%) reported students improved their hand washing. Eighty-three percent (83%) of teachers reported that they were more aware of nutrition themselves. Seventy-seven percent (77%) of teachers made healthier meal and/or snack choices, and among those teachers, 47% talked about or modeled those changes in front of students. Ninety-eight percent (98%) 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 2004 revealed that after the program, 74% of participants more often thought about healthy food choices when deciding what to feed their families. Eighty-two percent (82%) more often used the food label to make food choices. Seventy-eight percent (78%) more often planned meals in advance. Fifty percent (50%) more often followed the practice of not thawing foods at room temperature. Seventy-six percent (76%) 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. Food Power brings together food and physical activity in a fun and exciting way. Through Food Power Classroom Activities, the Food Power Adventure and the Food Power Digest, elementary school students learn the importance of healthy food choices and regular physical activity. As students travel the path food takes from the farmer’s field to the sports field, they learn where the food they eat comes from and how it gives them energy to grow and play.

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

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

- b. Impact: In 2004, this program was delivered to 51,092 elementary students; it also has involved 2,950 classroom teachers and 3,563 volunteers.

Teachers commenting on the impact of this program on elementary children have reported that approximately 54 percent of participants are making healthier meal and/or snack selections, and approximately 49 percent of participants are increasing their physical activity level.

"The kids are talking about what they ate for breakfast and reading the milk carton label at lunch," reported one teacher. This program is one example of how the University of Missouri is focusing its efforts on the lifelong health and fitness of Missouri citizens and combating the recent increase in childhood overweight and obesity.

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

Key Theme: Human Nutrition

- a. Description: Nutrition and Health—Health for Every Body. Health for Every Body *beyond* Scales and Mirrors is a multi-session workshop 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.

- b. Impact: According to University of Missouri Extension's monthly statistical reports, 3,491 individuals were reached through presentations, workshops, and the media. Programs were conducted in collaboration with 3 partners. Evaluation data was available for 62 participants. Sixty-two program participants have increased their awareness of strategies for promoting health and reducing health risk factors, 59 reported that they had learned new information and 41 adopted new practices. The real impact is reflected in the words of the participants.
- "I have learned to take better care of ME!"
 - "[New goal] Y membership – Use it at least 3 times per week."
 - "Articles on foods low in cholesterol and fat have helped me stay off of medications."
 - "For the first time in my life I am taking every opportunity for movement (basketball, dancing, tag, etc. and it is fun!"
 - "I have years of diet information that was all confused in my head. This class helped me get in touch with basic nutrition/health information."
 - "I feel more sane and okay with my body and healthful eating instead of buying into social messages."
 - "I have been exercising and eating nutritiously. I've lost 20 lbs so far this year and hope to lose more. I have a positive attitude."
- 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

1890 Cooperative Extension Service — Lincoln University

Key Theme: Human Health

- a. Description: This area of programming involves developing and disseminating nutrition and diet-related health information to underserved and underrepresented targeted populations in Missouri. Programming efforts include the production of a quarterly newsletter on nutrition issues and a series of fact sheets on nutrition, food safety and various health topics related to diet. These pieces of information are disseminated at a variety of venues such as health fairs, churches and at other events where individuals within the targeted communities might meet. Additionally, a public service announcement for radio listeners was developed and heard on various radio stations within the state
- b. Impact: Approximately 128 people, 80% of whom were African American ages 18-20, received health and nutrition education on various topics and through workshops and published materials.
- c. Source of Funds: Smith Lever
- d. Scope of Impact: State specific

Goal 4: Harmony Between Agriculture and Environment

1862 Agricultural Experiment Station Research Overview

MU researchers in **forestry** develop innovative land use systems for biomass production and create bioremediation systems utilizing agroforestry.

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 of Missourians. The impact of agriculture 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% 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: Forestry

- a. Description: Using poplars for biomass production and carbon sequestration. Scientists investigate new alternatives for capturing benefits from woody plant production systems. Work is underway to

evaluate the potential for using short-rotation poplars as a source of biomass and as a method of sequestering carbon on floodplain sites in the lower Midwest.

- b. Impact: A project was designed to measure carbon balance and eco-physiology. An eddy covariance flux tower will be installed for measuring ecosystem-level mass and energy exchange. The tower measures net carbon dioxide fluxes over a large area. Independent measures of biomass accumulation through traditional growth monitoring and soil respiration measurements are also being conducted. Results will be useful for policy makers involved in greenhouse gas emission decision-making and for producers searching for alternative crops.
- c. Source of Funds: Hatch, Grants
- d. Scope of Impact: Multi State

Key Theme: Forestry

- a. Description: Developing bioremediation systems in agroforestry. Scientists are developing new methods of mitigating the negative environmental impacts of crop production by using agroforestry techniques. Tree-shrub-grass riparian buffer strips and other agroforestry systems are designed for bioremediation systems.
- b. Impact: Growth chamber studies are used to measure the biodegradation of Atrazine in selected forages using C14 labeling techniques. Soil microbial activities are also quantified. In addition, investigators evaluate the potential for enhancing herbicide mitigation in grass and tree-grass buffers on a calibrated paired watershed. Systems include a corn-soybean/tree-grass buffer and a corn-soybean/contour grass buffer, both of which are compared to a control treatment with a corn-soybean rotation. Research results can be used to design bioremediation systems that help reduce the unintended movement of herbicides from crop fields.
- 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 Funding: 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 Funding: 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 Funding:** 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:** The database will be operational in 2005. 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 Funding:** 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% 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 Funding: 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 resistivity, 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 green house 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 GHS from the air.
- c. Source of Funding: 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% 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 Funding: 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:

- University of Missouri Extension representatives participated in a series of stakeholders' meetings organized by the Missouri Department of Natural Resources (MDNR) to investigate

the feasibility and acceptability of proposed revisions in Missouri Animal Feeding Operation regulations. University of Missouri Extension representatives reviewed and provided extensive comments to MDNR on the proposed regulations.

- The southeast Missouri Quality Dairy Management Group (QDM) – the 10-member producer cooperative group established in 2003 – met every six weeks during 2004 to share information related to dairy production systems. The group met at the farms of its members, when weather permitted, to view a management practice that the producer used on the farm. The meetings encouraged discussion of successes and concerns about all aspects of dairy production. As a result of the meetings, producers from the group have made a number of improvements, such as constructing a concrete manure catchment basin for a free stall barn and open lot area, improving manure collection and storage systems, and working with extension specialists to improve the operation of a settling basin.
- Eighty professionals representing NRCS, MDNR and private vendors attended the 2004 Nutrient Management Planner Training Courses. The intensive five-day courses included a three-day classroom course followed by a two-day field exercise. Completion of the course is a requirement for certification as a technical service provider (TSP) in Missouri. Participants who complete the course are eligible to write portions of a nutrient management plan.
- 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 a Heartland Animal Manure Management Meeting to discuss nutrient management planning (NMP) efforts, NMP software and technologies, and experiences in developing Comprehensive Nutrient Management Plans (CNMP).
- The Missouri Manure Management Action Group (MoMMAG) (<http://outreach.missouri.edu/mommag>) and the Agricultural Electronic Bulletin Board (AgEbb)/Commercial Agriculture website provide updated information on management practices, laws and regulations, as well as links to websites in other states with similar livestock manure issues.
- A \$10,000 grant was obtained from National Pork Board to conduct Nutrient Management Programming that is currently being planned.
- The USDA Water Quality Heartland project hosted a four-state meeting on phosphorus concerns and developing a phosphorus index. More than 50 individuals, including representatives from the University of Missouri, attended the meeting and discussed state criteria for developing a phosphorus index and how this would affect livestock manure management.
- Through a grant with the Missouri Department of Natural Resources, a computerized program was developed to assist producers with nutrient management planning. A multiagency team from University of Missouri Extension and the NRCS are teaching the computer-based curriculum in two pilot watersheds in southwest Missouri. Agency representatives and local producers will learn how to use the computerized program for making management decisions on nutrient management.
- Thirty professionals from 15 land-grant universities -- including the University of Missouri -- USDA, MWPS and the EPA Ag Center planned, authored and pilot tested a Livestock and Poultry Environmental Stewardship (LPES) Curriculum. The curriculum, nationally developed and regionally piloted, includes 26 lesson plans grouped into six modules. Each lesson includes teaching outlines, environmental stewardship or regulatory compliance assessment tools and PowerPoint presentations. The curriculum was funded by EPA.
- The Commercial Agriculture Swine Focus Team conducted producer meetings throughout Missouri to educate livestock producers on Comprehensive Nutrient Management Plans. Workshops were conducted in 16 locations. The goal is to train and assist producers to determine whether they need or want a CNMP.

- 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://outreach.missouri.edu/mowin/>)

- b. Impact:

- More than 250 real-estate professionals attended the course “On-Site Sewage For Real-Estate Professionals”. The course offers six hours of continued education units for real-estate professionals and covers the functions of a septic tank, inspection, maintenance and repair, regulations concerning on-site sewage, alternative on-site sewage systems, and how on-site sewage systems can affect property transactions. Participants evaluated the course as follows:
 - 93 percent of the participants reported the information learned was above average and were very satisfied with the training and materials.
 - 92 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.

Those attending the training sessions made these statements:

- “Topics covered will help me do a better appraisal inspection.”
- “Good subject matter coverage. Technical but usable by common people.”
- “Best continued education course I have ever attended.”
- “Excellent course and resources.”
- “Should increase my turnaround time for sales transactions.”
- In east central Missouri, 40 on-site sewage installers attended a continued education class on installing drip irrigation systems, water movement in soils, and on-site sewage maintenance. Participants were tested before and after the class to assess its effectiveness in increasing awareness and knowledge of soils, water movement, and maintenance issues.
- Home inspectors, on-site sewage installers and wastewater treatment professionals attended a course in Hannibal, Missouri, to learn about on-site sewage maintenance and function, soil properties for proper wastewater disposal, and alternative on-site sewage systems. More than 85 participants received 4.5 hours of continued education credit for the class, and evaluations were used to determine whether participants found the course useful. Surveys indicated that 80 percent would attend similar classes concerning on-site sewage, 92 percent would use the information in their daily jobs, and 85 percent thought the training would improve their ability to do their jobs.
- Hazardous material collections for agricultural producers and urban residents were held in several key areas of the state. In Warren County a collection for agricultural hazardous waste brought in 160 farm implement batteries, 165 gallons of oil and petroleum-based products, 1,285 gallons of farm and garden pesticides, and more than 200 gallons of paint.
- A new train-the-trainer program entitled “Creating a Healthier Home” for extension specialists and health educators was developed to help people identify possible asthma triggers and hazards that may be found in the home.

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

c. Source 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://outreach.missouri.edu/mowin/>)

b. Impact:

- In Missouri, more than 3,800 elementary students participated in water quality education events and learned about ecological practices relating to the management of natural resources to improve environment and water quality. Teachers commented that water festivals and water quality awareness days are a great educational opportunity enjoyed by students.
- University of Missouri Extension is involved in more than 30 water festival activities each year covering various skills, including mapping, graphing, sequencing events, and understanding cause and effect. Many events are designed to target Missouri Assessment Program (MAP) skills. The content of the learning stations is science-based and generally hands-on.
- In southwest Missouri, more than 300 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, ground water 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.
- Five years of evaluation in several schools in the northwest region demonstrated an increase in Missouri Assessment Program (MAP) test scores. Test results showed increased knowledge and awareness of water quality issues. Ten Water Festival learning activities were matched with specific MAP skills and were rated by teachers for effectiveness. Eight of the 10 activities received a rating of 90 percent for effectiveness in reinforcing MAP skills and being useable by third-grade students.
- West Plains, Missouri, had more than 500 students attend a water awareness day designed to meet student MAP skills for the third and fourth grades. Local college students worked with local planners to assist with teaching the learning stations and directing students from one area to the next. Test scores before and after the activities were used to determine what participants learned about water quality and watershed management. The test scores indicated an increase in correct responses from 38 percent to 68 percent after students participated in the learning events associated with the water quality awareness.
- Communities in northwest Missouri offered a series of water festivals for third and fourth graders designed to meet standard achievement test requirements. Topics concerning the hydrologic cycle, groundwater movement, watersheds, and soil erosion were presented to more than 400 students. Presenters from the Soil and Water Conservation District, Missouri

Department of Conservation, University of Missouri Extension, and the Missouri Department of Natural Resources worked together to offer the sessions. Evaluations were completed by the students and a separate evaluation was completed by teachers to gauge the success of the water festivals. Students ranked the activities high, and post-test scores showed an increase in knowledge from 55 percent to 85 percent. Teachers ranked the event successful, educational and enjoyable. One teacher said, "I found this very informative and useful. Great way to educate students on the environment."

- University of Missouri Extension received a grant from the Missouri Department of Natural Resources to develop web-based environmental programs (<http://outreach.missouri.edu/mowin/Project31903/interacmowin.html>) in five pilot areas. The program is designed to increase awareness and knowledge of nonpoint-source pollution in specific watersheds. The web-based materials cover areas generally taught at the 3-5 grade levels and are based in the student's home watershed. The project contains several basic programs on nonpoint-source pollution and an extended learning session that allows students to research local watershed areas. Math, writing and science skills become a part of the integrated program. Teacher training sessions have been held in the pilot watersheds with special training classes being held at the state science and math conference. Teachers attending the training expressed positive comments about the integrated approach to web-based learning that combines reading, writing and computer skills in lessons about environmental science and watershed stewardship.

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 300,000 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 are needed to enable landowners to make informed decisions regarding the stewardship of their farms and woodlands. Since 2001, Missouri landowners have had opportunities to learn about forestry and wildlife management through two southern-based distance-learning short courses: Master Tree Farmer and Master Wildlifer.

- b. Impact: The Master Tree Farmer and Master Wildlifer programs are multistate, integrated programs with the following impacts specific to Missouri:

Since its inception in 2001, the Master Tree Farmer Program has showed more than 500 citizens statewide how to improve their forestlands.

- These individuals own approximately 1.2 million acres, of which 525,000 acres (44%) are in forest cover.
- Ninety-two percent (92%) of these landowners said they would change the way they manage their land.
- In exit surveys, program participants expected to save an average of \$4,000 (\$2 million among the 500 landowners) in taxes by keeping accurate records and generate an additional \$10,000 in revenue (\$5 million among the 500 landowners) by harvesting more and higher quality wood volumes.
- Through their active management, they are increasing both the quantity and quality of wood fiber in Missouri and at the same time improving the health of the forest and the watersheds in which those forests reside.

In its inaugural year, the 2004 Master Wildlifer Program trained more than 600 citizens statewide in ways to enhance habitats for wildlife on their property.

- Missouri had the greatest number of participants among the 13 southeastern states participating in the program.
- These 600 individuals collectively own an estimated 182,500 acres.
- Ninety-four percent (94%) of the landowners indicated they plan to implement the wildlife habitat enhancement practices that were presented.
- Through their active management, they will be restoring bobwhite quail habitat and improving deer and turkey populations and related populations of waterfowl, songbirds, pheasants, sport fisheries, reptiles and amphibians.

Both programs have strengthened the cooperation between MU Extension and the Missouri Department of Conservation (MDC).

- MU's State Forestry Extension Specialist and State Wildlife Extension Specialists coordinated the statewide programs.
- MU Regional Extension Specialists contributed their logistical expertise in delivering adult education.
- MDC Foresters, Wildlife Biologists, and Private Land Conservations contributed their technical expertise.
- The end result was a seamless delivery where participants said their forest and wildlife management knowledge increased 33% and 94% said they would recommend these programs to other landowners.
- This has set the stage for development of a comprehensive Missouri-based natural resource education program more suited for the Midwestern states.

- 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:

- More than 2,000 commercial applicators and 6,000 private applicators attended University of Missouri Extension Pesticide Applicator Training sessions during 2004. 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.
 - 81 percent plan "always" to use personal protective equipment when mixing and applying pesticides.
 - 98 percent plan to familiarize themselves with their company's emergency plan.
 - 95 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.
- Five one-day pest management workshops were held in 2004. 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:

- Missouri implemented 37 total maximum daily loads (TMDLs) in critical watersheds during 2004. University of Missouri Extension assisted many of the watershed communities in the development of management plans to implement locally identified practices that would improve water quality. Twelve of the TMDLs were set in watersheds where agricultural production was

seen as a major contributor to stream or lake pollution. Through locally led watershed planning, communities identified management strategies that would increase public awareness and knowledge of watershed stewardship, adopt practices that were economically viable for the local industries and provide sound environmental stewardship.

- 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. Local Soil and Water Conservation Districts have used the locally developed watershed plans to obtain state funding through Special Area Land Treatment (SALT) projects to receive \$1.4 million to implement management practices to protect water quality. 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 Long Branch watershed in north central Missouri is used for public recreation and as a drinking water reservoir. University of Missouri Extension led local citizens through the process of establishing a watershed committee for developing and implementing a watershed plan to reduce sediment, nutrient and bacteria loading. More than 3,500 acres of farmland adopted management practices that would improve water quality. Local producers received more than \$2.1 million through the state Soil and Water Conservation program and the Natural Resources Conservation Service to implement management practices.
- 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. The Jack's Fork designated as a national scenic waterway and has more than 1.5 million visitors each year, making the \$6 million canoeing, camping and trail riding business a major economic contributor to the local economy. The rolling hills of the area are excellent pasture that supports a \$13.5 million livestock industry. 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 still keep the tourism and agricultural industries of Shannon County viable.
- Through a USDA 406 Water Quality grant, the University of Missouri is collaborating with Kansas State University, Iowa State University, and the University of Nebraska in the Heartland Regional Water Quality Project. Missouri has provided leadership for the Community Involvement in Watershed Management (CIWM) theme.
- A Heartland CIWM workshop was held in March 17-18, 2004. Although states and agencies have offered training in community development principles to watershed staff, the Heartland workshop was the first time that professional community development practitioners and faculty had a regional forum to share their direct knowledge and experience with watershed facilitation. Forty-four professionals attended, representing four states and several watershed projects. The meeting focused on discussion of community intervention and 10 watershed case studies contributed by attendees. The case studies served as the basis of discussion for multistate breakout groups. The value of this experience was shown in 32 attendees' comments on the exit survey. Comments from participants suggested that they know better how and why to bring in numerous stakeholders in watershed groups, that the workshop was a good way to learn about other regional projects, and that valuable relationships were developed between regional water quality specialists from the four states.
- The summary of participants evaluation of the four-state forum found that:
 - Each land-grant university and partner agency had a role in sharing impacts and outcomes from their own community development facilitation encounters, contributing to the group's learning experience.

- The case studies presented from each state have provided examples of successful, locally led watershed management activities, which have assisted participants as they work with local communities in developing and implementing watershed management plans.
- Communication has been expanded and strengthened, leading to a more productive, collaborative relationship and integration of efforts among extension faculty, partners and institutions. Multistate planning groups are meeting continuously to plan and implement training programs around local communities working in watershed management activities. Participants indicated that integration of resources obtained from the CIWM conference is a critical part of their tool box for assisting local watershed communities in management activities.
- According to needs expressed by participants in the conference, the issue team has expanded its scope to include an emphasis on conflict mediation and public deliberation.
- Through the Missouri Watershed Information Network (MoWIN) local agency personnel were trained in retrieving web-based watershed information for watershed planning. The web-based training was held in 12 locations and focused on a hands-on approach to learning and retaining information on 14 watershed areas. Surveys were given to the participants with the following responses:
 - 90% would use the information obtained for watershed management training.
 - 82% would attend another course on web-based information gathering for watersheds.
 - 85% would share information learned with co-workers and clientele.
- In southwest and southeast Missouri, annual irrigation conferences during 2004 focused on watershed protection through proper practices in (1) application timing to reduce runoff, (2) fertigation and (3) managing and protecting water supplies. The conferences identified watershed management practices that promote agronomic and economic benefits to irrigated crop producers.
- Many of the small communities in Missouri are un-incorporated and un-sewered. Three of these small communities in northeast Missouri worked with University of Missouri Extension to receive a \$1.5 million grant from USDA Rural Development and the Missouri Department of Economic Development 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 is developing a process to systematically model watersheds and determine the effectiveness of implemented watershed practices at improving water quality. Through a grant from the Missouri Department of Natural Resources, the University of Missouri will design a model for evaluating environmental impact based on agricultural management practices. Once completed and field tested in five pilot watersheds, the process will be developed for statewide use. Selected agency personnel involved in watershed management implementation will receive training on how to use the program. This model will allow local agency personnel to select those practices that will provide the best environmental improvement for the least amount of investment.

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

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

Goal 5: Enhanced Opportunity and Quality of Life for Americans

1862 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 674,877 educational contacts throughout Missouri. In addition, over 300,000 unique visitors accessed the MissouriFamilies.org website. The Internet presence averaged **two 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. These field faculty collaborated with over 10,994 youth and adult volunteers to plan, implement and evaluate local youth development programs. 4-H Youth Development Programs reached 105,463 Missouri youth in 2003-04.

4-H Youth Development Programs reached young people in every Missouri county. About 25% 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 2004, 4-H Youth Development Programs generated over \$1,004,340 in grants, contracts and awards in support of outreach programs. In addition, the Missouri 4-H Foundation provided \$997,975 in private support. External support of 4-H Youth Development Programs totaled nearly \$2 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 2004 4-H Youth Development Programs.

- Missouri's 10,994 4-H volunteers provided over \$39 million in volunteer services in 2004. National studies suggest that volunteers donate an average of 208 hours annually, valued at \$17.19 per hour.
- 2,201 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 60 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 in 2002 and 2003, 87.5% are currently enrolled in college.

- USDA/CYFAR and the National Network for Health recognized Missouri's Family and Community Resource Program (FCRP) for demonstrated outcomes and exemplary evaluation. In addition, the national Children, Youth, and Families Education Resource Network (CYFERnet) selected three of FCRP's computer skills assessment tools to add to its collection of research-based, peer-reviewed web resources. All evaluation plans, tools, and reports are available to the public at the FCRP website <http://extension.missouri.edu/fcrp/evaluation/index.htm>.
- A comprehensive volunteer screening process was implemented requiring every applicant to be screened for child abuse and neglect. As of fall 2004, more than 10,000 volunteers successfully completed the process.
- ParentLink's Project Family Support (PFS) helped 40 low-resource communities build their capacity to support families. Through ParentLink's efforts, communities have greater access to training, problem-solving support, research-based information, and links to services.
- ParentLink's WarmLine provided a resource for parents, professionals, and community groups across the state of Missouri. Individuals contacted the WarmLine seeking research-based information and problem-solving support pertaining to child development and family support systems. WarmLine staff also gave information to callers about local resources. During the past year, 1,700 individuals contacted the WarmLine for parenting resources.
- 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 more than \$500,000. During summer 2004, 34 University of Missouri students worked as 4-H CSAs.
- Of the 63,142 involved in the school enrichment program, nearly 31,000 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.
- As part of the 4-H After School Computer Labs project, 9 new after-school computer lab programs and 14 expanded existing programs operated in 10 low-income communities. Of the 338 youth who regularly participated in labs, an estimated 83% of participants were from low-income families.
- 4-H Youth Civic Engagement project, AmeriCorps*VISTA members started 17 new youth civic engagement programs and expanded 10 existing programs in 22 low-income communities. Of the 251 youth who participated, an estimated 53% were from low-income families.
- The 4-H Shooting Sports program involved 4,589 youth and 941 adult volunteers. Other environmental stewardship programs reached 3,117 youth, including forestry, soil conservation, sport fishing, wildlife, ecology, environmental science, outdoor skills, water riches, and conservation.
- Volunteer leader development remained a primary focus in the natural resources area. More than 220 adult volunteers received intensive subject matter and youth development training at Shooting Sports, Sportfishing, or Wildlife workshops.
- 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, Belarus, Uzbekistan, and Finland 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.

Four 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.

The Community Development Program draws upon resources from several departments in the four campuses of the University of Missouri 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

- An on-line survey of persons who attended the Community Development Academy between 1996 and 2004 was conducted in the summer of 2004, participants reported examples of positive community impacts attributed to skills learned through the Academy that included:
 - Organization of forestry landowners into a planning consortium
 - Development of local watershed management plans
 - Creation of a center for lifelong learning
 - Generation of \$3 million through fundraising to support preschools and youth centers
 - Organization of a “community caring council” engaging 80% of local elected officials
 - Organization of local leadership development programs
 - Gaining federal funds for local transportation projects
 - Creating a mentoring program
 - Laid foundation for \$150,000 investment in distressed neighborhood
 - New businesses have opened in downtown and two buildings have been restored
 - Built youth program where recidivism among juvenile offenders is down by a third
 - Organization of “Main Street” programs in three communities
 - Development of emergency management programs in three counties
 - Construction of a summer day camp saving families an estimated \$122,000
 - Establishing a micro loan program

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

- As part of the Alianzas Program, three educational centers have been opened to provide Mexican citizens with completion of validated Mexican secondary education via distance learning. As a result, Mexican nationals have furthered their education while living in the United States, and Mexican parents have been able to take a more active role in the education of their children.
- The “Cambio de Colores (Change of Colors) – Latinos in Missouri: Gateway to a New Community” conference served as a catalyst for the community-at-large conversations with 300 state, university and local attendees exploring an array of Latino- and community-based issues. As a result, Missourians throughout the state have learned best practices for interacting with the Latino community and the new Cambio Center for integration of outreach, research, and extension was established on the Columbia campus.
- Evaluation of participants of leadership programs continue to indicate that participation has resulted in personal growth and self-efficacy, community commitment, a shared future and purpose for the community, community knowledge, and civic engagement. Over the past 20 years, the 5,865 participants in the Experience in Community Enterprise and Leadership 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 24 having been conducted this past year.

As a result of Dent County’s Youth Leadership Academy, the Mayor of Salem, MO, invited participants to serve on a Youth Advisory Committee to provide a youth perspective to community issues facing the city. The graduates of the Youth EXCEL program in Camdenton have formed an advanced group that is planning a GPS Community Mapping Project.

Monroe County now has 60 additional community leaders stepping forward chairing committees addressing issues related to identified opportunities such as: “Grow Native” that encourages identification, development and marketing of natural resources related ventures and “Look to Your Neighbor First”, a networking tool encouraging Monroe County Entrepreneurs to look locally first for product production resources. One alumnus said, “I believe EXCEL has helped me understand others more and to discern areas where things need to be addressed.”

In Lafayette County, the 13th annual LEAD 2000 community leadership program was held. Graduates of this program now serve as County Commissioners, School Board Members, City Council Members and are appointed to planning and zoning commissions, Chambers of Commerce Boards and Economic Development Authorities.

- The City of Hollister (<http://www.cpac.missouri.edu/hollister/index2.html>) secured a \$9.5 million loan from the Missouri Transportation Finance Corporation to fund major reconstruction of Highway 65 within the city as a result of the study conducted by the MU Community Policy Analysis Center. CPAC estimated that the reconstruction project and easing of highway congestion will result in an increase of 348 jobs, more than \$11 million in income and a half million dollars in tax revenues.
- Results of facilitation include the following examples. The residents of Herculaneum now have a voice in expressing health and environmental concerns created by operation of the smelter and are working with EPA and other community stakeholders to develop the city’s master plan. The City of Laurie achieved a broad community consensus and is moving towards adoption of the Zoning Commission’s Comprehensive Plan, after three former failed attempts on their own. The Jefferson County Port Authority is developing a public Mississippi River access amidst polarization over other economic development issues.
- A community entrepreneurship readiness self-assessment tool (<http://www.cpac.missouri.edu/REI/IndexI.htm>) was developed and tested in 12 Missouri

communities and is being published by the Federal Reserve Bank of St. Louis and the Missouri Rural Development Partners. Participating communities are beginning to implement changes to foster more entrepreneurship locally.

- Tourism projects included assisting numerous landowners in southern Missouri on the process of moving and restoring log homes, a \$1.3 million project to renovate a vacant K-Mart building into a library and Route 66 Museum and development of an Ozark scenic by-way.
- After the conduct of a needs assessment in Johnson County, a free clinic opened in May of 2004 and volunteers are providing services to those without health care. The clinic is also working to become a Federally Qualified Health Clinic, which would provide federal funds to the clinic. An application for 501(c) (3) status has been made.
- In Central Missouri a deliberative forum on access to health care resulted in statewide partnership with the Missouri Department of Health and Human Services that is currently planning 21 forums in early 2005 for public input related to solving the problem of the medically uninsured. Data from the forums will be presented to legislators for policy formulation. The local forums in a Southwest Missouri community are now bilingual, in Spanish and English. A recent regional forum focused on racial and ethnic tensions led to the establishment of community committees to design future forums.
- As a result of participating in the CECH-UP program, students from Northwest Valley Middle School worked with local community leaders, school officials, and government officials to facilitate building a skateboard park. Groundbreaking began summer 2004. With information obtained from the Jefferson County Commissioner about stray animals, students from Fox School District began an informational campaign to reduce the number of stray animals that are euthanized by the county.
- The Fire and Rescue Training Institute introduced the University of Missouri Exercise and Evaluation Program (MU EEP) and has aided numerous state, local and private organizations in meeting requirements to conduct exercises (disaster simulations) to test emergency plans and procedures.
- When a series of tornados and severe storms struck Northwest Missouri in the spring of 2004, a Community Emergency Management Team worked with local relief-agency coalitions called COADs (Community Organizations Active in Disasters) to coordinate recovery efforts among agencies, support recovery efforts in collaboration with SEMA and FEMA, and provide research-based disaster recovery information from MU Extension and affiliated EDEN institutions. The team was crucial in supplying agricultural disaster assessment and the needs of victims, and disaster workers.

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. Ranking among the top one-third of states in proportion of the population over age 65 and with 25-30% of some rural counties in this age range, the Aging Program has continued its focus this year on Successful Aging and on Grandparents Raising Grandchildren. 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://iml.umkc.edu/casww>), a correlated curriculum on “Aging Well,” the Missouri Families website, and in several other areas critical to successful aging (e.g., “Healthwise for Life” and “Grandma’s Yellow Pie Plate”). A small grant from the Brookdale Foundation has 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.
- b. Impact: During FY04, regional specialists spent 2,022 hours providing educational support reaching 12,651 persons in 32 counties. Topics included retirement planning, money management, nutrition, disease prevention, strength improvement, chronic disease self-management, memory training, driver safety, preserving family traditions, passing on important possessions, 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 (sometimes in other sites) in their communities. 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.

The specific program focus on grandparents and relatives raising grandchildren is achieving its intended purpose. Grant funds made possible nineteen mini-grants of \$250 each to expand or establish programs for relatives as parents in local communities. Projects ranged from starting a library for grandparents to sessions for grandparents and children with appropriate activities for each. This focus is now a part of program duties of over twenty regional Extension specialists who are facilitating local support groups in their assigned counties and cultivating the program needs of their clients. One example of a resulting successful outcome in a support group in Buchanan County was a grandmother who after a number of failed attempts to gain legal guardianship of her two grandchildren was able to do so as a result of a presentation made by a lawyer to their group. She gave much credit to the group’s support and the information provided for a successful outcome with the children’s adjustment and improved relations with the children’s birth father.

- 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 program quality improvement and provider professional development. Extension faculty are assisting childcare centers and homes with the program accreditation process and implementing the goals of OPEN (Opportunities for Professional Education Network), Missouri’s career development initiative for childcare providers. Because childcare is plagued by

such high rates of turnover, it is important to address the professional needs of the workforce. For instance, OPEN has implemented a Professional Achievement and Recognition System (PARS) for providers to document their training and education efforts. Additionally, OPEN's "Trainer Registry" has created an opportunity for early childhood trainers to make their credentials and efforts known. Most importantly, the Workforce Incentive Program (WIN) is paying biannual cash incentives to childcare providers based on their educational attainment, ongoing professional development, and continued employment in the same early childhood program. Collectively, this information is being used to establish a database about Missouri's childcare workforce and to monitor ongoing professional development activities. Additionally, because the Missouri Department of Health and Senior Services, Bureau of Childcare requires childcare workers to complete 12 clock hours of training annually, Extension faculty regularly provide relevant educational opportunities for childcare workers.

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 education are the best predictors of quality early education. However, national assessments depict a system of mostly poor to adequate childcare programs, due in part to alarming rates of provider turnover. Turnover rates remain high because wages are low, benefits rare and opportunities for professional advancement limited. Missouri cannot recruit and retain a well-prepared childcare workforce, support families' workplace success and promote healthy child development without addressing the problem from multiple perspectives.

- b. Impact: As of Jan. 15, 2005, 2,946 childcare providers from licensed childcare centers and family childcare homes were enrolled in "Missouri's Professional Achievement and Recognition System" (PARS), up from last year's figure of 2,256. Of these individuals, 231 have increased their educational attainment as per Missouri's Early Childhood Career Lattice.

Additionally, 887 individuals were enrolled in Missouri's "Trainer Registry," a centralized database for individuals who provide training for early childhood professionals, up from 765, as reported last year.

As of Jan. 15, 2005, 511 early childhood professionals from childcare centers and family childcare homes in select rural, urban and suburban counties are participating in Missouri's "Workforce Incentive Program" (WIN), a decrease from last year's 642 professionals (and an indirect measure of turnover in the field). University of Missouri Extension was recently awarded a grant from the Administration for Children, Youth, and Families, Childcare Bureau to analyze the data gathered as part of the WIN evaluation. The study addresses 2 specific questions: 1) Did WIN work? and, 2) What can we learn about early childhood incentive programs using a within-group analysis? This study will yield valuable information for policy makers about viable strategies to strengthen the childcare workforce.

During 2004, 3,062 individuals attended University of Missouri Extension childcare provider educational workshops focused on the core competencies of providing quality early care and education. Although the evaluation results are not necessarily quantifiable, anecdotal evidence suggests that 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% of high school students have smoked tobacco, 77.8% 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 4-H Youth Development and Human Development Programs are engaged in a variety of programs designed to prevent youth from becoming involved in risky adolescent behaviors. Providing alternative youth activities and supervised after-school care programs are two important ways in which University of Missouri Extension prevents youth from becoming involved in problem behaviors. In addition to these efforts, the Center on Adolescent Sexuality, Pregnancy and Parenting developed several major programs designed to prevent teen pregnancy and provide support to new adolescent parents. These were:

- Maltreatment and Adolescent Pregnancy and Parenting (MAPP). The purpose of the MAPP Program is to increase professionals' awareness of three issues: (1) the relationship between childhood abuse and adolescent pregnancy, (2) the likelihood of abuse during adolescent pregnancy, and (3) the likelihood of abuse among children of adolescent parents.
 - HIV Prevention. University of Missouri Extension regional specialists train teachers and school personnel from around the state in one or more of the Center for Disease Control's HIV-risk reduction curricula. The purpose is to increase the commitment of Missouri school administrators and teachers to implement one or more of the Center for Disease Control's HIV-risk reduction curricula in their schools.
 - Missouri Volunteer Resource Mothers Program. Staff have developed a mentoring program for teen parents.
 - For additional information see Adolescents (<http://www.missourifamilies.org/adolescents/index.htm>) 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 addition, regional one-day HIV information workshops were presented around the state. These six-hour workshops reached school teachers, administrators and community service professionals.

These workshops provide CDC-approved curricula to professionals in the areas of abstinence, STD and HIV prevention. The programs are conducted and evaluated in partnership with the Missouri Department of Elementary and Secondary Education.

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 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 90 teen mothers received mentoring through Missouri MVRM (Missouri Volunteer Resource Mother) programs this past year.

In 2004, over 10,000 educational contacts were made throughout Missouri. Youth and their mentors participated in such programs as the Missouri Volunteer Resource Mothers Program, Adolescent Journaling and Adolescent Pregnancy Prevention programs. These programs have been shown to be highly effective in reducing the risk of child abuse, neglect and repeat unwanted pregnancies.

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

Key Theme: Children, Youth and Families at Risk

- a. Description: Building Strong Families. Demographic trends indicate that family well-being is a matter of concern. In 2001, 16,453 deaths occurred due to heart disease, 12,289 deaths due to cancer, and 1,514 deaths due to diabetes in Missouri. Nearly 6,000 low-birth weight babies were born in 2001 and 9,426 births were to teen parents. These infants are at great risk of experiencing health and learning problems in their lives. Although the average income of Missourians grew during the 1990s, the number of children living in poverty remains high, about 15 percent. Many homes are unsafe and lack attention to repairs and other hazards that put adults and children in danger. 32% of renters and 13% of homeowners find the cost of housing to be more than they can manage.

The Building Strong Families: Challenges and Choices Program is designed to help families find their strengths and learn skills to build on those strengths (<http://outreach.missouri.edu/bsf>). The program draws from an interactive, 13-module 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).

The curriculum is structured so a series of 3 to 13 sessions can be taught focusing on the particular needs of families. Supplemental materials were developed for lower-level readers, and a parallel curriculum for 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 2004, 96 new facilitators from Missouri and North Dakota were trained to implement the program in their communities. The Building Strong Families program design team has certified a total of 500 Extension specialists and paraprofessionals and community agency educators from Missouri, Nebraska, and North Dakota. To date, 3,503 family members have participated in the program.

Through an internal reporting system, Extension professionals reported spending 2,599 hours with the Building Strong Families Program (prep time, teaching, coalition building, etc.). They collaborated with 52 different partners, had the help of 222 volunteers, and had 107,129 contacts (calls, collaborations, workshop sessions, participants, newsletters, etc.) for the program in 2004.

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

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

Overall, 95% 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% 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.”

Short- and medium-term outcomes would 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/>).

- 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 - Family and Community Resource Program (FCRP) and ParentLink. On any given day in the United States, there are more than 2 million minor children with an incarcerated parent. Parental incarceration and related trauma and separation interfere with child development, resulting in long-term outcomes, including intergenerational incarceration. On November 8, 2004, an Associated Press Report stated the number of women in federal and state prisons outnumbered male offenders for the first time in history. In Missouri alone, there are at least 13,000 incarcerated adults who have one or more children. Two programs have focused on responding to the needs of children of offenders and their families: Living Interactive Family Education (LIFE) and ParentLink.

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

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

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

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

ParentLink has also placed a Parenting Corner in the visiting area of the Women's Eastern Region Diagnostic and Correctional Center in Vandalia (WERDCC, Audrain County). WERDCC is one of two state-run prisons in Missouri and all female inmates are processed through this facility.

- b. Impact: The program at the Potosi Correctional Center has positively impacted a total of 40 fathers or father figures, 50 youth and 80 children since it was started in 2000. In May 2004, the LIFE Program was awarded the National Priester Health Award given by Healthy People...Healthy Communities National Network for Health. The award was presented at the annual National Priester Conference held in St. Louis, Missouri. The award is given for positive health outcomes of program participants.

As an outgrowth of the support that the LIFE Program provides to caregivers, the Family and Community Resource Program wrote and received a grant award from the Missouri Children's Trust Fund to plan and host a conference for those who support children of incarcerated parents. The Children of Offenders Partnership (CO-OP) Conference was a huge success, with 151 participants in attendance and evaluations overwhelmingly positive. A web resource for caregivers and service providers was created and posted at <http://outreach.missouri.edu/fcrp/coopconference.htm>.

At the encouragement of the Missouri Department of Corrections and University Extension staff, LIFE Program staff applied for and received seed funds from the Missouri 4-H Foundation to expand the LIFE program to three additional Missouri correctional facilities in the following communities: Farmington, Charleston and Vandalia. The goals for this replication process are to:

- Increase number of young people enrolled as 4-H club members
- Increase the diversity of 4-H club members and volunteers
- Start new 4-H clubs in a variety of settings with new partners

In addition, LIFE staff are creating a LIFE volunteer/staff manual that can be used nationwide. The manual will be released at the end of June 2005. ParentLink staff showcased the Parenting Corner and other ParentLink resources at a WERDCC parenting fair, reaching approximately 1000 inmates. An additional 13 incarcerated parents made contacts with ParentLink's WarmLine staff to obtain further information on child development, parenting, and parenting resources.

- c. Source of Funds: Smith-Lever, CYFAR/NCP, Grants
- d. Scope of Impact: 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.

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

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

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

- b. Impact: Community Development Academy is a Multi-State Extension program and this impact recognizes examples of accomplishment. The CDA attracts from across the nation and around the world. Of the 58 participants in 2004, 8 were internationals from Kenya, South Africa, Canada, and the Republic of Georgia. CDA faculty are working with a university in Australia to develop a CDA course in Australia.

In exit and follow-up evaluations, participants in the 2004 Community Development Academy reported increased knowledge and understanding of community processes and changed their practices in their communities. The interactive courses helped them build relationships with fellow community development practioners from across the state and around the world. Many comments indicated this was one of the most important assets of the course in both short-term and longterm.

An on-line survey of the 598 persons who attended the Academy between 1996 and 2004 was conducted in the summer of 2004. There were 209 respondents. The 35% response rate was considered reasonable because many of the early participant records lacked email addresses. The survey responses indicated the CDA has been very well received. 95% of respondents reported using what they learned and nearly 50 percent reported using what they learned "a great deal." Respondents that wrote descriptions of how they were applying Academy skills and knowledge reported "internalizing" what they learned and using specific planning techniques and group process skills. For example, "The skills learned are a daily part of my activities. They have become second-nature to me now."

When asked about positive community change, participants wrote examples of positive community impacts. Among the positive organizational outcomes attributed to skills learned through the Academy were the following:

- Organization of forestry landowners into a planning consortium
- Development of local watershed management plans
- Creation of a center for lifelong learning
- Generation of \$3 million through fund raising to support preschools and youth centers
- Organization of a “community caring council” engaging 80% of local elected officials
- Organization of local leadership development programs
- Gaining federal funds for local transportation projects
- Creating a mentoring program
- Laid foundation for \$150,000 investment in distressed neighborhood
- New businesses have opened in downtown and two buildings have been restored
- Built youth program where recidivism among juvenile offenders is down by a third
- Organization of “Main Street” programs in three communities
- Development of emergency management programs in three counties
- Construction of a summer day camp saving families an estimated \$122,000
- Establishing a micro loan program

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

- c. Source of Funds: Smith-Lever, State, Fees
- d. Scope of Impact: Missouri, Pennsylvania, Michigan, Louisiana, New Hampshire, Washington, Ohio, Illinois, California, Connecticut, Minnesota, Colorado and International

Key Theme: Community Development, Conflict Resolution

- a. Description: Community Deliberation Program. Public deliberation programming 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.

Local government officials and community leaders and groups continue to request decision assistance and support from University of Missouri Extension. Current research suggests such support is effectively provided through the use of community-based decision making methodologies. Officials and leaders have indicated the need to identify specific local issues, recognize the capabilities and assets within their communities and become familiar with the challenges at the local level. Additionally, they indicated the need to master skills to use specific community-driven methods that allow them to come together, foster productive communication, identify common ground, and take action in ways that support collective issue resolution. In the medium-term, Missouri learners expressed the need to put their knowledge into action by employing the methods

of deliberation just described. By doing so, they will come together as a community, communicate effectively and address their priority issues as a cohesive and empowered group. In the long-term, they aspire to develop a “habit” of deliberation and community-driven problem-solving. This will directly result in enhanced and enriched communities throughout the state, greatly improving the lives of Missouri learners. Local communities will become empowered and able to proactively affect change, direct future growth and successfully address priority issues within their community base.

In partnership with University of Missouri Extension, the Kettering Foundation identified several moderators for the non-profit Kansas City Consensus to take part in a two-year working group focused on building deliberative practices in communities. They will attend three meetings a year.

- 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:

Training for moderation of public deliberation forums has resulted in the following:

- The local forums in a Southwest Missouri community are now bilingual, in Spanish and English. A recent regional forum focused on racial and ethnic tensions led to the establishment of community committees to design future forums.
- In Central Missouri a deliberative forum on access to healthcare resulted in partnership with the Missouri Department of Health and Human Services that is currently planning to hold 21 forums in early 2005 for public input related to solving the problem of the medically uninsured. Data from the forums will be presented to legislators for policy formulation.
- In Springfield, Missouri, a moderated monthly forum series is held at a local library.
- Deliberation training materials from Missouri’s program have been used nationwide including Texas, Oklahoma, Arizona, Pennsylvania, Iowa and Maryland.

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

- d. Scope of Impact: Colorado, Missouri, Illinois, Indiana, Iowa, Kansas, Michigan, Minnesota, Nebraska, North Carolina, North Dakota, Ohio, Oklahoma, Pennsylvania, and International

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

- a. Description: Community Emergency Management Program. The Community Emergency Management Program provides resources, personnel, educational programs, and materials to support the mission of the Missouri disaster recovery partnership and 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. MU Extension received a special needs grant from USDA through

the Extension Disaster Education Network (EDEN). With this grant the CEMP created a large collection of disaster preparedness, recovery and mitigation information from across the country and placed it on a CD ROM for mass distribution. The Disaster Resources Handbook on CD may be the largest collection of its type in the U.S. The original 2000 copies were taken immediately and distributed to states, local agencies, the Red Cross and private firms. The CD, now in its second run of 2000, is being distributed daily across the country and internationally through the web for only \$6.00 (<http://www.mufrti.org>).

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 have played key roles in providing Community Emergency Response Team (Citizen Corps-CERT) training delivered to citizen volunteers to teach them how to respond to support local government disaster operations.

With funding from USDA through EDEN and Purdue University, CEMP worked with a multidisciplinary team to develop a new national web-based *plant bio-security curriculum*, which is now available to extension professionals and the agricultural community at no cost. Access to this course is available on the EDEN homepage at <http://www.agctr.lsu.edu/eden>.

In January 2004, the Fire and Rescue Training Institute introduced the University of *Missouri Exercise and Evaluation Program (MU EEP)* to aid state, local and private organizations in meeting requirements to conduct exercises (disaster simulations) to test emergency plans and procedures. In the short time since its inception, the MU EEP has assisted the following entities with exercises: the Missouri Department of Agriculture (avian influenza and foot and mouth disease outbreak or terrorism), local public health agencies (natural pandemic flu outbreak, bio-terrorist release of anthrax and pneumonic plague, local governments (terrorist induced foot and mouth disease and deliberate chemical contamination), and private/corporate entities (business continuity for New Madrid Fault earthquake, evaluation of Weapons of Mass Destruction Exercises for State Emergency Management Agency). Although the MU EEP program is funded only through revenue generation, it provides a critical service to local and private organizations with exercise requirements.

In 2004 the University Fire and Rescue Training Institute (MUFRTI) revised the *farm safety curriculum in cooperation with rural fire fighters and producers*. Many Midwest emergency responders live and work around the agricultural community. This course deals with the procedures and special problems involved in rescues from farm machinery accidents. Classroom presentations are followed by an orientation of farm equipment at a local implement dealer and practical evolutions involving a tractor rollover, corn header entrapment, victim disentanglement from other farm machinery and EMS considerations. Emphasis is placed on hazard recognition, scene safety, and preplanning. This program meets the Awareness, Operations and Technician level requirements outlined in NFPA 1670 Standard Operations and Training for Technical Rescue Incidents, as well as, Chapter 8, Vehicle and Machinery Rescue of NFPA 1006, Rescue Technician Professional Qualifications.

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 Recovery Work - Spring 2004: When a series of tornadoes and severe storms struck Northwest Missouri in the spring of 2004, a multidisciplinary CEMP team, comprised of regional extension specialists and campus-based faculty and staff, moved into action. Team members worked with local relief-agency coalitions called COADs (Community Organizations Active in Disasters) to coordinate recovery efforts among agencies. At the request of Missouri's State Emergency Management Agency (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 in providing research-based disaster recovery information from MU 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 the disaster, 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.

CEMP faculty have assisted local and regional fire services in applying for National Fire Grants, resulting in Missouri having a very strong record in receiving these grants.

- 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 1990 and 2000, Missouri's Latino population grew from approximately 62,000 to 119,000 residents. This represents a 92% increase, compared to the total population of Missouri, which increased by only 9%. In six Missouri counties (Moniteau, Pettis, Saline, Barry, Lawrence and McDonald), the Latino population increase was either 400 percent or greater. Service providers believe the actual numbers of Latinos to be even greater than the Census reports, especially in those counties with a greater migrant Latino population.

With such rapid growth, immigrants and communities began 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 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 enhance the ability of Extension and its partners in accommodating the unmet challenges of both Latino immigrants and the Missouri communities that receive them. This is done through a Latino, university, and

community partnership utilizing a community-based, shared-learner approach on a statewide level.

Three University of Missouri Extension regions (Central, Southwest and West Central) were selected as target areas for the implementation of Alianzas, due to the increase in their immigrant populations over the decade. During the past year, Alianzas established collaborative partnerships with a host of community organizations and institutions and began to plan for expansion statewide. The establishment and maintenance of such working partnerships represents a significant change in practice from the scattered, individual, past efforts to identify and address the needs of the Latino population.

Through a partnership with the government of Mexico, three educational centers (one each in Missouri's West Central, Central and Southwest regions) were opened to provide Mexican nationals the opportunity to obtain a validated certificate of Mexican secondary education via distance learning.

On the campus of the University of Missouri-St. Louis in March 2004, the "Cambio de Colores (Change of Colors) – Latinos in Missouri: Gateway to a New Community" conference served as a continuation of the community-at-large conversations that were held at the 2002 and 2003 conferences on the campuses of MU and UMKC. Approximately 300 state, university and local attendees explored an array of Latino- and community-based issues. Alianzas has acted as a leading partner in the planning and implementation of the annual Cambio de Colores conferences. As a result, Extension staff has been able to build its capacity to better serve Latinos and the communities in which both live and work. Also, Missourians throughout the state are able to continue to learn best practices for interacting with the Latino community.

Alianzas distributed a weekly electronic newsletter dealing with current issues, best practices, and cultural information on Latinos, to over 240 Extension staff members, service providers, academicians, political representatives, and community members statewide.

Alianzas is creating an on-line manual that will aid Extension staff in working with Missouri's Latino community. The website will include a discussion board for Extension staff to post questions, receive answers, and correspond with other state Extension staff. The manual will be accompanied by an interactive, introductory Spanish CD, which was developed for Extension staff. The CD includes a review of more than 500 words and useful Spanish language phrases for Extension staff.

In Southwest Missouri, festivals highlighting Latino culture fostered multicultural understanding, and significant work was accomplished with community emergency management among the Latino population.

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

For additional program information, visit the Alianzas website: <http://www.alianzas.us>.

- 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.

In Kansas City, Alianzas partnered with, and helped coordinate the efforts of, various organizations in Kansas City, Kansas to host the conference, “Trabajando Juntos (Working Together),” which was targeted to area businesses and industries that desired to gain access to resources that would allow their organizations to be safer, more productive and more diverse. Alianzas’ planning partners included Washburn University in Topeka, Kansas; Kansas City Harmony; El Centro, Inc.; Kansas City, Kansas, Community College; Kansas City, Kansas, Chamber of Commerce; and the Unified Government of Kansas City, Kansas.

With the largest population of Latino immigrants now living in Northeast Kansas City, Alianzas established the Northeast Advisory and Access Group to accommodate the unmet challenges of the area’s recent Latino immigrants and the community that was receiving them. This informal coalition of over 100 of Northeast Kansas City’s service providers, community members, academicians, Extension staff, and local officials gains knowledge of available resources, current issues, best practices, and cultural information about Latinos.

Two key partnerships have developed since Alianzas’ inception. The first is a partnership with the Missouri Department of Elementary and Secondary Education’s Program for Migrant English Language Learning (MELL), which delivers high quality, comprehensive, and collaborative educational programs for migrant and immigrant children and youth. The second partnership is with the Mexican Consulate in Kansas City, through which Alianzas has been enabled to bring distance learning programming to Missouri.

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

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

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

- 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. Community decision support enhances local capacity to make sound policy choices. Rapid changes in technology, economic and social patterns require a

greater depth of analysis and understanding if local decision makers are to make sound policy choices. Tools include economic models, demographic analysis, Geographical Information System (GIS) mapping, participatory community action planning, fiscal impact tools, and local government support.

During the past year community decisions support has been offered in a variety of formats ranging from contract work applying data to community issues to training which enabled the community to move forward on a community priority, to direct involvement and facilitation, to finding resources for a community whether it be experts, examples of what other communities have done, or on-line training resulting in a product for use in the community. The decisions for which support was provided included a range of topics such as planning and zoning; services for the aged, low-income, disabled and handicapped; tourism; and economic development. Extension has worked in partnership with the community and with other organizations.

The Community Policy Analysis Center (CPAC) provides research, outreach and training to support improved policy decisions at both the local and state levels. The Show-Me Model not only provides valuable data and information, but also facilitates learning among community participants. The Center conducts community economic baseline analyses, scenario (what if) analyses, and supports training for extension staff. Work during the last year has included community impact studies regarding transportation, economic development, bioenergy development, and entrepreneurial climate. CPAC continues to work with researchers at the Letterkenny Institute of Technology and the National University of Ireland Galway to develop the policy analysis capacity of the Border-Midlands-Western Regional Assembly of Ireland. For more information of CPACs activities see <http://www.cpac.missouri.edu>.

During the past year, CPAC also developed a community entrepreneurship readiness self-assessment tool (<http://www.cpac.missouri.edu/REI/IndexI.htm>). The self-assessment tool includes a questionnaire and guide so communities can measure their strengths and weaknesses compared to other communities. The tool has been tested in 12 Missouri communities and is being published by the Federal Reserve Bank of St. Louis and the Missouri Rural Development Partners. Collaborative programming with the Missouri Community Development Society and USDA-Rural Development used telephone conferences to reach nearly 70 community and agency leaders across the state to discuss the community entrepreneurship.

The Office of Social and Economic Data Analysis (OSED) conducts projects, often in conjunction with state agency partners that focus on important public policy issues such as transportation, health and community services, and public education. During the past year, 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.

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

Together with Missouri Department of Elementary and Secondary education, OSED plays an integral role in the state system of school district accreditation. The analysis of school improvement data from thousands of Missouri teachers, students and parents is incorporated in the state

accreditation decisions and provides a foundation for school improvement planning. Enhancing the quality of Missouri schools and increasing academic achievement is a cornerstone of future economic development in a global economy increasingly rooted in human capital. A new OSEDA web application has further enhanced school improvement planning by making census and other social and economic information available for small areas within Missouri's 524 school districts. Web-based maps of Missouri districts now overlay school locations on thematic maps of key social and economic indicators highlighting the contextual factors that schools must address to design effective instructional strategies.

Other: An analysis comparing Missouri state and local taxes to all other states was condensed into policy briefs for the state legislature, which are currently being used in new legislator orientation as a part of the provided by University of Missouri Legislative Academy. The analysis is now being updated for 2002 and is part of a multi-state effort, which currently includes Illinois and Tennessee with plans to include Wisconsin and Nevada. This work was undertaken as part of the Regional Project, "NE-1011: Rural Economic Development: Alternatives in the New Competitive Environment," an integrated research and extension regional project.

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. Two examples of tailored assistance with planning and zoning were Laurie and Reeds Spring. In Laurie, programming included: providing examples of comprehensive plans and zoning ordinances, helping the Zoning Commission set up a timeline for the activities, designing venues beyond that legally required to assure broad community input; facilitating the community input sessions. Reeds Spring's financial crisis limited its options for assistance in determining if it wanted planning and zoning, and programming has included an overview of planning and zoning, board of adjustment and issues related to implementation resulting in the city now discussing its options. Additional decision support for communities, using the City of Steelville as an example, ranges from

- energy audits for senior citizen housing
- consulting on flooding problems, and
- helping the City of Steelville to obtain various grants to upgrade recreational facilities in the community.

- b. Impact: Community Decision Support is a Multi-State Extension program. The following impacts are state specific to Missouri. Following-up on school improvement plans, school districts in Mid-Missouri and in East Central Missouri have developed with OSEDA and successfully implemented new instructionally oriented student information systems that bring important learner information to teachers easily and securely on their workstations.

In Northeast Missouri, extension has worked for many years with a variety of communities and partners on housing. As a result,

- A CBDG grant in Hannibal is providing funds for housing rehabilitation in a second neighborhood.
- Mark Twain Council of Governments reaches 70 homeowners or residents of rental rehabilitation units in Clarence, Clark, Hannibal, Macon and Moberly.
- Follow-up with prior participants in Financial Management and Home Care & Maintenance programs indicated they are paying bills on time, and some report having more money. They are utilizing energy conservation and weatherization techniques as taught. More preventive maintenance is practiced both on a do-it-yourself and a for-hire basis.

- Housing situation workshops were conducted in partnership with OSEDA and a Housing Environmental Design Specialist, using results of four community surveys and seven town meetings. This effort resulted in more public-private cooperation on housing and a larger role for the private sector in housing in the region. Two lenders, three contractors and a venture capitalist are now planning privately funded housing ventures in Lewis, Marion, Ralls and Pike Counties.

Regional extension faculty, OSEDA, CPAC and other partners worked with the citizens of Stone County in the Stone County Futures project. The county decided to focus on tourism economic development and has launched the development of a scenic byway. Other tourism projects include assisting numerous landowners in southern Missouri on the process of moving and restoring log homes for preservation, housing and museum additions and working with the Laclede County Library Board on a \$1.3 million project to renovate a vacant K-Mart building into a library and Route 66 Museum.

The City of Hollister (<http://www.cpac.missouri.edu/hollister/index2.html>) secured a \$9.5 million loan from the Missouri Transportation Finance Corporation to fund major reconstruction of Highway 65 within the city as a result of the study conducted by the MU Community Policy Analysis Center. CPAC estimated that the reconstruction project and easing of highway congestion will result in an increase of 348 jobs, more than \$11 million in income and a half million dollars in tax revenues.

The City of Herculaneum, 2000 people, has serious environmental and health problems from a lead smelter that has operated in the town for over 100 years. EPA contracted with Extension and the extension team worked with the Herculaneum Community Action Group (CAG). Many residents, especially those living in the voluntary property buy-out zone, have had their lives on hold waiting for more information. The residents now have a voice in expressing health and environmental concerns created by operation of the smelter and are working with EPA and other community stakeholders to develop the city's master plan.

In the City of Laurie a broad community consensus emerged, around which, the Zoning Commission built and adopted the Comprehensive Plan (available online at the Lake West Chamber of Commerce website: <http://www.lakewestchamber.com> click on City of Laurie). This was the city's fourth attempt at planning and zoning, the first three failed to be enacted.

As a result of on-line community economics training provided for extension personnel, citizens and people across the nation, an extension agent in the state of Washington presented the analysis developed in the course in relation to promoting local growth to 45 elected officials and chamber officers in the state of Washington. "They are accustomed to kitchen table economics and some of the data were revealing. I received several invitations from individuals around the county to speak on these topics to other audiences. I could not have done this without the work in the course and your willingness to answer my questions." Additional examples of how the course has been used can be found on the website: <http://stevens.wsu.edu/Community/econdevresc.htm>.

Kimmswick, a small tourist town on the Mississippi River was split after the economic development corporation supported a riverboat casino, which a majority of the citizens fought. The county commission asked the regional community development specialist to survey the residents about public uses of land donated to the county. The specialist went into this hostile environment, made friends, and listened to the citizens' opinions on the issue. Based on the information, the Jefferson County Port Authority is developing a public river access for Jefferson County. The county program director points out this could only have been accomplished by someone with the highest integrity, a

genuine concern for the residents, and a certain amount of bravery.

The City Council of Arnold appointed the Arnold Commission on Aging to determine the needs in the county. The regional CD specialist facilitated the commission's work and assisted in conducting and analyzing a survey. On their survey form, many of the aged and disabled wrote a thank-you to the City Council for caring enough to ask them. Based on the survey results, the Commission recommended a media "blitz" so people will understand how to access the services that already exist. The Commission is also working with the City Council to secure funding for transportation.

Extension, along with other partners, provided decision-support to Johnson County as it works toward improving access to health care in the county. After a needs assessment was conducted, a free clinic opened in May of 2004 and volunteers provide services to those without health care. The clinic is working to become a Federally Qualified Health Clinic, which would provide federal funds to the clinic. 501(c)(3) status has been applied for (Organizational Development).

MERIL (Midland Empire Resources for Independent Living) begun in 1994, with a \$51,875 grant from the Missouri Division of Vocational Rehabilitation to cover nine counties of Northwest Missouri is now a \$3.5 million business growing with similar growth in clientele. In 2003-04, the regional community development specialist worked with MERIL to conduct a needs assessment of clients and health care providers to identify any gaps or new areas of need in programs/services, and provided training to its board. As a result, the specialist helped develop and implement a public relations plan to improve outreach to potential clientele, and MERIL secured a new office site with a computer lab for clients to develop skills or conduct Internet searches.

As a result of a joint meeting between University of Missouri Extension and University of Illinois Extension, the Local Government Partnership (collaborative effort of the MU Extension, East-West Gateway Council of Governments and UM-St. Louis) was able to create resource sharing opportunities that wouldn't have otherwise been explored. Training has been made available to several southwestern Illinois municipalities and additional collaborative efforts are underway between the two extension services and the Council of Governments.

- c. Source of Funds: Smith-Lever, State, Contracts, Grants, Fees
- d. Scope of Impact: Missouri, North Carolina, Pennsylvania, Illinois, Washington, 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 Local Government CECH-Up handbook was updated along with the website (<http://www.umsl.edu/cech-up>). The CECH-UP handbook provides cross-curricular lessons that are 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. The program is slated to

expand area of coverage in the state and has been adopted for use by 4-H VISTA volunteers working to enhance youth civic engagement.

- b. Impact: The Local Government CECH-UP Program provided opportunities for the schools to connect with the community:

Students from Northwest Valley Middle School worked with local community leaders, school officials, and government officials to facilitate building a skateboard park. Groundbreaking began summer 2004.

With information obtained from the Jefferson County Commissioner about stray animals, students from Fox School District began an informational campaign to reduce the number of stray animals euthanized by the county.

The program also 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 court house. 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.

- 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. Three "Small Acreage Options" fairs have been organized in rural Missouri for small scale and beginning farmers.

Through the "What's New with Sustainable Food and Farming?" seminars and the Sustainable Agriculture listserv (150 subscribers), a shared understanding of "sustainable agriculture" has been created for University of Missouri students, educators, and citizens on topics such as pastured poultry systems, sustainable agriculture grant programs, native cool season grasses in Missouri, crop diversification, etc. Over 140 researchers, educators, and students have become more knowledgeable and aware of various sustainable agriculture topics.

Over 1,000 college students participated in the program through guest lectures on community food systems, sustainable agriculture and the Latino agricultural community in Missouri and the Midwest, and through assistantships, internships, and individual advising. In addition, more than 200 FFA students were exposed to sustainable agriculture information at FFA camps and events.

Faculty reviewed sustainable agriculture grants for the Missouri Sustainable Agriculture Demonstration Award Program, the North Central Region Sustainable Agriculture Research and Education (NCR-SARE) Grant Program, and the NCR-SARE Farmer and Rancher Grant Program. CFSSA has helped select the best and strongest sustainable agriculture proposals that will potentially benefit hundreds of producers, rural communities and consumers. Furthermore, CFSSA has assisted farmers in writing grant proposals.

CFSSA also started a new initiative in 2004 to reach out and serve minorities in agriculture.

- b. Impact: More than 60,000 consumers and producers have been exposed to sustainable agriculture and community food systems information through a three-dimensional sustainable agriculture diorama developed in partnership with the MO Department of Agriculture displayed in state, county, and local events as part of the regular CFSSA exhibit. Some visitors expressed their intention to change their shopping behavior to buy locally grown foods and support local farmers.

Minority community gardens have been established and supported by CFSSA. Latino and African American families have run 4 community gardens with CFSSA assistance. Approximately 40 families have grown their own fresh and nutritious vegetables. Community garden members were grateful for the opportunity to grow vegetables and learn about gardening while improving nutrition and reducing family food expenditures.

- c. Sources of Funding: State, Smith-Lever (SARE)
- 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 2001 Survey of Consumer Finances, 25% of U.S. households have less than \$10,000 in net assets.

The 2004 Retirement Confidence Survey shows more than half of all workers report savings and investments of less than \$50,000.

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

In Missouri, there were more than 30,000 filings in 2001, rising to almost 34,000 in 2002.

According to the Missouri Division of Finance, there were 2.6 million payday loans with an average APR of 408%. The highest documented rate in Missouri was 1,950%.

Most financial experts and educators agree people need access to financial management education at

a young age in order to develop the skills they need 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 research is underway to target programming to young adults. Other audiences include youth and their teachers, young families, women, individuals who are on probation or parole, parents, and professionals working with low income families.

In FY2004 80,570 educational contacts were made through family financial management programs. This programming involved 216 partners and 148 volunteers. Below are the following outputs and outcomes.

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 in educational programs with low-to-moderate income families directly. One thousand two hundred fourteen (1,214) educational contacts resulted from implementation of the Money Action Plan curriculum.

Approximately 500 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.

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

- Set financial goals (57%)
- Started or increased savings (55%)
- Developed a spending plan (60%)
- Practiced recordkeeping (15%)
- Reduced credit card (60%)
- Reviewed credit reports (27%)

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

- Made positive changes in spending habits (47%)
- Lived within a spending plan (40%)
- Paid bills on time (37%)
- Established a savings plan (23%)

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 (92%)
- Calculated their net worth (69%)
- Said financial records were more organized than before the class (62%)
- Tracked spending for at least 30 days (54%)
- Reviewed their insurance coverage (62%), with 23% making changes;
- Increased the amount they were saving (60%)
- Reviewed their beneficiaries and reported they were up to date (85%)
- Discussed their estate plan and their wishes with their heirs (54%)
- Were more confident about saving and investing (92%)
- Wanted to continue to learn more about financial management and would recommend Women and Money to others (100%)

c. Source of Funding: Smith-Lever, State

d. Scope of Impact: Missouri

Key Theme: Leadership Training and Development

- a. Description: Community Leadership Development: EXCEL (Experience in Community Enterprise and Leadership) Neighborhood Leadership Academy. 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.

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

One-third of Missouri’s counties and communities – over 5,860 people – have participated in locally driven leadership programs. The number of counties expanding to develop a specific community youth leadership development program has grown in the past year to 24 and additional interest is high.

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

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

For additional program information about Community Leadership Programs, see

<http://www.ssu.missouri.edu/commdev/cld/cld.htm>. Information about the Neighborhood Leadership Academy in St. Louis can be found at http://pprc.umsl.edu/base_pages/cnd/programs_opportunities.htm.

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

The EXCEL program demonstrated effective in achieving its community development. The program provided a flexible design that any community can use effectively. During the past 20 years, over 5,865 participants in the Experience in Community Enterprise and Leadership Program have actively engaged in local, regional and state roles to benefit their communities.

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

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. Participants from different genders and ethnic backgrounds experienced the same kinds of benefits, as did those with different levels of education, income, and length of residence of family ties in the community.

As a result of Dent County's Youth Leadership Academy, the Mayor of Salem, MO invited participants to serve on a Youth Advisory Committee to provide a youth perspective to community issues facing the City of Salem. The graduates of the Youth EXCEL program in Camdenton have formed an advanced group that is planning a GPS Community Mapping Project.

Monroe County now has 60 additional community leaders stepping forward chairing committees addressing issues related to identified opportunities like: "Grow Native" that encourages identification, development and marketing of natural resources related ventures and "Look to Your Neighbor First", a networking tool encouraging Monroe County Entrepreneurs to look locally first for product production resources. One alumnus said, "I believe EXCEL has helped me understand others more and to discern areas where things need to be addressed."

In Lafayette County, the 13th annual LEAD 2000 community leadership program was held. Graduates of this program now serve as County Commissioners, School Board Members, City Council Members and are appointed to planning and zoning commissions, Chambers of Commerce Boards and Economic Development Authorities.

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

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

- c. Source of Funds: Smith-Lever, State, 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, Indiana).

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 2004, including: Focus on Kids, Families and Divorce, Anger Management, parenting workshops, 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. In 2004, approximately 460,000 Missouri parents and professionals who work with parents received parenting education or information in some form.

- 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. 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 2004, approximately 3,000 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 (4.4); and plan to avoid arguing or fighting with the other parent in front of the children (4.6). Participant comments include: "I think the program is exceptionally good and is very helpful for me in understanding the needs of my children in this difficult time"; "I will try to consider how my kids feel first and get along with the other person. I didn't realize how much kids were hurt when they see parents fighting or 'downing' the other"; and "It was most helpful to learn to give the other parent a chance to raise and spend more time with the child and to keep in contact with the child."

Families and Divorce – Families and Divorce is a 2-4 hour workshop that provides parent education indirectly by training teachers and other professionals. Topics include: the effects of divorce on children and families, supporting children through parental divorce and remarriage, and working with divorced and remarried parents. In 2004, 67 professionals participated in the Families and Divorce training in 3 counties and an additional 1,200 professionals received extension publications from the Families and Divorce program. Most participants "agreed" or "strongly agreed" the program helped them better understand the needs and reactions of children of various ages to divorce (4.3); and they plan to use at least one suggestion from this program to provide support to children who have experienced parental divorce (4.4). Participants indicated they now "understand more about the topic." One participant commented: "excellent resources [were] made available to us."

Anger Management – In 2004, 483 parents participated in Anger Management programs or received Anger Management information. The RETHINK anger management curriculum was used in 4 counties with approximately 450 parents. RETHINK is an anger management curriculum consisting of six two-hour sessions, with the goals of helping parents identify constructive ways to deal with anger, use healthy discipline strategies and better understand their children's behavior at different ages. Participants as a result of attending RETHINK, now plan to "listen better to my kids," "help

my kids to tell me why they are angry,” “give kids some choices,” and “try to picture what will happen to the other person if I say or do something when I’m angry.”

Other Parenting Workshops – General parent education workshops were provided to approximately 400 Missouri parents in 2004. 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. Of 96 parents who participated in Programs for Parents workshops, 89% indicated their knowledge increased greatly as a result of the program and 78% reported they planned to use information learned in the program. Participant comments include: “I learned that you can discipline your children in many different ways. I discipline my child without spanking, and I set limits for my child” and “I learned that guiding them means to show them the way, not enforce my desires or my will upon them. I try to teach my child through examples, and I talk to my child about how things look or how things happen.”

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

- Fund/Grant Development Training – A 5-hour Fund/Grant Development Training was held that provided professionals and other community members an opportunity to discover strategies to enhance their community’s financial capacity to support families. Participants learned more about grant writing and other fund development strategies. In 2004, 8 communities and 20 professionals participated. A sampling of their quotes:
 - “It was excellent. It was excellent! Amazing amount of valuable information in short time. I will share it with members of our coalition and community. So glad I came.”
 - “I feel that I can facilitate a successful grant application.”
 - “Thanks for inviting me to your workshop last week. It was one to the best four hours spent for me. In fact it provided me with a terrific opportunity to learn about the grant process and all the ramifications of securing grants. Wish we could have more of this type of training. As a Business Development Specialist, please let me know how I might be of help to you and your organization.”
- Healthy Parenting Tool Kit – The Healthy Parenting Tool Kit Training is a 4-6 hour workshop that provides parent education indirectly by training professionals and other community members. Military Specific topics are covered and include information related to deployment and dangerous work. In 2004, approximately 45 community members and four community groups received training. In reviewing 25 participant evaluations, 100% said they would recommend this training to others. Examples of quotes include:
 - “Very informative-Feeling of support”;
 - “Good Job - Interesting and inspires me to get to work.”
 - “Absolutely supportive, informational the diversity of the presenters; created an atmosphere of tremendous support and information.”

ParentLink’s WarmLine Phone Assistance – In 2004, ParentLink’s WarmLine Services were provided to over 1700 parents and community service providers who work with parents. (Approximately 51% of the calls were from parents.) The WarmLine 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:

- A caller said she was amazed at how much help she got so quickly!
- Caller said she and her family were “blown away” by all the help we could give them. Thanked us for all our knowledge and help.
- She had looked everywhere trying to find information and we had given her the most help of anyone. Thought we had been wonderful.

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 1994, approximately 15,000 materials were distributed through these Corners.
- Web Service – ParentLink’s web service is available to parents, providers, and community members seeking parenting information. During 1994, approximately 16,000 hits were received.

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

- 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 and Community Issues. More than 300,000 new jobs have been established in Missouri in the last decade. With these new jobs, unprecedented demands for affordable housing have followed. Many of the newly established jobs are entry level and represent low annual incomes. During this same period, many rural communities have expressed an interest in attracting businesses to boost slumping economic conditions. The arrival of businesses to any area increases the demand for affordable housing.

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

Community revitalization and sustainability is based on a community participatory process training program. Extension specialists work with the community to enable residents to take charge and make decisions about their own communities. This in turn leads to enhanced community sustainability and improved environmental stewardship in both residential and commercial sectors of the community. Community participants typically have the resource materials, skills and experience necessary to plan and execute a sustainable community planning process from conception and diagnosis through implementation. Extension personnel facilitate

the sustainable revitalization community assessment process in communities in their respective regions using these resource materials and processes. Through University of Missouri Extension Outreach Development Funding (ODF), these procedures are available for statewide distribution.

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 nursing home options. The scale of these programming efforts ranges from the individual interested in buying his/her first home to entire communities interested in identifying and inventorying their existing and anticipated housing stock.

- b. Impact: In Fiscal Year 2004, slightly more than 3,800 educational contacts were made through sustainable housing and community revitalization programming efforts. These efforts included 37 partners and more than 11 volunteers. The following outputs and outcomes were included:

HomeWorks is a practical course that helps homeowners successfully maintain homeownership through knowledge of basic home care 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% of participants felt the program exemplified excellent quality. 50% of participants felt the value of the program in terms of time, money and energy was of excellent use.

Stepping Through the Gateway to Financial Fitness is a collaborative program developed and presented by 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 (DFIC), 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 programs help consumers improve the quality of the air in their homes.

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

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

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

Short-term outcomes include: Two communities in Missouri are serving as pilot test sites for protocols and profiling procedures. The project team includes members and leaders from the two communities supported by staff from the Northwest Missouri Regional Council of Governments; staff from the Community Policy Analysis Center on the Columbia campus; CARES – The Center for Agricultural, Resource and Environmental Systems on the Columbia campus; and University Extension State Housing and Environmental Design Extension Specialists.

Medium-term outcomes include: A procedure for implementing the Housing Profile Protocols statewide will be developed. Evaluations of the participatory process will be conducted in each of the pilot-tested communities.

- c. Source of Funds: Smith-Lever, Federal grant
- 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 10,994 4-H volunteers provided over \$39 million in volunteer services in 2004. 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 10,000 volunteers for the club program were successfully processed. Less than 0.1% of the applicants were rejected.
- **Research on Volunteer Competencies:** In 2001 and again in 2004, Missouri participated in the study endorsed by the National Conference, Volunteer Odyssey 2001: The Journey Continues and the Volunteerism Task Force of the NAE4-HA Program Committee. This study asked state volunteerism specialists, county youth specialists and volunteers what competencies each group believes is necessary for volunteers to deliver a successful program. When completed *Identifying the Core Competencies Necessary for Volunteers to Deliver 4-H/Youth Development Program* will provide guidance in determining appropriate and needed volunteer training. Initial findings indicate among the top seven competencies identified by volunteers and specialists, the need is for subject matter training.
- **Volunteer Certification:** Missouri instituted two 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–In Missouri, the 4-H Shooting Sports program has been one of the fastest growing 4-H projects. The success of 4-H Shooting Sports was directly proportional to the effort put into leader training...equipping leaders for success. Volunteer leader training and certification remained the highest priority in the 4-H Shooting program. Volunteers were recruited to attend a national workshop and then returned to the state to conduct leader workshops for local volunteers.

Two leader certification workshops per year were conducted at various sites around the state. Volunteers were required to successfully complete a leader certification workshop before they were allowed to work with youth. The workshop consisted of more than 20 hours of training in 4-H philosophy, youth development principles, safety, risk management strategies, discipline lesson plans, and teaching methods.

The volunteers returned to their home community and worked with youth 8-18 years of age. Instruction takes place throughout the year and continues from year to year. In 2004, 169 adult volunteers completed the leader certification workshop.

Horse Bowl–2004 was the first year for Horse Bowl Coaches to be certificated in Missouri 4-H. There were 40 certified horse bowl coaches in the state. Missouri 4-H had 3500 youth enrolled in Equine Science projects and an estimated 2000 youth and adults were impacted this year by the certified horse bowl coaches. The Missouri certification was modeled after the Illinois Horse Bowl certification. One volunteer leader made the following comment regarding Horse Bowl certification training. “I think the (horse bowl) programs will foster learning in positive and healthy manors with less stress on the youth. I would recommend this program to others.”

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

Key Theme: Workforce Preparation

- a. Description: Access to College: Youth Futures – College Within Reach Program. One of the most popular methods used to help all students make a smooth transition to college is an orientation course. It is particularly important for nontraditional students (e.g., potential first-generation college students, ethnic minority groups, and students from working-class families) to complete an orientation course that not only addresses social adjustment issues but also outlines the level of student effort required and the support systems available for success in college.

The Youth Futures – College Within Reach Conference, held on the Lincoln University (LU) and University of Missouri (MU) campuses, provided an extensive college orientation for nontraditional students. 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.

During the conference, youth became aware of academic and student life activities and programs. They 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, LU, and community activities provided youth the experiences they need 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 serve 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 annually. Youth activity is tracked from the time the youth attend the conference until their sophomore year in college.

The conference was attended by 61 youth from Kansas City, St. Louis, Jefferson City, Columbia, and Mississippi County. The participants were 54% female and 46% male. The mean age was 15.83. Participants were 95% African American, 3% Caucasian, and 2% Hispanic.

- b. Impact: Before the conference a significant number of youth (25%) reported they had not thought of going to college while a majority (58%) said they were not sure they would 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 go somewhere in life
 - They felt more positive about going to college
 - They will take their school work more seriously

Over 90% 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, 87.5% 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

“I can really relate to being one of those kids although my problems are much more severe. I’m 16 years old and I am a child of the state (Division of Family Services). I’m so happy to have gotten the opportunity to come here and also to hear your speech. Life is hard for me right now transitioning into a young adult without a mother. But I have my mind set and I want to attend college and major in nursing and minor in psychology to help any and everyone if possible. That’s my priority. Well, thanks again if you feel you can help me succeed call my group home or write.... P.S. I want to attend University of Missouri-Columbia and your speech touched me.”

Quotes from participants about what they learned from the conference:

“How important it is to keep my grades up – personal things.”

“That attitude is everything and that I can do it.”

“That college life isn’t all that easy, nor was the ACT.”

“All your high school years count; scholarships are easy to get if you study hard.”

c. Source of Funds: Smith-Lever, Federal grant

d. Scope of Impact: Missouri

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 2004, thanks to generous donor support, the Missouri 4-H Foundation offered 45 college scholarships totaling more than \$38,000. Of these 45 scholarships

- 29 scholarships were available to 4-H members who resided in any county in the state of Missouri
- Upperclassmen were eligible to apply for 15 of these scholarships
- 20 of these scholarships could be used while attending any public institution in the state of Missouri and 14 could be applied toward a Missouri two year college or technical school

Testimonials

“Words cannot express my gratitude to you for donating this wonderful gift to help me get through college. In the past year, my father has had three different jobs and when I found out that my parents could not afford to help me with college, I set out to find a way to pay for it myself. I never would have been able to achieve this goal without you.”

c. Source of Funds: Smith-Lever, Federal grant

d. Scope of Impact: Missouri

Key Theme: Workforce Preparation

a. Description: Information technology - Afterschool Computer Labs. A three-year partnership between University of Missouri Extension, the Corporation for National and Community Service and the 4-H Community Youth Development VISTA Program/Afterschool Computer Labs connected youth to technology. AmeriCorps*VISTA members worked in partnership with county

extension offices and with community and faith-based organizations to build local programs. After-school computer labs offered upper elementary/middle school students a safe environment and adult supervision after school. Labs provided access to play-based learning, expanding the technological abilities of youth to succeed in school and career.

Thirty youth staff, VISTA members and youth and adult community volunteers were trained via regional workshops on starting up new lab sites. There was advanced training on technology kits, add-on activities, resource development, and assessment of computer skill development. A digital resource manual for after-school computer labs has been developed and posted at <http://4h.missouri.edu/go/programs/vista/ASCLmanual.htm>. The 4-H After School Computer Labs Model was selected for the 2004 National 4-H Afterschool Award of Excellence. The program model was also chosen by the Center for Education, Employment, and Community's Youth Learn Initiative to be shared on a new website about best program practices.

- b. Impact: Research conducted by Missouri 4-H at several computer lab sites found computer labs are succeeding at boosting the computer literacy levels of upper elementary and middle age school age students. The majority of students who regularly participated in lab programs showed gains in basic technological competencies such as operating a computer, using a word processor, and searching the web for information. From a sample of four lab sites, children grades K-6 were able to complete 70% of basic operating, web and word processing tasks. (Source: "Brightening Horizons: The Impact of After School Programs on Children's Computer Skills," Missouri 4-H, 2004).

In year two of the 4-H After School Computer Labs Project, 10 AmeriCorps*VISTA members developed 10 new after-school computer lab sites and expanded 16 existing lab sites in 16 low-income communities of Missouri. Over 1,500 upper elementary and middle school aged youth participated in labs (duplicates not removed), with approximately 85% from low-income families. VISTA members enabled after school technology programs to "keep the lights on after school" by leveraging 57 community volunteers, 750 community volunteer hours and \$18,500 in local in-kind donations to lab programs.

Testimonials

Mary Rocchio is among the up and coming VISTA members developing programs worth watching. In St. Louis County, Mary has partnered with three agencies on after school computer labs: Pagedale Family Support Center, the Youth and Family Center and Parks Chapel in Webster Groves. 44 youth were reached with adult supervision and computer technology access last quarter, 95% of whom are from low-income families. After five months, reports of impact from project partners are starting to come in:

- "Feedback of the summer program was tremendous with the community being more aware of the computer lab and inquiring about programs and classes."

Comments from school-based labs in Hannibal, Mo., coordinated by VISTA member Jeri Baker included:

- "One student who is very shy has shown his desire to be in the computer club. He was involved in the musical, which meant that he could not come to computer club on the night he was enrolled. He took it upon himself to talk to the counselor and me at Stowell about changing his nights so he could still come to computer lab. He has changed the hard drive in his computer at home and stated a desire to share this with his fellow computer members after Mr. Nicholson presented a demonstration on maintaining your computer."

- “At Veteran’s school the students are also using the Roller Coaster Tycoon game. One girl plays and knows how fast she can lose money and also how to make money.”
 - “Another boy at Veterans wishes everyday was computer lab day.”
- c. Source of Funds: Smith-Lever, Grants, Gifts
- d. Scope of Impact: National

Key Theme: Youth Leadership Development

- a. Description: Civic Engagement - 4-H Community Youth Development VISTA Program. A three-year partnership between University of Missouri Extension, the Corporation for National and Community Service and the 4-H Community Youth Development VISTA Program/Civic Engagement connected youth to their communities. AmeriCorps*VISTA members worked in partnership with county extension offices and with community and faith-based organizations to build local programs.

The Youth Civic Engagement project teamed middle school/high school age youth with municipal officials and community leaders to identify and solve problems together. While learning about local government, analyzing community issues, and implementing civic projects, youth gained knowledge and skills for becoming active citizens over a lifetime. The program is a three-year partnership between University of Missouri Extension and the Corporation for National and Community Service.

Missouri Cadre of Trainers and Facilitators of Youth-Adult Partnerships is a training partnership between Missouri 4-H and the Innovation Center for Community and Youth Development, Chevy Chase, MD. One youth staff and two youth co-trainers enrolled in the national train-the-trainer program in Nov. 2003. Missouri 4-H agreed to conduct four workshops in 2004-05 for extension staff, VISTA members, community volunteers, and youth to support local youth-adult partnership development. The goal of the Missouri Cadre is to facilitate positive community change by increasing access to educational tools and curricula for youth-adult partnerships and expanding the number of youth and adults active in partnerships at the local level.

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: The 4-H VISTA program continued reaching low-resource youth in disadvantaged communities with positive youth development experiences through the 4-H Youth Civic Engagement Project.

Entering its second year, the 4-H Youth Civic Engagement Project involved 10 AmeriCorps*VISTA members in developing 28 new youth civic engagement programs and expanding 17 existing programs in 30 low-income communities. Over 1,200 middle and high school aged youth participated in programs (duplicates not removed), with approximately 70% from low-income families. VISTA members empowered youth and adults in leadership, service, and decision-making by leveraging 1,250 community volunteers, 4,550 community volunteer hours, and \$85,750 in local in-kind donations to programs.

The Missouri Cadre was launched this year with two introductory workshops reaching 13 counties (37 participants). Seven of the participants were youth. Two more workshops are planned for 2005 for at least 15 counties (50 participants) in the start-up or early stages of youth-adult partnership development. "In-motion" workshops will further equip teams for building community readiness, orienting youth and adults for working together, fundraising, and evaluating youth-adult partnerships. They will also enrich participant learning by examining national and international work comparable to their own.

Testimonials

Participants reported on usefulness of the workshops and plans for implementing the material:

- "I will be presenting these ideas to the teen council, to see if they think it will attract their peers."
- "The extraordinary presentation given by the young girls and boys on the team displayed confidence, respectfulness...helped us to realize where we were on the model and where to go from here in order to sustain our program."
- One community team from St. Francois County, Mo. used the workshop to develop a 32-member youth-adult council, sponsored by 4-H, Caring Communities, and East Missouri Action Agency, and later a mayor's youth council. Out of the group's project came a web site by VISTA member Branson Merrill geared for other communities developing councils.
<http://extension.missouri.edu/vista/merrill/myc.htm>

c. Source of Funds: Smith-Lever, Grants

d. Scope of Impact: National

Key Theme: Youth Leadership Development

- a. Description: 4-H Community Service. One of the parts of a 4-H club is community service. Activities included not only the typical road clean-up and beautification projects but writing letters to soldiers in Iraq, 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.
- b. Impact: Totals from club service logs show on average every club conducts at least 6 service projects each year with at least 16 members participating in each service project. Using these averages, during the 2003-04 club year, the 2,640 clubs throughout the state conducted 15,840 service projects with 253,440* 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. 4-H members raised approximately \$25,000 through club donations at 4-H achievement and recognition events and state conferences. With \$3,000 distributed to 4-H members in need, Kids Helping Kids netted approximately \$22,000 last year. The 2005 State 4-H Council has resumed working toward a goal of \$30,000 which will be matched by Foundation gifts to create a Kids Helping Kids endowment fund.

Testimonials

One leader notes the benefits of community service-learning: “Youth benefit in many ways from participating in the community at events and donating time to help. They learn working skills of punctuality, dependability, teamwork, responsibility, confidence and cooperation. They build people skills learning to communicate, speak publicly, get along with others and build friendships. By devoting time to the elderly they experience first hand the satisfaction and happiness they can bring to others. All these things make for a well rounded person who will be an asset to their community now and in the future.”

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

1890 Cooperative Extension Service — Lincoln University

Key Theme: Aging

- a. Description: The mission of the Paula J. Carter Center on Minority Health and Aging (PJCCMHA) is to provide leadership in addressing the health, social, and economic needs of Missouri’s minority, disabled, and elderly populations through education, training, applied research, policy analysis, and the use of technology as a strategic tool; to disseminate culturally appropriate health care information and materials that will empower the minority populations to participate in improving their health. The Center identifies barriers to preventative healthcare and seeks to combat racial and ethnic bias in research and practice. The Center also provides diversity-training programs through conferences, workshops, and videoconferences.
- b. Impact: The PJCCMHA improved the delivery of healthcare services and/or quality of life for minorities and minority older adults. The following impacts are due to PJCCMHA:

Missouri Institute on Minority Aging (MIMA): 95% of over 30 participants reported they extended their knowledge of the social, economic and health issues impacting older minority individuals as well as resources available in the state for older minorities.

Computer Literacy Training Project formerly (CEST): Since the project’s inception in 1998, the Computer Literacy Training Project formerly Computer Entrepreneurial Skills Training (CEST) has trained over 300 individuals in Mid-Missouri in computer literacy and more than 50 individuals have been trained in entrepreneurial skills development.

Computer Literacy Training Project (CLTP): Seventy individuals completed the ten-week computer literacy training. Confidence using computers increased by 50%. Ten individuals who completed the entrepreneurial training wrote a business plan and started their own business.

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

Key Theme: Children, Youth, and Families at Risk

- a. Description: Central Missouri. In Missouri 19.5% of the youth population is from single-parent families; 21.6% live at incomes below the federal poverty line. Missouri ranks 23rd in the United

States for childhood poverty. For Jefferson City, 24.3% of the youth live in single parent families. Missouri has a high school drop out rate of approximately 13%; 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%; 100% of the families are considered living below the poverty level.

- b. Impact: 57% of the youth participants of the Collaborative Tutoring Program increased their grades by 1-3 letter grades during the 2003-2004 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. Eight youth participated in the Missouri State 4-H Congress. 37 volunteers served as volunteer helpers in identified high-risk communities.
- 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% 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 Funding: 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: Southeast Missouri. Pemiscot County is located in the lower southeast section of the Bootheel of Missouri. 32.1% of the county's 21,220 citizens live below the poverty level. Pemiscot County ranks #108 in the state of Missouri for high school dropouts, and the county ranks #114 in the rate of teen pregnancy out of the 115 counties in the state. The non-white student population in the county's public schools is 49.6%. In addition, 43.6% youth under age 18 live below the poverty line; 39.4% of youth live in single parent households; 15.9% of youth between ages 16-19 are high school dropouts; there is a 15% unemployment rate in the Caruthersville area.

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

- To provide learning educational opportunities to under reached and underserved youth in the Caruthersville area.
- To help youth seek and set goals for their lives.
- To provide life skills, prevention, tutorial assistance, computer lab in the after school program.
- To provide arts and crafts classes, character development, computer lab, physical education/fitness, breakfast and lunch and field trips in the summer enrichment camp.
- To collaborate and advocate with other organizations and schools on behalf of youth at risk.

- To partner with other youth oriented organizations to bring about a greater degree of opportunity and change in the lives of the targeted youth group.

Programs include: The LU Cooperative Extension After School Program that provides life skill training, after school tutoring, reading and Spanish classes; A Summer Enrichment Camp; Character Development Program; 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.
- 40% indicated an increase in their children’s self-discipline.
 - 45% of the youth participating increased knowledge of and skill with, food safety and science education.
 - 70% of the parents reported a more positive attitude of their children toward school and work. As indicated by teacher and parent reports, students are doing a “better job” of turning in homework.
 - 60% of those participating in the Collaborative Tutoring Program increased their grades by 2-4 letter grades. Prior to their participation in the program they were experiencing academic failure.

Summer Enrichment Camp: A total of 89 children were enrolled and there was an average daily attendance of 60 children.

After School Program: Programs were made available to all students. A total of 2,520 signatures are on file for the year. 20 students were tracked in partnership with the public schools to monitor progress.

- 18 students showed improvement in one or more subject areas.
- 10 students were reading above grade level, 8 students reading below.
- 14 students showed no unsatisfactory behavior, 3 students showed unsatisfactory in classroom work habits, and 3 showed unsatisfactory in both work habits and social habits.

Student’s progress reports reflect there have been improvements in 18 of the 20 students’ grades since enrollment in the LUCE After School Program.

- c. Source of Funding: 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% of the youth reported they had not thought of going to college while an overwhelming majority, 58%, 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% 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% 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% 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. Fifteen students from KCUIC attended the 2003-2004 Conference. A KCUIC Youth Futures newsletter was developed and distributed in 2003-2004.

- c. Source of Funding: 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 has worked in Kansas City to organize four urban 4-H clubs over the last year, with an approximate total membership of 100 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 Teen Conference (15 students attended-January 2004); attended 4-H Global Conference (March 2004); attended 4-H Camp (25 students attended-June 2004); 4-H Youth Congress (18 students attended-June 2004); Youth Futures Conference (15 students attended-July-Aug. 2004); Youth leaders attended National Conference in Washington, D.C. (William Lane was selected to attend and is a regional representative on the 4-H State Council).

The KCUIC implemented 4-H after-school tutorial program with JH Clark Middle School Ace Academy. 70 youth are enrolled in the after-school program.

- b. Impact: As a result of the publicizing of our successes with our current clubs and 4-H activities, Jackson County Family Court has approached Lincoln University to work collaboratively with them to establish 4-H clubs in their various youth facilities. 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.
- c. Source of Funding: Smith-Lever, State, National 4-H After-School Alliance Grant
- 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-four years with Lincoln University taking the lead for over twenty-one 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.

The Regional Community Careers System Grant provided educational opportunities for youth and adults in eight counties of the mid-Missouri area to receive career training and to better connect them with the world of work and train for future careers. Teaching curriculum was also developed by educators interested in increasing their experience with local businesses through participation in internships.

The Youth Enrichment Summer Program (YES! I CAN!) provided 4th and 5th grade youth an on-campus experience at Lincoln University. They experimented in the world of science: energy and air, water, land, and living things. They explored science and increased their reading, writing, listening, and speaking skills.

- b. Impact: 50% of the youth reported increasing their knowledge of science and skills in reading, writing and speaking improved by approximately 10% as a result of programming activities. 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 Federal Funding: 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.

- b. Impact: In Southeast Missouri, programming efforts reached more than 2,000 people in grades K-12, low-income youth and over 150 adult volunteers participated. Over 125 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.

Community awareness and community improvement projects were implemented, including the 2nd Annual Community Block Party. There were over 150 participants in the community block party. Participants learned organizational and program implementation skills. Families and community residents came together for interaction and educational and recreational programming. The CYFAR partners and volunteers also organized the first Annual Minority Health Fair. 66 people participated in this event.

- c. Source of Funding: 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://oseda.missouri.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://oseda.missouri.edu/>.

Place-specific county data are continuously updated to be used for community decision making, program planning and monitoring change. See <http://www.oseda.missouri.edu/countypage/>.

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

Campus faculty members 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 (OSED).

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).
- Lincoln University offers programming, such as Small Family Farms Program; Animal Production Efficiency; Grazing; Animal Health; Adding Value to New and Old Agricultural Products; Diversified/Alternative Agriculture; Small Farm Viability; Aging; Children, Youth and Families at Risk; Food Stamp Nutrition Education; Kid's Beat; Community Skills; Community Development; Community Gardening; Conflict Management; and Family Resource Management.

Did the planned programs describe the expected outcomes and impacts?

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

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

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

University of Missouri (1862)

Agricultural Experiment Station Research and University 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	Adding Value	Extrusion cooking of soybean			X
	Animal Production Efficiency	Evaluating low phytic acid grains fed to swine			X
	Animal Production Efficiency	Zinc supplementation in growing pigs			X
	Animal Production Efficiency	Effect of diet on sex of offspring born			X
	Animal Production Efficiency	Global analysis of genes expressed in reproductive tissues			X
	Animal Production Efficiency	Profitable and Sustainable Livestock Production Utilization System		X	
	Plant Genomics	Improving the understanding of auxin responsive gene expression			X
	Plant Genomics	Analysis of pollen rejection to reduce unintended pollination between species			X
	Plant Genomics	Understanding iron translocation and homeostasis in plants			X
	Plant Germplasm	Developing improved wheat varieties			X
	Plant Health	Engineering durable pathogen resistance in crop plants			X
	Plant Production Efficiency	Integrated Cropping System		X	
	Rangeland/Pasture Management	Forages for the 21 st Century		X	
Goal 3	Human Health	Non-hormonal contraceptive			X
	Human Health	Developing antimetastatic cancer drugs			X
	Human Nutrition	Nutrition and Health—Health for Every Body	X	X	
	Human Nutrition	Family Nutrition Education Programs	X		

	Key Theme	Program Description	Multi-State Extension (Smith-Lever)	Multi-State Integrated Research & Extension (Smith-Lever)	Multi-State Integrated Research & Extension (Hatch)
Goal 4	Agricultural Waste Management	Animal waste management	X	X	
	Forestry	Using poplars for biomass production and carbon sequestration			X
	Forestry	Developing bioremediation systems in agroforestry			X
	Water Quality	Watersheds Resource Education	X		
Goal 5	Children, Youth and Families at Risk	Adolescents at risk program	X		
	Children, Youth and Families at Risk	Building Strong Families	X		
	Children, Youth and Families at Risk	Children of Offenders	X		
	Children, Youth and Families at Risk	School-Age Childcare & Out-of-School Time	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	EXCEL	X		
	Volunteer Development	Volunteer outreach and development program	X		
	Workforce Preparation	Information technology – afterschool computer labs	X		
	Youth Leadership Development	Civic Engagement – 4-H Community Youth Development VISTA program	X		

	Key Theme	Program Description	Multi-State Extension (Smith-Lever)	Multi -State Integrated Research & Extension (Smith-Lever)	Multi-State Integrated Research & Extension (Hatch)
	Youth Leadership Development	4-H Community Service	X		

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

Institution University of Missouri
State Missouri

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

Actual Expenditures

Title of Planned Program/Activity	FY 2000	FY 2001	FY 2002	FY 2003	FY 2004
Goal 1 (3) Livestock Systems	<u>\$12,500</u>	<u>\$12,500</u>	<u>\$ 11,500</u>	<u>\$ 11,400</u>	<u>\$93,136</u>
Goal 4 (2) Animal Waste Mgmt	<u>\$78,000</u>	<u>\$78,000</u>	<u>\$ 82,000</u>	<u>\$ 79,217</u>	<u>\$74,684</u>
Goal 5 (7) Affordable Housing	<u>\$9,000</u>	<u>0</u>	<u>\$ 0</u>	<u>\$ 0</u>	<u>\$10,000</u>
Goal 5 (9) 4-H Youth	<u>\$126,000</u>	<u>\$126,000</u>	<u>\$150,000 *</u>	<u>\$276,250</u>	<u>\$159,441</u>
Goal 5 (12) Leadership Development	<u>\$300,000</u>	<u>\$300,000</u>	<u>\$179,484 **</u>	<u>\$215,052</u>	<u>\$119,764</u>
Goal 3 Nutrition and Health	<u>0</u>	<u>\$2,000</u>	<u>\$ 2,500 ***</u>	<u>\$ 19,787</u>	<u>\$32,842</u>
Goal 5 Adolescents at Risk	<u>0</u>	<u>\$7,000</u>	<u>0</u>	<u>\$ 6,500</u>	<u>\$10,756</u>
_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____
Total	<u>\$525,500</u>	<u>\$525,500</u>	<u>\$425,484</u>	<u>\$608,206</u>	<u>\$632,823</u>

*includes: Adolescents at Risk, School-Age Childcare & Opportunities for Youth During Out-of-School Hours, Workforce Preparation/Information Technology and DESE After-School Computer Labs and Building Character through Community Service Learning

**includes: Community Development Academy, Building Community through Public Deliberation, Building Strong Families, Community Emergency Mgmt., Alianzas, Community Decision Support, EXCEL

***includes: Family Nutrition Program

Director

Date

Form CSREES-REPT (2/00)

Appendix C

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

Institution University of Missouri
State Missouri

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

Actual Expenditures

Title of Planned Program/Activity	FY 2000	FY 2001	FY 2002	FY 2003	FY 2004
Goal 1 (A) Integrated Cropping Systems	<u>\$553,000</u>	<u>\$553,000</u>	<u>\$525,500</u>	<u>\$533,687</u>	<u>\$420,955</u>
Goal 1 (B) Forages and Livestock	<u>\$170,000</u>	<u>\$170,000</u>	<u>\$157,700</u>	<u>\$126,770</u>	<u>\$173,582</u>
Goal 3 Improving Human Nutrition and Health	<u>\$47,000</u>	<u>\$47,000</u>	<u>\$ 8,716***</u>	<u>\$ 12,500</u>	<u>\$ 36,629</u>
Goal 4 Watershed Resource Education	<u>\$42,000</u>	<u>\$42,000</u>	<u>\$ 63,000</u>	<u>\$ 47,185</u>	<u>\$ 42,405</u>
Goal 4 (B) Livestock Production Systems**	<u>\$144,000</u>	<u>\$144,000</u>	<u>\$152,000</u>	<u>\$156,425</u>	<u>\$195,974</u>
_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____
Total	<u>\$956,000</u>	<u>\$956,000</u>	<u>\$906,916</u>	<u>\$876,567</u>	<u>\$868,545</u>

***includes: Family Nutrition Program
**formerly Animal Waste Management (changed 2004)

Director

Date

Appendix C

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

Institution University of Missouri
State Missouri

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

Actual Expenditures

Title of Planned Program/Activity	FY 2000	FY 2001	FY 2002	FY 2003	FY 2004
Goal 1 Integrated Cropping Systems	<u>\$140,965</u>	<u>\$140,965</u>	<u>\$133,900</u>	<u>\$127,200</u>	<u>\$137,500</u>
Goal 1 Forages and Livestock	<u>\$140,684</u>	<u>\$140,684</u>	<u>\$133,200</u>	<u>\$145,000</u>	<u>\$139,400</u>
Goal 3 Human Nutrition and Health	<u>\$73,212</u>	<u>\$73,212</u>	<u>\$ 69,550***</u>	<u>\$ 72,000</u>	<u>\$ 65,300</u>
Goal 4 Water Quality	<u>\$33,929</u>	<u>\$33,929</u>	<u>\$ 32,230</u>	<u>\$ 35,600</u>	<u>\$ 31,630</u>
Goal 4 Livestock Production Systems	<u>\$37,340</u>	<u>\$37,340</u>	<u>\$ 35,470</u>	<u>\$ 39,250</u>	<u>\$ 30,520</u>
_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____
Total	<u>\$426,130</u>	<u>\$426,130</u>	<u>\$404,350</u>	<u>\$419,050</u>	<u>\$868,545</u>

***includes: Family Nutrition Program
****formerly Animal Waste Management (changed 2004)

Director

Date