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**AREERA Plan of Work – FY2000-2004**  
**Agricultural Experiment Station – University of Missouri**  
**Cooperative Research Program – Lincoln University**  
**University Outreach and Extension – University of Missouri System**  
**Cooperative Extension Service – Lincoln University**

**Introduction**

This Plan of Work covers the following units at the University of Missouri and Lincoln University:

- Agricultural Experiment Station – University of Missouri – Columbia
- Cooperative Research Programs – Lincoln University
- University Outreach and Extension – University of Missouri System
- Cooperative Extension Service – Lincoln University

**Research and Extension Programs.** The research programs and extension educational programs included in this Plan of Work are noted in the following table. Full descriptions, addressing each of the points included in the guidelines, follow. The programs are grouped by the four units: Agricultural Experiment Station – University of Missouri-Columbia; Cooperative Research Programs – Lincoln University; University Outreach and Extension – University of Missouri System; and Cooperative Extension Service – Lincoln University

National Goals Institutions	Goal 1 – An agricultural system that is highly competitive in the global economy	Goal 2 – A safe and secure food and fiber system	Goal 3 – A healthy, well-nourished population	Goal 4 – Greater harmony between agriculture and environment	Goal 5 – Enhanced economic opportunity & quality of life for Americans
1862 Research Missouri Agricultural Experiment Station – UMC	1.Crop Production 2.Crop Physiology 3.Crop Protection 4.Animal Genomics 5.Reproductive Physiology 6. Econ. Analysis 7.Value Added Agriculture 8.Forage and Livestock 9.Animal Disease and Health 10.Crop Genomics 11.Precision Agriculture	1.Food Safety	1.Improving Human Nutri. and Health 2.Molecular Mineral Nutrition	1.Climate & Long Range Forecasting 2.Climate Variables 3.Agroforestry Landscape Anal. 4.Improved Water Quality 5.Animal Waste Management 6.Stream & Wildlife Ecology 7.Soil Science and Fertility	1.Agricultural Policy 2.Fundamental Social Science 4.Community Development 5.Marketing 6.Quality of Life
1890 Lincoln University – Cooperativ	CRIS Projects: MOX-OC94-610 MOX-OC94-611 MOX-OC95-612 MOX-OC97-613		CRIS Projects MOX-OH94-524 MOX-OH97-525	CRIS Projects MOX-OP92-803 MOX-OP98-418	

e Research Program	MOX-OE97-705 MOX-OP96-416 MOX-OP97-417 MOX-OP92-803 MOX-OP98-418		MOX-OH97-526 MOX-OH97-527 MOX-OH98-528		
1862 – University of Missouri System, University Outreach and Extension	Programs: 1. Integrated Cropping Systems. 2. Forages for the 21 <sup>st</sup> Century. 3. Profitable & Sustainable Livestock Production Utilization Systems	NOTE: Programming related to this Goal is included in Goal #1, Goal #3 and Goal #4.	Programs: 1. Healthy New You 2. Show-Me Body Walk 3. Nutrition Communication Center 4. MO Nutrition Network 5. Nutrition Education Workshops 6. Food Safety	Programs: 1. Protecting Missouri Watersheds from Soil Erosion 2. Animal Waste Management 3. Nutrient Management on Missouri Cropland.	Programs: 1. Child Care 2. Older Adults 3. Adolescents at Risk 4. Parent Education 5. Building Strong Families 6. Family Financial Mgt. 7. Affordable Housing 8. Effective Black Parenting 9. 4-H Youth 10. School Age Child Care 11. Science and Technology Edn. 12. Volunteer Leadership Dev.
UMC Research UM Extension Integrated R/E	See Section on Integrated Research and Extension efforts.				
UM Multi-State Extension	See Section on Multi-State Extension Programs.				
1890 Lincoln University – Cooperative Extension Service	1. Small Farm Family Program 2. Sheep and Goat Production 3. Value Added Fiber Program 4. Market Develop. for MO Products 5. Horticulture Production 6. Socially Disadvantage Farmer Program	1. Safe and Secure Food and Fiber System	1. Achieve a Healthier, More Well Nourished Population 2. Missouri Center on Minority and Aging Program 3. Home Horticulture 4. Small Farm Families and Urban Gardening		1. Human Resource Development 2. Enhance Economic Opportunities and the QoL among Families and Communities 3. Community and Economic Development

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

## **Executive Summary**

This 2000-2004 plan of work for the Missouri Agricultural Experiment Station (MOAES) has been prepared in response to the 1998 Farm Bill Agricultural Research, Extension, and Education Reform Act (AREERA). This Act authorized the Cooperative State Research, Education and Extension Service (CSREES) to implement revised procedures for the use of federal research and extension funding with its partner institutions.

The MOAES plan includes an overview of priority research areas for the federal fiscal years 2000-2004, information about procedures used to receive stakeholder input into MOAES programming, the process for the peer review of project proposals, an explanation of multi-disciplinary, multi-institutional, and multi-state research involvement by MOAES scientists, and an explanation of the emphasis being placed on the integration of research and extension programming by MOAES and University Outreach and Extension.

This plan of work for MOAES lays out the research programs under the five national goals established by CSREES for research and extension. The plan includes 9 programs for Goal 1, 1 program for Goal 2, 2 programs for Goal 3, 8 programs for Goal 4, and 5 programs for Goal 5. Under each Goal, the projected amount of federal base funding that will be allocated over fiscal years 2000-2004 is reported.

## **Research Overview for the 2000-2004 Plan of Work for the Missouri Agricultural Experiment Station**

The mission of the Missouri Agricultural Experiment Station (MOAES) is to conduct problem solving research that helps the state's citizens make the most effective use possible of the state's natural resource base, including its people resources, in competing in an increasingly global economy.

Scientists in MOAES have academic homes in the College of Agriculture, Food and Natural Resources, the College of Human and Environmental Sciences, and the College of Veterinary Medicine, and also conduct collaborative research with colleagues at Lincoln University, Jefferson City.

In the 1990s, the MOAES prepared a series of white papers with stakeholder input to identify the changes that are occurring in Missouri's agriculture and natural resource base and to propose ways for the MOAES to respond to citizen needs. The white papers made four critical observations about research needs:

- ☐ Agricultural producers and agribusiness firms are now part of a global food system.
- ☐ The global food system is rapidly converting from an agricultural producer-driven system to a consumer-driven system.
- ☐ Consumers have shifted from having concerns about food availability to being concerned about food safety, food quality, and impact of production practices on the environment.
- ☐ Future opportunities will be defined by the extent to which we respond to advantages of a changing global food system, the state's natural resources, the quantity and quality of the research-based knowledge

available as the basis for making decisions.

Based on this input and other planning within MOAES, five strategic research initiatives were developed that relate directly to the five national goals of CSREES, and to critical issues at the state, regional, national, and international levels in agriculture and natural resources. These initiatives are:

**Biotechnology/Life Sciences:** MOAES scientists are working to develop new animal, plant and microbial products, value-added commodities and pest-resistant strains to decrease chemical use. The MOAES is providing information to broaden the knowledge base of genetics, the life processes of plants, animals, and microorganisms, and the interactions of life forms.

**Natural Resources:** MOAES is striving to maintain the quality of water, soil and air by identifying and applying management principles and a systems approach for the use and protection of natural resources. Faculty and staff are also assessing the implications of public policies on our natural resources and environment. Focus areas are water quality, watershed management, and animal waste management.

**Economic and Social Development:** MOAES is moving to improve economic and social development by designing strategies for profitable technologies and systems, market development, new-decision-making models and by building support services for family stability and community development. Focus areas are new generation cooperatives, value-added agriculture and international marketing.

**Food Production and Nutrition:** MOAES is improving plants and livestock and developing systems for processing, handling and storage of foods for a more efficient and safer supply. Focus areas are plant biology, genetics, and breeding, animal nutrition and reproduction, and food quality and safety.

**Integrated Crop Management:** MOAES is developing ways to minimize economic, health and environmental risks and increase profitability by developing sustainable systems for crop and livestock production, with key elements being integrated pest management and precision agriculture.

### **Stakeholder Input Process**

Stakeholder input for MOAES research planning and programming is received through the following channels:

**Advisory Committees for Farms and Centers:** Each farm or center in MOAES has a group of citizens from its region of the state who provides information on research and demonstration needs. These groups meet at least twice yearly.

**Advisory Committee to CAFNR Dean and Director:** A group of stakeholders representing producers, industry, government, and academic sectors meets once a year and provides advice about how to improve the College's education and research programs.

**Advisory Committee to SNR (School of Natural Resources) Director:** A stakeholder group comes to campus twice yearly and meets with the administration and faculty of SNR to recommend priority needs.

**Missouri Agricultural Land Management Resource Institute (MALMRI):** This institute was formalized by MOAES in 1989, and consists of representatives from the Missouri Department of Conservation, Missouri Department of Natural Resources, Missouri Department of Agriculture, Farm Services Agency, Natural Resources Conservation Service, University Outreach and Extension, and CAFNR. This group meets monthly to discuss areas of mutual concern.

**Missouri Agriculture and Natural Resources White Papers:** These were prepared in the 1990s with stakeholder input to identify and describe trends in Missouri agriculture and rural Missouri and to assess the implications of changes that are occurring. The purpose was to assist MOAES in establishing priorities and planning programs. The first set of eight reports provided background information on the future economic, social, and technical environment of agriculture. The second set of three reports examined the challenges and opportunities facing selected industries and identified some of the research needed to help Missouri agriculture achieve its potential.

**Core Stakeholder Review of this Plan of Work:** A group of 20 people representing the constituencies of MOAES was sent a draft of this plan of work. This submitted plan reflects the input of this stakeholder group.

### **Scientific Peer Review of MOAES Projects**

All research projects funded through the MOAES undergo a peer review. The Unit Leader in which the MOAES project is initiated appoints a three-person review committee for each proposal. When appropriate, a reviewer(s) from outside the Unit, including other universities, may be appointed by the Unit Leader. Reviewers are selected on the basis of research expertise in the relevant field(s). The Unit Leader designates the chair of the review committee. It is the responsibility of the committee chair to develop a consensus report of the review. The reviewers use an approved form for their report and address the scientific value, relevance, quality of the proposal, and also provide suggestions for alterations/or improvement, cooperation with other individuals or research units, and a recommendation.

After a project has been approved by the peer review committee and the Unit Leader, the Unit Leader forwards the proposal, the peer committee's consensus report, and a statement prepared by the project leader if he/she disagrees with any of recommendations from the reviewers and did not incorporate them into the final draft, to the Associate Director of the MOAES. The Associate Director communicates with the Unit Leader on any changes to be made in the proposal or the CRIS forms. After approval by the Associate Director, the proposal and CRIS forms are forwarded to CSREES for approval.

### **Multi-state and Multi-disciplinary Research**

Scientists who have appointments in MOAES are encouraged to participate in multi-state and multi-disciplinary projects and committees consistent with their professional needs, the needs of their research programs, and the goals of MOAES.

The extent of this involvement is clear from the following summary of the current representation of MOAES scientists in multi-state projects and committees: 24 NC projects, 32 NCR committees, 13 NCA committees, 2 NCS committees, 2 NCT committees, and 17 others (national, NE, S, and W).

The MOAES subscribes to the criteria for multi-state research projects developed by the North Central Regional Association (NCRA) in 1995. Projects should include the following: problem-solving research, high priority for the region, multi-disciplinary, multi-state (at least 3), assure accountability, direct impact/outcome to society/people, leverage additional support, demonstrate commitment of resource, and have a plan to implement the transfer of technology. The NCRA identified and implemented eight areas for cross-cutting research: systems, biodiversity, integrated pest management, natural resources and environment, economic issues, social issues, food safety and nutrition, and waste management. A list of funded regional projects in which Missouri is participating is included at the head of each goal.

The MOAES contributes to a six-state consortium in animal waste management. Members are the land-grant institutions in Iowa, Indiana, Michigan, Missouri, North Carolina, and Oklahoma, which provide funding to collaborating scientists to be used to supplement ongoing research, demonstration, and outreach projects in animal waste management.

The MOAES also has a number of research and extension grants that involved several states.

### **Integrated Research and Extension Activities**

The integration of research and extension programming is a long-standing ethos in MOAES, CAFNR, and University Outreach and Extension. This integration is best illustrated by pointing out that, with few exceptions, MOAES scientists have joint appointments with teaching or extension with the expectations that the research programs of scientists with these appointments will be inter-connected with their teaching or extension appointments. The research program of MOAES is driven by the needs of the state and region in agriculture and natural resources which require an integration of research, demonstration, and outreach, including technological transfer, to provide solutions.

The Farms and Centers of MOAES provide an important source of information to solve region-specific problems in agriculture and natural resources. The Advisory Committee at the Farms and Centers will be encouraged to be more active participants in program planning. Interactions among campus-based faculty and staff and those at the Farms and Centers will be fostered. Regional Extension specialists will continue to be encouraged to participate in the research and demonstration projects at the Farms and Centers.

An excellent example of research-extension integration is provided by the Missouri Watershed Initiative which was started in the 1990s to help communities develop local answers to their water quality problems, as part of the Water Quality Program of the state. Its purpose is to incorporate recommendations from interdisciplinary research and extension programs into local decision making on watershed land use and management. Groups involved in this initiative are the Watershed Advisory Council, Local Watershed Steering Committee, and the University Interdisciplinary Research and Extension teams.

### **Annual Report:**

Participants in the following described programs will be asked to submit progress reports yearly. Impact statements will be requested as a part of their reports. These reports will be synthesized into an annual report for the Missouri Agricultural Experiment Station.

**Funding:**

Missouri expends \$26,807,000 in federal dollars and state appropriations on the five research goals. A breakdown of federal and state funds is shown at the end of each goal.

**Reaching Underrepresented Groups:**

The College of Agriculture, Food and Natural Resources (CAFNR) and MOAES recognize that reaching underrepresented groups is an important part of the land-grant mission in recruiting students and in delivering programs. For example, CAFNR has a scholarship program (Carver Graduate Fellowship) for minority graduate students in food and agricultural sciences. This supplements the campus minority scholarship program.

The MOAES is making an inventory of research that is geared to small farms and sustainable uses in collaboration with University Outreach and Extension, Lincoln University and state and federal agencies within MALMRI. The Office of Social and Economic Data Analysis (OSED) is developing a demographic database to identify the underrepresented groups in Missouri, and the MALMRI agencies will then identify improved ways to meet their needs.

The close proximity of Lincoln University (LU) and MU and electronic capabilities provide easy access to the facilities and information for mutual benefit of research and academic programs at each institution. Collaborations exist for grant proposals, manuscripts, and statistical services, and each year projects are reviewed to avoid duplication of efforts. LU faculty members have adjunct professorships in Animal Sciences, Plant Sciences, Natural Resources, and Food Sciences Units. MU's Center of Agricultural Resource and Environmental Systems (CARES) is collaborating with the LU Geographic Information Systems and Remote Sensing Laboratory. Collaboration among human nutrition researchers has been underway since 1991 under a series of subcontracts. Joint proposals for health and disability research among those on low income and minorities were made to the National Institute of Disability and Rehabilitation Research. MU plan scientists are working with LU's faculty on vegetable research and outreach in southeast Missouri.

***Goal 1: An Agricultural System that is Highly Competitive in the Global Economy*****CROP PRODUCTION****Program:**

- \* Improving practices that will lead to greater crop production, the production of higher quality crops and crops that fit special niches.

**Statement of Issue(s):**

- \* Crop production in Missouri is faced with a wide range of environmental problems that include drought, flooding, cold weather, hot weather, insects, and microbial pathogen damage. Research is needed to determine best practices for growing crops under these abiotic and biotic stress conditions.

**Performance Goals:**

- \* Improving crop production techniques that will lead to higher productivity and better quality products for human and animal consumption.

**Output Indicators:**

- \* Greater productivity with less damage to the environment.



Outcome Indicators:

- \* Improved soil resources, less pollution and increased profitability in our crop production systems.

**Key Program Components:**

- \* improve the consistency of crop production during periods of abiotic and biotic stress;
- \* produce crops during more months of the year and with the soil covered for more of the year to prevent erosion;
- \* evaluate and introduce new crops and newly developed varieties of old crops that will improve production and profitability.

**Internal and External Linkages:**

- \* Internal linkages will include crop physiologists, horticulturists, plant pathologists, entomologists, soil scientists, agricultural engineers, agricultural economists, and state extension specialists.
- \* External linkages will include state and federal government agencies, including industry representatives, growers, and the general public.

**Target Audiences:**

- \* The research results will be most critical for state extension experts who will communicate the information directly to growers or co-op representatives who work directly with growers. The new practices will be used in courses to train students in various areas of crop production, as well as in extension education events.

**Evaluation Framework:**

- \* The results of the research can be directly measured by monitoring changes in grower production practices that incorporate results of these research projects. This information can be obtained by working with regional extension experts around the state.

**Program Duration:**

- \* This program will continue for the five years of this plan.

**CROP PHYSIOLOGY**

**Program:**

- \* Understanding mechanisms involved in crop growth and development that will lead to higher yields and to higher quality products.

**Statement of Issue(s):**

- \* Missouri farmers are faced with crop production problems that include: too much water, too little water, lack of nutrients, toxic levels of aluminum in acid soils, developing plant strategies to produce high quality forages, grains or special products.

**Performance Goals:**

- \* Improved understanding of plant structure and function that will lead to higher yields and higher quality products.

**Output Indicators:**

- \* Published reports on basic discoveries on plant physiological responses.

**Outcome Indicators:**

- \* Improved production practices based on better understanding of crop physiology.

**Key Program Components:**

- \* improving our knowledge of how plants respond to stresses such as drought, nutrient deficient soils, acid soils, and aluminum toxic soils;

- \* improving value-added traits;
- \* improving cropping system practices based on new knowledge of crop physiological processes.

**Internal and External Linkages:**

- \* Information will be shared with geneticists, biochemists, molecular biologists, plant breeders, extension experts, federal researchers, researchers at other universities and industries. When practical, research results will be given directly to producers.

**Target Audiences:**

- \* Results of crop physiology research will be delivered to faculty to update their physiological information in teaching of undergraduate and graduate students. This information will be distributed around the world when it is published in refereed journals. These results will be delivered to extension personnel and on to producers and industry researchers as well.

**Evaluation Framework:**

- \* Evaluation of the program will be made by the Dean and Director with input from the Associate Dean and Director, the Unit Leaders, members of grower groups, industry and government agencies from throughout the state. Student evaluations will provide information on the impact of the new research on the teaching program.

**Program Duration:**

- \* This program will continue for the five years of the plan.

**CROP PROTECTION**

**Statement of Issue(s):**

- \* Insects, pathogens and weeds reduce the quantity and quality of agricultural crops. The use of pesticides to control these agents has ecological and economic impacts on agricultural production. New strategies for controlling pests, including biopesticides, transgenic crops, and alternative management practices can reduce pest damage and the pesticide use needed for their control.

**Performance Goal(s):**

- \* Improve the quality and quantity of agricultural production and develop environmentally compatible crop management strategies that reduce the impact of biotic agents while minimizing environmental impacts associated with their control.

Output Indicators:

- \* Impact of insects, diseases, and weeds on agricultural production systems.
- \* Increased knowledge of the biological interactions between insects, diseases, and weeds with crops under agricultural management.
- \* Factors in the development of pesticide resistance by insects, diseases, and weeds.
- \* Basic research on the development and mode of action of management strategies.
- \* Basic research on the interaction of transgenic crops with insects, diseases, and weeds.

Outcome Indicators:

- \* Use of scientific data to improve crop management to reduce the impact of biotic agents.
- \* Improved knowledge about the interaction of biotic agents and their host plants on the population, cellular, and molecular levels.
- \* Improved monitoring of resistance development and development of new strategies for management of resistance.
- \* Development of biopesticides and transgenic crops that reduce the impact of insects, diseases, or weeds.

**Key Program Components:** Research projects will focus on:

- \* discovery of more effective, efficient, and sustainable methods for controlling insects, diseases, and weeds
- \* the ecology, behavior, and genetics of insects, diseases, and weeds that impact agricultural production
- \* potential new applications for growth regulators and other biopesticides against pests of field and horticultural crops
- \* development of mating disruption as a method of insect management
- \* evaluation of the impact of transgenic crops on integrated plant pest management

**Internal and External Linkages:**

- \* Existing partnerships with extension/outreach, federal and state agencies, other universities, stakeholders throughout the state, and the private sector will continue and will be enhanced. Since crop protection issues are not unique to Missouri, we continue to work cooperatively with scientists in other states through multi-state research projects and externally granted research projects. Linkages with the agricultural industry will become more important as transgenic crops are developed and made commercially available. Crop protection issues associated with transgenic crops will necessitate collaborative efforts with the industries that develop them. Additionally, we will continue to work with growers as they make the transition from traditional to transgenic crops.

**Target Audiences:**

- \* Our research programs are designed to meet the needs of agricultural producers, agricultural industries, and policy makers for state and federal agencies.

**Program Duration:**

- \* This program will continue for the five-year duration of this plan.

## **ANIMAL GENOMICS**

**Program:**

- \* Improved efficiency of production of animal protein through identification of specific genes influencing growth, disease resistance, reproductive rate, and meat quality.

**Statement of Issue(s):**

- \* Consumer concern regarding food cost, quality, and safety, as well as farm animal welfare encourage development of genomic technology for efficiently producing high quality animal protein at low cost and with less reliance on growth promotants and antibiotics.

**Performance goals:**

- \* Reduced reliance on growth promotants and antibiotics in livestock production. Increased market shares for the Missouri livestock and poultry producers and allied industries. Increased access to foreign markets.

Output Indicators:

- \* Publication of gene sequences.
- \* Publication of research identifying gene functions.
- \* Patents for tests for genetic markers.

Outcome Indicators:

- \* Application of commercial tests for markers identifying propensity for genetic disease, enhanced reproductive rate, increased growth rate, and improved meat quality.

**Key Program Components:**

- \* Identification of genetic markers associated with variation in reproductive performance, growth, meat quality, and disease resistance.

- \* Identification of timing of gene expression during the reproductive process.
- \* Identification of the function of gene products expressed during the reproductive process.

**Internal and External Linkages:**

- \* Linkages exist among the animal sciences programs at MU and those at other Midwestern universities (Iowa State University and the University of Nebraska), with USDA research programs, with the genomics program in Plant Sciences at MU and with the private sector.

**Target Audiences:**

- \* Livestock and poultry producers, livestock breed associations, breeding companies and the pharmaceutical industry will apply these technologies.

**Program Duration:**

- \* This program will continue for the five-year span of this plan.

**REPRODUCTIVE PHYSIOLOGY**

**Program:**

- \* Improved efficiency of animal production through increased reproductive performance and improved reproductive technologies.

**Statement of Issue(s):**

- \* Consumers expect animal food products that are economical, safe and of high quality. Increased animal production with reduced plant and human resources will be necessary to provide a safe, adequate food supply for future increased world populations.

**Performance goals:**

- \* Improved reproductive performance and genetic make-up of domestic farm animals.

**Output indicators:**

- \* Publication of new discoveries in high-quality, refereed scientific journals.
- \* Patents for new technologies.
- \* Record of external funding to support research.

**Outcome indicators:**

- \* Development and application of new technologies for improved reproductive performance.
- \* Identification of endocrine, cellular and molecular mechanisms regulating reproductive processes in farm animals.
- \* Identification and alteration of genes associated with improved reproductive performance and growth.

**Key program components:**

- \* The main thrust is to understand physiological mechanisms associated with increased fertility in domestic farm species. Emphasis is on ovarian function, *in vitro* fertilization, early embryonic development, maternal recognition of pregnancy and development of transgenic offspring. Identification of gene products linked to improved reproductive and productive traits will be used to develop new reproductive treatment regimens to improve reproductive performance and labor efficiency of farm animal operations.

**Internal and external linkages:**

- \* There are strong linkages within the group in reproductive biology in animal sciences. In addition, there is linkage with other sectors of the university, universities within the north central region, nationally and internationally, and with private industry.

**Target Audiences:**

- \* Consumers, livestock producers, livestock associated companies and pharmaceutical companies will benefit from basic science and technologies developed.

**Program duration:**

- \* The program will continue for the five-year duration of the plan.

**ECONOMIC ANALYSIS:**

Globally Competitive Agricultural System: Economic Analyses of a Sustainable Sector and Its Component Parts

**Statement of Issue(s):**

- \* The agricultural sector is in economic crisis, which is most pronounced in production agriculture, with some financial problems in the marketing and processing (agribusiness) sub-sectors. Present indicators suggest that this will continue through much of the five year planning period. From an economic research perspective these problems resolve into the need to **reduce costs** of production per unit of output throughout the sector, and **enhance revenues** of participating firms, resulting in the highest and best use of rural resources. Illustrative of the former are such things as the determination of least cost combinations of feed rations; minimum cost, value-added processing plant designs for agribusiness firms; and analysis of the role of expensive seed from the biotechnology industry. The latter is illustrated by the need to identify profitable niche markets, optimal size marketing facilities to compete in the international arena, investigation of opportunities for new generation cooperatives to process raw commodities, economic analyses of the production of industrial products from agricultural feedstocks, and efforts to identify preserve crops and livestock to preserve their integrity, thus enhancing their value.

**Performance Goals:**

- \* The objective of this research program is to determine the uses for resources in the agricultural sector that will generate at least as high returns as those obtained by the application of similar resources to comparable uses elsewhere in the economy. Although the primary focus will be on Missouri firms, some of the issues have no geographic boundaries.

**Key Program Components:**

- \* In broad terms, the work will be focused on micro and macro components. In fact, a matrix of these two components applied to production, processing and marketing yields six cells that categorize the work to be done.

**Internal and External Linkages:**

- \* Economists often serve as staff advisors to decision-makers. This type of collaborative relationship will characterize the interaction they will have with fellow researchers in MOAES. These internal relationships will generate adjustments in multi disciplinary research so that an element of economic feasibility will be integrated into recommendations concerning such things as fertilizer mixes, environmentally acceptable pesticide application rates, and market-focused production systems. External linkages will be with cooperating firms, especially in the marketing/processing areas, as well as with policy makers at the state, national and international level. The latter will be especially important in dealing with economic development and sustainability issues.

**Target Audiences:**

- \* Paralleling the above linkages are the target audiences with one variation. Commercial farmers will be reached both via collaboration with other researchers and directly in those instances where economic advice, e.g., results of price forecasting research, applies directly to them. Increasingly, the Electronic

Bulletin Board will reach the farm audience via the Internet. In the cases of processors and marketing firms, the linkage relationships will constitute the most direct channel to that target audience. Finally, the target audience of policy makers will be reached in most cases as a result of their requests for policy analyses.

**Evaluation Framework:**

- \* The primary evaluation of the work will be done as a component of the regular five year review of the Social Sciences Unit at MU by a team organized in conjunction with CSREES. The ultimate evaluation, of course, will be repeated requests for advice over time from policy makers, farmers, fellow researchers, and agribusiness personnel.

**Output Indicators:**

- \* Results of these economic analyses will be communicated in analytical reports, oral presentations, and via the Internet, as well as the conventional means, e.g., via news releases, radio and TV. However, the results that will really impact the competitive position of those in the sector will be the reductions in per unit costs and increases in revenue, i.e., the enhancement of net returns, while maintaining the sustainability of the sector via research on such things as the economics of soil conservation and preservation of water quality.

**Outcome Indicators:**

- \* The increase in sector net revenue alluded to above will be a reflection of physical manifestations such as reductions in volumes of expensive inputs used per unit of output, increases in quantity of high value products marketed, enhanced value-added processing opportunities, increased volume of Identity Preserved commodities marketed and similar indicators. The important consequence of the overall effort is to strengthen the competitive position of Missouri agriculture worldwide, while maintaining the sustainability of the system.

**Program Duration:**

- \* This program will continue for the five-year life of the plan.

**VALUE-ADDED AGRICULTURE**

**Statement of Issues(s):**

- \* Adding value to renewable natural resources is seen by many as a way to increase economic activity within the state. This is particularly important in rural and other "under-served" communities, but is not limited to these settings.

**Performance Goals:**

- \* Individuals will be enabled to develop or access new technologies and business systems to support value-added activities

Output Indicators:

- \* New technologies developed and assessed for applicability to the Missouri setting.
- \* Evaluation and development of organizational structures and business systems suitable for use in entrepreneurial settings.

Outcome Indicators:

- \* Increased numbers of new businesses started
- \* New products and processes enter the marketplace.
- \* Increased economic activity.

**Key Program Components:**

- \* New ways of converting raw materials into consumer products.

- \* Methods for appropriate information transfer of new technologies.
- \* Organizational alternatives that foster business development.

**Internal and External Linkages:**

- \* There are many research programs working in the area of value-adding for renewable resources, both within MU and other research institutions. Both formal and informal networks will be developed to encourage scholarly activity in this area. When possible, linkages with new and existing industries will be supported.

**Target Audience:**

- \* Start-up and expanding businesses in Missouri, particularly in rural and under-served communities.

**Program duration:**

- \* This program area will continue for the five-year duration of the plan of work.

**FORAGE/LIVESTOCK: A FORAGE/LIVESTOCK SYSTEM THAT IS HIGHLY COMPETITIVE IN THE GLOBAL ECONOMY.**

**Statement of Issue(s):**

- \* As our global economy continues to open and expand, products from our forage/livestock system will face both increased competition and enhanced market opportunities. Missouri forage and forage-based livestock producers and their associated industries will require improved information and technologies in order to produce and market their products competitively both domestically and internationally.

**Performance Goals:**

- \* Improved profitability and market shares for Missouri produced forages and forage-based livestock enterprises.

Output Indicators:

- \* Level of production of forage-based livestock and forages in the state.
- \* Improved production practices for forage/livestock producers stemming from problem solving research.
- \* Outreach efforts, research demonstrations, publications, etc. derived from forage/livestock research programs.

Outcome Indicators:

- \* Enhanced trade opportunities for Missouri forage/livestock products, both domestically and internationally.
- \* Improved domestic market share for Missouri forage/livestock products.
- \* Increased profitability of Missouri forage/livestock enterprises.

**Key Program Components:**

- \* Improved grazing systems for beef cattle production;
- \* Supplementation strategies for more profitable and efficient ruminant livestock production;
- \* Value-added strategies for livestock producers;
- \* Improved forages for ruminant livestock production.

**Internal and External Linkages:**

- \* Partnerships will be continued and improved with research and extension faculty at both other universities and within MU, with federal employees such as ARS employees and their labs, with governmental agencies such as NRCS and their employees, and with appropriate individuals and institutions in the private sector. Linkages with private industry and commodity groups will be important in the facilitation of technology transfer.

**Target Audiences:**

- \* The primary audience will be livestock and forage producers, and those professionals who work with and counsel these producers. A secondary audience will be the associated industries that provide products to producers, or that purchase, process or handle the forage/livestock being produced. Another audience will be policy makers, agencies and others that regulate and otherwise set policy effecting the producers. And a final audience will be the consumers of the livestock products and the general public in terms of how such production practices improve animal health and welfare, and natural resource sustainability.

**Evaluation Framework:**

- \* Individual projects will be evaluated based upon successful completion of stated goals, publications, grants and other outside resources secured, and technology transferred and adopted by the intended audience. Evaluation of the overall program will include these individual program accomplishments, plus a more comprehensive review of the scope and scale of the forage/livestock research efforts including a research needs assessment of the forage/livestock industry, major problems being addressed, and improved technologies being developed.

**Program Duration:**

- \* This research program will continue for the five-year duration of this plan.

**ANIMAL DISEASE AND HEALTH****Statement of Issue(s):**

- \* The status of animal health in production units is dependent upon factors such as proper management, nutrition, and the absence of infectious agents. Management systems can have an impact on the health status of production units. Production units (cattle, poultry and swine) are susceptible to infectious diseases. Diseases of particular importance involve the respiratory, enteric, and reproductive systems. Producers, animal specialists, and food animal veterinarians need more scientific information concerning the role of environmental factors, nutrition and infectious agents in order to make recommendations related to animal health.

**Performance Goal(s):**

- \* Additional scientific data is needed concerning the effect of management systems on the health of animals in production units. There is a need for geologic surveys of the blood level of micronutrients in cattle. Additional scientific data are needed concerning the effects of endophyte-infected fescue on production. Improved molecular genetic procedures are needed to evaluate the genetics of production traits and disease susceptibility in cattle and swine. Additional increased scientific data concerning the development and activation of the bovine immune system are needed to develop improved vaccines for infectious agents. Additional studies are required to eliminate voids concerning the pathogenesis of noninfectious and infectious diseases of food animals and horses.

**Output Indicators:**

- \* Identify the role of management systems on animal health.
- \* Documentation of the geographic distribution of micronutrient deficiencies in production units.
- \* Detection of genetic abnormalities in production animals.
- \* Data concerning the role of physiological factors in the development and activation of the bovine immune system.
- \* Diagnostic methods for the detection of infectious agents involved in respiratory, enteric, and reproductive diseases.



### Outcome Indicators:

- \* Utilization of scientific data to improve management systems to maintain animal health.
- \* Increase utilization of scientific data in the formulation of recommendations for the treatment of micronutrient deficiencies in production animals.
- \* Improve diagnostic procedures to detect genetic abnormalities in production animals.
- \* Improve control measures and vaccines for infectious diseases of food animals.
- \* Improve diagnostic procedures for the detection of agents responsible for infectious diseases of production animals.

### **Key Program Components:**

- \* Characterization of health and disease status of several swine production systems. Geographic surveys of the blood micronutrient status in feeder cattle.
- \* Genetic basis of melanoma in swine and cystic ovaries in dairy cattle.
- \* Basic research on the bovine immune system and pathogenesis of infectious diseases.
- \* Characterization of cellular receptors in cattle related to immune responses.
- \* Identification and characterization of sarcocystidae parasites.
- \* Studies on the alteration of leukocytes associated with equine chronic obstructive pulmonary disease.
- \* Pathology of equine laminitis.

### **Internal and External Linkages:**

- \* Partnerships exist with extension and outreach, other universities, federal agencies, and the private sector. These linkages will be utilized as avenues for technology transfer to producers, animal specialists, and food animal veterinarians. Results obtained from the above programs, with the exception of micronutrient status of cattle, are applicable to other regions and states. The availability of documented scientific information will be used to increase food production and make available a constant supply of safe animal products. In addition, veterinary practitioners should be able to use this information in the diagnosis and treatment of both noninfectious and infectious diseases of production animals.

### **Program Duration:**

- \* This program will continue for the five-year duration of this plan.

## **PLANT GENOMICS**

### **Statement of Issue(s):**

- \* Plant genetics has advanced rapidly from studies of traits and their expression to an analysis and manipulation of individual genes responsible for these traits. Genomic analysis with proteomic analysis to assess the levels, and type, of proteins produced in response to developmental or environmental signals are now a requirement for genetic analysis, plant breeding, and the genetic engineering of crop plants.

### **Performance Goals:**

- \* Improve the germplasm base of the major crops grown in Missouri, focusing on soybean, corn, wheat, and forages.
- \* Provide breeding programs with improved germplasm for cultivar development
- \* Improve specific traits of selected crop plants.

### Output Indicators:

- \* Develop genetically improved germplasm for use in crop breeding programs.
- \* Publish results in peer-reviewed journals.
- \* Deposit crop gene sequences in public databases.

- \* Construct combined physical and genetic maps.
- \* Produce user-friendly data mining algorithms ('bioinformatics') for the scientific community.

Outcome Indicators:

- \* Hold public workshops in genomic techniques, measuring success by the number of applicants and the feedback received.
- \* Demonstrate yield and quality improvements from the use of new cultivars.
- \* Show expanded uses and markets for selected identity-preserved crops.

**Key Program Components:**

- \* Identify and provide an initial characterization of genes of agronomic and biological interest, focusing on maize and soybean
- \* Contribute to mapping the corn genome and gene identification using molecular marker techniques
- \* Make 'libraries' of cDNA from various soybean tissues and analyze them by high through-put sequence analysis of individual members
- \* Employ molecular marker techniques, especially in the soybean breeding program, to develop varieties with improved agronomic and food/feed quality traits.

**Internal and External Linkages:**

- \* Internally, collaborations among faculty in Biochemistry, Biological Sciences, Plant Sciences, and the ARS Plant Genetics Unit on factors influencing total gene expression in crop plants, especially corn and soybeans.
- \* Externally, collaborations with other universities, including University of Illinois, University of Minnesota, Iowa State University, Stanford University, and Northern Arizona University, commodity groups, and industry.

**Target Audiences:**

- \* Crop scientists and geneticists in public and private plant breeding programs
- \* Crop breeders
- \* Colleagues working in plant biotechnology in the public and private sectors

**Program Duration:** This program will continue for the five-year duration of this plan.

**PRECISION AGRICULTURE**

**Statement of Issue(s):**

- \* Increasing economic and environmental pressures are requiring producers to become more efficient in their use of crop production inputs. Precision agriculture systems and technologies, which use intensive information to target and optimize inputs, hold promise for improving returns and reducing environmental risks. Missouri producers must have access to knowledge and technologies that allow them to tailor precision agriculture principles to their specific farming conditions.

**Performance Goals:**

- \* Increased availability of precision agriculture information and technologies applicable to Missouri producers and agribusinesses. Increased adoption of sound, research-based precision agriculture methods by Missouri producers.

Output Indicators:

- \* Better methods for collecting, interpreting, and utilizing precision agriculture data.
- \* New management systems that use precision agriculture data to control variable-rate inputs.

- \* Research results documenting environmental and economic effects of precision agriculture in Missouri conditions.

**Outcome Indicators:**

- \* Increased access to applicable precision agriculture information for Missouri producers and agribusiness.
- \* Increased adoption of appropriate precision agriculture systems by Missouri producers.

**Key Program Components:**

- \* accurately characterizing soil, landscape, crop pest, and crop production variability under Missouri conditions;
- \* developing and applying sensors and sensing and control systems for more efficient and affordable precision agriculture data collection and utilization;
- \* determining site-specific cause and effect relationships in Missouri crop production;
- \* developing and evaluating variable-rate input (e.g. nitrogen fertilizer) plans for improved efficiency; and
- \* quantifying environmental and economic benefits of selected precision management systems.

**Internal and External Linkages:**

- \* Partnership will be continued with extension, federal labs, other universities, and the private sector, as appropriate. We will focus on shared responsibilities for the agreed research objectives of projects and we will use joint ventures with industry to facilitate technology transfer. The coordination role of the Missouri Precision Agriculture Center (MPAC) will be important in developing and maintaining these linkages. MPAC includes MU research and extension faculty, along with federal (USDA-ARS) researchers, industry representatives and producers working together to address research, extension, and instructional issues relative to precision agriculture in Missouri.

**Target Audiences:**

- \* We will focus on Missouri crop producers of all sizes. When appropriate, special attention will be devoted to traditionally underserved sectors.

**Program Duration:**

- \* This program will continue for the 5-year life of the plan.

**Allocated Resources:**

<b>YEAR</b>	<b>FTEs</b>	<b>Federal</b>	<b>State Appropriation</b>
2000	58.2	\$4,406,000	\$15,811,000
2001	58.2	\$4,406,000	\$15,811,000
2002	58.2	\$4,406,000	\$16,000,000
2003	60	\$4,500,000	\$16,000,000
2004	60	\$4,500,000	\$16,500,000

**Anticipated Impacts:**

Scientists will provide information to help Missouri producers in the following areas:

- Breeding plants for specific traits, including industrial and pharmaceutical uses.
- Identifying alternative crops for increased profitability.
- Improving crop yields using seed with resistance to diseases, insects, and weather conditions.
- Developing new commercial/industrial uses for soybeans.
- Developing marketing cooperatives.
- Improving forages and grazing practices.
- Developing transgenic animals for use in organ transplants

## **Regional Projects**

Missouri is participating in the following regional projects:

W-112: Reproductive performance in domestic ruminants

NC-119: Management systems for improved decision making and profitability of dairy herds

W-173: Stress factors of farm animals and other effects on performance

NC-113: Methods to increase reproductive efficiency in cattle

NC-185: Metabolic relationships in supply of nutrients for lactating cows

NC-142: Regulations of photosynthetic processes

NC-136: Improvement of thermal processes for food

NC-193: Development of pest management strategies for forage alfalfa persistence

NC-205: Ecology and management of European corn borer and other stalk-boring lepidoptera

NC-140: Rootstock and interstem effects on pome and stone fruit trees

S-274: Integrated management of arthropod pests of livestock and poultry

NC-107: Bovine respiratory disease: risk factors, pathogens, diagnosis and management

NC-225: Improved grazing systems for beef cattle

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

### **FOOD SAFETY**

#### **Statement of Issue(s):**

- \* Changes in food production and distribution systems raise questions about the safety of our food supply. We need a new understanding of the interrelationships of production, processing, distribution and storage on chemical, biological and physical hazards found in food products. In addition, consumers need tools to accurately assess the risks associated with foods, and how to protect themselves against unnecessary hazards.

#### **Performance Goals:**

- \* A more complete understanding of the role of various factors in assuring food safety from production to final consumption. Consumers will be able to make informed decisions about food safety issues.

#### Output Indicator:

- \* Intervention strategies at production, processing and consumption levels that will decrease the potential for food-borne hazards.

#### Outcome Indicators:

- \* Increased physical health of Missourians.
- \* Increased economic health of Missourians and Missouri-based companies due to an increase in productivity and a decrease in health care and insurance related expenses.

#### **Key Program Components:**

- \* Novel ways to prevent the growth and pathogenic bacteria in raw and lightly processed food products, particularly meat products.
- \* Relationships of microbial ecology and pathogen growth in food products.
- \* New technologies and novel application of technologies to eliminate food-borne hazards.

#### **Internal and External Linkages:**

- \* There are many research programs working in the area of food safety, both within MU and in other research institutions. Both formal and informal networks will be developed to encourage scholarly activity in this area. When possible, linkages with food processors will be supported.

**Target Audiences:**

- \* Technological applications will be focused on food producers and processors, but the intended target of the program is all citizens of the state.

**Program Duration:**

- \* This program will continue for the duration of the five-year plan of work.

**Allocated Resources:**

YEAR	FTE's	Federal	State Appropriations
2000	1.6	\$144,000	\$243,000
2001	1.6	\$144,000	\$243,000
2002	1.6	\$144,000	\$243,000
2003	2	\$146,000	\$243,000
2004	2	\$146,000	\$243,000

**Anticipated Impacts:**

New information and technologies will be developed to improve food for consumers in the following manner:

- Developing nutritious, but low-fat ice cream.
- Increasing shelf life and reducing microbial growth of packaged beef through applications or organic acids.
- Developing freezing method to improve transport and storage of frozen foods.
- Developing new alternative for lactose-intolerant people.

**Regional Project(s):**

Missouri is participating in the following regional project:

NC-129: Fusarium mycotoxins in cereal grains.

***Goal 3: A Healthy, Well-Nourished Population***

**IMPROVING HUMAN NUTRITION AND HEALTH**

**Statement of Issue(s):**

- \* At the point of application, dietary nutrients have two critical roles to play: the prevention of nutritional deficiency diseases; and the promotion of optimal health. While the former is reasonably well understood, the latter is the subject of much debate. Consumers need more scientifically defensible information concerning the relationship between dietary components and health to avoid being misled by unfounded claims that might be potentially hazardous.

**Performance Goals:**

- \* Increased scientific data (both applied and basic) explaining and clarifying the relationships between specific dietary components and human health.

Output Indicators:

- \* Improving of dietary practices and cultural factors that contribute to health.
- \* Explaining the role of nutrients and cellular metabolites in promoting health metabolic processes.

Outcome Indicators:

- \* Increased use of scientifically defensible nutritional science information in nutrition education materials.
- \* Improved human health by those who adopt the factual nutrition education recommendations.

**Key Program Components:**

- \* nutritional habits and practices of various populations; and,
- \* roles and nutrients and other cellular components in regulation of metabolic processes

**Internal and External Linkages:**

- \* Existing partnerships with extension/outreach, other universities, and the private sector will be maintained and expanded and new linkages will be identified and developed. We will cooperate with various state government agencies to facilitate dissemination of scientifically defensible, health-promoting nutritional information. Because nutrition and health are not specifically limited to any particular state or region, our research efforts will complement similar efforts across both the region and the country. As more scientific data are gathered, agricultural producers will have the opportunity to incorporate this knowledge (through biotechnology) into the production of more healthful food products.

**Program Duration:**

- \* This program will continue for the five-year duration of this plan.

**MOLECULAR MINERAL NUTRITION**

**Statement of Issue(s):**

- \* Human health, at the most basic level, is largely controlled by the action of various chemicals within the cell. Recent attention has focused on the role of minerals such as calcium, iron, zinc, and selenium in regulating gene expression. A potentially significant step forward in both health promotion and disease prevention may be achieved through a more complete understanding of how specific nutrients modulate metabolic processes within the cell and, thus, affect the entire organism.

**Performance Goals:**

- \* Enhanced understanding through basic science-generated research of the particular roles that specific mineral nutrients have in regulating cellular processes and metabolism.

Output Indicators:

- \* Better understanding of how cellular mineral nutrient uptake and export are regulated.
- \* Basic research results demonstrating the mechanism by which mineral nutrients regulate gene expression and the outcome of such regulation.

Outcome Indicators:

- \* Increased use of newly discovered basic scientific data to reduce the risk of either nutritional deficiencies or toxicities.
- \* Increased utilization of basic scientific knowledge to modify gene function, resulting in improved human health and enhanced disease prevention.

**Key Program Components:**

- \* examining selenium-sensitive genes to study the role of these genes in maintaining selenoenzyme activities, and characterizing various selenoenzymes to assess their capacity to predict selenium requirements;
- \* examining zinc-responsive genes to determine their roles in the accumulation of zinc in cells and the mechanism of homeostatic control
- \* applying the data generated through the examination of selenium and zinc metabolic regulation to other mineral nutrients.

**Internal and External Linkages:**

- \* Existing partnerships with extension/outreach, other universities, federal agencies, and the private sector will be maintained and expanded, and new linkages will be identified and developed and avenues for technology transfer will be examined. Because nutrition and health are not specifically limited to any particular state or region, our research efforts will complement similar efforts across both the region and the country. As more scientific data are gathered, agricultural producers will have the opportunity to incorporate this knowledge (through biotechnology) into the production of more healthful food products. Additionally, medical practitioners should be able to use the information to treat various medical conditions.

**Program Duration:**

- \* This program will continue for the five-year duration of this plan.

**Allocated Resources:**

YEAR	FTE's	Federal	State Appropriations
2000	1.6	\$218,000	\$481,000
2001	1.6	\$218,000	\$481,000
2002	1.6	\$218,000	\$481,000
2003	2	\$222,000	\$485,000
2004	2	\$222,000	\$485,000

**Anticipated Impacts:**

To improve the health of the population of the state, projects are in place to provide the following information.

- Identifying vulnerable populations from national nutrient intake data.
- Identifying mechanisms through which zinc affects growth and development.
- Completing a survey on factors affecting obesity in children.

***Goal 4: An Agricultural System which Protects Natural Resources and the Environment***

**CLIMATE AND LONG RANGE FORECASTING**

**Program:**

- \* Role of short wave-long wave interaction and frontal development in mid-latitude cyclone formation

**Statement of Issue(s):**

- \* In order to better understand atmospheric evolutionary processes, the interaction of various atmospheric circulation systems needs to be studied.

**Performance Goals:**

- \* A better understanding of the interaction of mid-latitude cyclones (low pressure areas) and their frontal systems with longer wave patterns in the atmospheric flow. A better understanding of the distribution of "potential vorticity," a basic atmospheric variable, in these interactions.

**Output Indicators:**

- \* Better understanding of the process of formation of occluded frontal zones in typical developing mid-latitude cyclones.
- \* Increased basic knowledge about the distribution of potential vorticity
- \* Within short wave - long wave interactions in atmospheric flow.

**Outcome Indicators:**

- \* Improved mid-range forecasting can come with better knowledge of the atmospheric flow interactions being studied here.
- \* Improved short range forecasting will depend on better understanding of the dynamics of frontal processes.

**Key Program Components:**

- \* use of computerized atmospheric simulation models to produce idealized atmospheric data
- \* construction and use of a trajectory model to follow individual air parcels in the data
- \* use of various computer programs to analyze and display output data

**Internal and External Linkages:**

- \* This research is aided by interactions with the MU computing facility and with other external university and federal research facilities.

**Target Audiences:**

- \* Improved weather forecasts will aid all sectors of the population.

**Program Duration:**

- \* This program has a termination date of 31 August 1999.

**CLIMATE VARIABLES****Statement of Issue(s):**

- \* Climate change and the dynamic mechanisms leading to climate change on both global and regional scales has been of paramount interest to the agricultural community and the general public in recent years. This interest has been generated by phenomenon such as El Nino and weather disasters such as the Midwestern droughts of 1988 and 1998, or the disastrous Mississippi River drainage basin floods of 1993. Various mechanisms have been examined in order to explain long and short-term global climate variations, including the effect of increasing carbon dioxide concentrations, which have ostensibly been linked to human activities. These activities include agricultural activities as well. Climate fluctuations due to natural variability inherent in the climate system have also been examined extensively. In particular, interannual variability in Midwestern climates have been linked to coupled ocean-atmosphere phenomena such as El Nino and Southern Oscillation, and the North Pacific Oscillation.

**Performance Goals:**

- \* This project seeks to increase the understanding of how interannual variability in large-scale atmospheric flow regimes, in particular blocking flows, as forced by sea surface temperature variations in the Pacific Ocean basin influence local climatic variables as well, especially those that impact on the local economy



and agricultural community. These variables include temperature, precipitation, and the length of the growing season.

**Output Indicators:**

- \* Increased understanding of the dynamics associated with interannual variability in the large-scale flow and blocking.
- \* Development and update the climatological databases and the description of large-scale dynamics which describe blocking life cycles.

**Outcome Indicators:**

- \* Determine how large-scale flow regime interannual variability impacts on local climatic variables.
- \* Improved understanding of information associated with interannual variability of local climate. This information can be used for seasonal forecasting to enhance the preparedness of agricultural community for growing seasons.

**Key Program Components:**

- \* The global climatological and dynamic characteristics of blocking including interannual variability.
- \* Model studies to determine the effects of climate change on large-scale flow regimes, including the increase of atmospheric carbon dioxide concentrations.
- \* The local climatological character of heavy precipitation events, including interannual variability.
- \* The local climatological character of the growing season, including an examination of the issuance of frost and freeze procedures.

**Internal and External Linkages:**

- \* Partnerships will continue with the Missouri Climate Center and the National Weather Service Offices in Pleasant Hill, Missouri and St. Charles, Missouri.

**Target Audiences:**

- \* This research program will focus on meeting the needs of the agricultural community, state and federal agencies, and the general public.

**Program Duration:**

- \* This program will continue for the five-year duration of this plan.

**AGROFORESTRY**

An assessment of agroforestry's physical, biological, economic, and social benefits.

**Statement of Issue(s):**

- \* Due to the long-term environmental consequences of current land-use practices (i.e., soil erosion, chemical pollution of waterways etc.), research on the benefits, (production and protection) of intentionally combining trees and/or shrubs with crops and/or livestock is needed.

**Performance Goals:**

- \* Increased application of agroforestry technology for conservation and financial benefits on the small family farm.

**Output Indicators:**

- \* An understanding of the ecological roles and functions of agroforestry practices.
- \* A determination of the potential for economic diversification and rural development through income-generating enterprises associated with agroforestry.

- \* An understanding of the socio-economic bases for landowner and collaborative group adoption of agroforestry technology.

Outcome Indicators:

- \* Improved knowledge base on the economic, environmental, and social benefits of agroforestry.
- \* Increased application of agroforestry technology on the small, family farm.

**Key Program Components:**

- \* identifying species and selections for use in agroforestry practices;
- \* developing a scientific basis for designing agroforestry practices;
- \* evaluating and demonstrating the environmental, ecological, and economic benefits of properly designed agroforestry practices;
- \* evaluate and demonstrate the production benefits of agroforestry; and
- \* identify and quantify the economic and social factors that facilitate or constrain the adoption of agroforestry.

**Internal and External Linkages:**

- \* Partnerships are currently in place with the USDA, Forest Service, Natural Resource Conservation Service and the Agricultural Research Service; the Missouri Department of Conservation; University of Nebraska and Iowa State University; the UM Extension Service; and, Hammon's Products Company in the private sector. Linkages, especially with the private sector, will be expanded.

**Target Audiences:**

- \* This program is focused on benefiting the owners of small family farms.

**Program Duration:**

- \* This program will continue for the five-year duration of this plan.

**LANDSCAPE ANALYSIS**

**Statement of Issue(s):**

- \* As domestic agriculture and human populations expand, natural resource professionals must have access to the latest spatial data analysis technologies to understand the impact of anthropogenic factors on natural resources at the landscape scale and to mitigate those problems through effective management and planning. Geographic information systems (GIS) and other computer-based spatial analysis technologies provide increasingly important new tools for dealing with landscape scale problems relating to the agriculture-natural resource interface.

**Performance Goals:**

Output Indicators:

- \* Expanded research on the application of GIS to natural resource management and agricultural/land use planning.
- \* New educational programs in landscape analysis and GIS Applications.

Outcome Indicators:

- \* Reduced negative impact of agriculture on natural resources
- \* Improved quality life for Missouri's citizens resulting from enhanced environmental quality.
- \* Improved habitat management for the maintenance of biodiversity.
- \* Capacity for resource planning and management at the landscape scale

**Key Program Components:**

- \* Application of spatial data analysis technologies to natural resource planning and management.

- \* Development of new spatial data analysis approaches and software.
- \* Landscape scale effects of agricultural practices on living and nonliving resources
- \* Education programs in spatial data analysis/applications for CAFNR students.
- \* Continuing education courses for resource agency professionals and teachers in GIS applications.

**Internal and External Linkages:**

- \* Both multi-disciplinary partnerships among campus academic programs (Institute for Spatial Analysis) and interagency partnerships (Missouri Resource Assessment Partnership) will be established or continued as appropriate for this goal. We will utilize these two consortiums to develop research protocols for multidisciplinary solutions to resource problems and educational programs that provide an understanding of spatial data applications in real world settings.

**Target Audiences:**

- \* Our research program will focus on meeting the needs of resource managers and planners in state and federal agencies and the private sector. Academic programs will be designed to target graduate and undergraduate students, resource agency professionals, secondary school educators and the private sector.

**Program Duration:**

- \* This program will continue for the five-year duration of this plan.

**IMPROVED WATER QUALITY THROUGH DECISIONS BASED ON SOUND SCIENTIFIC EVIDENCE.**

**Statement of Issue(s):**

- \* All citizens should have access to a high quality, safe water supply. Recent statewide strategic planning by UM Outreach and Extension, conducted in all Missouri counties, found that water quality was the most frequently voiced concern. Further, expanding residential use of agricultural lands and increasing intensification of agricultural operations make a complex scenario for water quality.

**Performance Goals:**

- \* Improvement in quality of drinking water, where necessary, and maintenance of water quality for Missouri citizens.

Output Indicators:

- \* Increased public confidence in the quality of public drinking water.
- \* Reduced treatment costs for public drinking water supplies.

Outcome Indicators:

- \* Improvement or maintenance of existing public drinking water supply quality in terms of measurable standards.
- \* Reduced levels of contaminants in public water supply through adoption of improved agricultural and residential waste disposal practices.
- \* Greater opportunities for economic growth and development in Missouri communities related to the ability to provide a consistently high quality water supply.
- \* Ability of communities to effectively find sustainable solutions to their water quality problems.

**Key Program Components:**

- \* monitoring seasonal patterns in the trophic state of Missouri reservoirs and monitoring the health of Missouri streams;
- \* developing an understanding of the sources and pathways of microbes and nutrients across the watershed landscape;

- \* developing a decision support system that identifies the effects of alternative land use/management activities on farm income, soil erosion, surface water quality and fishery characteristics at the sub-watershed level;
- \* developing acceptable alternative management strategies that minimize environmental impact or appropriate mitigation protocols to enable watershed restoration;
- \* increasing the understanding of characteristics of watershed residents and users to gain effective public involvement at the watershed-level to address water quality-related issues; and
- \* initiating economic baseline studies that show community impacts related to water quality.

#### **Internal and External Linkages:**

- \* Relationships will continue with a statewide stakeholder group comprised of representatives of various organizations to provide overall guidance that maintains consistency between research and outreach-extension efforts and state water quality goals. Likewise, partnerships with state and federal agencies and laboratories, other universities and the private sector will be maintained, as appropriate. UM Outreach and Extension personnel at the state- and county-levels will continue with involvement in technology transfer.

#### **Target Audiences:**

- \* Agricultural organizations and product development companies, agricultural producers, rural residents and community dwellers and leaders will be the focus of our efforts. Special attention will be devoted to traditionally underserved sectors, such as the rural poor.

#### **Program Duration:**

- \* This program will continue for the five-year duration of this plan.

### **ANIMAL WASTE MANAGEMENT**

#### **Statement of Issue(s):**

- \* The growth of animal agriculture has been a source of economic growth to rural areas of the United States. However, the environmental soundness of our current methods of managing animal waste is being questioned and it likely that the growth of animal agriculture will be limited if more environmentally friendly and socially acceptable methods of managing waste are not developed. The recent USDA-EPA United National Strategy for Animal Feeding Operations provides that comprehensive nutrient management plans be developed and implemented for all animal feeding operations by the year 2008. A critical component in development of these plans is the estimation or prediction of nutrients (primarily nitrogen and phosphorus) which will be excreted in an animal feeding operation.

#### **Performance Goals:**

- \* Increased understanding of the various factors that can influence manure nutrient variability and the development databases and models which can be used to predict manure nutrient excretion based on modern animal genotypes, feed ingredients and feeding practices that lead to improved manure storage and application procedures.

#### Output Indicators:

- \* Increased understanding of the influence of the numerous factors (feed ingredients, feeding practices, stage of growth of the animal and animal genotype on nutrients excreted.
- \* Development of databases and models which will predict nutrient excretion based on modern animal genotype, feed ingredients and feeding practices.

#### Outcome Indicators:

- \* Increased understanding of nutritional methods to reduce nutrient excretion by animals.

- \* Improvement of databases that can be used to reduce the negative impact of animal agriculture on environmental quality.
- \* Improved manure storage and application procedures.

**Key Program Components: Research Projects will focus on:**

- \* Role of feeding programs of the animal on nutrients excreted, thereby minimizing nutrient loading from land application of manure.
- \* Influence of novel feed ingredients on nutrients excreted and odor.
- \* Better understanding of genotype of the animal and stage of growth on nutrients excreted.
- \* Development of databases and models, and educational programs for regulatory and waste management professionals.

**Internal and External Linkages:**

- \* Interdisciplinary partnerships will continue with a multi-state approach. We will continue to work with federal agencies, and the private sector to accomplish our goals and facilitate technology transfer.

**Target Audiences:**

- \* Our research program will focus on meeting the needs of animal agriculture producers, state and federal agencies and the general public in the development of more effective animal waste management systems.

**Program Duration:**

- \* This program will continue for the five-year duration of this plan.

**STREAM AND WILDLIFE ECOLOGY**

**Statement of Issue(s):**

- \* With a growing human population, expanding residential and urban use of agriculture and forest lands, and intensification of agricultural operations there are pressures on aquatic and terrestrial habitats that are critical to support fish and wildlife populations. In response to degradation, loss and fragmentation of habitat there are measurable declines in terrestrial populations and several sensitive fish species are considered threatened. Of particular concern is the reduction of areas in large forest tracts, loss of glades and stream riparian areas, degradation of recharge regions for springs and groundwater, and loss of wetlands in floodplains that support waterfowl, species diversity and benefit and water quality.

**Performance Goals:**

- \* Enhance conservation of the state's natural resources to benefit fish and wildlife populations.

Output Indicators:

- \* Sustained abundance and reproductive output of native fish and wildlife species.
- \* Achieve maximum diversity of fish and wildlife populations within the feasible limits set by management of available habitat.

Outcome Indicators:

- \* Improvement or maintenance of existing fish and wildlife populations.
- \* Measurable recovery of threatened and endangered species.
- \* Improved habitat management for the maintenance of biodiversity and consumptive use of fish and wildlife resources.

**Key Program Components: Research and education activities will focus on:**

- \* Developing of management approaches, strategies and tactics to reverse declines in fish and wildlife biodiversity and population status
- \* Determining factors affecting the decline in threatened and endangered species at the landscape level

- \* Determining how land use and land cover characteristics and isolated and/or connected habitat affect wildlife populations and biodiversity
- \* Establishing biocriteria for streams based on measured of aquatic community structure and function in unimpaired surface waters and functionally define biological integrity and form
- \* Documenting reproductive ecology of fish and wildlife species to understand how and under what conditions breeding occurs to identify key habitat
- \* Determining the relative importance of food limitation and predation as factors with regulate of selected fish and wildlife populations
- \* Determining how land use and land cover affect water quality in streams and lakes

**Internal and External Linkages:**

- \* Partnerships with state and federal agencies and laboratories and the private sector will be maintained. Cross-disciplinary partnerships among campus academic programs will be continued, with particular emphasis on the Conservation Biology Program.

**Target Audiences:**

- \* Our research program will focus on meeting the need of resource managers and planners in state and federal agencies and the private sector. Academic programs will be designed to target graduate and undergraduate students, resource agency professionals and the private sector. UM Outreach and Extension will be involved in information transfer.

**Program Duration:**

- \* This program will continue for the five-year duration of this plan.

**SOIL SCIENCE AND FERTILITY**

Enhance the efficiency of agricultural production in ways that improve soil health and minimize non-target effects of applied nutrients.

**Statement of Issue(s):**

- \* Improve the management of crop nutrients, increase understanding about how soil management practices impact microbial activities in soil, increase knowledge about soil formation and sustainability, and investigate the bioavailability, fate, and transport of chemicals in soils.

**Performance Goals:** For scientific community and clientele groups:

- \* Increasing understanding of factors controlling soil health
- \* Improving databases on soil resources in Missouri
- \* Improving models for predicting the fate and transport of chemicals applied to soils
- \* Improving soil nutrient management guidelines

Output Indicators:

- \* Improved soil nutrient management guidelines
- \* Improved database on soil resources in Missouri
- \* Improved models for predicting the fate and transport of chemicals applied to soil

**Key Program Components:** Basic and applied research on the following topics:

- \* Investigate precision application of fertilizer and lime
- \* Study how to increase efficiency of fertilizer use by crop plants
- \* Investigate the management of crop nutrients in soils
- \* Examine the fate and transport of chemicals in soils

- \* Develop improved soil-test-based recommendations

**Internal and External Linkages:**

- \* Existing partnerships with extension/outreach, federal and state agencies, other universities, stakeholders throughout the state, and the private sector (including commodity organizations) will continue and will be enhanced. We will continue to work cooperatively with scientists from other states through multi-state projects and committees.

**Target Audiences:**

- \* Extension faculty and staff, agricultural consultants and industry representatives, agricultural producers and landowners, state and federal regulatory agencies, colleagues at other academic institutions.

**Program Duration:**

- \* This program will continue for the five-year duration of this plan of work.

**Allocated Resources:**

FY	FTE's	Federal	State Appropriations
2000	21.0	\$1,373,000	\$1,949,000
2001	21.0	\$1,373,000	\$1,949,000
2002	21.0	\$1,373,000	\$1,949,000
2003	21.4	\$1,400,000	\$2,000,000
2004	21.4	\$1,400,000	\$2,000,000

**Anticipated Impacts:**

To aid in developing an agricultural system that protects the environment and the natural resources of the state, we are working toward the following.

- Improving weather forecasting for optimal timing of crop applications.
- Developing agroforestry practices to offer viable production options for erodible land.
- Providing corn and soybean producers recommendations for optimal timing of fertilizer applications to increase yields without increasing costs.
- Increasing native fish populations in Missouri River.
- Reducing levels of contaminants in public water supplies.

**Regional Project(s):**

Missouri is participating in the following regional projects:

NC-94: Climate and agricultural landscape productivity analysis and assessment in the North Central region

NC-174: Management of eroded soils for enhancement of productivity and environmental quality

S-283: Develop and assess precision farming technology and its economic and environmental impacts.

***Goal 5: Enhanced Economic Opportunity and Quality of Life for Americans***

**AGRICULTURAL POLICY**

**Statement of Issue(s):**

- \* The 1996 Farm Bill (FAIR Act) created a radically different set of farm policies. The adjustments within the production agriculture and agribusiness sectors have already been significant and there is great uncertainty for the future. Policy makers at the local, state and federal levels need unbiased micro and macro policy analysis. The current serious farm financial crisis is one manifestation of the need for analysis to help guide the policy process.

#### **Performance Goals:**

- \* Researchers at the University of Missouri and Iowa State University will provide objective evaluations of at least 10 major national policy options during each of the next three years. The results of these analyses will be presented at 12 or more regional meetings, two statewide conferences and to at least four national audiences.

#### Output Indicators:

- \* Results from econometric modeling of the U.S. food and agriculture industries will project utilization and prices, expected aggregate farm income and consumer food costs.
- \* The consequences of restructuring the dairy market order program will be regularly assessed implications on select dairy production regions publicized to appropriate industry leaders and interested congressional representatives.
- \* Changes in world markets resulting from GATT agreements and actions of the World Trade will be monitored and significant potential price and income effects reported to decision makers at all levels.

#### Outcome Indicators:

- \* Price and income projections from econometric modeling will be used by federal and state decision-makers as food and agriculture legislation is enacted and policies developed.
- \* Analysis of local and regional impacts of national policy will be requested and used by elected officials, farm organizations and agricultural commodity groups.
- \* Analysis which assesses financial stress and risk management strategies will be used by agricultural leaders, bankers and elected officials.

#### **Key Program Component(s):** The multi-disciplinary research team in the MOAES will:

- \* Evaluate farm program options and summarize the potential impacts at the farm, regional and national levels.
- \* Prepare a baseline analysis that looks ten years ahead and gives projections for all major agricultural commodities, including utilization, prices, projected farm income and consumer food costs.
- \* Evaluate potential implications of major policies on international trade and U.S. competitiveness.

#### **Internal and External Linkages:**

- \* Missouri scientists collaborate with colleague scientists at seven other SAES's, with USDA economists and with legislative staff at both the federal and state level. Interactions with extension professionals and congressional staff on Capitol Hill are daily occurrences.

#### **Target Audiences:**

- \* Policy makers in Washington, D.C. and Jefferson City, MO are the primary audiences. Agricultural interests at all levels are also very important target audiences.

#### **Program Duration:**

- \* Policy analysis is, by nature, long term. Policy adjustments and the resulting responses are implemented over multiple years. The current research thrust will continue for the duration of this five-year plan.

## **FUNDAMENTAL SOCIAL SCIENCE**



**Statement of Issue(s):**

- \* The "food system" is going through a period of immense change. Technology, globalization and information are creating changes and uncertainty at all strata of the food system. There is great need for sound, fundamental social science research.

**Performance Goal(s):**

- \* Social scientists will provide analyses that develop and empower Missouri decision makers to manage their portion of the global food and natural resource systems in a sustainable manner. These researchers will also provide information to help rural communities creatively address current and longer-term issues.

**Output Indicators:**

- \* Economic and social implications of major biotechnological advances will be analyzed and options for individual business owners will be evaluated and communicated.
- \* The changing nature of global markets and alternative response strategies will be evaluated and communicated.
- \* The challenges and opportunities associated with the explosion in information technology will be assessed and options shared with decision-makers.

**Outcome Indicators:**

- \* Analysis of new technologies will be outreach driven. Options evaluated will be ones determined from extensive interactions with decision-makers and extension professionals.
- \* Research results will be regularly presented to legislators at both the state and federal level.
- \* Research outcomes will be in demand by commodity groups, agribusinesses and decision-makers within state and federal agencies.

**Key Program Component(s):** Research projects will:

- \* Address the price and income risks that are likely to be key issues for both production agriculture and agribusinesses for the duration of this plan.
- \* Evaluate the structural and organizational issues that are most probable due to globalization and rapidly changing technologies.
- \* Develop feasible, decision-relevant options for adapting to the many economic, social and environmental factors impacting agriculture and rural Missouri.

**Internal & External Linkages:**

- \* Social scientists have a tradition of interdisciplinary collaboration and partnering with colleagues in state and federal agencies. The stated goal of being "a leading institution in outreach driven education and research" requires regular contact with the clientele served and extension professionals who also serve that clientele.

**Target Audiences:**

- \* The primary audience is decision-makers at the local, state and national level. On issues like technology and trade, the audience is truly international.

**Program Duration:**

- \* This program will continue for the five-year life of this plan.

**COMMUNITY DEVELOPMENT****Statement of Issue(s):**

- \* Changes in the structure of agriculture and larger, macro changes (like welfare reform and the restructuring of healthcare) are having differentiated impacts on rural communities.

**Performance Goals:** Researchers will develop research which helps communities:

- \* Retain employment and economic activity.
- \* Address infrastructure issues.
- \* Assess the benefits and costs of tourism/ecotourism.

Output Indicators:

- \* A broad based assessment of the nature and scope of the Missouri travel/tourism sector will be completed.
- \* Research on rural implications of national policy decisions on healthcare, education and telecommunications will be completed and results reported.
- \* Rural Missouri schools that are most effective and least effective (as measured by standardized test scores and college admissions) will be studied to identify those factors having the greatest influence on success factors.

Outcome Indicators:

- \* Information on ecotourism opportunities with the highest potential success will be presented to the tourism industry.
- \* Case studies of successful tourism innovations will be completed and shared with industry professionals and community development professionals.
- \* A multi-state evaluation of healthcare delivery and the impact on community development options will be completed and the results/implications shared with decision-makers at local, state and national levels.
- \* Summary information on rural education strategies and programs that are most successful in preparing high school graduates for workforce and higher education success will be reported to educators and other appropriate decision-makers.

**Key Program Components:**

- \* Opportunities for enhancing the tourism sector in Missouri.
- \* Changes needed at local and state levels to realize the benefits of ecotourism.
- \* Timely, decision-relevant analysis of healthcare delivery and education options will be communicated so rural communities can take actions appropriate to community needs.

**Internal and External Linkages:**

- \* Collaborations with industry professionals, state and federal agency personnel and research scientists with mutual interests will be maintained and strengthened. Research results will be communicated via extension professionals, direct interaction, appropriate publications and workshops/conferences.

**Target Audiences:**

- \* Rural community leaders state agency leaders and industry professionals will be the primary audience. Legislators and regulatory personnel with the ability to influence the social or economic environment will also be targeted. Individuals and communities, the ultimate benefactors, will always be central to the research planning, implementation and outreach.

**Program Duration:**

- \* This program will continue for the five-year duration of this plan.

**MARKETING**

**Statement of Issue(s):**

- \* Global competition, market uncertainty and rapidly changing prices have increased the complexity of marketing decisions. New technologies and market imperfections also confound the decision process.

#### **Performance Goals:**

- \* Research will produce analyses which help producers and agribusiness improve incomes. Research will help decision-makers better understand the multiple competitive forces and enhance their ability to analyze the likely changes and the related impacts.

#### Output Indicators:

- \* Timely analysis of critical technologies will provide agriculture producers information relevant to their decision needs.
- \* Forecasts of the global agricultural situation, assuming normal weather and stable economic conditions will be prepared annually.
- \* Sustainable agriculture options relevant to the Missouri situation will be assessed and most promising scenarios regularly communicated.
- \* Efficient models of risk management will be evaluated and communicated to appropriate decision-makers.

#### Outcome Indicators:

- \* Agribusinesses and agricultural producers will be more effective business managers because they receive regular assessments of the costs and benefits of new technologies.
- \* Individuals and groups will use economic forecasts developed from research to develop business plans that have long term viability.
- \* On-farm research results will be communicated on at least a quarterly basis and sustainable producers will achieve economic goals as a result of knowledge gained/implemented.
- \* Risk management options evaluated via research will help Missouri producers survive the uncertainties of the marketplace.

#### **Key Program Components:**

- \* optimal grain and oilseed marketing strategies
- \* profit enhancing technologies that can be adopted by Missouri agriculture producers and agribusinesses.
- \* risk management options and strategies that will enhance the probability of farm and agribusinesses survival and/or growth.

#### **Internal and External Linkages:**

- \* Interactions and collaborations with appropriate extension professionals and research colleagues at other institutions and industry professionals will be maintained and enhanced. Regular joint conferences/workshops and educational meetings will be held, as needed.

#### **Target Audiences:**

- \* Agricultural producers and agribusiness will be the primary audience. Policy makers and industry groups will be kept informed and two-way communication stressed.

#### **Program Duration:**

- \* This program will continue for the five-year life of this plan.

### **QUALITY OF LIFE**

#### **Statement of Issue(s):**

- \* Support services, infrastructure, environmental amenities, and demographics have changed radically in some rural areas during the 1990's. The future of some communities is in doubt, while other communities

struggle with: a) the stresses of population growth and b) agricultural structural changes that exceed the local capacity to maintain or enhance the quality of life.

**Performance Goals:**

- \* Research will provide information useful for individuals and groups in local decision making and problem solving. Research results will facilitate informed decisions on issues like healthcare, community services, family services, and community infrastructure.

Output Indicators:

- \* Factors critical to health, education and family stability will be identified.
- \* Information on means families use to negotiate responsibilities in the common family structures will be measured and communicated.
- \* Factors determining satisfactory healthcare services in rural areas will be described and the role of healthcare in economic and community development explained.

Outcome Indicators:

- \* Comparisons of the well being of Missouri children and children in neighboring states will be made (based on 10 critical indicators) and opportunities for improving the status of Missouri's children will be documented. Year-to-year comparisons will be calculated and transmitted to key decision-makers.
- \* A summary of successful strategies for addressing financial and family management issues will be developed for use with target audiences.
- \* Location quotients and multiple analyses will be developed on a regional basis for selected areas of Missouri. These measures will be related to quality of life factors.

**Key Program Components:**

- \* The social and economic costs of failing to achieve at least the regional median quality of life factors.
- \* Strategies and programs that can be implemented to enhance local quality of life. This will include estimates of the cost required to attain/maintain achievable quality of life indices.

**Internal and External Linkages:**

- \* Partnerships with social services, educational and community services agencies will be maintained and enhanced. There are many groups and agencies involved in providing and assessing quality of life factors. Collaboration with these groups and agencies is a hallmark of current and planned research activities.

**Target Audiences:**

- \* We will focus on the core fabric of Missouri, its families and communities. In all cases, traditionally underserved populations will receive special attention. We will work closely with extension and family services professionals to ensure they benefit from the knowledge provided by research that is completed.

**Program Duration:**

- \* This program will continue for the five-year term of this plan.

**Allocated Resources:**

<b>FY</b>	<b>FTE's</b>	<b>Federal</b>	<b>State Appropriations</b>
2000	9.3	\$1,353,000	\$829,000
2001	9.3	\$1,353,000	\$829,000
2002	9.3	\$1,353,000	\$829,000
2003	9.5	\$1,380,000	\$850,000
2004	9.5	\$1,380,000	\$850,000

**Anticipated Impacts:**

The quality of life of Missourians should be improved using research results identified below:

- Identifying potential for local ecotourism development from survey of Missouri tourism industry.
- Publicizing factors identified in rural schools that influence success of students for improved educational experiences.
- Increasing healthcare services in rural areas.
- Designing effective support systems for child-care providers and parents from analysis of collected data on child care conditions in rural Missouri.
- Identifying environmental factors to aid in retirement planning.
- Preparing a 10-year baseline analysis for major commodities for use by policy makers.

## **1890 (LU) Cooperative Research Programs Lincoln University**

### **Overview:**

The mission of the Cooperative Research Programs of Lincoln University is to enhance the quality of life for diverse limited resource audiences through mutually supportive research at the state, national and international levels. This mission is partially fulfilled by various research projects conducted under the Evans-Allen cooperative agricultural research. The research programs at Lincoln University are divisible into animal science, crop science, human nutrition, natural resources and agricultural economics. Each of these focus research areas has approved projects that either address goals 1, 3 or 4 as indicated in this plan of work of the five national goals. The 5-year, estimated budget for this Plan of Work (POW) based on the current level of federal formula dollars of \$2,031,527 and a state match of \$280,000 for FY2000 equals \$2,311,527.

### **Merit/Scientific Peer Review Process of the Project Proposals:**

All the Evans-Allen project proposals by the principal investigators are subjected to a scientific peer review process. A proposal is submitted to the Research Director who reviews it for fulfillment of the University's land-grant research mission and guidelines. It is then forwarded to the Dean and Director of the Experiment Station of the College of Agriculture, Food and Natural Resources, University of Missouri-Columbia (UMC) or to the Director of the Midwest Area, USDA Agricultural Research Service (USDA/ARS) with whom Lincoln University has a continuing understanding for this scientific peer review process.

The Dean or Director of these two institutions on a project-by-project basis appoints peer reviewers. At least three reviewers are required for the review of each proposal. The reviewers take anywhere from 4-6 weeks to review a proposal.

The peer-reviewed proposals are returned from UMC or USDA/ARS to the Research Director who returns them to the principal investigators for revision.

The revised peer reviewed proposals are processed by the University and finally submitted to the USDA/CSREES for approval.

### **Stakeholders Input Process:**

- \* Merit/scientific peer review process;
- \* Solicitation of input from producers through a survey;
- \* Solicitation of input from state and federal agencies;
- \* Direct communication with farmers and extension specialists;
- \* Feedback from Nutrition Extension Specialists.

### ***Goal 1: An agricultural system that is highly competitive in the global economy.***

The following approved Evans-Allen Research projects make up Lincoln University's research program addressing this goal:

MOX-OC94-610	Fungicide and Soil Interaction Effects on Plant Growth and Development
MOX-OC94-611	Sweet Potato Production in Central and Southeast Missouri
MOX-OC95-612	Influence of Farming Systems on Selected Soil Quality Parameters
MOX-OC97-613	Improving Seeding Performance of Warm Season Vegetables at Low Temperatures
MOX-OE97-705	Analysis of the Market for Sweet Potato in Missouri
MOX-OP96-416	Effect of Chlortetracycline on Postpartum Fertility & Pregnancy Rate in Early Postpartum Ewe
MOX-OP97-417	Activation and Atresia of Primordial Follicles
MOX-OP92-803	Establishing a Research Support Capability at Lincoln for Missouri Aquaculture Producers
MOX-OP98-418	Nitrogen & Phosphorus Excretion in Growing Pigs: Effect of Phase Feeding Fiber and Phytase

**Statement of Issue(s):**

- \* Limited resource farmers in Missouri need continuous research-based information on alternative crops to diversity their production effectively and to be competitive in the global economy. They need research projects to improve the ability of warm season vegetables to withstand chilling stress when planted early in the growing season; to evaluate the effects of farming practices on soil quality, sweet potatoes, microbial populations and twinning in beef cattle.

**Performance Goals:**

- \* Increase the pounds of edible meat per unit of input through basic and applied research with specific emphasis on increasing reproductive efficiency; improved nutrient utilization efficiency of farm animals and reducing negative environmental impacts on production efficiency.
- \* Gain knowledge to improve crop yield, quality and sustainability.

**Key Program Components:**

- \* Developing need-driven research capability in animal production and management.
- \* Improving knowledge in development and storage of germplasm resources.
- \* Increasing production and quality of sweet potatoes in Missouri.
- \* Improving adaptability of warm season vegetables in Missouri.
- \* Reducing point-source contamination of soil and water by various contaminants.
- \* Reducing crop decline and replants problems caused by biotic and abiotic factors.

**Internal and External Linkages:**

Internal:

- \* A core group consisting of an animal nutritionist, reproductive physiologists and a grazing systems specialist.
- \* Interdepartmental linkages among Biology, Agricultural and Social Sciences faculty.

External:

- \* University of Missouri;
- \* USDA;
- \* University of Tennessee;
- \* State Producers Organization;

- \* North Central Regional Association of Experiment Station Directors (NCRA);
- \* North Central Research Aquaculture Center;
- \* Public and Private Sector on a Local, Regional and International Level.

**Target Audiences:**

- \* Limited resource producers and consumers;
- \* Underserved and minority producers and consumers;
- \* State and Federal Agencies;
- \* Scientific community.

**Evaluation Framework:**

Output Indicators:

- \* Dissemination of research-based information through refereed and non-referred publications and abstracts; producer-oriented bulletins, annual reports and research newsletters and presentations/seminars/proceedings at local, national and international levels.

Outcome Indicators:

- \* Improved profit margins for the producers as a result of animals attaining market weight at a much earlier age; reduced feed costs through improved nutrient utilization efficiency; improved competitiveness for small producers based on their feedback; a reduction in the decline of small and family farms based on annual return statistics and improved quality of life for small farmers and family farmers based on qualitative and quantitative feedback.

**Program duration:**

Five years.

**Allocated Resources:**

YEAR	FTE'S	FEDERAL	STATE MATCHING DOLLARS
2000	16.5	\$1,157,970.39	\$159,310.00
2001	16.5	\$1,157,970.39	
2002	16.5	\$1,157,970.39	--
2003	16.5	\$1,157,970.39	--
2004	16.5	\$1,157,970.39	--
<b>Total</b>		\$1,157,970.39	\$159,310.00

**Goal 3: A healthy, well-nourished population.**

The following approved Evans-Allen Research projects make up Lincoln University's research program addressing this goal:

MOX-OH94-524	Nutrition and Health in Older Adults: Relationships Over 20 years (1975-95)
MOX-OH97-525	Dietary Protein Restriction, Running Activity, and the Development of Obesity
MOX-OH97-526	Bioavailability of Carotenoids from Plant Foods
MOX-OH97-527	Development of Culturally-Sensitive Carotenoid Database for African Americans



**Statement of Issue(s):**

- \* Many elderly in Missouri, especially ethnic minorities (e.g. African-Americans) suffer disproportionately from chronic and debilitating diseases that may be affected by dietary habits. They need reliable nutrition information to adopt healthy eating habits and food practices. They lack information on optimal nutrient requirements for their diverse populations. There is a need to determine for them the role of diet in development of obesity, eating disorders, hypertension, and cardiovascular disease in the elderly, minority groups, low income populations, and other under-represented groups.

**Performance Goals**

- \* Investigate diet-related health problems for diverse populations with specific emphasis on under-represented populations and elderly.
- \* Investigate possible mechanisms of nutrient influence on human health.
- \* Enhance research capacity and student training in nutrition-related fields.

**Key Program Components**

- \* The influence of diet on energy metabolism, obesity and eating disorders.
- \* The influence of diet-induced obesity on hypertension.
- \* The influence of antioxidants on lipid peroxidation.
- \* The influence of vitamin A and carotenoids on health of minority populations.
- \* The influence of fat intake on health of elderly.

**Internal and External Linkages**Internal:

- \* The five faculty members in the Human Nutrition Research Group.
- \* One faculty member from the Department of Social and Behavioral Sciences.
- \* The Missouri Center for Minority Health and Aging in Cooperative Extension.
- \* The Wildlife Management Center of Excellence Initiative.
- \* Possible collaboration with faculty from the Departments Nursing and Physical Education.

External:

- \* Two faculty members from the Department of Physiology at the University of Missouri, Columbia.
- \* Two research scientists from the USDA Human Nutrition Research Center at Beltsville, MD.
- \* The Arthritis Research Group at the Medical School, University of Missouri, Columbia.
- \* The Missouri Department of Health.
- \* The Missouri Institute of Mental Health.
- \* One faculty member from the Bowman Gray Medical School, Wake Forest University.
- \* One Research Scientist from the USDA / ARS Animal Physiology Research Unit, University of Missouri, Columbia.
- \* The Heartland's Alliance for Minority Participation (HAMP) Program, National Science Foundation.

**Target Audiences:**

- \* Missouri residents, minority groups, the elderly, low income populations, and other under-represented populations.
- \* Other necessary populations in the United States.

**Evaluation Framework:**Output Indicators:

- \* Quantity and quality of data collected; publications in scientific journals; presentations at scientific meetings; monthly and annual reports; abstracts; seminars; presentations and proceedings.

Outcome Indicators:

- \* Utilization of research results for Extension programs in Missouri and throughout the United States; measurable improvements in public health for specific target populations, such as the elderly, minority groups, low income populations, and other under represented groups in Missouri and the United States; reduction in health care costs resulting from the adoption of nutrition intervention programs; and improvement of health based on healthcare records.

**Program Duration**

- \* Five years.

**Allocated Resources**

YEAR	FTE's	FEDERAL DOLLARS	STATE MATCHING DOLLARS
2000	9.5	\$670,403.91	\$91,724.00
2001	9.5	\$670,403.91	--
2002	9.5	\$670,403.91	--
2003	9.5	\$670,403.91	--
2004	9.5	\$670,403.91	--
<b>Total</b>		\$670,403.91	\$ 91,724.00

**Goal 4: *An agricultural system which protects natural resource and environment.***

The following approved Evans-Allen Research projects make up Lincoln University's research program addressing this goal:

MOX-OP92-803	Establishing a Research Support Capability at Lincoln for Missouri Aquaculture Producers
MOX-OP98-418	Nitrogen & Phosphorus Excretion in Growing Pigs: Effect of Phase Feeding Fiber & Phytase

**Statement of Issue(s):**

- \* There is a need to increase public concern on gases and particulate matter accumulation in areas where intensive confined animal production systems are practiced; improve poor reproductive and nutrient utilization efficiency of farm animals; and address the negative effects of external factors on aquacultural production systems in Missouri.

**Performance Goals:**

- \* Improve animal performance through innovative nutritional and reproductive techniques.

**Key Program Components:**

- \* Development of need-driven research capability in animal production and management.
- \* Improving knowledge-base in the development and storage of the germplasm resources.
- \* Improving nutrient utilization by enhancing feed efficiency and environmental quality.

**Internal and External Linkages:**

Internal:

- \* A group consisting of an animal nutritionist, reproductive physiologists and a grazing systems specialist.
- \* Interdepartmental linkages among Biology, Agricultural and Social Sciences.

External:

- \* University of Missouri
- \* USDA
- \* University of Tennessee
- \* State Producers Organization
- \* North Central Regional Association of Experiment Station Directors (NCRA)
- \* North Central Aquaculture Research Center

**Target Audiences:**

- \* Limited resource farmers/producers
- \* State and Federal Agencies and the
- \* Scientific community
- \* Students

**Evaluation Framework:**

Output Indicators:

- \* Refereed journals, abstracts, producer-oriented bulletins, annual reports proceedings and newsletters.

Outcome Indicators:

- \* Increasing profit margins as a result of the animals attaining market weight at a much earlier age.
- \* Cleaner air and underground water technologies for the consumers, scientific community and students.
- \* Decreasing feed costs through improved nutrient utilization efficiency.
- \* Improving long-term survival rate of germplasm resources removed from their natural environments.

**Program duration:**

- \* Five years

**Allocated Resources:**

<b>Year</b>	<b>FTE's</b>	<b>FEDERAL DOLLARS</b>	<b>STATE MATCHING DOLLARS</b>
2000	3.0	\$203,152.70	\$ 28,965.00
2001	3.0	\$203,152.70	--
2002	3.0	\$203,152.70	--
2003	3.0	\$203,152.70	--
2004	3.0	\$203,152.70	--
<b>Total</b>		<b>\$203,152.70</b>	<b>\$ 28,965.00</b>

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

### Overview

Missouri’s economic base and its population are diverse. Nearly 60 percent of the population resides in the two metropolitan areas of St. Louis and Kansas City. On the other hand, 48 counties have less than 15,000 people. The total population in 1998 is estimated at 5.4 million. Twenty-nine counties lost population between 1990 and 1998; twenty-three of them in north Missouri. At the same time, many counties in the southern part of the state have had significant population growth, primarily due to in-migration of retirees. The recreation areas in the state, especially the Lake of the Ozarks and the Branson area, have experienced significant population growth during the past decade. There is also great diversity among individuals and families in the state.

The economic base of Missouri is also diverse. Tourism, industry and agriculture are the major sectors in the economic base. By Census count there are 98,860 farms in Missouri. For the first time in decades the number actually “increased” between the most recent Agricultural Census periods. The number of farms with sales of more than \$100,000 is slightly more than 10,500 whereas the number with less than \$50,000 of sales totals 81,600. The circumstances among small farms vary widely from those trying to make a significant portion of their living from the farming operation to those who are farming on a small scale as a “way of life” By all measures, Missouri is a state of small farms.

Detail regarding the situation is provided in the “issues statement” included with each major program effort included in the plan of work.

The identification of priority issues and concerns -- using the stakeholder process described below -- led to the following priorities for FY00-04:

Summary Table: County Program Plan Priorities

<b>Base Program/Program Clusters</b>	<b>Number of Times Programs Appear in County Plans</b>
<b>I. Agriculture Profitability and Viability</b>	
Business and Farm Management	168
Crop Production Systems	104
Horticulture	55
Profitable Livestock Production Systems	83
Sustainable Agriculture	70
Dairy	13
Small Farms	8
Agriculture/Farm Safety	1
	<b>502</b>
<b>II. Environmental Quality &amp; Stewardship</b>	
Water Quality	67
Natural Resource Management	83

Waste Management	62
Air Quality	4
	<b>216</b>
<b>III. Family Strengths</b>	
Parent Education	101
Child Care	54
Family Financial Management	97
Building Strong Families	47
Elderly	36
Housing	30
Poverty at Issue	3
	<b>372</b>
<b>IV. Nutrition and Health</b>	
Decisions for Health	153
Comprehensive School Health and Nutrition	2
	<b>155</b>
<b>V. 4-H Youth Development</b>	
	<b>274</b>
<b>VI. Business, Community and Economic Development</b>	
Workforce Preparedness	41
Citizen Education and Leadership	81
Community Based Development	88
Small Business Development	113
Information Technology	24
Education	15
	<b>362</b>

## Stakeholder Input

University Outreach and Extension, University of Missouri System (in cooperation with Lincoln University), define the following as stakeholders:

- The 1,988 Missouri citizens who are elected and appointed to serve on the 114 County Extension Councils under Chapter 262.550-262.620 of the Revised Statutes of Missouri.
- The Regional Extension Councils that represent the 114 county extension councils in our eight administrative regions of the state.
- The 11 citizens who serve on the self-organized and self-governed Missouri Extension County Council Leadership Council who advise and work for the betterment of University Outreach and Extension on a continuing basis.
- The more than 7,000 citizens who participated in the program development process.
- The regional extension specialists and campus based faculty and administrators who are involved with University Outreach and Extension.

The process for gaining stakeholder input into the plan of work task involved the following steps:

- Involvement of more than 7,000 citizens in 275 separate sessions in all 114 counties to identify the priority issues and concerns of Missouri citizens. A “deliberative group process” was used. Each session lasted from 2 ½ to 3 hours. The process was structured to get input from every participant and ended up with a summary of the 5-8 issues and concerns of highest priority. See county summaries at: <http://outreach.missouri.edu/about/fy00-03>. County Extension Councils and staff were provided with a template to assist in recruiting participants. Data were collected on those who participated. Diversity representing the diversity in the county was achieved in most cases. Nearly 10 percent of the participants were youth under 18; the gender split was nearly even; about 10 percent were minorities; and 40 percent had had little or no previous involvement with Extension prior to the deliberative group sessions.
- The County Extension Councils, under Missouri law, have a responsibility to review and provide counsel to the university regarding programs. The County Extension Councils reviewed the outcome of the deliberative group sessions (noted above), studied the social and economic trend data for the county, reviewed the current extension educational programming in the county to determine whether existing programs should be continued, revised, or eliminated. Based on this information, and their own knowledge and expertise, the Council in each county worked with the staff to prepare a draft County Program Plan which included the program priorities to be addressed over the next four years.
- The draft plan was circulated to all that had participated in the deliberative group sessions and other stakeholders in the county for comment.
- The Council reviewed the input, revised as they deemed appropriate and submitted their final County Program Plan by June 1, 1999. The County Program Plans may be accessed at: <http://outreach.missouri.edu/about/fy00-03>.
- The Program Directors and Program Leaders reviewed and summarized the County Program Plans and established a Program Framework. The Program Framework includes six Base Program Areas and seven Focus Teams as follows:

<u>Base Program Areas</u>	<u>Focus Teams</u>
1. Agriculture Profitability and Viability	1. Commercial Agriculture
2. Business, Community and Economic Development	2. Community Infrastructure
3. Environmental Quality and Stewardship	3. Missouri Enterprise Development
4. Family Strengths	4. Value Added Agriculture
5. Nutrition and Health	5. Water Quality
6. 4-H Youth Development	6. Missouri Youth and Families at Issue
	7. Sustainable Food and Farming Systems
- County Extension Councils, with input from Extension staff, review the County Program Plans on an annual basis.
- Program evaluations are used on a continuous basis to determine outcomes and need for program adjustments.

## University Outreach and Extension - Merit Review Process

The Missouri County Extension Councils, under State Statute (Chapter 262, Revised Missouri Statutes) “shall assist in the planning and carrying out of extension programs in their county and area, making recommendations to the University as they may deem necessary”. The County Program Plans (described under Stakeholder Input) are the basis for this statewide Plan of Work. Each County Program Plan is reviewed and officially approved by the County Extension Councils in the 114 counties.

County Extension Council members are elected and appointed and include in their membership citizens with a wide a wide array of education, experience and expertise. The primary objective of the Merit Review Process is to determine whether the planned programs are relevant and of high quality. Relevance is determined by the extent to which the programs are responsive to the high priority needs of the citizens. The County Extension Councils, utilizing the stakeholder input, analysis of social and economic trends, and the counsel of the regional specialists are in the best position to determine relevancy.

In addition, the County Extension Councils are required to review the current programs annually to determine which programs are to be continued, revised, or terminated. The results of these county reviews are used by program leaders and faculty to determine and implement needed program changes.

Quality of the programming is determined by the response of participants and evaluation of the adoption of new ideas and practices that are embodied in the output and outcome indicators for each of the programs.

We believe the Statutory role of the County Extension Councils in Missouri, combined with their education, experience and knowledge and the knowledge and expertise of regional specialists and campus based faculty is sufficient to meet the requirements of merit review.

**FY99 Base for Plan of Work:** The FY99 base for this plan of work includes the following:

Smith-Lever 3b&c funding received	\$ 7,611,027
Required State Match	\$ <u>7,611,027</u>
TOTAL BASE for FY99	\$15,222,054

The following Plan of Work for University Outreach and Extension, University of Missouri includes 260 FTEs and \$17,155,420.

**Multi-State Extension Programs for University Outreach and Extension, University of Missouri System: This information will be submitted following receipt of guidelines currently under development.**

**Integrated Research and Extension Programs, University Outreach and Extension, University of Missouri System: This information will be submitted following receipt of guidelines currently under development.**

### University Outreach and Extension Program Descriptions

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

##### INTEGRATED CROPPING SYSTEMS

### **Statement of Issues:**

- \* Crop production in Missouri is extremely diversified in relationship to the type of commodities produced and the size of operations producing those commodities. According to the 1997 Census of Agriculture, approximately 66 percent (i.e. 12,449,272 acres) of Missouri's 28.8 million acres of farmland is dedicated to crop production. The major commodities grown in Missouri are soybeans, corn, and wheat. Other crops grown in the state are sorghum, cotton, barley, rice, and tobacco.
- \* Nationally, Missouri ranks fourth in sorghum production and sixth in the production of soybeans and rice. Missouri ranks tenth nationally in the production of corn, cotton and winter wheat. In 1997, these commodities accounted for \$2.1 billion in sales.
- \* The production of soybeans, Missouri's largest cash crop, thrives in the southeast, northwest, northeast, and north central parts of the state. Corn, wheat, and sorghum are grown throughout the state. Cotton and rice are grown in the southeast corner of the state.
- \* Given Missouri's diversity related to factors such as commodities produced, soil types, broad variations of climate, and size of operations, its producers will face many challenges in the next millennium to maintain their competitiveness on the national and international levels. Some of the challenges that have been identified by Missouri producers relate to adoption of new technology—GMO's, precision agriculture, producing and marketing identity-preserved commodities, improved marketing skills, environmentally sound production, compliance with new regulations, adoption of best management and integrated pest management practices, and maintaining profitability to name just a few.
- \* As a result of the University Outreach and Extension Program Development and Deliberative Group Process, 83 Missouri counties have identified, developed, and will implement programs that will address some or all of these issues affecting Missouri's crop producers.

### **Performance Goals and Indicators:**

As a result of Missouri Integrated Crop Production Program:

- a) By 2004, 20,000 agricultural producers will attend at least one educational program on adoption of new technology and at least 25% of those producers will adopt one of these new technologies resulting in reduced soil loss, more efficient pesticide usage, increased profitability, efficiency, and improved environment.
- b) By 2004, 10,000 agricultural producers will attend at least one marketing workshop and at least 30% of those attendees will adopt at least one new marketing strategy.
- c) By 2004, 5000 of Missouri's producers will be producing and marketing identity preserved commodities for niche or value-added markets.
- d) By 2004, 56,000, or 75%, of Missouri's row crop producers will practice environmentally sound integrated crop management in their farming operations.
- e) Currently, 7.5% of Missouri's row crop producers are using site specific cropping systems on their operations. By 2004, this will increase to 20% of Missouri's row crop producers will have adopted these practices.

### **Key Program Components:**

- \* *Profitable and Environmentally Sound New Technology in Crop Production*  
This multi-faceted statewide program will focus on the adoption of new and emerging technologies to optimize production through optimal management of nutrients, herbicides, insecticides, and fungicides. Multiple educational approaches, including workshops, soil-crops conferences, demonstrations, internet, professional development experiences, field days, and educational resources such as guides, slide sets, and power point presentations will be used to deliver these programs.



\* Tools/Techniques for Marketing Commodities and Differentiated Products

This program teaches producers to use contractual arrangements, new methods of marketing, how to form a marketing group, how to retain ownership, crop insurance risk management, grain storage, government programs, and use of niche and/or specialty markets. Educational methods used will include workshops, conferences, seminars, Agricultural Electronic Bulletin Board, internet, guide sheets, marketing newsletters, and mass media.

\* Integrated Crop Management.

The ICM program will teach producers to use and how to evaluate economic thresholds, scouting, bio-control, pest and crop phenology, rotational usage, variety selection, alternative tillage, host resistance, and other preventive practices for environmentally sound and safe pest management. This will be accomplished through meeting presentations, demonstration plots, applicator training, electronic media-newsletters, and guide sheets.

**Internal and External Linkage:**

- \* The development and implementation of these programs will involve University of Missouri regional and state specialists in agronomy, entomology, plant pathology, IPM, ag economics and agricultural engineering. Extension programs are directly linked to the Missouri Agricultural Experiment Station outlying research centers and farm. In addition, professional staff of the USDA agencies of FSA, NRCS and Crop Reporting Service, and the Missouri Departments of Agriculture and Natural Resources will be involved in various aspects of development and implementation of these programs.

**Target Audiences:**

The primary target audiences for these programs are:

- \* Agricultural producers
- \* Agribusiness firms
- \* Agricultural lenders
- \* Specialty product producers
- \* Governmental agencies
- \* Industry representatives
- \* Certified Crop Advisors
- \* Consumers

**Program Duration**

- \* These programs will be implemented and evaluated over the entire length of the Plan of Work (five years).

**Allocated Resources:**

- \* These programs will involve 40% of the total programming effort related to Goal 1.

Goal 1: Program	Year	FTEs	Dollars
Integrated Cropping Systems	2000	46	\$3,035,540
	2001	46	\$3,035,540
	2002	46	\$3,035,540
	2003	46	\$3,035,540
	2004	46	\$3,035,540

**Education and Outreach Programs Underway:** (See Summary Statement for Goal 1)

**FORAGES FOR THE 21<sup>ST</sup> CENTURY**

**Statement of Issue(s):**

- \* 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 (includes alfalfa hay), or 4.7% of the total hay produced in the U.S. This ranks Missouri 4th nationally for total hay produced. The agronomic practices associated with forage production help 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 and 60,000 operations. Beef producers in Missouri suffer from low farm income and small profit margins. Nearly half of their income is spent for livestock feed during January, February and March. Hay represents about 90% of the 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 investments, and low profit margins. According to economic analysis, small dairies could adopt grazing to lower feed cost, minimize capital investments, increase profit margins, and protect the environment.
- \* As a result of the University Outreach and Extension program development process, 60 Missouri counties have identified, and will implement and evaluate programs that will address these issues that are affecting Missouri's forage production systems.

### **Performance Goals and Indicators:**

As a result of the Missouri "Forages for the 21<sup>st</sup> Century and Beyond" program, by the year 2004:

- a) 6,000 of Missouri's beef producers will attend a program on "Winter Feeding and Stored Forages" and 50 % of those producers that attend will adopt one or more of the practices covered in the program.
- b) 6,000 of Missouri's forage/livestock producers will attend a grazing school and 20% of those that attend will adopt one or more of the practices covered in the schools.
- c) 9,00 of Missouri's dairy producers will attend a workshop on "Pasture-based Dairies" and 25% of those producers will adopt some aspect of a new system.

### **Key Program Components:**

- a) Winter Feeding and Stored Forages for Beef Cattle  
This program will educate producers about stockpiling tall fescue, adaptation of winter annuals in Missouri, grazing crop residues, winter grazing management, how to lower hay feeding losses, ammoniation of low quality hay, forage quality and prudent use of supplemental feed. The program will include workshops, livestock seminars, and demonstrations at the regional research centers, training for regional specialists and state/federal agency staff, mass media, internet, and guide sheets.
- b) Grazing Systems and Pasture Management  
This program will educate 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 educational methods will include regional grazing schools, special field days, guides, and mass media.
- c) High-profit Pasture-based Dairies  
The program will educate dairy producers about grazing management, forage quality for dairies, balancing rations on pasture versus in the dry lot, capital investments, milk barn design, record-keeping, seasonal versus year-round dairies, fence design, watering systems, herd health, fertilization of pastures and improving soil resources. The educational methods will include "Pasture Dairying" schools, cow colleges, manuals, guides, demonstrations, dairy clubs, seminars, and the mass media.

### **Internal and External Linkages**

- \* The development and implementation of these multi-disciplinary programs will involve University of Missouri regional and state specialists in agronomy, dairy, farm management, IPM, veterinary medicine, rural sociology, agricultural engineering, and community development. Resources of the outlying research centers in Linneus and Mount Vernon will also be involved in these programs. In addition, professional staff with NRCS, FSA, Missouri Department of Natural Resources, Agriculture, and Conservation will be involved in these programming efforts.

**Target Audiences**

The primary target audiences for these programs are:

- \* Beef producers
- \* Dairy producers
- \* Forage producers
- \* Agricultural lenders
- \* Governmental agencies
- \* Certified crop advisors
- \* Input suppliers

**Program Duration**

- \* The Winter Feeding and Grazing Systems programs will be implemented and evaluated over the entire length of this Plan of Work (five years).
- \* The Pasture-based Dairy programs will be pilot tested in the Southwest region over the first three years of the Plan of Work and then, based on evaluation results, may be implemented statewide during the final two years of this planning period.

**Allocated Resources:**

- \* This program will involve 20% of the total effort related to Goal 1 – Globally Competitive Agriculture.

Goal 1 Program	Year	FTEs	Dollars
Forages for 21 <sup>st</sup> Century	2000	23	\$1,517,770
	2001	23	\$1,517,770
	2002	23	\$1,517,770
	2003	23	\$1,517,770
	2004	23	\$1,517,770

**Education and Outreach Programs Underway:** (See Summary Statement for Goal 1)

**PROFITABLE AND SUSTAINABLE LIVESTOCK PRODUCTION UTILIZATION SYSTEMS**

**Statement of Issue(s):**

- \* Several factors have influenced the type of livestock production currently practiced in Missouri. Climate, soil types and terrain, geographic location, availability of markets, environmental regulations, renewable resources such as grain, forages and water, and governmental policies.
- \* Missouri’s animal agriculture contributed three billion dollars to the Missouri economy in 1997. Meat animals accounted for 64% of the total receipts, poultry/eggs 25%, and the dairy products contributed 10%.
- \* Some of the many factors impacting the livestock industry identified by the program development and deliberative group process are animal waste management, air quality, CAFO’s, marketing, livestock management, new technology, profitability, record keeping, herd health, consumer education, and water quality.

\* As a result of the University Outreach and Extension program development process, 109 county programs are planned to be implemented and evaluated during this programming period that will address many of the issues impacting Missouri's livestock industry.

### **Performance goals and Indicators:**

As a result of the Profitable and Sustainable Livestock Production Utilization Systems Program by 2004:

- a) 15,000 beef producers will attend at least one educational program and at least 25% of those will adopt one new practice to improve/enhance the production efficiency of their beef herd.
- b) Five hundred new producers will adopt production practices that enroll their operations in the Show-Me-Select Replacement Heifer Program.
- c) Two hundred beef producers will conduct the On-Farm Assessment of their farming operation.
- d) 1000 producers will improve their production efficiency and profitability by effectively incorporating modern swine production technologies into their operation.
- e) Twenty percent of Missouri's dairy producers will adopt new management strategies that maintain their economic viability.

### **Key Program Components:**

a) *Improve/Enhance Production Efficiency of Beef Herds in Missouri*

This multi-faceted statewide programming effort will focus on the implementation and evaluation of the Show-Me-Select Heifer, Missouri Steer Feedout, Bull Test, heifer development, cow-calf, and the Missouri on-farm performance testing programs. Topics to be included in these programs are breeding strategies, genetic predictions, EPD, AI, economics, nutrition, animal health, and replacement heifers, to name a few. Educational strategies to be used to implement these programs are workshops, seminars, demonstrations, field days, farm tours, computer programs, guide sheets, web sites, mass media, and individual consultation.

b) *Improved Marketing and Financial Strategies for Beef Cattle Producers in Missouri*

This program will focus on enhancing programming related to retaining ownership, production and financial analysis by the implementation of the Retained Ownership and ON-farm Assessment Programs. These multi-faceted programs will educate producers on the following topics – production and nutritional management, economics, animal health, operational assessment, marketing, feedlot management, and retained ownership. Educational methods to be used include feedlot tours, marketing programs, distance learning, ultrasound demonstrations, stocker seminars, workshops, field trips, guide sheets, and use of mass media.

c) *Swine Production for 21<sup>st</sup> Century Technology Education and Implementation Programs*

This program is aimed at assisting existing swine producers to adopt new technologies and to remain competitive. Topics to be covered in this program are modern production techniques, artificial insemination, modern waste management, marketing, nutrition, animal health, record keeping, developing niche markets, and labor management. Educational methods that will be used are TEdI teams, individual consultation, seminars, workshops, "success stories," mass media, Program Implementation Experiences, and individual consultation.

d) *Enhancing Profitability and Viability on Missouri Family Dairy Farms*

This program is designed to create a critical mass of dairy producers able to integrate new management practices to improve their business and also to maintain the viability of rural communities dependent on these producers. This educational program addresses the educational needs in the areas of financial management, record keeping, family/farm management, herd management, nutrition, herd health, marketing, and niche marketing.

### **Internal and External Linkages**

- \* The development and implementation of these programs will involve state and regional specialists in animal science, farm management, agricultural engineering, veterinary medicine, community development and 4-H. In addition, these programs will be implemented in cooperation with the Missouri breed associations, Missouri Department of Agriculture, input suppliers, regional research centers and practicing veterinarians.

### **Target Audiences**

The primary target audiences for these programs are:

- \* Beef producers
  - \* Swine producers
  - \* Dairy producers
  - \* Veterinarians
  - \* Youth
  - \* Agricultural lenders
  - \* Agribusiness
  - \* Governmental agencies

### **Program Duration**

- \* The Improved Production Efficiency and Marketing Strategies Program will be implemented and evaluated over the entire length of this Plan of Work.
- \* The new swine and dairy programs will be pilot-tested over the first three years of the plan and then will be implemented statewide during the final two years.

### **Allocated Resources:**

- \* This program will involve 40% of total programming effort related to Goal 1.

Goal 1 Program	Year	FTEs	Dollars
Profitable and Sustainable Livestock Production Systems	2000	46	\$3,035,540
	2001	46	\$3,035,540
	2002	46	\$3,035,540
	2003	46	\$3,035,540
	2004	46	\$3,035,540

### **Education and Outreach Programs Underway:**

- \* All of University Outreach and Extension's field staff are "regional" specialists who have multi-county assignments. A majority of the programming implemented in Missouri would be conducted on a multi-county basis. During FY96-99 educational programs were available in all of the areas included in the FY00-04 plan of work. The research based programs included the following:
  - Business and Farm Management
  - Crop Production Systems
  - Horticulture (Home and Commercial)
  - Livestock Production Systems

Results associated with these programs are included in the FY98 Annual Report submitted to CSREES.

## ***Goal 3 – Healthy and Well Nourished Population***

## Statement of Issue(s):

- \* Improved health status is dependent on genetics, environment, quality of health care and the individual's willingness and ability to engage in behaviors known to promote health and prevent disease and injury. University Outreach and Extension programming in support of Goal 3 - A Healthy and Well-Nourished Population – specifically focuses on the health-related attitudes, knowledge, skills and practices of individuals. Missouri Extension efforts in support of this goal are based on stakeholder input obtained through a deliberative group process and discussions with county extension councils. Nutrition, food safety, healthy lifestyles and health care access were identified as critical issues in 42 % of Missouri's 115 counties. This programming also relates to goals established for CDC's *Healthy People 2000 and 2010*.
- \* Obesity, poor eating habits and physical inactivity are known risk factors for a number of chronic health problems including heart disease, stroke, diabetes, and some forms of cancer. An estimated 32% of adult Missourians are obese and only 21% consume the recommended five portions of fruits and vegetables daily. Less than 18% of Missourians exercise regularly enough to meet CDC recommendations and over 30% engage in no physical activity. It is estimated that about 1/3 of all Missouri children have at least one known risk factor for heart disease -- smoking, high-fat diets, or physical inactivity. There is great opportunity to assist Missouri residents improve their health and quality of life through offering educational programs related to dietary guidelines, healthier eating, and behavior change strategies for incorporating physical activity into daily activities.
- \* Preventing foodborne illness involves the safe storage, handling, and preparation of food. In 1997, there were about 3,400 reported cases of foodborne illness in Missouri resulting in 482 hospitalizations and 3 deaths. These numbers reflect the tip of the iceberg because of under reporting. USDA has identified key "control points" at which consumers in the home can help keep food safe: purchasing, storing, pre-preparation, cooking, serving, and handling leftovers. Similar control points exist for food handlers such as restaurant chefs, cooks in day care centers and schools and food handlers at community/church suppers and county fair booths. Taking appropriate action at these critical points can prevent foodborne illness. Extension programs will help residents maintain a safe food supply by providing educational programs and resources that provide information, improve decision making and increase skills related to food buying, preparation and handling.
- \* Staying healthy requires health consumers to assume more responsibility for their health and health care. The United States spends an estimated \$200 billion a year on unnecessary and inappropriate care. Health consumers need to learn skills that will help them reduce their demand for unnecessary care, while encouraging the more appropriate use of preventive health services. Seventy percent of all doctor visits for new problems have been termed unnecessary. On the other hand, many individuals fail to use appropriate preventive health services. Based on 1997 data, an estimated 30% of Missourians over age 65 did not get their yearly flu shot, 56% reported never having a pneumonia vaccination. Seventy-five percent of Missourians 50 years of age and over reported that they had not done a home blood-stool test, a screening for colon/rectal cancer, during the past two years. Thirty percent of women in the same age category reported they did not have a mammogram during the last two years. Medical self-care increasingly is being recognized as an important component of health promotion programming. Extension programs will increase consumer's skill in communicating with their health care providers and improve their ability to make sound self care decisions such as when to seek professional care and how to apply home treatment safely and effectively.
- \* While the life expectancy of the general population has benefited from increased emphasis on lifestyle behaviors, this is not the case for that portion of the population that is low income. There is great diversity

in the low-income population. Eighteen percent work full-time, year round. Almost one-third are from minority populations, 38% are children and 10% are elderly. Low-income individuals are more likely to have poor diets, delay seeking health care and less likely to have a regular source of care. They are also less likely to receive early routine and preventive health care that would help with early detection and reduction of risk. Children are at particular risk. Poor children are more likely than middle and upper class children to be hungry, have nutritional deficiencies, have more physical and mental health problems and do less well in school.

- \* In addition to family income, health insurance and place of residence are associated with an individual's ability to obtain health care. An estimated 15% of Missouri's adult population between the ages of 18 and 64 are without health insurance. Rural Missourians are less likely to have health insurance provided as a benefit by their employers. Implementation of the MC+ for Kids program in Missouri will increase access to care for the 90,000 children under the age of 19 who are without insurance. However, a shortage of providers in rural Missouri may make participation in the MC+ for Kids program difficult for eligible children. Sixty-five counties, parts of counties and some inner-city areas have been defined as Primary Health Care Professional Shortage Areas. Most of these shortage areas are in rural Missouri.
- \* Decisions and choices about health and health care are some of the most difficult for individuals to make. They affect one's ability to engage in behaviors that maintain quality of life and gain access to quality health care. Enabling individuals to maintain lifestyle changes over time requires a two pronged effort: helping the individual learn information and skills needed to make changes and working with community structures in order to create environments that are more conducive to maintaining health and desired behavior change. Outreach and Extension plans to address both of these issues by increasing individual and community access to health information and education resources. Emphasis will be placed on identifying education resources that reflect the diversity of our population.

### **Anticipated Impact:**

The overriding goal of all educational programming in the areas of nutrition and health is to cause permanent behavior change of Missouri citizens in regard to nutrition, health promotion, food safety, and physical activity practices. This is very difficult, but educational programs in these areas are expected to impact 3,060 citizens. Nearly 60,000 will receive educational information; 20-60% will gain skill and knowledge, depending upon the specific program; 10-25% will indicate their intention to adopt recommended practices

**Performance Goal 1** – To annually increase through non-formal education programs consumer awareness, knowledge and skills related to nutrition and dietary practices known to reduce health risk factors (e.g., obesity, hypertension, etc.).

Indicators:

#### Output Indicators

- 55,000 individuals will participate in non-formal educational programs related to nutrition, dietary practices and healthy eating.
- 20% of program participants will report an increase in knowledge about nutrition and dietary practices known to promote health and prevent disease based on pre/post evaluations.
- 15% of program participants will report learning specific skills that will improve their ability to eat healthier
  - 10% of program participants will report that they intend to adopt recommended nutrition practices.

#### Outcome Indicator

- 5% of program participants will adopt recommended nutrition practices.

### **Key Program Components:**

- \* *A Healthy New You* -- A Healthy New You teaches clients the benefits of healthy eating and a physically-active lifestyle, the basic principles of good nutrition and physical fitness, the keys to attaining a positive self-image and body image, how to make and maintain healthy lifestyle changes, and how to involve family, friends, and community in leading a healthier life. The program curriculum consists of four (4) lessons, which cover the main topic areas of healthy eating, active living, and positive self-image.
- \* *Show-Me Body Walk* -- Body Walk is a traveling 25' X 30' walk-through exhibit that represents the human body. The exhibit provides resources to teachers and an action-oriented educational experience for elementary-aged students. As they walk through the exhibit, students engage in activities that emphasize the importance of good nutrition and other healthy lifestyle choices. The workshops presented to teachers focus on strategies to increase the effectiveness of nutrition and food safety education efforts in the classroom.
- \* *Nutrition Communications Center* (formerly the Resource Network) -- Extension Specialists and other professionals need reliable, credible, science-based information on health and nutrition to improve the quality of people's lives and improve the economic health of the state and individual. The center's goal is to assist regional specialists and others to stay current on research, demographics, and consumer trends in food and lifestyle habits. Educational strategies include responding to individual questions and requests for information, providing subject matter updates via a listserv; providing and supervising the content of the web site; editing a quarterly newsletter; recording radio, and video interviews for statewide dissemination; and scheduling quarterly teleconferences with regional specialists.
- \* *Missouri Nutrition Network* -- The Network is a coalition of public and governmental organizations that utilizes a social marketing approach to promote healthy eating. The primary target audience is low-income (Food Stamp eligible) families. The Network provides local partners with media campaign materials, personnel training, and grant funding to conduct a healthy eating campaign in their own communities. The current campaign theme "It's All About You, and Your Family, Too!" promotes three nutrition practices: increasing consumption of fruits and vegetables, increasing consumption of breads, grains, and cereals, and lower-fat methods of cooking meats.
  - \* *Regional Nutrition Education Workshops* -- In addition to statewide programs, regional specialists conduct a number of nutrition education workshops to address locally identified needs and interests. Topics range from sports nutrition to the role of nutrition in disease prevention. One on One for Kids, a basketball and education camp sponsored by Children's Mercy Hospital in Kansas City, is an example of one such program. As part of this camp, Extension Specialists in the West Central Region conduct a sports nutrition class for the campers. During the 30-minute class, campers are taught the basics of two major sports nutrition concepts -- fluid retention for pre/during/post events and healthy energy boosting snack choices for pre-event. Extension has been involved in this effort for three years and evaluations of the camp indicate that the sports nutrition segment is among the highest rated components by the campers and the coaches. A similar program has been developed to provide information to teen athletes.

#### **Internal and External Linkages:**

- \* Linkages vary, to some extent, depending on the program. The team involved in developing the Healthy New You curriculum includes HES regional and state specialists, the health education specialist (School of



Medicine) and the nutrition and health specialist from Lincoln University. The Body Walk program was developed in conjunction with the Governor’s Council on Physical Fitness. The University of Missouri HES Extension Food and Nutrition Program serves as program manager and regional HES and 4-H youth development specialists work with local schools and parent volunteers in setting up the exhibit in the schools. Existing partners in the Nutrition Communications Center include the School of Medicine, Dept. of Rural Sociology, School of Journalism, Dept. of Dietetics, and the Dept. of Biological Sciences, all at the University of Missouri-Columbia (MU). Other partners include the Missouri Department of Health, Lincoln University, and state extension offices nationwide (via web and listserv communication). Partners involved in the Missouri Nutrition Network include state and regional nutrition/HES specialists, the Missouri Departments of Health, Elementary and Secondary Education, and Family Services and, at the local level, county health departments, hospitals, community colleges, social service agencies, health coalitions, businesses and churches.

**Target Audiences:**

- \* The target audiences for A Healthy New You include adults who have been unsuccessful with dieting and want to reduce health risk factors through a different approach to eating healthy and being physically healthy. The program is also appropriate for those interested in learning basic principles related to eating healthy and incorporating physical activity into their daily lives. K-4 elementary teachers and their students are the target audiences for Body Walk. Target audiences for the Nutrition Communications Center are regional extension specialists and county extension staff, Missouri citizens, colleagues in related fields, and media outlets. The target audience for the Missouri Nutrition Network is low-income (Food Stamp eligible) families. One-on-one for Kids reaches school-age children as well as coaches.

**Program Duration:**

- \* A Healthy New You is a new program and will be a long-term effort (five or more years). Body Walk and the Nutrition Communication Center have been in existence for some time and both are expected to continue long term. The Missouri Nutrition Network is also a relatively new effort and is a long-term integral component of educational programming in nutrition at the state level. One-on One for Kids is in its 3<sup>rd</sup> year and based on evaluations is likely to continue long term.

**Allocated Resource:**

- \* Effort among these major efforts is allocated as follows:
  - 25% Healthy New You
  - 25% Body Walk
  - 25% Nutrition Communications Center
  - 10% Missouri Nutrition Network
  - 15% Regional Educational Workshops

- \* This performance goal constitutes 70% of the resources allocated to Goal 3.

Goal 3: Performance Goal 1	Year	FTEs	Dollars
Nutrition and Dietary Practices	2000	15	\$988,500
	2001	15	\$988,500
	2002	15	\$988,500
	2003	15	\$988,500
	2004	15	\$988,500

**Education and Outreach Programs Underway:** (See Summary Statement at the end of Goal 3)

**Impact Statement:**

Small farmers in Missouri will be more knowledgeable about methods of marketing and adding value to their agriculture products. The aforementioned programs will continue providing a base of educational and social support for farm families, thus enabling them to become more confident and more willing to try these new methods, and more able to be supportive of their communities.

**Performance Goal 2** - To annually reduce food-borne illnesses through non-formal education programs focusing on improved decision making and increased skills related to food buying, handling and preparation.

Indicators:

Output Indicators

- 1,500 Missourians will participate in non-formal education programs focusing on food safety issues.
- ♣ 60% of participants completing programs will demonstrate increased knowledge of basic food safety principles based on pre/post evaluations.
- ♣ 40% of participants completing programs will report they have learned specific skills that will improve their ability to handle foods safely.
- ♣ 25% of participants completing programs will report that they intend to adopt recommended food safety practices.
- ♣ 25% of participants completing the programs will report that they intend to adopt recommended food safety practices.

Outcome Indicator

- ♣ 10% of participants completing programs will report that they adopted one or more recommended food safety practices.

**Key Program Components:**

- \* Food safety programming at the state level has focused on providing technical training to state and local sanitarians, particularly in the use of HACCP-like techniques. In addition, HACCP training for meat processors has been offered to meet the mandatory requirements of the USDA, and will continue to be a major activity of the program for the next year. In addition, HACCP training will be expanded to include managers, seafood processors and food service operations in the next year. Food safety efforts at the regional level emphasize food preservation, food preparation for the occasional quantity cook, and food safety programs for food service workers. Program methods include responding to individual questions, providing educational fact sheets, offering educational workshops such as the “ServSafe” Program and other similar training activities, and providing newsletters such as *Quality for Keeps* which has been an efficient and effective way to deliver safe home food preservation information. Programs have also been offered to Head Start cooks, Girl Scout leaders and representatives from non-profit organizations such as the Lion’s club, church groups and others whose members prepare and serve food to people at fairs, festivals, or food stands.

**Internal and External Linkages**

- \* Internal partners include regional nutrition specialists, state nutrition specialists from MU and Lincoln University, and local extension councils who pay for the printing of the *Quality for Keeps* newsletter. External partners include the environmental sanitarians in local health departments, the Missouri Department of Health and the Missouri Restaurant Association. In addition, collaborative efforts among the Missouri Department of Agriculture and Department of Economic Development support several programs.

**Target Audiences**

- \* Target audiences include professionals in the food processing and retail food service industry, homemakers, representatives of not-for-profit organizations including churches, Lions Club, Girl Scouts, etc., and food service staff in schools and child care programs.

**Program Duration**

- \* The professional development program for sanitarians has been in place for a number of years and is expected to continue for some time. HACCP programs are also expected to continue for the food industry for the near future as the use of HACCP to assure food safety becomes normative in the industry. However, the audience will expand away from the purely technical towards the managerial, marketing and consumer portions of the population. The two regional programs mentioned, ServSafe and *Quality for Keeps*, are successful programs and will continue to be used long-term by regional specialists involved in food safety education.

**Allocated Resources:**

- \* Resources allocated to this goal are distributed among major programs as follows:
  - 10% Professional development
  - 10% HACCP training
  - 30% ServSafe and other similar programs.
  - 25% Quality for Keeps
  - 25% Food preparation for the occasional quantity cook
- \* Total resources allocated to this performance goal constitute 10% of the total for Goal 3.

Goal 3: Performance Goal 2	Year	FTEs	Dollars
Reduce food-borne illnesses	2000	2	131,800
	2001	2	131,800
	2002	2	131,800
	2003	2	131,800
	2004	2	131,800

**Education and Outreach Programs Underway:** (See Summary Statement at the end of Goal 3)

**Impact Statement:**

Under-served populations will become more aware of the potential for illness associated with inadequate storing, handling and cooking habits. They will also learn how to identify acceptable food outlets, and shop for nourishing and affordable food items. Inter-generational programming will reach all members of target households who participate in these programs, and will help them associate good health with good food choices. Limited resource populations will therefore require less emergent medical intervention for illness such as food poisoning and malnutrition.

**Performance Goal 3** – To annually increase health consumers’ awareness, knowledge and decision making skills with regard to health practices known to promote health and prevent disease, with an emphasis on increasing physical activity.

Indicators:

Output Indicators

- 3,200 Missourians will complete non-formal education programs focusing on physical activity and other behavior practices known to promote health and prevent disease.
- 30% of participants completing programs will demonstrate increased knowledge of strategies for incorporating into their daily lives behavior change practices known to promote health and prevent disease.

- 15% of participants completing programs will report they have learned behavior change and/or decision making skills.
- 10% of participants completing programs will report they intend to adopt recommended practices.

Outcome Indicators

- 5% of participants completing programs will report they adopted one or more recommended practices.

**Key Program Components:**

- \* A Healthy New You - See Performance Goal 1 for a description of this program. A Healthy New You is interdisciplinary in nature and addresses physical activity and positive body image in addition to focusing on healthy eating.
- \* National Network for Health - NNH is a multi-state project. It is one of 5 networks originally developed as part of CYFERnet to provide technical assistance to State Strengthening and Youth and Risk projects. The health education specialist, School of Medicine and an HES nutrition specialist provide leadership for a work group responsible for identifying and placing resources and research related to health promotion and disease prevention on the NNH web site. Emphasis is placed on resources and research developed through extension and land grant universities. In addition, the health education specialist serves on the NNH Management Team.
- \* Take Care: A Medical Self-Care Workshop for Young Families - This workshop series provides participants with basic consumer health information and increases their health care decision making skills. In order to make effective self-care decisions, people must have access to reliable health information and they need access to that information when a health problem arises. In order to accomplish this, Take Care teaches skills related to using a good reference to make health care decisions and provides information on how to improve patient-doctor communication. In addition to increasing parents' confidence in making health care decisions, the information provided will help parents work more effectively in a managed health care environment. Follow-up newsletters reinforce the information provided in the workshops. Easy to read fact sheets have been developed and these are being translated into Spanish. Low-income parents have been reached by working with community agencies and organizations such as the Head Start, Community Action Agencies and Health Departments.
  - \* Regional Education Workshops -- Working in conjunction with local partners, regional specialists carry out a variety of educational programs related to health promotion and disease prevention. Following are examples of efforts that are likely to continue and have potential to be replicated in other parts of the state.
  - \* CHARTwalk: Off and Walking - CHARTwalk is the result of a community partnership called the Northeast Community Health Assistance Resource Team. With a goal of achieving cardiovascular health, the task force launched this regional walking program in 1997. The initiative's main objective is to motivate people to become physically active. The walking program is only one effort of the Northeast Missouri CHART. In order to encourage walking as a physical activity that promotes cardiovascular health, this group has also held a conference and assisted in the development of two work site wellness programs. A quarterly newsletter is published and a Web page is under development.

\* Glo-Germ Hand Washing Mini-Lesson -- One of the best and simplest ways to reduce the risk of spreading illnesses such as the cold and flu is by proper and frequent hand washing. The Glo-Germ Hand Washing Mini-Lesson helps children understand that washing hands thoroughly with soap and warm water is necessary to get rid of "germs." Included with the lesson materials are a teaching outline with suggested script and optional activity pages suitable for children of different ages. Schools can borrow the Glo-Germ Kit from extension or use substitutions that are suggested in the lesson materials. While the mini-lesson was designed for use by school nurses and teachers it has also been used in adult training programs.

**Internal and External Linkages:**

\* Internal partners include Regional HES/nutrition specialists, state HES nutrition and family and consumer economics specialists, the health education specialist from the MU School of Medicine and the nutrition and health specialist from Lincoln University. Subject matter support is provided by the MU School of Education, Department of Physical Education and Health and by the MU School of Medicine. External Partners include the Missouri Department of Health, county health departments, hospitals, public and parochial schools, churches, community action agencies, local businesses, Head Start, and Community Health Assistance Resource Teams and other local health coalitions.

**Target Audiences:**

\* Target audiences for this goal include school-age children, older adults, African-Americans and individuals with limited resources. Specific audiences for the "Healthy New You" program are young and middle age adults. Audiences for the "Take Care" program include parents with young children, older adults, and Hispanics.

**Program Duration:**

\* The majority of the programs related to this goal are long-term. "Healthy New You" is a new program and is being planned as a long-term effort. Medical Self Care has been an on-going effort in our system and will continue long term. CHARTwalk is the result of a community partnership and its long-term existence is dependent on the success of the coalition. National Network for Health is anticipated to be a short-term effort as is the Glo-Germ Hand Washing Mini Lesson.

**Allocated Resources:**

\* Percent of time for each major effort is as follows:

- 30% A Healthy New You
- 20% Take Care
- 20% NNH
- 30% Regional Efforts

20% of Goal 3 program effort is allocated to this performance goal.

Goal 3: Performance Goal 3	Year	FTEs	Dollars
Consumer Health Knowledge/Practices	2000	5	\$329,500
	2001	5	\$329,500
	2002	5	\$329,500
	2003	5	\$329,500
	2004	5	\$329,500

**Extension and Outreach Programs Underway:**

- \* All of University Outreach and Extension's field staff are "regional" specialists who have multi-county assignments. A majority of the programming implemented in Missouri would be conducted on a multi-county basis. During FY96-99 educational programs were available in all of the areas included in the FY00-04 plan of work. The research based programs included the following:

- Comprehensive School Health Nutrition Education and Services
- Decisions for Health

Results of these programs are included in the FY98 Annual Report submitted to CSREES

**Impact Statement:**

Limited resource audiences will learn how to make better food choices at retail grocery outlets and by supplementing food purchases with home-grown fruits and vegetables; the importance of combining proper diet with exercise regimens for improved health; and how improved health benefits the body as it ages. Through increased knowledge about healthy living, people in target populations will be less likely to require medical intervention for chronic diseases attributed to unhealthy food intake, substance abuse and lack of exercise. Target populations in Missouri will be positioned to enjoy graceful aging that was once prevented by social, economic and cultural barriers.

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

**PROTECTING MISSOURI'S WATERSHEDS**

**Statement of Issue(s):**

- \* The safe production of food and fiber is vital to Missouri agriculture and the State of Missouri. More than 13 million acres of Missouri farmland is planted and harvested cropland. Missouri farmers must be able to profitably sustain this vital industry, while protecting and rebuilding the productivity of this very valuable natural resource--soil.

- \* Erosion control and soil conservation was identified by 22 counties as a key issue to be addressed by University Outreach and Extension during the Deliberative Group Process. The need for continued education and demonstration on the short and long-term environmental, economic, and agronomic impact of conservation or reduced-till and no-till crop production was identified as a major aspect of that programmatic need.

- \* The major educational needs that have been identified related to this programming effort are the complex interactions between weeds, herbicides, pesticides, soil type, water and the relationship of soil structure to plant nutrition, plant development, biological activity, erosion control, economics, and tillage alternatives.

**Performance Goals and Indicators:**

- a) By 2004, 70 percent of Missouri's farms will adopt some type of no-till or reduced tillage production system.
- b) By 2004, 12,000 Missouri producers will attend an educational program on adoption of tillage alternatives and at least 25% of those producers that attend will adopt at least one new production strategy.
- c) By 2004, producers that attend these educational programs will adopt site and crop specific management systems on 30% of their no-till acres.

**Key Program Components:**

\* Nutrient Pesticide management and Tillage

This program will teach producers about the appropriate use of nutrients, herbicides, insecticides, and fungicides for specific tillage alternatives. Educational methods will include conferences, soils and crops conferences, demonstrations, mass media, guides.

\* Tillage Systems for Profit and the Environment

This educational and research program will focus on site specific agriculture, conservation tillage practices, residue management, planter adjustments and attachments, pest control, and economic and management strategies for each alternative. Educational methods to be used will be soil and crop conferences, no-till clubs, lender/farm manager programs, demonstrations, newsletters, mass media and guides.

\* Residue Management

This program will educate producers about implementing cost-effective terrace systems, constructing terraces with readily available equipment, use of ridge tillage to reduce erosion and improve water quality, using contouring and contour strip cropping, and managing terraces and waterways. Educational methods used will include workshops, demonstrations, one-on-one consultations, newsletters, direct mailing, mass media, and guides.

**Internal and External Linkages:**

- \* The development and implementation of these programs will involve University of Missouri regional and state specialists in agronomy, entomology, plant pathology, soil science, ag economics, and agricultural engineering. In addition, the programming will be a cooperative program with NRCS and the Missouri Soil and Water Conservation Districts.

**Target Audiences:**

- \* The primary target audience for these programs will be:
  - Agricultural producers
  - Agribusiness
  - Agricultural lenders/farm managers
  - Soil and Water Conservation District staff
  - Certified crop advisors
  - Farm equipment dealers

**Program Duration:**

- \* This program will be implemented and evaluated over the entire length of this programming period.

**Allocated Resources:**

- \* This program will involve 20% of the total programming effort related to Goal 4. Staff programming effort will be allocated in the following manner:

Goal 4 Program	Year	FTEs	Dollars
Protecting Missouri's Watersheds	2000	7	\$461,930
	2001	7	\$461,930
	2002	7	\$461,930
	2003	7	\$461,930
	2004	7	\$461,930

**Extension and Outreach Programs Underway:** (See Summary for Goal 4)

**ANIMAL WASTE MANAGEMENT**

**Statement of Issue(s):**

- \* Livestock/poultry is a multimillion-dollar business in the state. Large numbers of hogs, dairy cattle, poultry, and some beef cattle are concentrated in confinement units. The poultry industry is expanding rapidly. The Missouri approach to waste management, designed and implemented by University Extension, MDNR and NRCS, has been successful.
- \* MDNR reports that all of the livestock's dairy and poultry facilities operating under this program constitute a waste management equivalent to that generated by six million people – more than the whole population of the state. Successful as the waste management program may be, much can be accomplished in educating producers and developing new ways of utilizing animal and poultry waste to prevent ground and surface water contamination.
- \* Missouri soil types and topography are very diverse, ranging from rolling wind-blown loess and river bottoms to fractured karst topography overlain with shallow, rocky clay and drainage features such as caves and sinkholes. There is no single strategy for educating livestock producers regarding the potential for water degradation from land application of agricultural waste.

**Performance Goals and Indicators:**

- a) By 2004, University Outreach and Extension will train 1,500 poultry and livestock producers in best management practices for land application of animal waste to balance crop nutrients and prevent runoff. Fifty percent of these producers will develop and implement total nutrient management systems that will meet guidelines set forth by MDNR.
- b) By 2004, University Outreach and Extension will train 50 consultants and technicians in the private sector to write nutrient management plans.

**Key Program Components:**

- \* Livestock Nutrient Management  
This program will train producers how to develop a nutrient management plan for their production systems. Topic to be covered will include soils, nutrient application scheduling, regulatory compliance, and manure application alternatives. Education methods to be used will be producer meetings, training of regional specialists, demonstrations, one-on-one consultations, mass media, and guides.
- \* Missouri's Manure Management  
Missouri Manure Management is an interagency program that is designed to provide producers, technical agencies, educational institutions, researchers, and the general public with usable, accurate, and environmentally-sound manure management and application information. An electronic clearinghouse will be used to: 1) provide access to comprehensive information on manure management research and application; 2) identify relevant manure management publications and educational program.
- \* Training Professionals In Manure Management  
This program will focus on training professionals to assist producers in the technical design of facilities and structures, and the development of nutrient management plans that will bring those producers into compliance with state and federal regulations governing manure management and application.

**Internal and External Linkages:**

- \* Internal implementation of this program will involve agronomy, agricultural engineering and animal sciences. External involvement will include NRCS, MDNR, and livestock commodity organizations.

**Target Audiences:**

- \* The primary target audience for these programs will be:
  - Livestock producers
  - Agricultural lenders
  - Consultants



Governmental regulatory agencies  
Livestock associations

**Program Duration:**

- \* These programs will be implemented and evaluated over the entire length of this Plan of Work.

**Allocated Resources:**

- \* These programs will involve 40% of the programming effort related to Goal 4

Goal 4 Program	Year	FTEs	Dollars
Animal Waste Management	2000	15	\$989,850
	2001	15	\$989,850
	2002	15	\$989,850
	2003	15	\$989,850
	2004	15	\$989,850

**Extension and Outreach Programs Underway:** (See Summary for Goal 4)

**NUTRIENT MANAGEMENT ON MISSOURI CROPLAND**

**Statement of Issue(s):**

- \* More than 13 million acres of Missouri land produces row crops and forages. According to the Census of Agriculture, \$576 million of fertilizer and chemicals were applied to those acres in 1997.
- \* In Missouri, about 34 percent of the population obtain their water supply from groundwater while 66 percent obtain their water supply from major rivers and reservoirs. Groundwater is the source of 74 percent of all rural, domestic water. Indiscriminate application of nutrients and pesticides on this 13 million acres can result in water degradation of this very important drinking water supply.
- \* Of the 877,722 acres under irrigation in Missouri, 80 percent are located in the southeast corner of the state. Fewer than 10 percent of the irrigators use scheduling methods to determine the proper time to irrigate. In addition, Chemigation (application through irrigation) has been added to many of these systems and more irrigators are expected to adopt this technique of chemical application. Many of these systems lack proper safety devices to prevent backflow contamination.
- \* During the University Outreach and Extension program development process, Missourians identified safe management and application of chemicals and nutrients as issue to be addressed in Missouri's water quality programming in 57 counties.

**Performance goals and Indicators:**

- \* As a result of the Nutrient management on Missouri Cropland Program, by 2004:
  - a) 15,000 farmers and 1,000 commercial applicators will be learn how pesticides can or may interact and move in soils and how to help preserve ground and surface water quality when using pesticides and fertilizers. Thirty percent of these clientele will adopt best management practices.
  - b) Seventy-five percent of Missouri Farm acreage will be under pest management practices and site specific applications that will reduce potential pesticide runoff.
  - c) 1500 farmers will be trained about well-head protection, tail-water recovery, and Chemigation safety. Fifty percent of those clientele will make changes in their management practices.

**Key Program Components:**

- \* Pesticide and Nutrient Management.  
This program will focus on soil testing and interpretation, best management practices, pesticide application, secondary containment, container/waste product disposal, mixing procedures, record keeping, and safety.

Educational methods will include watershed assessment, demonstrations, water quality workshops, soils and crops conferences, commercial applicator training, self-study manuals, guides and educational materials, and mass media.

\* Site Specific Application

Under the direction of the Missouri Precision Ag Center, producers and commercial applicators will receive training on site specific application. The training will include equipment selection and calibration, field mapping, calibration, employee training, economics, and GPS instrumentation. Educational methods will include demonstration projects, workshops, Precision Ag seminars, applied research projects, guides, and mass media.

\* Irrigation, Chemigation, and Well Development

This program will focus on training irrigators to use scheduling to optimize water usage, installing well-head protection, economics of irrigation, safe chemigation, equipment selection, and tail-water recovery systems. The education methods that will be used are annual irrigation conferences, irrigation scheduling, safe chemigation and wellhead protection demonstrations, educational support of the Irrigation Associates, guides, and mass media.

**Internal and External Linkages:**

- \* The development and implementation of this program will involve the Missouri Precision Ag Center, Water Quality Focus Team, regional and state specialists in agronomy, agricultural engineering, and farm management. In addition, the programming will involve NRCS staff, Missouri Irrigation and Water Management Associates, Missouri Departments of Agriculture and Natural Resources, Missouri Ag Industry Council, and commodity associations.

**Target Audiences:**

- \* The primary target audiences for these programs are:
  - Agricultural producers
  - Irrigation dealers
  - Commercial applicators
  - Certified crop advisors
  - Government personnel
  - Agribusiness firms
  - Landowners

**Program Duration:**

- \* These programs will be implemented and evaluated over the entire length of this Plan of Work.

**Allocated Resources:**

- \* These programs will involve 40% of the total programming effort related to Goal 4.

Goal 4 Program	Year	FTEs	Dollars
Nutrient Management on Missouri Cropland	2000	15	\$989,850
	2001	15	\$989,850
	2002	15	\$989,850
	2003	15	\$989,850
	2004	15	\$989,850

**Extension and Outreach Programs Underway:**

- \* All of University Outreach and Extension’s field staff are “regional” specialists who have multi-county assignments. A majority of the programming implemented in Missouri would be conducted on a multi-

county basis. During FY96-99 educational programs were available in all of the areas included in the FY00-04 plan of work. The research based programs included the following:

- Water Quality
- Hazardous (Toxic) Materials
- Nutrients and Bacterial Wastes
- Surface/Groundwater and Watershed Protection
- Natural Resource and Environmental Management
- Solid Waste Disposal

\* Results of these programs are included in the FY98 Annual Report submitted to CSREES

## ***GOAL 5: Enhanced Economic Opportunity and Quality of Life for Americans***

### **Goal 5: I. Missouri Children, Youth and Family (MOCYF) Project**

**Two Major Program Efforts:**

- A. Effective Black Parenting Series**
- B. Public Policy Lending Library**

#### **Overall Statement of Critical Issues to be Addressed:**

- \* Beginning in November 1997, an Organizational Change Survey was conducted to document the current state of and changes in Missouri's ability to develop and sustain effective programs within the University Outreach and Extension system. This survey, developed by the University of Arizona, looked at issues surrounding one of the main objectives of the **MOCYF Project**: improving University Outreach and Extension's capacity to support community-based programs for children, youth and families at risk. Of the 300 eligible respondents, 75% returned completed surveys. Of the 248 respondents, over half (57%) reported that they are called upon *monthly* in the area of children, youth and families at risk. Eighty-one percent (81%) of respondents stated that they are currently active in community task forces working on children, youth and family issues.
- \* The national trends also mirror Missouri's response to issues pertaining to the knowledge of policy which effects the lives of children, youth and families at risk. The National Results indicate that Extension professionals were not at all confident about their knowledge of policy and legislation effecting lives of the children, youth and families they serve. While a majority (64%) of respondents believe it is their role to educate policy makers on youth and family issues, only one-fourth feel they currently have good or excellent knowledge of policy affecting the lives of such audiences
- \* Diversity assessments in three of the eight administrative regions revealed that Outreach and Extension personnel are aware of the nature of diversity in their counties, particularly with regard to race, ethnicity, socio-economics status, age, gender and disability. However, present programming in these regions tends to reach the more affluent, middle class, white, non-disabled citizens who are middle-aged or older. Though only three of the eight assessments are completed, the assessments affirm what the Organizational Change Survey summarizes - University Outreach and Extension staff need continued administrative and community support as they continue working with increasingly diverse citizens in Missouri communities.
- \* In November 1998, the Executive Summary of KIDS COUNT 1998 Data stated that while the number of Missouri children receiving cash assistance decreased from 1992 and 1997, many of those children still live in poverty, as their parents replace welfare with low-paying employment. The **MOCYF Project** is ready

to build upon the existing strengths and resources in existence and provide training and resources regarding effective programming for low income audiences within each region in Missouri.

### **EFFECTIVE BLACK PARENTING SERIES:**

*(See above for overall statement of issues.)*

#### **Performance Goals and Indicators:**

##### Output Indicators

- \* 50 parents or caregivers (per year) will complete 75% of the Effective Black Parenting classes, a 15 week series.
- \* 75% of the parents attending classes will learn problem solving skills when dealing with their child(ren); and at least one other life skill (e.g., setting goals) that will enable them to become more productive citizens

##### Outcome Indicators

- \* 75% of the parents attending classes will report changed behavior or intent to change their behavior in communicating with their child(ren)..

#### **Key Program Components:**

- \* Eight communities will provide culturally sensitive parent education classes for low-income parents. The classes will utilize the Effective Black Parenting Series. The classes will be conducted by UOE staff with the involvement and representation of a variety of agencies (e.g., Court Appointed Services). MOCYF Project staff will assist colleagues in learning about the Effective Black Parenting series, training and resources. In addition, an evaluation consultant will provide technical assistance to UO/E field staff regarding parent education evaluation and program design for high-risk families.

#### **Internal and External Linkages:**

- \* Interdisciplinary - At the current time the Effective Black Parenting series has been facilitated by a variety of trained University Outreach Specialists representing Consumer and Family Economics, 4-H Youth Development and Human Development and Family Studies, et al.
- \* Multi-institution - The Effective Black Parenting programming conducted by MOCYF Project staff was originally conducted by a specialist from Lincoln University. While MOCYF staff has since undergone EBP Facilitator's training, the LU Specialist continues to serve in partnership with MOCYF staff regarding the EBP programming.

The MOCYF Project site in Southeast Kansas City has partnered with the University of MO-Kansas City for evaluation services of the EBP program. In addition, the Principal Investigator has expressed a desire to continue a partnership with UO/E staff in the KC area to explore resources for future EBP classes.

#### **Target Audiences:**

- \* African-American parents and caregivers (e.g., grandmothers)

**Program Duration:** Long-term

**Allocated Resources:** See Summary for Goal 5, I-VIII

**Extension and Outreach Programs Underway:** (See Summary for Goal 5, I-VIII)

### **PUBLIC POLICY LENDING LIBRARY**

*(See above overall statement of issues to be addressed. In 1998, approximately 64% of UO/E staff responded to a survey and stated that they felt it was their role to inform decision makers about policies that effect children, youth*

and families. However, only one fourth of those respondents felt they had a good knowledge about how policy effects children, youth and families.)

**Performance Goals and Indicators:**

Output Indicators

- \* Eight targeted communities (one per region) will host National Issue Forums, hosting 15-25 community members and utilizing the deliberative process and/or National Issues Forum documents provided by the Public Policy Lending Library.
- \* The UO/E system will increasingly become aware of changes in public preferences expressed at forums. Consequently, UO/E will plan to use the dialogue (i.e., citizen opinions) to adapt decisions regarding UO/E resources and programming

Outcome Indicators.

- \* National Issue Forum facilitators will involve one to two hundred citizens in forums. Of those, at least 50% will maintain or increase their role as an active community member.

**Key Program Components:**

- \* University Outreach and Extension staff will become more knowledgeable and involved in policy issues which effect children, youth and families through the increased awareness and availability of public policy resources. Information regarding policy will be also be shared through the **MOCYF** National Issues Forum (NIF) Lending Library, Poverty at Issue (HES) WWW site, electronic distribution lists and publication.

**Internal and External Linkages:**

- \* Interdisciplinary - The program draws will involve University Outreach Specialists representing Consumer and Family Economics, Community Development, Agriculture, 4-H Youth Development and Human Development and Family Studies, et al.
- \* Multi-institution - We anticipate a continued partnership with Lincoln University, especially when working in communities where high poverty rates exist (e.g., Pemiscott County, SE Kansas City, etc.)

**Target Audience:**

- \* Community Leaders (including University Outreach Extension Council members) promoting public dialogue regarding issues that effect the quality of life for children, youth and families.

**Program Duration:** Long-term

**Allocated Resources.** (See Summary Table following Goal 5: VIII)

**Extension and Outreach Programs Underway:** See Summary for Goal 5, I-VIII)

**Goal 5: II. AFFORDABLE HOUSING AND HOUSING AND COMMUNITY ISSUES**

**Statement of Issue(s):**

- \* Need for quality affordable housing and increase in home ownership rates are important issues for public and private sector housing educators, developers and agencies in the nation, as well as in the state of Missouri. Education plays an essential role in expanding homeownership and home retention opportunities for Missouri citizens, particularly low to moderate- income families.
- \* A central focus of Outreach and Extension programming in housing is to implement educational programs that address the issues of affordable homeownership, post home purchase maintenance and financial planning and community participatory process to foster housing development. These programs provide an opportunity to examine potential and existing barriers facing Missouri households and build capacity within

the communities which in turn helps to improve quality of life of Missouri citizens through home ownership, home retention, housing development and community revitalization.

- \* More than thirty Missouri counties included affordable housing related programming in their plan of work. There are three ongoing programs and one program under development that address affordable housing issues in this state. These are: *HomeWorks: Maintaining Your Housing Investment*, *Healthy Indoor Air for America's Homes*, *Home Ownership Made Easier* and *Affordable Housing Development through Community Partnership*. Teams of extension specialists and agency partners are implementing and evaluating the ongoing programs in different regions of the state.

### **Performance Goals and Indicators:**

#### Output indicator:

- \* Thirty extension specialists have been trained to offer the ongoing programs. Ten additional specialists will be trained to teach new program under development.
- \* Certified trainers of all affordable housing related programs will reach 500 participants with these programs.

#### Outcome indicator:

- \* Of these 500 participants, 250 will adopt at least one recommended practice related to affordable home ownership or home maintenance or home development.

### **Key Program Components:**

- \* *Home Ownership Made Easier* – A one day workshop on financial and environmental factors related to the home buying process is implemented by a team of trainers working with local partners and participants.
- \* *HomeWorks* – One or two day workshops are implemented by a team of trainers with local partners and participants. These workshops are customized from a core curriculum containing thirteen modules on home maintenance and financial management.
- \* *Healthy Indoor Air for America's Homes* –Extension specialists depending on community participant needs implement one or multiple session workshops. The core curriculum contains twelve modules.
- \* *Affordable Housing Through Community Partnership* – Multiple sessions of community meetings and workshops will be conducted with each community participating in the program to develop community capacity and enhance community participatory process towards affordable housing development. Extension specialists will coordinate this process with developers, builders, and local agency and government partners and community citizens.

### **Internal and external linkages:**

- \* *Home Ownership Made Easier* – This program draws upon the expertise from Consumer Family Economics, Environmental Design specialists in extension as well from agency partners from USDA Rural Development, US Department of Housing and Urban Development and Consumer Credit Counseling Services.
- \* *HomeWorks* - This program draws upon the expertise of extension specialist in Environmental Design Consumer and Family Economics, Agricultural Engineering and Community Development, along with expertise from local home inspectors, community action agencies, lenders and builders.
- \* *Healthy Indoor Air for America's Homes* – This program draws upon the expertise of extension specialists in Environmental Design, Community Development and Agricultural Engineering.
- \* *Affordable Housing through Community Partnership* – This program will draw upon the expertise of Environmental Design, Consumer and Family Economics and Community Development Specialists, as well as local stakeholders.

**Target Audience:**

- \* First time homebuyers, renters, homeowners interested in home maintenance and retention issues, communities interested in affordable housing development.

**Program Duration:**

Home Ownership Made Easier – Long term

HomeWorks – Long term

Healthy Indoor Air for America's Homes – Short term

Affordable Housing Development through Community Partnership – Long term

**Allocated Resources:**

Home Ownership Made Easier 15%

HomeWorks 40%

Healthy Indoor Air 15%

Afford. Housing Through Community Partnership 30%

(See Summary following Goal 5, VIII)

**Extension and Outreach Programs Underway:** See Summary for Goal 5, I-VIII

**GOAL 5: III. FAMILY FINANCIAL MANAGEMENT****Statement of Issue(s):**

- \* Over the past several years the United States economy has shown continued growth, unemployment rates have fallen, and the number of families receiving welfare has decreased.
- \* Despite these economic improvements, many individuals and families face continued economic challenges. Household debt levels have increased faster than income over the past six years. Personal bankruptcies reached an all-time high in 1998 at almost 1.4 million filings. This increase correlates closely with the increased debt load carried by American families. The personal savings rate has continued to fall. Currently, people spend \$9.99 of every \$10.00 they earn. The Retirement Confidence Survey reports that only half of all workers have even tried to determine how much they need to save for retirement. These and other economic challenges are exacerbated by the lack of financial skills of adults and youth. This leads to poor consumer and financial decision making.
- \* Recent deliberative groups and county extension councils identified several key issues to be addressed. These include basic financial management skills and consumer education. Thirty-one counties identified these issues. Sixty program efforts were identified in county plans of work.

**Performance Goals and Indicators:**Goals/Objectives

- \* 1000 individuals and/or families will increase their financial management skills through participation in financial management education programs.

Output Indicators

- \* One thousand people will attend family financial programs.
- \* Eighty percent of participants who show increased knowledge of financial management concepts after participating in financial management programs as indicated on pre and post learning surveys
- \* Sixty percent of participants who plan to adopt one or more new financial management practices
- \* Fifteen different agencies and organizations collaborating on financial management programs

Outcome Indicators

- \* Thirty percent of participants of financial management programs who adopt one or more recommended financial management practices.

**Key Program Components:**

- \* Family financial management programs – educational programs teaching basic financial management concepts and skills, credit management, basic savings and investing, and consumer decision making.
- \* Women's financial management program (WFIP) – 7-week workshop series teaching mid-life and older women basic financial management skills.
- \* Money action plan (MAP) – program designed to train helping professionals working with clients having financial problems. it currently includes information on the basics of money management, budgeting, record keeping, credit and communication.

**Internal and External Linkages:**

- \* The WFIP program includes collaborative efforts with AARP and other agencies and organizations working with mid-life and older adult women.
- \* The MAP program includes collaborations with social service agencies and organizations that work with clients having financial problems.

**Target Audiences:**

- \* Individuals and families.
- \* Mid-life and older adult women.
- \* Social service agency and organization personnel working with clients having financial problems.

**Program Duration:**

- \* These program efforts will continue for five years.

**Allocated Resources:**

Financial Management Programs – 40%

WFIP – 25%

MAP – 35%

(See Summary following Goal 5, VIII)

**Extension and Outreach Programs Underway:** See Summary for Goal 5, I-VIII

**CHILD CARE PROGRAM****Statement of the Issue(s):**

- \* Currently, the state of MO does not require childcare workers to obtain training and education prior to caring for children. Research demonstrates that childcare provider education and preparation are the best indicators of the quality of care children receive. During the recent MO Program of Work planning process, 44 counties reported that child care provider education and training was a program priority. Toward that end, the UO/E childcare program will develop a research-based educational program for newly hired, undereducated childcare workers and train staff from statewide childcare provider training organizations to implement the program. The ultimate goal is to insure statewide access to the educational program.

**Performance Goals and Indicators:**Output Indicators

- \* One statewide, research-based preservice curriculum will be developed.
- \* Twenty UO/E regional staff will be trained to train 120 other agency/organization's staff to conduct the curriculum.



- \* Three thousand five hundred newly hired, undereducated child care provider will complete the preservice training program.

Outcome Indicators

- \* Twenty percent of those trained with the preservice curriculum will exhibit positive behavior changes associated with the program.

**Key Program Components:**

- \* Preservice curriculum designed
- \* Preservice curriculum pilot-tested
- \* Preservice curriculum evaluated
- \* UO/E staff trained to train other child care provider trainers
- \* Program is accessible to child care workers statewide

**Internal and External Linkages:**

- \* The program has been made possible through a contract between the University of Missouri and the Missouri Department of Health. As progress is made, additional linkages will be forged between UO/E and statewide child care provider training organizations (Missouri Departments of Social Services, Elementary and Secondary Education, Health, and Mental Health).

**Target Audience(s):**

- \* MO child care provider-training organizations and newly hired, undereducated child care workers.

**Program Duration:**

- \* 3 years total, starting in August, 1999

**Allocated Resources:** (See Summary following Goal 5, VIII): See Summary for Goal 5, I-VIII

**Goal 5: V. Building Strong Families:**

**Statement of Issue(s):**

- \* More than fifty Missouri counties specifically included “building strong families” in their plans of work. Nearly every county in Missouri included topics directly related to family strengths. The Building Strong Families for Missouri program is being implemented statewide and evaluated by a team of 40 extension specialists. A statewide training of agency trainers is planned for March 2000.

**Performance Goals and Indicators:**

Output indicator:

- \* One hundred agency trainers will be certified to offer Building Strong Families.
- \* Certified Building Strong families trainers will reach 750 participants with the program.

Outcome indicator:

- \* Of those 750, at least 500 participants will adopt at least one recommended practice for strengthening their family.

**Key Program Components:**

- \* A seven-session program is designed by a trainer working with local partners or participants to customize the program from a core curriculum containing the following modules: Identifying Strengths, Communicating, Managing Stress, Child Self-Care, Food & Fitness, Working, Setting Goals, Parenting, Spending, Balancing Work & Family, Alert Consumer, Healthy House, and Self-Esteem.

**Internal and External Linkages:**

- \* The program draws upon expertise from human development and family studies, food science and human nutrition, consumer and family economics, environmental design, and addiction technology transfer from

the University of Missouri's Columbia and Kansas City campuses and from counties in every Missouri region.

**Target Audiences:** Working parents with dependents.

**Program Duration:** Long-term.

**Allocated Resources:** (See Summary following Goal 5, VIII)

**Extension and Outreach Programs Underway:** See Summary for Goal 5, I-VIII

## **Goal 5: VI. PARENT EDUCATION PROGRAMS**

### **Statement of Issue(s):**

- \* The diversity in composition and structure of families in Missouri creates unique parenting needs. These needs range from general information on basic parenting skills to specific information on coping with divorce, single parenting and anger management. In deliberative group discussions, the need for parenting information was identified as a high priority in 52 counties. In county plans of work, parenting programs were listed 88 times.

### **Goals and Indicators:**

- \* Parents will be reached with general information through the media and with specific information through targeted programs. It is expected that there will be 2,500 parents each year who will receive parenting information and participate in programs from University Outreach and Extension in Missouri.

#### Output Indicator

- \* Seventy percent of those individuals will adopt at least one new parenting practice, as a result of extension programming.

### **Key Program Components:**

- \* Programs will include three major parent education efforts in Missouri which are: Programs for Parents (general curriculum); Focus On Kids (divorcing parents); and RETHINK (anger management for parents).

### **Internal and External Linkages:**

- \* Program cooperators include the court system, local departments of family services, 4-H Youth Development and Lincoln University (through MO-CYF).

### **Target Audiences:**

- \* The target audiences include parents and divorcing parents with children under the age of 18, single parents and stepparents.

### **Program Duration:**

Programs for Parents (general curriculum) short-term  
RETHINK (anger management for parents) short-term  
Focus On Kids (divorcing parents, court mandated program) long-term

### **Allocated Resources:**

Programs for Parents - 30%  
RETHINK - 20%  
Focus On Kids - 50%  
(See Summary following Goal 5, VIII)

**Extension and Outreach Programs Underway:** See Summary for Goal 5, I-VIII

## **Goal 5: VII. Family Strengths (Adolescents at Risk)**

**Statement of Issue(s):** (*Teen Pregnancy*)

- \* A review of the deliberative group process results revealed that 17 counties identified teen pregnancy as a need. In addition, 10 counties have identified teen pregnancy in their plans of work.
- \* A review of the deliberative group process results revealed that 16 counties identified family and child abuse/neglect/violence as a need. In addition, 7 counties have identified family and child abuse/neglect/violence in their plans of work.
- \* A review of the deliberative group process results revealed that 7 counties identified both teen pregnancy and family and child abuse/neglect/violence as needs.

**Performance Goals and Indicators:**Output Indicators

- \* At the end of the reporting period, State and Regional Extension staff will train 100 school personnel on two teen pregnancy prevention curricula that have been identified by the Centers for Disease Control as having the strongest evidence of effectiveness. In turn, these school personnel will implement the curricula with 1000 students.
- \* At the end of the reporting period, 10 communities in Missouri will establish mentoring programs for pregnant and parenting teens and sustain those programs for at least two years, thereby reaching 150 teens.
- \* At the end of the reporting period, State and Regional Extension staff will train 200 citizens on the MAPP program related to maltreatment and adolescent pregnancy and parenting and 10 communities will establish coalitions to address issues around maltreatment and adolescent pregnancy and parenting.

Outcome Indicators

- \* Twenty percent of adolescents participating in educational programs will adopt at least one recommended practice or make at least one healthy life decision as a result of the program effort.

**Key Program Components:**

- \* Adolescent Pregnancy Prevention--Contract with the Missouri Department of Elementary and Secondary Education to support the "Programs That Work" effort in the Missouri public schools. This effort involves training school personnel to implement two teen pregnancy prevention curricula that have been identified by the Centers For Disease Control as having the strongest evidence of effectiveness in delaying the initiation of sexual activity, increasing the use of protection or decreasing the number of sexual partners.
- \* Mentoring Pregnant and Parenting Teens--Provide resources, training and technical assistance to community-based coalitions to establish Missouri Volunteer Resource Mothers (MVRM) programs. Missouri Volunteer Resource Mothers is a mentoring program for pregnant and parenting teens in which they are paired with community volunteers who provide information, support and resources for approximately three hours per week until the young mother is one year postpartum. MVRM has been shown to reduce child abuse potential, decrease parenting stress, and improve the health of the infant.
- \* Violence Prevention--Provide training and materials to community groups to implement MAPPP (Maltreatment and Adolescent Pregnancy and Parenting Program). The MAPPP training manual and video challenges community members to address abuse prior to, during and after an adolescent pregnancy. It has been estimated that 60% of pregnant teens were sexually abused before the age of eleven. In addition, many pregnant and parenting adolescents are simultaneously abused at home and by partners. In addition, children of teen parents are at increased risk for child abuse and neglect.

**Internal and External Linkages:**

- \* Internally, CASPP will link with campus-based faculty in Columbia, St. Louis and Kansas City to carry out the three major program efforts identified above. These linkages will involve faculty from Nursing, Social Work, and Law.

- \* Externally, CASPP will link with the Missouri Department of Elementary and Secondary Education, the Missouri Department of Social Services, and the Missouri Department of Health. Regional staff will link with a wide variety of community agencies, such as Parents as Teachers, CHART, and Community 2,000 teams.

**Target Audiences:**

- \* There are three target audiences for the three major program efforts: Regional Extension Staff who serve as the link between CASPP efforts and local communities, local community-based coalitions, and pregnant and parenting teens.

**Program Duration:**

- \* All three programmatic efforts (pregnancy prevention, mentoring pregnant and parenting teens, and violence prevention) will exist for at least an additional five years.

**Allocation of Resources:**

Adolescent Pregnancy Prevention-----20%  
 Mentoring Pregnant and Parenting Teens--50%  
 Violence Prevention--30%  
 (See Summary following Goal 5, VIII)

**Extension and Outreach Programs Underway:** See Summary for Goal 5, I-VIII

**Goal 5: VIII. OLDER ADULTS AND THEIR FAMILIES**

**Statement of Issue(s):**

- \* The context for the UMKC Center on Aging Studies' role in working with UM Outreach/Extension is the rapidly increasing population of elders in Missouri (which has 750,000 persons over age 65 and ranks 7<sup>th</sup> nationally in proportion of population over age 65). With the aging of the "baby boom" generation the proportion of persons over age 65 in the U.S. will increase from 13% in 2000 to 17% in 2020 and 20% in 2030. The most rapidly growing segment of the elder population is the oldest-old, or those over age 85. Nearly every sector of life is significantly influenced by these trends, and it is important for Extension professionals to have resources readily available to meet the needs of older adults and their families in their communities.
- \* As the result of county needs assessments and deliberations of the Elderly Base Program Planning Team, two primary foci guide our current programs and plans:
  - a) Needs of frail elders and their families for information on caregiving and dependent care; caregiving also includes older adults as caregivers to developmentally disabled adult children and to grandchildren (where the parent is absent)
  - b) Positive models for social roles in later life, or "successful aging," which recognizes the potential for older adults to continue to be contributing and productive members of their communities.

**Performance goals and indicators:**

- \* Our program efforts will result in the following outputs and outcomes:

Outputs

- \* Comprehensive web site on care giving and on successful aging
- \* Short-term educational opportunities for Extension field faculty by interactive television and Program Implementation Experiences (P.I.E.s)
- \* Longer-term credit opportunities for professional improvement
- \* Tend Positive models/programs for successful aging in communities

- \* One thousand persons will receive current information on caregiving in an easily accessible and usable format
- \* Fifteen Extension field faculty in using technology to access current information and develop community programs in aging

Outcomes

- \* Forty percent of the 1,000 persons reached through programming for older adults and their families will adopt at least one recommended practice.

**Major Efforts in the program:**

- \* The programs in the aging area will continue to build on efforts of the past several years and will consist of the following:
  - Using technology to convey new information and resources on aging (especially family caregiving and positive social roles/successful aging) to Extension professionals and lay persons – particularly the Center on Aging Studies Without Walls web site and a daily on-line news bulletin of new development and research findings
  - Working directly with Extension field faculty through Program Implementation Experiences and interactive television programs to learn how to access new information and translate it into community programs
  - Working toward making formal credit education available to Extension field faculty in a web-based format

**Internal and External linkages:**

- \* Gerontology and aging studies is inherently interdisciplinary. The UMKC Center on Aging Studies is positioned to draw on a wide variety of faculty resources in academic units across the campus (e.g., sociology, psychology, pharmacy, medicine, dentistry, nursing, public administration, music therapy, social work, counseling) and on other campuses of the UM system. Aging topics can impact a range of Extension disciplines (e.g., agriculture, business, community development, human development/families), and aging resources will be directed toward these areas as appropriate. The Center on Aging Studies also is positioned to work with and integrate resources from a number of governmental agencies (e.g., Missouri Division on Aging) and professional associations in aging.

**Target Audience(s):**

- \* The “customers” for programs of the Center on Aging Studies ultimately are older adults and their families in communities all over Missouri, but we work primarily by providing resources and training to Extension field staff and other community professionals--who in turn interface with these citizens and translate our resources into formats that apply in their local areas.

**Program Duration:**

- \* The program is ongoing and long-term since there is a steady flow of new information to transmit and build into local programming efforts.

**Allocated resources for Goal 5, Programs I-VIII:**

Goal 5 Program, I-VIII	Year	FTEs	Dollars

Missouri Youth and Families at Issue, Affordable Housing, Family Financial Mgt., Child Care, Building Strong Families, Parent Education, Family Strengths, and Older Adults	2000	40	\$2,639,600
	2001	40	\$2,639,600
	2002	40	\$2,639,600
	2003	40	\$2,639,600
	2004	40	\$2,639,600

**Extension and Outreach Programs Underway:**

- \* All of University Outreach and Extension’s field staff are “regional” specialists who have multi-county assignments. A majority of the programming implemented in Missouri would be conducted on a multi-county basis. During FY96-99 educational programs were available in all of the areas included in the FY00-04 plan of work. The research based programs included the following:
  - Educational Programs for Parents and Their Children
  - Building Better Child Care for Missouri: A Six Session Program for Directors
  - Family Financial Management
  - Affordable Housing
  - Building Strong Families
  - Elderly Issues: Center on Aging without Walls
  - Poverty at Issue
- \* Results of these programs are summarized in the FY98 Annual Report submitted to CSREES.

**Goal 5: IX. 4-H Youth Development**

**Statement of Issue(s):** *(Building Character through Community Service Learning)*

- \* The need for character education for youth was identified through citizen input in 43 Missouri counties. Additionally, 30 counties identified the need for youth leadership development and 19 counties called for citizenship education. Repeatedly, plans developed by county advisory groups call for programs that help young people develop the traits of responsibility, fairness, citizenship, trustworthiness, respect and caring. In Missouri, the Character Counts! Program and community service learning are two 4-H youth/Extension initiatives that are addressing these issues.

**Performance Goals and Indicators:**

Output Indicators:

- \* 1,500 youth will enroll in Show-Me Character Education programs (A13)
- \* 200 classrooms will enroll in Show-Me Character Education Programs (S13)

- \* 175 4-H clubs will enroll in 4-H Community Service activity (A12)
- \* 175 4-H clubs will submit community service logs
- \* 5,000 youth and adults will participate in 4-H community service learning activities
- \* 800 community service learning activities will be completed by 4-H clubs
- \* 35 4-H clubs will secure Missouri 4-H Foundation Community Service grants

Outcome Indicators:

- \* As a result of community service learning and character education programs, 4-H volunteers and youth will report that youth are more responsible and are viewed by the community as valued, contributing members.
- \* 4-H clubs will generate \$20,000 in matching community funds and in-kind services for 4-H community service grants

**Key Program Components:**

- \* Show Me Character is Missouri 4-H's character education initiative, partnering with the National CHARACTER COUNTS! Coalition. The program emphasizes six pillars of character—caring, citizenship, fairness, responsibility, respect, and trustworthiness. Missouri 4-H staff will provide training, materials and technical assistance for parents, youth, volunteers, educators, childcare providers and community groups. The six pillars will be integrated into 4-H newsletters, camps, fairs, judging classes and other traditional 4-H programs. Collaboration with local school districts, parks and recreation departments, juvenile justice centers, U.S. Army bases and other community groups will expand the outreach.
- \* Educational programs will stress the importance of citizenship, caring and sharing through service to the community. Each 4-H club will be asked to voluntarily report community service activities completed throughout the year. They will record the number of young people and adults involved in service as well as the types of service provided. A recognition certificate will be presented to clubs that meet criteria. The Missouri 4-H Foundation will provide a grant incentive program that encourages 4-H clubs to plan and implement community service learning projects. Each project requires a match of community resources.

**Internal and External linkages:**

- \* Through national events such as the creation of the Corporation for National Service, Thousand Points of Light Foundation and the Presidents' Summit on America's Future there has been a renewed emphasis on service. These events, coupled with the 4-H national ad campaign, "Are You Into It, have re-focused 4-H members on community service learning. The National 4-H Base Program Strategic Team identified community service learning as one four "programs of excellence" in its 1998 report. Missouri 4-H will partner with many initiatives, including the CHARACTER COUNTS! Coalition, the Missouri School Board Association, Girl Scouts, Boy Scouts, and PREP.

**Target Audiences:**

- \* Youth, parents, community members

**Program Duration:**

- \* Long-term

**Allocated Resources:**

- \* Character Education – 70%; community service learning 30%

**Extension and Outreach Programs Underway:** See Summary for Goal 5, IX

**School-Age Care and Opportunities for Youth during out-of-school hours**

**Statement of Issues(s):**

- \* Child care in the broadest sense—serving infants through early teens in a wide range of settings—has been approved by the Extension Committee on Policy (ECOP) as a new national initiative for the Cooperative Extension System. The need for supervised care and positive activities for youth during non-school hours was validated through citizen input in numerous Missouri counties. Specifically, 22 counties identified the need for youth activities and 8 counties called for latchkey or after school programs. Additionally, 11 counties identified the need for community/youth centers, 9 for recreational facilities, 8 for increased educational opportunities for persons of all ages and 3 for recreation opportunities for youth. More than 30 counties pointed to the need for improved access to child care. Studies show that high-quality infant and school-age care are the most difficult to secure. The plans developed by county advisory groups call for programs that provide young people and their families with safe, supervised and educationally-enriching programs and services that are available year-round during non-school hours.

### **Performance Goals and Indicators:**

#### Output Indicators:

- \* 1,300 youth enrolled in 4-H Adventure Clubs or 4-H supported School Age Child Care (SACC) programs
- \* 60 SACC programs assisted in 35 communities
- \* 500 SACC providers trained
- \* A library of SACC resources available from CES across the nation will be assembled.
- \* 20 new after-school computer labs started

#### Outcome Indicators:

- \* As a result of SACC provider training, 250 will adopt recommended practices
- \* Of the 20 new after-school computer labs started with 4-H support, 15 will be sustained by the community after grant funding ends.
- \* As a result of technical assistance by 4-H faculty, \$10,000 will be secured in grants by local SACC programs.

### **Key Program Components:**

- \* The National 4-H Base Program Strategic Team identified school-age care as one four “programs of excellence” in its 1998 report. 4-H Youth Development staff will facilitate training sessions for school-age child care (SACC) providers throughout Missouri and the nation on a number of topics such as developmentally appropriate practice, accreditation, SACC credential process, child care resources, guidance and discipline, program development, character education, parent involvement and computer technology. In addition, Missouri 4-H faculty will assemble a library of CES resources for SACC programs that can be checked out by persons from across the nation. Missouri 4-H faculty will also continue to assist local school districts in securing funding to implement SACC programs.
  - \* The program is to establish after-school computer labs for middle school youth will continue. The project meets the needs of at-risk youth by providing a safe, engaging and recreational setting during the after school hours. A partnership with the state Department of Elementary and Secondary Education and local school districts makes the program possible. Special efforts will be made to develop computer labs in school districts and communities with underserved audiences including minorities, low-income youth, and youth for whom English is a second language.

### **Internal and External linkages:**

- \* Missouri 4-H will partner with the National Network for Child Care, the National School Age Care Alliance, the Missouri School Age Care Alliance, Missouri Child Care Accreditation, and the Missouri Department of Elementary and Secondary Education.



**Target Audiences:**

- \* Youth, parents, school personnel, communities

**Program Duration:**

- \* Long-term

**Allocated Resources:**

- \* SACC training, resources, technical assistance-80%
- \* After-school computer labs – 20%

**Extension and Outreach Programs Underway:** See Summary for Goal 5, IX

**SCIENCE AND TECHNOLOGY EDUCATION****Statement of Issue(s):**

- \* The Secretary of Labor's SCANS report identified working with technology as one of five essential competencies that workers will need for the future. The need for science and technology education was validated through citizen input in numerous Missouri counties. In the area of science education, 23 counties identified the need for water quality and environmental education and 15 counties called for 4-H school enrichment programs. The need for technology education was expressed as the need for workforce preparation for youth in 21 counties and for programs on the increased use of information technology in 24 counties. In Missouri, the following programs are addressing science and environmental education needs: Streets to Streams, Hatching Chicks and Observation Earth. Technology education for youth includes several workforce preparation initiatives, as well as 4-H computer projects and related programs.

**Performance Goals and Indicators:**Output Indicators:

- \* 85,000 youth and volunteers will enroll in 4-H school enrichment and group programs Observation Earth (S97), Hatching Chicks (S15), Streets to Streams (A66)
- \* 20 after-school computer labs will be established
- \* 1,100 youth and 250 volunteers will enroll in 4-H computer projects (890, 891, 894)
- \* The national 4-H computer curriculum for the Cooperative Curriculum Service will be completed and piloted.

Outcome Indicators:

- \* Of the 20 new after-school computer labs started with 4-H support, the community will sustain 15 after grant funding ends.
- \* Of the 1,100 youth enrolled in 4-H computer projects, 65% will complete the project and adopt new practices as a result of the program.

**Key Program Components:**

- \* 4-H Youth Development programs reach youths and adults who enroll as volunteers in 4-H youth development programs through 4-H clubs, 4-H School enrichment and 4-H special interest groups. They receive support from 4-H and Extension staff in the form of printed materials, training, seminars, conferences, and on-line information. Statewide 4-H enrollments, county ES-237 reports are used to determine the number of persons completing non-formal programs in these areas.
  - \* The program to establish after-school computer labs for middle school youth will continue. The project meets the needs of at-risk youth by providing a safe, engaging and recreational setting during the after school hours. A partnership with the state Department of Elementary and Secondary Education and local school districts makes the program possible.

**Internal and External linkages:**

- \* Missouri 4-H will partner with the Missouri Department of Elementary and Secondary Education, UOE Water Quality Programs and the National Network for Science and Technology.

**Target Audiences:**

- \* Youth, parents, school personnel, communities

**Program Duration:**

- \* Long-term

**Allocated Resources::**

- \* Science and environmental education- 75%
- \* Technology education—25%

**Extension and Outreach Programs Underway:** See Summary for Goal 5, IX

**Volunteer Leadership Development****Statement of Issue(s):**

- \* The National 4-H Base Program Strategic Team identified volunteer leadership development as one four “programs of excellence” in its 1998 report. The need for volunteer leadership development was identified through citizen input in 34 Missouri counties. Additionally, 8 counties identified the need for coalitions to support youth and 30 called for youth leadership development.

**Performance Goals:**Output Indicators:

- \* 15,000 youth and adults will volunteer with 4-H programs
- \* 200 persons will access and use part or all of the on-line volunteer training course
- \* 1,500 4-H club members will be surveyed for the Missouri 4-H impact study
- \* 114 counties will receive a resource packet on working with Latino audiences.

Outcome Indicators:

- \* 90,000 hours of volunteer time valued at \$12 per hour will be donated.
- \* 50% of the persons accessing the on-line volunteer training course will correctly answer self-study questions on positive youth development.
- \* 75% of the youth surveyed for the 4-H impact study will report that the adults in 4-H respect them and provide them with safe environments.
- \* 75% of the youth surveyed for the 4-H impact study will report that 4-H provides them with opportunities to be leaders, to volunteer and to help others.
- \* The number of Latino/Latina volunteers workign in Missouri 4-H will increase by 100% in four years.

**Key Program Components:**

- \* 4-H Youth Development programs reach youths and adults who enroll as volunteers in 4-H youth development programs. Volunteers will be enrolled and receive support from 4-H and Extension staff in the form printed materials, training, seminars, conferences, on-line information and recognition. State-level volunteer training include Shootings Sports volunteer certification, the North Central Regional 4-H Leaders Forum and the Missouri 4-H Leaders Forum. A new, on-line self-study course for volunteers who work with youth will be introduced.
- \* Modeling after the national 4-H Impact Assessment Project, Missouri will conduct its own impact assessment in 2000. A survey will be administered to 1,900 youth in 4-H clubs. The survey will provide

data on the youth’s perception of the adults who work with them in 4-H. It will also collect data from the youth on how they feel about volunteering.

- \* Initiatives to recruit, retain and support volunteers from the Latino community will include the development of resource materials, special training for faculty and staff, and partnerships with other human service agencies and groups.

**Internal and External linkages:**

- \* Missouri 4-H will partner with the Missouri 4-H Foundation and private funders, the North Central states’ 4-H programs, National 4-H Council and CSREES.

**Target Audiences:**

- \* Youth, parents, school personnel, communities

**Program Duration:**

- \* Long-term

**Allocated Resources:**

- \* Volunteer recruitment, enrollment, support and recognition—60%
- \* Volunteer training—20%
- \* Volunteer self- study course—10%
- \* Impact study—10%

**Allocated Resources for Goal 5, IX – 4-H Youth Development:**

Goal 5 Program	Year	FTEs	Dollars
4-H Youth Development: Building Character School Age Child Care Science & Technology Volunteer Leadership	2000	46	\$3,035,540
	2001	46	\$3,035,540
	2002	46	\$3,035,540
	2003	46	\$3,035,540
	2004	46	\$3,035,540

**Extension and Outreach Programs Underway:**

- \* All of University Outreach and Extension’s field staff are “regional” specialists who have multi-county assignments. A majority of the programming implemented in Missouri would be conducted on a multi-county basis. During FY96-99 educational programs were available in all of the areas included in the FY00-04 plan of work. The research based programs in 4-H Youth Development included the following:

- Character Counts
- School Age Child Care
- Environmental Stewardship
- Family and Parenting
- Health Education
- Leadership Development (Youth and Adult)
- Workforce Preparedness

- \* Results of these educational programs are summarized in the FY98 Annual Report submitted to CSREES.

**Goal 5 Anticipated Impact:**

The overriding goal of all education programming related to the Enhancing Economic Opportunity and Quality of Life for Americans areas is to cause adoption by Missouri citizens of recommended practices. In the Family

Strengths program area, in which more than 10,000 citizens will participate, this kind of impact is expected on 10-70% of persons participating, depending upon the specific program; 75-90% will gain knowledge and skills; and 20-80% will intend to adopt recommended practices.

# 1890 (LU) Cooperative Extension Service

## Overview

In the over-25-year history of Lincoln University Cooperative Extension (LUCE), 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 plight. Profitable farming methods by minority farmers, coupled with education about the benefits of a farming lifestyle will help to stem the exodus of minority landowners from farming.

## Stakeholders

LUCE programming is designed to address the expressed needs of our stakeholders. The mechanisms used to garner stakeholder participation are diverse and heavily dependent on the needs of the community being served. However, the source of information used in program planning and development are derived from surveys, focus groups, local interest groups, and Extension staff.

LUCE is now in the process of conducting a "client satisfaction survey" among all the citizens it serves under various programs. The findings from this survey will be considered while preparing all future Work Plans.

## Merit Review Process

Successful Extension programming requires constant input from both state and local partners, which include subject matter experts. All programs delivered by Lincoln University will undergo periodic review by local and state review teams. These teams will consist of stakeholders having significant input. The team and review approach will be program specific.

1890 (LU) Extension Overall Budget by Year and Goals					
Year	Goal 1	Goal 2	Goal 5	Total	State Match
2000	\$1,059,000	\$285,000	\$600,000	\$1,944,600	\$ 530,000
2001	\$1,089,000	\$315,000	\$745,000	\$2,149,000	\$ 850,000
2002	\$1,217,000	\$355,000	\$830,000	\$2,402,000	\$1,200,000

2003	\$1,300,000	\$405,000	\$890,000	\$2,595,000	\$1,240,000
2004	\$1,380,000	\$455,000	\$925,000	\$2,760,000	\$1,250,000

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

### **SMALL FARM FAMILY PROGRAM**

#### **Statement of Issue(s):**

- \* Approximately 80% of Missouri farms are classified as "small farms". Maintaining their viability is central to the survival and progress of many small townships and communities. Therefore, the survival and continued profitability of Missouri's small farms are major concerns for farmers and community leaders alike. These concerns have been expressed at all levels of the community, and through several forums.

#### **Performance Goals:**

- \* The purpose of the Small Farm Family Program (SFFP) is to meet the informational and educational needs of farm families who are likely to be under served by other University Outreach and Extension (UO/E) programs. The under served are most likely to be those families with minority status and/or limited resources - including financial means, education, political power, social status, self-esteem, and thus, have limited access to usual sources of knowledge and information.
- \* The SFFP personnel constantly strive for opportunities to educate program participants on the importance of conserving natural resources, maintaining and/or improving the environment, and on becoming less dependant on purchased inputs. As more research-based information becomes available on sustainable agriculture, these are passed on to the small family farmers. The program promotes technologies that are environmentally friendly, economically sound, and socially responsible.

#### **Key Program Components:**

- \* The SFFP is unique in that it requires input and research-based knowledge from many areas, as it supports "all" educational and informational needs of a family farmer. The program implementers are obliged to seek out information wherever these might be available; this often forces collaboration with myriad organizations.

#### **Internal and External Linkages:**

- \* During the 28 years since the program's inception, an extensive and strong network of relationships have been developed among various program stakeholders. This program represents a model of collaborative partnership between the state's 1862 and 1890 institutions. Through a signed Memorandum of Agreement between the two institutions, the organizational structure and the program implementation plan have been formalized. While LUCE provides the bulk of the operational expenses and leadership to the program, University of Missouri System Outreach and Extension (UMSOE) makes available an array of resources necessary to implement the program.
- \* LUCE has designated a full-time person to provide leadership to the program, and UMSOE has included SFFP in the job responsibilities of three Regional Directors and three Farm Management Specialists (who serve as the Regional SFFP Coordinators). The program is delivered to the target population by SFFP Educational Assistants (EAs) on a one-on-one basis. At present, there are 20 EAs serving 22 counties in the southern part of the state. An Advisory Council, formed with representatives from various stakeholders' groups, oversee proper functioning of the program.

- \* The two land grant institutions will co-host the Second National Small Farm Conference in St. Louis in October 1999. LUCE is also considered for housing a Regional Small Farm Information Center.

**Target Audiences:**

- \* This program is specifically geared toward serving small family farmers who are often not reached by other more traditional extension programs. These educationally and financially disadvantaged people also lack self-confidence and political power. They do not actively seek out information or assistance. The EAs are recruited from the same locality, with similar backgrounds. Thus, it is easier for these EAs to gain the confidence of targeted populations. They seek out families who could use the program assistance, and then work with them on a one-to-one basis.

**Program Duration:**

- \* This program is on-going since 1971. The state of Missouri still has about 100,000 small farms, and a majority are struggling to hold onto these farms while they still make a living. They desperately need help now, and will require assistance for years to come. Thus, this program must continue for a very long time.

**Allocated Resources:**

- \* LUCE budgets approximately \$550,000 annually to this program. In addition, UMSOE commits considerable human resources - approximately 5 FTE - to support the activities of this program. The state of Missouri also allocates \$50,000 to support the SFFP. There are 20 EAs working in 22 counties. There is also a demand to expand this program.

<u>Fiscal Year</u>	<u>FTE</u>	<u>Dollars</u>
2000	20	\$600,000
2001	20	\$605,000
2002	22	\$625,000
2003	23	\$630,000
2004	25	\$650,000

**Merit Review:**

- \* The Small Farm Family Program activities were reviewed at least twice in the nineties, the last one conducted in 1996. The review team was composed of faculty members from both Lincoln University and the University of Missouri, and a few other stakeholders. Most recommendations made by the team have since been implemented.
- \* The SFFP Advisory Council regularly monitors program activities. Another evaluation will be done in the year 2001 by a team composed of University personnel, USDA, state agencies, and other stakeholders.

**SHEEP AND GOAT PRODUCTION**

**Statement of Issue(s):**

- \* The land area in Missouri suitable for sheep and goat grazing and browsing is 46% of the total land. Small ruminants primarily, sheep and goats are best suited for converting forage, forbs and browse into meat, milk and fiber as saleable and consumable products high in nutrition and wearable items. Profitable use of these non-arable lands is a concern raised in various forums. Co-grazing with sheep, goats and cattle are being encouraged by the Department of Natural Resources (DNR) with funding available to producers for fencing, watering systems and fertilizer to improve production per acre of land.
- \* A partnership is being researched with DNR and Cooperative Extension to provide a holistic program to optimize production per grazing acre. This team approach to deliver this program in grazing, fencing, reproduction, selection, herd health, predator control, disease control, nutrition, management, and building

plans for producers is being developed with the goal of increasing sheep and goat production by 75% in Missouri by 2004.

**Performance Goals:**

- \* The development of relevant guide sheets and videotapes containing up-to-date research-based information addressing the needs of the producer will be used as output indicators. Other output indicators include the acceptance and participation in workshops, training seminars, and the implementation of Ram Test Stations. Each year producers will be encouraged through various educational avenues to participate in this program.

**Key Program Components:**

- \* The key components of this program are (a) involvement of producers, field extension personnel, and local community leaders in the introduction of this program to communities; (b) an interdisciplinary approach to address all aspects of sheep and goat production; and (c) a youth component.

**Internal and External Linkages:**

- \* The program has as a major component, forged partnerships with several organizations, including the 1862 university, local organization, State Department of Agriculture, the Missouri State Fair Marketing Councils, and youth development organizations.

**Targeted Audiences:**

- \* Small farm families and limited resource individuals and families, sheep and goat producers, regional livestock and other specialists.

**Program Duration:**

- \* Program duration is expected to be 5 years from the time of inception until completion. The program will be offered in all 114 counties, excluding urban St. Louis and Kansas City. Youth-oriented versions of sheep and goat production are on a continuous basis, as youth become of age to participate in 4-H programs.

**Allocated Resources:**

<u>Fiscal Year</u>	<u>FTE</u>	<u>Dollars</u>
2000	1.0	80,000
2001	1.0	85,000
2002	2.0	125,000
2003	2.0	130,000
2004	2.0	135,000

This program presently reaches producers in over 100 counties. Collaboration with researchers at Missouri's two land-grant universities, coupled with networking among researchers from other states, provide the research for this program.

**Summary Statement:**

- \* Research results in all aspects of sheep and goat production and programming on a multi-county basis are being practiced and applied by sheep and goat producers. There are statewide workshops, conferences, and short courses offered that include producer participation from all rural counties. Guide sheets, videotapes and newsletters are to be developed on all aspects of production.

**VALUE-ADDED FIBER PROGRAM**

**Statement of Issue(s):**



- \* Wool produced on small farms is being sold for 5-15 cents per pound, and much of it is not selling at all. Mohair produced from adult Angora goats is stored in warehouses, and has been there for three years. The kid hair is selling, and some of the yearling mohair. The need to develop markets outside the commercial marketplace is imperative if producers of woolled breeds are to stay in business. Developing value-added wool markets selling to hand spinners, quilters, and weavers is being done through different marketing channels. A 1000% mark-up per pound of wool can be achieved by educating producers on how to grade, skirt fleeces, make washed wool into roving and batts, and making it into yarn. Yarn can be used for knitting, crocheting and weaving, as well as locker-hooking, and in some cases used in tatting and counted cross stitch for crafters. By methods of processing, fiber from animals and plants will result in increased profit at the farm gate or through internet and festival event marketing. Through consultation with farmer groups, initiative has been taken to solve the marketing dilemma for Missouri small farmers.

**Performance Goal:**

- \* Guidesheets, videos and newsletters will be developed in response to the topics requested by producers. The number of individuals participating by using these materials will be measured performance. Goals will be measured in terms of planned conferences, and participation in fiber festivals. Outcome indicators will include measures of new producers participating in the value-added program.

**Key Program Components:**

- \* The organization of producers into association to aid in the development of the program is one key component. Others include the delivery methods such as workshops, festivals and conferences that are organized by farmers and local extension staff.\

**Internal and External Linkages:**

- \* Internal - Partners with fine arts department on the Lincoln University campus
- \* External - Partners with guild members throughout the state

**Targeted Audiences:**

- \* The target audience for the program includes farmers producing sheep, goat, rabbit, llama and alpacas, regional livestock specialists, youth specialists and other specialists. Also targeted are individuals who purchase products with the intention of adding value.

**Allocated Resources:**

<u>FY</u>	<u>FTE</u>	<u>Dollars</u>
2000	1	54,000
2001	1	59,000
2002	1	62,000
2003	2	85,000
2004	2	90,000

**Program Duration:**

- \* The program is planned for 5 years, with the addition of new communities upon demand.

**MARKET DEVELOPMENT FOR MISSOURI PRODUCTS**

**Statement of Issue(s):**

- \* Southeast Missouri is the poorest part of the state. Because of the absence of marketing opportunities, lack of alternative farming enterprises and value-added production for the small disadvantaged farmers in the region, poverty is a persistent issue. The consequences of such a deplorable economic situation are far

reaching in their societal impacts. For example, there is rural to urban migration by individuals who are not skilled enough to earn living wages.

- \* Reports received from farmers indicate past development of markets and cooperatives, which could not be sustained for various reasons. The result is that farmers who are risk averse are afraid of venturing into more productive and profitable farm enterprises and cooperatives unless there are immediate market outlets. Direct, relationship, and other niche marketing techniques are either unknown or very new to most of the small limited resource farmers in the region. By failing to organize into associations or cooperatives, these limited resource farmers cannot take advantage of the global competitive markets.
- \* Sheep and goat producers in Missouri form a category of farmers who need assistance in opening up markets in the face of expanding demand in the country, especially for goats. Overall, in repeated conference evaluations, small and limited resource farmers have always chosen marketing as their primary obstacle to increased profitability, growth, and sustainability.

#### **Performance Goals:**

- \* To increase agricultural producer awareness, understanding, and information on improving the productivity and global competitiveness of the U.S. agricultural production system through new value-added commodities in which CSREES partners and cooperators play an active extension or education role.
- \* To increase consumer awareness, understanding, and information on food accessibility, and affordability in which CSREES partners and cooperators play an active education and extension role.
- \* To increase agricultural producer awareness, understanding, and information regarding the adoption of agricultural production practices that sustain and/or protect ecosystem integrity in which CSREES partners and cooperators play an active education and extension role.

#### **Key Program Components:**

- \* The key components of the program include, and not limited to, the following: (a) continuation of internet marketing of goats, (b) beginning of internet marketing of sheep, (c) developing marketing strategies for pastured poultry, (d) establishing a North Central Regional Center for Small Farms and Sustainable, (e) helping vegetable producers in the Bootheel to form a cooperative for purposes of marketing their products, (f) assisting in the development of web pages to advertise and sell natural fiber products from sheep and other animals, (g) submitting Fund for Rural America proposal whenever the funds are reinstated, to provide opportunities for people to farm and market their products to enhance their economic well-being, (h) developing market(s) for specialty products, such as cheese made from sheep and goat milk, (i) teaching marketing plan and pricing of crafts and other products, (j) marketing welfare-to-work program to potential employers, (k) marketing Lincoln University to the University of Wisconsin for purposes of internship for graduating seniors from Lincoln University, (l) organizing conferences and workshops for the stakeholders to provide networking opportunities and disseminate current information on various marketing strategies, and (m) marketing feasibility surveys and studies.

#### **INTERNAL AND EXTERNAL COLLABORATIONS (LINKAGES):**

- \* INTERNAL COLLABORATORS INCLUDE THE UNIVERSITY OF MISSOURI AND LINCOLN UNIVERSITY EXTENSION AND OUTREACH PROFESSIONALS. EXTERNAL LINKAGES INCLUDE THE MISSOURI DEPARTMENT OF AGRICULTURE, THE UNITED STATES DEPARTMENT OF AGRICULTURE (USDA) AND ITS VARIOUS AGENCIES, FOR PROFIT AND NOT-FOR- PROFIT ORGANIZATIONS, AND NON-GOVERNMENTAL ORGANIZATIONS (NGOS).

#### **TARGET AUDIENCES:**

- \* The individuals targeted in this program are limited resource and small farmers who are traditionally underserved. Extension and outreach assistance will be required to meet the needs of the group. Both consumers and producers will be affected. While producers will be assisted, through extension, outreach,

and conferences to produce safe food, consumers will be encouraged to buy them through various marketing strategies, and promotions. Community leaders will also be targeted. Improvement in the economic well-being and quality of life of these citizen groups will spill over into their rural communities. Information given out at conferences will help agricultural professionals to serve their clientele better. It is expected that more than two thousand (2,000) citizens will participate in this program annually from the year 2000 to 2004.

**PROGRAM DURATION:**

- \* The duration of the program is continuous and will last as long as there are farmers and workers expecting to sustain themselves on their farms and operations. For example, vegetable marketing will continue as long as producers are willing and able to produce for the market.

**Allocated Resources:**

<u>FY</u>	<u>FTE</u>	<u>Dollars</u>
2000	1	\$ 25,000
2001	1	\$ 40,000
2002	1	\$ 65,000
2003	2	\$ 90,000
2004	2	\$115,000

**SUMMARY:**

- \* THE MARKETING PROGRAM OF THE LINCOLN UNIVERSITY COOPERATIVE EXTENSION HAS ALREADY BEGUN TO IMPLEMENT ASPECTS OF THIS PROGRAM. EFFORTS WILL CONTINUE UNTIL THE PROGRAM IS COMPLETELY IMPLEMENTED.

**HORTICULTURE PRODUCTION (PRIMARILY FRUITS AND VEGETABLES)**

**Statement of Issue(s):**

- \* Approximately 47% (by weight) of food consumed by Missouri citizens are fruits and vegetables. Missouri imports over 90% of its fruits and vegetables. Missourians are concerned about the quality, nutrition and safety of the fruits and vegetables they consume. They also desire to have more knowledge and control over the food that they consume. Local and regional production offers the opportunity to provide fresher and higher quality produce to the Missouri consumer, whether this produce is grown in commercial operations or home gardens. Knowledge on the production of safe and healthful fruits and vegetables without negative impacts on the environments (e.g. water pollution caused by fertilizer nutrients and pesticides) are desired by both commercial and home gardeners.
- \* Production of these crops also offers economic alternatives for many small and medium scale growers within the state. Most of these crops are not widely grown on a large scale and information is greatly lacking to assist new and existing commercial growers. A multi-facet dual educational program is offered - one to assist commercial operations to be more successful and profitable, and the other to assist home gardeners to make their gardens more productive, both with fruits and vegetables that are safe, nutritious and high quality. The issues and delivery methods were developed from the expressed needs of both clientele groups from surveys and county program plans and requests from growers and extension personnel. A major target audience for the home gardening component are extension personnel and Master Gardeners who work with limited resource, minority, inexperienced and youth gardeners.

**Performance Goals:**

- \* For commercial growers outcome indicators are increased quantity and quality of products, increased market share and profitability of horticulture producers, and reduction in production inputs (fertilizers, pesticides, etc.). For home gardeners, outcome indicators are increased quantity and quality of fruits and vegetables grown in home gardens, proper and safe use of pesticides, reduction of pesticides and fertilizers used by home gardeners.

**Key Program Components:**

- \* For the period 2000-2004, between 2000 and 3000 growers will be targeted through the Vegetable Production Newsletter and educational meetings such as the Great Plains Vegetables Conference. A major emphasis will be placed on the crop nutrition program (including a water quality component) which uses soil testing and plant analysis to determine proper fertilizer applications (including micronutrients) to crops to increase productivity and quality, and to reduce fertilizer inputs and environmental pollution. Other educational components will include, guidesheets, workshops and conferences, educational tours, direct grower assistance, diagnostic services, field days, and training and support to area extension specialists. With home gardening, training of Master Gardeners and Extension educational assistants are key components of the program.

**Internal and External Linkages:**

- \* This program involves representatives of state and local organizations, e.g. Missouri Vegetable Growers Association, Missouri Department of Agriculture, Missouri Department of Natural Resources, and various commodity groups and local gardening groups.

**Target Audiences:**

- \* The target audience for this program are commercial fruit and vegetable growers and home gardeners. Emphasis is also placed on youth, minority and limited resource audiences.

**Program Duration:**

- \* This is an ongoing program. Some components, such as the crop nutrition program, are multiyear in scope and are opened ended. For example, according to the Missouri Department of Natural Resources, less than 10% of Missouri farms have had their soil tested within the past three (3) years. Increasing the nutritional value of these crops and reducing fertilizer application rates may take decades.

**Allocated Resources:**

<i>FY</i>	<i>FTE</i>	<i>Dollars</i>
2000	1	\$ 25,000
2001	1	\$ 40,000
2002	1	\$ 65,000
2003	2	\$ 90,000
2004	2	\$115,000

**Summary:**

- \* Both the commercial fruit and vegetable production and home gardening components have been underway for several years. The crop nutrition component has been added within the past two years. This program has drawn interest nationally due to its emphasis on 1) quality of production (not just quantity of yield), 2) eliminating soil fertility as the limiting factor in crop production and 3) reduction of fertilizer inputs , thus reducing groundwater pollution.

**SOCIALLY DISADVANTAGED FARMER PROGRAM**

**Statement of Issue(s):**

- \* The United States Department of Agriculture is criticized for the lack of service to small farmers, especially minority and female farmers. This audience appeals to the Cooperative Extension Program for help and assistance that can enhance, improve and strengthen their farm operation and insure that their farm operation is successful. The trend of loss of small farm family operations continues to escalate. On a national and global scale, the large agriculture corporations are addressing issues such as marketing, biotechnology, and land use. The small farmer finds it difficult to relate to issues of such magnitude because they are confronted with more basic and crucial issues such as money management, financing farm loans including operating loan, improving credit rating, developing satisfactory cash flow records, utilizing existing technology in crop production, and exploring alternative agriculture activities.
- \* During the past year, the state legislature recognized the critical need for these issues to be addressed and as a result, the House and Senate Agriculture Committee convened four public forums throughout the state to listen to small farmers speak of their needs. Each session resulted in the committee recommending that more monies be allocated to address these problems.

**Performance Goals:**

- \* Beginning with the year 2000 through 2004, each year 15 new small farmers will be identified and enrolled in the 2501 Program that has established an outstanding record of performance of saving many minority and female farmers, who were on the verge of foreclosure by a bank or other lending agency. These farmers will gain knowledge that will help them become productive and successful farmers. Output indicators will measure alternative agriculture enterprises that farmers can engage in to make their farm operation financially successful.

**Key Program Components:**

- \* The key components are: the design and implementation of the program by the Extension Project Staff and farmer cooperators enrolled in the program, the length of the program and the involvement of 90% of the farmers in all training workshops and demonstration sessions.

**Internal and External Linkages:**

- \* The program involves representatives from Extension, Missouri State Department of Agriculture, Women in Agriculture and several private banks and lending institutions throughout the state. USDA agencies including Natural Resources Conservation Service, Farm Service Administration, and Rural Development will also be involved.

**Target Audiences:**

- \* The target audience will remain farmers who have been enrolled in the program over the past 5 years and new farmers identified by the staff or by existing farmer-cooperators.

**Program Duration:**

- \* The program duration will coincide with the Cooperative Extension 5-year plan. One hundred and sixty (160) farmers will be carried forward into the new year and an estimated 15 new farmers will be enrolled in the program each succeeding year. Ten (10) farmers will graduate from the program and will be eligible for follow-up assistance as needed.

**Allocated Resources:**

<u>FY</u>	<u>FTE</u>	<u>2501 Program Funds</u>
2000	4.75	\$275,000
2001	4.75	\$275,000
2002	4.75	\$275,000
2003	4.75	\$275,000
2004	4.75	\$275,000

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

### **TO PROVIDE A SAFE AND SECURE FOOD AND FIBER SYSTEM**

#### **Statement of Issue(s):**

- \* Very highly publicized outbreaks of food borne illness over the past 10 years have been attributed to microbial contamination of eggs, beef and fresh fruits and vegetables. Both restaurants and catered meals have also been implicated in cases of food borne illness affecting large numbers of people. In addition, food that may be uncontaminated when brought into the home can be handled, stored or prepared in ways as to allow the development of dangerous levels of illness-causing pathogens. Extension has a very important role to play in helping achieve the goals of the President's 1997 Food Safety Initiative.
- \* In addition, 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 1990 census, 13.3% 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. Thirty percent of children 18 and under are food stamps recipients.

#### **Performance Goals:**

- \* To annually increase, in Missouri, public awareness, understanding, and information on food accessibility and affordability; to annually increase the effectiveness of citizen participation on public policy issues affecting food security (i.e. food access, affordability, and recovery).
- \* To annually increase, in Missouri, public awareness, understanding, and information regarding food safety and food borne risks and illnesses.
- \* Output indicators will include: a) number of workshops and presentations given on these topics, b) number of people attending these workshops, c) number and variety of fact sheets produced and distributed on relevant topics; d) number of public service announcements (PSAs) used on radio stations, broadcast area and approximate audience size at time of airing of PSAs; and e) number of people subscribing to nutrition newsletter. Outcome indicators will include measures of awareness, knowledge and self-reported behaviors before and after attendance at workshops.

#### **Key Program Components:**

- \* To conduct a series of home visits with elderly food stamp recipients in southern Missouri and other regions as funding permit using lessons adapted from the curriculum *Families First: Nutrition Education and Wellness System*.
- \* To conduct a series of workshops for primarily low-income Missourians on nutrition topics including a variety of cooking activities.
- \* To produce a regular newsletter on pertinent nutrition, health and food safety issues for Missourians, especially those traditionally under served by other programs.
- \* To set up a web site with continually updated nutrition, health and food safety information and links to other web sites providing sound information on the Internet.

- \* *Food Safety and You.* A program, contingent on funding from USDA CSREES Plan of Work to provide food safety education to occasional quantity foods cooks, primarily low income African Americans, in the Bootheel and other areas of the state where it is needed. (funds applied for – pending funding)

### ***GOAL 3: A Healthy, Well-nourished Population***

#### **TO ACHIEVE A HEALTHIER, MORE WELL-NOURISHED POPULATION**

##### **Statement of Issue(s):**

- \* Substantial improvements have been made in the nation's health profile in the last twenty years. However, not all groups have benefited equally from these improvements. 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 emphasize the importance of a low-fat and low-cholesterol diet that can be achieved through an increase in the intake of fruits and vegetables, complex carbohydrates and fiber and a decrease in the intake of fatty foods. Recommendations for the public also include limiting sugar, alcohol and salt intake.
- \* Focus groups conducted with members of the hard-to-reach American public (primarily low-income African Americans and Hispanic populations) showed that being healthy seemed to be important to participants and they were generally aware of what to do to stay healthy. However, chronic diseases such as cancer and diabetes were thought to be due to fate and heredity and beyond their individual control.

##### **Performance Goals:**

- \* The goals of the Lincoln University Cooperative Extension Nutrition program are 1) to annually reduce health risk factors of low-income Missourians to improve dietary habits and physical exercise; and 2) to annually increase, in Missouri, public awareness, understanding and information on dietary guidance and appropriate nutrition practices.
- \* Some of the output indicators for these goals will be: 1) number of workshops and presentations given on these topics; 2) number and variety of fact sheets distributed on relevant topics; 3) number of people subscribing to program newsletter(s); 4) number of questions answered via email and from web page. Some of the outcome indicators will be number of program participants having knowledge, skills and ability to be well nourished; number of participants with improved food buying skills; food preparation skills and an increased level of physical activity.
  - \* In addition, we plan to improve individual and family health status of low-income, primarily African-American Missourians, and to annually improve the level of individual and family safety (or reduce risk levels) from accidents in homes, schools, workplaces and communities.

##### **Key Program Components:**

- \* To conduct a series of home visits targeting Food Stamp recipients to demonstrate the importance of a healthy diet in promoting long-term good health
  - \* To conduct a series of experiential workshops aimed at helping people make wise food choices and thus reduce risk of heart disease, hypertension and complications due to diabetes.
- \* To present a variety of programs on various topics of interest to low income Missourians, including the following:

*Nutritious Snacks; Eating the Pyramid Way; Cooking for Health; Diabetes and Me; Community Food Security and Me; Supermarket Tours to Stretch your Budget; What's in a label?*

- \* In FY 2000 – 2005 radio public service announcements and at least one article in a newsletter a year will be employed to raise awareness about individual behaviors to enhance health and prevent accidents. The following topics will be addressed: (a) access to individual and family health care; (b) individual and family health (e.g. smoking and chemical dependency); and (c) reduction of accidents or risk of accidents in the home, school, workplace and community.

**Internal and External Linkages:**

- \* These programs will be conducted in collaboration with Agriculture, Rural Development, and Youth and Family faculty and staff working with the Missouri Center for Minority Health and Aging and the Agriculture and Extension Information Center at Lincoln University Cooperative Extension. We will also work with the Lincoln University Cooperative Research Faculty in Human Nutrition and Agriculture and with the University of Missouri Outreach and Extension, primarily.
- \* We will also collaborate with staff from the Departments of Health, Agriculture and Social Services when possible. In addition, we will work together with state and local agencies when performing activities pertinent to our target programs (e.g. Diabetes Foundation, Arthritis Foundation, Chef's Collaborative 2000 members). Collaboration with federal agencies including the Food and Drug Administration, the Centers for Disease Control and other agencies within the Department of Health and Human Services, as well as with other USDA agencies, including the Team Nutrition program will add to our ability to deliver effective programs. Over the next five years, we intend to strengthen links between the nutrition programs of our sister 1890 Land Grants and with nutrition programs at the 1862 Land Grants, primarily in the North Central region of the U.S.

**Target Audiences:**

- \* Primarily low income Missourians and other under served segments, like African Americans, Hispanic families, and those who use the food bank system of the state. We will also work with low-income groups particularly at risk for the major chronic diseases in which diet can play an important role in disease prevention or lessening of morbidity associated with a disease (e.g. hypertension, cardio-vascular diseases and stroke, cancer and diabetes).

**Program Duration:**

- \* The programs will have a varying length, depending on the program and the needs assessments, and on funding for the programs. Some will be for FY 2000 only, while others will be used for FY 2000 – FY 20003 and some will be implemented for the entire five-year period.

**Allocated Resources:**

<u>FY</u>	<u>FTE</u>	<u>Dollars</u>
2000	1	\$ 25,000
2001	1	\$ 40,000
2002	1	\$ 65,000
2003	2	\$ 90,000
2004	2	\$115,000

**MISSOURI CENTER ON MINORITY HEALTH AND AGING (MCMHA) PROGRAM**

**Statement of Issue(s):**



- \* Based on the 1990 census results for Missouri, the population aged 65 and over numbered about 720,292 (14% of Missouri's residents), ranking Missouri 7<sup>th</sup> in the nation in percentage of older adults (65+). In Missouri, African Americans represent 89.3% of older minority ratings and Hispanics 5.5%. Research has substantially documented that older minority people, by almost all economic, health and social indicators are poorer and less healthy, have poorer housing, fewer options in personal and public transportation, and significantly more limited access to health professionals and to community-based programs and services. The mission of the Missouri Center on Minority Health and Aging is to provide leadership in the areas of health care, psychological and social needs of the minority elderly population in Missouri. This will be accomplished through education, training, policy analysis, and the use of technology as a strategic tool.

**Performance Goals:**

- \* For each year, 2000-2004, there will four ongoing MCMHA projects implemented. The average number of individuals reached through these programs per year will be 500. Those participating in MCMHA projects will gain knowledge and skills that will enable them to improve their social, health and economic quality of life. Output indicators will include the number of persons who complete the programs, as well as pre- and post-evaluations. Outcome indicators will vary by project but will include number of individuals adopting strategies for healthy behaviors, number of individuals gaining meaningful employment, and incidence and mortality data in relation to specific diseases. Collaboration with the Missouri Department of Health on a number of projects will allow us to gather outcome data by zip code and race on incidence and mortality for particular diseases in which minorities have disparate rates.

**Key Program Components:**

- \* The key components of the MCMHA are: (a) the Annual Missouri Institute on Minority Aging; (b) AgeWorks! Technology Advocacy Project; (c) Computer and Entrepreneurial Skills Training Project; and, (c) the Breast and Cervical Cancer Control Project.

**Internal and External Linkages:**

- \* The MCMHA involves collaborative arrangements and partnership agreements with federal, state, private and local organizations and agencies. These partners provide assistance with planning, resources for training, financial support, research, and technical assistance to the MCMHA and its projects.

**Target Audience:**

- \* The MCMHA serves limited resource African Americans, Hispanic Americans, American Indians, and Asian Americans in Missouri, as well as individuals with mental and physical disabilities. Our target areas are the urban areas of St. Louis and Kansas City and the rural area of Southeastern Missouri commonly referred to as the Bootheel.

*Program Duration:*

- \* The MCMHA is a long term project that runs on a fiscal year of July 1 to June 30.

**Allocated Resources:**

<b>FY</b>	<b>FTE</b>	<b>Dollars</b>
2000	3.75	\$210,000
2001	3.75	\$210,000
2002	3.75	\$210,000
2003	3.75	\$210,000
2004	3.75	\$210,000

**Summary Statement:**

- \* Efforts are currently underway to document the health status of minority populations in Missouri describing leading health disparities. This effort is being done in conjunction and collaboration with the Missouri Department of Health's Office of Minority Health and the Center for Health Information Management and Epidemiology (CHIME), Missouri Department of BioStatistics, and LU Cooperative Research. The data from this report will provide a baseline.

## HOME HORTICULTURE

### Statement of Issue(s):

- \* There are a large number of limited resource families in Missouri that are found in target areas that the Lincoln University Cooperative Extension Program serves. These families are located in our rural and urban areas, many of whom lack the knowledge, information, or skills to utilize existing resources to improve their quality of life. Home horticulture efforts will be to assist these families to improve their quality of life through educational programs. These programs will train participants to improve their diets by growing quality, nutritious fruits and vegetables to supplement their food budgets, and by managing their limited resources.

### Performance Goals:

- \* For each year, 2000-2004, conduct an eight (8) week Home Landscape and Gardening Workshop. To reach a minimum of 15 participants. These participants will gain knowledge and skills needed to develop their home grounds. The output indicators will be the number of participants who complete the workshop and develop a simple landscape plan. Outcome indicators will include a site visit to assess effectiveness of improved home grounds. Developing other home horticulture programs in gardening for the elderly and youth.

### Key Program Components:

- \* The length of workshops; turf management; urban gardening programs; improving on the community environment.

## SMALL FARM FAMILIES AND URBAN GARDENING

### Statement of Issue(s):

- \* Extension programs provide educational settings that reach both our urban and rural clientele to help families improve their quality of life.

### Performance Goals:

- \* Each year, 2000 - 2004, demonstration plots will be developed to show how to grow vegetables. Developing and revising guidesheets, other educational materials for our limited resource clientele, and quarterly newsletters.
- \* Output indicators will include the number of our clientele requesting materials, and visiting demonstration plots. Outcome indicators - number of persons demonstrating improved skills and knowledge gained in growing nutritious fruits and vegetables.

### Key Program Components:

Home Horticulture programs, urban gardening program, Small Farm Family program, intergenerational activities in gardening for the elderly and youth.

### Allocated Resources:

FY

FTE

Dollars

2000	1	\$ 50,000
2001	1	\$ 65,000
2002	1	\$ 80,000
2003	2	\$105,000
2004	2	\$130,000

## ***GOAL 5: Enhanced Economic Opportunity and Quality of Life***

### **HUMAN RESOURCE DEVELOPMENT**

#### **Statement of the Issue(s):**

- \* Making ethnic and poor families more resilient and self-sustaining through good parenting and community education.
- \* The decision to focus on this issue resulted from the deliberative process of surveying the needs of people in the state. The survey was conducted by the University of Missouri Outreach and Extension focus groups in Kansas City and St. Louis, and the Diversity Assessments conducted in the Southeast and East Central regions by the Diversity Task Force.

#### **Issue Addressed:**

- \* A majority of the Communities for which needs were assessed identified child/youth, family and community development as a need. Of particular concern is the issue of parenting. Citizens believe that families will become more resilient and self-sustaining through good parenting and community education. The need for parenting and community education will be addressed through the implementation of an expanded version of the Effective Black Parenting (EBP) Curriculum. EBP is a comprehensive 15-session curriculum designed to address parenting of African American children from a historical perspective. The sessions include the opportunity to develop an awareness of the family/community relationship, and interdependency as related to sustainability.

#### **Performance Goals:**

- \* For each year, 2000-2004, Lincoln University will be responsible, directly or indirectly, for 125 families participating in Parenting African American and Other Minority Children Programming. The average class size is 15. The participants will gain knowledge and skills that enable them to become more effective parents and contributors to their communities. Output indicators will include the number of families who complete the program, and pre-/post- program participation assessments. Outcome indicators will include measures of continued improvement in parenting skills and involvement in community reconstitution at one, three, and five years, following involvement in LU's parenting program.

#### **Key Program Components:**

- \* The design of the expanded program components.
- \* Comprehensiveness is allowed because of the duration of the program.
- \* The two-day Retreat designed to promote the sense of community and individual well being.
- \* The Field Trip designed to promote communitarian responsibilities of participants.
- \* Inclusion of community-based rituals in rites of passage programs - Kwanzaa.
- \* Inclusion of community-based programmatic efforts ... i.e. faith-based / community center computer laboratories.
- \* The recognition of the tenants of Diversity and Inclusion and programming with diverse audiences.
- \* Formation of formal and informal networking groups.

**Internal and External Linkages:**

- \* The program involves representatives of state and local parent and community development organizations and agencies. Resources are provided from public and private entities. Research efforts will be initiated with the University of Missouri and Purdue University regarding "planned hopelessness" to determine the implications for minority parents.

**Target Audiences:**

- \* The target audience will be people parenting ethnic minority children, and practitioners working with people who parent minority children.

**Program Duration:**

- \* The program is usually implemented over a two-month period of time. The duration is ongoing because formal and informal groups are encouraged and formed. The groups tend to meet once a month with an Extension employee or volunteer as the facilitator.

**Allocated Resources:**

<i>FY</i>	<i>FTE</i>	<i>Dollars</i>
2000	2	50,000
2001	2	80,000
2002	3	100,000
2003	3	115,000
2004	3	120,000

**TO ENHANCE ECONOMIC OPPORTUNITIES AND THE QUALITY OF LIFE AMONG FAMILIES AND COMMUNITIES.**

**Statement of Issue(s):**

- \* Parents are finding a significant number of obstacles in raising their families today. The statistics for their children are alarming: one in four will spend part of their childhood in poverty; one in four will live in a single parent household; one in six will lack adequate health insurance; one in five will become a teenage parent; one in four will come home to an empty household most days; and one in five will become a problem drinker as an adolescent.
- \* Other challenges include achieving adequate education, gainful employment, avoiding depression and suicide and developing a strong self-esteem and sustainable life skills. Existing education, community, health and child care approaches are not meeting the challenge. The youth development program will assist families in development of life skills needed to be productive citizens and help them in their career development. This will assist them in enhancing their economic opportunities and improve their quality of life.

**Performance Goal(s):**

- \* For each year, 2000-2004, there will be eight (8) workshops designed to provide development of Careers and Life Skills. These participants will gain the knowledge and skills needed to promote economic opportunity for economically disadvantaged people in Missouri. Output indicators will include the number of people completing the programs and immediate post-course evaluation.

**Key Program Components:**

- \* The key components of the program are (a) joint design and implementation by Lincoln University, University of Missouri Outreach and Extension, business partners, industry, State Department of Education, Labor, Social Services agencies, and others as appropriate; (b) the duration of the program; (c)

orientation and recognition sessions, and appropriate teaching and learning methods (externships, mentoring, job shadowing, field trips, etc.).

**Internal and External Linkages:**

- \* Programs will be conducted in collaboration with the Agriculture and Extension Information Center at Lincoln University, University of Missouri Outreach and Extension, Housing and Urban Development, Department of Elementary & Secondary Education, Linn State Technical College, businesses, labor, and industry. Others will be determined as the programs proceed; these might include the Private Industry Councils of St. Louis City and St. Louis County; Greater St. Louis Treatment Network; Northside Consortium; Missouri Department of Social Services; Ecumenical Housing; and Multimedia Training. Some of these collaborations are pending based on funding of a Welfare-to-Work Competitive Grant applied for related to Comprehensive Employment for TANF Recipients with Addiction (CETRA) Programs.

**Target Audiences:**

- \* The audiences will be inclusive of minority, economically and socially disadvantaged, handicapped, and underserved populations.

**Program Duration:**

- \* The programs will have a varying length depending on the nature and scope of the material used, funding provided, additional funding past the time of the grant, and other factors.

**Allocated Resources:**

<u>FY</u>	<u>FTE</u>	<u>Dollars</u>
2000	3	50,000
2001	3	65,000
2002	3	80,000
2003	3	95,000
2004	4	115,000

**COMMUNITY AND ECONOMIC DEVELOPMENT**

**Statement of Issue(s):**

- \* Create innovative approaches, such as the Bootheel Community Development Corporation, Bootheel Construction Training Academy, New Housing for First-Time Homeowners, and community leadership development.

**Performance Goals:**

- \* Develop and implement job training programs to increase the employability and occupational skills, and job placement of low-income persons. Increase the self-sufficiency of poor and low-income persons by promoting entrepreneurship, home-based businesses and other micro-enterprise creation and expansion. Output indicators would show an increase in the employability and occupational skills of participants in low-income families; and the number of participants in the Futures program that obtain and keep jobs in order to become self-sufficient.

**Key Program Components:**

- \* Identify potential jobs and organize training to match the job market,
- \* Construction trades, and
- \* State community development block grant.

**Internal and External Linkages:**

- \* The Bootheel Community Development Project staff will be supported by a ten member interagency task force whose members will provide advisory assistance and will also participate in many of the community organization and training functions. Staff of the Bootheel Regional Planning commission will conduct an independent evaluation. Two members of the task force (USDA Farm Service Agency and Missouri Housing Development Commission) have agreed to fund the construction of fifty new homes costing nearly \$3 million. The Bootheel community Development Corporation will contribute matching funds to the project as requested by the U.S. Department of Housing and Urban Development.

**Target Audience:**

- \* The target audience for the program is the six county Bootheel communities of Howardville, North Lilbourn, New Madrid, Wilson City, Wyatt, and Hometown.

**Program Duration:**

- \* The program duration is 1999-2005. The Bootheel Community Development Corporation, in cooperation with faculty affiliated with Lincoln University Cooperative Extension Service, will carry out the operations of the Corporation.

**Allocated Resources:**

<u>FY</u>	<u>FTE</u>	<u>Dollars</u>
2000	1	\$500,000
2001	1	\$600,000
2002	1	\$650,000
2003	1	\$680,000
2004	1	\$690,000

**Summary:**

- \* Through these partnerships the Lincoln University Cooperative Extension program will be strengthening the quality of life for the people of Missouri in low-income areas. The partnerships of state, federal and private foundations will provide more resources and funding than ever to the newly formed Bootheel Community Development Corporation for the six (6) counties: Scott, Stoddard, Mississippi, New Madrid, Dunklin, and Pemiscott.

**Impact Statement:**

The concentrated effort on enhancing economic opportunity for underserved, minority populations will produce the following impact: the number of minority youth finishing high school will be increased by 20 percent, the number of families completing Effective Black Parenting training will increase by 50% by the year 2004, African American families will be better able to take advantage of the available economic opportunities, and a significantly higher percentage of the minority population will possess the skills to be employable.