

**2002 Missouri Annual Report**  
**University of Missouri and Lincoln University Outreach and Extension**  
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## **I. Planned Programs - Overview**

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

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

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

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

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

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

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

In the over-25-year history of Lincoln University Cooperative Research and Extension (LUCRE), 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.

Missouri ranks very high in the nation in the percentage of older adults residing in the state. In addition, 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.

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

As extension programs continue to be implemented under our current Plan Of Work, we are integrating distance-learning technology to facilitate workshops and information dissemination when applicable. The increased use of this technology is measured in terms of cost and timesavings as it relates to travel and reaching a broader audience.

As our research programs move forward emphasis is being placed on collaborative team efforts in the areas of animal science, human nutrition, plant and soil science and environmental science. Many research programs begun in FY 2001-2002, are moving 1890 programs closer to reaching more stakeholders than ever before with quality life changing research.

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

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

In addition, ongoing annual stakeholder listening occurs through the County Extension Council infrastructure, 4-H councils, partnership program teams, as well as through priority program evaluations, and survey information collected in program content areas. Continuous listening to learners and stakeholders creates an environment of continuous improvement. This data is 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 Outreach and Extension faculty and staff work with County Extension Councils to annually update County, Regional and State Plans of Work to continually address the highest priorities for Missouri learners, partners and communities. In 2002, this process led to revised planning at all levels including a revision of the expected outcomes and performance indicators for the critical success factors in the University Outreach and Extension Strategic Direction.

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

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

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

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

- Biotechnology – (Goal 1 & 3)
- Business Development (Partially, goal 1)
- Citizen Engagement (Goal 5)
- Community Based Infrastructure (Goal 5)
- Environmental Quality (Goal 4)
- Healthy Families (Goals 3 & 5)
- Healthy Living (Goals 3)

- High-Growth Companies and Target Industries (Partially, goal 1)
- Leadership Development (Goal 5)
- Natural Resources and Environment (Goal 1)
- Pre-Business Planning (Partially, goal 1)
- Production Agriculture (Goal 1)
- Workforce Preparation (Goal 5)
- Youth Development (Goal 5)

### **Programs Addressing Underserved Learners**

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

- The Family Nutrition Education Program. This program provides low-income citizens with the latest nutrition information. Programs include EFNEP, FNP, School-enrichment programs, Medical Self-Help, Body Walk, Health for Every Body, etc.
- The 4-H/Youth Development activities in Goal 5 describe a variety of programs including Adolescent at Risks, Out-of-School Hours, and Workforce Preparation
- The Alianzas: Building Inclusive Communities program under the Community Development theme describes programming to immigrants and the various challenges they face (i.e., discrimination, low-pay, inadequate health insurance, etc.).
- Lincoln University 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, Kid's Beat, Community Skills, Community Development, Community Gardening, Conflict management and Family Resource Management

### **Diversity Accomplishments**

Missouri has made great strides in this fiscal year to achieve diversity, affirmative action and equal employment goals. We are making progress toward ensuring that Diversity in staffing, advisory groups, Extension County Councils, audiences and programming become a reality. Following are examples of what has occurred in the past fiscal year:

- As a participant in the “Change Agent States for Diversity” (CASD) project; an organizational profile was completed and reviewed to determine the make up of our workforce and our Extension County Councils. This profile indicated that we have made some progress in our recruitment and hiring efforts.
  - As part of the CASD project, University Outreach and Extension completed a Climate Assessment of Diversity in University Outreach and Extension involving 381 employees.
  - Outreach and Extension continued to strengthen the new recruitment system, which utilized technology to its full advantage. This system effectively uses a CD ROM, graphics and visuals that have award-winning appeal. Twenty people attended workshops in this fiscal year that focused on diversity and the recruitment/hiring process. Recruitment teams continue to help to recruit a diverse workforce. Sixty-four personnel teams recruiting and hiring faculty were trained on diversity expectations, affirmative action and equal opportunity policy and practices. There were 320 faculty, staff and Extension Council members trained using this just-in-time method of training.

- The Outreach and Extension leaders reviewed diversity, affirmative action and equal employment organizational performance six times a year to determine progress and discuss actions for improvement of performance. Leaders met every other month and included administration, regional directors, campus program leaders, directors and content-based program leaders. Statistics related to performance in recruitment, interviewing, hiring and retention related to faculty was carefully evaluated along with changing membership of County Extension Councils. These reports and ensuing continuous learning dialogues were very successful in improving performance.
- Outreach and Extension completed a process to enhance the “applicant materials review” and the interview procedure with up-to-date PowerPoint presentations on the importance of diversity to strengthen University Outreach and Extension.
- The University of Missouri Outreach and Extension hired 5 people of color as regional specialists. This means we reached our goal for minority hires as set forth in our Affirmative Employment Plan (on file at CSREES). Currently, people of color make up 9.41% of the organization’s employees.
- Outreach and Extension recruiting efforts are people centered and are designed to build a sphere of influence among colleges and universities in order to recruit highly qualified minority faculty.

Twelve recruiting teams conducted on site recruiting at targeted universities, colleges, professional associations and career planning and placement centers with diverse student enrollment or membership. University Outreach and Extension endeavors to include minority faculty in all recruiting teams.

The development of an intentional recruiting plan and the implementation of the award winning career/recruiting web site resulted in the following applicants:

- 10 Blacks- PhD
- 18 Blacks- MS
- 12 Asian/ Pacific Islander-PhD
- 14 Asian/Pacific Islander-MS
- 1 American Indian or AK Native-PhD
- 3 American Indian or AD-MS
- 23 Caucasian – PhD
- 199 Caucasian - MS
- 1 Hispanics-PhD
- 4 Hispanic – MS
- 7 Unknown PhD
- 12 Unknown MS

This pool of applicants resulted in filling 32 positions of which 5 people of color were hired. This was 15.6% of the total number of positions filled.

- The workforce profile for UOE at the system level is:
  - 50% of the System Program Directors represent a minority (one out of two is Black).
  - 25% of the Regional Directors are minorities (Two out of eight are Black.).
  - Currently there are 18 regional faculty that represent a protected class.
  - 63% represent females.
  - 37% represent males.

- Outreach and Extension re-appointed a Diversity Catalyst Team for Missouri. This team developed a draft strategic plan and implemented the Change Agent States for Diversity (CASD) objectives for 2002.

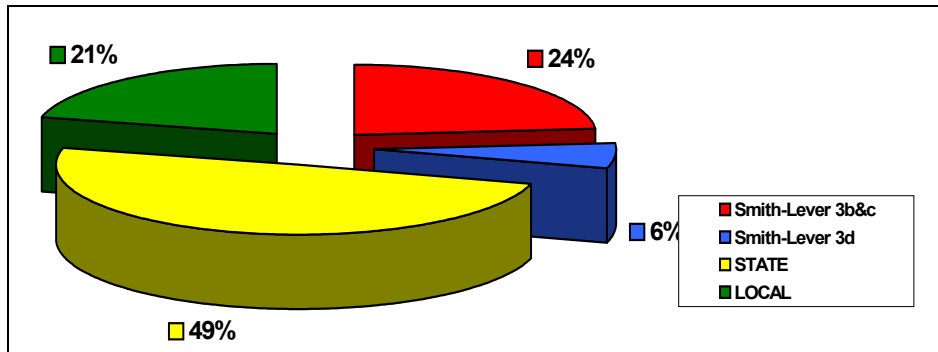
### Stewardship of Resources

Table 1 and graph 1 show the overall expenditure of University of Missouri Outreach and Extension for the 2001-2002 programming year to be \$31,822,387 with 7.5 million in federal Smith-Lever 3b & 3c funds. These dollars are critical to the core mission of University Outreach and Extension and permit the flexibility to address emerging community issues, learner needs and aspirations and to continue a relevant statewide community-based presence. The following report does not reflect the contributions of more than 18,000 volunteers involved in priority program development, implementation and evaluation.

<b>PROGRAMS</b>	<b>TOTAL</b>
<b>Smith-Lever 3b&amp;c</b>	
Regular 3(b) and 3(c)	6,916,487
CSRS Retirement	309,262
Expanded 4-H	217,504
Expanded Part-Time Farmer	29,395
Rural Development	73,116
<b>Total 3(b)&amp;(3c)</b>	<b>7,545,764</b>
<b>Smith-Lever 3d</b>	
Expanded Food and Nutrition	1,574,836
Farm Safety	10,875
Food Safety & Quality (Carryover only)	9,400
Cotton Pest Management	0
Integrated Pest Management	216,276
Urban Home Gardening	0
Pesticide Impact Assessment	0
Water Quality (Carryover only)	0
<b>Total 3(d)</b>	<b>1,811,387</b>
<b>OTHER PROGRAM FUNDS:</b>	
<b>STATE</b>	<b>15,732,306</b>
COUNTY	4,459,365
NON-TAX	2,273,565
<b>LOCAL</b>	<b>6,732,930</b>
FEDERAL (Other than Extension Administered)	0
<b>TOTAL OTHER PROGRAM FUNDS</b>	<b>22,465,236</b>

Graph 1: Overall Expenditure of University of Missouri Outreach and Extension for the 2001-2002



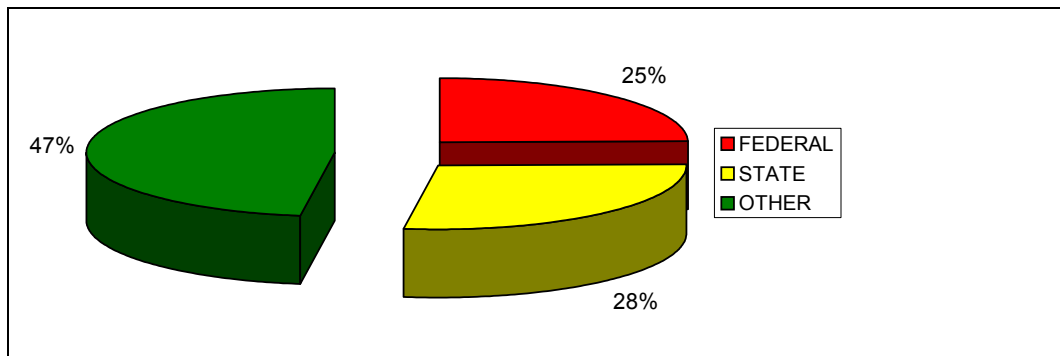


Graph 1: Overall Expenditure of University of Missouri Outreach and Extension for the 2001-2002

Table 2 and graph 2 shows the overall expenditure of University of Missouri Agricultural Experiment Station for the 2001-2002 programming year to be \$43,367,379 with \$3.7 million in federal Hatch funds.

PROGRAMS (1862 Research)	TOTALS
<b>FEDERAL</b>	
CSREES	
Hatch	3,725,282
MRF	783,709
M-S	457,270
Grants	2,626,163
Other	46,853
<b>Total CSREERS</b>	<b>7,639,277</b>
USDA	3,017,498
Other Federal	4,192,312
<b>Total Federal</b>	<b>14,849,087</b>
<b>OTHER PROGRAM FUNDS:</b>	
STATE	16,483,008
OTHER	
Income (fees)	3,013,689
Industry	1,290,809
Other Non-Federal	7,730,786
<b>TOTAL OTHER PROGRAM FUNDS</b>	<b>28,518,292</b>
<b>TOTAL ALL PROGRAMS</b>	<b>43,367,379</b>

Table 2: Overall Expenditure of University of Missouri Agricultural Experiment Station for the 2001-2002

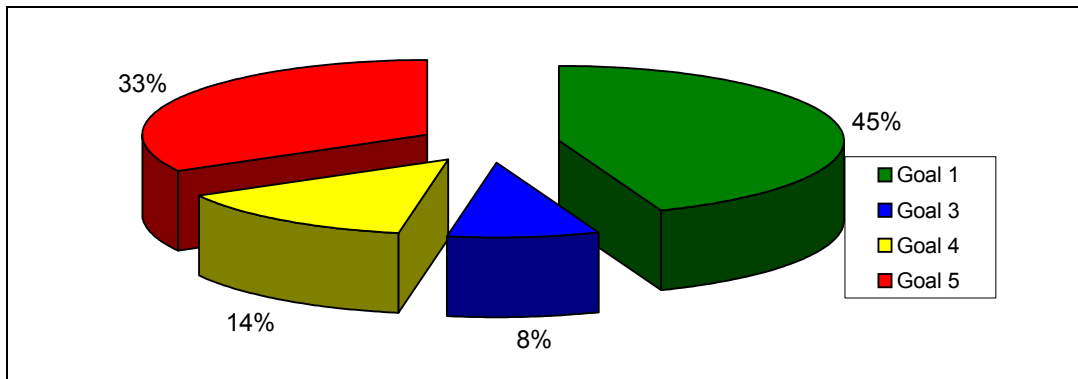


Graph 2: Overall Expenditure of University of Missouri Agricultural Experiment Station for the 2001-2002

Table 3 and graph 3 show University of Missouri Outreach and Extension expenditures by goal area for 2002.

	<i>2002 Planned</i>	<i>2002 Actual</i>
<b>Goal 1</b>		
Integrated Cropping Systems	\$3,035,540	\$3,311,374
Forages	\$1,517,770	\$1,655,687
Prof Livestock Prod.	\$3,035,540	\$3,311,374
<b>Total - Goal 1</b>	<b>\$7,588,850</b>	<b>\$8,278,435</b>
<b>Goal 3</b>		
Nutrition and Diet	\$988,500	\$1,078,323
Food Safety	\$131,800	\$143,776
Consumer Health	\$329,500	\$359,441
<b>Total - Goal 3</b>	<b>\$1,449,800</b>	<b>\$1,581,541</b>
<b>Goal 4</b>		
Watersheds	\$461,930	\$503,905
Animal Waste	\$989,850	\$1,079,796
Nutrient Management	\$989,850	\$1,079,796
<b>Total - Goal 4</b>	<b>\$2,441,630</b>	<b>\$2,663,497</b>
<b>Goal 5</b>		
Total Families programs	\$2,639,600	\$2,879,456
Total Youth and Vol. Leadership	\$3,035,540	\$3,311,374
<b>Total - Goal 5</b>	<b>\$5,675,140</b>	<b>\$6,190,830</b>
<b>TOTAL</b>	<b>\$17,155,420</b>	<b>\$18,714,302</b>

Table 3: University of Missouri Outreach and Extension Expenditures by Goal Area for 2002



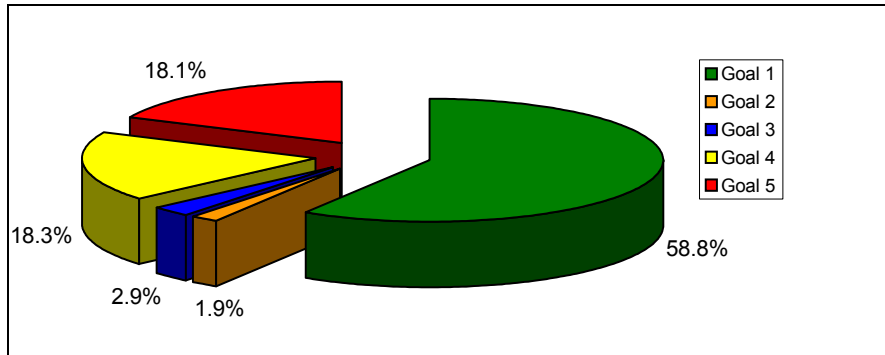
Graph 3: University of Missouri Outreach and Extension Expenditures by Goal Area for 2002

Table 4 and graph 4 show University of Missouri Agricultural Experiment Station expenditures by goal area for 2002.

**1862 Research Expenditures  
by Goal Area**

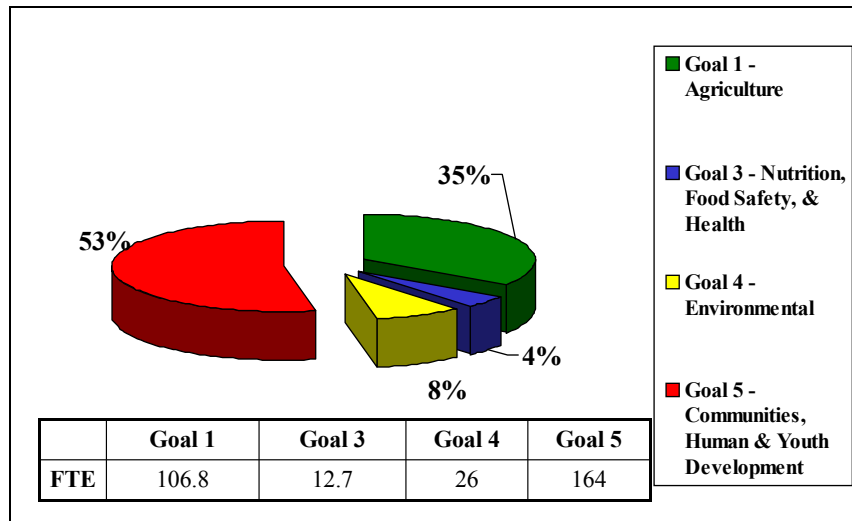
Goal 1	\$25,500,019
Goal 2	\$823,980
Goal 3	\$1,257,654
Goal 4	\$7,936,230
Goal 5	\$7,849,496
	<b>\$43,367,379</b>

Table 4: University of Missouri Agricultural Experiment Station by Goal Area for 2002



Graph 4: University of Missouri Agricultural Experiment Station Expenditures by Goal Area for 2002

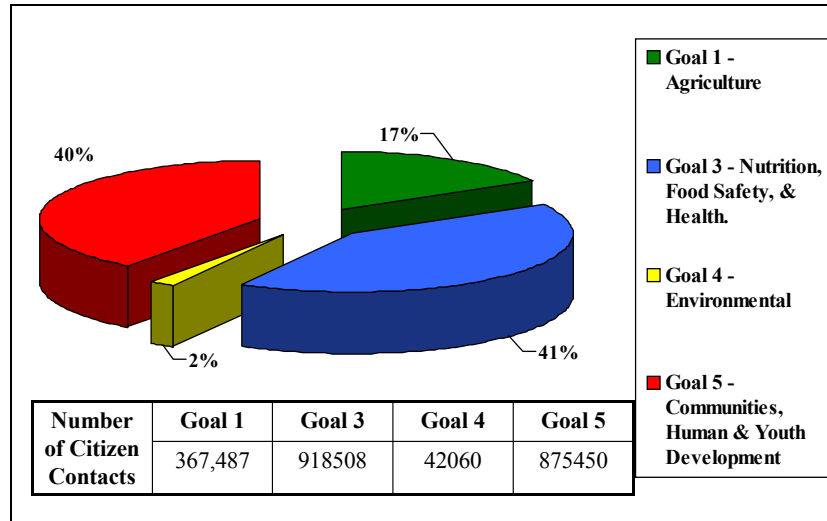
Graph 5 shows the percentage of FTE's of professional faculty/staff in each goal area for FY02.



Graph 5: Percentage of FTE's by Professional Staff

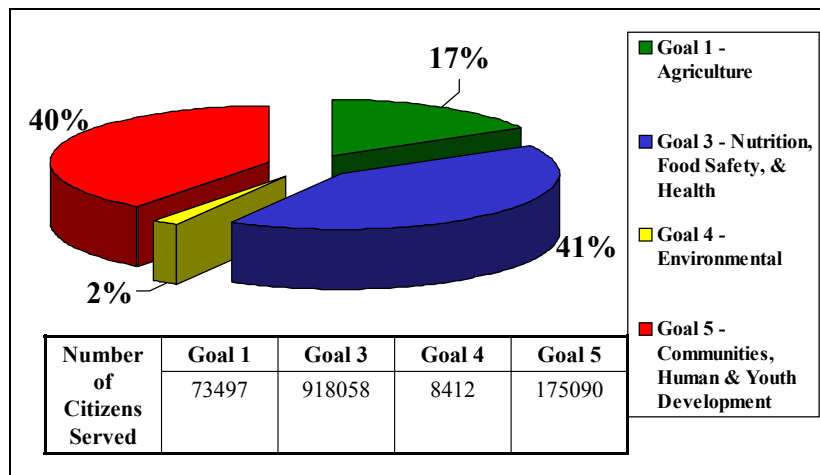
Graph 6 shows the total number of contacts with Missouri learners by goal area in FY02. Over two million contacts were documented. These contacts range from informational issues to major educational programs with sequence learning over time. These contacts do not include web-based learner contacts. University Outreach and Extension has information, fact sheets and web-based series learning available on the web that is not reflected in this chart for 2002. Continuing education and cooperative extension

programs are marketed to more than 800,000 virtual visitors. Virtual visitors viewed more than 7,500 extension publications a day (<http://muextension.missouri.edu/>)



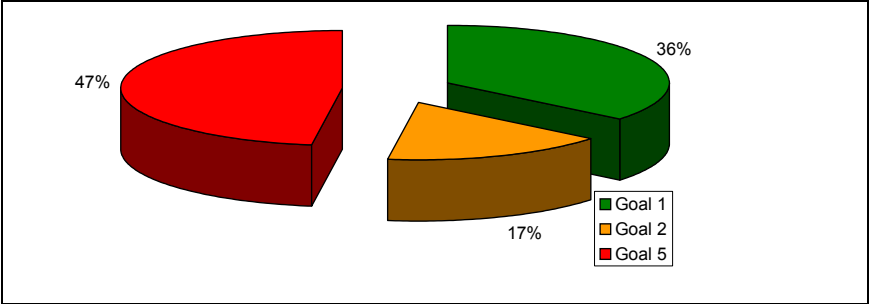
Graph 6: Percentage of Contacts by Goal

Graph 7 shows the total number of Missourians by goal area who were engaged in sequenced educational programming during FY 02. The 440,611 learners represent over 7% of the state’s total population of 5,595,211. These contacts do not include web-based learner contacts. University Outreach and Extension has information, fact sheets and web-based series learning available on the web that is not reflected in this chart for 2002. Continuing education and cooperative extension programs are marketed to more than 800,000 virtual visitors. Virtual visitors viewed more than 7,500 extension publications a day (<http://muextension.missouri.edu/>)



Graph 7: Percentage of Missourians by Goal

Lincoln University receives \$2,400,000 for Cooperative Research and \$2,600,000 for Cooperative Extension. In Cooperative Extension these resources are allocated to goals 1,2, and 5. See graph8.



Graph 8: Lincoln University Allocated Resources by Goal

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

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

Problem solving research is conducted in the areas of plant and animal production to help the state's citizens make the most effective use of natural resources in competing in an increasingly global economy. Across all livestock production systems in Missouri, profit margins are very narrow. Not only do Missouri producers feel pressures from other states, but more and more, their competitive arena includes low cost production outside the United States. To help sustain and improve Missouri's competitiveness in the arena of livestock production, Agricultural Experiment Station (AES) research includes a variety of fronts, addressing near term improvements in management practices to longer term improvements in animal genomics. In the area of **animal production efficiency**, researchers develop more cost effective rations and improve reproductive rates with management and **genomics**. Research on **grazing** systems help Missouri producers make the most of favorable forage production capacity.

In the area of plant production, researchers in **plant genomics** are using gene mapping to select for disease resistance in corn. At the genetic level, research is also directed towards improving nitrogen fixation in soybeans and improving plants' ability to fight disease. One goal is to generate plants that will have resistance to a broad spectrum of pathogens, potentially reducing the need for pesticides. In the area of **plant germplasm**, plant breeders work to improve wheat varieties in order to enhance producers' economic returns. **Plant production efficiency** is enhanced by developing technologies that increase the length of the growing season for vegetable crops in southeast Missouri.

## **1890 Cooperative Research Overview**

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

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

Education to cope with the increasingly competitive agriculture and food sector focused on the fundamentals of enterprise development, new crop production systems, new beef and pork production and marketing systems, and increased utilization 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 both targeted educational programs on reproductive efficiency in beef and swine, but also alternative marketing strategies with beef calves. Crop production profitability was improved through both educational programs to further enhance input-use efficiency and new systems including identity preservation of higher value grains. And 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 enhance and maximize benefits from, and participation in, the global economy. Programming efforts 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 of many Missouri farmers' fear of venturing into unfamiliar enterprises, efforts continued to emphasize education and use of new available technology to open competitive markets to Missouri farmers.

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

### **Key Theme: Animal Genomics**

a. Program Description: Birth Weight

Research conducted to improve the understanding of genetics that influence birth weights will ultimately improve the genetic selection for low birth weight in cattle and provides a better understanding of birth weight control in mammals. This knowledge may also someday help us understand why very low birth weight babies have an increased probability to develop type II diabetes and cardiovascular diseases later in life.

b. Program Impact:

Birth Weight is a Multi-State Integrated Research (Hatch) activity. The following impact is state specific to Missouri.

Progress was made towards the creation of high-density gene maps of two segments of bovine chromosomes 2 (funded by a Research Board grant) and 5. We have mapped 57 markers onto chromosome 5 and 24 on chromosome 2. Publication of these two maps is expected sometime next year. Lower birth weight eases calf delivery and thus reduces management costs and mortality rates.

c. Source of Funds: Hatch, Grants

d. Scope of Impact: Multi-State

### **Key Theme: Animal Health**

a. Program Description: Thermal Stress

Hot and humid summers plague Missouri livestock producers. Dairy producers suffer reduced milk yields while rates of gain for beef cattle decline during the hot summer months. Researchers use rodent models to analyze the impact of thermal stress on domestic animals, and develop management tools, at both ambient and animal levels, to reduce heat stress. Investigators are also analyzing the impact of thermal stress on rumen function and nutrition of lactating dairy cows.

b. Program Impact:

Thermal Stress is a Multi-State Integrated Research (Hatch) activity. The following impact is state specific to Missouri.

The effects of thermal balance on rumen function of cows exposed to a thermal challenge (heat

stress) has been carefully modeled using telemetric thermometers, strategic cooling system and rumen modeling. The results of this study were used to reformulate models currently used to predict feed intake of dairy cows during the summer. In feedlot cattle, preliminary studies have shown that dietary supplements containing seaweed extract reduce hyperthermia experienced during heat stress. Night cooling of dairy cows exposed to heat stress becomes a useful strategy once night air temperature falls below 26C. Studies of feedlot cattle continue in both environmental chamber and field situations to adjust models of response to summer heat stress, which will eventually lead to more thorough evaluations of procedures to improve performance under this condition. Better methods of dealing with heat stress will improve Missouri producers' competitiveness with other regions where environmental conditions are less challenging.

c. Source of Funds: Hatch, Grants

d. Scope of Impact: Multi-State

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

a. Program Description: Feed supplement.

Distiller dried grain supplement (DDGS) is a byproduct of ethanol production and a protein feed supplement that can be substituted for soybean meal in cattle diets. DDGS is a common additive in dairy rations and research was conducted to evaluate its economical potential in beef heifer and steer production.

b. Program Impact:

Feed supplement is a Multi-State Integrated Research (Hatch) activity. The following impact is state specific to Missouri.

Studies were conducted to evaluate DDGS in corn/corn silage diet. In addition, a grazing study was performed to determine optimal level of DDGS for growing heifers grazing tall fescue. DDGS was found to be a more economical protein source than soybean meal in terms of gain and cost per pound of gain. Utilizing this byproduct of ethanol production has the potential to reduce cattle producers' costs while maintaining the rate of gain.

c. Source of Funds: Hatch, Grants

d. Scope of Impact: Multi-State

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

a. Program Description: Reproductive Management

Profitability in beef production is highly dependent on reproduction rates. Studies at the University of Missouri are designed to develop and evaluate practices that improve reproductive management on farming and ranching operations involved with beef cow-calf production. Research is focused on the use of progestins in combination with prostaglandin F2a (PG) and gonadotropin releasing hormone (GnRH) to synchronize or induce estrus in yearling beef heifers and postpartum suckled beef cows.



b. Program Impact:

Reproductive Management is a Multi-State Integrated Research (Hatch) activity. The following impact is state specific to Missouri.

Research conducted at the University of Missouri Thompson Farm characterized more accurately the timing of estrus among cows whose estrous cycles are synchronized with a protocol developed at University of Missouri called MGA (Melengestrol acetate) Select. An intensive ultrasound study was conducted to characterize changes in patterns of dominant follicle development among cows assigned to the MGA Select or 7-11 Synch protocols. These studies will lead to highly effective and economical protocol(s) to synchronize estrus in postpartum beef cows and replacement beef heifers which will result in excellent pregnancy rates following artificial insemination (AI) at a fixed time.

c. Source of Funds: Hatch, Grants

d. Scope of Impact: Multi-State

**Key Theme: Grazing**

a. Program Description: Nutrient levels

Grass tetany disease is a paralyzing and potentially fatal condition in cattle resulting from inadequate nutrient levels in grass. Past research has shown that adding phosphorus fertilizer to tall fescue would increase the magnesium concentrations of leaf blades. Research was conducted to determine whether phosphorus fertilizer would also increase the blood serum magnesium levels of grazing, lactating beef cows, thereby reducing likelihood of grass tetany.

b. Program Impact:

Nutrient levels research is a Multi-State Integrated Research (Hatch) activity. The following impact is state specific to Missouri.

The study was completed and showed over the two years that phosphorus fertilization increased the blood serum magnesium levels in cows. In addition, increased calf weight gain was an unanticipated benefit. Calf weight gain was over 40lbs greater on the phosphorus treated pastures than untreated pastures, thereby the potential exists to increasing producer returns.

c. Source of Funds: Hatch, Grants

d. Scope of Impact: Multi-State

**Key Theme: Grazing**

a. Program Description: Overwintering

Winter feed cost is the single highest cost associated with beef production. Agronomists and animal scientists work to develop methods to lower the cost of production and enhance environmental quality through more efficient use of grazing lands. Because producers have little control over output prices, efforts to substantially improve profitability depend on finding new

and innovative ways to reduce input costs, especially that for winter-feeds. Use of annual ryegrass for low-cost winter pasture and analyzing species diverse pasture are two studies directed towards reducing overwintering costs.

b. Program Impact:

Overwintering is a Multi-State Integrated Research (Hatch) activity. The following impact is state specific to Missouri.

This is the fifth year of a long term study evaluating the role of pasture species diversity in determining yield, quality, and stability of pastures. Statistical analysis of the first five years of data has been initiated. A two-year grazing evaluation of yield, quality, and persistence of perennial ryegrass in companion to endophyte-free tall fescue is complete and table and figures for publication have been created. Adoption of these practices by beef producers with fall calving could translate into winter feed cost savings in Missouri in excess of 10 million dollars annually. Another study showed that annual ryegrass could be grown for winter pasture in Missouri if a 10 cm stubble is left in autumn. In addition it was found that beef heifers grazing annual ryegrass can gain more than 0.9 kg/day for 90+ days during winter. In total, this research provides livestock producers with solid management options for high-quality winter pastures. Reducing winter feed costs will improve producer returns.

c. Source of Funds: Hatch, Grants

d. Scope of Impact: Multi-State

**Key Theme: Ornamental/Green Agriculture**

a. Program Description: Ornamental Plants

Ornamental plant production is a growing industry but the competitive forces to reduce costs are high. Innovative approaches to producing nursery stock are necessary to remain competitive. Research is conducted to compare the performance of trees and shrubs produced in a lower cost, bare root system to that of comparable balled and burlapped or container grown plants.

b. Program Impact:

Ornamental plants research is a Multi-State Integrated Research (Hatch) activity. The following impact is state specific to Missouri.

A replicated planting at MU South Farms was established in which 2-inch-caliper green ash trees were planted either balled and burlapped or bare root Missouri Gravel Bed in mid July. Results to date indicate that 2-inch caliper ash trees can be planted from a Missouri Gravel Bed bare root in mid summer with excellent survival. If growth of bare root trees in the field after planting is similar to that of conventionally handled balled and burlapped trees, landscapers will be able to take advantage of the savings in freight, equipment and labor costs associated with bare root handling.

c. Source of Funds: Hatch, Grants

d. Scope of Impact: Multi-State

## **Key Theme: Plant Genomics**

a. Program Description: Aflatoxin

Aflatoxin is a chemical by-product of the growth of the fungus *Aspergillus flavus* on corn kernels. Because it can be harmful to animals ingesting it, corn containing high aflatoxin levels may be rejected at grain elevators. Research is being conducted to create an anchored physical map of corn and to identify genes for *Aspergillus flavus* resistance and aflatoxin reduction in corn.

b. Program Impact:

Aflatoxin is a Multi-State Integrated Research (Hatch) activity. The following impact is state specific to Missouri.

Researchers have completed screening of aflatoxin parents with AFLP markers and mapped candidate genes on mapping population. They have also collected materials for microarray analysis of resistant vs. susceptible materials and screened parental lines for AFLPs. Reducing aflatoxin contamination in corn will reduce crop loss for producers and reduce the potential for liver cancer in humans with long-term exposure.

c. Source of Funds: Hatch, Grants

d. Scope of Impact: Multi-State

## **Key Theme: Plant Genomics**

a. Program Description: Disease Resistance Signaling

Despite plant resistance to most pathogens, plant diseases result in significant yield losses in agriculture. Research is aimed at engineering durable pathogen resistance in crop plants. The major focus is to characterize resistance genes and manipulate plant disease resistance signaling pathways. The objective is to define how the structure of the Arabidopsis RPS4 resistance gene and the corresponding protein product determine function in plant disease resistance signaling.

b. Program Impact:

Disease resistance signaling is a Multi-State Integrated Research (Hatch) activity. The following impact is state specific to Missouri.

Researchers are ascertaining the biological relevance of splice variants of RPS4 encoding truncated RPS4 proteins. A suppressor screening approach has been initiated to identify additional elements in the RPS4 signaling pathway that would not be detected in loss-of-function screens. 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

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

- a. Program Description: Fixing Nitrogen

Soybean plants are able to obtain nitrogen from the atmosphere, free of cost, through a symbiotic association with a bacterium, *B. japonicum*. However, since the nitrogen fixation process is not very efficient, many soybean farmers add nitrogen fertilizer. Researchers work to improve the nitrogen fixing capacity of bacterium by identifying and increasing the expression of specific genes required for infection.

- b. Program Impact:

Fixing nitrogen is a Multi-State Integrated Research (Hatch) activity. The following impact is state specific to Missouri.

Researchers refined the techniques by which to monitor attachment and determine what physical operational definition constitutes attachment. Two genes for alanine dehydrogenase have been isolated. Future genetic alterations of the soybean plant and its bacterial endophyte will permit specific infection by superior strains of nitrogen fixing bacteria to enhance leguminous plant productivity. The identification of a second alanine dehydrogenase gene will clarify the role of alanine in nitrogen transfer between symbionts, which means that we can increase the nitrogen content of leguminous plants.

- c. Source of Funds: Hatch, Grants

- d. Scope of Impact: Multi-State

### **Key Themes: Plant Genomics, Plant Health**

- a. Program Description: Plant Disease

Plant disease is a major problem in crop production. It has been estimated that up to 40% of plant productivity in Africa and Asia, and about 20% in the developed world, is lost to pests and pathogens. Plants have similar defense responses to viral, bacterial and fungal pathogens, which suggests shared signaling pathways. A promising strategy is to enhance the plant's own defense system by engineering regulatory components in resistance signaling pathways. Research is directed towards identifying and characterizing a key regulatory component in the shared pathways that is suitable for genetic engineering.

- b. Program Impact:

Plant disease is a Multi-State Integrated Research (Hatch) activity. The following impact is state specific to Missouri.

Researchers have identified the upstream kinase of WIPK and SIPK, two MAP kinase involved in plant disease resistance and demonstrated that WIPK gene activation by stress stimuli, including pathogen infection is controlled by SIPK. They have also provided both loss- and gain-of-function evidence for the NtMEK2-SIPK/WIPK pathway in plant disease resistance. An

understanding of these pathways will lead to the generation of crops that will have resistance against a broad spectrum of pathogens.

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

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

- a. Program Description: Wheat Breeding

Research is being conducted in the area of wheat breeding and genetics. The breeding program is directed towards the development of varieties of soft red winter wheat and/or enhanced germplasm with improved grain yield, grain quality, and resistance.

- b. Program Impact:

Wheat breeding is a Multi-State Integrated Research (Hatch) activity. The following impact is state specific to Missouri.

Agronomic data including yield, test weight, maturity, height, disease resistance and quality data has been collected on approximately 7,000 lines over 7 locations, and 850 early generation populations. Work on identifying new sources of resistance to scab resulted in the evaluation of approximately 225 plots and 2000 head rows in the field and approximately 1420 lines in the greenhouse. This research will lead to the development and release to Missouri growers, adapted varieties of soft red winter wheat that have higher yield potential, excellent test weight, good end use quality and resistance to pathogens relevant in the Missouri wheat growing areas. These attributes should enhance the economic return for wheat growers both in Missouri and in the surrounding states.

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

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

- a. Program Description: Vegetable Crops

Vegetable crops are produced in southeastern Missouri. Research is being conducted to evaluate and implement technologies that increase the length of the growing season. High tunnels are unheated, passive solar greenhouses. Production workshops throughout Missouri have indicated a significant interest by growers in high tunnels for season extension of horticulture crops.

- b. Program Description:

Vegetable crops research is a Multi-State Integrated Research (Hatch) activity. The following impact is state specific to Missouri.

Research was initiated to investigate the use of high tunnels for extended warm-season vegetable crop production. High tunnels, in combination with row covers, significantly extended the

growing season of tomatoes in central Missouri. Yield, quality and microclimate were significantly affected by using high tunnels versus field production. This project will include off-site research with growers to promote adoption of this technology.

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

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

### **Key Theme: Aquaculture**

- a. Program Description:

A new project in aquaculture was begun in FY 2001-2002, using re-circulating aquaculture systems, low water requirements, low land requirements, the ability to control water temperature, the ability to control water quality, and independence from adverse weather conditions. The project has the following objectives: 1) to monitor water quality fate throughout a re-circulating system, and determine the relationship of water quality to fish production and 2) determine feed consumption rates as a basis for quantifying efficiency of feed utilization through different fish populations.

- b. Program Impact:

The initial impact of this study is the creation of a demonstration system at Lincoln University's Carver Research Farm facility. The facility contains eight (8) research tanks presently stocked with ornamental fish and one sample re-circulating system, which farmers can affordably purchase. The demonstration system's cost is under \$5,000. This project has resulted so far in a regional conference with the Missouri Aquaculture Association, University of Missouri and interested stakeholders.

Future impact is anticipated to include the adoption and inclusion of aquaculture production by at least 84 small, limited resource farmers. The findings from feeding trials to compare the growth of fish between the treatments and controls will aid producers in maximizing fish production. The findings from the re-circulating systems study will aid producers in obtaining year-round production due to improved water quality and temperature control. A reduction in competition between pond raised products will incur by developing niche markets with re-circulating system utilization due to the small amount of space needed to operate a re-circulating system.

Producers will see increased profitability of the overall farming operation because the system can be placed in an existing facility, such as a swine facility, that is no longer in use, and agricultural land will not have to be taken out of production as it would if a pond system was put in place. Negative impacts on the environment will be reduced because there will not be a need for farming equipment, such as tractors, to be utilized for activities such as feeding, harvesting of fish, or mowing pond banks.

- c. Source of Federal Funds: Evans-Allen
- d. Scope of Impact: Missouri

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

- a. Program Description:

*Grazing Study* -- New varieties of forages are constantly being released by Universities and/or feed companies. The vast majority of grazing trials on these forages are conducted to examine their effectiveness with cattle. Trials were conducted by Lincoln University to evaluate the effects of these new warm-season forages on growing lambs in Missouri.

*Sperm Study* – Spermatozoa were treated with Hoescht and chlortetracycline (CTC) to evaluate those alive and capacitation status, respectively. Semen was collected from 2 to 4 rams, pooled, and diluted to  $50 \times 10^6$  sperm/ml in the appropriate extender. Extenders used were ram semen diluter (RSD-1), caprogen and synthetic oviductal fluid (SOF). Within 30 minutes of extension, 39°C incubation was initiated. One-half of the samples were incubated in 5% CO<sub>2</sub> and air, and the remaining half were incubated in 100% N gas. Motility, live-dead, capacitation and acrosomal status were evaluated at 0, 4, 24, 48 and 72 h of incubation. Osmolarity was 295, 353 and 280 mOsm for RSD-1, caprogen and SOF, respectively.

*Swine Study* - Trials have been conducted to determine efficacy of the phytase (NP) in wheat middlings (WM) on feed intake, feed efficiencies, weight gains, and bone development of pigs, and the excretion of ammonia (NH<sub>3</sub>) and volatile fatty acids (VFA) in the feces. Evaluation of the live and carcass characteristics of the pigs will be used to further validate the beneficial effects of WM to finishing pigs as it seem to have at this early stage of the study. Fecal samples collected will also be used to determine concentrations of organic and inorganic compounds excreted in the feces and how the inclusion of WM in the diet has affected the rate or the extent of nutrient excretion in the feces.

- b. Program Impact:

The impact of these studies on the swine industry in general, and swine producers in particular, has been that feed costs have been reduced by 30% as a result of the replacement of portions of the major feed ingredients like corn with a much cheaper feed ingredient like wheat middlings without adversely affecting the performance of their animals.

- c. Source of Federal Funds: Evans-Allen
- d. Scope of Impact: Missouri

**Key Theme: GIS/GPS**

- a. Program Description:

Research on greenhouse gases emissions and soil properties in southern Missouri has begun and the first year of field sampling has begun. Lincoln University researchers are now characterizing initial soil physical and chemical properties of our study sites. Using Global Positioning System (GPS), soil samples were collected at the George Washington Carver Farm, Lincoln University

station in Lilbourn, Missouri as well field in New Madrid County. Soil physical properties of these sites are being studied and more sampling will be carried out in other farms in the next months.

b. Program Impact:

Because of the infancy of this project anticipated impact includes increasing the number of ways to reduce greenhouse gases emissions from agricultural fields, which will improve the environmental quality of life in agricultural communities. Greenhouse gases also affect the global climate, which in turn, affects health (i.e. skin cancer, respiratory diseases, rise of sea level, flooding).

In addition, at least 5 students have been trained in the techniques of utilizing GIS in soil sampling, field plotting, field data collection and analysis.

c. Source of Funding: State

d. Scope of Impact: Missouri

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

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

a. Program Description:

Two trends have dominated in 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 jointly 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% of start-up businesses fail, it is realized that 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 in order to increase success rate.

Missouri Value Added Development Center is (<http://valueadded.missouri.edu/index.htm>) unique in its structure. Although headquartered in Columbia, its efforts extend throughout the state via approximately 45 Agricultural Business Counselors (ABCs). ABCs are the key to Center activities by maintaining local connections with producers. Specifically, ABCs are the point of contact for local producers interested in value added endeavors. 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 agric-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 quality and 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. Program Impact:

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

- In a one-year period, USDA value added grants received by Missouri agricultural producers increased from \$131,000 to \$2.8 million.
- In addition, Missouri Department of Agriculture value added grants awarded to Missouri producers have grown from \$500,000 in 1999 to \$1.8 million in 2001.
- Five Missouri producer groups are exploring alternatives to collectively produce, process, and market identity-preserved (IP) grains with enhanced quality attributes.
- Three producer groups are currently conducting feasibility or membership drives to establish an ethanol or biodiesel production facility. The potential annual economic impact to the state of Missouri by the Mid-Missouri Energy Ethanol Plant is estimated to be \$154 million. The Mississippi Valley Processors are currently developing a USDA grant to process soybeans into soybean meal, biodiesel and vegetable oil.
- A melon cooperative in the southeast region is exploring the feasibility of building a melon cutting and warehouse facility that would allow the sale of prepackaged fresh melons to schools and other markets.
- Seven investors have started the Missouri producer-owned pecan business in 2000. This business cleans, processes and merchandises locally produced pecans under the “Missouri Pecan Growers” brand name. In 2002 the cooperative began selling these pecans in Schnucks and Hy-Vee grocery stores. It is estimated that the business is currently capitalized at \$7 million.

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

d. Scope of Impact: Missouri

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

a. Program Description: Profitable and Sustainable Livestock Production Utilizations Systems

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 U.S. 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 of the 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, new technology and many other issues. To address these trends and issues the *Livestock Production Systems* program has focused on three major program trusts:

- 1) **Improved/Enhanced Production Efficiency of Beef Herds in Missouri.** This program educates beef producers about breeding strategies, genetic predictions, EPD (Expected Progeny Differences), AI (artificial insemination), economics, animal health and the selection of replacement heifers. The educational methods used include workshops, livestock seminars, demonstrations, field days, producer tours, computer programs, web sites, mass media, guide sheets, and individual consultation. The major Named Program related to this thrust is the [Show-Me Select Heifer Program](http://agebb.missouri.edu/select/) (<http://agebb.missouri.edu/select/>).
- 2) **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 method used includes feedlot tours, marketing programs, distance learning, ultrasound demonstrations, stocker seminars, workshops, producer tours, guide sheets and the mass media. The major Named Program related to this thrust is the [Premier Beef Marketing Program](http://agebb.missouri.edu/commag/beef/premierbeef/index.htm) (<http://agebb.missouri.edu/commag/beef/premierbeef/index.htm>).
- 3) **Swine Production for the 21<sup>st</sup> Century Technology Education and Implementation Program (TeDI).** This program educates swine producers about modern production techniques, artificial insemination, modern waste management, nutrition, animal health, record keeping, niche market development, and labor management. Educational methods used include seminars, workshops, individual consultation, "success stories", guide sheets and mass media.

Missouri is a member of the **Livestock Marketing Information Center**, which is a collaborative effort between USDA, state extension specialists and industry cooperators. This program involves a coalition of 24 states including Missouri.

b. Program Impact:

The Profitable and Sustainable Livestock Production Utilizations Systems is a Multi-State Extension program. The following impacts are state specific to Missouri.

- 1) The Premier Beef Program was initiated to educate small-herd beef producers in the concept of value-based feeder calf marketing and to institute regional feeder calf marketing alliances.

Currently, 13 marketing cooperatives are active in Missouri, representing 131 farms and 5,100 feeder cattle annually. Marketing feeder calves through the cooperatives has resulted added value of \$45,31 per calf or an average net profit of \$1,764 per farm. A web site has been developed that allows interested beef producers to learn about Premier Beef:

[http://agebbfp.missouri.edu/commag/beefanddairy/pb\\_index.htm](http://agebbfp.missouri.edu/commag/beefanddairy/pb_index.htm)

- 2) The Missouri Ration Balancing System for Beef Cattle is windows-based ration balancing software for beef cattle producers. Two computer programs, Grower and Balancer, were developed for use by the UOE regional specialists to train producers to balance feed rations. To date, 35 regional meetings have been conducted, through which 322 Missouri beef producers have acquired the software and have become proficient in its use. UOE regional livestock specialists indicate that they are spend significantly less time balancing rations for beef cattle clients since the software and training was offered.
- 3) During the 2002 reporting period, 232 herds were enrolled in the program with 9,391 heifers. Programmatically, 22 regional livestock specialists and 73 veterinarians participated actively in the program statewide.
- 4) Sixty percent (60%) of the participants in Show-Me-Select (SMS) Replacement heifer sales indicated they were willing to pay a \$100 per head premium for SMS heifers relative to standard pregnant heifers.
- 5) The On-Farm Assessment of farming operations is currently under development by the Commercial Agriculture Beef Focus Team and has no reportable accomplishments during the period.
- 6) The MO-Pork program provided educational programs and on-farm consulting to over 210 Missouri family swine operations that represent nearly 80% of Missouri's pork production. The MO-Pork program resulted in an estimated savings of \$1.00 per pig marked or an estimated \$4 million to the Missouri pork industry.
- 7) Five hundred youth actively participated in swine educational programs including the MPA Pork Institute, Youth Pork Quality Assurance, and the Pork Skillathon.
- 8) The Nutrient Management program is a farm-level, systems based model incorporating engineering, animal production, nutrition, agronomy and economics. This program focuses on alternative management practices to enhance environmental stewardship. The adoption of these alternatives has resulted in a nutrient savings of over \$ 1 million dollars just by not over formulating diets and minimizing feed wastage.
- 9) The Commercial Ag Dairy Focus Team conducted a Competitive Dairy Audit of the dairy industry in Missouri. The Audit was developed to analyze the historical trends, Missouri's competitive position, and the economic opportunities for the industry. The audit identified the following two basic strategies for developing a more profitable and sustainable Missouri dairy industry:
  - To retool and reinvest in the existing on-farm infrastructure
  - Increase the scale of new and existing dairies.The audit will be used as the basis for development of a strategic program plan by the team. The complete audit report can be found at:  
<http://agebb.missouri.edu/commag/dairy/audit/index.htm>
- 10) Show-Me Select cattle bring higher prices at market sales. Beef producers are netting greater profits at market through Show-Me Select Replacement Heifers. UO/E faculty have worked with a total of 158 veterinarians, 43,996 heifers, and 451 producers since the beginning of the program with the goal to raise genetically superior animals that bring higher prices and create a reliable source of replacement heifers. At the 2002 Show-Me Select sales, heifers sold on average for \$952.
- 11) The Show-Me Buying Cooperative markets more than 300,000 pigs annually. The cooperative's members implemented the use of dietary phytase and lowered inorganic

phosphorus additions in all premixes and diets purchased. The use of phytase and lower phosphorus inclusion rates has resulted in more than a 30% reduction in phosphorus concentrations of manure.

12) The Premier Beef Management Program had an estimated total impact in 2002 on the state economy of \$231,084.

13) The Missouri Nutrient Management program has resulted in a nutrient savings of over \$ 1 million dollars by not over formulating diets and minimizing feed wastage.

- 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. Program Description: Integrated Cropping System

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

The economic well being of all Missourians depends on a healthy and vibrant agriculture. Nearly 80% of Missouri's 29 million acres are devoted to crop and rangeland. In addition, crop sales account for nearly 50% of total agricultural cash receipts (nearly \$5 billion). The science and technology associated with crop management changes 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; competition among information sources.

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

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

During this reporting period the MAJOR program thrust for these Integrated Crop Program (ICM) priorities have focused on and can be summarized as follows:

- 1) Enhanced profitability of grain, fiber, and forage production
  - Programs focusing on the management of seven major or emerging crops (soybean, corn, wheat, forages for grazing, alfalfa, cotton, rice)
  - Programs that compare cropping systems that incorporate transgenic cultivars with those that use traditional cultivars
  - Precision agriculture and remote sensing

- Programs focused on improved marketing that incorporate a global perspective and consumer perspective
  - Programs on alternatives to traditional cropping systems; focus on improved profitability and income stability
  - Programs on value-added, niche markets including organic crop production
- 2) Reduced negative impacts of grain, fiber, and forage production on the environment
- Integrated pest management
  - Pesticide applicator training
  - Programs focusing on alternatives to traditional pest and nutrient management practices
  - Soil management programs including soil conservation
  - Best management practices for nutrients including appropriate development of nutrient management plans
  - Role of GMO cultivars in pest management

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

b. Program Impact:

Integrated Cropping Systems is a Multi-State Integrated Research and Extension program. The following impacts are state specific to Missouri.

- 1) During the reporting period, 8,000 Missouri agricultural producers attended programs on new production practices and technology. As a result of these programming efforts, the use of no-till or reduced-till technology to conserve soil and water has increased over the past 10 years.
- 2) About 40% of Missouri soybean producers use no-till technology at present, compared with 6% in 1990.
- 3) A similar shift has occurred among Missouri corn producers, 31% of whom currently use no-till, compared with 14% in 1990.
- 4) In the early 1990s, Missouri cotton and rice producers began using weed control programs with newer technology that reduces costs per acre by \$5 to \$10 and the use of herbicides by 2-5 pounds per acre.
- 5) About 85% of the Missouri cotton producers and 75% of the rice producers have adopted the new technologies as presented in the University Outreach and Extension Integrated Crop Management Program.
- 6) In addition, 50 weekly summaries of crop market data were posted on the Agricultural Electronic Bulletin Board to assist producers in making timely marketing and strategic planning decisions.
- 7) Five hundred copies of "Economics of Specialty Corn Production," a publication developed by members of the agricultural economics faculty, were distributed to interested producers.
- 8) Twenty programs on the economics of identity preserved (IP) production were conducted with a total attendance of 500.
- 9) 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.

- 10) A recent survey of 2,200 Missouri cotton producers found that 82% 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.
- 11) A major accomplishment of the (Integrated Pest Management) IPM Weed Control Program was the 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 2000.
- 12) The most recent survey by the USDA-ARMS (Agricultural Resource Management System) found that 80% of Missouri's corn acres were scouted.
- 13) 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 1000 farmers, who managed a total of 25,000 to 10 million acres.
- 14) Five pest management workshops were conducted for 150 producers. Pre- and post-test results indicated that more than 70 percent of those attending improved their knowledge of pest management.
- 15) Agribusiness survey results show that most producers using precision agriculture practices managed tracts larger than 500 acres. In 1999 a statewide survey was conducted to obtain a baseline of precision agriculture technology use in Missouri (<http://www.fse.missouri.edu/mpac/pubs/baseline.pdf>). A follow-up survey conducted in 2001 in west-central Missouri (<http://www.fse.missouri.edu/mpac/pubs/Case Study Report.pdf>) showed that farmers using some type of precision agriculture technology increased from 9.3% of farmers in 1999 to 28.5% of farmers in 2001.
- 16) Farmer enrollment in the University Outreach and Extension on-farm research and farmer-to-farmer precision agriculture educational program increased from 5 in 1999 to 27 in 2001. The program promotes site-specific application of pesticides and nutrients.
- 17) These program efforts yielded the following results:
  - A six fold increase by soybean producers in the use of no-till Missouri producers.
  - Increased understanding by producers of their marketing alternatives and opportunities, especially in relation to IP grains.
  - Increased yields estimated at \$10.7 million resulting from cotton scouting.
  - A 8.5-fold increase in the use of alternative herbicide modes on Missouri soybeans.
  - 1,500 Missouri producers, agribusiness employees and crop consultants attending training sessions on precision agriculture.
  - A 7.2-fold increase in value added grants awarded to Missouri agricultural producers.

c. Source of Funding: Smith-Lever, State

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

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

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

Forages represent a significant renewable natural resource for Missouri with more than 9.7 million acres in pastures and harvested forages. This represents approximately 33.5% of the total land in farms in Missouri. Missouri produces 7.1 million tons of hay (including alfalfa hay) or 4.7% of the total hay produced in the U.S. This ranks Missouri 4<sup>th</sup> nationally for total hay production. The agronomic practices associated with the Forages for the 21<sup>st</sup> Century program will enhance water quality, reduce soil loss, and produce wildlife habitat while feeding Missouri's

livestock industry.

Missouri ranks 2<sup>nd</sup> in the nation for the total number of beef cows with over two million head on 60,000 operations. Nearly half of the beef producers production costs is for livestock feed during January, February and March. Forages represent about 90% of that cost for winter feed.

Missouri's dairy producers are struggling. Since 1991, almost 30% 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.

To address these trends the *Forages for the 21<sup>st</sup> Century* has focused on three major program trusts:

- 1) **Winter Feeding and Stored Forages for Beef Cattle.** This program educates producers about stockpiling tall fescue, adaptation of winter annuals in Missouri, grazing residues, winter grazing management, how to lower feeding losses, ammoniation of low quality hay, forage quality and prudent use of supplemental feed. The methods used include workshops, livestock seminars and demonstrations at the regional research centers. In addition mass media, and Internet and guide sheets are effective.
- 2) **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.
- 3) **Grass-Based Dairies.** This program educates dairy producers about grazing management, forage quality for dairies, balancing rations on pasture versus in 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. The methods used include pasture walks, dairy schools, cow colleges, lender meetings, "core-groups", manuals, guides, demonstrations, seminars and mass media.

b. Program Impact

Forages for the 21<sup>st</sup> Century is a Multi-State Integrated Research and Extension program. The following impacts are state specific to Missouri.

- 1) 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%.
- 2) About 950 producers attended the grazing schools taught at Linneus and throughout the eight regions. More than 80% plan to adopt fencing, watering, and pasture management changes as presented in the schools. Fifty percent of those producers implemented the changes without cost-share assistance.
- 3) The pasture-based dairy team made more than 1,500 audience contacts. During 2002, the pasture-based dairy curriculum was developed, and the ensuing educational program was "customized" for the six core dairy groups. Each core group consists of 15 to 20 producers. The core group method was based on the highly successful New Zealand educational model.
- 4) Pasture-based dairy farmers produced milk for \$8.03/cwt, 20% less than confinement dairies.

- 5) More than 60% of the core group producers adopted business plans that split their personal finances from the dairy's finances.
  - 6) Forty percent of the participating producers reported that they renovated or expanded their dairy facilities.
  - 7) More than 90% of the participating producers report that using their business plans helped them make better financial decisions.
  - 8) Almost 60% of participating producers indicate that they have more leisure time and a better quality of life.
  - 9) "Grass-Based Dairy" educational programs were conducted by the Missouri team in Iowa, Texas, Oklahoma, Arkansas, Kansas, Tennessee, Illinois and Kentucky. A multistate grass-based dairy program based on the Missouri model, involving Tennessee, Arkansas and Missouri is currently being developed.
  - 10) Financial data from 12 of the pasture-based dairies showed that the average dairy had 95 cows marketing \$2,097 of milk with an operating expense of \$1,237 per cow. Total farm milk sales for these producers were \$199,215 with operating expenses of \$117,515, leaving a net operating margin of \$75,716 to cover family living, interest and capital purchases.
  - 11) To date, the Missouri Winter Feeding/Stored Forage Program reached more than 20,000 producers, reducing the cost of winter feeding by an average of 40%.
- 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: Adding Value to New and Old Agricultural Products**

- a. Program Description: Value Added Fiber

The value-added fiber program was developed out of a need for producers of sheep, goats, rabbits, llamas and alpacas to sell their fibers to increase income over the commercial market. The commercial market for wool and mohair dropped to a low of 15 cents a pound for wool and the 23 warehouses in Texas who purchase Missouri mohair were not able to sell the mohair at all that was stored by Missouri producers for over 3 years. This in itself created a real dilemma for the Angora goat producers. Angora wool from rabbits is directly marketed to hand spinners or doll makers. NO commercial market exists for rabbit llama and alpaca producers.

- b. Program Impact:

Thirty-seven (37) students learned to spin; some beginners learned how to make designer yarns. One hundred and seven (107) students were exposed to the process of making Turkish felted rugs. Forty-four (44) students were taught how to take fiber and dye with natural products grown all over the state that produce color permanently. 288 pieces of literature on value-added fiber production were distributed at different events throughout the state.

- c. Source of Federal Funding: Smith-Lever

- d. Scope of Impact: Missouri



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

a. Program Description: Internet Goat Sales

The marketing program at Lincoln University Cooperative Extension and the Missouri Goat Marketing Committee, successfully began selling goats by Internet auctions in June 1998 to expand the market outlet for goats and goat meat, provide affordable, and a culturally relevant food supply, increase the awareness of the healthful attributes of goat meat to consumers, and ultimately improve the farm profitability of goat producers in Missouri.

b. Program Impact:

The Internet goat sales indicate that 99.9 percent of the participants were completely satisfied with these sales. In the four years the auction has been in place, prices increased by 66 percent, from \$59.50 to \$98.75 for a Top Kid (meat goat), an average price increase of 17 percent annually. Producers have increased herds and many first time producers have begun production.

c. Source of Federal Funding: Smith-Lever

d. Scope of Impact: Missouri

## **Key Theme: Diversified/Alternative Agriculture**

a. Program 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 90's. 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 maybe widened. The primary objective of this program is to better inform Missouri Small Limited Resource Farmers in general, and minority farmers in particular, of the benefits associated with the production of specialty horticulture crops.

The Lincoln University Marketing Program continued the program of pastured poultry in Southeast Missouri. Efforts in the past year focused on enhancing and increasing farmer marketing, customer relations, and economic performance skills.

b. Program Impact:

Over 80 limited resource farmers were regular participants in this program. Work continued with 10 African American farmers and two Native American farmers, ranging in age from 35 to 70 years old. Sixty-percent (60%) of farmers participating in the program adapted production techniques that have rendered their farm more sustainable. These farmers produced new vegetable varieties for their local markets. The number of minority farmers participating in the Alternative Horticulture program increased by 2 during the recording period.

There was renewed interest in pastured poultry consumption in the past year. Health consciousness is driving consumers to seek out meat that is low in fat and cholesterol. This renewed interest resulted in increased production and sales at Bobby Clay's pastured poultry farm. Clay's income rose 10% as the result of an increase of twenty-five cents (\$.25) per pound and increased sales.

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

**Key Theme: Small Farm Viability**

- a. Program Description:

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

- b. Program Impact:

Honey production in Douglas County has increased 131% in just one year, from 3,500 lb in 2001 to 8,090 lb in 2002. This increase translates into an increase in gross sales from \$4,375 to \$10,112. With assistance from the Missouri Foundation for the Blind, LUCRE Educational Assistants were able to help a legally blind stakeholder successful start and maintain a greenhouse production of crops. Presently, this stakeholder has a steady customer base for the crops produced. One farmer diversified his farming by starting "free range poultry" production. In 2001, the farm raised, processed and sold 400 birds. Currently, the farm has already raised and sold 1,000 chickens at \$2.00 per pound. About 30 turkeys are being raised this year on a trial basis.

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

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

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

Research on improving the safety of the nation's food supply focused on applying new methods of bacteria detection in meat processing.

### **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

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 Agricultural Experiment State Research – University of Missouri**

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

a. Program Description: Detecting Harmful Bacteria

Each year, thousands of people are affected by food borne illnesses. Mass recalls of tainted beef in recent years bring public attention to the potential scope of the problem. Scientists are focusing on faster and more accurate tests to detect harmful bacteria in meat.

b. Program Impact:

Detecting Harmful Bacteria is a Multi-State Integrated Research (Hatch) activity. The following impact is state specific to Missouri.

A recent breakthrough is the discovery of a test that detects the three most serious meat bacteria in 1/3 the time of alternative tests. Being able to rapidly detect and identify undesirable microorganisms on meats is important in order for processors to take action towards fixing problems before the meat leaves the plant.

c. Source of Funds: Hatch, Grants

d. Scope of Impact: Multi-State

## 1890 Cooperative Extension Service — Lincoln University

### Key Theme: Food Accessibility and Affordability

a. Program 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, five 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 grand children. Some of the paraprofessionals work with youth in LUCE’s Kid’s Beat program and other after school programs, as well.

b. Program Impact:

2546 contacts were made. 46 % of the participants 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 Federal Funds: Smith –Lever, USDA Food and Nutrition Service

d. Scope of Impact: Missouri

### Key Theme: Food Safety

a. Program 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.

b. Program Impact:

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 Federal Funds: Smith-Lever
- d. Scope of Impact: Missouri

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

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

Cancer remains a major health threat and research on human health targeted two aspects of cancer prevention. Dietary use of soy isoflavones was studied for their impact on colon cancer, which is largely attributed to both diet and lifestyle. New cancer drugs were explored specifically targeting prostate and breast cancer that have reduced side effects. Low and non-toxic carbohydrates were studied as potential antimetastatic drugs.

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

Substantial improvements were made in the nation's health profile in the last twenty years. However, not all groups have benefited equally from these improvements. Many nutrition and health programs in Missouri are now aimed at helping the needs of minority populations that have not made the strides in increased quality of life enjoyed by whites.

A scientific consensus on the relationship between diet and chronic disease has emerged. To reduce disease risk, scientific panels emphasized 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 included limiting sugar, alcohol and salt intake.

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

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

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

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

activity, about 1 out of 5 took diet pills, laxatives or vomited to keep from gaining the weight. The rate of physical activity among Missouri teens is also a concern. About two-thirds of young people are getting regular exercise, but the trend has shown no increase during the late 1990s.

These trends among Missouri children and adolescents indicate that there is an important need to increase healthy eating patterns and improve fitness. Researchers also have found that low income and ethnic minority children are at even greater risk poor diet and lack of exercise. This results from a combination of community and family factors that result in the lack of money to purchase food, the availability of healthy foods, difficulty in preparing food safely, limited safe community resources for physical activities other many other factors. Many Missouri families are in this limited resource group. The Missouri Department of Social Services reports in 2002 that 418,631 households received food stamps. One out of five Missouri children are living in households that receive food stamps. Additionally, over 1 out of 3 (36.1%) qualify for the free or reduced meal program provided through the schools.

### **State of Missouri Families 2002**

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

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

In addition this work, faculty developed an interactive teaching exhibit of the human body that was set up in large rooms so children can play the role of a food item (e.g., a vegetable, hamburger, etc.) and enter the mouth and walk through internal organs of the body (down the esophagus into the stomach, and so forth) in order to understand the consequences of nutrition and physical fitness on the body. Specialized programs for parents with a particular emphasis on pregnant and parenting teens are shown below. These are also multi-session programs that were conducted in schools, community centers, health clinics and other locations that were easily accessible to parents who lived in impoverished rural and urban areas of Missouri. News media and information technology were also increasingly used by the University of Missouri to deliver educational information.

The University of Missouri Outreach and Extension Human Environmental Sciences program is committed to creating educational programs to improve the lives of Missouri families. Through a wide variety of delivery methods University Outreach and Extension (UOE) assisted children, youth and adults in learning ways to improve their health and well-being. This year UOE continued to address some of the major issues facing Missouri families including child abuse, obesity, diabetes, and poor nutrition. Through a variety of methods, Human Environmental Sciences faculty in cooperation totaled over 1,029,000 educational contacts throughout Missouri. Here are just a few of the major efforts:

- 50,000 elementary school children were engaged in an interactive exhibit about healthy decision-making, and 156,000 Missourians participated in in-depth nutrition educational activities.
- After presenting the Life in the State of Poverty Welfare Simulation to 60 school nurses and counselors, UOE received requests for four additional simulations in different areas of Missouri. Five

simulations were conducted during the past year involving 60 volunteers and reaching 200 participants.

- Family Nutrition is a statewide nutrition education program bringing the latest research-based information to low-income Missourians. Over 100 paraprofessional educators worked with clients individually and in small groups—in their homes, in schools and at agencies. 160,000 Missourians learned ways to prevent heart disease and cancer through nutrition and fitness.
- Body Walk is a fun, interactive program that taught K-4<sup>th</sup> graders about nutrition and health. Over 48,000 elementary students in 176 schools participated in this program during the year. The program also engaged 2,946 teachers and 3,046 volunteers.
- The Nutrition Communication Center's mission is to help Missourians improve their health and quality of life by selecting nutritious foods and adopting healthy habits. The "rapid response" Center offered cutting edge information in the area of nutrition, health, and fitness ranging from dietary supplements to food safety. During 2001-2002, the Center responded to over 800 requests for information.

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

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

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

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

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

- a. Program Description: Reducing Cancer

In the U.S., 80% of the incidence of colon cancer can be attributed to dietary factors and lifestyle. The relationship between dietary factors and colon cancer needs to be well understood in order to provide consumers with optimum dietary recommendations. Research is conducted to identify the cellular and biochemical role of dietary factors in cancer risk.

- b. Program Impact:

Reducing cancer is a Multi-State Integrated Research (Hatch) activity. The following impact is state specific to Missouri.

Researchers have completed an experiment using the transgenic Neu/ERb2 spontaneous mammary tumor model in which soy isoflavones were found to significantly delay tumorigenesis. An animal study was initiated using ERaKO and WT mice in which colon tumors are induced with a carcinogen, and 5 dietary treatments are being tested. Identification of dietary factors that



reduce the risk of colon cancer will lead to improved dietary recommendations by which people can modify their dietary habits. This research can ultimately lead to improved quality of life and reduced health care costs.

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

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

- a. Program Description: targeting drugs

Currently available cancer drugs have severe side effects. Research is being done to develop a new class of low- or nontoxic carbohydrates as potential antimetastatic drugs. Work includes design and synthesis of galectin-specific glycoaminoconjugates and evaluation of their ability to inhibit cell adhesion and drug resistance of highly metastatic human cancer cells.

- b. Program Impact:

Targeting drugs is a Multi-State Integrated Research (Hatch) activity. The following impact is state specific to Missouri.

Effort was focused on preparation and evaluation of divalent lactulose-amines as a necessary step towards more complex multivalent glycoconjugates. The novel structures, as we anticipated, displayed strong antitumor activity against human prostate cancer cell lines. In other in vivo experiments, the ability of divalent lactulosamine to significantly suppress immunoresistance of human breast carcinoma in a rodent model has been demonstrated, along with profound inhibition of angiogenesis in the tumor.

If results of the studies on animals are positive, they can be quickly translated to clinical trials involving patients with prostate and breast cancer.

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

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

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

- a. Program Description:

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

b. Program Impact:

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

c. Source of Federal Funding: Evans-Allen

d. Scope of Impact: Missouri

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

### Key Theme: Human Nutrition

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

The [Family Nutrition Education Programs](http://outreach.missouri.edu/fnep/index.htm) (FNEP) (<http://outreach.missouri.edu/fnep/index.htm> ) are an important part of University Outreach and Extension, bringing the latest nutrition information to low-income Missourians. FNEP helps clients achieve life long health and fitness. Paraprofessional nutrition educators work with clients individually and in groups, in their homes, in schools, and at agencies. Clients gain skills that pave the way for nutritional well-being and health. Programs include EFNEP, the Expanded Food and Nutrition Education Program and FNP, the Family Nutrition Program.

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

The Family Nutrition Program (FNP) brings nutrition information to low-income Missourians. FNP's main focus is youth and the adults who support them. Nutrition educators work primarily in schools, helping students achieve lifelong health and fitness. Each FNP participant attends an average of five sessions with a nutrition educator. Sessions vary from 30-60 minutes in length.

FNEP provides nutrition programming that meets learners' needs considering age, culture, reading level, and abilities. Lessons with hands-on activities are designed for youth and the adults that support them, pregnant teens, and immigrant populations. EFNEP Lessons include a series of up to 20 lessons. These are the core lessons:

- Making meals from what's on hand,
- Creative cooking,
- Making healthy food choices,
- Planning makes the difference,

- Stretching your food dollars, and
- Keeping foods safe.

Additional lessons address food groups, eating light, nutrition during pregnancy, feeding infants and children, and food preservation. Lessons for pregnant and parenting teens on healthy nutrition habits for improved birth outcomes. Programming also covers breast-feeding and feeding babies and toddlers. Programming is collaborative with the North Central Region states.

Body Walk is a unique educational program designed to involve kindergarten through fourth grade students in learning the skills and choices for healthy lifestyles. The program includes:

- A walk through exhibit providing a colorful and enticing staging area for memorable learning experiences about healthy behaviors and choices.
- Classroom activities and suggested resources for teachers to use to prepare the students prior to their walk through the exhibit and to reinforce the learning afterward.
- A take-home booklet for students to read with their families.

This program is administered by University of Missouri Outreach & Extension for the Governor's Council on Health and Physical Fitness and is transported to elementary schools across the state.

Through School Enrichment nutrition programming children and teenagers learn about these topics:

- Food safety
- Food guide pyramid
- Basic nutrition for youth
- Balancing nutrition and physical activity for good health

For additional program information see: [Missouri Families](http://missourifamilies.org/) (<http://missourifamilies.org/>) and [Show-Me Body Walk](http://outreach.missouri.edu/hesfn/bodywalk/) (<http://outreach.missouri.edu/hesfn/bodywalk/>).

b. Program Impact:

The Family Nutrition Program was developed through Multi-State Extension program efforts. The following impacts are state specific to Missouri.

FNP reached 156,069 adults and youths in 2002. A 'Teacher Feedback' form was given to teachers whose classes received nutrition education. The teachers were asked to complete the form during the last lesson. Two thousand two hundred forty-one (2,241) forms were returned.

Among the classrooms with the reported changes in students trying new foods, the average percent of students making the change was 62 % (based on groups that provided an estimate).

Seventy-five percent (75%) of teachers reported one or more change among students or themselves after FNP. Seventy-three percent (73%) indicated that were more aware of nutrition. Of those teachers, 54% say they will spend more time on nutrition education following FNP.

Of those teachers who are making healthier food/beverage choices, eighty-four percent (84%) talk about or model changes in front of students while eighty-five percent (85%) are more willing to try new foods.

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

- 95% of students are now trying new foods
- 75% improved their hand washing skills
- Many were talking more about the foods they choose

#### Health for Every Body Program Impacts

Outputs: Based on available data about 2,714 Missourians were reached through educational programming. In addition, newsletters were mailed to over 350 individuals in order to increase awareness and reinforce key concepts.

#### Participant Reactions:

“This program helps people realize they can be healthy without dieting.” “I learned to like me as I am, and focus on being healthier.” “This program is a new way of looking at eating and exercising and I feel more conscious of how I feel and what I eat.” “This class opens doors for people who want to be healthy.” “This class is a wonderful idea for health living.” “This series was excellent and it really brings forward some common sense ideas that make much more sense than dieting. It would be great if a working group could come out of this, sort of a support group to continue the work.”

“I’ve learned to accept myself as I am. Also to think of how I feel- am I hungry and the amount I’m eating. “ Made me more aware of what I am doing to my body.”

#### Outcomes

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

- 490 health consumers have increased awareness of strategies for promoting health and reducing health risk factors.
- 60 program participants reported that they had learned new information.
- 51 program participants reported that they had gained new skills.
- 64 had more positive feelings about themselves

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

- 69 program participants adopted new practices.
- 43 continued to work on health goals set during the class
- 8 established new health goals

b. Source of Funds: Smith-Lever, State, Public/Non-profit agencies

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

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

a. Program Description: Take Care: Medical Self-care

A statewide needs assessment conducted as part of University Extension’s deliberative group

process found that health and health care were important issues in about 40% of Missouri counties. After five years of slow growth, U.S. health care spending resumed its upward climb in 1998. The national health bill is projected to double by 2007, hitting 2.1 trillion. Americans spend an estimated \$200 billion a year on unnecessary and inappropriate health care. Individuals and families can control health care costs by learning how to make better health and health care decisions. In order to make effective health care decisions people must have access to reliable information and they need that information when a health problem arises. Extension's medical self-care program meets this need by teaching individuals to use a medically sound self-care reference. Based on the program's logic model, accomplishing this short-term outcome, use of a quality self-care reference, will contribute to the accomplishment of the intermediate outcomes of improved use of health care services and reduced health care costs. This programming also relates to goals established for CDC's Healthy People 2010. Recently there has been a renewed interest in self-care by employers and managed care plans. Individuals are expected to take more responsibility for their own health. University Outreach and Extension needs to take advantage of this interest.

Two curricula are used in this program effort. Take Care: A Medical Self Care Workshop for Families with Young Children was developed in 1984. This four-session series increases skills in dealing with common acute illnesses. Newsletters reinforce key concepts and help build the confidence of parents in making self-care decisions. Twelve easy-to-read fact sheets are available in English and Spanish. Take Care of Yourself, is the self-care reference provided to parents. Health Wise, a 90-minute session for adults aged 50 and older, uses a commercially produced curriculum developed by Healthwise Inc., Boise, Idaho. This 90-minute session focuses on managing chronic illnesses and is designed to improve the confidence and skill of participants to make decisions that promote improved health status and appropriate use of the health care system. The reference used in this session is Healthwise for Life. Community partners are more aware of Extension resources related to medical self-care and health care decision-making. Partners at the local level have been health departments, community action agencies, a local hospital and Head Start.

b. Program Impact:

Outputs: Based on available data, 382 individuals participated in Medical Self-Care programs.

Participant Reactions:

"Feel better equipped to handle minor things – than before – using the manual."

"More confident dealing with doctor."

"Info in the book has prevented health problems that would result in going to the doctor and getting a prescription."

"Feel the information is a good resource to start consideration of medical concerns. Information gives some good basics to consider." "This class made me think about preparedness."

Outcomes

Short Term:

- 67 participants in the Take Care program reported that they received information/knowledge that they could use in their interactions with others.
- 64 participants in the Take Care Program reported that they intended to use provided reference.

- 30 Health Wise participants reported using Healthwise for Life an average of 3 times within the three months following the workshop. For those participants who reported having a reference prior to taking the workshop, on average they had used that reference once in the three months prior to the workshop.

Medium term Outcomes (36 individuals participated in the 90-day follow-up):

Based on a 90-day follow-up of 36 individuals that participated in this program, we found that 66% (n=24) of the participants reported that the program helped them improve the quality of self-care provided at home; 66% (n=24) reported that the program helped them decide if a doctor visit was necessary; 44% (n= 16) indicated that they asked more questions of their doctor; 42% (n=15) indicated that they had been more active in talking about treatment options with their doctor; and 17% (n= 6) reported that the program had helped save health care dollars. Money was saved on doctor visits, emergency room visits, medications and lab/X-ray tests. One person reported saving \$50, another \$150 and a third estimated that they saved between \$200 and \$300.

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

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

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

- a. Program Description:

This area of programming involves getting nutrition and diet-related health messages to the public in Missouri. Programming includes the production of a quarterly newsletter on nutrition issues for senior, primarily African American, audiences; a series of fact sheets on nutrition, food safety and health topics related to diet; and various handouts to be used at health fairs and other events where LUCE faculty and staff might have a booth. It also includes the production and distribution of radio public service announcements.

- b. Program Impact:

Approximately 128 people 80% African American, ages 18-20 received health and nutrition education on various topics and through workshops and published materials.

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

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

- a. Program Description: Urban Horticulture – Kansas City

The 2002 programming was built upon the foundation established in 2001. One Head Start site was added this year bringing the total amount of head start sites served to 4. Some of the goals included developing healthy living practices and observing changes in the growth of plants.

With the assistance of LUCE, Kid Safe, an organization that provides funding for safe, after-school activities for children, constructed of four raised beds. Horticulture instruction to classes was provided. The East Area Community Coalition provided space for the garden.

*Southeast Missouri*

The overall objective of Human Nutrition programming in Southeast Missouri is to improve the health status and promote healthy life-style of limited resource and minority individuals, their families and seniors in six counties of the Bootheel.

The program also seeks to increase knowledge and awareness of health risk factors and the requirements needed to create and maintain a healthy life-style, to reduce health problems caused by improper eating habits and lack of physical and mental activities.

The program seeks reduce the teen pregnancy and infant mortality rates through enhancing life-skills/parenting-skills activities provided and as mentor support; to reduce the chronic diseases in minorities through life-style changing; and, to reduce or delay health problems.

b. Program Impact:

In *Kansas City*, students developed and demonstrated a better understanding of plant growth fundamentals. Students demonstrated a better understanding of basic science which is expected to help them improve their grades in elementary school, and develop an appreciation of the natural environment and how it impacts them personally, which will make them more environmentally responsible citizens. Six (6) children from Ladd Elementary School received scholarships to attend the 4H camp in the summer of 2002. The KCMSD Head Start gave the horticulture program an award for outstanding partnership of 2001

In *Southeast Missouri* Over 1300 contacts were made to Southeast Region clientele. The program and activities brought about changes in health habits, increased knowledge levels, decreased in health risk factors, improved in physical/mental health and improved in socio-economical status.

c. Source of Federal Funding: Smith-Lever

d. Scope of Impact: Missouri

## **Goal 4: Harmony Between Agriculture and Environment**

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

Improvement in environmental quality of agricultural and managed ecosystems was the focus of research. Animal waste and its contribution to both nitrogen and phosphorus loading of streams was studied from the perspective of new policy implications on existing producers. Bio-remediation continued to be explored as a tool to help decontaminate and renew sites of heavy metal and radioactive contamination. Forest management strategies that both lessen environmental impact and enhance income potential were studied. Soil quality as influenced by agricultural traffic and compaction was studied in north Missouri among sites both with and without a sub-surface claypan. And lastly, wildlife management studies included nutrition and feeding studies to enhance the performance of crappie, an important species across Missouri.

### **1890 Cooperative Research Programs Overview**

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

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

The extension educational approach to enhancing environmental quality in Missouri focused on several themes, but all utilized an inter-agency, 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 was a major educational effort which included dealing 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 expose and educate the public on the complex water cycles found across the state. And lastly, pesticides used in agricultural, industry, home, and roadside environments was and is an on-going focus of the state-wide pesticide applicator training program.

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

### **Key Theme: Agricultural Waste Management, Water Quality**

#### **a. Program Description: Manure Management**

Runoff from livestock production threatens water quality. US Environmental Protection Agency (USEPA) is committed to converting from nitrogen- to phosphorus-based manure management to protect water quality. Research is directed at assessing the costs and feasibility of annual limits on phosphorus as proposed by USEPA.

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

Manure management is a Multi-State Integrated Research (Hatch) activity. The following impact is state specific to Missouri.



Studies indicate that proposed regulation would create extensive hardships for many farmers while bringing little water quality benefit. As a feasible alternative, researchers have promoted implementing phosphorus limits using a rotation approach where manure is applied based on crop nitrogen need but then no further manure is applied until the crop has removed excess phosphorus. Preliminary results on the effect of soil properties on phosphorus buildup rates indicate that the equation used to predict fertilizer need on phosphorus deficient soils needs to be updated. By understanding and measuring the effect of recently applied phosphorus on runoff phosphorus concentrations, manure management guidelines can be developed that protect water quality and the viability of livestock producers in Missouri.

c. Source of Funds: Hatch, Grants

d. Scope of Impact: Multi-State

### **Key Theme: Biological Control**

a. Program Description: Bioremediation

Environmental contaminants are a major threat to public health and long-term viability of natural systems. Researchers are exploring the energy generating mechanisms and pathways of the sulfate-reducing bacteria. These bacteria are known primarily for their role in iron metal corrosion in anaerobic environments. In addition, these bacteria are able to change the oxidation state of uranium, converting it from U(VI) to U(IV) and thereby making it nearly insoluble. This process offers the possibility of application for bioremediation of uranium-contaminated environments.

b. Program Impact:

Bioremediation is a Multi-State Integrated Research (Hatch) activity. The following impact is state specific to Missouri.

Researchers established that cytochrome c3 was on the pathway of electron transfer to uranium in *Desulfovibrio desulfuricans*. This cytochrome is also involved in electron flow from hydrogen in this bacterium. The goal is to develop strains that can clean up toxic metals and radioactive material.

c. Source of Funds: Hatch, Grants

d. Scope of Impact: Multi-State

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

a. Program Description: Forest Management

A high percentage of Missouri's forest lands are held by private landowners. Researchers are developing management practices that can offer economic returns to landowners and at the same time are consistent with sustainable resource management. Finding out what motivates forest landowners is an important aspect in developing acceptable management practices.

b. Program Impact:

Forest management is a Multi-State Integrated Research (Hatch) activity. The following impact is state specific to Missouri.

A survey to ascertain the level of knowledge and behavior of forest landowners along the Missouri River was conducted. Lumber value data were generated from the yield study to determine the value of the individual tree. Information is used to isolate those factors of management that account for increased value of the northern red oak and sugar maple trees. Knowing these values will help forest managers do a better job of managing the forest for optimum value.

c. Source of Funds: Hatch, Grants

d. Scope of Impact: Multi-State

**Key Theme: Soil Quality**

a. Program Description: Soil Compaction

Missouri soils are subject to compaction. Compaction reduces the ability of plants to take up air and nutrients from the soil, and results in reduced yields. Research is being conducted to determine the extent of soil damage caused by heavy equipment on loess soils in Northwest Missouri in a corn and soybean rotation.

b. Program Impact:

Soil compaction is a Multi-State Integrated Research (Hatch) activity. The following impact is state specific to Missouri.

Corn was grown at the Graves Memorial Research Farm on compacted and non-compacted plots. Soil penetrometer measurements, bulk density samples, and yield measurements were recorded in each plot. A presentation at the Graves Field Day was made to keep farmers informed of the progress in this research. Understanding the effects of soil compaction and drainage practices on productivity will help farmers adopt management practices that improve soil structure and drainage characteristics to improve production potential and profitability.

c. Source of Funds: Hatch, Grants

d. Scope of Impact: Multi-State

**Key Theme: Wildlife Management**

a. Program Description: Fisheries

Hot summers can adversely affect fish growth in Missouri impoundments. Summer weight loss and particularly adult mortality in white crappie from exposure to warm water could reduce size structure in populations and contribute to year-to-year differences in availability of desirable-size individuals. Research is directed towards increasing the knowledge base related to fish energetics

and ecology in order to improve fisheries.

b. Program Impact:

Fisheries is a Multi-State Integrated Research (Hatch) activity. The following impact is state specific to Missouri.

A bioenergetics model for white crappie was evaluated and improved. Researchers studied the impacts of warm water exposure in Missouri impoundments on white crappie weight and condition loss. Results can be used to determine which impoundments are suitable for white crappie fisheries.

c. Source of Funds: Hatch, Grants

d. Scope of Impact: Multi-State

## 1890 Cooperative Research Programs — Lincoln University

### Key Themes: Soil Quality, Water Quality

a. Program Description: A Survey of the Occurrence of Environmental Toxins in Soil and Water Samples Collected from Three Southeast Missouri Farm Communities

The project titled, “A Survey of the Occurrence of Environmental Toxins in Soil and Water Samples Collected from Three Southeast Missouri Farm Communities,” is a continuation of our study of the occurrence of environmental toxins in three rural communities in New Madrid County Missouri. This year’s study focused on determining toxicity and lead concentrations in water extracts of soil samples collected from twenty-eight sites. Drinking water samples collected from 29 homes in the area were screened.

This is a continuation of our study of the occurrence of environmental toxins in three rural communities in New Madrid County Missouri. This year’s study focused on determining toxicity and lead concentrations in water extracts of soil samples collected from twenty-eight sites. We also screened drinking water samples collected from 29 homes in the area.

Rural communities are often located in areas where a variety of environmental contaminants are present. Although many of these contaminants result from agricultural activities, some result from industries located in or near these communities.

Scorecard data reveals that 500 houses in New Madrid County have a high risk of lead hazards. This number can be related to the fact that New Madrid county is ranked fifth among counties in Missouri with the greatest reported releases of lead compounds into air (Pollution Locator: Lead Hazards: State Report @ [www.scorecard.org](http://www.scorecard.org)). Several industries in the area have been identified as significant polluters releasing lead and other pollutants such as PCBs and ammonium copper arsenate into the environment ([www.scorecard.org](http://www.scorecard.org)).

Water and soil samples collected from a total of twenty-eight (28) randomly selected sites in three communities and one farm site in southeast Missouri were studied for potential toxicity and the presence of lead. We focused on evaluating the water-soluble components of the soil samples for toxicity using the Microtox® Model 500 Analyzer. The presence of lead in collected drinking

water samples and water extracts of the soil samples were determined using the Dithizone Method. The Microtox® test was carried out following the standard operating procedures. The measured effect was bioluminescence reduction after five or fifteen minutes in the marine bacterium Vibrio fischeri at 15 ° C.

b. Program Impact:

Approximately one-fourth (24.13%) of all the samples showed some toxicity with EC<sub>50</sub> (Effective Concentration causing a reduction of bioluminescence by 50%) values ranging from 4.92% to greater than 100%. Concentrations of lead ranging from 21µg/L to 170µg/L were found in all samples that exhibited toxicity. One soil sample that tested positive for lead was collected from the playground area of a daycare center in Lilbourn, Missouri. This sample had the highest lead concentration. As a result of our investigations one playground area was covered with a plastic liner covered with mulch. This measure seems to limit exposure of the children to the soil, but it does not prevent the possible exposure to wind blown dust from contaminated areas. The sample with the second highest concentration of lead (118 ug/L) was collected from Howardville, Missouri.

The majority of water samples tested negative for lead. However, one sample collected from a water fountain at the Lilbourn Elementary School tested positive for lead. A second test was conducted and no lead was detected. Letters explaining our results were sent to every home from which water was collected.

Our detection of lead in water extracts of the soil samples is significant and indicates that concentrations of lead could be higher in the samples. Our work in the coming months will include acid extraction of the remaining soil samples. Acid extracts of soil samples releases more of the metal and simulates the acid condition of the stomach when soil or dusts is ingested. Analysis of acid extracts of the samples will give additional information in regards to potential hazards to health.

Since lead is a cumulative poison, the determination of its presence in many of the soil samples is significant, especially in regard to impacts on the health and development of children in the communities. The highest lead concentration was found from soil samples collected from the daycare site in Lilbourn, Missouri. The owner has been informed and has taken measures to maintain the plastic liner barrier in the playground area.

Twenty-nine families were assured that no lead was in their drinking water at the time of our tests (summer 2002).

c. Source of Funding: State matched Funding

d. Scope of Impact: Missouri

**Key Themes: Soil Quality, Water Quality**

a. Program Description: *In situ* Lead immobilization in contaminated urban soil by phosphates in Jasper County Superfund Site

There are over 17,000 contamination sites the United States, among which include numerous sites containing toxic metals such as lead (Pb) that need to be remediated. Lead (Pb) as well as Cd and

Zn contamination in soils and lands from abandoned mining and smelting areas in Jasper County, Missouri, has been identified as a human health and ecological threat (Missouri Department of Health, 1995; USEPA, 1998). In the Oronogo-Duenweg Mining Belt Superfund site within Jasper County, about 2,600 residential properties had been contaminated by a former Pb smelter to the level  $>800 \text{ mg Pb kg}^{-1}$  required for remedial action, and over 2,850 ha lands contaminated by mining operations up to  $4000 \text{ mg Pb kg}^{-1}$  (USEPA, 1996; CDM Federal, 1994, and 1995). Mean contamination levels range from  $450 \text{ to } 4000 \text{ mg Pb kg}^{-1}$ ,  $4000 \text{ to } 11500 \text{ mg Zn kg}^{-1}$ , and  $25 \text{ to } 85 \text{ mg Cd kg}^{-1}$ . A survey conducted by the Missouri Department of Health in 1994 and the City of Joplin Health Department in 1995 showed that 14% of children under 7 years of age near the historic mining and smelting areas had elevated blood-Pb level  $>100 \text{ ug L}^{-1}$  set by the Center for Disease Control for requiring intervention, and the blood-Pb levels were directly related to Pb concentrations in soils. Contamination from mining activities had also created barren or sparsely vegetated lands and elevated metal concentrations in surface and ground waters (USEPA 1998; Missouri Department of Health, 1995).

A cost-effective and environmental-friendly remedial strategy is needed to safeguard human and environment from the lead contamination. In 1994 Record of Decision (ROD), the U.S. Environmental Protection Agency, Region VII selected *in situ* phosphate treatment as a contingent remedial alternative to excavation and replacement of contaminated residential yards in Jasper County contaminated areas. This project is to assess the efficacy of phosphate treatment for reducing lead bioavailability and enhancing lead immobilization in soil.

This project involves the bench-scale treat ability studies. The soils used in this study were collected from the contaminated areas in the Jasper County Superfund site. The collected soils were treated with the phosphate materials at a various rate and incubated at room temperature over several months. The post-treated soils were then characterized for the alteration of solid-phase lead species to assess the immobilization processes in soil. *In vitro* and *in vivo* bioavailabilities were measured to determine the treatment efficacy.

b. Program Impact:

- 1) *In situ* phosphate treatment of the contaminated soils could effectively reduce lead bioavailability in soil as indicated by *in vitro* and *in vivo* measurements.
- 2) The reduction of the bioavailability increased with increasing reaction time.
- 3) Lead solubility in soil was significantly reduced due to the treatment.
- 4) Immobilized lead species was identified as “pyromorphite-like” lead phosphate minerals.

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

c. Source of Funding: U.S. Environmental Protection Agency (USEPA), Region VII, Missouri Department of Natural Resources (MDNR)

d. Scope of Impact: Missouri

**Key Theme: Air Quality**

a. Program Description:

High asthma rate among children was voiced by the representatives from Bootheel at the Stakeholder Symposium held at Lincoln University in 2001. Pesticide (DDT) aero sprays used in the neighboring cotton fields was speculated to trigger asthma in children. Allergy and asthma specialists associated pollen and mold as the major aeroallergens. The warm climate and swampy geological features set the Bootheel as a potentially high pollen and mold region. The AAAI has documented and recorded periodically high pollen and mold counts in Cape Girardeau. There is no aeroallergen counting station located in Bootheel presently. This project was initiated to investigate the air quality by monitoring the aeroallergens in Bootheel throughout the growing season of 2002.

There is no current field data available related to aeroallergens related air quality in Bootheel. Rotorod sampler is used for this project because it's used by many allergists across the country for monitoring aeroallergens. Air samples collected by a Rotorod sampler can represent the aeroallergen quality in the area within a 50-mile radius from where the sampler is located. Lilbourn was chosen as the collection site for its central location in Bootheel and the home of a Lincoln University extension office.

Aeroallergen data will be submitted to Multidata Inc. Multidata Inc. will process data collected from all counting stations to provide daily report and forecast. Pollen related data are available at [www.pollen.com](http://www.pollen.com). The public can access the information and take preventive measures to avoid allergy symptoms or asthma during high pollen and mold season.

b. Program Impact:

One area resident was recruited and trained to use and monitor equipment measures air quality. A high level of spring pollens and spores was observed and recorded by computer imaging system. After all the air samples are examined, a diagram will be presented showing seasonal peaks and duration of aeroallergens collected by the air sampler. Residents in Bootheel would be informed as how long their allergy season lasts and how well their air quality is as far as the pollen and mold counts are concerned.

c. Source of Funding: State

d. Scope of Impact: Missouri

**Key Theme: Biological Control**

a. Program Description:

This project is also in its infancy, and if the insect deterrent compound in scented geraniums could be successfully isolated and identified, the impact of this project could be enormous. The application of the insect deterrent compounds would protect the general public as well as the domestic and wild animals from mosquito-transmitted diseases, specially the West Nile encephalitis.

Scented geraniums are plants with easy growth and propagation. Once the plants are established in a pot or garden, it has the potential to continue to grow and potentially provide residences with

multi-season insect protection. Incorporating and maintaining these plants as companion plants in agricultural and greenhouse practices could potentially reduce or prevent insect damages to crops. These plants could not only be used to landscape residential areas to reduce mosquito population but also can freshen the environment with a pleasant scent.

b. Program Impact:

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

Nature derived insect deterrent compounds have been gaining public attention and favor due to the increased health and environment awareness. Scented geraniums have been known and used by tribes in southern Africa to deter undesirable insects. Robert's Lemon Rose geranium, one of the scent geraniums, demonstrated its effectiveness in controlling various insects in the past year. It could either kill smaller insects or adversely affect the behaviors of larger insects when in close contact with the leaf juice. This leaf juice was able to kill adult mosquitoes. Mosquitoes are responsible for transmitting West Nile virus (WNV). This viral infested encephalitis has claimed numerous human fatalities and uncountable wild and domestic animal lives across the U.S. in the year of 2002. The identification of the active ingredients against insects in Robert's Lemon Rose geranium will be of great value in the war against the spreading of the disease through pharmaceutical applications and agricultural practices.

c. Source of Funding: State

d. Scope of Impact: State-wide, regional and national

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

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

a. Program Description: Animal Waste Management

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

In Missouri, livestock production represents approximately 50% (\$2.4 billion) of the income from agricultural commodity sales. A major producer of livestock, Missouri ranks 7<sup>th</sup> in swine, 11<sup>th</sup> in poultry, and 2<sup>nd</sup> 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 has also identified several water bodies in the state 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 a critical source.

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 states environmental goals for conservative manure utilization.

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

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

Missouri is a major livestock producer, ranking seventh in swine, 11<sup>th</sup> in poultry and second in cattle production. Many operations are highly concentrated and located in areas where soil conditions aren't suitable for heavy land application of livestock manure. The economic viability of Missouri's livestock industry is at stake if social and environmental issues are not addressed. Confined livestock operations have been listed as a major environmental and health concern for odor and mishandling of manure

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

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

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

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

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



b. Program Impact:

Animal Waste Management is a Multi-State Integrated Research and Extension program. The following impacts are state specific to Missouri.

- 1) This program objective will be addressed during 2003 now that the final Concentrated Animal Feeding Operations/Animal Feeding Operations (CAFO/AFO) rules (12/13/02) have been published in the Federal Register.
- 2) Missouri is currently part of a multidisciplinary manure management team operating under a \$300,000 National Pork Producers Council/Environmental Protection Agency (NPPC/EPA) grant to develop a comprehensive manure management planner training program.
- 3) A team of University of Missouri faculty taught a 5-day course (3-days classroom and 2-days field) on nutrient management planning for 85 national resource specialists (NRS) and 5 industry professionals. This training will serve to meet part of the requirements to become a certified nutrient management planner.
- 4) A two-day training conference (UOE Program Development Experience) was conducted on current manure management regulations, water quality initiatives, and producer strategies to comply with those regulations for 40 regional agronomists, natural resource engineers, livestock and farm management specialists. This training was an abbreviated version of the Natural Resources Conservation Service (NRCS) certified nutrient management planner training.
- 5) Missouri state specialists assisted with developing and conducting training sessions on order and environmental assessment for sixty professionals from five states.
- 6) The Missouri Manure Management Action Group (MoMMAG) <http://outreach.missouri.edu/mommag> and the Agriculture Electronic Bulletin Board (AgEbb)/Commercial Ag site provide updated information on management practices laws and regulations, as well as links with other states with similar livestock manure issues.

c. Source of Funds: Smith-Lever, EPA, Natural Resource Conservation Service, State

d. Scope of Impact: Missouri, Indiana, Minnesota, Iowa, Ohio, Oklahoma, Illinois

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

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

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

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

with a score of 80 percent or better to obtain certification. In four years, more than 1,500 installers completed the course and passed the certification test.

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

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

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

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

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

b. Program Impact:

- 1) Cooperative efforts between University Outreach and Extension, Natural Resource Conservation Service (NRCS), the Missouri Department of Natural Resources (MoDNR) and local Soil and Water Conservation Districts (SWCD), resulted in more than 800 farmers completing the Farmstead Assessment System evaluation.
- 2) Seventy percent (70%) of the farmers completing the Farm-A-Syst made changes in management practices to reduce the potential for drinking water contamination.
- 3) Well plugging educational programs and demonstrations during 2002 resulted in 253 abandoned wells being plugged and registered with the Missouri Department of Natural Resources, including 2 irrigation wells.
- 4) More than 130 irrigators have learned about wellhead protection, chemigation, backflow prevention and irrigation scheduling.
- 5) Data from the 2002 Bootheel Irrigation Survey showed that the corn irrigators who used irrigation scheduling (21% of the total) produced 11 bushels per acre more than the irrigators who did not use scheduling. This increased yield means that about 22 lbs more of N was removed from the soil by grain, reducing the amount left in the soil subject to winter, leaching rains.
- 6) A course was developed and taught for real estate professionals to increase their understanding of on-site sewage systems and how they can affect land transfers. The 6-hour CEU course was offered to more than 100 real estate professionals.
- 7) Two communities in southeast and east central Missouri held workshops in cooperation with the Eastern Small Flows Organization and the Midwest Assistance Program to increase knowledge of alternatives to traditional on-site septic systems. System design and funding

were discussed with three southeast Missouri communities looking at different options for small communities without sewer systems.

- 8) Hazardous material collections for agricultural producers and urban residents were held in several key areas of the state. The collections netted more than 200 different unusable agricultural pesticides, filling twelve 55-gallon barrels, two 64-cubic-foot Gaylord boxes, and two 30-gallon containers. More than 150 people from both urban and rural areas participated in bringing in unused or unwanted pesticides. More than 12 tons of waste was collected.
- 9) A one-day workshop was offered to 30 participants on keeping a home healthy and safe. Household hazardous materials and in-door air quality were topics of discussion. Evaluations after the workshop showed that participants increased their understanding and knowledge of household hazardous materials and indoor air quality and the problems associated with moisture in the home.

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

d. Source of Impact: Missouri

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

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

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

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

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

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

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

- b. Program Impact:

- 1) Over 1,000 fourth and fifth graders in southeast Missouri learned about ecological practices and management of natural resources to improve environmental quality. Classroom teachers were sent materials beforehand and both pre- and post-tests were given to the students. Post-

test scores showed a dramatic increase in students' knowledge of environmental issues and natural resource management.

- 2) A Water Awareness Day was held in Kirksville with more than 450 junior high students participated in the multi-agency educational program. Twenty-two instructors offered a series of programs throughout the school day building students' Missouri Assessment Program (MAP) skills, including mapping, graphing, sequencing events and understanding cause and effect. Statements from the teachers were – "I haven't seen the kids so excited about graphs and maps in years" and "These are day-to-day science concepts the kids can understand". The science coordinator has asked for a training session on water education for teachers.
- 3) More than 25 water festivals were held throughout the state during 2002. Each festival was designed to fit the needs of the region and the needs of the school. Forsyth, Missouri, tracked the effectiveness of the festivals for third graders. Teachers at the school have rated the program as follows:
- 4) Estimate of % of student group gaining new knowledge or enhanced existing knowledge:  
75% of all students  
On a scale of 1 – 10 with ten being excellent:
  - a. Overall program – 10
  - b. Methods used to present materials – 9.9
  - c. Content of sessions – 10
  - d. Presentation style for age group – 9.6
  - e. Overall session – 9.9

Teacher comments from the program were as follows: Excellent; presentation was very well organized and well managed by all presenters.

- 5) Five years of evaluation in several schools in the Northwest Region demonstrated an increase in Missouri Assessment Program (MAP) test scores. UOE evaluated the quality of the classroom experience using a scale of 1 – 4 with 4 being the highest:
  - Fourteen of the content presentations received a rating of 3.0 or higher as very useful.
  - Handout materials received a 3.86.
  - Enviroscope and Ground Water Model received a 3.83.
  - Soils resources scored lowest at 2.54.

A follow-up survey with teachers showed an increase in the number of times water education programs were included in the general classroom curriculum.

- c. Source of Funds: Smith-Lever, EPA/DNR, State
- d. Scope of Impact: Missouri

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

- a. Program Description: Pesticide Applicator Training

There are approximately 6,000 commercial and 35,000 private (farmer) pesticide applicators 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 and a five-year cycle for private applicators. Environmental and health concerns about pesticides, the changing field of pesticide development, new laws and regulations, and registration make a responsive and intensive training program essential. The private applicator-training program reaches into essentially all of Missouri's counties.

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

University Outreach and Extension regional specialists conduct private applicator programs. Commercial applicator training was conducted in five locations during January. Instructors who supported the program represented the Missouri Departments of Agriculture, Conservation, Natural Resources and Transportation; University Outreach and Extension; Oklahoma State University; and private industry.

b. Program Impact:

1) More than 2,000 commercial and 6,000 private applicators attended University Outreach and Extension Pesticide Applicator Training sessions. Survey responses from the commercial applicators revealed that:

- 97% usually or always considered the impact of pesticides on water sources before applying a pesticide.
- 16% had made great changes as a result of the program.
- 16% had made some changes and were still attempting to improve their practices.

A survey of the private applicator audience showed that:

- 77% indicated that the training made them very aware of the factors that influence the movement of pesticides into groundwater.
- 88% indicated that the training made them very familiar with the importance of protecting the environment.

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

- 2) Agribusiness survey results showed that most farms using precision agriculture practices are larger than 500 acres.
- 3) The 2001 follow-up to a 1999 survey found that farmers using some type of precision agriculture technology increased from 9.3% of farmers in 1999 to 28.5% of farmers in 2001. (<http://www.fse.missouri.edu/mpac/pubs/Case Study Report.pdf>)
- 4) Farmers enrolled in an on-farm research program that promoted site-specific application of pesticides and nutrients increased from 5 in 1999 to 27 in 2001.
- 5) As a result of extension programming efforts, Missouri farmers have adopted integrated pest management programs on 78% of the Missouri's corn, soybean and cotton acreage.
- 6) Thirteen pest management workshops (10 classroom style and 3 field workshops) were held in 2002. These workshops targeted producers and agribusiness personnel. It is estimated that Missouri has reached the Farm Bill initiative of at least 75 percent of crop acres making use of some form of integrated pest management.
- 7) Data from the 2002 Bootheel Irrigation Survey showed that 25% 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 N by applying small irrigation amounts more frequently.

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

- d. Scope of Impact: Missouri

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

- a. Program Description: Watersheds Resource Education

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

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

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

- b. Program Impact:

The Water Resource Education program is a Multi-State Integrated Research and Extension program (Smith-Lever and Hatch). The following impacts are state specific to Missouri.

- 1) Currently, about 40% of Missouri soybean producers use no-till technology compared with 6% in 1990.
- 2) A similar increase has occurred among Missouri corn producers, 31% of whom currently use no-till, compared with 14% in 1990.
- 3) More than 2,800 producers were reached directly in 2002 through educational programs, such as workshops, soils and crops conferences and field days, concerning the benefits of no-till and conservation tillage for soil quality, soil conservation and water quality.
- 4) Twelve communities received assistance to develop watershed management plans and source water protection plans based on science-based Best Management Practices. After completing the plans, five of these communities were able to have producers enroll their crop production acres in the Missouri Conservation Reserve Enhancement Program (MoCREP). This program promoted the reduction of cropland being row cropped in environmentally sensitive watersheds that contain public drinking water reservoirs. This effort led to a reduction in turbidity and in pesticide and nutrient levels in several public drinking water reservoirs.

- 5) Since the beginning of the wellhead registration process, more than 1,450 wells were properly plugged to reduce the chance of contamination from surface flow into groundwater
- 6) Communities seek strategies from UOE to protect water. Atrazine levels in the Vandalia Reservoir stabilized at no more than 6 parts per billion, compared with 1997 levels that peaked at 85 parts per billion. University Outreach and Extension worked with residents, local officials and experts to develop a watershed management plan. People are participating in decisions to reduce non-point source pollution and voluntarily implement solutions. In addition to having cleaner water, the city of Vandalia saved more than \$30,000 in water treatment costs.
- 7) As a result of University Outreach and Extension watershed educational programming and technical assistance, farmers in the Long Branch Watershed enrolled nearly 5,000 acres in the Missouri Enhanced Conservation Reserve Program. In addition, the U.S. Army Corps of Engineers, in conjunction with the Missouri Department of Conservation, is developing a plan to establish Long Branch Lake as a fishery, thus improving the overall water quality of the watershed.
- 8) As a result of the University Outreach and Extension Watershed Education Program, 15 communities developed watershed-planning committees, and 10 of those communities completed writing and implementing a watershed plan. Several of those community reservoirs are slated for removal from the 303(d) list during 2003.
- 9) As part of a four-state project, University Outreach and Extension provided leadership to catalog and document programming efforts that look at the watershed community when developing and selecting best management practices (BMPs) for watershed planning. Other participating states were Iowa, Kansas and Nebraska. Individuals in each state are able to draw upon expertise in the other states to develop programs that are effective in capacity building and in long-term decision making for improving watershed management.
- 10) A decision support system (DSS) model for selecting best management practices (BMPs) is being developed and calibrated based on successful BMP implementation to reduce pesticide run-off. Development of a local watershed group is essential for getting local ownership of environmental problems and issues. The DSS is a tool that can be used by local watershed groups to help identify best management practices (BMPs) that will be most effective at reducing environmental concern and are economically viable for the affected communities.

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

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

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

### 1862 University Outreach and Extension Overview

#### Human Environmental Sciences

The University of Missouri Outreach and Extension Human Environmental Sciences program is committed to creating educational programs to improve the lives of Missouri families. Through a wide variety of delivery methods University Outreach and Extension assisted children, youth and adults in learning ways to improve their personal, family and community health and well-being. This year University Outreach and Extension continued to address some of the major issues facing Missouri families including child abuse, adolescent pregnancy, financial problems, poor quality child care, inadequate housing and divorce. Through a variety of methods, University Outreach and Extension Human Environmental Sciences faculty in cooperation totaled over 875,450 educational contacts (excluding web-based contacts) throughout Missouri. 175,000 were in educational programs structured with a series of sessions. Here are just a few of the major efforts: 50,000 elementary school children were engaged in an interactive exhibit about healthy decision-making, over 2,000 individuals sought help with obtaining housing loans, 17,000 individuals received educational information on the consequences of child abuse and 4,000 divorcing parents learned more about how to keep their children out of parental conflicts.

Access to learners was improved this year through the development of an extensive online delivery system for our educational programs. Through the creation of Missouri Families (<http://missourifamilies.org/>) many more people have access to practical, science-based information about health, human development, housing, personal finance, and nutrition. In June 2002, the website was accessed once every 2 minutes and averaged about 10 visitors per hour. In the short span of six months, findings from Internet search engines indicate that our information about nutrition and divorce is among the top sources on the Web.

A new statewide report on the condition of Missouri families was developed in 2002. This "Report on the State of Missouri Families" highlights the needs of Missouri families in the areas of family life, finances, aging, chronic disease, and housing. The report served to inform citizens, policy makers, and social service professionals about the critical needs affecting their communities. Through this report we have engaged 5,000 Missourians in discussions about how to improve family life.

- This year the first "Report on the State of Missouri Families" highlighting the needs of Missouri families was released. This report included a website, statewide brochure, a fact sheet for every Missouri county, news releases, and county-specific PowerPoint presentations. In the six months since the release of this report, over 4500 brochures have been distributed, 1,863 people were reached through presentations, 202 were contacted by email, 1 TV report was conducted, 35 radio programs were produced, 41 news columns were published, and 2,760 were reached through newsletters. Additionally, the Report is accessed online once every 30 minutes.
- In an effort to extend the reach of our programs to more people the Missouri Families website was created. At present, this website includes answers to over 1,000 questions about health, human development, nutrition, fitness, housing and personal finance. Findings from Internet search engines indicate that online readers regularly seek our information about nutrition and divorce.
- The Building Strong Families Program continued collaboration with internationally known family strengths researchers at the University of Nebraska. UOE faculty were invited to Nebraska to



train 42 Extension specialists and community partners as facilitators. The Building Strong Families program design team certified 268 Extension specialists and paraprofessionals and community agency staff so they could offer the program statewide. This group taught 1800 (500 this year) individuals.

- The High School Financial Planning Program is a curriculum targeted at high school students that teaches financial planning basics. In the 2001-2002 school year, teachers/volunteer leaders in over 100 schools taught over 5,000 youth. Over 325 teachers and counselors were provided information and resources at the Annual Missouri Association for Career and Technical Education Conference in July 2002.
- In 2000-2001, almost 2,000 people requested home ownership information through the Missouri Housing Partners Initiative (MHP) (<http://outreach.missouri.edu/mhp/>). One of the objectives of MHP was to provide significantly enhanced program access by going online. The result is a 300% increase in requests for information.
- Web-based learning was been a central theme in the work of the Missouri Textile and Apparel Center (<http://outreach.missouri.edu/motac/>) as they expanded their online outreach resources to textile manufacturers across the mid-west.
- The *Focus On Kids* (<http://outreach.missouri.edu/cooper/fok/>) program was taught to divorcing parents in cooperation with the local circuit courts. Twenty extension regional specialists taught *Focus on Kids* in 31 Missouri counties. During the last year, there were 3,400 participants. Most of the *Focus on Kids* participants indicated that they planned to make a stronger effort to work with their former spouses for the sake of the children, as a result of attending the program.
- Child care providers were the critical link between program quality and children's experiences. Unfortunately, the field is plagued by alarmingly high rates of turnover. Missouri is pilot-testing a workforce development initiative (WIN) that pays bi-annual cash incentives to child care providers based on their educational attainment, ongoing professional development, and continued employment in the same early childhood program. To date, 509 early childhood professionals from child care centers and family child care homes in select rural, urban, and suburban counties participated in the incentive program. Ultimately, we hope to improve children's childcare experiences by strengthening the provider workforce.
- In 2000, 80 professionals from across the state in the counties with the highest rates of child abuse were trained to address violence in the lives of girls and young women. During 2001-2002, these representatives educated 17,000 people about the causes and consequences of child abuse, especially for young women.

#### 4-H Youth Development

Three major program teams in Missouri focused on improving the well being of youth, families and communities. A major focus for the youth programming was through the Missouri 4-H Youth Development (<http://mo4h.missouri.edu/>) program that helped communities create opportunities for young people to be valued, contributing members of their families, schools, and communities. The National Research Council in *Community Programs to Promote Youth Development* (2002) recommends the following characteristics for effective programs: physical and psychological safety, appropriate structure, supportive relationships, opportunities to belong, positive social norms, support for efficacy and mattering, opportunities for skill building, and integration of family, school and community efforts. University Outreach and Extension's 4-H Youth Development Programs combined these elements in all

programs, connecting youth with caring adults for learning-by-doing experience in organized clubs, enrichment programs, special-interest groups; camps and school-aged child care programs. 4-H Youth Development programs at the local, regional and state level emphasized the following key themes: School-Age Care/Opportunities for Youth during Out-of-School Hours; Workforce Preparation/Information Technology; and Character Education through Community Service Learning. There was a special emphasis on targeting communities in St. Louis, Kansas City, and the Bootheel with programs that addressed the unique social and educational needs of children and adolescents living in impoverished communities.

#### Character Education

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

#### Science and Technology Education

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

#### Volunteer Leadership Development:

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

#### Community Development

The University of Missouri Community Development Program focused on creating and sustainable and viable communities for healthy families, youth, businesses, governments, and organizations in urban, suburban, and rural areas. Programs focused 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, planning and policy development were actively taught.

Four areas were especially emphasized this past year. First, creating inclusive communities to particularly address the rapid in-migration of Hispanic families into Missouri involved outreach to Hispanics and worked to foster multicultural communities across the state. Second, community emergency management programs focused on building resilient communities capable of responding to natural disasters and prepared for homeland security threats. Third, leadership development in local community efforts and training of people who worked in a variety of organizations through the Community Development Academy demonstrated many positive impacts in communities across the state. Fourth, community decision-making efforts focused on increasing the numbers of communities engaging in public dialogue around important issues and on providing sound decision support to communities through collaborative learning.

The Community Development Program drew upon resources from a 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 included grassroots watershed plan development, community gardening and food systems, and community housing programs among others.

- University Outreach and Extension faculty who completed the Community Development Academy were engaged in new and expanded local leadership development. They involved citizens in planning and implementation of community-wide programs, and adopted community-

based approaches in all aspects of their extension programming. The Missouri Hospital Association funded 11 of its members to participate in the Community Development Academy in 2002. The Association is now requiring organizations that receive awards through its regional health partnership grant program to send teams to the Academy. Internationally, a partnership between the University of Missouri and several entities in South Africa played a critical educational role in shaping the future of development South Africa through the Grassroots Community Development Academy. Government workers, community development organizations and non-government groups used it to address social issues.

- As part of the Alianzas Program, three educational centers were opened to provide Mexican citizens completion of validated Mexican secondary education, via distance learning. The first *Cambio de Colores: A Call to Action* conference hosted 300 participants to who explored the array of Latino and community issues. An indepth brief highlighting issues was published and is being shared with key leaders across the state and within the university. A legislative brief was developed for Missouri legislators with regard to public safety issues created by lack of drivers licensing options for immigrants. More than 60 individuals located throughout Missouri met in a videoconference to discuss the issue of driver's licenses as they pertain to Latino immigrants. In Kansas City, bilingual public issues moderator training and public forums were held on race relations and healthy communities, and the Northeast Neighborhood developed and begun implementing a strategic plan for addressing Latino needs.
- Sixth graders in the Fox School District who participated in the Local Government CECH-Up program organized school clean up and beautification projects.
- Two training programs for moderation of public issues forums were held, one focused on bilingual training in Spanish. Bilingual race relations forums were held in Kansas City. A web-based directory of moderators trained in public deliberation was developed as a resource for people who wish to convene public forums and need assistance with moderating forums. An on-line e-newsletter was established to inform all trained moderators and people interested in public deliberation on what is happening in Missouri, forums taking place, future happenings, etc. A local issue book was developed on transportation problems for service workers traveling from the inner city to suburban St. Louis "The Long Journey to Work: How Do We Connect People and Jobs?" As a result of public deliberation in Independence, an extensive partnership was formed to deal with the broad array of community issues.
- Impacts from community decision support programming included the use of expected earnings information by Howell County high school counselors in career guidance, implementation of a tax increment finance district by Kirksville, use of the Boone County Vision Report by county commissioners to guide land use/growth policies, effective communication of the Kingdom City Highway Coalition with the Missouri Department of Transportation to revise the design of a highway exchange, and the development of a comprehensive plan in Franklin County which incorporated its economic baseline information.
- Faculty with expertise in community and economic planning facilitated improvement of the Soil and Water Commission Districts planning development and implementation processes and decision-making mechanisms. Participatory planning processes were provided through training for Resource and Conservation Development Board officers. Training and support for development of 501(c)3 non-profit organizations has been provided via the web.

- Twenty-two courses on community emergency management were taught last year. The Community Emergency Management Program launched the new Advanced Crisis Simulation and Education Lab program with Clay County in September 2002 at a County-wide exercise. The program trained 100 City of Jackson School District teachers and administrators through a 16 hour disaster response course.
- Rapid response to severe ice storms, flooding, and tornadoes included a statewide web site for disaster recovery information. This web page was held up as an example by State Emergency Management Agency and Federal Emergency Management Agency. After the Kansas City ice storm, extension staff with web access from home provided key information for recovery to local media. Following flooding and tornadoes in Southeast Missouri, extension staff provided facilitation that led to cooperation among disaster recovery organizations.
- 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 16 years, the nearly 4,400 participants in the Experience in Community Enterprise and Leadership program were actively engaging in local, regional, and state roles to benefit their communities. The fastest growing aspect was the development of specific community youth leadership development programs, with 15 having been conducted this past year. Qualitative observations and interviews showed positive results for the 83 high school students who participated in the Migrant Leadership Academy (over 95% of which were Latino/Hispanic). More students reported that they definitely wanted to finish high school and attend post-high school education, and more reported feeling empowered in dealing with different types of people and finding resources for their immediate future plans.

### **1890 Lincoln University Extension Overview**

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

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

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

#### **Key Theme – Aging**

##### **a. Program Description: Successful Aging**

The dramatic increases in longevity in the United States and Missouri since 1900 led to a major shift in the age structure of the population. Missouri ranks among the "older" states (top 1/3) in terms of the proportion of its population over age 65. The most substantial growth from 1990 to 2000 occurred in the 85 and over age group. Virtually every Missouri county had a substantial increase in this age group, and 18 counties had an increase of greater than 40% (Office of Social

and Economic Data Analysis). Another 30 counties had increases between 20 and 40 percent. Even greater changes and demands will come as the Baby Boom cohorts (those born 1946-1964) move into the older age categories. Nearly every sector of community life is influenced in some way by these aging trends, including health care, housing, family and intergenerational relations, economic life, and the types of jobs available.

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

Human Environmental Sciences regional specialists implemented programs in their region based on: a) teaching community groups (older adults, their families, and/or community professionals) to utilize the Center on Aging Studies without Walls web site as a tool for gaining resources on the topics it covers, b) the instructional modules on successful aging, and c) the "Healthwise for Life" and "Grandma's Yellow Pie Plate" programs. Additionally, the staff of the University of Missouri-Kansas City Center on Aging Studies was actively involved in promoting and presenting these programs both in the Kansas City area and upon request in other areas of Missouri. The Aging Program contributed content to the Missouri Families web site and provided cutting-edge information on new developments in the field of aging to an Internet users group.

b. Program Impact

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

Data for FY2002 indicate that regional specialists spent 2783 hours in the Aging Program Area and 593 hours in the Center on Aging Studies without Walls. Forty (40) counties had programming specifically designated as "Aging," "Center on Aging without Walls," or "Elderly." MPPERS (Missouri Program Performance Evaluation and Reporting System) data indicate that 22,831 persons were reached through these programs. Fifty-five counties reported programming in the area of "Family Financial Management," which included the use of the "Grandma's Yellow Pie Plate" program, and 28 of these counties were different than the 40 counties who reported aging programming. Over 26,000 educational contacts were made in the area of "Family Financial Management." In addition, University of Missouri-Kansas City Center on Aging Studies faculty/staff reached approximately 500 persons in 13 presentations in Kansas City, Independence, Lee's Summit, Gallatin, and Moberly.

Standardized evaluation tools are currently being finalized for the "Successful Aging" programs, so ability to report consistently on outcomes is limited for the FY2002 year. Program Results and

Lessons Learned (PRL's) reports which have been submitted by regional specialists indicate that aging programming on the Center on Aging without Walls, Successful Aging, Healthwise for Life, Who Gets Grandma's Yellow Pie Plate, and Grandparents Acting as Parents were well received and resulted in increased knowledge and behavior change goals. Evaluation data collected by the University of Missouri-Kansas City Center on Aging Studies faculty/staff who presented programs also support this conclusion

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

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

- a. Program Description: Child Care

The University of Missouri, Outreach and Extension is striving to relieve Missouri's "silent crisis" in childcare through multiple program efforts. OPEN (*Opportunities for Professional Education Network*), Missouri's career development initiative for child care providers, recently began implementing a strategic plan addressing quality control in child care training, career development pathways and career counseling, articulation between institutions of higher education, and financing and compensation. Additionally, because the Missouri Department of Health, Bureau of Child Care requires child care workers to complete 12 clock hours of training annually, University Outreach and Extension regional faculty routinely provide relevant educational opportunities for child care workers statewide. Additionally, because the Missouri Department of Health, Bureau of Child Care requires child care workers to complete 12 clock hours of training annually, University Outreach and Extension regional faculty routinely provide relevant educational opportunities for child care workers statewide.

Several Regional Faculty assisted child care programs with the accreditation process. "Accreditation is a measure of best practices for early childhood programs" (Virginia Hopp, 2001). Extension Regional Faculty were involved in establishing and sustaining regional affiliates of the National Association for the Education of Young Children.

To improve the quality of child care it is important to address the high turnover rate of child care providers. The child care field is plagued by alarmingly high rates of turnover; those who opt for a career in child care quickly learn that they will be poorly compensated, have limited benefits, and few opportunities for professional advancement. With these shortcomings in mind, Missouri is currently pilot-testing a workforce development initiative, "Missouri's Workforce Incentive Program (WIN)." WIN pays bi-annual cash incentives to child care providers based on their educational attainment, ongoing professional development, and continued employment in the same early childhood program. To facilitate participation in the WIN project (described above), early childhood professionals complete a detailed application form that captures individual demographic characteristics, education, experience, professional development activities, and personal and household income. This information is being used to establish a database about Missouri's child care workforce and to monitor ongoing professional development activities.

Child care impacts most aspects of daily life for Missouri citizens. Because 64.5% of mothers with children under age 6 and 77.3% of mothers with children ages 6 to 17 are members of Missouri's workforce, child care participation has become the norm for Missouri children and families. Research indicates that the quality of children's child care experiences contributes to

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

b. Program Impact:

Child care provider educational workshops are typically evaluated by University of Missouri Outreach and Extension regional faculty. Although all of the results are not quantifiable, anecdotal evidence suggests that child care providers value UO/E's child care programs and typically report acquiring new knowledge and skills from participating.

To date, 509 early childhood professionals from child care centers and family child care homes in select rural, urban, and suburban counties are participating in Missouri's Workforce Incentive program. Additionally, to assess whether such a costly effort makes a difference, a longitudinal evaluation study is being conducted with a subgroup of program participants and a comparison group. The study has been designed to determine if the workforce development initiative increases workforce stability (i.e., reduces turnover) and educational attainment, and improves child care quality and provider interactions with children. Ultimately, we hope to improve children's child care experiences by strengthening the provider workforce.

Also, as of June 30, 2002, 1500 child care providers from licensed child care centers and family child care homes had begun to participate in "Missouri's Professional Achievement and Recognition System." This information will assist state policy makers in understanding the credentials and work experience of those individuals who prepare our child care workforce. These efforts will strengthen the child care system in Missouri.

c. Source of Funds: Smith-Lever, State, Kauffman Foundation

d. Scope of Impact: Missouri.

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

a. Adolescents At-Risk Program

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

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

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

- Maltreatment and Adolescent Pregnancy and Parenting (MAPP). The purpose of the MAPP Program is to increase professionals' awareness of three issues: (1) the relationship between childhood abuse and adolescent pregnancy, (2) the likelihood of abuse during adolescent pregnancy, and (3) the likelihood of abuse among children of adolescent parents.
- HIV Prevention. University Outreach and Extension regional specialists train teachers and school personnel from around the state in one or more of the Center for Disease Control's HIV-risk reduction curricula. The purpose of these programs 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 Mother's Program. Staff have developed a mentoring program for teen parents.
- For additional information see [Adolescents \(http://www.missourifamilies.org/adolescents/index.htm\)](http://www.missourifamilies.org/adolescents/index.htm) and [Missouri 4-H \(http://mo4h.missouri.edu/\)](http://mo4h.missouri.edu/).

b. Program Impact:

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

In 2001-2002, MAPPP-trained professionals provided information to to 17,000 people in 16 Missouri counties about the consequences of violence for teen parents and their children. Over 3,000 professionals across the United States participated in an in-service program about the link between family violence and teenage pregnancy. In addition to Missouri, professionals in Hawaii and New York have initiated a statewide educational program on these issues.

Between July 1, 2001 and June 30, 2002, seven regional one-day HIV information workshops were presented around the state. The localities included Kirksville, Springfield, Poplar Bluff, Maryville, Kansas City, St. Louis, and Jefferson City. These six-hour workshops reached 126 school teachers, administrators, and community service professionals.

Past follow-up evaluation results of the mentoring program demonstrated that, compared to a nonmentored group of pregnant and parenting teens, the mentored group had (a) decreased child abuse potential, (b) no repeat pregnancy within 1 year, (c) decreased parenting stress, and (d) increased parenting knowledge. The long term goal is to help adolescent mothers to provide a loving, safe and developmentally appropriate environment for her infant. Since 1998, 35 Resource Mothers programs have been established in Missouri and programs in five states: New York, Hawaii, New Mexico, South Carolina and Georgia. Over 90 teen mothers received mentoring through Missouri MVRM (Missouri Volunteer Resource Mother) programs this past year.



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

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

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

- a. Program Description: Building Strong Families

Demographic trends indicate that family well being is a matter of concern. In 2001, there were 16,453 deaths 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 having 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%. Many homes are unsafe and lack attention to repairs and other hazards that put adults and children in danger, and 32% of renters and 13% of homeowners find the cost of housing to be more than they can manage.

A 13-module curriculum was designed to help families find their strengths, face challenges and make choices. In addition to extension faculty, 64 individuals from partner organizations were trained to facilitate the program in their communities. Curriculum was designed to be taught to either adult family members or to parents and children together. The curriculum is structured so that a series of four to six sessions can be taught that focuses on the particular needs of families. Supplemental materials were developed for lower-level readers and a parallel curriculum for young people is being developed.

From July 1, 2001 to June 30, 2002, 108 new facilitators from Missouri and Nebraska were trained to implement the program in their communities. These facilitators held over 50 workshop programs and awareness sessions in every region of Missouri.

- b. Program Impact:

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

Based UOE's internal Missouri Program Performance Evaluation and Reporting System (MPPRS), field faculty had 11,426 contacts with individuals using Building Strong Families materials (this included program workshops, newspaper columns, newsletters, radio spots and other media). Extension facilitators spent 4,321 hours on the program and involved 68 community partners and 362 volunteers.

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

Overall, 95% of participants who complete end-of-session evaluation

forms after each workshop session state that they have gained new information or learned a new skill. Seventy-five percent say they will try the new skill or use the information with their families.

Most participants who responded to a 3-month follow-up survey are making changes as a result of setting goals at this program. Although they may not be making changes in every goal area they set, 47 out of 50 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 percent) and using better communication skills (79 percent).

Long-term impact has not been evaluated, although short- and medium-term outcomes would indicate Building Strong Families curriculum will assist families in making sustainable changes that significantly improve their ability to live safer, healthier and better lives.

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

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

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

- a. Program Description: School-Age Care and Opportunities for Youth During Out-of-School Hours

The need for School-Age Child Care (SACC) education that provides a safe and nurturing environment for children of working parents is one of the most critical issues facing American society. In Missouri, 77 percent of women with children ages 6-17 are employed outside the home. Recent census data indicated that 1.03 million children between the ages of 4-17 reside in Missouri. More children exist than places for after school child care.

Quality School-Age Child Care (SACC) programs provide effective prevention programming that reduces risk factors and promotes healthy development. Children enrolled in after-school and summer school-age childcare programs spend time equivalent to a school year in the non-formal educational setting. Quality SACC programs have demonstrated the ability to enhance academic and social skills necessary to be successful in school.

For the past seven years, Missouri 4H/Youth Development Programs provided state and national leadership in the field of School-Age Child Care (SACC) education. In 1988, Missouri 4H/Youth Development Programs provided funding to establish the national extension center for School-Age Child Care (SACC). Under the guidance of Missouri youth staff, the center created a coalition of (11) states to develop program development materials, curriculum, training, and evaluation designs necessary to promote a nationwide program. In 1990 a \$230,000 grant from

the W. K. Kellogg Foundation and the National 4-H Council provided funding for a national center for School-Age Child Care (SACC) education to provide technical assistance to thirty-five communities across the nation who had received approximately \$4 million, from the Cooperative Extension Service, to start School-Age Child Care (SACC) educational programs. In 1993 the national center, again with the guidance of Missouri 4-H staff, expanded to include fourteen land grant institutions as well as to provide a broader range of childcare education and services.

In addition, since 1988 4H/Youth Development Programs provided statewide leadership in facilitating the establishment of School-Age Child Care (SACC) programming to provide professional training and to implement research. The 4-H Adventure Club School-Age Child Care (SACC) Program is currently in fourteen schools that are part of two school districts. This 4-H School-Age Child Care (SACC) Program provides living laboratories for development of programmatic expertise and research sites.

From 1988-1992, in partnership with Missouri Department of Elementary and Secondary Education, 4H/Youth Development Programs provided technical assistance to nearly 100 schools across the state that had received state grants to start School-Age Child Care (SACC) programs. The faculty leader of this program built a national reputation of excellence and now serves as the national youth-at-risk liaison for thirty SACC project sites, working with Wellesley College on its School-Age Child Care (SACC) project of national accreditation, and serving as a member of the advisory board for the Child Care Action Campaign. Another state faculty member serves on the state School-Age Child Care (SACC) Advisory Committee of the Missouri Department of Elementary and Secondary Education. She held officer positions with the Missouri School-Age Care Coalition and served as a Board of Director for Missouri Accreditation of Childhood Education and School-Age Child Care Programs.

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

b. Program Impact:

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

Youth are in safe, nurturing and enriching environments during the non-school hours that promote homework completion and school attendance. According to a recent poll, sixty percent of voters say it is difficult for parents to find after-school programs in their communities (Afterschool Alliance, June 2000). The U.S. General Accounting Office estimates that in 2002, the current number of out-of-school time programs for school-age children will meet only twenty-five percent of the demand in some urban areas (U.S. General Accounting Office, 1998). Children spend only 20% of their waking time in school, because public schools meet only for 6 hours per day, 180 days per year. This leaves 185 days and many hours each day free --- a time of both risk and opportunity (The Future of children, 1999).

Students who spend one to four hours per week in extracurricular activities are 49% less likely to use drugs and 37% less likely to become teen parents than peers who do not participate (U.S. Department of Health and Human Services, 1996). Higher participation is linked to more positive outcomes. One study found that, compared to peers with lower attendance rates, children who attended after-school programs regularly have higher grades and self-esteem. It found that those children who attend programs more frequently achieve more positive outcomes (Baker and

Witt, 1996) Another study found that program children had fewer school absences, better conflict management skills, and better work habits at school than non-program children from the same high crime neighborhoods, and those who attended more frequently had more pronounced effects (Vandell and Pierce, 1999). Quality youth development programs can cut crime immediately and transform this prime time for juvenile crime into golden hours of academic enrichment, wholesome fun and community service. They can provide school-age children and teens with a safe haven from danger and negative influences while providing constructive activities that teach youngsters the values and skills they need to become good neighbors and responsible adults (Fight Crime: Invest in Kids, 2000). Quality youth development programs help children and youth develop a relationship with a caring adult. Such a relationship can be a powerful mediator of compromising environmental factors in the family (e.g., alcoholism) and the community (e.g., poverty) (Feldman, et al, 1987, Schorr, 1988). The educational success of youth is connected to the strength of their local community (Isreal and Beaulieu, 2000).

- c. Source of Funding: Smith-Lever, State, Grants
- d. Scope of Impact: Michigan, Missouri, Ohio

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

- a. Program Description: Community Development Academy

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.

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

- 1) Promote active and representative participation toward enabling all community members to meaningfully influence the decisions that affect their lives.
- 2) 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.
- 3) 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.
- 4) Work actively to enhance the leadership capacity of community members, leaders, and groups within the community.
- 5) Be open to using the full range of action strategies to work toward the long term sustainability and well being of the community.

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

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

b. Program Impact:

Community Development Academy is a Multi-State Extension program and this impact recognizes examples of accomplishment.

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

The Missouri Hospital Association funded the participation of eleven of its members in 2002. They are now requiring that organizations who receive awards in their regional health partnership grant program send teams to the Community Development Academy.

One participant is a Program Coordinator of a Neighborhood Leadership Program for the City of Seattle, Department of Neighborhoods and a Research and Evaluation Aid for a transportation-related trip reduction program through the City of Seattle Strategic Planning Office. His experience in Community Development Academy has helped him with the development of a leadership development program for neighborhoods in Seattle.

An evaluation of the Community Development Academy is currently being conducted to determine the longer-term impacts of participation in this program. The evaluation should be completed in early 2003 with results available later in the spring of 2003. However, there are changes occurring in communities that are partially attributed to participation in the Community Development Academy.

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

The University of Missouri held a conference on Hispanic Immigration Issues in Missouri in March of 2002. As part of that program University Outreach and Extension staff facilitated discussions among very diverse groups of people in order to help establish networks around the State of Missouri that facilitated the development of plans to address a range of issues. Of the 10 facilitators, nine were graduates of the Community Development Academy and only 2 were actually community development staff. Many of these same people are engaged in ongoing programs with Alianzas, an University Outreach and Extension program working on issues related to the growth of the Hispanic community in Missouri.

Community Development Academy-South Africa was established in 1998 as a partnership between the University of Missouri and the University of Pretoria and Medunsa University in South Africa. The Grassroots Community Development Academy in South Africa has become an independent non-governmental organization and serves as the educational resource on working in community in South Africa. This partnership continues to play a critical educational role in shaping the future of development in South Africa. Teams from South Africa have participated in all three courses in Missouri. These teams were built through collaboration among several universities to offer the program in South Africa and continue to provide leadership to the development of a Community Development Academy in South Africa. Courses one and two are now being conducted regularly in South Africa and the impact continues to grow as does demand for the training. Faculty from the University of Missouri assisted with the development and implementation of the program.

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

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

- a. Program Description: Building Community through Public Deliberation

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

In major survey of nearly 17,000 Missouri citizens conducted in 1994, nearly all identified “desired community outcomes” as issues that could be addressed only through public decisions and actions. A review of these issues indicated that a substantial portion were problems that could not be solved unless people worked together at the community level. Recently, local government officials and community leaders and groups have requested decision assistance and support from University Outreach and Extension. Current research suggests that such support is effectively provided through the use of community-based decision making methodologies. As a result, this program was adopted and developed as a means to provide University Outreach and Extension faculty and others with the concepts, methods and materials necessary to engage people at the community-level. The use of this model assumes citizens and community leaders are concerned about civic issues, will willingly participate in deliberation processes surrounding those issues and will take action toward their own community-betterment once they identify the directions to do so.

In the short-term, Missouri learners expressed their need to increase their knowledge about their community, their local governing processes and their empowerment opportunities as a group. They indicated the need to identify the specific local issues they wish to address, recognize the capabilities and assets within their communities, and become familiar with the challenges they face at the local level. Additionally, they indicated the need to master skills to use specific community-driven methods that allow them to come together, foster productive communication, identify common ground, and take action in ways that support collective issue resolution. In the medium-term, Missouri learners expressed the need to put their knowledge into action by

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

b. Program Impact:

Building Community Through Public Deliberation is a Multi-State Extension program. The following impacts are state specific to Missouri:

- 1) Twenty nine people were trained in convening and moderating deliberative public forums at the Missouri October 2002 National Issues Forum Workshop on “Discovering Common Ground on Community Issues” sponsored by University Outreach and Extension. Missouri participants were from the Department of Health and Senior Services, Columbia-Boone County Community Partnership, St. Louis County Economic Council, Missouri Department of Economic Development, Citizens Speak!, and the Missouri Valley Human Resource Community. There were participants from the Southern Growth Policies Board (Raleigh, North Carolina) and the Lyndon Baines Johnson Library and Museum (Austin, TX) as well as 10 lawyers.
- 2) A training for League of Women Voters board members in one central Missouri county focused on choices in planning and conducting public meetings.
- 3) A training program in public deliberation for 21 Hispanic community leaders in Kansas City, sponsored by the Kaufmann Foundation and University Outreach and Extension, was held in December, 2002.
- 4) A partnership was formed in Johnson County involving Central Missouri State University’s Office of Community Engagement, the Warrensburg Chamber of Commerce, University Outreach and Extension and a private citizen (a psychologist) to offer quarterly public deliberative forums to the community. The first forum was held in July 2002 on racial and ethnic tensions followed by a second on terrorism. A third is scheduled for early 2003. To date, almost 50 local citizens have attended the forums and inquiries are increasing as to when the next forum will be held.
- 5) Issues forums and/or public meetings based on the deliberative process were held in Jackson, Johnson, Warren, Saline and St. Louis Counties.
- 6) A deliberative forum on racial and ethnic tensions was held with 34 freshman women at the University of Missouri-Columbia.
- 7) Forums are being conducted using the issue book “Missouri’s Water Resource—Will They be Available for Future Generations.” This book was developed by Extension faculty for use in statewide public deliberations.
- 8) A web-based directory of moderators trained in public deliberation was developed (<http://www.ssu.missouri.edu/pubdelib/>) as a resource for people who wish to convene public forums and need assistance with moderating forums.
- 9) The local issue book “The Long Journey to Work: How do we Connect People and Jobs?” was developed and used in forums on transportation issues for service workers traveling from the inner city to suburban St. Louis.
- 10) An on-line e-newsletter was established to inform all trained moderators and people interested in public deliberation on what is happening in Missouri, forums taking place, future happenings, etc.

11) As a result of public deliberation in Independence, a partnership was formed to address local issues. The partnership includes the Northwest Community Development Corporation, City of Independence, University Outreach and Extension, Van Horn Caring community, Independence Policy Department, United States Department of Justice, COMBAT, Englewood community Association, Fairmount Commercial Club, Van Horn High School, Mount Washington Neighborhood Association, University of Missouri-Kansas City and University of Missouri-Columbia—Department of Community Development.

- c. Source of Funds: Smith-Lever, State
- d. Scope of Impact: Missouri, California, Illinois, Indiana, Iowa, Kansas, Michigan, Minnesota, Nebraska, North Carolina, North Dakota, Ohio, Oklahoma, South Carolina, Texas and Virginia.

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

- a. Program Description: Community Emergency Management Program

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

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

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

- b. Program Impacts:

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

University Outreach and Extension quickly developed a web site (<http://outreach.missouri.edu>) linked to its front page, for disaster recovery information for in response to the ice storm, floods, and tornadoes that occurred in the past year. This web page was held up as an example by State Emergency Management Agency and Federal Emergency Management Agency. Local Extension offices also distributed unique and valuable information to communities and citizens.

University Outreach and Extension used its comprehensive knowledge of the communities to assist State Emergency Management Agency with meeting recovery needs of citizens through local partnerships. Assistance with logistics and personnel support for crucial disaster recovery coordination meetings were provided. Statewide assessment indicated improvement in plans for communities, schools and businesses. Existing organizations were strengthened because of Community Emergency Management Program efforts. Campus disaster planning also



benefited from the program and its staff.

The number of participants attending community disaster education programs is growing. The Community Emergency Management Program in Cooperation with University of Missouri Fire Rescue Training Institute, the State Emergency Management Agency and the Federal Emergency Management Agency conducted 22 courses in community emergency management. Between July 1, 2001 and June 30, 2002. University of Missouri Extension's Fire and Rescue Training Institute conducted 1,097 continuing professional education courses and enrolled 21,171. Courses were held in 92 Missouri counties and participants came from all 114 Missouri counties. Many of these programs dealt with aspects of homeland security, terrorism response and response to a multitude of natural disasters, including wildfires.

Statewide assessment data indicates that University Outreach and Extension is seen as a key source of disaster education and informational materials.

- The Community Emergency Management Program worked extensively with Clay County to improve its plans and readiness. By October 2002, county officials had three separate training activities through the program. After the ice storm, Clay County evaluated and updated its emergency management plan.
- The Community Emergency Management Program launched the new Advanced Crisis Simulation and Education Lab program with Clay County in September 2002 at a County-wide exercise. 30 participants from county government and non governmental organizations attended.
- In August of 2002 the City of Jackson School District put 100 teachers and administrators through a 16 hour disaster response course called Community Emergency Response Team. This led to further discussions of school planning and preparedness.
- The University of Missouri Fire Rescue Training Institute entered into an agreement with the Disaster Recovery Institute International to develop and deliver a 16 hour Business Continuity course. This was the first agreement of this kind between the Institute and a University. The first course was offered in October 2002.
- A 4-hour business planning workshop was offered 4 times in the last 9 months to local audiences.
- The Fire Training and Rescue Institute received a Federal Aviation Administration Airport Safety Enhancement Award in June 2002, "in recognition of outstanding effort in research for and operation of the Mobile Aircraft Rescue and Firefighting Trainer, benefiting Airport Firefighters and the airports they serve..." The self-contained, full size aircraft fire simulator is the first mobile unit that meets FAA requirements for civil airport firefighting and rescue training.
- The U.S. Marine Corps adopted the Fire and Rescue Training Institute's Hazardous Materials Incident Response: Awareness and Hazardous Materials Incident Response: Operations as an integral training program component for the Chemical-Biological Incident Response Team, the Corps' primary terrorism incident response team. The U.S. Army Chemical School at Ft. Leonard Wood, Missouri adopted same two courses by for the U.S. Army and National Guard Civil Support Team training curriculum.

c. Source of Funds: Smith-Lever

d. Scope of Impact: Alabama, Alaska, Arizona, Arkansas, Colorado, Connecticut, Florida, Georgia, Idaho, Illinois, Indiana, Iowa, Kansas, Kentucky, Louisiana, Maine, Maryland, Michigan, Minnesota, Mississippi, Missouri, Montana, Nebraska, Nevada, New Hampshire, New Jersey,

New Mexico, New York, North Carolina, North Dakota, Ohio, Oregon, Pennsylvania, Puerto Rico, South Carolina, South Dakota, Tennessee, Texas, Utah, Virginia, Washington, West Virginia, Wisconsin

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

### a. Program Description – Alianzas: Building Inclusive Communities

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

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

Educational materials have been created or translated, including a Spanish resource manual for health professional and medical interpreters; a directory of Latino organizations and contacts in Kansas City; extension nutrition guide sheets; a tornado safety sheet in Spanish and English; a resource/referral manual on domestic violence and Spanish information capsules on health air on Spanish radio in Kansas City. A website at Missouri Southern State college highlights Latino issues: <http://www.mssc.edu/missouri/index.htm>.

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

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

Alianzas assisted in planning the first Cambio de Colores: A Call to Action conference attended by approximately 300 state, university, and local people who explored the array of Latino and community issues. As a result, an indepth study highlighting issues has been published (<http://muextension.missouri.edu/explore/commdm/dm7615.htm>) and is being shared with key leaders across the state and within the university. The document highlights current issues, policy

implications, and community case studies. Program staff are coordinating the planning and hosting of the second conference March 12-14, 2003.

A legislative brief was developed for Missouri legislators with regard to public safety issues created by lack of drivers licensing options for immigrants. More than 60 individuals located throughout Missouri met in a videoconference to discuss the issue of driver's licenses as they pertain to Latino immigrants. As a result, University Outreach and Extension and Missouri Division of Motor Vehicles are sharing information that can foster easier access to information for immigrants.

In the West Central Area, Spanish "Command Language" training was provided to area service agencies and organizations, and a summer language and culture summer camp is being developed with a focus on children of new immigrant families and established families. In partnership with the Kauffman Foundation, bilingual public issues moderator training and public forums were held on race relations and healthy communities. Race relations forums, planned for 2003, will be integrated into one school district's social studies curriculum.

In Kansas City, work with the Coalition of Hispanic Organizations united more than 20 organizations to discuss Latino business development and the opportunities that exist for new entrepreneurs. This committee is conducting needed research and networking with potential and existing business development organizations to respond to culturally specific needs or emerging demographics. Work with the Mexican Consulate and the Kansas City-Mexico Business Trade Office included a plan for an import-export business incubator to enhance international business development and participation.

In Southwest Missouri, four festivals highlighting Latino culture took place last fall. A small grant from a community foundation was secured to fund child care for victims of domestic violence while they make safety plans, and courses were taught to prevent Latino teen suicide in one school system. Extension faculty took conversational Spanish and Mexican culture classes to enable communication with Latino immigrants.

A program emphasizing literacy in the home for parents and young children took place in Central Missouri. Nutrition and parenting programs were also conducted.

For additional program information see [Alianzas \(http://www.uoealliances.com\)](http://www.uoealliances.com)

b. Program Impact:

Alianzas: Building Inclusive Communities is a Multi-State Extension program. The following impacts are state specific to Missouri.

Citizens who participated in "Building an Inclusive Community" workshop from four Central counties indicated they understand the cycle of socialization, formation of biases, development of reference groups and societal privileges. One participant said: I learned that everyone has experienced some sort of oppression. I wished this workshop would have lasted all week.

The development of a strategic plan was facilitated to address the unmet needs of Latinos in Northeast Kansas City. As a result, more than 80 organizations have been configured to pursue strategic goals. The education subcommittee compiled a "back to school packet", complete with

information on how to be culturally sensitive, which was made available to schools in the Northeast area.

The Mexican Consulate, Memorial Funeral Services, Jewish Vocational Services, Don Bosco and Central Bank have established the Latino/Immigrant Bereavement Fund in Kansas City to offset local and international bereavement costs for financially challenged Latino or immigrant families.

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

- c. Source of Funds: Smith Lever, State
- d. Scope of Impact: Missouri, Kansas, Oklahoma, Nebraska, Iowa, North Dakota, South Dakota, Michigan, Minnesota, Illinois, Indiana, Ohio, Wisconsin. Program staff participated in the North Central Conference on Hispanic issues and the Mid America International Agricultural Consortium conference on Hispanic issues.

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

- a. Program Description: Community Decision Support

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

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

The Office of Social and Economic Data Analysis (OSED) conducts projects, often in conjunction with state agency partners, that focuses on important public policy issues such as transportation and education. During the past year, OSED analyzed the 2000 Census and prepared numerous reports now posted on the web for easy access (<http://www.oseda.missouri.edu>). Users may view by extension region or by state agency regions. Presentations have been conducted via videoconference and streaming video. Collaborative programming with the Missouri Community Development Society and USDA-Rural Development used telephone conferences to reach nearly 160 community and agency leaders across the state to discuss demographic changes and the implications for communities.

A statewide team of regional and state specialists focused on training and programming to better

serve local government officials. First efforts were targeted to the train local extension specialists.

b. Program Impact:

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

Guidance counselors used the study, Expected Earnings Of Howell County Students, to inform students of the costs and benefits of alternative occupational choices.

The City of Kirksville used its study on the impact of tax increment financing to inform the decision to implement a tax increment finance district.

Support of the development of the Boone County Vision Report involved a 58-member citizen team, which produced a vision used by county commissioners to guide land use and growth policy development.

The Kingdom City Highway Coalition used the Kingdom City Transportation Study to inform its successful communication with the Missouri Department of Transportation, which resulted in revision of the interchange design for Highway 54.

Franklin County has used its baseline study to inform and complete a new comprehensive plan.

A formal evaluation of long-term impact of the Community Policy Analysis Center's engagement with communities is planned for the next year.

c. Source of Funds: Smith-Lever, State, contracts, grants

d. Scope of Impact: Missouri, North Carolina, California, and International. The Community Policy Analysis Center also actively participates in national Community Policy Analysis Network.

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

a. Program Description: Missouri Local Government CECH-UP

One of the primary goals of education is to prepare students to become more informed, active and responsible citizens. Citizenship education challenges students to practice civic participation and address problems in their community. By applying academic learning to real-life issues, students strengthen their civic attitude, skills for active citizenship and work-force skills.

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

Missouri Local Government CECH-UP provides Missouri middle school students with the opportunity to observe politics and policy-making first-hand, talk with local officials, study and make recommendations on local issues, and take action on local government issues facing their communities. Students in three Fox junior high schools studied how government operates close to home and how state and local governments fund public services. Their studies included schools and school boards. Students at Willow Springs Middle School dealt with the necessity of taxes

and learned about county positions and responsibilities of each job. Students at Fulton Middle School took field trips to the Callaway County Courthouse, where they watched trials and learned about voting and election process from the County Clerk's staff by participating in a mock election and tallying the votes. They also attended the Fulton City Council meeting and spoke before the Council. More than 150 eighth graders from Owensville Middle School learned about local and county government. The highlight of the program was a visit to the Gasconade County courthouse where the students observed "law day" in the judicial branch of county government. They then toured the other divisions of county government in the afternoon.

b. Program Impact:

Fifth and sixth grade students at Simpson Elementary School in the Fox School District and their parents organized a committee that met the first Saturdays of April and May to clean up trash around the school.

The four sixth grade classes at Sherwood Elementary School in the Fox School District also implemented a school beautification project.

Students of Don Barzowski at Arcadia Valley High School came together with their parents and community members at the Arcadia Forum, where they discussed controversial community issues.

Willow Springs' teachers reported that the program was essential to their curriculum in that it was the only way that their students got information concerning their local government. Students extensively studied state and national government at different levels of their education, and the program provided an opportunity for them to gain information about their local government.

Since CECH-Up is only in its fourth year and involves primarily middle-school students, long-term outcomes have yet to be realized. These outcomes include higher voter participation, more people preparing for and entering public service, and greater involvement in community and local government issues.

c. Source of Funds: Smith-Lever, State

d. Scope of Impact: Missouri

**Key Theme: Family Resource Management**

a. Program Description: Family Financial Management

Increasing the financial literacy of Americans has become a national priority of the past 5 years. Hogarth sums up the importance of financial literacy when she states, "Well-informed, well-educated consumers should make better decisions for their families, increasing their economic security and well-being. Secure families are better able to contribute to vital, thriving communities, further fostering community economic development. Thus, financial literacy is not only important to the individual household and family, it is also important to communities: (2002, Journal of Family and Consumer Sciences, Vol. 94, No. 1).

In spite of the healthy economy of the late nineties, many families are showing signs of financial stress during the current recession. Higher rates of unemployment resulting from lay-offs and

plant closures, tighter job markets for new graduates, and losses and lower returns from financial markets have left some families struggling. Bankruptcy filings in 2001 increased 19% from 2000, reaching almost 1.5 million. This increase is blamed in part to record levels of consumer debt and the economic downturn.

Most financial experts and educators agree that young 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 the young people today have access to and spend a significant amount of money. Having access to money does not translate to the ability to make wise financial and spending decisions.

To meet these needs, educational programming should continue to focus on specific financial management topics such as money management, insurance, credit, saving and investing. In addition, we need to do a better job of helping people access their financial values, attitudes and beliefs and how they influence their financial management behavior. Employees need to increase their understanding of their employee benefits, specifically as they relate to health care and retirement.

To accomplish this, educational programs focus on basic money management, the basics of savings and investing, building financial literacy in youth, retirement planning, financial management for women, estate planning, and consumer decision-making. Audiences have ranged from youth and their teachers, young families, individuals being placed on probation or parole for financial offenses, parents, low income families, families facing financial crisis, and professionals working with low income families.

In FY2002, 28,086 educational contacts were made through family financial management programs. This programming involved 281 partners and 191 volunteers. Included were the following outputs and outcomes:

The Gateway to Financial Fitness program is a collaborative effort in the St. Louis area involving University Outreach and Extension, Catholic Commission on Housing, Neighborhood Housing Services, Federal Deposit Insurance Corporation, the Federal Reserve Bank of St. Louis, Fannie Mae, Housing and Urban Development - St. Louis and banking, financial services and insurance industries. The purpose of the program is to help people learn and practice personal financial skills and in the long run, improve their housing situation. The program involves individual counseling and a series of five workshops. Over 75 workshops have been held since October 2001 reaching 258 participants and utilizing 60 volunteer instructors. Ninety (90) participants completed all five workshops.

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 utilized in educational programs with low-to-moderate income families directly. Two Hundred and eighty (280) educational contacts resulted from implementation of the Money Action Plan curriculum. This included training 44 professionals.

Financial Management for Women programs resulted in 624 educational contacts. These programs target mid-life to older women to increase the financial management skills of this audience. Topics include goal setting, record keeping, credit and debt management, insurance,

saving and investing, and estate planning. These programs typically involve a community coalition in the planning and development.

Two hundred and sixty-eight (268) individuals on probation or parole, mainly for financial related offenses, participated in basic financial management classes conducted by UOE. Participants are often required to attend classes by the judge or their probation officer in an effort to reduce the probability that they will be repeat offenders. Programs focus on differentiating between wants and needs, setting financial goals, tracking income and expenses, planning spending to stay within income, developing the savings habit, establishing or rebuilding a credit history, and maintaining a checking account.

For additional program information see [Personal Finance \(http://www.missourifamilies.org/learningopps/learnfinance/index.htm\)](http://www.missourifamilies.org/learningopps/learnfinance/index.htm); [Consumer and Family Economics \(http://outreach.missouri.edu/hes/money.htm\)](http://outreach.missouri.edu/hes/money.htm); and, [Consumer Economics Update \(http://outreach.missouri.edu/ceupdate/money.html\)](http://outreach.missouri.edu/ceupdate/money.html)

b. Program Impact:

As a result of the Gateway to Financial Fitness program 42 participants enrolled in an Individual Development Account program; participants plan to implement recommended financial management practices in order to become free of credit card debt, increase emergency fund savings, track expenses, using automatic bill paying, evaluate insurance coverage, reassess retirement needs, and make a will.

The results of the Money Action Plan training of professionals indicates that participants plan to implement recommended financial management practices. Results from training in the Southwest region indicate that 93% of participants plan to conduct a personal property inventory; 85% plan to determine the amount of life insurance they need; and 78% plan to complete health records for each family member, develop a plan to reduce debt, calculate needs for disability insurance, and make appropriate consumer complaints when necessary. One participant commented that "I appreciate information provided about my personal finances, once learned personally I won't forget to use the info professionally." A 7-month follow-up to this training indicated that of those responding, 67% had made progress toward their goals, 55% had increased the amount of money they saved, and 78% had reduced their debt level. Additional recommended financial management practices participants had implemented included making more than the minimum payments on credit cards (78%), started or added to an emergency fund (67%), use effective communication skills when discussing money topics (55%).

Most participants in the Financial Planning programs for women indicate that after completing the series they feel more confident about the way they handle their money and more comfortable and confident with financial decision making and dealing with financial professionals. They also report they can better identify their financial goals and feel more positive about managing their money. By the end of the series, participants report having made some changes in their financial behavior. Results from a series in Southwest Missouri indicate that at the end of the series 17% had set up an effective system for organizing and storing financial records, 50% developed the confidence to achieve financial goals, 53% developed the ability to set money priorities, 17% have written financial goals, 35% revised spending and saving goals, 14% reduced debt, 17% made a plan to reduce debt, 14% established investment goals, 32% reviewed retirement goals, 10% started saving on a regular basis, 7% increased the amount saved. Participants also plan to implement financial management practices including 53% plan to set up a record keeping system



for organizing and storing financial records, 58% plan to set financial goals, 58% plan to make a plan to reduce debt, 100% plan to evaluate insurance and implement necessary changes, 46% plan to review and update retirement plans, and 72% plan to start or increase saving.

End of session reports from individuals on probation or parole for financial related offenses and reports from probation officers in Jackson County indicated that 90% indicated they would be tracking their expenses, 100% had at least 3 written goals, 100% of participants identify at least one change in their financial behavior that would allow them to start saving for a specific financial goal, 100% of participants begin developing a spending plan. Probation officers reported positive changes in the financial behavior of their participating probationers. One participant from the Northeast region included this comment - "I put this off as long as I could without going to jail, because I knew it would be awful. After attending the class, I've learned how to budget, set goals, and identify needs vs. wants. This class will help me manage my money better. The hands-on activities were good and made me think about where I spend my money. Thank you for being understanding and helping me feel at ease in the group.

c. Source of Funding: Smith-Lever, State,

d. Scope of Impact: Missouri

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

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

Community leaders are the central force in effectively mobilizing people to address local issues. Effective citizen leaders translate knowledge and commitment into hands-on action to engage in building community networks, make well-informed community decisions and find real solutions to real problems. Ongoing leadership development ensures that communities have the capacity to move forward as current leaders retire from public life.

A handbook, "Community Leadership Development: The EXCEL Approach," extensive website and training for extension specialists provides program guidance. A statewide community leadership conference was held for the first time via videoconference in the spring of 2002.

One-third of Missouri's counties and communities – nearly 4,400 people – have participated in locally driven leadership programs. The number of counties expanding to develop a specific community youth leadership development program has grown in the past year to 15, and additional interest is high.

Effective citizen leaders translate the knowledge they've gained and 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 Outreach and Extension works collaboratively with the local community and its leaders. Frequently, community leaders wonder how to achieve the kind of success they dream about and recognize that they cannot be successful alone or without greater personal capabilities.

For additional program information see [Community Leadership Development \(http://www.ssu.missouri.edu/commdev/cld/cld.htm\)](http://www.ssu.missouri.edu/commdev/cld/cld.htm).

b. Program 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.

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

A parent of a graduate from the Dent County Leadership Academy (a Youth EXCEL) said: *"I just wanted to thank you for the Youth Leadership Academy. My son really enjoyed it and was very blessed to be a part of it. As you know he is home schooled. One of my challenges as a home school parent is make sure he has a well-rounded education. The Outreach and Extension office continues to provide programs that not only is educational, but also fills the social need. The Youth Leadership Academy was a prime example.... We went to UMR's (University of Missouri Rolla) water festival day with our home school group. At one of the activities they divided our group into two teams. They asked one person to be the spokesman for each team. My son's hand shot up. The activity was a question and answer game about the usage of water. When it as their team's time to answer, he pulled his team together asked everyone what their ideas were, made the decision, which one was the best, then he gave the answer. He let everyone on his team have a chance to pick a question and do the special thing they were able to do if they were correct. He congratulated them when they were right and encouraged them if they weren't. He even cheered for the other team. I was really proud of him and the way he handled himself. I know he wouldn't have taken the responsibility to be the team leader and do it so well if it weren't for the leadership training workshop."*

A participant from the Lafayette County program who is tentatively planning to run for state representative in the next election stated, "I'm really glad I went ahead and signed up for LEAD 2000. I have gained tremendously in regards to getting acquainted with other communities in the county, and understanding the issues facing Lafayette County. This will be a big help to me when I prepare to campaign for public office. I'm better prepared to serve the people."

Qualitative observations and interviews showed positive results for the 83 high school students who participated in the Migrant Leadership Academy (over 95% of which were Latino/Hispanic). More students reported that they definitely wanted to finish high school and attend post-high

school education, and more reported feeling empowered in dealing with different types of people and finding resources for their immediate future plans.

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

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

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

### **Key Theme: Parenting**

- a. Program Description: Parenting Education Programs

The Parent Education program is focused on two specific areas of parenting: cooperative coparenting after divorce (Focus on Kids) and anger management (RETHINK), based on identified needs in the state of Missouri.

In the year 2000 in Missouri, over 20,000 children experienced parental divorce. Parental divorce is associated with increased risk of behavioral, psychological, and academic difficulties for children. Research has demonstrated, however, that if divorcing parents can provide consistent, firm parenting, and reduce the amount of conflict to which children are exposed, their children are more likely to show healthy adaptation to the divorce. Furthermore, parents who are divorcing and have at least one child under the age of 18 are required by the state of Missouri to take a 2.5 hour parent education class. Therefore, there is a statewide need for divorce education programs that educate parents about children's responses to divorce and about the importance of minimizing coparental conflict and increasing coparental cooperation.

The RETHINK program was identified by the State Parent Education Team in 1998 as one that could help address the needs found in the county plans of work. It was perceived to be an effective program to use with a variety of parent and youth audiences including divorcing parents, court referred parents and youth, caregivers and other educators who spend a great deal of time with children. In addition, the RETHINK program had already been thoroughly tested, evaluated and found to be successful in a number of other states.

#### **OUTPUTS:**

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

mandated in Missouri and Human Development faculty deliver this program in 29 counties.

RETHINK is an anger management curriculum consisting of six two-hour sessions, with the goals of helping parents identify constructive ways to deal with anger, develop better relationships with their children, use healthy discipline strategies and better understand their children's behavior at different ages. Videos, handouts, overheads, role-plays, flip charts and several hands on activities are used to help meet the program objectives.

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

b. Program Impact:

Evaluation data from parent education programs demonstrate that learners have increased their ability to manage stress, knowledge about child development and how parenting behaviors affect child development, and use of positive parenting behaviors.

Focus on Kids programs involved over 3400 parents during the period of July 01-June 02. Immediate post-test evaluation results show repeatedly that over 90% of the parents indicate that better understand the benefits of cooperating with the other parent in support of their children, understand more about the ways in which parental conflict can harm children and indicate that they plan to avoid arguing or fighting in with the other parent in front of the children. Numerous positive comments have been received from both parents and court personnel about this program. One court administrator wrote, "The Focus on Kids program provides a valuable resource for the court in educating parents as to the possible detrimental effects of divorce proceedings on children and how to avoid those negative effects." Here is a typical parent comment, "The program helped me to understand the benefits to my children if my spouse and I can work cooperatively with each other." A six-month follow-up evaluation of 143 parents who participated in the Focus on Kids program demonstrated that over 90% continued to report that the program helped them to understand the impact of divorce on their children and 94% indicated that the program influenced the decisions they made about handling their children. Furthermore, six months after attending Focus on Kids, almost 92% of participants agreed with the statement that "As a result of the program, I plan to make a stronger effort to work with my ex-spouse for the children's sake." Sixty-three percent reported that they were more cooperative with their ex-spouses as a result of the program and 78% indicated that they were acting in ways to assure that their ex-spouse continued to have a positive and ongoing relationship with the children. Finally, 80% indicated that the program influenced decisions they made regarding their children.

An increasing number of states is requiring divorce education programs. Focus on Kids began as a local program in Columbia, Missouri in 1996, and is now offered in 29 counties. More and more judges and attorneys in the state of Missouri are referring their clients to Focus on Kids. These policy changes at the state and national level demonstrate the confirm the impact of parent education programs, such as Focus on Kids.

Anger management programs involved over 800 parents during the period of July 01-June 02. Evaluation data from a RETHINK anger management program conducted with Early Head Start parents Home Visitors in Sedalia show that around 90% of participants indicated that the program provided them with new knowledge they could use and that they planned to adopt new parenting practices. These results confirm the extensive evaluation data from other states showing that over 90% of RETHINK participants who completed evaluations made positive behavioral changes.

Early Head Start Home Visitors indicated that a year after participating in the RETHINK program, Early Head start parents still make reference to how much the skills that they learned in RETHINK have influenced their relationships with others and impacted their anger management positively and that of their children.

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

### **Key Theme: Parenting; Children, Youth and Families at Risk; Community Development**

- a. Program Description: Effective Black Parenting

In a recent review of the scientific literature on the protective factors that prevent children from becoming involved in risky and dangerous activities such as use of drugs and alcohol, engaging in early sexual activity and getting involved in delinquent activities, the single most powerful factor was being cared for by a loving, yet firm adult. In Missouri there are a large number of African-American parents who are frequently not served by traditional parenting programs and many of these parenting programs do not consider the unique cultural issues that affect Black children. In Missouri it is estimated that there are over parents and grandparents who are the primary caretakers of children.

The Human Resource faculty at Lincoln University identified and adapted a Black Parenting curriculum that addressed basic needs, safety, guidance and the unique challenges faced by Black children including dealing with issues of racism. The program has been conducted in those areas of Missouri in which there are significant numbers of Black grandparents and parents caring for children. Faculty have also developed some special activities to involve fathers in the program, especially non-custodial fathers.

- b. Program Impact:

The Black Parenting Program had 4,602 contacts with adults during the year. Almost 40% of the program participants were fathers or grandfathers. The number of fathers reached by this program is especially important because this is an audience that is very difficult to engage in parenting programs. This is about twice as many fathers as is typically involved in parent education.

In a follow-up survey of 21 past participants in the Black Parenting program, a 20-item parenting inventory was administered. Answers to questions on this inventory provide information about knowledge of parenting behaviors that have been shown to be linked to positive child development. For example, parents over 95% of parents reject the use of physical punishment in handling discipline and 86% endorse the idea of showing children affective and affirmation when they behave in a positive manner. Eighty-five percent of the mothers reported understanding that drinking and smoking during pregnancy would be detrimental to the developing child. There was also evidence that parents understood more about the normal developmental course of children and can provide better safety to children. For example, 95% reported knowing that children under 3 years of age should not be left alone to care for themselves.

Immediately after the program and during the follow-up parents regularly report positive responses to this program. Recently, one parent wrote the following note about what she learned

as a result of participating in the program "Instead of yelling at my child I've learned how to talk to him and listen to what the problem is. Not yelling, using the firm approach, stand firm, look straight in the eye and say what I "need" and mean it."

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

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

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

Over a quarter of a million new jobs have been established in Missouri since 1993. With these new jobs unprecedented demands for affordable housing have followed. Many of the newly established jobs are entry level and represent low annual incomes. During this same period, many rural communities have expressed an interest in attracting businesses to boost slumping economic conditions. The arrival of businesses to any area increases the demand for affordable housing.

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

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

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

University Outreach and Extension sustainable housing and community revitalization programs provide participants with the knowledge and skills necessary to obtain and maintain environmental stability and security, manage human and material resources, while increasing consumer awareness. This is accomplished through educational programs focusing on home ownership, community revitalization, environmental quality, affordable housing, and environmental stewardship. Audiences have ranged from high school students to senior citizens interested in nursing home selection options. The scale of these programming efforts range from

the individual interested in buying his/her first home, to entire communities interested in identifying and inventorying their existing and anticipated housing stock.

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

b. Program Impact:

In Fiscal Year 2002, slightly over 7,600 educational contacts were made through sustainable housing and community revitalization programming efforts. These efforts included 24 partners and over 45 volunteers. The following outputs and outcomes were included:

Missouri Housing Partners Initiative provided homeowner information to over 1500 people. Electronic versions of the request forms are now available.

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

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

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

Stepping Through the Gateway to Financial Fitness is a collaborative program effort developed and presented by Environmental Design and Consumer and Family Economics Regional Extension Specialists, the Catholic Commission on Housing (CCH), Neighborhood Housing Services (NHS), the Federal Deposit Insurance Corporation (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 people's housing conditions.

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

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

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

Short-term outcomes include: responses to follow-up evaluations indicate that all participants in these offerings have made at least one change to improve the air quality in their home as a result of the programming effort.

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

The Housing Profile Protocols: Partnering to Develop Tools that will Foster Community Revitalization and Citizen Empowerment project is a 3-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 effectively allocate resources to address their specific housing needs and issues.

Short-term outcomes include: almost half way through year two of a proposed three year process, two communities in Northwest Missouri have been contacted and are serving as the pilot test sites for both 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 CPAC -- The Community Policy Analysis Center on the Columbia campus, CARES -- The Center for Agricultural, Resource, and Environmental Systems on the Columbia campus; and overseen as principal investigator by the Columbia campus-based University Outreach and Extension State Environmental Design Extension Specialist.

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

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

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

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



The Missouri Department of Elementary and Secondary Education (DESE) identifies technology education as critical for Missouri's youth to attaining educational and employment objectives, fulfilling citizenship responsibilities and pursuing meaningful leisure activities. Assessment data demonstrate the need the science and technology education. In Missouri, 73.6% of fourth-graders are proficient in math; 36.6% are proficient in science. By 10<sup>th</sup> grade, only 10.3% of students are proficient in math, and 5.6% are proficient in science. The DESE website states: "The overarching mission of Technology Education in Missouri is to build citizen understanding develop math and science competency through technology. This enables students to attain appropriate education/ employment objectives, fulfill citizenship responsibilities, and pursue meaningful leisure activities in a technological society."

University Outreach and Extension's Information Technology and Science Education for youth include computer and technology literacy strives at infusing technology education into 4-H club programs, including project work, competitions and administration.

University Outreach and Extension/4-H Youth Development Programs entered into a three-year statewide agreement with AmeriCorps\*VISTA to expand the availability and enhance the quality of at least 50 school-age care programs in ten Missouri counties. Entitled the "After-School Computer Labs VISTA Project," the agreement involves ten University Outreach and Extension specialists to supervise VISTA members to work with low-income communities to establish, support, and sustain high-quality after-school programs serving 2,000 children and teens. State 4-H and Community Development program leaders and faculty at the University of Missouri-Columbia are directing the project. Site supervisors will recruit and coordinate the work of VISTAs as they assist communities in establishing and strengthening school-age care and after-school computer labs. The State 4-H lending library of educational software and other resources is available for use by project sites.

After school computer labs provide upper elementary and middle school age students with a safe place to go and continue learning with adult supervision during out-of-school time. The labs create learning opportunities through recreational use of educational software and interaction with peers and lab volunteers. Youth participants develop social, academic, and technological skills that better prepare them to succeed in school, at work, and at life. A website for after school computer lab resources is being developed. (<http://4h.missouri.edu/go/vista/afterschool.htm>)

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

b. Program Impact:

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

Extension faculty collaborated with local school districts to open 16 after-school computer labs with funding provided by the Missouri Department of Elementary and Secondary Education (DESE). More 50 local schools have partnered with Extension and 4-H faculty on this project over the last three years. A program evaluation study of the 4-H/DESE after school computer labs was conducted in 2002. Data were collected from 16 school districts. The evaluator visited

25 of 87 supported computer labs, collecting data through surveys, in-depth interviews, observations, and examination of source documents. Site directors, students, computer lab staff, principals, teachers, parents and Extension educators were involved. Preliminary findings indicate:

- Many of the students participating do not have other access to technology
- Play-based computer activities assist students in learning academic and social skills. Lab personnel and teachers indicate that these skills transfer to classroom learning and outside interactions.
- Students demonstrate increasing fluency with computer skills and share their expertise with other students and adults.
- Students demonstrate willingness to share, take turns and collaborate with other students.

Extension faculty taught science education to 59,186 students through the Hatching Chicks in the Classroom school enrichment program.

Extension faculty worked with 50 Missouri 7<sup>th</sup> and 8<sup>th</sup> grade science teachers to deliver biotechnology education to 6500 students using the 4-H Field of Genes school enrichment program. Teacher evaluations returned by 16 teachers indicated they reached students in cities, suburbs, small towns and farm communities. Teachers indicated that there was a 7% increase in knowledge scores between pre- and post-testing. They also reported integrating the materials with other classroom content. One teacher responded, “I think this was a good beginning for our city kids. Most of them think food comes from the supermarkets. They know very little about agriculture, so we were really at stage one!” Another wrote, “I think a connection between agriculture and biotechnology was definitely made. My students don’t have much access to agricultural issues since they live in the suburbs. This unit was very beneficial to them.”

Extension faculty worked with 326 volunteers to reach 766 students with 4-H Computer projects. An additional 423 students were reached through 4-H Computer special interest and school enrichment programs.

- c. Source of Funds: Smith-Lever
- d. Scope of Impact: Minnesota, Idaho

Additionally, Missouri is a member of the 4-H Cooperative Curriculum System that has 40 member states (not included are Connecticut, Massachusetts, New Jersey, Rhode Island, Arkansas, Nevada, New Mexico, Oklahoma, South Carolina, and Tennessee).

### **Key Theme: Youth Development, Character/Ethics Education, Children, Youth and Families at Risk**

- a. Program Description: Juvenile Justice Programs

The Juvenile Justice and Delinquent Prevention program facilitated by University Outreach and Extension help prevent negative outcomes for youth by strengthening positive development through comprehensive educational and recreational activities. These program initiatives facilitate the development of positive social skills, increased school achievement, prevention of at-risk behavior and decreased violence for youth. Parent involvement initiatives are designed to provide additional support and networking so parents can better support their children.

University Outreach and Extension programs and outreach efforts in juvenile justice settings are varied.

- a. In Polk County, 4-H faculty and staff provide homework and tutoring services, computer technology classes and Challenge or team building activities to high-risk school-age youth and youth in the county juvenile detention center.
- b. In Dallas County, computer technology classes, leadership development experiences, homework and tutoring services, life skills development classes, character education programs and recreational activities are provided to high-risk youth in school settings.
- c. In Knox county, a 4-H club integrates juvenile offenders into community based programs. Since 1993, the Leadership RAP (Ready and Proud) program has been an integral part of the program at the Boone County Juvenile Justice Center.
- d. The program targets high-risk youth as those are the characteristics of youth in residence at the Boone County Juvenile Justice Center. Youth participating in the program have an opportunity to interact with, and learn from, adult community leaders. Leadership RAP is designed to promote thought in an atmosphere of action and participation. It deals with concepts in the context of participant exercises and videos.
- e. Extension in Rolla was awarded a grant in 2002-03 in conjunction with a Rolla community coalition to enhance services and programs to high need youth. This program includes character education, computer technology, leadership and life skill development experiences, and recreational activities.

b. Program Impacts:

The programs in Polk, Dallas and Phelps counties were designed to increase academic achievement, computer skills, and positive social skills of youth. Other youth outcomes include: an increase in ability to deal with risk-taking in a safe and positive manner, increase leadership opportunities, and an increased sense of personal confidence and decrease youth delinquency and violence. Evaluation of the Polk County program revealed that these outcomes were achieved. Dallas County has just begun its second year of implementation and the program in Rolla began the fall of 2002 so outcome data will be forthcoming.

In Knox County, ten (10) youth have signed up as members of the Untouchables 4-H Club. These youth have been exposed to new challenges, such as leadership, positive reinforcement for their talents and social skills. In February, five of the youth participated in the Knox County UO/E Family night and demonstrated their projects, which include cartooning, astronomy and the Renaissance art form of chain maille. These youth had never been exposed to public speaking, nor had they experiences praise and encouragement for their natural skills. This experience has already proven positive for the youth. Teachers are reporting better self-esteem and enthusiasm they have never witnessed before. Teachers also report more motivation from the students and better adult/authority relationships. Six (6) of the ten (10) students who are in the club are currently under the jurisdiction of the Juvenile office, and the other four have had referrals for mentoring or informal adjustments. Since enrolling in the program in January, all 10 members have maintained or improved their grades, have self-reported more positive self-esteem, and have not had further discipline referrals or delinquencies reported to the juvenile office.

In 2001, 363 youth were admitted to the Boone County Juvenile Justice Center for residential treatment. The average daily population was 27.6 residents. Although the center is specifically designed to serve the needs of youth from Boone and Callaway counties (the 13<sup>th</sup> Circuit), it houses juveniles from other neighboring counties as well. Juveniles are typically placed at the

center only when the severity or chronic nature of their offense dictates removing the youth from their family and community. An evaluation of the Leadership RAP program used with juvenile offenders was conducted using post-release referral data. That analysis showed that there were 33.15% fewer post-release referrals for misbehavior (much of which was criminal) among program participants than among comparable Juvenile Justice Center (JJC) residents who did not participate in the program. The difference was even greater for public order offenses (primarily drug-related). There were 56% fewer public order post release referrals among program participants compared to non-participants. More than 83% of Leadership RAP participants reported that they were better able to resolve conflicts constructively as a result of the program. This is particularly meaningful since inability to resolve conflicts constructively is one of the major factors leading to youth being assigned to the Juvenile Justice Center. Also, more than 91% of Leadership RAP participants agreed that learning was important to their getting what they want in life. This is particularly meaningful since Juvenile Justice Center residents disproportionately do poorly in school and have a high drop out rate.

c. Source of Funds: Smith-Lever

d. Scope of Impact: Missouri

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

a. Program Description: Building Character through Community Service Learning

In celebration of the 100th anniversary of the National 4-H movement, 4-H'ers, friends and family members have shown the importance of service through the 4-H Power of Youth Pledge campaign. Youths and adults were invited to pledge and carry out community service activities. More than 5 million hours of service were pledged on-line, with nearly 100,000 hours pledged by Missouri youth and adults. Community service-learning activities provide an opportunity for youth and adults to work together in solving community problems and improving the quality of life. Service activities vary from planting flowers for community beautification, building playground equipment for a community park, to making weighted vests and blankets for Autistic children. Whatever the activity, participants are learning to work toward a common goal and share their lives with others.

Rather than build a monument, 4-H Youth Development used its broad reach to engage the voices of American in a centennial "Conversation on Youth Development in the 21<sup>st</sup> Century." Across the nation, 4-H and Extension faculty hosted conversations at the county, state and national levels. In the fall of 2001, Missouri's local Conversations on Youth Development involved more than 1,138 citizens from 61 counties. Over 200 persons also participated in the state Conversation on January 22, 2002. At the national level, over 50,000 persons took part in the process, led by Extension 4-H faculty. At these grassroots meetings, policy recommendations were developed. Highest priority was given to the establishment of local, state and national youth advisory boards and the involvement of young people in policy and decision making roles. For additional program information see [Missouri 4-H \(http://mo4h.missouri.edu\)](http://mo4h.missouri.edu).

b. Program Impact:

Building Character through Community Service Learning is a Multi-State Extension program. The following impacts are state specific to Missouri.

1) 4-H Power of Youth Pledge campaign – Community Service Learning. In 2002, the 4-H Power of Youth pledge campaign resulted in 5,030,173 hours of community service pledges. In Missouri, youth and adults pledged 96,562 hours in the following categories:

(1) <u>Category</u>	<u>Total Hours</u>	<u>Total Pledges</u>
Helping an older person	11929	468
Improving my community	8148	419
Working with literacy programs	6055	131
Fighting hunger	5416	254
Helping a younger person	19288	540
Protecting/improving the environment	8563	372
Helping someone with special challenges	6448	221
Mentoring/tutoring	8376	319
Building respect , and tolerance for others	8902	316
Other	13437	145

The Independent Sector places a dollar value of \$16 on volunteer service. Missouri’s 4-H Power of Youth Pledges resulted in more than \$1.5 million in service.

Community service learning continues to be integrated into every aspect of the 4-H Youth Development program in Missouri and the nation. The Missouri 4-H Foundation provides Community Service grants to 4-H groups, with support from private entities. In 2001-02, twenty-two 4-H clubs, which involved over 700 youth and adults, were involved in 3,600 of hours of volunteer service. They utilized \$11,000 of grant dollars and were able to leverage an additional \$61,600 of community support in the form of in-kind equipment, supplies and manpower. For every dollar that the W.T. Kemper Foundation (\$10,000 annually) and Pioneer Hi-Bred International (\$2,500 annually) donate to Missouri 4-H for community service grants- 4-H is able to leverage an additional \$5.60 for community service projects across the state.

2) Conversations on Youth Development – Youth and civic engagement. At these grassroots meetings, policy recommendations were developed. Highest priority was given to the establishment of local, state and national youth advisory boards and the involvement of young people in policy and decision making roles. As a result of these recommendations, Missouri 4-H Youth Development Programs has worked with Governor Bob Holden and established the Governor’s Youth Cabinet and Missouri Youth Network.

Missouri 4-H faculty advised the Governor’s staff on youth empowerment and processes for creating the youth cabinet. The preliminary results of the Conversations were shared with the Governor’s youth policy team, a group of cabinet-level officials from all state agencies. In June 2002, Governor Holden chose the Missouri 4-H Congress as the venue to announce the formation of the Cabinet and Network. Nearly 400 youth, ages 17-22, applied, including numerous 4-H members. Appointments to the Governor’s Youth Cabinet and Missouri Youth Network were announced in August 2002, with work beginning immediately. The Cabinet and Youth Network are envisioned as opportunities to make youth voices heard by Governor Bob Holden, other

elected officials, community leaders and agencies providing services to young people, with the following goals:

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

Following the local and state Conversations on Youth Development, a team of 19 Missourians attended the National Conversation on Youth Development. This team worked tirelessly to keep the positive youth development agenda in the public eye. Among their accomplishments: development and distribution of 1,000 copies of Missouri's recommendations to key decision makers, elected officials, and youth throughout Missouri; hosting a VIP breakfast at the Governor's mansion to share the recommendations and express appreciation for support; press releases, interviews and other media coverage for the Conversations; development of an action plan to build strategic alliances to advance the agenda on youth development. Members of Missouri's Conversation team also assisted with the selection of the Youth Cabinet members. In addition, Missouri 4-H partnered with Citizens for Missouri's Children, a youth policy and advocacy organization to host the state Conversation and develop an agenda for youth development to share with elected officials and decision makers.

With the formation of the Governor's Youth Cabinet and Youth Network, Missouri youth have moved to a new level of engagement in policy and decision-making. In addition to on-going work with the Cabinet and Network, Missouri 4-H has entered an agreement with the Corporation for National and Community Service to place 10 VISTA members in county Extension offices beginning in February 2003. In collaboration with Extension Community Development, a Youth Community Development Program Coordinator has been hired to lead the initiative. The VISTA members will focus on youth and civic engagement, and will work closely with the Governor's Youth Cabinet and Youth Network to broaden the involvement of Missouri youth in public policy work.

- c. Source of Funds: Smith-Lever
- d. Scope of Impact: Conversations on Youth Development and Power of Youth – All 50 states collaborated with National 4-H Council and CSREES/USDA

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

### **Key Theme: Aging**

- a. Program 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 strategic tool; to disseminate culturally appropriate health care information and materials that will empower the minority populations to participate in improving their health. Identify barriers to preventative health care and combat racial and ethnic bias in

research and practice. The Center also provides diversity-training programs through conferences, workshops, and videoconferences.

b. Program Impact:

The *Paula J. Carter Center on Minority Health and Aging* (PJCCMHA) improved the delivery of healthcare services and/or quality of life for minorities and Minority older adults. The following impacts are due to *Paula J. Carter Center on Minority Health and Aging* (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 were trained 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 (10) individuals who completed the entrepreneurial training wrote a business plan and started their own business.

c. Source of Federal Funding: Smith-Lever

d. Scope of Impact: Missouri

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

a. Program Description:

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 23<sup>rd</sup> in the United States in the area of childhood poverty. In addition, Missouri has a high school drop out rate of 13%, and the average grade for completion is 11.1 for high school dropouts. In diverse communities, with large concentrations of minority populations, the statistics are much higher.

Lincoln University Cooperative Research and Extension (LUCRE) programs have been designed to reduce the myriad of risks that youth residing in high risk.

b. Program Impact:

- Youth participants gained knowledge, skills, changed attitudes, and modified behaviors that will have impact on their future.
- 85% of the parents reporting indicated 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 youth participating increased knowledge concerning food safety and science education.
- 70% of the parents reported a change in the attitude of their youth toward school- work. The

- youth have increased positive attitudes toward school -work and are doing a “better job” of turning in their 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.

c. Source of Federal Funding: Smith-Lever, State

d. Scope of Impact: Missouri

### **Key Theme: Communications Skills**

- a. 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 4<sup>th</sup> and 5<sup>th</sup> 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. Program Impact:

Fifty percent (50%) of participating youth reported increased 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 from all over the State of Missouri, of various economic levels, rural and urban, ages 8 to 19 years of age.

c. Source of Federal Funding: Smith-Lever

d. Scope of Impact: Missouri

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

Lincoln University Cooperative Research and Extension (LUCRE) 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.



a. Program Description: Communities, Youth and Families At Risk

The 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 Lincoln University 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. Program 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 after-school.

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 2<sup>nd</sup> 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. Sixty-six (66) people participated in this event.

c. Source of Federal Funding: Smith-Lever

d. Scope of Impact: Missouri

**Key Theme: Community Development**

a. Program Description: Youth Organic Gardening

Ptah Academy is a not-for profit, non-sectarian, African American owned and operated private school serving the St Louis community. PAAS incorporates the use of a holistic learning structure to enhance the academic process of elementary education, creating an environment that is child centered without the use of religion, and spiritually defining organizations. The school serves approximately 40 students in grades Pre-K to 7<sup>th</sup> grade, in a non-graded structure. The founder of Ptah understands the need for student's lives to be enhanced with environmental education and basic gardening information to learn valuable lessons and insight regarding the land and the environment. The organic gardening program focus on primarily of gardening that is free of any pesticides or chemicals. Another focus is on appreciation of the land and the environment as well as basic gardening skills and hands on applications.

b. Program Impact:

Over 60% of participating students continued in the programs and are continuing the gardening

program and are planning for the upcoming growing season.

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

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

- a. Program Description: Community Garden Project

The community garden Project in the Hamilton Heights neighborhood (location St. Louis, MO) unfolded as a result and response to the National Youth Service day that took place in April 2002. On April 27<sup>th</sup> Lincoln University Cooperative Extension, along with 70 youth volunteers participated in National Youth Service Day. This day is one of the largest events in the world, and focuses national and international attention on the ongoing service contributions of young people. The volunteers decided to assist the Hamilton Heights neighborhood by implementing and installation of a community garden. This idea had a twofold rationale, one to beautify the neighborhood due to vacant lots being a current eye sore and to assist seniors in the neighborhood by supplying free food. Weekly meetings were held with the garden volunteers at the Martin Luther King Community

- b. Program Impact:

Eighty percent (80%) of the participants were retained in the program. 70 % percent reported they learned and are using more productive ways of cooperation, teamwork and problem solving. Self-esteem and pride have also increased, as members are able to gain a renewed pride in their neighborhood.

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

### **Key Theme: Conflict Management**

- a. Program Description:

Stowe Middle School serves approximately 400 students, ages 10 to 16. Stowe Middle School is currently designated as a “School of Opportunity” which is indicative of low-test scores and low attendance. Many students who attend Stowe are at risk of educational failure, dropping out of school and/or involvement in delinquent activities. The school attendance is very poor, often due to excessive fighting and high suspension rates. Students at Stowe Middle face many challenges on a daily basis; most of the students often live in a very economically deprived area. Many students come from a culture that fosters violence and students use violence as a survival and coping mechanism. The school currently receives very little social support from the surrounding community and many of the teachers at the school appeared frustrated and overwhelmed with the school climate.

A Peer Mediation Program was developed at Stowe Middle to address school violence issues. A collaborative effort with the National Council on Alcoholism and Drug Abuse assisted training students in the mediation process of resolving disputes. Trained students will be available to

assist their school in obtaining a more peaceful and less violent solutions to conflicts. Mediators meet twice weekly to practice skill building and teamwork exercises.

b. Program Impact:

A pre-test revealed that 80% of the student body at Stowe had poor conflict resolving skills. The mediators learned to work as a team to mediate conflict. To date 50% of students participating in the mediation program have improved communication skills and 10% have gone on to serve as peer mediators. There was no program like this in existence at this school prior to Lincoln University's program implementation. Specific conflict reduction impact will be available at the end of the present academic year.

c. Source of Federal Funding: Smith-Lever

d. Scope of Impact: Missouri

**Key Theme: Family Resource Management**

a. Lincoln University participated in the creation, management and completion of a Parent-Child Activity Center for the U.S. Department of Defense Healthy Parenting Tool Kit. The Parent-Child Activity Center was designed to take information on deployment, relocation and dangerous work from other parts of the tool kit and transform it into a medium easily used by parents and other caregivers of children.

b. Program Impact:

As a result of the development of this kit, the U.S. Department of Defense is considering the manufacture of enough kits to distribute to military bases and installations. In preliminary responses to the kits, 70 % of the participants reviewing the kit have reported it aided in the communication of concerns of family members of military personnel being deployed, or engaging in dangerous military work.

c. Source of Federal Funding: United States Department of Defense

d. Scope of Impact: local, state and national

### III. Stakeholder Input Process

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

- 10 percent of participants were youth under 18.
- Half were men, half women.
- 10 percent were minorities.
- 40 percent had little or no experience with extension educational programs.

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

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

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

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

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

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

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

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

Programming receiving higher priority during 2002 included:

- Emergency Preparedness in relationship to Homeland Security (for local communities) incorporating information from EDEN (the Extension Disaster Education Network <http://www.agctr.lsu.edu/eden/default.aspx>)
- Diabetes Education
- Building Community Through Public Deliberations
- A Conversation on Youth (4-H Youth faculty facilitated statewide effort)
- Value Added Agriculture
- Agriculture Marketing and Business
- Inner City Youth Development

The Missouri Agriculture Research stakeholder input process continues to be the same as reported in the 1999 Plan of Work (POW). There are several advisory committees representing all regions of the state and having members from industry, government, academics and producers. Commodity group representatives met throughout the year. Two areas of the state (Delta region and Southwest Missouri) have asked for more help with horticultural programs. To date, a vegetable specialist was added to the faculty in Columbia and a horticultural research specialist was hired at the Southwest Center in Mt. Vernon. Southwest Center has amended its mission to include a sustainable agriculture program.

#### **IV. Program Review Process**

Missouri made no significant changes in the merit review processes or scientific peer review program since their 5-Year Plan of Work.

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

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

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

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

- Stewardship of Resources

These success factors were revised based on stakeholder recommendations and input from stakeholders, and 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 under-served and under-represented populations of the State?***

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

- The Family Nutrition Education Program. This program provides low-income citizens with the latest nutrition information. Programs include EFNEP, FNP, School-enrichment programs, Body Walk, Health for Every Body, etc.
- The 4-H/Youth Development activities in Goal 5 describe a variety of programs including Adolescent at Risks, Out-of-School Hours, and Workforce Preparation
- The Alianzas: Building Inclusive Communities program under the Community Development theme describes programming to immigrants and the various challenges they face (i.e., discrimination, low-pay, inadequate health insurance, etc.).
- Lincoln University programming such as Small Family Farms Program, Animal Production Efficiency, Grazing, Animal Health, Adding Value to New and Old Agricultural Products, Diversified/Alternative Agriculture, Small Farm Viability, Aging, Children, Youth and Families at Risk, Food Stamp Nutrition Education, Kid’s Beat, Community Skills, Community Development, Community Gardening, Conflict management and Family Resource Management

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

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

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

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

**University of Missouri (1862)**

Agricultural Experiment Station Research  
and University Outreach and Extension

**Multi-State and Integrated Activities**

Key Theme	Program Description	Multi-State Extension (Smith-Lever)	Multi State Integrated Research & Extension (Smith-Lever)	Multi-State Integrated Research & Extension (Hatch)
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	<b>Key Theme</b>	<b>Program Description</b>	<b>Multi-State Extension (Smith-Lever)</b>	<b>Multi State Integrated Research &amp; Extension (Smith-Lever)</b>	<b>Multi-State Integrated Research &amp; Extension (Hatch)</b>
<b>Goal 1</b>	Animal Genomics	Birth Weight			X
	Animal Health	Thermal Stress			X
	Animal Production Efficiency	Feed Supplement			X
	Animal Production Efficiency	Reproductive Management			X
	Grazing	Nutrient Levels			X
	Grazing	Overwintering			X
	Ornamental/ Green Agriculture	Ornamental Plants			X
	Plant Genomics	Aflatoxin			X
	Plant Genomics	disease resistant signaling			X
	Plant Genomics	Fixing Nitrogen			X
	Plant Genomics. Plant Health	Plant Disease			X
	Plant Germplasm	Wheat Breeding			X
	Plant Production Efficiency	Vegetable Crops			X
	Plant Production Efficiency	Integrated Cropping Systems		X	
Rangeland/ Pasture Management	Forages for the 21st Century		X		
<b>Goal 2</b>	Food Safety	Detecting Harmful Bacteria			X
<b>Goal 3</b>	Human Health	Reducing Cancer			X
	Human Health	Targeting Drugs			X
	Human Nutrition	Family Nutrition Program	X	X	
<b>Goal 4</b>	Ag Waste Mgmt, water Quality	Manure Mgmt			X
	Biological Control	bioremediation			X
	Forest crops	forest mgmt			X
	Soil Quality	soil compaction			X
	Wildlife Mgmt	fisheries			X
	Agricultural Waste Mgmt	Animal Waste Mgmt	X	X	
	Water Quality, Soil Erosion, Land Use Planning, Natural Resources Management; Riparian Buffers	Watershed Resource Education		X	
<b>Goal 5</b>	Children, Youth and Families at Risk	Adolescents at risk program	X		

<b>Key Theme</b>	<b>Program Description</b>	<b>Multi-State Extension (Smith-Lever)</b>	<b>Multi State Integrated Research &amp; Extension (Smith-Lever)</b>	<b>Multi-State Integrated Research &amp; Extension (Hatch)</b>
Children, Youth and Families at Risk	Building Strong Families	X		
Children, Youth and Families at Risk	School-Age Child Care & Opportunities for Youth During Out-of-School Hours	X		
Community Development	Community Development Academy	X		
Community Development, Conflict Resolution	Building Community Through Public Deliberation	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		
Leadership Training and Development	EXCEL	X		
Youth Development	Workforce Preparation/Information Technology Education for Youth and DESE After-school Computer Labs	X		
Youth Development/4-H, Leadership	Building Character through Community Service Learning	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**

<b>Title of Planned Program/Activity</b>	<b>FY 2000</b>	<b>FY 2001</b>	<b>FY 2002</b>	<b>FY 2003</b>	<b>FY 2004</b>
Goal 1 (3) Livestock Systems	<u>\$12,500</u>	<u>\$12,500</u>	<u>\$ 11,500</u>	_____	_____
Goal 4 (2) Animal Waste Mgmt	<u>\$78,000</u>	<u>\$78,000</u>	<u>\$ 82,000</u>	_____	_____
Goal 5 (7) Affordable Housing	<u>\$9,000</u>	<u>0</u>	<u>\$ 0</u>	_____	_____
Goal 5 (9) 4-H Youth	<u>\$126,000</u>	<u>\$126,000</u>	<u>\$150,000 *</u>	_____	_____
Goal 5 (12) Leadership Development	<u>\$300,000</u>	<u>\$300,000</u>	<u>\$179,484 **</u>	_____	_____
Goal 3 Nutrition and Health	<u>0</u>	<u>\$2,000</u>	<u>\$ 2,500 ***</u>	_____	_____
Goal 5 Adolescents at Risk	<u>0</u>	<u>\$7,000</u>	<u>0</u>	_____	_____
_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____
<b>Total</b>	<u>\$525,500</u>	<u>\$525,500</u>	<u>\$425,484</u>	_____	_____

\*includes: Adolescents at Risk, School-Age Child Care & 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)**



