PLAN OF WORK

Iowa State University

College of Agriculture

Iowa Agriculture and Home Economics Experiment Station

Cooperative Extension Service

Federal Fiscal Years

2000-2004

As submitted 8/18/99

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* Indicates special projects in the ISU Extension system. Programs have been numbered based on a system previously used in the ISU Extension Plan of Work.

Introduction

The Iowa State University Plan of Work consists of 31 programs in research and 26 programs in extension. Several of the programs address issues covered by two or more of the USDA-REE national goals. Research programs have been listed under the one most prevailing goal. Extension has listed some programs under more than one goal.

Most programs were developed on a 5-year timeline although many individual programs will have critical short-term needs that will be addressed within the longer planning timeline.

Extension programs develop educational programs based on unbiased research from the land grant universities and other partners. Each project is expected to have a strong linkage with research and to convey available research results. The internal and external linkages described in each project highlight this partnership.

Stakeholder input was solicited prior to determining the 57 research and extension programs/projects. This process is described in detail under II. Stakeholder Input Processes. The processes described clearly show that stakeholder input was used to develop programs and the allocation of dollars to those programs.

The extension components of the plan of work were reviewed by peer institutions and the Iowa Association of County Extension Councils. All research projects funded under the Hatch Act undergo scientific peer review prior to approval. The research programs as described in this plan of work were also reviewed in their entirety by a faculty advisory committee. The extension and research components were subsequently merged into this final, joint plan.

Accomplishments reporting on the research activities of the station will be achieved through the accumulation and compilation of impact statements submitted on the annual AD-421 reports and as requested and gathered for other special and routine purposes. During the 5-year plan of work, all Extension programs covered in the plan will be evaluated to document the outputs and outcomes. Documentation of learning will be obtained using end of meeting instruments, follow-up evaluations spaced appropriately to allow behavior change, focus groups and secondary data sources.

For further clarification on the Plan of Work or program content, contact either

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I. Planned Programs:

	Goal 1	Goal 2	Goal 3	Goal 4	Goal 5
1862 Research	Programs 1–15	Programs 16 and 17	Program 18	Programs 19 –26	Programs 27 –31
1862 Extension	Programs 101–121, 142, and 146	Program 330	Programs 145 and 330	Programs 142, 143, 146, and 147	Programs 200–320 and 340–460

1862 Research

GOAL 1: An agricultural system that is highly competitive in the global economy.

Program 1. Food Crops

Statement of Issue:
The production, marketing, and selling of fruit and vegetable crops provide the primary or secondary income for many Iowans. Also, many Iowans supplement their diets with fruits and vegetables grown in their backyards. To remain competitive in our rapidly changing global economy, these commercial food crop producers must adopt new cultivars/rootstocks that are more tolerant to abiotic and biotic stresses affecting plants, cultural systems that improve production efficiency and promote sustainability, and postharvest handling practices that improve crop utilization and product safety. Before new cultivars, production systems, or postharvest practices can be recommended, they must be thoroughly evaluated under Iowa environmental conditions. In keeping the industry competitive, we also need to understand the basic processes associated with these applied problems.

Performance Goals:
- Increase the quality and percentage of marketable product per acre, reduce production costs and increase business profitability through improved cultural techniques and use of adapted fruit and vegetable cultivars.
- Improve the access to an affordable and safe food supply.
- Improve the harmony between horticulture production practices and the environment.

Output Indicators:
- Better adapted fruit and vegetable cultivars.
- More efficient cultural practices.
- Greater understanding of plant biological processes.
- Greater understanding of the ripening and senescence processes.
- Production practice options for reducing the over-reliance on chemicals.

- Research reports to the scientific community, technical reports and workshops for active producers, interpreted information for potential producers, the general public and schools, and cooperative services to state agencies.

Outcome Indicators:

- Number of clients demonstrating increased awareness or knowledge of problems or practices.
- Number of clients adopting new cultivars/rootstocks.
- Number of clients adopting new technologies.
- Number of research reports to the scientific community, technical reports and workshops for active producers, interpreted information for potential producers, the general public and schools, and cooperative services to state agencies

Key Program Components:

- Improve the production efficiency and increase the competitiveness of the Iowa fruit and vegetable industry through the increased use of adaptive cultivars tolerant to abiotic and biotic stresses.
- Improve production management systems.
- Develop efficient and sustainable practices that ensure ecosystems integrity and enhance the quality of water, soil, and air resources.
- Improve postharvest handling practices to maintain quality, reduce product loss, and improve food safety.

Internal and External Linkages:

- Iowa State University researchers and extension specialists in the departments of agronomy, animal ecology, botany, economics, entomology, food science and human nutrition, plant pathology, sociology, and statistics
- Interdepartmental programs in genetics, plant physiology and molecular biology, and molecular, cellular and developmental biology
- Leopold Center for Sustainable Agriculture
- Pappajohn Center for Entrepreneurship
- Iowa State Horticulture Society
- Iowa Fruit and Vegetable Growers Association
- Muscatine Island Vegetable Growers Association
- Iowa Nut Growers Association
- Iowa Master Gardeners
- Iowa Department of Agriculture and Land Stewardship
- Iowa Department of Economic Development
- Iowa Department of Natural Resources
- Institutions and agencies affiliated with CSREES multistate research committees NCR-22, NCR-84, NCR-101, NC-140 and W-128

Target Audiences:

Iowa and surrounding states commercial fruit and vegetable producers and home gardeners.

Program Duration:

Greater than five years

Allocated Resources:

Year	SYs	State and Hatch funds
FY99	2.5	$ 289,776
FY00	2.6	295,571
FY01	2.6	301,482
FY02	2.7	307,512
FY03	2.7	313,662
FY04	2.8	319,936

Program 2.Forest Resource Enhancement

Statement of Issue:
Forests and woodlands in Iowa are diverse and multidimensional systems that provide a broad variety of amenities and products ranging from traditional timber and wildlife habitat to protection of hydrologic source areas. Rural forests and woodlands have been highly impacted by their proximity to agricultural operations. Urban and suburban forests have been affected by the changing demographics of Iowa's urban and suburban population leading to neighborhood and community decline in some locations and urban sprawl in others. The combined influence of these and other factors has been the creation of a highly fragmented forest with a multiplicity of owners and management objectives. A number of needs have evolved from this situation. However, to assure an adequate research base and high impact products, available resources will be focused on the use of trees as environmental buffers, development of fast growing disease and insect resistant tree species, assessment, protection and enhancement of the urban-suburban forest, and creation of composite plant fiber products.

Performance Goals:
The overarching goal of this research effort is to improve environmental quality and the creation of value-added products.

- Protect the soil resource, increase crop yield, improve water quality, and enhance biological diversity.
- Provide a low cost means of energy savings, improve the aesthetics and livability of populated areas, and improve air quality.
- Meet the growing demand for wood fiber based products and to address the changing attitude of society concerning the best and highest use of these resources.
- Protect environmental quality while supporting economic development on a broader front.

Output Indicators:
- Improvement of surface water quality.
- Improvement in livability of the urban-suburban environment.
- Development of value added wood based products.

- Research reports to the scientific community, technical reports and workshops for active producers, interpreted information for potential producers, the general public and schools, and cooperative services to state agencies.

Outcome Indicators:

- Amount of stream water nitrogen and suspended solids concentrations.
- Development of dedicated wood fiber plantations that make minimum use of chemical additions for disease and pest control.
- Survival rate of a variety of tree species in urban and community settings.
- Number and variety of plant fiber composite materials available for use in the building, paper, and furniture industries.
- Number of research reports to the scientific community, technical reports and workshops for active producers, interpreted information for potential producers, the general public and schools, and cooperative services to state agencies

Key Program Components:

- Expand the knowledge base on how to establish and manage field and streamside buffers, the efficiency of chemical and carbon capture in environmental buffers, and increases in crop yield.
- Improve stream water quality.
- Increase wildlife and desirable insect species.
- Reduce soil erosion.
- Enhance ability to manage and improve urban and suburban forests.
- Develop composite fiber products that make use of both virgin and waste plant.
- Develop glues and preservatives that are both environmentally friendly and add value to agricultural commodities.
- Develop fast-growing disease- and insect-resistant trees (primarily Populus sp.), identify resistant clones with desirable traits, enhance of these traits through traditional tree breeding and genetic engineering, and test and commercialize the clones developed.

Internal and External Linkages:

- Iowa State University researchers in the departments of forestry, food science and human nutrition, agronomy, horticulture, plant pathology, sociology, community and regional planning, geological and atmospheric sciences, botany, agricultural and biosystems engineering, and animal ecology
- Researchers in allied departments at the University of Missouri, University of Nebraska, and Auburn University
- Natural Resources Conservation Service
- Environmental Protection Agency
- U.S. Forest Service
- Department of Energy
- U.S. Geological Survey
- Agricultural Research Service
- Tennessee Valley Authority
- Novartis
- Iowa Farm Bureau

- Iowa Department of Natural Resources
- Boise Cascade
- Leopold Center
- Trees Forever
- Iowa Soybean Producers Association

Target Audiences:
Landowners, regulatory agencies, non-government organizations, home owners, conservation groups, natural resource management agencies, community and government leaders, wood and plant fiber producers, community tree stewards and managers, commodity groups, industries based on wood fiber or composite material production and use.

Program Duration:
Five years

Allocated Resources:
Iowa Agriculture Experiment Station (state funds) and McIntire-Stennis funds. No Hatch funding involved.

Program 3. Fundamental Plant Sciences

Statement of Issues:
The need to continuously increase crop productivity, improve food quality, and provide alternative crops with higher market value while minimizing the environmental impact of agriculture has greatly taxed our understanding of fundamental plant biology. In recent years, new experimental techniques including plant transformation, genomics, and computer assisted biology have provided new research capabilities that allow plant biologists the tools needed to understand and later modify plants for improved production characteristics. For continued improvements in crop plant productivity, it is necessary for our understanding of basic biological properties in plants continue to expand.

Understanding the basic properties of crop plants requires the application of a broad group of biochemical, molecular biological, physiological, genetic, and ecological techniques to crop plants, associated wild plant species, and model organisms like Arabidopsis thaliana and cyanobacteria. Metabolic pathways for the synthesis of important biochemicals along with the key control points of these processes need to be determined. New genes and genetic systems need to be found so that the desired characteristics can be transferred into crops. Developmental events that result in the production of vigorous mature plants must be understood. The methods that plants use to detect and respond to changes in their environments need to be determined so that plants can be genetically altered to make them less stress sensitive. Key biodiversity questions need to be answered to determine how crop plants interact with the agricultural environment in order to minimize the deleterious effects of intensive agriculture. Finally, new technologies need to be developed to bring powerful new techniques like genomic and post-genomic analyses to bear on improving crop productivity.

Performance Goals:
- Determine basic scientific advances for evaluation by the scientific community.

Output Indicators:

- Research reports to the scientific community, technical reports and workshops for active producers, interpreted information for potential producers, the general public and schools, and cooperative services to state agencies.

Outcome Indicators:

- Amount of competitive funding from federal or private sources to develop the research ideas more fully.
- Number of contributions (via research reports in refereed and other publications and presentations) to the understanding of the biology and chemistry of the plant that are recognized by scientific peers.
- Any application to crops of basic scientific advances (via interpreted information for producers, the public, schools, and cooperative services to state agencies).

Key Program Components:

- Discover new metabolic pathways and alter them for enhanced plant production.
- Modify plant genomes.
- Understand how plant developmental events influence crop yield.
- Modify plants for increased pest resistance.
- Modify plants to increase stress tolerance.
- Understand the plant genome to discover new biological elements that contribute to crop productivity.
- Understand how the interactions between plants and their environments influence crop yield.

Internal and External Linkages:

- Collaborations of individual groups of researchers with other research groups throughout the country and the world

Target Audiences:

Researchers in universities and government laboratories, and the biotechnology and seed industries.

Program Duration:

Well beyond the lifetime of any current participant in the project.

Allocated Resources:

Year	SYs	State and Hatch funds
FY99	4.8	$ 764,935
FY00	4.9	780,234
FY01	5.0	795,838
FY02	5.1	811,755
FY03	5.2	827,990
FY04	5.3	844,550

Program 4.Plant Germplasm

Statement of Issue:
Germplasm is the key element of successful plant breeding programs. The conservation and use of the comprehensive collection of genetic diversity of cultivated plants and their relatives are the biological foundation for the long-term success of U.S. agricultural producers. Different selection and evaluation methods are used to develop cultivars within and among different crop species, but elite germplasm is necessary in all instances to develop new superior cultivars. Evaluation, development, and enhancement require long-term commitments (20 to 40 years) to develop superior germplasm sources. But today the main focus often is what can be achieved in five to ten years. Incremental improvements have been made in all cultivated crop species during the past 50 years. Pedigree breeding methods were emphasized in elite line crosses. Consequently, the germplasm base of most of our important crop species has become very restricted; e.g., nearly 80% of the parentage of U.S. corn hybrids involves selection within six inbred families. Development and enhancement of elite germplasm are necessary to ensure future genetic advance. Corn hybrids available to the corn producers are evaluated in replicated trials in 7 districts.

Performance Goals:
- Increase the genetic diversity available for basic and applied plant science research.
- Increase the germplasm base of the major U.S. crop species to reduce the chances of devastating crop losses due to either biotic or abiotic stresses.
- Develop and enhance elite germplasm resources to provide private and public breeding programs a greater array of elite germplasm for cultivar development.
- Improve germplasm to ensure systematic genetic advances of newly developed cultivars.
- Enhance specific plant and seed traits to permit alternative uses of the major crop species.
- Provide unbiased data of corn hybrids available to Iowa producers.

Output Indicators:
- Diverse sources of germplasm made available for cultivar development or for producer use.
- Genetically improved germplasm made available for cultivar development or for producer use.
- Modifications of seed and plant will enhance future options for uses of the crops.
- Information relative to effectiveness of breeding and selection methods.

- Distribution of information either hard copy or computer diskette with a hybrid selection program.
- Research reports to the scientific community, technical reports and workshops for active producers, interpreted information for potential producers, the general public and schools, and cooperative services to state agencies.

Outcome Indicators:

- Number of valuable traits identified and included in germplasm collections in new cultivars and other commercial products.
- Percent of gain in yield due to selection methods and genetically advanced new cultivars.
- Number of potential uses and markets for specialty types.
- Number of research reports to the scientific community, technical reports and workshops for active producers, interpreted information for potential producers, the general public and schools, and cooperative services to state agencies

Key Program Components:

- *Corn:* Develop and enhance germplasm to broaden the genetic base of U.S. corn breeding programs.
- *Forage Grasses:* Identify plant characters appropriate for use as selection criteria for genetically improving stability, quality, and productivity of hay, silage, and pasture crops; develop and modify breeding methods for use in improving broadly-adapted germplasm of forage crops; develop and evaluate experimental populations and cultivars for use in sustainable, integrated, crop-livestock production systems.
- *Small Grains:* Breeding for improved turf grasses; enhance grain yield, grain quality, disease resistance, and profitability of the oat crop through traditional breeding integrated with molecular-marker-assisted breeding; elucidate genomic structure and organization of the Avena genus using molecular genetics; develop quantitative genetic models to understand the ecological interactions of oats with companion species and the relationships between genotype and phenotype.
- *Popcorn:* Improve popcorn germplasm by use of recurrent selection procedures to improve traits in germplasm that is 100% popcorn and incorporate other types of corn into popcorn to improve traits in popcorn and to broaden the genetic base of popcorn.
- *Soybean:* Develop improved general-use and special-purpose soybean cultivars for use by Iowa farmers; expand genetic variation for agronomic and seed traits; assess the impact of new genetic types on production and use of the crop; evaluate breeding methods that will enhance cultivar development.
- *Alternative Crops:* Improve the genetic germplasm of possible alternative crops, including horticultural crops, that have potential for production and use under Iowa conditions.
- *State Corn Yield Test:* Conduct replicated trials of hybrids available to the producers within 7 districts that have different maturities, soil types, and environments.
- *P.I. Station:* Collect, maintain, and evaluate diverse germplasm to provide breeding programs germplasm and information for basic and applied research.

Internal and External Linkages:

- Scientists in the departments of plant pathology, entomology, food science and human nutrition, genetics, biochemistry, biophysics and molecular biology.

- State corn yield trials conducted with Iowa.
- Regional trials conducted throughout the North Central region.

Target Audiences:
Producers in Iowa and the United States.

Program Duration:
Five years

Allocated Resources:

Year	SYs	State and Hatch funds
FY99	8.5	$ 1,496,713
FY00	8.7	1,526,648
FY01	8.8	1,557,181
FY02	9.0	1,588,324
FY03	9.2	1,620,091
FY04	9.4	1,652,492

Program 5.Crop Production and Management Strategies for Iowa

Statement of Issue:
Production of high quality food and fiber is a multibillion dollar industry for U.S. agriculture. Sustaining this high level of production and quality is imperative for our society. To achieve current production goals, millions of dollars are spent on herbicides annually. Also, climate predictions indicate that producers will have to contend with more variable weather, which will impact yield stability in the future. Iowa landscape is dominated by agricultural production of row crops and forages. Successful row crop systems require high quality seeds to ensure germination and stand establishment, decreased sensitivity of crops to drought and pests, and improved seed composition to expand product marketability. Forages complement row crop production by supplying nutrients for animal production, enhancing soil conservation practices, in converting CRP acres to row crops, and as an alternative source of energy. To remain viable in an increasingly global and competitive agriculture, Iowa producers must have access to novel approaches that reduce production risks while protecting the natural resource base for society.

Performance Goals:
- Develop management strategies that improve the efficiency of crop production while protecting the natural resource base.
- Develop improved, integrated weed management systems for cropping systems.
- Improve the production and utilization of forages.
- Advance the understanding of seed development, maturation, germination, and dormancy to improve seed quality, emergence and early season growth of crops, and to allow natural management of weed and seed banks.
- Improve reliability of crop production systems during severe climatic variability to gain increased production efficiency with higher average yields.

- Improve quality, uniformity, value, and marketability of agricultural products by developing genetically improved crops with higher-value products.

  Output Indicators:
  - Sustained and/or improved crop and forage yields.
  - New, more efficient agricultural production systems.
  - Novel techniques, which are more environmentally benign than current tactics, to reduce the competitiveness and fecundity of weeds.
  - Increased communication of research productivity via the WWW.
  - Research reports to the scientific community, technical reports and workshops for active producers, interpreted information for potential producers, the general public and schools, and cooperative services to state agencies.

  Outcome Indicators:
  - Number of producers adopting weed, crop, and forage management strategies that sustain agricultural crop production and lessen environmental degradation.
  - Maintenance of a quality and diverse seed supply.
  - Incorporation of new genetic material into germplasm to stabilize crop yields.
  - Number of CRP acres converted to sustainable crop systems.
  - Attendance at field days and workshops; number of "hits" on relevant internet web sites.
  - Number of research reports to the scientific community, technical reports and workshops for active producers, interpreted information for potential producers, the general public and schools, and cooperative services to state agencies

Key Program Components:
- Improve understanding of the biology and ecology of weeds in the agroecosystem.
- Identify genetic material or biochemical pathways that help crops maintain dry matter production or limit loses when growing under stressful environmental conditions.
- Conduct field experimentation of basic production research using modern varieties or cultivars growing in different environments and soils.
- Alter seed chemical composition to increase marketability.
- Identify and characterize factors that limit the nutritive value of forage grasses and legumes.
- Develop systems and strategies for improving the seasonal distribution and utilization of forages.
- Understand the basic biology, biochemistry and molecular biology of seed dormancy.
- Understand the influence of the seed production environment on seed quality and dormancy in a range of crop and forage species important to Iowa.

Internal and External Linkages:
- Iowa Board of Regents institutions, community colleges, and private colleges
- Leopold Center for Sustainable Agriculture
- State/national crop and livestock commodity organizations
- Farm service organizations
- Media agencies and organizations
- USDA agencies

- State and federal extension services
- State agencies
- Land Grant universities in the 12-state North Central Region
- National and international scientific societies
- Agricultural industries

Target Audiences:
Educational and extension faculty and staff, undergraduate and graduate students, agricultural producers and landowners, legislators, agricultural consultants, agricultural industry representatives, users of the internet, scientific collaborators and associates, and the non-farming general pubic.

Program Duration:
Five years

Allocated Resources:

Year	SYs	State and Hatch funds
FY99	7.6	$ 1,130,472
FY00	7.8	1,153,081
FY01	7.9	1,176,143
FY02	8.1	1,199,665
FY03	8.2	1,223,659
FY04	8.4	1,248,132

Program 6.Precision Agriculture

Statement of Issue:
Over the last decade, the advent of the global positioning system (GPS) and other technological advances have led to increased interest and adoption of the concept of precision agriculture, which holds the promise of both economic and environmental benefit. Agricultural equipment manufacturers, farm input suppliers, and a host of other businesses are working to provide the necessary equipment and tools for farmers to implement this management strategy, within the United States and other parts of the world.

Although precision agriculture has tremendous potential, there are some barriers preventing the full benefit of precision agriculture being realized. The concept has been technology-led, with private enterprises making significant progress in developing technology for spatial application and control of inputs. However, the interpretation of spatial variability and the necessary understanding of soil, science, crop science and agronomy on a site-specific basis are much less well developed (Stafford, 1997). The technological advances in machinery have emphasized the need for better agronomic knowledge at all scales and the evolution of management strategies to account for spatial and temporal variation within the field. The second major impediment to widespread implementation of precision agriculture, is gathering the requisite information to adequately describe the spatial and temporal variation of important factors. Therefore, the

development of sensing technologies which allow automated collection of soil, crop, climatic and other important information is critical for widespread adoption of precision agriculture.

Performance Goals:

- Improve economic return and global competitiveness of agricultural producers though the sound adoption of precision agriculture.
- Increase long-term agricultural production while protecting the environment through the adoption of efficient and sustainable management strategies which account for spatial and temporal variation within the production system.

  Output indicators:

  - Development and adoption of sensing technologies to effectively measure the temporal and spatial variation in crop production parameters.
  - Provide a strong research base for the development of precision agriculture concepts and their implementation in production agriculture.
  - Development of strategies for the interpretation of spatial and temporal variability on a site specific basis based on sound agronomic principles.
  - Development of decision support systems, including the use of Geographic Information Systems, crop production models, climatic data and models, statistical methods and artificial intelligence to determine factors limiting crop production and risk assessment of different strategies.
  - Information and technology transfer to agricultural producers, agricultural chemical and seed industry, and agricultural equipment industry.

  Outcome indicators:

  - Number of agricultural producers adopting precision agriculture concepts and technologies.
  - Number of agricultural producers adopting decision support systems and risk assessment models to improve economic return, reduce environmental impact, and manage risks.
  - Number of publications and educational programs, through which information and strategies are disseminated to provide producers with the relevant knowledge base to make informed management decisions.

Key Program Components:

- Development and evaluation of sensor technology for precision agriculture, from remote sensing to real-time machine-based sensors for data acquisition and application control.
- Agronomic research on a site-specific basis to provide a sound foundation for the development of precision agriculture management strategies and their implementation in precision agriculture.
- Utilization of GIS, crop growth modeling and other analysis techniques for interpretation and prediction of the consequences of spatial and temporal differences in production fields.
- Development of analysis tools to assist producers with their decision making and to help identify specific strategies that will enable producers to increase their profitability while protecting the environment.
- Information and technology transfer to agricultural producers, agricultural chemical and seed industry, and agricultural equipment industry.

Internal and External Linkages:

- Iowa State University researchers and extension specialists in the colleges of agriculture and engineering
- Leopold Center for Sustainable Agriculture
- National Soil Tilth Laboratory
- Institute for Physical Research and Technology, Ames Laboratory
- Land Grant Universities, in particular those within the North Central Region
- State/national commodity organizations
- State and federal agencies (USDA, EPA, DOE)
- Institutions and agencies affiliated with CSREES multistate research committees and projects NCR-180

Target Audiences:

Agricultural producers, commodity groups, agricultural equipment manufacturers, agricultural chemical and seed industry, agricultural dealers, and environmental organizations.

Program Duration:

Greater than five years

Allocated Resources:

Year	SYs	State and Hatch funds
FY99	0.6	$ 53,779
FY00	0.6	54,855
FY01	0.6	55,952
FY02	0.6	57,071
FY03	0.6	58,212
FY04	0.7	59,377

Program 7.Green Industry

Statement of Issue:

The green industry is the fastest growing segment of Iowa's agriculture economy. A demographic shift from rural farms to urban living has changed the landscape in which most of the population lives and works. Plant systems and related services for the non-food sector of the green industry consist of lawn care, golf courses, school athletic fields, sod producers, production nurseries, landscape design, maintenance, installation firms, retail garden centers, arborists, greenhouse crops, retail florists, Christmas tree growers, and other horticulture commodities. Basic and applied research is necessary to develop, select, and maintain sustainable and environmentally sound production and management practices. Research is needed to develop new technologies and biorational strategies that increase profitability while minimizing the environmental impact from urban agriculture. The aesthetic, functional and economic impact of ornamental plants in our working and living environment have a profound positive impact on the quality of life for all Iowans.

Performance Goals:

- Improve life quality by developing sustainable ornamental plant systems.

Output Indicators:

- Better selection of root zone materials to reduce plant disease treatment.
- Improved plant production practices to reduce cost and increase profitability.
- Greater understanding of plant adaptability that leads to new plant materials and management techniques.
- Research reports to the scientific community, technical reports and workshops for active producers, interpreted information for potential producers, the general public and schools, and cooperative services to state agencies.

Outcome Indicators:

- Number of acres with reduced application of fertilizers and pesticides through improved plant development.
- Number of patents and products developed.
- Number of natural pesticides developed that reduce environmental risk.

Key Program Components:

- *Nursery and Landscape:* Conduct applied and basic research on ecological physiology of landscape plants, economically efficient and environmentally sustainable landscape plant production practices, and landscape plant establishment and maintenance.
- *Greenhouse Crops:* Develop production alternatives that reduce non-sustainable inputs (i.e. chemicals, energy, peat, etc.) used in the greenhouse industry; conduct research on alternative root substrates using waste products (i.e. composted animal wastes), manipulation of the substrate environment, and the development of biological and cultural methods of controlling soil-borne fungal pathogens to reduce chemical fungicide usage.
- *Turfgrass:* Adapt grass species and cultivars to Iowa conditions; amend sand-based systems to improve growing conditions, minimize fertility and pesticide input, and increase surface stability; develop environmentally sound alternatives to synthetic pesticides; develop traffic-tolerant grass systems for use on golf courses and athletic field areas; enhance germplasm for improving turfgrass response to biotic stress, including the use of tissue culture and genetic modifications.

Internal and External Linkages:

- Departments of horticulture, agronomy, plant pathology, entomology, forestry, animal ecology, and economics
- Iowa Turfgrass Association
- Iowa Sports Turf Managers Association
- Iowa Golf Course Association
- Iowa Lawn Care Professional Association
- United States Golf Association
- Golf Course Superintendents Association of America
- National Turfgrass Evaluation Program
- North Central Research Committee - 192, National Germplasm - NC7, and 101 Controlled Environments.

Target Audiences:
Growers, consumers, and managers of green industry ornamental plants in Iowa and the United States.

Program Duration:
Five years.

Allocated Resources:

Year	SYs	State and Hatch funds
FY99	5.3	$ 627,576
FY00	5.4	640,127
FY01	5.5	652,930
FY02	5.6	665,988
FY03	5.7	679,308
FY04	5.9	692,894

Program 8. Improved Grazing Systems for Beef Cattle Production and Enhancement of Environmental Quality

Statement of Issue:
Profitability and competitiveness of the beef industry depend on its ability to control costs per unit of output. Production costs for the cow/calf sector of the beef industry are high. One problem is that forage quality and nutrient requirements of beef cattle are often not synchronized, thus requiring the feeding of supplements and harvested forages to compensate for low forage quality. Another challenge is managing the seasonal variability in the amount and nutritional quality of the forage supply. The result is that harvested forages and supplements are the largest component of total costs. Systems for beef production that make more effective use of standing forages by grazing should improve both the profitability and sustainability of the industry.

Forage management is commonly the weakest component of beef cattle operations, thereby limiting enterprise profit and promoting other less environmentally desirable farming practices. Many studies have documented the large proportion of costs in the beef cow system that comes from harvested and purchased feeds. Because these costs often account for one-third or more of the total, it seems logical that a major reduction in harvested and purchased feed could enhance profitability of the cow-calf system.

Performance Goals:
Efforts are targeted to livestock producers and the public.

- Enhance forage production and grazing practices to increase efficiency of animal growth and production.
- Enhance understanding of the role of forage utilization and sustainable grazing systems in environmentally friendly approaches to cattle production.

Output Indicators:

- Better understanding of forage production systems.
- Enhanced methods to define costs of producing cattle using forage-based systems.
- Enhanced understanding of the role of plants and animals in food producing systems.
- Development of forage-beef decision support software to enhance the ability of producers to evaluate and improve their own grazing systems.
- Research reports to the scientific community, technical reports and workshops for active producers, interpreted information for potential producers, the general public and schools, and cooperative services to state agencies.

Outcome Indicators:

- New information defining the optimum interaction between animals and plants in grazing systems.
- Reduced costs of producing beef using grazing systems.
- Improved recommendations for forages to be used in grazing systems.
- Greater public knowledge of the principles of forage production, a greater public appreciation for the role of grazing systems in protecting the environment, and enhanced appreciation for the role cattle have in harvesting and converting forages to quality meat for human consumption.

Key Program Components:

- Develop and evaluate concepts and systems that increase the uniformity of the year-round forage supply and the efficacy of forage, animal and grazing management to improve the profitability of beef production. Specific objectives are to:
- Quantify production and economic impacts, including risk, of beef cow-calf systems that better match animal nutrient requirements to the quantity and nutritional value of the forage supply.
- Improve the profitability and productivity of cow-calf systems by identifying alternative forage species and grazing management to extend the length of the grazing season.
- Develop strategies for using forage legumes to improve the agronomic, animal performance, environmental, and economic characteristics of forage-beef systems.
- Develop a systems-based educational program on integrated forage/cattle management systems for cow-calf producers in the four-state region.

Internal and External Linkages:

- Multistate research projects (NC-157, NC-185 and the MINK Cooperative Grazing Project - Missouri, Iowa, Nebraska and Kansas)

Target Audiences:

Livestock produces, the public, the scientific community, and students.

Program Duration:
Five years

Allocated Resources:

Year	SYs	State and Hatch funds
FY99	3.0	$ 559,037
FY00	3.1	570,218
FY01	3.1	581,622
FY02	3.2	593,255
FY03	3.2	605,120
FY04	3.3	617,222

Program 9. Understanding the Physiological Basis of Animal Reproduction, Growth and Well Being

Statement of Issue:
The Food Animal Integrated Research for 1995 symposium (FAIR'95) identified the need to "Increase efficiencies of producing food from animals" as a primary objective for future animal research. Key areas of research within this objective were to improve scientific understanding of physiologic mechanisms affecting reproduction, growth and performance. These understandings will be vital for an optimization of production efficiency and promotion of a healthy and competitive livestock industry in Iowa. Application of this new knowledge will allow development of cost-effective production systems which minimize animal stress and promote well-being, thereby assuring the public, animal welfare groups and regulatory agencies of humane production practices. Further, it is necessary to produce animals which provide consumers with the quality meat, milk and poultry products they desire at an affordable cost. High production efficiency and lean growth are imperative for expanding national markets and effectively competing in global markets. The successful accomplishment of these goals will assure the continuation of a viable livestock industry.

Performance Goals:
- Alter production methods to increase reproductive efficiency and animal well being.
- Enhance public understanding of the concepts of animal well being and physiological basis for animal growth, reproduction, and behavior).

Output Indicators:
- Better understanding of the physiological basis for reproduction and growth of food animals.
- Research reports to the scientific community, technical reports and workshops for active producers, interpreted information for potential producers, the general public and schools, and cooperative services to state agencies.

Outcome Indicators:

- Percent increased efficiency of reproduction and growth of animals; and improved conditions for growth and well-being of animals.
- Number of producers with a greater understanding of the principles of animal behavior, animal responses to their environment, and the biology of reproduction and growth.
- Number of research reports to the scientific community, technical reports and workshops for active producers, interpreted information for potential producers, the general public and schools, and cooperative services to state agencies

Key Program Components:

- Determine genetic, neuronal and hormonal mechanisms that enhance reproductive efficiency.
- Elucidate properties of muscle cytoskeleton to improve muscle growth and meat quality.
- Evaluate nutritional, hormonal and neuronal factors that regulate growth and performance.
- Study the physiological impact of reproduction practices on stress, health, performance and well being of animals.
- Apply newly developed knowledge of physiology to optimize production efficiency.

Internal and External Linkages:

- Multistate research projects (NC-131, NC-113, NE-112, W-171, and W-173)

Target Audiences:
Livestock producers, the public, the scientific community, and students.

Program Duration:
Five years

Allocated Resources:

Year	SYs	State and Hatch funds
FY99	12.7	$ 1,806,846
FY00	13.0	1,842,983
FY01	13.2	1,879,842
FY02	13.5	1,917,439
FY03	13.7	1,955,788
FY04	14.0	1,994,904

Program 10.Genetic Enhancement of Agriculturally Important Animals

Statement of Issue:
The selection of breeding stock based upon quantitative genetic analysis and the prediction of breeding values technology is not a mature science as advances in mathematical and statistical theory and computing systems continue to allow animal breeders the opportunity to work with ever more sophisticated models and estimation procedures. The quality, consistency, healthfulness and efficiency in which animal products are produced are under a significant amount of genetic control and, as such, investigative and descriptive genetic research projects

must continue to be a high priority. The impact of this research will be increased efficiency for producers, better understanding of biology for researchers, and improved food products for consumers.

Diseases in all animals, especially swine and poultry, have a significant negative impact on efficiency of production. It is estimated that up to 12% of production potential in poultry is lost annually because of disease. In swine, the costs for treatment and subclinical loss and death is over $1.5 billion lost each year, and the move to concentrated facilities makes disease the number one concern of swine producers. In addition, disease negatively impacts consumer confidence in meat, milk, and eggs as a wholesome food source, thereby reducing market demand for these products. There are also consumer concerns about antibiotics used to control diseases. Because genetic improvements can be permanent and cumulative, they represent a long-term, cost-effective solution.

Advances in molecular biology and gene mapping have opened the door to the possibility of identifying individual genes that control traits of economic importance in pigs and chickens. Genetic modification using gene transfer into animals provides the opportunity to perform detailed study of gene expression and function in the context of a living animal. In addition, gene transfer can permit the rapid improvement of economically important livestock traits, especially in the areas of disease resistance and/or reproductive success. As such, gene transfer serves as a potentially useful supplementary approach to classical animal breeding methods for animal improvement.

Performance Goals:

- Alter genetic selection practices to increase efficiency of growth and production of meat, milk, and eggs.
- Enhance public understanding of the concepts of animal genetics and the role of molecular genetics in improving the quality and efficiency of producing foods of animal origin.

Output Indicators:

- Better understanding of the genetic basis for animal selection.
- Enhanced methods to select for disease resistance among animals.
- Enhanced methods for use of genetic markers when making selection decisions.
- Research reports to the scientific community, technical reports and workshops for active producers, interpreted information for potential producers, the general public and schools, and cooperative services to state agencies.

Outcome Indicators:

- Number of improved tools and strategies for selection of superior breeding stock.
- Improved disease resistance among animals.
- New methods for selecting breeding stock based on genetic markers and related information derived from characterization of the animal.
- Number of producers with a greater understanding of the principles of animal genetics, the contributions being made by research in molecular genetics, and the role of genetics research in improving the quality and consistency of foods produced by animals.

- Number of research reports to the scientific community, technical reports and workshops for active producers, interpreted information for potential producers, the general public and schools, and cooperative services to state agencies.

Key Program Components:
- Develop and test, by statistical approaches and animal selection, optimal selection and mating systems for genetic improvement.
- Enhance immune response and disease resistance by genetic selection.
- Identify and map genes associated with important economic traits and use them to genetically modify animals through marker-assisted selection or gene transfer.

Internal and External Linkages:
- Multistate research projects: (NE-60, NC-168, NC-119, NC-209, NC-210, NRSP-8, NC-220 and S-284)

Target Audiences:
Livestock producers, the public, the scientific community, and students.

Program Duration:
Five years

Allocated Resources:

Year	SYs	State and Hatch funds
FY99	4.9	$ 1,078,991
FY00	5.0	1,100,571
FY01	5.1	1,122,583
FY02	5.2	1,145,034
FY03	5.3	1,167,935
FY04	5.4	1,191,294

Program 11. Develop and Integrate Nutritional Knowledge to Enhance Animal Production

Statement of Issue:
An increasing world population competing with animals for space and finite quantities of food, air, and water results in a continuing drive to increase the biological capacity and efficiency of animals to produce food, pharmaceuticals, clothing, and pleasure. Intensive management of animals with high capacities for productivity requires elucidation of factors regulating key biological processes, precise quantification of the nutrients required to support these processed, development and evaluation of novel feedstuffs tailored to animal needs, and greater awareness of the impact of animal production on the environment and on the quality and wholesomeness of animal-derived foods (e.g., meat, milk and eggs). Increased knowledge of microconstituents of plants, feedstuffs, and animals and their possible regulatory role in function of cells and tissues are needed to enhance animal production. Similarly, the ideal composition of animal-derived

foods that promote human health can be developed as a means to increase the value of foods from animals.

Evaluation of the plant-animal interface in intensive grazing systems and animal production in more extensive production systems to better utilize forages and grasslands for food production is needed. As society becomes more dependent on renewable sources of carbon, coordination of animal production with crop processing provides opportunities to recycle plant nutrients back to the land and to develop crops with characteristics beneficial to processing and to livestock in a conjoint system. Achievement of these goals will assure viable livestock and poultry industries that continue to contribute to societal demands for a wholesome, nutritious, and inexpensive food supply and a healthful, aesthetic environment.

Performance Goals:

- Alter nutritional practices to increase efficiency of growth and production of meat, milk, and eggs.
- Enhance public understanding of the concepts of animal growth and the role of animal nutrition in improving the quality and efficiency of producing foods of animal origin.

Output Indicators:

- Better understanding of the nutritional basis for animal growth.
- Enhanced methods to define nutrient needs of animals.
- Enhanced understanding of the role of plants and animals in food producing systems.
- New information defining the role of nutrition in growth of animals.
- Research reports to the scientific community, technical reports and workshops for active producers, interpreted information for potential producers, the general public and schools, and cooperative services to state agencies.

Outcome Indicators:

- Superior recommendations for nutrient composition of diets for animals.
- Improved nutrient quality and consistency of foods of animal origin.
- Improved environmental quality near livestock production units.
- Number of producers with a greater knowledge of the principles of animal growth, the contributions being made by research in animal nutrition, and the role of animal nutrition research in improving the quality and consistency of foods produced by animals.
- Number of research reports to the scientific community, technical reports and workshops for active producers, interpreted information for potential producers, the general public and schools, and cooperative services to state agencies.

Key Program Components:

- Elucidate the bioregulatory roles of nutrition and cell signaling compounds on performance of animals.
- Quantify the dietary nutrient requirements of animals.
- Enhance nutritional value and consumer demand for animal products.
- Identify, develop, and evaluate novel nutrient sources for animal production.
- Develop nutritional regimens to enhance the environmental integrity of animal production.

Internal and External Linkages:

- Multistate research project NC-185 and the Missouri, Iowa, Nebraska, and Kansas study of grazing systems for beef cattle

Target Audiences:
Livestock producers, the public, the scientific community, and students.

Program Duration:
Five years

Allocated Resources:

Year	SYs	State and Hatch funds
FY99	5.2	$ 1,328,909
FY00	5.3	1,355,487
FY01	5.4	1,382,597
FY02	5.5	1,410,249
FY03	5.6	1,438,454
FY04	5.7	1,467,223

Program 12.Potential of Alternative Livestock for Iowa's Economic Enhancement

Statement of Issue:
Increasingly, American consumers are seeking alternative types of meat and other novel animal products out of dietary and environmental concerns and cultural preferences. Numerous native and exotic fish and wildlife species are now being cultured to satisfy this demand. Additionally, some species are being raised for private fishing and hunting purposes and to serve as pack and guard animals, tourist attractions, and pets. Aquaculture has been the fastest growing sector of American agriculture for the past two decades. "Game farming" is an equally rapidly growing industry, which today includes native animals such as bison, elk, quail, and waterfowl, plus exotic species such as llama, ostrich, fallow deer, and pheasant.

The Midwest has long been a center of breeders, owners, and auctions of alternative livestock. A growing number of Iowans are engaged in fish farming and game ranching as a primary or supplemental income source. Aquaculture curricula are in place in over 100 Iowa high schools. Commodity organizations exist in Iowa for the fish, bison, elk, and ratite production industries, and there are cottage industries that use the bones, hides, feathers, and egg shells of such animals. Novices to the production industries require basic information on cultural and husbandry principles and techniques, pertinent regulations, and marketing. Advanced practitioners require new research-based knowledge to maximize production efficiency, enhance profits, and ensure that their operations comply with environmental and health (animal and human) standards.

Performance Goals:
- Enhancement of rural and urban economies through private alternative livestock operations.
- Reduction of environmental pollution from cultural operations.
- Increased producer technical knowledge and management skills.

- Expansion of the market for Iowa products.
- Assistance to state agencies which are involved in fish and non-traditional livestock culture and regulations, environmental protection, and economic development.

Output Indicators:

- Identification and improvement of animal cultural and husbandry techniques suitable for Iowa.
- New feeds for alternative livestock based on Iowa agricultural commodity by-products
- Improved environmental management methods for aquacultural operations
- Coordination of Iowa alternative livestock producers and organizations
- Research reports to the scientific community, technical reports and workshops for active producers, interpreted information for potential producers, the general public and schools, and cooperative services to state agencies.

Outcome Indicators:

- Number of producers.
- Percent of producer profits.
- Number of producers adopting recommended cultural and husbandry practices.
- Improved growth and health of cultured animals.
- Amount of Iowa agricultural products utilized for animal feed.
- Amount of water pollution attributed to aquacultural operations.
- Number of producers participating in trade associations and educational programs.
- Percent increase in product sales.
- Number of research reports to the scientific community, technical reports and workshops for active producers, interpreted information for potential producers, the general public and schools, and cooperative services to state agencies.

Key Program Components:

- Evaluate nutritional and physical environmental factors that influence growth and performance of fishes used in Iowa intensive aquaculture operations.
- Evaluate various fish species to determine those best for Iowa's climate.
- Determine plant and animal by-product substitutes for fish meal to formulate fish feeds with lower pollution potential.
- Manipulate nutrients to enhance fish culture pond productivity.
- Provide publications, WWW sites, and workshops to increase knowledge of producers and the general public.
- Conduct on-site evaluations and recommendations for improving cultural and husbandry operations.
- Provide coordination services for state commodity organizations and agricultural and natural resources agencies.

Internal and External Linkages:

- USDA North Central Regional Aquaculture Center
- Iowa Departments of Natural Resources, Agriculture and Land Stewardship, and Economic Development

- Iowa Aquaculture Association
- Iowa Bison Association
- Iowa Elk Breeders Association
- Iowa Emu Association
- Iowa Chapter of the American Ostrich Association

Target Audiences:
Iowa general public, school children, fish farmers and game ranchers in Iowa and the North Central region, ISU Extension field staff, state agency personnel having alternative livestock responsibilities, and alternative livestock scientists.

Program Duration:
Five years

Allocated Resources:

Year	SYs	State and Hatch funds
FY99	1.1	$ 124,522
FY00	1.1	127,012
FY01	1.1	129,553
FY02	1.2	132,144
FY03	1.2	134,787
FY04	1.2	137,482

Program 13.International Economic Competitiveness

Statement of Issue:
Economists have long recognized the gains to society as a whole from freer trade. At the same time, not all sectors may gain. U.S. agriculture has been competitive in international markets. We have a highly productive land base, appropriate climatic conditions, access to abundant supplies of water, and a research system to develop the latest and most efficient technologies. At the same time, major changes are occurring in the production environment. With growing populations and incomes, there is growing competition for land, water, and services of the environment. Simultaneously we have new and expanded competition from South America and other regions in supplying international markets. Our exports have been growing, but that is not assured in the future if we do not stay on the frontiers of knowledge and efficiency.

Competitiveness is not an all inclusive concept, but rather, it applies to each of our major export markets. The concept is also dynamic and the state of our competitiveness for particular commodities may change rather quickly. It can be influenced by the regulatory (environmental, food safety) environment, various forms of trade barriers (tariff, non-tariff), available technology, and public policies. The structure of the industry also has an impact. Contractual linkages or integration of the food supply chain can further reduce costs, increase economies of size and efficiency, and improve agricultural competitiveness. Although these structure changes may not be deemed as desirable, they may improve our competitiveness in international markets.

Performance Goals:

- Conduct research and educational programs on the international competitiveness of Iowa and U.S. producers, the impacts of trade barriers, regulations, incentives, disincentives, and agreements on the competitive position of domestic products.

  Output Indicators:

  - Greater understanding of the competitiveness of domestic producers.
  - Greater understanding of how competitiveness is impacted by domestic regulations and international trading practices and agreements.
  - Research reports to the scientific community, technical reports and workshops for active producers, interpreted information for potential producers, the general public and schools, and cooperative services to state agencies.

  Outcome Indicators:

  - Continuing competitiveness of Iowa and U.S. producers.
  - Number of research reports to the scientific community, technical reports and workshops for active producers, interpreted information for potential producers, the general public and schools, and cooperative services to state agencies.

Key Program Components:

- Evaluate the competitiveness of Iowa and U.S. producers in international markets for crop and livestock products.
- Identify major factors affecting the international competitiveness of Iowa and U.S. producers.
- Identify domestic and international policy practices that would increase the competitiveness of domestic producers.
- Assess the role of research and development and the associated adoption of new technologies in maintaining and improving the competitive position of Iowa and U.S. producers.
- Analyze the role of exchange rates and international financial crises on export growth and long-run export market stability.

Internal and External Linkages:

- U.S. Department of Agriculture agencies
- State agencies
- Environmental Protection Association
- Agricultural business
- Commodity groups
- Professional societies
- Other Land Grant universities

Target Audiences:

Teaching and extension faculty and specialists, state and federal public policy makers, producers, agribusinesses, college students

Program Duration:

Five years

Allocated Resources:

Year	SYs	State and Hatch funds
FY99	0.8	$ 291,177
FY00	0.8	297,000
FY01	0.8	302,940
FY02	0.8	308,999
FY03	0.9	315,179
FY04	0.9	321,483

Program 14.Agricultural Risk Management

Statement of Issues:
Production agriculture has entailed substantial risk related to price, production, weather, and financial factors. The new farm program legislation of 1996 shifted additional risk from the federal government to the farmer. Thus there is a growing need and demand for risk management tools and alternatives in the agricultural sector. Simultaneously, structural changes in agriculture are driving integration of the food supply chains in the sector. Associated with these changes are growing contractual relationships that may shift risk bearing but also may introduce additional risks. Following passage of "Freedom to Farm" in 1996, new risk management alternatives (including insurance programs and contractual arrangements) have been and are being developed. These alternatives provide farmers with new tools but also with complex decisions in selecting risk management tools and appropriate marketing strategies. To remain competitive in agriculture, Iowa producers must manage their risk effectively and efficiently.

Performance Goals:
- Developing and evaluating new risk management tools and contractual relationships for producers to better deal with price, production, revenue, and financial risks of agriculture in both the crop and livestock sectors.

  Output Indicators:
  - New risk management strategies and programs.
  - Trade-offs of contractual arrangements.
  - Information and software for evaluating risk management options.
  - Research reports to the scientific community, technical reports and workshops for active producers, interpreted information for potential producers, the general public and schools, and cooperative services to state agencies.

  Outcome Indicators:
  - Number of producers adopting appropriate risk management practices.
  - Number of stakeholders understanding risk management principles.
  - Survival and success rates of producers and, to some extent, rural communities.
  - Number of research reports to the scientific community, technical reports and workshops for active producers, interpreted information for potential producers, the general public and schools, and cooperative services to state agencies.

Key Program Components

- Create new risk management options and strategies.
- Evaluate alternative risk management options in the context of the farm firm.
- Develop marketing and risk management strategies suitable for representative farm situations, including crop vs. livestock, ability of farmer to handle risk, debt-to-asset situation, as well as related financial and resource circumstances.
- Analyze contracting, incentive structures, and the farm firm.
- Provide "good practices" guidelines for contracting and contractual arrangements.

Internal and External Linkages:

- Agronomic and animal-related departments at ISU
- U.S. Department of Agriculture Risk Management Agency
- Chicago Board of Trade
- Private insurance companies
- Private sector firms up and down the food supply chain.

Target Audiences:

Crop and livestock producers, private insurance, financial and risk management firms, public policy makers, firms up and down the food supply chain, outreach, and students.

Program Duration:

Five years

Allocated Resources:

Year	SYs	State and Hatch funds
FY99	3.0	$ 237,128
FY00	3.1	241,870
FY01	3.1	246,708
FY02	3.2	251,642
FY03	3.2	256,674
FY04	3.3	261,808

Program 15.Agricultural Information Technology

Statement of Issues:

The information revolution is having profound impacts on agriculture and the future of the sector. Information technology has the potential to cause dramatic alterations in the structure of agricultural production, marketing, processing, distribution, and consumption. Everything from precision farming to source identification to electronic markets will impact the sector. Even though information-based agriculture is being heralded as the future of agriculture, there are difficulties being encountered in the transition to the new information technologies. The adoption and widespread use of information technology in agriculture is constrained by a number of factors. First, many of the technologies are not yet profitable within current production

systems. Second, producers lack objective information on new equipment, training on how to operate and use the information hardware, software, data systems, and decision tools, and the necessary private infrastructure for efficient operation of systems. Land Grant universities are being viewed as not providing the necessary supporting infrastructure in terms of teaching (information-based courses), research, and extension. Likewise, the private sector has not developed the necessary supporting infrastructure and training. Also, the information they provide is not always viewed as objective.

Performance Goals:

- Conduct agricultural information technology research and educational programs, which will enable Iowa agriculture to be competitive, profitable, and environmentally friendly.

  Output Indicators:
  - New data gathering and analytical methods.
  - Information, software, and systems for evaluating impacts of adapting new information technologies.
  - Research reports to the scientific community, technical reports and workshops for active producers, interpreted information for potential producers, the general public and schools, and cooperative services to state agencies.

  Outcome Indicators:
  - Numbers of participants at all levels of the food chain able to evaluate productivity, profitability, safety, and environmental impacts of adapting new information technologies.
  - Number of research reports to the scientific community, technical reports and workshops for active producers, interpreted information for potential producers, the general public and schools, and cooperative services to state agencies.

Key Program Components:

- Design and develop data gathering and analytical methods.
- Provide value-adding opportunities for grain and livestock products.
- Create system of linkages for the food supply chain.
- Provide of evaluation of economic, safety, and environmental impacts of information-based agriculture methods and technologies.
- Incorporate new knowledge into on- and off-campus learning experiences.

Internal and External Linkages:

- All units within the experiment station and extension system should be involved in the internal system.
- Involve research farms and demonstration units.
- External linkages should include all stakeholders from producers to input suppliers to processors to consumers (both domestic and international). The food safety, consumer, natural resource, and environmental communities should be involved in assessing the gains from the new information technologies. In addition, a multistate university consortium is needed to realize economies of size in such a research effort.

Target Audiences:
This project will provide information to producers, the farm supply industry, extension, food supply chain managers, researchers, consumers, public policy makers, and the general public.

Program Duration:
Five years

Allocated Resources:

Year	SYs	State and Hatch funds
FY99	2.6	$ 211,869
FY00	2.7	216,106
FY01	2.7	220,428
FY02	2.8	224,837
FY03	2.8	229,334
FY04	2.9	233,920

GOAL 1: Impacts
Greater profitability and competitiveness through the development and dissemination of information on new or improved methods, practices, and products that will result in

- reduced crop and postharvest product losses,
- more efficient use of agricultural chemicals,
- yield gains through genetic improvements,
- new products and applications,
- improved quality and consistency of products, and
- a better understanding and adoption of appropriate risk management practices.

New contributions to the understanding of agriculturally important plants and animals and the applications of scientific advances promote greater utilization of Iowa agricultural products for the continuing competitiveness of Iowa and U.S. producers.

GOAL 2: A safe and secure food and fiber system.

Program 16. Improving the Quality and Safety of Muscle Foods

Statement of Issue:
Consumers have traditionally preferred muscle foods as a source of dietary protein, and muscle food products have been a major component of human diets. However, changing lifestyles and developing technologies have changed the way muscle foods are produced, processed, distributed, and consumed. These changes have resulted in concerns by consumers and regulatory agencies for product quality and product safety. Considerations for food quality and safety need to begin with 'on the farm' animal production, continue through animal product handling and processing, and conclude only after the products have been distributed, prepared, and consumed.

Muscle foods provide the largest category in terms of value of end products from agriculture production. Meat animals and livestock in the U.S. provided 45.3% of all cash receipts from farming in 1997, more than that received for all feed and fiber crops. Further, agriculture is a critical element of the Iowa economy. Iowa currently ranks 1st, 5th and 6th among all states for cash receipts received for swine, sheep, and beef, respectively. Consequently, it is imperative for Iowa that muscle foods maintain an image of high quality and assured safety with consumers.

This research is designed to improve the quality and safety of muscle foods by examining efficacy of growth factors in live animals, development of improved processing technologies that will enhance the quality, safety of muscle foods, and packaging environments to improve product safety during storage and distribution. Completion of the project will permit the muscle food industry to maintain a competitive position with other sources of protein in human diets, alleviate the current consumer image of muscle foods as hazard-prone, and maintain muscle foods as a prominent choice for a highly satisfying eating experience.

Performance Goals:

- Alter nutritional practices to increase efficiency of growth and production of muscle foods.
- Enhance processing technologies to improve quality, safety and consistency of muscle foods.
- Enhance public understanding of food safety and quality.

Output Indicators:

- Better understanding of the factors that influence the quality of muscle foods.
- New processing technologies for manufacturing muscle foods.
- Better understanding of the functional properties of muscle and non-meat proteins in the manufacturing of processed meat products.
- Research reports to the scientific community, technical reports and workshops for active producers, interpreted information for potential producers, the general public and schools, and cooperative services to state agencies.

Outcome Indicators:

- New methods to improve growth of muscle.
- Improved quality of fresh and processed meat products.
- Enhanced safety and consumer confidence in meat products.
- Percent of the public who understand of the principles of food safety and quality and the role and value of muscle foods in the human diet.
- Number of research reports to the scientific community, technical reports and workshops and interpreted information for potential producers, the general public and schools, and cooperative services to state agencies.

Key Program Components:

- Determine nutritional and genetic factors of animals that offer potential to modify muscle growth, post-mortem muscle biochemistry, and meat quality, and improve ultimate meat quality.
- Improve the quality of fresh meat by identification and modification of key intracellular muscle biochemical events during growth and immediately post mortem.
- Improve the quality of processed meat products by identification of new functional interactions of muscle proteins with nonmeat proteins and other nonmeat ingredients.
- Improve the quality and safety of meat products by identification of ingredients and processes that provide barriers to growth of food-borne pathogens.

Internal and External Linkages:

- Food Safety Consortium

Target Audiences:

Livestock producers, meat processors, the public, the scientific community, and students.

Program Duration:

Five years

Allocated Resources:

Year	SYs	State and Hatch funds
FY99	2.9	$ 302,514
FY00	3.0	308,564
FY01	3.0	314,736
FY02	3.1	321,030
FY03	3.1	327,451
FY04	3.2	334,000

Program 17. Reduction of Physical, Chemical, and Biological Hazards Introduced into Foods

Statement of Issue:

Consumers and regulatory agencies have a heightened interest in the safety of the food supply. Recent outbreaks involving Escherichia coli O157:H7 and Listeria monocytogenes have received much attention in the popular press and have resulted in calls for new research to reduce the risk associated with foods. There is a growing realization by all parties that food safety begins at the farm and continues through to the consumers' plate, and that every step in the process is important to maintain a safe food supply. Because of this, it is important to maintain an active and ongoing research program in the area of food safety, not only for our domestic food supply, but also for the increased demand for U.S. products in the international market.

The Hazard Analysis Critical Control Point (HACCP) system approach to food safety identifies hazards as physical, chemical, or biological. The HACCP system has become the de facto standard for food safety, being recognized and endorsed by major scientific and regulatory

agencies, including the National Academy of Science and the U. S. Department of Agriculture. While most of the recent consumer concerns have involved biological hazards, all three hazards must be addressed to adequately ensure the safety of the food supply.

In normal production, food produced and processed under hygienic conditions is relatively free of risk. However, hazards can be inadvertently introduced at any stage, from production to consumption. An analysis of the hazards and the modes of introduction at each stage in the system can lead to reductions in potential risks, either by avoidance or intervention strategies. In addition, the development of improved detection methodologies is necessary in improving the estimation of the incidence of hazards, as they occur.

Performance Goals:

- A safe and secure food system.
- Improve our understanding of the hazards to a safe food supply.

Output Indicators:

- New and improved analytical methods.
- Greater understanding of chemical, physical, and biological hazards to food safety.
- Research reports to the scientific community, technical reports and workshops for active producers, interpreted information for potential producers, the general public and schools, and cooperative services to state agencies.

Outcome indicators:

- Improvements in the overall safety of the food supply.
- Number of research reports to the scientific community, technical reports and workshops and interpreted information for potential producers, the general public and schools, and cooperative services to state agencies.

Key Program Components:

- Develop new analytical methods and improve the sensitivity and specificity of existing methods.
- Evaluate chemical, physical, and biological hazards which may be introduced during food production, processing, storage, distribution, and preparation and determine methods or procedures to reduce the risk from these hazards.

Internal and External Linkages:

- Iowa Experiment Station projects
- College of Veterinary Medicine
- Food Safety Consortium (Iowa, Kansas, Arkansas)
- National Alliance for Food Safety
- Southern multistate research project (S-263)
- Public and private industry

Target Audiences:

Scientific community, food industry, students, and the general public.

Program Duration:

Five years

Allocated Resources:

Year	SYs	State and Hatch funds
FY99	1.4	$ 110,638
FY00	1.4	112,851
FY01	1.5	115,108
FY02	1.5	117,410
FY03	1.5	119,759
FY04	1.5	122,154

GOAL 2: Impacts
A more safe and secure food and fiber system due through the development and dissemination of information on new or improved methods, practices, and products that will result in

- improved quality of fresh and processed meat products,
- greater public understanding of the principles of food safety and quality, and
- greater understanding of chemical, physical, and biological hazards to food safety.

New contributions to the understanding of the hazards to a safe food supply and the applications of scientific advances promote enhanced food safety and consumer confidence in the food supply in Iowa, the United States, and the world.

GOAL 3: A healthy, well-nourished population.

Program 18. Improving Human Foods: Functionality, Selection and Nutrition

Statement of Issue:
This project will focus on improving the foods people consume. The scope of the research will cover improvements in all consumer aspects of foods including functional, sensory, economic, nutritional, and selection criteria. Research will span from developing more effective nutrition education tools to understanding fundamental principles of food ingredients, nutritive value and bioavailability. The overarching objective of this project is to improve human food consumption patterns to provide for a healthy, well nourished population. An additional objective is to support the development of a reliable food industry that can sustain this population.

Diet and nutrition are major factors in assuring adequate growth in children and adolescents, maintaining optimal health, and preventing acute and chronic diseases such as heart disease, diabetes and cancer. At a time when the information linking diet and health is increasing, consumers in the United States and other developed countries in the world are becoming more dependent upon processed and packaged foods for a larger proportion of their diet. This results in a critical need to develop foods with improved nutritional properties that will maintain optimal health and prevent disease. Tight integration and cooperation between nutritional sciences and food sciences is critical to improving the nation's health. This approach is an essential

component of health care reform and will help to contain health care costs that threaten to bankrupt the nation. Although a "healthy food" industry is gaining momentum, this industry needs guidance from scientists to provide the scientific basis for functional foods and to develop food products that will actually make people healthier, be cost effective, and be marketable.

Performance Goals:

- Improve our understanding of the principles of ingredients and flavor of foods.
- Increase our understanding of human nutritional needs and nutrient metabolism.
- Develop strategies for improving the quality and nutritional value of consumer foods.
- Determine optimal dietary intakes for health maintenance and disease prevention.
- Develop novel foods and food ingredients that will help prevent human disease.
- Assess and optimize bioavailability of dietary components.
- Improve tools for food surveys and nutritional assessment.
- Optimize market aspects of improved food products.
- Develop strategies for effective nutrition education.
- Improve our understanding of dietary and feeding choices.

Output indicators:

- Greater understanding of food components as they influence food properties and nutritional value.
- Improved strategies for providing foods that fit today's lifestyle to the consumer.
- Increased availability and consumption of health promoting foods by people.
- Assistance to food companies in developing profitable foods that will improve human well being.
- Research reports to the scientific community, technical reports and workshops for active producers, interpreted information for potential producers, the general public and schools, and cooperative services to state agencies.

Outcome indicators:

- Improved nutritional status of people.
- Number of health promoting foods available to consumers.
- Number of food companies willing to take the risk of developing improved foods.
- Percent of the public aware of health promoting dietary and feeding behaviors.
- Number of research reports to the scientific community, technical reports and workshops and interpreted information for potential producers, the general public and schools, and cooperative services to state agencies.

Key Program Components:

- Study the impact of food constituents on chronic disease indices.
- Research mechanisms of dietary prevention of disease.
- Assess bioavailability and bioactivity of nutrients and non-nutrient constituents of foods.
- Research detoxification of dietary toxicants.
- Study the effects of processing on bioavailability and bioactivity of dietary constituents.
- Investigate the impact of social and economic factors on food choices.
- Research to improve tools for assessment of dietary intake and nutritional status.

- Study dietary and feeding habits associated with optimal growth.
- Research the educational programs that will effectively inform and fully educate people about all the related issues of food and nutrition.
- Assess the impact of food perceptions, acceptability of products, and marketing on sales.

Internal and External Linkages:
- Experiment station projects on improving the quality and safety of muscle foods and on food safety
- Center for Designing Foods to Improve Nutrition and Center for Crops Utilization Research
- Food industries
- Government agencies that address food and nutrition policy
- Professional organizations that focus on human foods and nutrition

Target Audiences:
Consumers, food processors, food companies, nutrition companies, and health care providers.

Program Duration:
Five years

Allocated Resources:

Year	SYs	State and Hatch funds
FY99	4.7	$ 768,217
FY00	4.8	783,581
FY01	4.9	799,253
FY02	5.0	815,238
FY03	5.1	831,543
FY04	5.2	848,174

GOAL 3: Impacts
A healthy and well-nourished population through the development and dissemination of information on new or improved methods, practices, and products that will result in
- increase in the availability of health promoting foods for consumers,
- increase in risk-taking by food companies in developing improved foods, and
- increase in the public's awareness of health promoting dietary and feeding behaviors.

New contributions to the understanding of the hazards to a safe food supply and the applications of scientific advances promote an improved nutritional status of the general population of Iowa, the United States, and the world.

GOAL 4: An agricultural system which protects natural resources and the environment.

Program 19. Sustainable Agriculture

Statement of Issue:
Agricultural productivity has increased tremendously over the last fifty years as new technologies have been developed and adopted by crop and livestock producers. Advances in mechanization and automation, the success of crop and livestock breeding programs, increased use of fertilizers and pesticides, and government policies that favored consolidation and large scale crop monoculture enabled U.S. agriculture to become the most productive in the world. It has now become clear that this intensive, high-input agricultural production system has put stress on the environment and on our rural communities. Intensive agricultural production has contributed to depletion of soil resources and contamination of groundwater. It has also increased the cost of production, putting economic stress on farm families and rural communities. In response to these problems there has been an increasing emphasis on development of sustainable agricultural production systems. Sustainable agriculture emphasizes environmental stewardship, economic profitability, and social stability. In order to be successful, sustainable agricultural systems must be productive and profitable.

Performance Goals:
- Conduct research and educational programs in sustainable agriculture that will enable Iowa agriculture to be highly productive, economically profitable, environmentally friendly, and socially responsible.

  Output Indicators:
  - Greater understanding of the principles of sustainable agriculture.
  - Crop and livestock production systems that maintain productivity, protect the environment, lower production costs, and sustain rural communities.
  - Research reports to the scientific community, technical reports and workshops for active producers, interpreted information for potential producers, the general public and schools, and cooperative services to state agencies.

  Outcome Indicators:
  - Number of producers using IPM/ICM and reducing pesticide use in Iowa.
  - Number of producers adopting soil-building practices.
  - Number of producers using increased crop diversification and rotation.
  - Number of producers using Management Intensive Grazing.
  - Number of producers using hoop houses for swine production.
  - Number of producers using better manure management practices, resulting in reduced pollution.
  - Number of farmers and rural communities under economic stress.
  - Number of organic producers in Iowa.
  - Number of research reports to the scientific community, technical reports and workshops and interpreted information for potential producers, the general public and schools, and cooperative services to state agencies.

Key Program Components:

- Develop crop production systems that reduce erosion, enhance soil quality, and reduce groundwater pollution.
- Utilize plant nutrients effectively from fertilizer and animal waste.
- Develop alternative livestock production systems (hoop houses, management intensive grazing, etc.).
- Examine the potential for alternative crops in Iowa.
- Develop machinery systems for alternative crops.
- Use riparian vegetation to reduce runoff and pollution.
- Reduce pesticide use with IPM research.
- Examine government policies as they affect sustainable agriculture and sustainability of rural communities.
- Conduct research to assess the implementation and impact of sustainable agriculture practices.
- Include economic analysis in all of the activities mentioned above.
- Mainstream sustainable agriculture principles into all College of Agriculture curricula.
- Offer some courses specifically focused on sustainable agriculture and organic agriculture.
- Develop an interdepartmental graduate program in sustainable agriculture.
- Provide K-12 students and teachers with information and activities pertaining to sustainable agriculture (e.g. AgEdSt programs with high school FFA).
- Provide continuing education on the latest developments in sustainable agriculture (distance ed., short courses, workshops, etc.).

Internal and External Linkages:

- ISU departments, extension field staff
- Leopold Center for Sustainable Agriculture
- Iowa agricultural professionals: Co-ops, certified crop advisors, seed company personnel, machinery company personnel, farmer organizations, etc.
- Commodity groups
- Other land grant institutions

Target Audiences:

Farmers, producers, agribusiness professionals, and the public.

Program Duration:

On going

Allocated Resources:

Year	SYs	State and Hatch funds
FY99	2.7	$ 294,723
FY00	2.8	300,617
FY01	2.8	306,629
FY02	2.9	312,762
FY03	2.9	319,017
FY04	3.0	325,398

Program 20.Sustainable/Organic Agriculture

Statement of Issue:
Iowans remain concerned about profitability, the environment, and the quality of life associated with agriculture. Sixty percent of Iowa farmers polled in 1994 believe there is too much reliance on agricultural chemicals in farming, and only 20% felt their quality of life had improved during the last five years. Sixty-two percent felt that increased use of sustainable farming practices would help maintain the natural resource base. Non-farmers are concerned about the impacts of agriculture on water quality and of livestock intensification on communities.

Organic agriculture is based on the principles of sustaining the environment through avoidance of potentially polluting synthetic chemicals. Organic agriculture has been experiencing tremendous gains in acreage and commerce, with Iowa organic acreage totaling 120,000 in 1998, and national sales equaling $4.5 billion. Based on price differentials in today's marketplace, consumers differentiate more readily on an "organic" label, as opposed to a "sustainable" label. Research on organic production practices in Iowa lags far behind what producers require for full participation in the marketplace. A need exists to provide increased sustainable/organic agriculture research, education, and training in Iowa.

Performance Goals:
- Long-term economic stability, environmental soundness, and positive social impacts.
- Help ensure appropriate profit in the short- and long-term for farm families through the development of sustainable/organic crop and pasture systems.
- Provide opportunities on alternative agriculture, diversification, and organic agriculture by assisting in the development of a database on alternative production systems.
- Enhance value-added efforts through development of value-retained (organic) products, by-products.
- Promote alternative markets by analyzing, facilitating, and supporting alternative marketing strategies.
- Reduce the reliance of Iowa farmers on pesticides and purchased fertilizers through the development of sustainable/organic crop and pasture systems.
- Enhance soil and water quality through the development of sustainable/organic crop and pasture systems.
- Provide research-based information in the development of rules for the State of Iowa Organic Certification Program.
- Provide research-based information in training to key agricultural professionals-producers, lenders, Natural Resources Conservation Service, FSA, landowners, Extension, and private consultants.

Output Indicators:
- Development of sustainable/organic crop and pasture systems.
- Development of a database on alternative production systems.
- Development of value-retained (organic) products and byproducts.
- Improved alternative marketing strategies.
- More reliable information and recommendations for organic certification.

- Research reports to the scientific community, technical reports and workshops for active producers, interpreted information for potential producers, the general public and schools, and cooperative services to state agencies.

Outcome Indicators:

- Number of producers and acres in certified organic production.
- Number of producers trained and certified in manure management.
- Number of community-supported agriculture projects (CSAs) active.
- Number of producers and acres involved in Management Intensive Grazing (MIG).
- Number of producers adopting practices to improve or protect soil/water quality.
- Number of diversified or alternative community marketing systems or strategies.
- Number of trained or updated key agricultural professionals in sustainable agriculture.
- Number of research reports to the scientific community, technical reports and workshops and interpreted information for potential producers, the general public and schools, and cooperative services to state agencies.

Key Program Components:

- Organic agriculture research and education program.
- Showcase of creative, successful, sustainable agriculture operations.
- Integrated Crop Management.
- Integrated Planning Approaches, including the Strategic Advantage program.
- Holistic Management.
- PFI/organic community workshops and field days.
- Sustainable agriculture trainings.
- Manure Management Certification Training.
- Value Added workshops.
- Community Supported Agriculture workshops and field days.
- Leopold Center for Sustainable Agriculture workshops and conferences.
- Small farm programs.
- Sustainable agriculture workgroup.
- Extension 21 projects.
- Alternative livestock systems, including Swine, Pastured Poultry workshops, and MIG programs and pasture walks.

Internal and External Linkages:

- Leopold Center
- Outlying research and demonstration farms
- ISU researchers
- Colleges of Veterinary Medicine and Family and Consumer Sciences
- Practical Farmers of Iowa, Natural Resources Conservation Service, Farm Service Agency, Iowa Department and Land Stewardship
- Commodity Groups
- Iowa Network for Community Agriculture; Iowa Department of Economic Development; Iowa Department of Natural Resources; Soil and Water Conservation District; Resource

Conservation and Development; Appropriate Technology Transfer for Rural Areas; Sustainable Agriculture, Research, and Education
- Center for Rural Affairs
- Purdue University
- Missouri Alternative Agriculture Center
- North Central Extension Services
- Iowa Forage and Grassland Council
- The World Bank
- Iowa Agribusiness Assoc.
- Iowa Farm Bureau Federation, U.S. Environmental Protection Association, non-governmental organizations
- Agriculture chemical dealers

Target Audiences:
Producers, small farmers, ISU and Extension staff, key agricultural professionals, local resource development staff, crop consultants, land owners, consumers, legislators, key decision makers, lenders, non-governmental organizations, and women, minorities, small farmers and alternative producers interested in sustainable/organic agriculture.

Program Duration:
More than 5 years

Allocated Resources:

Year	SYs	State and Hatch funds
FY99	1.1	$ 85,488
FY00	1.1	87,198
FY01	1.1	88,942
FY02	1.2	90,721
FY03	1.2	92,535
FY04	1.2	94,386

Program 21.Sustainable and Environmentally Safe Management of Soil Resources

Statement of Issue:
Four key issues are addressed by this plan of work. The first is management of crop nutrients. All crops require appropriate quantities of nutrients at the right time and in the right place. Poor management of nutrients can result in soil degradation by nutrient depletion or accumulation of unwanted substances in the soil. Excessive applications are a source of inefficiency and cost for the producer as well as a potential source of contamination of water supplies. Two research approaches are required: fundamental research that explores the chemical and biological mechanisms that allow crop plants to take up nutrients, and applied research that focuses on cost-effective and environmentally sound management of nutrients in different soils.

The second issue deals with microbial activities in soil. All crop plants depend on microbially synthesized soil enzymes that play a critical role in creating plant-available forms of nitrogen, phosphorus, and sulfur and in decomposition of crop residues. Soybean plants, in particular, depend on native microbiological partners for nitrogen fixation and enhanced phosphorus uptake. An improved understanding of how soil management practices impact microbial activity and microbial biomass could lead to reduced crop production inputs without sacrificing yields.

The third issue is soil resource assessment and sustainable management. Detailed documentation of soil morphology and spatiality at many scales is fundamental to effective soil use, fair tax assessments, land-use planning, environmental protection and precision application of agricultural inputs to the soil. In addition to assessing the present soil resource, research must be directed to understanding how that resource changes over time. The net effects of soil erosion and other forms of soil degradation threaten both Iowa crop production and surface water quality. Development of improved and economically feasible preventative measures rests upon better understanding of soil formation and degradative process. Research at multiple sites of various ages permits rigorous evaluation of the short- and long-term impacts of soil degradation on food supplies, soil quality, and water quality under various and changing environmental conditions.

The final issue addressed by this plan of work is the fate and transport of chemicals in soils. When pesticides and metals enter the soil they are affected by three major processes: immobilization by complexation and/or sorption at soil mineral surfaces, mobility in soil water, or transformation by biological or abiotic reactions. Knowing the degree to which pesticides and metals are immobile, mobile, or transformed in soil is critical to accurate predictions of both their impacts on water supplies and their bioavailability to plants, soil animals, and soil microorganisms.

Performance Goals:

- Provide the scientific community, extension specialists, agricultural producers, and the fertilizer industry with critical information that will improve nutrient management guidelines to increase input effectiveness and decrease environmental risks.
- Provide the scientific community, extension specialists, fertilizer industry, and seed industry with fundamental information about the activity of microbial symbionts in soil and how soil management impacts microbial biomass, enzyme activity, and biological diversity.
- Provide the scientific community, land users, and land-use planners a more complete database of soil resources to improve predictions of the spatial variability of soil properties and processes and to assess the short-term and long-term impacts of soil and crop management on soil quality.
- Provide the scientific community, extension specialists, the fertilizer industry, and the agrochemical industry with fundamental knowledge to improve models that predict the fate and transport of metals and pesticides once they are applied to the soil or where they occur in contaminated soils.

Output Indicators:

- Improved nutrient management recommendations for crop producers.
- Improved understanding of the impact of soil management practices on microbial activity, microbial biomass, enzyme activity, and biological diversity in soils.

- Improved soil management recommendations.
- Improved database and understanding of soil resources.
- Improved predictions of the fate and movement of metals and pesticides in contaminated and agriculturally managed soils.
- Research reports to the scientific community, technical reports and workshops for active producers, interpreted information for potential producers, the general public and schools, and cooperative services to state agencies.

Outcome Indicators:

- Percent increase in crop production yield per unit of inputs (e.g., land, fertilizers) with decreased environmental risks.
- Minimized soil degradation and off-site impacts of crop production.
- Number of producers who are better informed land users and land-use policy makers.
- Number of research reports to the scientific community, technical reports and workshops and interpreted information for potential producers, the general public and schools, and cooperative services to state agencies.

Key Program Components:

Basic and applied research conducted in the field, laboratory, or greenhouse and addressing the issues of:

- Management of crop nutrients in soils.
- Microbial biomass, microbial activity, and enzyme activity in soils.
- Soil resource assessment and sustainable soil management.
- Fate and transport of metals and pesticides in soils.

Internal and External Linkages:

- Leopold Center for Sustainable Agriculture
- State and national crop commodity organizations
- U.S. Department of Agriculture and its agencies, including Natural Resources Conservation Service and National Soil Tilth Laboratory
- U.S. Department of Energy
- U.S. Environmental Protection Agency
- State and federal extension services
- Iowa Department of Agriculture and Land Stewardship
- Iowa Department of Natural Resources
- National and international scientific societies
- Peer researchers at Land Grant universities in the North Central Region

Target Audiences:

Agricultural producers and land owners, extension faculty and staff, graduate and undergraduate students, agricultural consultants and industry representatives, land-use planning commissions, tax assessors, and scientific collaborators and peers.

Program Duration:

Five years

Allocated Resources:

Year	SYs	State and Hatch funds
FY99	10.4	$ 1,446,115
FY00	10.6	1,475,037
FY01	10.8	1,504,538
FY02	11.0	1,534,629
FY03	11.3	1,565,321
FY04	11.5	1,596,627

Program 22.Integrated Pest Management

Statement of Issue:
Integrated Pest Management (IPM) promotes minimized pesticide use, enhanced environmental stewardship, and sustainable systems. This is achieved by protection of commodities, homes, and communities with environmentally and economically sound practices that result in abundant, high quality supplies of food and fiber products and improved quality of life.

Several forces in the United States today are intensifying the need for increasing the practice of IPM. The Food Quality Protection Act (FQPA) recently passed by Congress mandates removal of many traditional pesticides from the marketplace by the year 2001. The Clinton administration has mandated a long-range goal of having 75% of farm acreage under IPM practice. These mandates, as well as the increasing public concern with and intolerance toward traditional toxic pesticides in food and in the environment, mean that new alternative methods of pest control will need to be developed.

Performance Goals:

- Conduct research and education programs in integrated pest management that will improve Iowa agriculture and the quality of life for Iowa citizens in and around the home, workplace, neighborhood, and recreation areas.

  Output indicators:
  - Dissemination of research results concerning integrated pest management that will optimize the ability of Iowa agriculture to be productive, economically profitable, and competitive while positioning it to meet future challenges of shifting consumer expectations.
  - Dissemination of integrated pest management research results that directly and sustainably impact in a positive way the health, safety, and well being of Iowa citizens in and around their homes and communities.
  - Research reports to the scientific community, technical reports and workshops for active producers, interpreted information for potential producers, the general public and schools, and cooperative services to state agencies.

  Outcome Indicators:
  - Number of people who use alternative pest management technologies and strategies in Iowa.
  - Measures of residues of traditional pesticides in groundwater.

- Number of humans and animals exposured daily to traditional pesticides.
- Number of research reports to the scientific community, technical reports and workshops and interpreted information for potential producers, the general public and schools, and cooperative services to state agencies.

Key Program Components:

- Development of detection, monitoring, and sampling systems that reliably and sensitively indicate the presence and abundance of pest species.
- Development of economic thresholds and models that provide guidance for taking action against pest populations.
- Development of novel, alternative technologies and strategies for mitigating pest populations.
- Development of systems for improved monitoring, risk assessment and remediation of residues from traditional pesticides and their metabolites.
- Development of methods to reduce the resistance of pests to novel IPM technologies and strategies in order to optimize their sustainability.
- Develop and deliver customized IPM continuing education courses targeting professional and consumer audiences.
- Develop interactive information centers for increasing responsiveness to inquiries and improving accessibility of producers and the public to up-to-date IPM research information.
- Improve awareness of students to international aspects of IPM by developing study abroad course offerings.
- Develop and deliver new resident instruction courses in IPM principles and practice.
- Develop and implement improved methods of delivering IPM educational programs, including utilization of electronic and web-based formats.
- Develop improved K-12 education in IPM by more intensive outreach programs and courses that ‘teach the teachers’.
- Develop improved pest diagnostic capabilities, including utilizing electronic communication where possible.
- Develop the capability to remotely deliver laboratory components to IPM-related courses.
- Encourage faculty involvement in technology transfer activities.

Internal and External Linkages:

- ISU departments
- Interdepartmental programs
- Extension field staff
- Leopold Center for Sustainable Agriculture
- Center for Agricultural and Rural Development
- Center for Crops Utilization Research
- Iowa State University Research Foundation
- Multistate research projects related to IPM
- Producers
- Certified crop advisors
- Seed company personnel
- Green industry personnel
- Public health officials

- Commodity groups

Target Audiences:
Farmers, agribusiness professionals, veterinarians, green industry professionals, pest control operators, public health professionals, teachers, students, and the general public.

Program Duration:
Five years

Allocated Resources:

Year	SYs	State and Hatch funds
FY99	7.3	$ 789,324
FY00	7.4	805,111
FY01	7.6	821,213
FY02	7.7	837,637
FY03	7.9	854,390
FY04	8.1	871,478

Program 23.Animal Waste Management

Statement of Issue:
Animal production is a major agricultural enterprise for Iowa and the nation. Public concern over the management of animal manure has become a major environmental issue in Iowa and in many other states with significant animal production. Major environmental issues center on water quality (surface and groundwater) and gaseous emissions including odors. However, there are many other associated environmental issues such as animal disease control, insect populations, dust, extra traffic, and proper disposal of dead animals. Iowa has experienced significant changes in the number and structure of animal production systems in the past decade. There are fewer, larger animal production operations particularly in swine, layer and dairy operations. There has been a drastic drop in the numbers of feedlot beef produced since the early 1970's. The mid-western family farm concept of balanced and diversified cropland and animal production systems has been significantly altered by specialization of both crop and animal production systems. This has tended to separate these two major agricultural enterprises in rural Iowa. There is a need to support animal production as a value-added process for agriculture while maintaining and improving our environment through the use of improved management techniques to take advantage of the abundant land resources available throughout the state.

Animals have not been efficient users of nutrients supplied in their diets. Therefore, significant plant nutrients are found in animal manures. These nutrients, particularly nitrogen, phosphorus, and potassium, are needed for crop inputs for our major crops of corn and soybean. New technologies in genetics and nutrition will allow less nutrients to be produced per unit of animal production. Animal manures are not currently being utilized as efficiently as possible in Iowa. Surveys indicate that nearly one half of all animal manure applied to land is not credited as a nutrient source. Therefore, animal manure nutrients can be applied at excessive rates if better

management practices are not adopted. These excessive rates of application can lead to both surface and groundwater pollution.

Odors have always been a problem surrounding the management of manure from animal productions systems. However, with the increased concentration of animals and the adoption of liquid manure handling systems, odor problems have become more severe. Community problems have been observed with the consolidation of the animal industry. There are fewer small, independent animal producers in the state today. Large-scale operations have not been welcome in most communities. Therefore, there is less tolerance for odors and more potential for surrounding neighbors to be impacted by odors from larger operations. These social problems have created an ever-increasing hostility between animal producers and surrounding neighbors. Odor complaints have increased as a result of these community problems.

Other long term environmental impacts such as ammonia release and greenhouse gas production from animal production systems have been noted in other parts of the world and will need to be addressed to maintain a long-term sustainable agriculture in Iowa.

Performance Goals:

- Maintain and increase the value of animal agriculture in Iowa while improving the soil, water, and air quality as a result of animal production.
- Maintain the competitiveness of animal production in Iowa.
- Develop animal production systems that are not environmental threats to communities and that improve the economy of the area.

Output Indicators:

- Better designed animal production systems.
- More efficient nutrition formulations.
- Improved animal manure handling, storage and application management systems.
- Research reports to the scientific community, technical reports and workshops for active producers, interpreted information for potential producers, the general public and schools, and cooperative services to state agencies.

Outcome Indicators:

- Number of animal producers efficiently utilizing animal manures and byproducts.
- Amount of crop nutrients imported into the state.
- Decrease in nutrients recycled in animal manures.
- Number of producers using improved animal manure management systems and the proper utilization of cropland.
- Number of animal production systems designed and managed to be “good neighbors.”
- Number of animal facilities accepted as well as any other agricultural activity.
- Number of research reports to the scientific community, technical reports and workshops and interpreted information for potential producers, the general public and schools, and cooperative services to state agencies.

Key Program Components:

- Integrate plant and animal genetics, nutrition, housing, waste management and cropping system research and education to minimize both internal and external costs associated with animal production.

Internal and External Linkages:
- U.S. Department of Agriculture National Soil Tilth Laboratory
- Leopold Center for Sustainable Agriculture
- Iowa State Water Resources Institute
- Multistate research projects NC-218, S-275
- Multistate Animal Waste Consortium
- Iowa Department of Natural Resources
- U.S. Environmental Protection Association
- USGS

Target Audiences:
Animal producers in Iowa, community leaders, environmental organizations, state and federal agencies, agribusiness professionals, and the public.

Program Duration:
Five years

Allocated Resources:

Year	SYs	State and Hatch funds
FY99	3.5	$ 362,523
FY00	3.6	369,773
FY01	3.6	377,169
FY02	3.7	384,712
FY03	3.8	392,406
FY04	3.9	400,255

Program 24.Improving Water Resources Management in an Agroecosystem

Statement of Issue:
Water resources management will be a major national priority for the foreseeable future in the United States and the world. Iowa is rich in surface water resources. It lies between North America's two largest rivers, the Mississippi and the Missouri, and contains over 19,000 miles of interior rivers. Iowa's standing water bodies include 35 major natural lakes, about 200 artificial lakes and 100,000 farm ponds, and four large flood-control reservoirs. Although an immensity of wetlands originally occurred in Iowa, most of this resource was lost due to agricultural drainage.

In recent years, however, more than 25,000 wetland acres have been preserved or restored through various government conservation programs. Collectively, these waters are important to the state by providing drinking water for humans, wildlife and livestock, general purpose water

supplies, habitat for hundreds of native fish and wildlife species, and recreational and aesthetic opportunities for Iowans and visitors to the state. But there are continuing challenges to the societal uses and management of these resources posed by agricultural, urban and industrial pollution, drainage practices, and waterway manipulation for transportation which require research and extension contributions of new knowledge for management applications. In particular, nutrient inputs from agricultural watersheds pose significant problems for Iowa municipal water supplies and cause eutrophication of the state's water bodies. Moreover, the geographical scale of water resources problems extends far beyond the borders of Iowa. Due to the connectivity of drainage systems, certain Iowa-source problems affect water resources in downstream states and are believed to extend to the marine ecosystem in the Gulf of Mexico. Similarly, the wetland resources of Iowa exert large impacts on migratory waterfowl, which seasonally range far to the north and far to the south of Iowa.

Performance Goals:

- Improving Iowa's surface water quality for human and wildlife uses.
- Contributing to the restoration and sounder management of riparian zone vegetation, fish, and other aquatic wildlife populations in Iowa and regionally.
- Increasing economic and cultural benefits derived from societal uses of the water resources.

Output Indicators:

- Greater understanding of the impacts of agriculture land and water use practices on aquatic environmental quality.
- Knowledge required to restore plant communities to riparian zones and hydrologic source areas.
- Greater understanding of the habitat requirements and population to trophic dynamics of economically important Iowa fishes.
- Environmental assessment data for improved state and federal water resource management programs.
- Research reports to the scientific community, technical reports and workshops for active producers, interpreted information for potential producers, the general public and schools, and cooperative services to state agencies.

Outcome Indicators:

- Number of project recommendations for achieving surface water quality improvement adopted.
- Number of project inputs incorporated into revisions of state fisheries and aquatic endangered species management policies.
- Populations of native aquatic biota.
- Number of acres of public and private lands with wetland restoration and improved riparian management.
- Number of research reports to the scientific community, technical reports and workshops and interpreted information for potential producers, the general public and schools, and cooperative services to state agencies.

Key Program Components:

- Monitor and assess sources of sediment and agricultural and other chemical inputs into Iowa surface waters.
- Evaluate impacts of agricultural land and water use practices on aquatic environmental quality, including the well-being of aquatic organisms.
- Develop information needed to restore appropriate plant communities to riparian zones and hydrologic source areas.
- Determine habitat requirements and population and trophic dynamics of economically important Iowa fishes.
- Conduct surveys and evaluate the status of rare and endangered aquatic species.
- Evaluate habitat features affecting bird communities that utilize restored wetland complexes.
- Provide publications, WWW sites, and workshops to increase knowledge on water and wetland resources by the general public.
- Provide environmental assessment data required for improved state and federal water resources management programs.
- Train private consultants and agency personnel on the development and management of riparian buffer zones.
- Train private and agency aquatic pesticide applicators on chemical safety.
- Conduct on-site evaluations and make recommendations for management of private ponds and lakes relative to water quality, aquatic vegetation control, and sport fisheries.

Internal and External Linkages:
- USGS BRD Iowa Cooperative Fish and Wildlife Research Unit
- USDA North Central Regional Aquaculture Center
- USDA Natural Resources Conservation Service
- Iowa State Water Resources Research Institute
- ISU Center for Agricultural and Rural Development
- Leopold Center for Sustainable Agriculture
- North Central Experiment Station multistate research committees NCR-195, NCR-196 and NCT-179
- Iowa Departments of Agriculture and Land Stewardship and Natural Resources
- U.S. Environmental Protection Agency
- Iowa County Conservation Board System
- Iowa Soil and Water Conservation Districts
- Iowa Association of Naturalists.

Target Audiences:
The general Iowa public; school children; environmental nongovernmental organizations; private farm pond and wetland owners; government environmental and agricultural policy makers, planners, and managers; ISU Extension field staff; and environmental scientists.

Program Duration:
Five years

Allocated Resources:

Year	SYs	State and Hatch funds

FY99	4.0	$ 419,848
FY00	4.1	428,245
FY01	4.2	436,810
FY02	4.2	445,546
FY03	4.3	454,457
FY04	4.4	463,546

Program 25.Interaction of Biosystems with Weather and Climate

Statement of Issue:
Increased climate variability has contributed to large year-to-year variations of corn production (and other crops) throughout the Midwest during the last two decades, following a relative "benign" period from the fifties through the seventies. This points to the importance of understanding climate variations and their effects on production variation so that producers can maximize their efforts in conjunction with the governmental programs in place. A concern is that natural or human-induced climate changes, as suggested by past observations and global climate models, could have marked impact on crop production.

There is a particular need to address climatological trend interpretation and climate change at regional scales, especially warm season rainfall, which is of great importance to agricultural interests. Such understanding of the dynamics of climate systems allows evaluation of agricultural vulnerability to changes in land use or in greenhouse gases. Because of the interconnection of the global climate system and the global agricultural economy, it is also important to understand other regions' climate variability, which may affect global climate and, hence, domestic crop production and which may affect agricultural competitors in the world market.

Performance Goals:
The ultimate goal of this project will be to enable improved production practices and better marketing of agricultural products through improved understanding of weather and its interactions with agriculture.

- Develop predictive relationships for crop yield in the north central region as a function of climate forcing mechanisms.
- Improve weather forecasting in the Midwestern United States.
- Take research to the classroom and off campus.
- Define sustainable agricultural risks as related to climate.
- Develop instruments and observational analysis models useful to agricultural production and protection.

  Output Indicators:
  - New or improved techniques to improve forecasting.
  - Greater understanding of climates in other regions that affect Midwest climate.
  - New methods for sensing and recording environmental conditions.
  - New analytical models for using satellite observation to forecast crop disease, insect pest activity, and crop conditions.

- New understanding of crop-weather-climate relationships for agricultural and related use.
- Research reports to the scientific community, technical reports and workshops for active producers, interpreted information for potential producers, the general public and schools, and cooperative services to state agencies.

Outcome Indicators:

- Number of the public with a greater understanding of climate forcing functions and impacts.
- Number of program graduates better equipped to address the agricultural sector's crop-weather-climate issues.
- Accuracy of weather and climate forecasts.
- Number of research reports to the scientific community, technical reports and workshops and interpreted information for potential producers, the general public and schools, and cooperative services to state agencies.

Key Program Components:

- Assemble and update both weather and crop yield data in the north central region and ascertain relationships between crop response and weather.
- Evaluate the characteristics and processes of regional weather and climate that may be vulnerable to climate change or climate variability.
- Develop optimum strategies for merging microclimate models with soil and vegetation models.
- Use regional climate models to simulate present and future climates to establish data sets for use in evaluating impacts of climate change on yield.
- Quantify relationships between El Niño/Southern Oscillation (ENSO) activity in the Pacific and weather effects on crop production in the Midwest.
- Develop a climatology of mesoscale rainfall systems and related atmospheric processes during the strong El Niño-La Niña event of 1997-98.
- Investigate the roles of the thermodynamic and dynamic effect of changes in soil moisture on warm season precipitation events.
- Evaluate possible forecast improvements from the use of enhanced data.
- Develop techniques to improve forecasting of mesoscale convective systems.
- Evaluate components of climate risk analysis as it pertains to sustainable agricultural systems, emphasizing soils, grain quality, pest management and crop yield.
- Understand climate in other key regions that potentially affects Midwest climate or markets for agricultural products.
- Develop methods for sensing and recording environmental conditions impacting crop production and protection.
- Develop analytical models to enable satellite observations to be used in forecasting crop disease, insect pest activity, and crop conditions.
- Take research results into the classroom through development of curricula and materials using multimedia software to develop scientific understanding.

Internal and External Linkages:

- Computer and computational scientists
- Soil, crop and ecosystem scientists

- International Institute for Theoretical and Applied Physics
- National Soil Tilth Laboratory
- Regional climate centers
- State climatologists
- National Center for Atmospheric Research
- National Science Foundation
- National Weather Service
- National Centers for Environmental Prediction
- Colorado State University
- University of Minnesota
- University of New Hampshire
- University of Wisconsin
- UNESCO

Target Audiences:
Undergraduate students, graduate students, agricultural interests in crop production and protection, national and international decision makers, legislators, energy industry, environmental specialists.

Program Duration:
Five years

Allocated Resources:

Year	SYs	State and Hatch funds
FY99	2.2	$ 260,565
FY00	2.2	265,776
FY01	2.3	271,092
FY02	2.3	276,514
FY03	2.4	282,044
FY04	2.4	287,685

Program 26.Improving Environmental Quality in a Changing Landscape

Statement of Issue:
Human settlement and agricultural development of Iowa caused enormous changes in the state's ecosystems. The once vast tall-grass prairie was essentially eliminated, most wetlands were drained, over 60% of the forests were lost, and many native animal species were extirpated or greatly reduced in abundance. At the same time, numerous exotic plants and animals became established while a few environmentally adaptive native forms prospered. Although the major ecological transformations attributable to agricultural development are largely in the past, Iowa's landscape, in terms of its societal uses and biota, continues to change.

Agricultural cropping and grazing practices and timber harvesting are evolving in response to economic and social pressures, with both positive and negative environmental implications. Government programs are encouraging removal of the most ecologically fragile agricultural lands from production and conversion to more environmentally beneficial uses. Forests, prairies and wetlands are recovering as a result of management and restoration. Urban areas have grown extensively, and rural areas are increasingly being converted to residential and other non-agricultural uses. Some formerly depleted native wildlife populations are now abundant, to the point that they pose hazards to human activities.

Increasing societal conflict is a regrettable consequence of many of these recent landscape transformations. This situation may be expected to continue, with major implications for Iowa communities and environmental quality. Landscape-scale research and extension programming is needed to deal with these issues.

Performance Goals:
- Geographically inventory, describe, and monitor Iowa natural resources.
- Contribute information for use by land managers, planners, scientists, and policy makers to make better informed decisions on natural resources conservation.
- Determine appropriate spatial scales to evaluate wildlife-habitat relationships and develop and apply models to explain such relationships.
- Apply ecological theory and techniques to improve wildlife habitats and populations.
- Contribute a landscape perspective to evaluating government agricultural and natural resources policies and programs.
- Provide landscape approaches for Iowa communities to deal with regional environmental issues.

Output Indicators:
- Improved recommendations for watershed land uses and practices.
- More complete databases of Iowa's natural resources and biological diversity.
- Better understanding of the relationships between environmental quality and land uses.
- New ecological indicators of environmental quality.
- Greater understanding of impact of agricultural policy on renewable natural resources.
- Research reports to the scientific community, technical reports and workshops for active producers, interpreted information for potential producers, the general public and schools, and cooperative services to state agencies.

Outcome Indicators:

- Number of agencies sharing and using the Geographic Information System databases for agricultural and renewable natural resources policy making and programming.
- Number of spatially-based models available for natural resources management.
- Increased public awareness of land use impacts on environmental quality.
- Number of producers using improved agricultural land use practices for purposes of environmental protection and pest management.
- Number of economically improved rural and urban communities through more rational and efficient uses of the state's natural resource base.
- Number of research reports to the scientific community, technical reports and workshops and interpreted information for potential producers, the general public and schools, and cooperative services to state agencies.

Key Program Components:

- Accumulate Iowa natural resources and biological diversity databases.
- Determine relationships between environmental quality and land uses.
- Develop ecological indicators of environmental quality by empirical measures and modeling.
- Evaluate impacts of government agricultural policy on renewable natural resources.
- Identify key features of anthropogenic landscapes that influence local cultural decision making.
- Determine needs for native faunal re-establishment in restored Iowa ecosystems and project long-term responses of populations to land uses.
- Design watershed land uses and practices that provide sustainable agricultural productivity and ecological integrity.
- Evaluate social strategies for achieving agro-ecological improvements.
- Evaluate Iowa's potential for contributing to a functional regional ecosystem.
- Provide publications, WWW sites, and programs to increase public knowledge on land use and environmental relationships.
- Conduct technical workshops for land use and environmental policy makers, planners, and managers.
- Assist federal and state agencies and communities to prepare watershed environmental management plans.
- Assist farm operators to prepare farm environmental management plans.
- Provide coordination and integration services for state and federal renewable natural resources managers.

Internal and External Linkages:

- USGS BRD Iowa Cooperative Fish and Wildlife Research Unit
- USDA Natural Resources Conservation Service Wildlife Habitat Management Institute and Natural Resources Inventory and Analysis Institute
- Center for Agricultural and Rural Development
- Leopold Center for Sustainable Agriculture
- North Central Regional Center for Rural Development
- North Central Agricultural Experiment Stations multistate research committees NCR-196 and NCT-179

- Iowa Department of Natural Resources and Department of Agriculture and Land Stewardship
- Iowa County Conservation Board System
- Iowa Soil and Water Conservation Districts
- Iowa Association of Naturalists

Target Audiences:
Iowa general public; school children; community betterment groups; landowners and farm operators; government environmental and agricultural policy makers, planners, and managers; ISU Extension field staff; ecological, and environmental and agricultural scientists.

Program Duration:
Five years

Allocated Resources:

Year	SYs	State and Hatch funds
FY99	6.0	$ 541,755
FY00	6.1	552,590
FY01	6.2	563,642
FY02	6.4	574,915
FY03	6.5	586,413
FY04	6.6	598,141

GOAL 4: Impacts
An agricultural system which protects natural resources and the environment through the development and dissemination of information on new or improved methods, practices, and products that will result in

- enhanced soil and water quality,
- increased utilization of integrated pest management, sustainable, and organic agricultural practices,
- adoption of better manure management practices,
- increased wetland restoration and improved riparian management on public and private lands,
- greater societal recreational and economic benefits from surface water uses, and
- Iowa's agriculture being highly productive, economically profitable, environmentally friendly, and socially responsible.

New contributions to the understanding of the impact of agriculture on the environment and the applications of scientific advances promote protection of the environment and natural resources of Iowa, the United States, and the world.

GOAL 5: Enhanced economic opportunity and quality of life for Americans.

Program 27. Rural Development

Statement of Issue:
Rural areas constantly change. In some locales and on some topics, change in agriculture and rural places is occurring at a rapid pace; in others, the rate of change is slower, although the results over long periods are as dramatic as the sudden shifts seen elsewhere. Such changes-no matter what the rate-create issues for local residents, the occupations and communities in which they are involved, and their urban counterparts. If rural challenges are to be met, a strong research base must be constructed that informs potential development policies and projects that could be provided through education and extension.

Critical issues related to rural development involve the changing structure of agriculture and of rural communities, as well as a focus on relationships between rural and urban sectors. Among research and education topics raised by stakeholders that relate to development are assessing the image of agriculture and rural life among all residents, evaluating environmental issues, informing rural residents through education and extension, considering the increase in diversity among rural residents, educating future scientists while also sharing research ideas and results with the general public, and examining potential implications of policies related to rural areas. A common theme among comments from stakeholders indicates that partnering with local residents should be enhanced, suggesting a strong role for extension in fostering development created by and for residents at the level of the local community. Of course, different stakeholders provided conflicting suggestions on what is needed on many topics, which again suggests the need for sound scientific research and education before development projects are attempted.

Performance Goals:
- Examine the extent to which Iowa's rural residents, organizations, and communities solve development issues.

  Output Indicators:
  - Information of use to decision-makers at local, regional, and state levels; those initiating development projects; and those setting policies.
  - Research reports to the scientific community; technical reports, workshops, and interpreted information for the general public and schools; and cooperative services to state agencies.

  Outcome Indicators:
  - Number of communities supporting development projects.
  - Measures of capital-human (skills, talents, health of residents), social (community involvement, diversity of leaders, cooperation among organizations), environmental (natural resources, quality of air and water, land-use decisions), constructed physical (housing, business facilities, transportation system, public infrastructure), and financial (monetary resources that can be used for development).

- Statistical measures of employment opportunities, educational attainment, per capita income, housing availability, continuing education, participation in local events, and elements of the environment, such as water quality.
- Proportion of residents in poverty, in family stress, school drop-outs, and infant mortality.
- Number of research reports to the scientific community, technical reports and workshops and interpreted information for the general public and schools, and cooperative services to state agencies.

Key Program Components:
- Identify factors critical to rural development, including workforce and housing characteristics and availability.
- Evaluate potential economic, political, and social impacts of changes in policies related to rural development.
- Determine indicators of change and assist residents of rural areas is using these measures to enhance local development strategies.
- Examine how technological changes affect individuals, families, and communities in rural areas.
- Explain previous rural trends, monitor those currently at work, and forecast others that may occur.
- Assess sustainable development of rural communities.
- Provide information on trends affecting rural areas through publications, Internet locations, and programs.

Internal and External Linkages:
- All units within the experiment station and the extension system
- All of the sciences when the topic is rural development
- Center for Agricultural and Rural Development
- Center for Family Policy
- Institute for Social and Behavioral Research
- Leopold Center
- North Central Regional Center for Rural Development
- Utilization Center for Agricultural Products
- Census Services
- Community Development-Data Interpretation and Analysis Laboratory
- Iowa PROfiles.

Target Audiences:
County, area and state policy makers, (e.g., county boards of supervisors, city councils, school boards, regional and state planning and economic development organizations), private companies, the scientific community, individuals and families.

Program Duration:
Continuing process

Allocated Resources:

Year	SYs	State and Hatch funds
FY99	4.1	$ 1,171,317
FY00	4.2	1,194,744
FY01	4.3	1,218,639
FY02	4.4	1,243,011
FY03	4.4	1,267,872
FY04	4.5	1,293,229

Program 28. Fiber-Related Products (Textiles and Apparel) and Businesses for Protection, Social, and Economic Enhancement

Statement of Issue:
Rural communities need to have more options for economic development that can improve their quality of life. Fundamental, mission-linked, and multidisciplinary research is required that is socially and culturally sensitive to consumer and economic needs as well as protection of individuals in the underserved rural areas of the Midwest.

Performance Goals:

- To increase products, services, and information that are focused on issues and problems related to the economic development, protection, and social enhancement of rural areas, small towns, rural people, rural organizations, and rural institutions.

  Output Indicators:
  - Increased awareness and adoption of methods to prevent sun and pesticide exposure.
  - Technologies that expand the rural family income and textile and apparel businesses.
  - Recording of successful business strategies.
  - Identification of new markets (domestic and international).
  - Distribution of commercial products, services, and information.
  - Research reports to the scientific community, technical reports and workshops for active producers, interpreted information for potential producers, the general public and schools, and cooperative services to state agencies.

  Outcome Indicators:
  - Increased access to, appreciation, and use of technology.
  - Percentage of consumers satisfied with rural businesses and their products.
  - Percent/numbers of people appropriately using personal and protective gear for health and safety.
  - Number of business successes in the textile and apparel-related industry.
  - More knowledgeable business and public sectors.
  - Numbers of communities, families, and individuals with the capacity to improve their own quality of life.
  - Numbers of Iowa human and capital resources being utilized.

- Number of research reports to the scientific community, technical reports and workshops and interpreted information for the general public and schools, and cooperative services to state agencies.

Key Program Component:
- Enhance growth and profitability of textile/apparel manufacturers and retailer via identification of marketing opportunities in the local, regional, national and global marketplace, stimulating technology innovation and implementation stimulation for fiber-related products and services.
- Enhance trade through consumer and business environment studies.
- Design for human factors.
- Use of protective clothing for occupational safety and health.

Internal and External Linkages:
- Partnerships with universities via multistate research projects, extension, state agencies, and the private sector
- Industry

Target Audiences:
Fiber/apparel producers and retailers, small and medium-sized enterprises, and all rural citizens.

Program Duration:
Five years

Allocated Resources:

Year	SYs	State and Hatch funds
FY99	0.4	$ 46,695
FY00	0.4	47,629
FY01	0.4	48,581
FY02	0.4	49,553
FY03	0.4	50,544
FY04	0.4	51,555

Program 29.Value Added Agriculture

Statement of Issue:
In a time of low prices for agricultural commodities, one way to improve the economic situation for producers is to add value to the commodities they currently produce. Value can be added to these commodities by finding new applications for these products that will create increased demand and raise prices. These applications could include traditional uses such as foods and feeds, or nontraditional applications in nonfood products such as adhesives, plastics, composite products, fuels, lubricants, etc. Another potential benefit of adding value to these commodities is that new processes may be required that could lead to new processing facilities in the areas where the commodities are grown or raised, resulting in employment opportunities for persons living in these communities.

Because farming and the production of these commodities are of major importance in the Iowa economy, finding ways to add value to these commodities should be an ongoing effort by Iowa State University. Successful research results will lead to improved profitability for producers and potential industrial growth that could lead to rural development. Furthermore, there is a growing concern that many farm practices and commodity processing facilities generate underutilized by-products and waste streams that compromise the quality of the environment. These concerns can also be addressed through this research project by finding ways to use these underutilized materials in value-added applications as well.

This project will be a multidisciplinary effort to find value-added uses for the agricultural products produced in the State of Iowa. By using a multidisciplinary approach, this investigation will evaluate the impact of adding value to these products from key areas including supply, farming practices, functionality, and economic feasibility. Furthermore these multidisciplinary teams will be able to investigate all potential applications including food, nonfood, and feeds.

Performance Goals:

- Assess the potential benefit of identifying value-added uses for basic agricultural commodities.
- Evaluate current farming and processing methods to identify low-value by-products and waste streams that can be used in other products, thereby increasing their value and reducing potential environmental problems.
- Develop research projects to evaluate the technical and economic feasibility of using these materials in identified applications.
- Strive to transfer the technology from any successful research efforts to the marketplace for the purpose of providing employment, rural development, and improving the profitability of farmers in the State of Iowa.

Output Indicators:

- Greater understanding of how to quantify the benefit of adding value to agricultural commodities and by-products.
- Technology that utilizes agricultural products as value added components in food, nonfood, and/or feeds.
- Key commodity boards, community development groups, state agencies, and industries that show interest using the technology to start new companies or expand existing operations.
- Research reports to the scientific community, technical reports and workshops for active producers, interpreted information for potential producers, the general public and schools, and cooperative services to state agencies.
- Improved cooperation between the university, state and federal agencies, industries and communities to transfer technology that will lead to industrial growth and rural development.

Outcome Indicators:

- Value of agricultural commodities.
- Value of under-valued by-products from producers and processors that will lead to improved land management and a reduction in waste streams.
- Number of research reports to the scientific community, technical reports and workshops and interpreted information for potential producers, the general public and schools, and cooperative services to state agencies.

Key Program Components:

- Study the economic impact of adding value to agricultural commodities on producers, processors and communities.
- Study the economic and environmental impact of finding value-added uses for low valued by-products and waste streams.
- Initiate new research projects to determine the feasibility of using these products in food, feed and nonfood applications.
- Transfer the technology from the laboratory research projects to private industry.

Internal and External Linkages:

- Center for Crops Utilization Research (CCUR)
- Utilization Center for Agricultural Products (UCAP)
- Meat Export Research Center (MERC)
- Center for Agriculture and Rural Development (CARD)
- Midwest Agribusiness Trade and Information Center (MATRIC)
- National and state commodity boards
- Private industry
- Government agencies that focus on land management and natural resources
- Professional organizations that focus on utilization of agricultural products
- Departments of food science and human nutrition, animal science, agronomy, animal ecology, agricultural and biosystems engineering, economics, forestry, and sociology

Target Audiences:

Specifically, for farmers, producers, processors, commodity groups, community development groups, state agencies, and industries; and generally, for all citizens of the State of Iowa in terms of reducing potential environmental problems and generating new industry for increased employment opportunities.

Program Duration:

Five years

Allocated Resources:

Year	SYs	State and Hatch funds
FY99	11.7	$ 827,604
FY00	11.9	844,156
FY01	12.2	861,039
FY02	12.4	878,260
FY03	12.7	895,825
FY04	12.9	913,741

Program 30.Quality of Life

Statement of Issue:
Sustaining and enhancing rural life quality requires investments in safe technology, community and social services support to families, and better management of natural resources to preserve and improve environmental amenities. These investments must be based on scientifically valid research that responds to a variety of challenges: population aging and employment needs, devolution of social service policy making to the community level, tensions between maximizing incomes and preserving resources, and health hazards from intensive livestock and crops production. This program outlines three main research areas: Human Development and Family Well-Being; Hazards to Health and Safety; and Environmental Amenities.

Human Development and Family Well-Being. The specific objectives respond to critical needs for research about innovative child care and educational programs for children and youth development; behaviors for successful couples and family relationships; business/workforce and family system interface to balance life roles and reduce stressors; the influence of aging on family and community support service demands; financial management for educational programs on retirement and debt service needs; impacts of continued agricultural economic adjustment on family life and symptomatic mental health and substance abuse behaviors; analyses of health care management systems and delivery for special needs and chronic geriatric conditions; the role of housing and community planning for economic vitality and essential shelter expenditures; rural labor market constraints and opportunities for youth skills and migration decisions; and the impact of welfare reform on social service delivery and workforce development.

Controlling Health and Safety Hazards. For better prevention, the extent of farm accidents, pesticide residues on clothing and equipment, and groundwater pollution will be monitored to discover sources and causes of existing hazards. Amelioration requires evidence from experimental research and economic assessment of demonstration practice, particularly for contaminants affecting water quality and manure management techniques.

Increased Environmental Amenities. Rural life provides natural resource amenities that have attracted return migrants from some urban areas recently. This trend can be enhanced with better amenities, but that objective is especially challenging for Iowa because it has the most transformed landscape in the entire nation. Research in this area will help to maintain and reclaim flora, fauna, and landforms and also monitor the essentials of environmental quality via studies of sensitive “marker” species.

Performance Goals:

- Understand how family behaviors affect quality of life in the context of existing social service and community environments to recommend policies and strategies for improvement.
- Identify the most serious hazards and monitor their incidence for potential regulatory solutions and more effective dissemination of information about best practices for prevention by rural producers and consumers.
- Improving Iowa woodlands and community forestry programs and critical habitat for fish and wildlife.
- Asses community and farmland practices for tree growth and planting patterns that preserve cropland and community aesthetics via experimental plantings and demonstration crops to produce data for cost-benefit analysis.
- Research methods for monitoring species and evaluation of data from demonstration projects for recommending resource management practices that sustain fish and wildlife for recreational and related aesthetic purposes.

Output Indicators:

- Updated databases for rural Iowa morbidity and mortality, repeated measure studies of pesticide and other toxic materials in various media, and multivariate analyses to identify proximate correlates to suggest causal factors that may be subject to better control.
- A new state-level survey to supplement national longitudinal data collected in the Census Survey of Program Dynamics.
- Research reports to the scientific community; technical reports, workshops, and interpreted information for the general public and schools; and cooperative services to state agencies.

Outcome Indicators:

- Improvements in child wellbeing as measured by U.S. Department of Health and Human Services preferred criteria; standard demographic indicators of individual and family well-being such as employment rates of youth by skill level, activity indicators of daily living for older people, rates of substance abuse, and USDA food insecurity measures.
- Number of health, welfare and community development policies formulated by state agencies.
- Numbers of hazards and their symptoms such as injuries and illness, as well as new regulations and widespread adoption of better management practices based on test-retest evaluation results.
- Area of expanded woodlands, reduced soil loss to erosion, biodiverse tree stands in communities, amount of biomass for biofuels, and better wildlife habitat.
- Area of expanded range for individual species, increased diversity, restored wetlands and floodplains, and increased populations of rare species.
- Number of research reports to the scientific community, technical reports and workshops and interpreted information for the general public and schools, and cooperative services to state agencies.

Key Program Components:

- Collaborate closely with state and federal human service agencies.

- Apply agricultural and biosystems engineering methods to produce data critical for economic analysis.
- Interact regularly with regulatory agencies for cooperation and policy guidance.
- Study complex ecological niches such as transition edge areas and montane wetlands.
- Toxicity tests for aquatic invertebrates, surveys of carnivores and their avian prey, the influence of agricultural practices and associate fragmentation of floodplains, and mapping and habitat restoration projects for wetland preservation.

Internal and External Linkages:
- Institute for Social and Behavioral Research
- Center for Family Policy
- Center for Agricultural Research and Development
- ISU Extension to Families
- Center for Crops Utilization Research
- U.S. Bureau of the Census
- Iowa Department of Natural Resources
- Local and federal regulatory agencies
- Private and public landowners

Target Audiences:
Policy makers, general public.

Program Duration:
Five years

Allocated Resources:

Year	SYs	State and Hatch funds
FY99	10.9	$ 696,983
FY00	11.1	710,923
FY01	11.3	725,141
FY02	11.6	739,644
FY03	11.8	754,437
FY04	12.0	769,525

Program 31.Fundamental Social Sciences

Statement of Issues:
The social sciences play an important role in empowering the agricultural system with knowledge that will improve competitiveness in domestic production, processing, and marketing by assessing economic, social, and educational issues related to agriculture and rural life. Among critical topics are the profitability of farm operations and businesses in small towns and the sustainability of families, organizations, and communities in rural areas. Also included are factors related to the environment.

Research issues in the fundamental social sciences focus on the development of individuals, families, organizations, communities, and rural/urban collaboration. Among other topics, studies should examine the structure of agriculture in Iowa and in a global perspective; resources, preferences, behaviors, and needs of individuals as consumers and as members of families and communities; quality of life and rural development issues; food safety and security; environmental implications of changes in rural areas; land use for agriculture, housing, and recreation; socioeconomic costs and benefits of current and new technologies in agriculture and other industries; social and educational factors affecting poverty as well as welfare and other social services; housing needs for varied occupants; labor-force availability and preparation; education through the life course; youth development, family resiliency, and aging; population diversity and redistribution in rural and urban sectors; efficiency of organizations and agencies; social and economic dimensions of urban forestry and horticulture applications; and enhanced methods to measure change and evaluate programs and policies in rural and urban areas. The social sciences contribute in a special manner in part because changes in these areas affect some groups more than others; and some are impacted positively from some change while others may see negative results from that same change. The social sciences assist in mediating among completing claims on issues affecting various groups.

Performance Goals:

- Assist decision-makers (individual, family, organization, community, or a larger entity) in assessing specific socioeconomic issues or the socioeconomic implications of more general rural concerns.

  Output Indicators:

  - Research reports to the scientific community; applied publications and programs for rural residents; and technical reports and workshops aiding state and other agencies integrating data from the social sciences with that from other disciplines.

  Outcome Indicators:

  - Statistical measures of consumer demand, availability of adequate housing, the adoption of appropriate technology, and participation in educational efforts.
  - Level of improvements in land-use planning and other factors related to the environmental.
  - Level of involvement of those initiating development projects and those setting policies in the research process.
  - Numbers of decision-makers (at local, regional, and state levels; those initiating development projects; and those setting policies) receiving enhanced education.
  - Amount of funding from federal or other sources to support research.
  - Number of research reports to the scientific community, technical reports and workshops and interpreted information for the general public and schools, and cooperative services to state agencies.

Key Program Components:

- Understand links between social, economic, and other dimensions of rural areas, especially those related to the structure of agriculture and rural communities.
- Study roles individuals, families, organizations, and communities play in developing rural areas.
- Identify factors that enhance or limit potential for change.
- Suggest policy modifications that enhance opportunities in rural places.
- Collect and distribute data to aid decision-makers exploring rural issues.
- Explore ties between various segments of the rural and urban population.

Internal and External Linkages:

- Various social sciences and other sciences in agriculture at ISU
- Iowa Departments of Agriculture and Land Stewardship, Economic Development, Education, Human Services, Natural Resources, and Public Safety
- USDA units
- National Institute of Health
- U.S. Department of Commerce

Target Audiences:

State, federal, and international decision-making bodies, public and private policy centers and institutes, congressional and legislative committees, the scientific community, individuals and families.

Program Duration:

Ten years

Allocated Resources:

Year	SYs	State and Hatch funds
FY99	2.1	$ 225,808
FY00	2.1	230,324
FY01	2.2	234,931
FY02	2.2	239,629
FY03	2.3	244,422
FY04	2.3	249,311

GOAL 5: Impacts

Enhanced economic opportunity and quality of life through the development and dissemination of information on new or improved methods, practices, and products that will result in

- increases in employment opportunities, educational attainment, per capita income, housing availability, continuing education, participation in local events, and elements of the environment such as water quality,
- communities supporting development projects; increased capacity of communities, families, and individuals to improve their own quality of life,

- improved cooperation between the university, state and federal agencies, industries and communities to transfer technology that will lead to industrial growth and rural development, and
- enhanced education of decision-makers at local, regional, and state levels; those initiating development projects; and those setting policies.

New contributions to the understanding of social and economic factors and the applications of scientific advances promote economic opportunity and quality of life for the populations of Iowa, the United States, and the world.

1862 Research: Summary of Allocated Resources*:

Funding Source	FY 99 (Base)	FY 00	FY 01	FY 02	FY 03	FY 04	Total FY 00–04
Goal 1							
Hatch $	2,107,553	2,149,704	2,192,698	2,236,552	2,281,283	2,326,909	**11,187,146**
State $	7,894,176	8,052,060	8,213,101	8,377,363	8,544,910	8,715,808	**41,903,243**
Total $	**10,001,729**	**10,201,764**	**10,405,799**	**10,613,915**	**10,826,193**	**11,042,717**	**53,090,388**
SYs	62.6	63.9	65.1	66.4	67.8	69.1	**332.3**
Goal 2							
Hatch $	15,175	15,478	15,788	16,103	16,425	16,754	**80,549**
State $	397,978	405,938	414,056	422,337	430,784	439,400	**2,112,515**
Total $	**413,153**	**421,416**	**429,844**	**438,441**	**447,210**	**456,154**	**2,193,064**
SYs	4.3	4.4	4.5	4.6	4.7	4.7	**22.8**
Goal 3							
Hatch $	234,901	239,599	244,391	249,279	254,264	259,349	**1,246,881**
State $	533,316	543,983	554,862	565,959	577,279	588,824	**2,830,907**
Total $	**768,217**	**783,581**	**799,253**	**815,238**	**831,543**	**848,174**	**4,077,788**
SYs	4.7	4.8	4.9	5.0	5.1	5.2	**24.9**
Goal 4							
Hatch $	1,008,921	1,029,100	1,049,682	1,070,675	1,092,089	1,113,931	**5,355,476**
State $	3,191,420	3,255,248	3,320,353	3,386,760	3,454,495	3,523,585	**16,940,443**
Total $	**4,200,341**	**4,284,348**	**4,370,035**	**4,457,436**	**4,546,584**	**4,637,516**	**22,295,919**
SYs	37.2	37.9	38.7	39.5	40.3	41.1	**197.5**
Goal5							
Hatch $	752,711	767,765	783,120	798,783	814,758	831,054	**3,995,480**
State $	2,215,696	2,260,010	2,305,210	2,351,314	2,398,341	2,446,307	**11,761,182**
Total $	**2,968,407**	**3,027,775**	**3,088,330**	**3,150,097**	**3,213,099**	**3,277,361**	**15,756,663**
SYs	29.2	29.8	30.4	31.0	31.6	32.2	**155.0**
Annual							
Hatch $	**4,119,260**	**4,201,645**	**4,285,678**	**4,371,392**	**4,458,820**	**4,547,996**	**21,865,532**
State $	**14,232,586**	**14,517,238**	**14,807,583**	**15,103,734**	**15,405,809**	**15,713,925**	**75,548,290**
Total $	**18,351,847**	**18,718,883**	**19,093,261**	**19,475,126**	**19,864,629**	**20,261,921**	**97,413,821**
SYs	**138.0**	**140.8**	**143.6**	**146.4**	**149.4**	**152.4**	**732.5**

* Note that due to the strict criteria of auditing procedures that require traceable documentation, only formula Hatch funds plus approximately 50 percent of state allocations to these research programs are being reported.

1862 Extension

GOAL 1: An agricultural system that is highly competitive in the global economy.

Program 101. Strategic Advantage: Management Development for Iowa's Farm Businesses

Statement of Issue:
Production agriculture in the United States is undergoing a profound transformation. Driven by technological and organizational innovation, the entire agriculture and food sector is becoming more consolidated and coordinated. In order to be competitive in the 21st Century, Iowa's farm managers must acquire a new set of skills. Specifically, farmers must make the difficult transition from being, for the most part, front-line managers—managing a production process or operation to being a general manager with a focus on business strategy, resource acquisition and business relationships. This need is apparent in the results of ISUE's most recent program assessment. Farmers and the agribusiness mangers with whom they work identify concerns about competitiveness, profitability, economic viability, the benefits and costs of participating in specific business relationships or the development of new managerial skills. Fundamental questions of this type can only be addressed within a strategic management framework. Strategy development is an essential function of management. Consequently, strategic management is relevant to all farm operations.

Performance Goals:
This program is designed for and directed toward farmers in Iowa. However, educational programs will also be offered for individuals and organizations working directly with farmers. This would include ISUE field staff, lenders, other agribusinesses and farm consultants and advisors. Over the long run, Strategic Advantage will increase:

- The strategic management skills of Iowa farmers
- The capacity of Iowa farm families to respond positively to structural and technological change.
- The competitiveness of Iowa's commercial farm businesses

Output Indicators:
The output of Strategic Advantage will be assessed by the quantity and quality of the following factors:

- Management development workshops offered and the number of participants
- Educational materials such as case studies, worksheets or electronic media.
- Training sessions for staff and other providers
- Integration of strategic management concepts and materials into other educational programs
- Increased demand by farmers for programming in other supporting management areas such as risk, finance, human resources, entrepreneurship
- Increased consultation by field staff and private sector partners with farmers and agribusinesses on strategic management

- Increased coverage of strategic management and management development by the farm press and on the internet
- Number of articles, radio or TV spots and internet hits on Strategic Advantage or farm management development.

Outcome Indicators:

Outcome indicators will be assessed on an ongoing basis. Key indicators include:

- Number of participating farm families who make strategic changes in their farm businesses.
- Reported increase in family income and well being as a result of participating in a Strategic Advantage activity.
- Increased understanding and awareness among farmers and agribusiness managers of strategic management.

Key Program Components:

Because Strategic Advantage is an ongoing project, the work planned for the coming five years focuses on increasing program effectiveness and integrating strategy concepts and materials more completely across all of ISUE's programs. Specific program components include:

- Materials Development
  - improve the strategy development materials with an increased emphasis on strategic response to specific developments or conditions in agricultural and food markets.
  - expand materials to include strategy development for farmer-owned agricultural businesses.
  - increase flexibility of materials to support a range of learning methods and opportunities beyond multi-session workshops.
- Staff Training and Development
  - continue to build the expertise across campus and field staff in management development and strategy
  - provide support to field staff in delivering management development programs
  - increase the ability of the field staff to incorporate strategic management concepts in their own programming activities
- Program Delivery—information and skill building programs for farmers and related groups will be offered by the campus and field staff in a variety of ways:
  - mass media
  - workshops and other face-to-face programs
  - consultation and planning with individual farm families including follow-up with past participants
  - distance and asynchronous learning methods
- Management and Recruiting Methods
  - design and conduct an ongoing evaluation of program effectiveness and the benefits from participation
  - design and test alternative methods of management development appropriate for farms and farmer-owned businesses
  - design and test alternative methods for marketing and recruiting for management development programs for farmers

Internal and External Linkages:

Management development cuts across many of ISUE's projects. Strategic Advantage will work directly with the Iowa Beef Industry Center, Iowa Pork Industry Center, Grain Quality Initiative, Finance and Risk Project, Money 2000, Beginning Farmer Center, the Dairy Team and the Value Added Project. Research support will be provided through cooperative relationships with faculty in the Department of Economics, and the Colleges of Agriculture, Business and Family and Consumer Sciences.

Strategic Advantage has already developed a wide range of industry linkages including all major farm and commodity organizations in Iowa, the lending community and the farm press. In the next five years, we will work with these groups to improve recruitment and financial support for the program.

Linkages with other universities offering management development programs for farmers and farmer-owned businesses will be strengthened. The primary contact will be with the agribusiness programs at Purdue, particularly their 'Positioning your Farm Business' project. Additional working relationships will be explored with Michigan State University, Ohio State and Cornell University.

Target Audiences:
The primary audience for Strategic Advantage is commercial family farm businesses in Iowa. Strategic management is a fundamental skill that can be significantly strengthened in most managers. Secondary audiences for Strategic Advantage include ISUE field staff, farm consultants and advisors and agricultural lenders. The materials and methods used in Strategic Advantage, however, are accessible to all interested parties.

Project Duration:
Five years

Plan For Resource Development:
Funding to support material development, related applied research, marketing and recruiting and program delivery will be sought from the major agribusiness and farm organizations that have already made long term commitments to the project.

Local organizations such as community banks, cooperatives or county-level farm organizations will be asked to sponsor workshops and support participants with scholarships, day care and other services.

Allocated Resources:

Year	SYs	State and Federal funds
FY99	3	$ 218,505
FY00	3	222,278
FY01	3	226,126
FY02	3	230,051
FY03	3	234,055
FY04	3	238,139

Program 103. Crop Nutrient Management

Statement of Issue:
Having nutrients readily available for plant uptake is essential for crop production. Management of all nutrient sources, including fertilizer and manure, within the constraints of farm production systems and operational goals are prerequisite for both profitable crop production and environmental sustainability. Inappropriate management can lead to reduced economic return and potential environmental degradation. The environmental consequences are especially pertinent to nitrogen and phosphorus. In a statewide survey of producers conducted in Iowa (1998 Iowa Farm and Rural Life Poll), as an example, only 47 percent of crop producers reported they adjusted commercial fertilizer rates after applying manure to a field, and 59 percent used judgment alone when determining manure application rates. Applying those statistics across all of Iowa's counties, and recognizing that fertilizer use is a major input cost for crop production, touches on the importance of recognizing and appropriately using multiple sources of nutrients in crop production systems. Doing so will help Iowa producers optimize systems for comprehensive farm planning and maintain long-term economic viability and environmental stewardship.

Performance Goals:
- Adoption of best practices for fertilizer and manure management by crop producers, livestock producers, agency personnel, nutrient management planners, and nutrient suppliers (fertilizer and agricultural chemical dealers, livestock industry, and commercial applicators)
- Develop an Iowa society of production agriculturalists that emphasize and incorporate nutrient planning into crop and livestock production systems
- Minimize negative impacts on water, air, and soil quality by optimizing adoption of the most efficient use of available crop nutrients and by development and use of best storage and application technology for fertilizer, limestone, and manure
- Provide manure certification training to all livestock producers and commercial manure applicators
- Understand and evaluate the economic and environmental potential of site specific technology in nutrient utilization
- Employ animal feeding strategies to reduce manure nutrient content

Output Indicators:

- Five thousand confinement site manure applicators and 500 commercial manure applicators must meet certification requirements by Iowa law during this program planning cycle
- Development and expansion of nutrient management information and educational web sites including: fertilizer use and management, Iowa Manure Management Action Group (IMMAG), policy and legislative issues, and nutrient management programs (fertilizer and manure workshops, manure certification, manure nutrient planning)
- New machine technology development that allows uniform field application of all agronomic rates of limestone and manure
- Produce, update or revise handbooks, newsletters, and bulletins as appropriate
- Hold workshops, field days, farm/field visits, and ICN sessions as appropriate
- Track web site hits and publication distribution
- 100 percent of manure applicators who are required by law to be certified will be trained to meet state certification standards

Outcome Indicators:

- 75 percent of manure nutrient plans will be implemented
- 60% of Iowa producers will implement a systematic soil sampling program, compatible with ISUE recommendations
- 50 percent of manure producers will have their manure tested for nutrient content at least once
- 60 percent of producers who use manure as a crop nutrient will take appropriate credit for the manure nutrients

Key Program Components:

Educational Meetings and Activities

- Certification meetings, on-going ISU Extension agribusiness education programs, manure nutrient management workshops, manure planner workshops, developing successful agribusiness activities to commercially provide comprehensive nutrient planning

On-farm Activities

- One-on-one on-farm visits
- On-farm nutrient demonstrations—evaluation/demonstration of new nitrogen and phosphorus management techniques, manure and limestone applicator calibration/application techniques, manure nutrient content and managing manure nutrient variability, manure nutrient availability studies, fertilizer rate studies, watershed projects, statewide nutrient management research/demonstration projects

Written Communications

- Newsletters, web sites, publications

Internal and External Linkages:

Partners:

- Iowa State University College of Agriculture and appropriate departments and researchers
- Iowa State University Research and Demonstration Farms
- Natural Resources Conservation Service
- Iowa Department of Natural Resources

- Iowa Pork Industry Center
- Iowa Beef Center
- Leopold Center
- Iowa Poultry Association
- Farm Bureau
- Agribusiness Association of Iowa
- Iowa Department of Agriculture and Land Stewardship
- Iowa Environmental Council
- Iowa Pork Producers Association
- Iowa Cattlemen's Association
- Independent Crop Consultants
- Certified Crop Advisors
- other certification programs, community colleges, and farm equipment manufacturers

Efforts:

- Host meetings of extension nutrient management specialists from the North Central Region to enhance discussion and collaboration on emerging nutrient management planning issues and concerns
- Promote sharing of certification training materials across states and institutions and co-develop educational materials
- Use multi-state EPA curriculum
- Promote development and use of low-rate manure and uniform distribution limestone application equipment

Target Audiences:
Crop and livestock producers, crop consultants, FFA Advisors, agribusiness employees, nutrient management planners, regulators, legislators, agency personnel, non-farm public. All meetings and events are open and accessible to all. The U.S. Department of Agriculture (USDA) prohibits discrimination in all its programs and activities on the basis of race, color, national origin, gender, religion, age, disability, political beliefs, sexual orientation, and marital or family status. (Not all prohibited bases apply to all programs.) Many materials can be made available in alternative formats for ADA clients. To file a complaint of discrimination, write USDA, Office of Civil Rights, Room 326-W, Whitten Building, 14th and Independence Avenue, SW, Washington, DC 20250-9410 or call 202-720-5964.

Project Duration:
5 years

Plan for Resource Development:
Assess users appropriate fees for educational materials and programs to recover costs when needed. Contract educational meetings and materials for agency programs and certification. Additional funding resources for educational programs, materials, and on-farm activities may be available from Iowa Department of Natural Resources grants, EPA 319 funds, USDA/EPA unified CAFO strategy, Leopold Center, Iowa Pork Industry Center, REAP, Agricultural Experiment Station, Agribusiness Association of Iowa, Farm Bureau grants to counties program, Iowa Legislature, commodity groups, United States Department of Agriculture/NRCS EQIP funding

Committee Members:
Jack Frus, Mitch Hoyer, Paul Kassel, Kris Kohl, Dan Meyer, John Sawyer, Jim Johnson, Randy Killorn, Jeff Lorimor, Antonio Mallarino, Angie Rieck-Hinz, Laura Sternweis

Allocated Resources:

Year	SYs	State and Federal funds
FY99	11	$ 633,583
FY00	11	643,016
FY01	11	652,637
FY02	11	662,451
FY03	11	672,461
FY04	11	682,671

Program 104. Agricultural Financial Management

Statement of Issue:
A profitable, sustainable, and globally competitive agricultural sector is essential for the well-being of Iowa communities, families, and social structure. Effective financial management is a key component in attaining this goal. Agricultural producers and agribusinesses face severe multi-year financial stresses, and closely-related structural issues of a longer-term nature. The problem's severity is reflected in county Extension clientele surveys showing declines of 50 to 60 percent in gross farm incomes in the last two years. An ISU study of the financial stability among Iowa's farmers showed that as many as one-third face serious financial risks over the next few years. During the last decade, approximately 50 percent of Iowa's net farm income came from government program payments, and the main component of these payments is scheduled to end in the year 2002. Financial pressures in the agricultural sector have adverse impacts on non-farm businesses, families, and the ability of communities to provide educational, medical, and other essential services. Driving forces behind these pressures include global economic and policy changes, technology, and changing life styles. Additionally, the increasing average age of farmers' signals significant need for major asset transfers. Net income differences between the high and low one-third of producers show that potential gains from improved financial management are possible.

Performance Goals:
To change the attitudes of farmers from reactive to proactive and encourage farm financial management based on the goals and resources presently and potentially available. Farmer goals include personal, family and business objectives. Specific programs need to be developed including those for exiting, full-time, part-time, and beginning farmers, multiple generation farms, those wishing to evaluate specialty enterprises and other categorizations deemed necessary.

Output Indicators:
These include traditional methods such as publications, meetings, home study courses, news releases, and feature articles. Also included are 400 planned one-on-one individual consultations annually utilizing the FINPACK program by the Farm Financial Planning Associates. Non-traditional approaches, including the web, DTN, ICN, satellite and other electronic formats will be utilized as appropriate. We will continue to search for and utilize other non-traditional approaches.

Specific output indicators are:

- Number of farmers assisted by the Farm Financial Planning Associates utilizing the Finpack program.
- Participation in financial management programs designed for specific audiences including beginning farmers, multi-generation farm families, part-time farmers, and exiting farmers.
- Participation in program efforts to increase knowledge in the areas of transfer planning and estate planning.
- Participation in educational programs and utilization of information provided in the area of employee management.

Outcome Indicators:
Improvements in financial management decisions will be measured in the areas of profitability, business decisions, resource use and sustainability. Better understanding and ability to take advantage of opportunities throughout the food chain is a desired outcome. This would include the non-food use of agricultural products. Other outcomes include improved quality of life and better environmental quality in Iowa. Pre and post project surveys will be used to measure improved skills. Increased awareness of management, understanding and information on improving the productivity and global competitiveness of the U.S. agricultural production system is an intended outcome from improved financial management.

Specific outcome indicators are:

- Number of farmers participating in record keeping programs
- Follow-up survey results indicating changes in record keeping practices by participants in record keeping programs.
- Survey results indicating increased use of recognized farm business analysis techniques to measure profitability, improved financial position, and increased sustainability.
- Improvement of farm business financial performance as evidenced by farm business analysis results.
- Number of farm families completing inter-generational farm transfers.
- Participation in crop insurance, crop and livestock marketing and other risk.
- Utilization of planning and budgeting information for decision-making regarding financing, production and marketing of non-traditional agricultural products.
- Utilization of Extension information relating to legal and economic aspects of contracts.

Key Program Components:
In the short-run, risk management and farm financial planning will be the primary focus. Within the next two years discussions of government farm program impacts, evaluation procedures and implementation of any new or modified programs will be developed. Examples of other Extension programs to be conducted include: legal/tax aspects of financial management, marketing, networking, asset acquisition and control, inter-generational transfers, legal and economic aspects of contracts, evaluation of alternative production systems, farm family goal setting and implementation, business planning, financial record keeping and analysis, effective cost control, employee management, estate planning, transfer planning, and the economics of value added enterprises.

Internal and External Linkages:
Internal linkages include improved communication and joint programming with staff members in other project areas. Linkages with researchers in the ISU Colleges of Agriculture, Veterinary Medicine and Business, the Pappajohn Entrepreneurial Center and other appropriate colleges will be explored.

External linkages include bankers associations, commodity groups, general farm organizations, agri-business associations, attorneys, Iowa Farm Business Association, mental health organizations and the media. External linkages will be formed with other public and private institutions including; other colleges and universities in Iowa, other land grant universities, community colleges, and USDA's FSA and NRCS.

Target Audiences:
Farmers, lenders, agribusiness, land owners, and other agricultural professionals.

Project Duration:
The short-term, one-to-two year emphasis will be on risk management and farm financial planning. Farm financial planning will utilize the FINPACK program, primarily through the Farm Financial Planning Associates. Emphasis will be on teaching skills utilizing interdisciplinary teams and developing external linkages. Intermediate-term emphasis will be on evaluation and implementation of the 2002 farm program, asset acquisition, transfer and control, contracts, marketing and a variety of related issues. Financial management will continue as a long-term component of many programs.

Plan For Resource Development:
Financial management will utilize a variety of methods for resource development. Examples of potential sources for added funding include user fees, registration fees, USDA, and other sources of contracts and competitive grants. Additional funding could come from the private sector linkage groups listed above.

Allocated Resources:

Year	SYs	State and Federal funds
FY99	24	$ 1,101,811
FY00	24	1,116,903
FY01	24	1,132,298
FY02	24	1,148,000
FY03	24	1,164,016
FY04	24	1,180,353

Program 106. Commercial Greens Industry

Statement of Issue:
The production, marketing, and selling of horticultural crops creates many jobs for Iowans. Commercial horticultural enterprises in Iowa consist of fruit, nut, and vegetable producers, lawn care companies, golf courses, school athletic fields, turfgrass sod producers, production wholesale nurseries, rewholesale nurseries, landscape design and installation firms, retail garden centers, landscape maintenance companies, arborists, greenhouse crop producers, retail florists, Christmas tree growers, public utilities, and city, county, and state public lands. Opportunities for growth are most promising in the non-food, horticulture industries of Iowa (turf, nursery/garden center and landscape, greenhouse crops, etc.) which constitute the fastest growing segment of Iowa's agricultural economy. Access to research-based information and programs that emphasize sustainable and environmentally sound production and management practices, value-based marketing, and new technologies, will increase profitability for the commercial greens industry in Iowa.

Performance Goals:
- Increase the quality and percentage of marketable product per acre, reduce production costs and increase profitability of businesses, and strive to eliminate environmental contamination through improved cultural techniques and use of adapted horticultural plants.
- Improve and enhance the quality of life for all Iowans.
- Using principles of Integrated Pest Management (IPM) and Plant Health Care (PHC), insure the safety of commercial workers and all users of managed landscapes.

Output Indicators:
State-wide conferences, regional on-site meetings, field days, and one-on-one consultations will be held with clients to address low-input production strategies, new research-based production technologies, marketing techniques, and important environmental issues. Appropriate resource materials will be compiled and new materials created to augment conferences, meetings, and field days.

Outcome Indicators:
The impact of extension programs on commercial greens industry clients will be measured using two survey techniques; (1) end-of-meeting questionnaires, and (2) questionnaires mailed to participants of targeted programs 6 to 12 months after the program. Survey instruments will attempt to identify changes in client behavior, such as increased awareness

or knowledge of a problem or practice, adoption of new technologies, and ultimately, economic benefit derived resulting from client participation.

The following indicators will be measured:

- Number of producers who have reduced production costs
- Number of producers who have adopted one or more IPM practices
- Number of producers implementing proactive management strategies that result in minimal environmental impact

Key Program Components:

Three commercial greens industry categories are identified to facilitate efficient and comprehensive program delivery. They are: (1) grounds management firms, (2) fruit, vegetable, and alternative crop producers and sellers, and (3) landscape plant producers and sellers. Existing programs deemed pertinent will be continued and new program offerings will be created as needed within each of the categories. Emphasis will be placed on employee training across all categories. In addition, applied research findings will be communicated to clients to strengthen and enhance the economic vitality of commercial horticultural enterprises in Iowa.

Internal and External Linkages:

Internal:

- Iowa State University extension specialists in the departments of animal ecology, economics, entomology, food science, forestry, landscape architecture, plant pathology, and sociology.

External:

- Extension specialists in allied departments at the University of Illinois, Kansas State University, University of Minnesota, University of Missouri, University of Nebraska, and University of Northern Iowa
- Community colleges
- Iowa State Horticultural Society and its allied trade associations
- Iowa Department of Agriculture & Land Stewardship
- Iowa Department of Transportation
- Iowa Urban & Community Forestry Council
- County Conservation Boards
- Iowa Department of Natural Resources
- Natural Resource Conservation Service
- Department of Corrections
- Trees Forever
- Quad City Botanical Center

Target Audiences:

Producers and retailers of horticultural products, consultants, governmental agencies, professional associations, community and government leaders, community colleges and other educational institutions, testing laboratories, and environmental organizations.

Project Duration:
The Commercial Greens Industry Plan of Work will serve as a guidepost for extension staff with commercial horticulture responsibilities until September 30, 2004, with implied provisions for rapid response to crises and other emergencies affecting this segment of agriculture in Iowa.

Plan For Resource Development:
Potential sources for funds to support extension programming and research include; Leopold Center, Urban Forestry Center for the Midwestern States, Iowa Nursery & Landscape Association Research Corporation, Iowa Turfgrass Institute, Information Development for Extension Audiences, Iowa Fruit & Vegetable Growers Association, and fees assessed to program participants.

Allocated Resources:

Year	SYs	State and Federal funds
FY99	12.3	$ 600,578
FY00	12.3	610,011
FY01	12.3	619,632
FY02	12.3	629,446
FY03	12.3	639,456
FY04	12.3	649,666

Program 107. Iowa Beef Center

Mission statement: "*To enhance the vitality, profitability, and growth of the Iowa beef industry.*"

Statement of Issue:
Iowa's 39,000 beef producers must make significant strides to quantify and improve the quality and safety of their product while reducing production costs in order to increase the profitability of their beef enterprise. Estimated returns over the past decade to typical Iowa cow-calf producers averaged $1.02 per cow over total cost. Feedlots were estimated to have averaged $12/head over total costs. The profitably of these commodity beef enterprises will face increasing challenges in the years ahead due to narrowing operating margins, increasing input and output price risk, evolving value-based marketing standards, and rising food safety concerns. These same challenges also offer opportunities for Iowa cattle producers that have the information and skills to access emerging higher value markets and allocate available resources more efficiently. Well-managed profitable beef production systems add value to forages, grains, and operator inputs, reduce soil erosion, and stimulate economic activity via locally purchased inputs and services. Insufficient profit from beef enterprises will result in more acreage moving into grain production and increased exporting of raw grain products from Iowa communities.

Performance Goals:
- Increase the adoption of beef quality and safety practices.
- Reduce production costs of Iowa cattle producers.
- Increase the level and improve Iowa's competitive position in beef production.

Output Indicators:

- Decision analysis tools to evaluate alternative markets for fed cattle and resource allocation questions for cow-calf operations will be developed.
- Educational programs and demonstrations on value based marketing, year-round grazing, alternative calving systems, and risk management will be conducted.
- The Iowa Beef Center web site, newsletters, radio interviews, and print media will be used to reach clientele.

Outcome Indicators:

- Iowa produced beef will increasingly exceed national benchmarks for quality measures.
- The number of producers using individual identification of animals to facilitate data collection, treatment records, and management decisions will increase.
- Certify over 1,000 Iowa cattle producers in Beef Quality Assurance standards and work to develop Iowa standards for safe, high quality beef.
- Cow-calf herds will increasingly use SPA records for management decisions and document a trend of reduced production cost for these herds.
- Producers will understand and participate in source verified programs.
- Producers will understand and regularly utilize marketing tools such as grid marketing, futures, options, and retained ownership.

Key Program Components:

Demonstrations with cattle producers will be used to involve producers in the learning process.

- Carcass data collection, closeout record data and marketing analysis for producers.
- Evaluate Iowa owned sires for beef tenderness and carcass characteristics to establish references sires for preferred quality measures.
- Large herd demonstrations of alternative calving and year-round grazing involving 2 herds over a 2-3 year period.
- Evaluate alternative certification systems (ISO 9000, Process Verified) for beef supply chains.
- Facilitate joint programs with out-of-state cow-herd owners feeding cattle in Iowa feedlots.

Provide computer decision analysis tools to improve producer decision analysis.

- Hire a person to spearhead development of user-friendly computer spreadsheet programs.
- Train staff and allied industry professionals in use of decision tools and interpreting the output.

Increase visibility of and respect for the Iowa Beef Center as source of timely and relevant beef information.

- Hire media specialist to work with campus and field staff to increase the amount and frequency of materials coming from the Iowa Beef Center that effectively reaches clients.
- Develop and maintain an innovative, high-quality web site for Iowa beef producers.
- Multi-county educational programs on emerging technologies and practices.

Internal and External Linkages:

- College of Agriculture
- Animal Science
- Agronomy
- Economics
- Agricultural and Biosystems Engineering
- Iowa Cattlemen's Association
- Iowa Quality Beef
- Iowa Beef Industry Council
- Cow Herd Improvement Program
- Iowa Farm Bureau

- College of Veterinary Medicine
- Veterinary Diagnostic and Iowa Veterinary Medical Association
- Production Animal Medicine
- Extension Field Staff
- Livestock, Farm management and Land Stewardship
- Crops, Agricultural Engineers
- County Extension Education Directors
- Iowa Dept of Natural Resources
- Iowa Dept of Agriculture
- Iowa Dept of Economic Development
- Chariton Valley Beef
- Precision Beef Alliance
- Leopold Center
- Meat Export Research Center
- Community college
- Experiment station

Target Audiences:
The primary audience is Iowa cattle producers, allied industries, and professionals that serve them. The focus will be on commercial sized beef cattle enterprises with cow-calf, backgrounding, and feedlot operations. Programs will also include or be developed for part-time farmers with cattle operations and youth projects.

Project Duration:
Intermediate

Plan for Resource Development:
Extension 21 Value-Added and Precision Agriculture funds are currently the core resources for the Iowa Beef Center. These resources will be leveraged by cooperative work with other agencies and other funding sources such as: CREES, Iowa Cattlemens Association, National Cattlemens Beef Association, Iowa Department of Natural Resources, Iowa Department of Economic Development, Leopold Center, Iowa Farm Bureau, Natural Resource Conservation Service.

Allocated Resources:

Year	SYs	State and Federal funds
FY99	20	$ 1,700,912
FY00	20	1,725,438
FY01	20	1,750,454
FY02	20	1,775,970
FY03	20	1,801,997
FY04	20	1,828,544

Program 108. Iowa Pork Industry Center

Statement of Issues:
An estimated 89,000 Iowa jobs have been created directly or indirectly by pork production which contributes $3.1 billion to the state's gross product plus $2.9 billion in personal income. In 1997 the USA became a net pork exporter for the first time. Continued exports are vital to the sustainability of the swine industry. Iowa has raised approximately 25% of USA pork annually, but that status is threatened by a trend to fewer, larger operations and more integrated

production. Concerns about impacts of these changes on the environment, producer competitiveness, and economic and social structures have broadened industry awareness. Consumer safety and quality concerns necessitate more information transfer from producers and retail to ensure that desired products are available. Currently no group coordinates intra- and extra-mural University efforts with producers, allied industry, community colleges and state and federal agencies to develop and implement programs that meet the state's educational and society needs related to pork production. The Iowa Pork Industry Center proposes to fulfill that role.

Performance Goals:

The Iowa Pork Industry Center will develop resources to:

- enhance the pork industry's contribution to the economic, environmental, and human capital of Iowa by assisting pork producers and processors to identify, refine and maintain sustainable roles in the changing global marketplace;
- demonstrate technologies (production systems, financial and risk management, environment, health management, information transfer) for sustainable production applicable to Iowa needs; and
- increase producer awareness of and ability to measure and evaluate production and marketing systems that increase quality attributes (chemical and microbial safety, muscle quality, environment and animal welfare practices, social impacts) for consumers in domestic and international markets.

These goals will be broadly implemented with over 90% of Iowa producers exposed to educational or developmental programs originating within these three areas. Program areas include responses to industry structural changes, personnel resources limitations, emerging pork quality issues, producer profitability, and consumer education. Specific projects to capture value-added markets will reach 30% of producers and 5% of producers will make demonstrable changes in their production or marketing activities in response.

Output Indicators:

A team of specialists will be created to assist in new markets development. This team will assist producers, processors and others to identify potential markets and strategies to meet markets. Decision-making aids will be developed in risk assessment/management, financial, business structures and coordinated production and marketing, production technologies, and pork safety and quality evaluations. Small group and general meetings, personal contacts, individual and group consultations, publications, web sites, pork hot-line maintenance, demonstration and pilot projects, regular articles for industry publications, field-based research, and intra- and extra-mural committees/organizational activities will be of program outputs.

Outcome Indicators:

Program outputs will provide educational opportunities for 85% of Iowa pork producers. Specialty production practices will enable 5% of contacted producers to increase value-added efforts within 3 years. Iowa will increase exports by 10% in 5 years. On-farm procedures for transmission of verified pork safety and quality information within the farm-retail chain will be refined for over 75% of production within 5 years. Muscle quality attributes of pork will be increased by 35% in 3 years and 65% in 5 years. Coordinated production projects will be presented to 30% of Iowa producers and 10% will implement strategies within 5 years.

Demonstration projects will be initiated in intra- and extra-mural systems in 2 years with substantial reports available within 4 years.

Key Program Components:
Major areas are: industry structural changes, personnel resources limitations, emerging pork quality issues, producer profitability, and consumer education. Structural activities will focus on understanding of contracts, networking, market access and legal issues. Personnel resources activities will focus on labor force skills enhancement, identification of out-sourceable tasks, increasing stock handling skills, and personnel management techniques. Pork quality activities will enhance value-added and specialty marketing, pork safety and quality attributes, quality verification systems (HACCP, ISO), new product developments, and understanding of regulatory activities. Producer profitability will encompass risk management strategies, production and financial record analyses, technology adoption, and personal and business strategic planning activities. Consumer education will focus on economic, ethical and environmental production issues, understanding of emerging technologies, new pork safety and quality attributes and its value as a food resource.

Internal and External Linkages:
Intramural linkages will exist between the Colleges of Agriculture, Veterinary Medicine, Business, Family and Consumer Sciences and Engineering. External linkages will include individual/groups of producers, Iowa and national pork organizations, state and federal research, development and regulatory agencies, state and regional farm organizations, allied supply industries and processors, consumers, professional societies, and domestic and international marketing groups. Programmatic linkages with other land-grant and 1896 schools are to be maintained.

Target Audiences:
Producers, allied industries (feed, equipment and genetic suppliers, veterinarians, marketers), domestic consumers, pork processors and retailers, international consumers and state and federal government agencies. Access will be through personal and programmatic activities of the IPIC and field extension specialists.

Project Duration:
Long term

Plan for Resource Development:
Cooperative programs with state and national pork organizations for market development activities, federal and state agency grants to complete technology transfer vehicles, and foundations and private agencies for educational program development are possible through alignment of mutual activities.

Allocated Resources:

Year	SYs	State and Federal funds
FY99	16	$ 1,210,214
FY00	16	1,227,193
FY01	16	1,244,512
FY02	16	1,262,178
FY03	16	1,280,196
FY04	16	1,298,575

Program 109. Strengthening Iowa's Dairy Industry

Statement of Issue:
The Iowa dairy industry provides economic development for rural communities and value-added benefits for Iowa grain and forage producers. Currently, demand for raw milk by Iowa processors exceeds Iowa production, and many existing dairy operations are expanding and new operations are being started. These larger operations require larger amounts of capital and hired labor, and are more sensitive to price and cost fluctuations. The primary concerns of Iowa dairy producers are about issues affecting profitability, while consumers want safe, nutritious foods. Both are concerned about air and water quality. Consequently, the most important dairy-related issues affecting Iowa are (1) human resource management; (2) risk management; (3) business planning and arrangements; (4) improving production practices; (5) environmental quality; (6) food safety and quality; and (7) structure of agricultural and public policy. Two of these issues, environmental quality and public policy issues related to the changing structure of agriculture and the effect on rural communities are addressed in other projects.

Performance Goals:
Develop a survey to collect Iowa benchmark data such as the number of dairy farms with employees and employees per farm, average milk produced per cow, average somatic cell count of milk sold, and number of producers who have difficulty meeting minimum milk quality standards. Measurements of change will include Iowa milk production per cow verses national trends, average SCC for state, employers adopting human resource management tools, dairy managers who utilize various risk management tools for purchasing inputs as well as for marketing products, quality of life verses the 1992 ICN survey, post test results from milk marketing sessions.

Output indicators:
A variety of program delivery methods will be used to address these primary issues and will include: (1) workshops 1/2 to one day in NE and NW; (2) newsletter series to all producers followed by conference; (3) one-on-one, workshops, Strategic Advantage, and Farm-On; (4) workshops, one-on-one, agri-business co-sponsored workshops, applied research, field trials, and demonstrations; (5) (this issue will be addressed by the Nutrient Management project); (6) seminars, workshops, one-on-one visits, news releases, conference with veterinarians, and cooperation with other projects; and (7) (will be coordinated with communities and farm economy projects). In addition, various distance education techniques, such as the internet and ICN, will be utilized to reach a wider audience.

Outcome Indicators:
Outcome indicators include:

- number of farms adopting human resource tools
- Iowa production per cow will be higher than the national level
- state average SCC will continue to decline
- number of farms requesting one-on-one assistance and who make production
- changes that increase profitability or production or milk quality

Key Program Components:
Primary objectives of programs developed to address the above issues are for clientele to (1) learn how to recruit, train, and retain quality employees, and to use their own time effectively; (2) learn about tools available to manage risk associated with inputs and outputs, and when it would be advantageous for them to use the various tools; (3) develop financially stable dairy businesses through financial analysis, development of appropriate ownership arrangements, estate planning, and asset transfer; (4) adopt production practices and new as well as existing technologies that will improve profitability through better nutrition, genetics, cow comfort, reproductive performance, and animal health; (5) promote production and processing practices that maintain or improve air and water quality; (6) provide consumers with high quality, nutritious, and safe milk and meat products; and (7) create an awareness of what impact the changing structure of agriculture will have on rural communities.

Internal and External linkages:
Internal partners will be those involved with related projects such as nutrient management, financial management, communities, nutrition choices for health, strategic advantage, and crops. External partners are community colleges, especially Northeast Iowa Community College (Calmar), Dordt College (Sioux Center), Iowa Institute of Cooperatives, Iowa Farm Bureau, Iowa Veterinary Medical Association, and various commodity organizations. In addition, Iowa State University Extension dairy specialists have a long-standing cooperative effort with counterparts at sister universities in Illinois, Minnesota, and Wisconsin. This four-state group has produced jointly authored publications, and conducted 3–5 jointly sponsored workshops and seminars each year. While development of cooperative effort will continue with these three states, similar possibilities exist with states adjacent to northwest Iowa as well.

Target Audiences:
Programs will be designed for and marketed to independent farm owners and operators, agribusiness professionals, youth, college students both at Iowa State as well as else where, and consumers in Iowa.

Project Duration:
Long term (more than five years)

Plan for Resource Development:
Additional resources and multi-state cooperation will include partnering with commodity organizations, agri-business professionals, and farm associations. Become more entrepreneurial by seeking additional resources through National Institute of Health, Iowa Department of Economic Development, USDA SARE, and Excellence in Extension grants.

Allocated Resources:

Year	SYs	State and Federal funds
FY99	17	$ 1,000,395
FY00	17	1,015,487
FY01	17	1,030,881
FY02	17	1,046,583
FY03	17	1,062,599
FY04	17	1,078,936

Program 121. Value-Added Agriculture

Statement of Issue:
To provide leadership in producer-initiated, value-added agriculture activities. Iowa production agriculture is undergoing dramatic change due to revisions in government policies, shifting consumer demand, international economic unrest, structural reorganization and other factors. To respond to these changes, Iowa producers are seeking new products, markets, processes, quality systems or other opportunities to differentiate their products from traditional commodities.

Performance Goals:
- Increase farm income by increasing the margins that Iowa producers receive for their products.
- Increase the ability of Iowa producers to supply high value crops and livestock matched to end-users needs.
- Development and implementation of verifiably safe food products matched to the needs/demands of the marketplace.
- Network of producers to own or supply goods and services to end users.
- Development and capacity building in value added ag for staff and personnel who work with farmers and rural communities.

Output Indicators:
- 2 statewide conferences on value added agriculture.
- Readily accessible curriculum and information (e.g. web, video, directories, printed materials), on opportunities and markets for value added agriculture.
- Training of at least 10 staff and service providers in-depth on value added agriculture.
- 6–10 regional conferences on value added agriculture
- 5–6 hands-on workshops to teach skills necessary for development of value added ag

Outcome Indicators:

- 4,000 producers attending value added agricultural programs per year.
- 200 producer groups adopting practices of value added agriculture through retaining control of their product further in the processing chain, starting their own value added business or forming alliances, networks, associations, etc. from FY 2000–2004.
- 25 producer alliances that will ensure 100 percent trace-back verifiable food products or ingredients within FY 2000–2004.
- Development of at least 50 value added agricultural community groups in Iowa, that have been trained in capacity building within FY 2000–2004.

Key Program Components:

Development of Entrepreneurial and Business Skills: Development of entrepreneurial and business skills through conferences, workshops and other educational programming, as well as printed, web-based and video materials for individuals and organizations will be an integral part of the programming. Topics such as strategic planning, business start-ups, organizational development and support, feasibility, capitalization, market research and development, and potential technology transfer and application will be taught.

Staff Capacity Building: Through the value added ag program, key agency personnel such as commodity and farm organization staff, Extension, USDA Rural Development and RC and D staff and others will be provided training in capacity building to assist the farmers and community entrepreneurs. A statewide program of developing this network will be established.

Development of Supply Networks and Food System Quality Programs: Working with the Iowa Beef, Pork and Grain Industry Centers, the Value Added programming group will work with producers, alliances and organizations to develop ISO or similar quality assurance on-farm food safety systems and supply networks.

Internal and External Linkages:

The team will work with all agricultural commodity boards and general farm organizations, Iowa Crop Improvement Association, Iowa Departments of Agriculture, Economic Development and Natural Resources, USDA Rural Development, and Iowa Institute for Cooperatives. Within the university the Value Added Ag Team will work ISU Centers for Advanced Technology and Development, Crop Utilization, Manufacturing Technology, Industrial Research and Service, Utilization Center for Agricultural Products, Meat Laboratory, Swine, Beef, Grain Quality and Designing Foods.

Target Audiences:

Farmers and agribusiness professionals and others who have an interest in developing value added ag businesses are the primary target audience. Other individuals and organizations involved in community and economic development will be targeted to provide them the capacity building skills to work with community-based value added agricultural groups.

Project Duration:

The value added agricultural program will be intermediate to long term depending upon the need and resources available for the programming.

Plan for Resource Development:

Private foundations that have an interest in a sustainable agricultural systems and community rural development will be key partners. Groups which will be potential resources for funding include foundations such as Kellogg, Pew, Kauffman, Stanley, and Norwest. Additionally, quasi-public funding from commodity check-off groups such as the Iowa Corn Promotion Board, Soybean, Cattlemen and Pork will be a key partners in development of value added quality agricultural systems.

State-based public funding includes partnerships with the Iowa Department of Economic Development, Agricultural and Land Stewardship and Natural Resources. Additionally, the Value Added Agricultural program will be working with Iowa State University to secure funding from the Iowa Legislature.

Federal USDA, FDA and other governmental agencies will be an integral part of funding the value added ag programming, particularly in the areas of safe food systems.

Allocated Resources:

Year	SYs	State and Federal funds
FY99	8	$ 994,365
FY00	8	1,009,457
FY01	8	1,024,851
FY02	8	1,040,553
FY03	8	1,056,569
FY04	8	1,072,906

Program 142. Integrated Pest and Crop Management (IPM/ICM)

Statement of Issue:
Insects, weeds, plant-parasitic nematodes, and diseases are a continuing threat to Iowa's crop production. Every crop acre in Iowa is subject to yield reduction resulting from these pests. Additionally, costs are incurred that include practices for cultural and chemical control of these pests. Adoption of Integrated Pest Management results in more efficient use of resources, increased profitability, and enhanced environmental stewardship. The IPM program in Iowa currently focuses on field corn, soybean and alfalfa.

Performance Goals:
- The number of acres adopting IPM practices will be increased to at least 75% of crop acreage.
- Reduce pesticide use on Iowa crop acreage through adoption of alternative pest management tactics, including: use of pest-resistant crop cultivars, cultural practices, crop rotation, biological control and crop residue and soil management practices.
- Educate 30,000 producers about current and emerging crop pest and management problems.
- Improve knowledge economic, social and environmental benefits of IPM practices among non-farm citizens through contact with 30,000 people.
- Develop management strategies that improve the efficiency of crop production while protecting the natural resource base.

Output Indicators:

Meetings

- ICM conference—state and regional; Agricultural Chemical Dealer Updates
- Pesticide Applicator Training Programs (private and commercial)
- Field Extension Education Laboratory (diagnostic clinics)
- Field Crop Scout Schools; County and area crop clinics/field days
- Outlying research and demonstration farm programs

Publications

- ICM Newsletter
- IPM Extension publications and poster presentations
- Area and county newsletters

Mass media

- Topical news releases
- "IPM" roundtable and other radio and television spots
- Public service announcements; Farm publication articles
- Extension web pages; Slide sets and videotapes
- Live teaching and one-on-one contacts:
- Field calls and telephone contacts
- Diagnostic laboratories

Outcome Indicators:

The number of producers that have modified their management plans to incorporate IPM/ICM-based principles will be measured. Another indicator is accurate approximation of the number of acres where IPM/ICM techniques were used, both regionally and statewide.

Changes in the efficiency of IPM/ICM techniques, particularly involving pesticide use will be measured. Pesticide use reduction may be measured as a net drop in the amount of pesticide applied, but may also be achieved through changes in product selection, application timing, and application frequency.

Key Program Components:

- Seasonal monitoring and forecasting of crop pests (i.e., black cutworm monitoring, weed emergence monitoring and forecasts, degree-day accumulations).
- IPM education through private and commercial pesticide applicator continuing instruction courses
- The ISU Agribusiness Education Program, a comprehensive, interdisciplinary program of clinics and schools to improve the transfer of information to the farmer through agribusiness professionals.
- Targeted pest management education programs, including the soybean cyst nematode management education coalition.
- Plant disease clinic, weed ID and herbicide diagnostic services, insect ID clinic, and remote diagnostic clinics.
- Development and distribution of regional IPM publications.

Internal and External Linkages:

Researchers in the ISU Agriculture and Home Economics Experiment Station, commodity groups, private industry, neighboring land grant and other universities especially in the north central region, Practical Farmers of Iowa, IICCA, Certified Crop Advisers board, the Agribusiness Association of Iowa, Natural Resources Conservation Service, Iowa Department of Natural Resources, Iowa Department of Agriculture and Land Stewardship. Internal linkages include improved communication and joint programming with staff members in other project areas.

Target Audiences:
Farmers, agribusiness personnel, other professionals who work in agriculture, and the general public.

Project Duration:
IPM is an on-going, long-term program.

Plan For Resource Development:
Expand and improve partnering with the external linkage groups listed above. In addition, grant monies will be pursued to fund specifically targeted efforts.

Allocated Resources:

Year	SYs	State and Federal funds
FY99	33	$ 3,881,424
FY00	33	3,938,022
FY01	33	3,995,753
FY02	33	4,054,638
FY03	33	4,114,700
FY04	33	4,175,963

Program 146. Consumer Horticulture Program

Statement of Issue:
According to a recent survey, gardening is the most popular outdoor leisure activity in America. Each year gardeners spend billions of dollars on plant materials, lawn and garden equipment, and garden supplies. A healthy, attractive home landscape increases the value of a property and enhances the quality of life. There are many sources of information available in the area of consumer horticulture, but few of these sources provide accurate, research-based information. Access to research-based information and programs will help the consumer make wise decisions in plant selection, culture, and pest management.

Performance Goal:
To improve consumer knowledge of proper species and cultivar selection, culture, and environmentally sound pest management strategies.

Output Indicators:
Record of the number of Hortline calls, calls to county extension offices, pesticide identification submissions to the Plant Diagnostic Clinic and the Entomology Dept and the number of individuals accessing information on the World Wide Web consumer horticulture site. Maintain complete records of volunteer hours and program activities reported by master gardeners.

Outcome Indicators:
- Number of gardeners who adopt one or more IPM practices
- Number of gardeners who are making appropriate cultivar selections
- Number of gardeners who read the label and use appropriate personal protective equipment

Key Program Components:
- Develop and expand resource materials to assist clientele and extension staff.
- Hortline, newsletters, publications, newspaper articles, radio programs, workshops, and field days at demonstration home gardens will be utilized to reach the consumer horticulture audience.
- Improve master gardener training and support materials to better prepare master gardeners for answering the public's horticultural questions.

Target Audiences:
Home gardeners, master gardeners, and youth.

Project Duration:
Five years

Allocated Resources:

Year	SYs	State and Federal funds
FY99	11	$ 616,763
FY00	11	626,196
FY01	11	635,818
FY02	11	645,632
FY03	11	655,642
FY04	11	665,852

GOAL 1: Impacts
Iowa producers will reduce input costs, adopt new technologies and develop value added enterprises to meet the demands of global markets.

GOAL 2: A safe and secure food and fiber system.

Program 330. Nutrition: Choices for Healthy FY 2000–2004

Statement of Issue:
Many Iowans lack the understanding to practice responsible nutrition and health choices as evidenced by the following.

- In Iowa the prevalence of obesity has increased every year since 1989 for adults over the age of 18. (25.3% to 32.7%). Only 5 states have a higher % at risk for obesity. A national study indicates the proportion of overweight children and adolescents has steadily increased since 1980. A 1996 study showed an increase in adult inactivity with 26.9% of adult Iowans physically inactive.
- In 1998 77% of a Better Homes and Gardens survey sample used take-out food at least once per month, compared to 55% in 1992. Americans consume close to 50% of their meals away from home. Restaurant meals tend to be high in calories and saturated fats.
- Inadequate nutrition during childhood can affect brain development and reduce a child's ability to learn, thus also decreasing productivity potential as adults.
- USDA data shows that 11.9 million households lacked sufficient food sometime during 1995. Food shortages have the greatest negative impact on children and elderly adults.
- Over 80% of Iowans are failing to eat the recommended minimum of 5 fruits and vegetables a day thus missing an opportunity to reduce their risk for chronic disease. Some confusion also exists in understanding what "5-A-Day" means.
- Of the 10 leading of causes of death in Iowa, 5 are associated with food choices and physical activity (cardiovascular disease, cancers, and diabetes). Cost benefit analysis showed that every $1 spent on EFNEP (Expanded Food and Nutrition Education Program), offers a potential health care savings of $2 to $17 due to the prevention or postponement of nutrition related chronic diseases and conditions.
- Current national medical cost for osteoporosis is $10 billion/year, rising to an estimated $60 billion/year in 2000. Teen girls and adult women around menopause currently consume only 2/3 of recommended amounts of calcium.
- Over 1/3 of Americans believe vitamin supplements are necessary for good health and women are more likely than men to believe they need supplements.
- Iowans over age 65 are the fastest growing segment of the population; and Iowa leads the nation with the highest proportion of those aged 85+. Older individuals who consume inadequate amounts of calories, vitamins and minerals are more likely to develop acute illness and chronic disease. Proper nutrition can alleviate existing health problems.
- While the American food supply is among the safest in the world, foodborne illness is a major source of personal stress, death and economic burden. Annually an estimated 6.5 to 33 million people become ill from foodborne pathogens, resulting in an estimated 9,000 deaths and estimated cost of $10-33 billion. Most foodborne illness can be avoided through safe food-handling practices.

Annual Performance Goals:

1. 70% of 2,000 food safety program participants will plan to adopt one or more recommended food handling practices.

2. 50% of 2,000 food safety program participants will actually adopt one or more recommended food handling practices.
3. 70% of 15,000 nutrition and health program participants will plan to adopt one or more healthful dietary or lifestyle behaviors.
4. 50% of 15,000 nutrition and health program participants will actually adopt one or more healthful dietary or lifestyle behaviors.
5. 70% of 2,000 parents who participate in ISU Extension programs with a nutrition and health component will plan to adopt one or more practices that support development of healthy eating behaviors by their children.
6. 50% of 2,000 parents who participate in ISU Extension programs with a nutrition and health component will actually adopt one or more practices that support development of healthy eating behaviors by their children.
7. 70% of 2,000 nutrition and health program participants will plan to use guidelines for evaluating information about nutritional supplements and/or functional foods.
8. 50% of 2,000 nutrition and health program participants will actually use guidelines for evaluating information about nutritional supplements and/or functional foods.

Output Indicators:

- # food safety and quality programs offered
- # people receiving food safety education through individual consultations
- # people attending food safety programs
- # hits on food safety web page
- # people receiving nutrition and health information through individual consultations
- # people attending nutrition and health programs
- # community partnerships

Outcome Indicators

- # food safety program participants who plan to adopt one or more recommended food handling practices
- # food safety program participants who actually adopt one or more recommended food handling practices
- # nutrition and health program participants who plan to adopt one or more healthful dietary or physical activity behaviors
- # nutrition and health program participants who actually adopt one or more healthful dietary or physical activity behaviors
- # parents who participate in ISU Extension programs with a nutrition and health component who plan to adopt one or more practices that support development of healthy eating behaviors by their children
- # parents who participate in ISU Extension programs with a nutrition and health component who actually adopt one or more practices that support development of healthy eating behaviors by their children
- # nutrition and health program participants who plan to make an informed decision based on reliable information about nutritional supplements and/or functional foods
- # nutrition and health program participants who actually make an informed decision based on reliable information about nutritional supplements and/or functional foods
- # EFNEP youth eating a variety of foods

- # EFNEP youth selecting low-cost nutritious foods
- # EFNEP youth adopting one or more recommended food handling practice
- # EFNEP and FNP participants showing improved nutrition practices
- # EFNEP and FNP participants showing improved food resource management
- # EFNEP and FNP participants showing improved food safety practices

Key Program Components:

- Social marketing principles will guide development of nutrition and health programs that promote a safe and sufficient food supply and healthy food and lifestyle choices for Iowans. Equal access will be a goal in reaching audiences that are diverse in terms of income, language, age, gender and culture. Some issues will be addressed through public policy and community capacity-building.
- Prevention of overweight and obesity focuses on lifelong physical activity, healthy food choices and portion control. Target audiences include parents and caregivers of children in grades 4-6, youth in grades 4-6, perimenopausal women, teens and young adults. Examples: EDGE program, Weight Management bulletin series, Expanded Food and Nutrition Education Program (EFNEP) youth curriculum, and A Parent's Guide To Children's Weight. A weight management component will be added to the Understanding Menopause program.
- Healthy eating behaviors and a safe, secure food supply provide the foundation for learning, health and productivity. Target audience is parents and childcare providers responsible for children aged 0-5 years, with a focus on low-income families. Education will include breastfeeding promotion, the parent-child feeding relationship, appropriate dietary recommendations based on child's age, and food safety. Examples: Placement of breastfeeding brochures in physicians' offices, EFNEP, Family Nutrition Program (FNP), Kids Meal Time newsletter, Childcare That Works, Family Mealtime program, Fight BAC!, bookbags and other parent child interaction programs.
- Chronic disease prevention will focus on diabetes, osteoporosis, cancer, and cardiovascular disease. Audiences for prevention programs are adults over 40 and pesticide applicator trainees (diabetes); teens, young women and perimenopausal women (osteoporosis); nurses (cancer); men and women at the worksite (cardiovascular disease). Program examples are 5+5, Take Control To Reduce Your Risk of Cancer, and Nutrient Standards Menu Planning. Diabetes and osteoporosis education programs will be expanded or developed.
- Individuals will be empowered to reclaim control of their lives by developing positive lifelong habits related to safe and healthy eating at home and away from home, regular physical activity, stress management and time management. Audiences are working adults, low income families, and parents of school age children. Programs include: on-site presentations/activities, newsletters, displays, brochures, mass media, web-based food safety lessons, youth and adult EFNEP and FNP. The PACE+ system will be explored as a way to encourage training for health care professionals.
- The public lacks a way of evaluating safety and efficacy of nutritional supplements and functional foods. Target audiences are adults, health care professionals, perimenopausal women, and athletes. Materials will be developed to help people use accurate information sources, work with their health care providers and make informed choices. Possible vehicles include Time Out For Facts About Foods, Fluids, and Athletic Performance; and additional resources to be developed that may include a package program, a world wide web site, and displays for worksites and health fairs.

- Programs for 50- to 74 year-olds will focus on healthy eating, food safety and physical activity. Programs for those 75 and over will target caregivers of individuals trying to maintain independence in their home.
- Methods will include lessons for preformed groups, newspaper and newsletter articles, handouts to accompany home-delivered meals, programs for children of older adults, and training for Home Care Aides.
- Nutrition and food safety are components of sustainable agriculture efforts. Staff will increase awareness of partnering opportunities, especially as related to community gardens, farmers' markets, community-supported agriculture groups, incubator kitchens and others as appropriate.
- Schools and restaurants are legally mandated to implement sanitation training for foodservice managers and employees. Training opportunities offered by ISUE include food safety certification education programs, Hazard Analysis Critical Control Point training, and a world wide web page on food safety.

Internal and External Linkages:

Internal

- Other Extension plans of work: Money 2000, Child Care That Works, Strengthening Families, Greens Industry, Master Gardeners, Value Added Agriculture Program, Iowa Pork Industry Center, Iowa State University Extension (ISUE) Agriculture Dairy Program.
- Other Extension units: 4-H and Youth, Families, Communities, Agriculture, County Extension Education Directors
- Center for Designing Foods to Improve Nutrition (CDFIN).
- College of Agriculture, College of Family and Consumer Sciences, College of Education
- Several programs have been developed using research conducted in the College of Family and Consumer Sciences. The EDGE program builds upon research by Dr. Douglas Lewis and Dr. Elisabeth Schafer. The osteoporosis education programs build upon research conducted by Dr. Lee Alekel. The Time Out program builds upon research conducted by Jean Anderson, R.D.
- Parent and child healthy eating programs build upon the Social Marketing Research Project of Dr. Elisabeth Schafer and Diane Nelson.

External

University of Iowa School of Public Health; community libraries; health facilities; Iowa Departments of Public Health, Education, Human Services, Agriculture and Land Stewardship, Natural Resources, and Inspections and Appeals; parish and school nurses; teachers; athletic trainers; school food service; WIC (Women, Infants, Children Program); Head Start; Resource and Referral; commodity groups; small businesses; Area Education Agencies; Iowa Hospitality Association; media outlets; local Empowerment Boards; Iowa Nutrition Education Network; Food Safety Consortium.

Target Audiences:

Parents of children aged 0–5, youth, pregnant and perimenopausal women, teens and young adults, low income families with young children, health professionals, adults, commercial and private pesticide applicators, worksite employees, food service managers and workers, caregivers of children and adults, county sanitarians, athletes, coaches, food producers.

Efforts will be made to include minority audiences and new immigrants to the state.

Project Duration:
Principal components are of long-term duration. Some specific segments will be of intermediate duration.

Plan for Resource Development:
Potential sources for grant funding include Empowerment Boards and/or Zones; Centers for Disease Control; Iowa Departments of Public Health, Economic Development, Education, Elder Affairs, Human Services, Agriculture and Land Stewardship, and Natural Resources; Iowa Medical Society/county medical societies, Iowa Pharmacy Association, American Association of Retired Persons, Hospitals/Foundations, WELLMARK, Rodale Foundation, Practical Farmers of Iowa, Iowa Athletic Association, I-CASH, Farm Bureau, McDonald Foundation, University of Iowa School of Public Health, Des Moines Register I-Care program, National Osteoporosis Foundation, Iowa Nutrition Education Network, decategorization boards, local school boards.

Allocated Resources:

Year	SYs	State and Federal funds
FY99	20.37	$ 1,577,750
FY00	20.37	1,600,610
FY01	20.37	1,625,722
FY02	20.37	1,647,700
FY03	20.37	1,673,753
FY04	20.37	1,696,692

GOAL 2: Impacts
Iowans will reduce foodborne illness and its associated stress, death and economic burden by adopting recommended food handling practices.

GOAL 3: A healthy, well-nourished population.

Program 145. Farm Safety

Statement of Issue:
Iowa is losing a vital resource every year from farm injuries. The farmer is engaged in one of the top two most hazardous occupations that have the highest death rate in the nation, as reported by the National Safety Council. Agriculture has had this ranking for the last 25 years. Iowa loses approximately 50 farm worker and farm family members per year and reports over 2,500 agricultural related injuries per year.

Performance Goal:
To establish farm safety and health programs to reduce the incidence of disabilities suffered by persons engaged in agriculture that results from disease or injury.

Output Indicators:

- Number of farm safety programs offered
- Number of farm safety publications distributed
- Number of public service announcements

Outcome Indicators:

- Number of farm accidents

Key Program Components:

1. Increasing farm safety awareness with the intent of encouraging farmers to adopt safe farming practices. Articles on farm safety issues will be released through Iowa's newspapers and farm journals. Safe Farm radio interviews on farm safety by state specialists will be produced and distributed to Iowa radio stations weekly. Monthly Public Service Announcements about farm safety will be produced and distributed each month to Iowa radio stations. The Safe Farm fact sheets series and other extension publication will be published to provide educational information. Safety presentations by the safety specialist will be made to the organizations and associations that request farm safety information. Information on agricultural injuries and fatalities in Iowa will be collected and distributed.

2. Reducing the Numbers of Farm Injuries and Fatalities: Tractor safety training courses will be offered each year. Safety day camps in which extension staff have conducted or participated will be held throughout the state. In-school farm safety program will be conducted. Interactive farm safety display that illustrates safety principals will be developed and produced.

3. Enhancing the Iowa Cooperative Extension Service Efficiency to Provide Farm Safety Programming: Farm safety in-service extension training for field specialist/agricultural engineers will be held each year. Instructional materials will be distributed when developed and the World Wide Web site that contains farm safety information will be maintained.

Internal and External Linkages:

- Iowa Center for Agricultural Safety and Health
- Iowa Department of Agriculture and Land Stewardship
- Iowa Department of Public Health
- National Center for Agricultural Safety
- ISU Departments of Ag and Biosystems Engineering, Entomology, College of Family and Consumer Science (Textiles and Agriability project), College of Design

Targeted Audiences:

Farm families, farm workers, agricultural producers, and farm youth.

Project Duration:
Five years

Allocated Resources:

Year	SYs	State and Federal funds
FY99	2	$ 164,712
FY00	2	166,598
FY01	2	168,522
FY02	2	170,484
FY03	2	172,486
FY04	2	174,528

Program 330. Nutrition: Choices for Healthy FY 2000–2004 (see page 94)

GOAL 3: Impacts
Iowans will reduce obesity and preventable dietary related causes of death by adopting one or more healthful dietary and physical activity behavior.

GOAL 4: An agricultural system which protects natural resources and the environment.

Program 142. Integrated Pest and Crop Management (IPM/ICM) (see page 90)

Program 143. Pesticide Applicator Training

Statement of Issue:
Federal and State law requires that all people who purchase and apply restricted use pesticides and any applicator who applies pesticides for hire be certified according to established standards. Ninety-nine percent of Iowa row crop acres are treated with pesticides each year (as of 1995 data), which amounts to over 22 million acres statewide. Pesticide applicator training strives to reduce off-target movement of pesticides and reduce human exposure to pesticides.

Performance Goals:
Provide training and educational materials to more than 25,000 private applicators and 12,000 commercial applicators in Iowa. From this effort, applicators learn to safely and more efficiently apply pesticides.

Output Indicators:
- Live and videotape programs offered and the number of applicators attending commercial programs
- Live programs and number of applicators attending private programs

- Educational materials, for example manuals, videos, slide sets, web pages, bulletins, etc. that are written or revised
- Number of pesticide misuse complaints filed with the Iowa Department of Agriculture and Land Stewardship.
- Citizens (non-certified applicators) educated in pesticide safety.

Outcome Indicators:
- Number of participants (private and commercial) who plan to adopt recommended PAT and IPM practices; number who actually adopt those practices
- Number of participants from non-certified educational programs who plan to adopt recommended PAT and IPM practices; number who actually adopt those practices.

Key Program Components:
- Initial training materials (private and commercial)
- Recertification training programs (private and commercial)
- Integrated Pest Management Program
- Sustainable Agriculture Program
- Organic Agriculture Program
- Radio broadcasts, website information, and other mass media
- Home Horticulture and Pest Newsletter
- Reiman Gardens outreach
- Health care provider continuing education program (with IDALS, Iowa Department of Public Health, University of Iowa College of Medicine)
- Master gardener programs

Internal and External Linkages:
Internal:
- ISU Departments of Agricultural and Biosystems Engineering, Agricultural Education, Animal Ecology, Entomology, Forestry, Extended and Continuing Education, Extension Communications, Horticulture, Plant Pathology, Seed Science Center, Sociology, Textiles and Clothing, Extension County and Field Staff, the Iowa Pesticide Impact Assessment Program.

External:
- Iowa Department of Agriculture and Land Stewardship (Pesticide Bureau) [IDALS]
- Iowa Department of Natural Resources [IDNR]
- U.S. EPA
- Iowa Department of Public Health [IDPH]
- University of Iowa College of Medicine
- University Hygienic Laboratory [UHL]
- Natural Resource Conservation Service [NRCS]
- 15 Iowa Merged Area Community Colleges
- Iowa Department of Transportation [IDOT]
- Iowa state, county and municipal law enforcement agencies
- Agricultural Health Study Program
- Land Grant Universities in Minnesota, Nebraska, Oklahoma State, and South Dakota

Target Audiences:
35,000 private pesticide applicators; 12,000 commercial pesticide applicators; homeowners that use pesticides.

Project Duration:
On-going, long-term project

Plan for ResourceDevelopment:
Increased resource development potential exists through IDALS, IDPH, U.S. EPA, IDNR, USDA-CREES (FQPA).

Allocated Resources:

Year	SYs	State and Federal funds
FY99	2	$ 630,479
FY00	2	639,912
FY01	2	649,534
FY02	2	659,348
FY03	2	669,358
FY04	2	679,568

Program 146. Consumer Horticulture Program **(see page 92)**

Program 147. Sustainable Agriculture

Statement of Issue:
Iowans remain concerned about profitability, the environment, and the quality of life associated with agriculture. Sixty percent of farmers polled in 1994 believe there is too much reliance on agricultural chemicals in farming, and only 20% felt that their quality of life had improved during the last five years. Sixty-two percent felt that increased use of sustainable farming practices would help maintain the natural resource base. A need exists to provide sustainable agriculture education and training in Iowa.

Performance Goals:
Sustainable agriculture is a system of farming which over time encompasses and provides balance to the goals of economic stability, environmental soundness, and social impacts.

Social Goals (to target 10,000 Iowans in agriculture, key decision makers, policy makers, and the urban public)
1. Broaden the goals of agriculture by facilitating discourse and improving policy to support a more sustainable agriculture in Iowa
2. Broaden the sense of optimism and a future in agriculture in Iowa. Economic Goals (to target 40,000 Iowans: general public, producers, lenders, and community leaders)
3. Enhance economics by helping ensure appropriate profit in the short- and long-term for farm families

4. Provide opportunities on alternative agriculture, diversification, and organic agriculture
5. Enhance value-added efforts-greater retained value products (organic) and by-products
6. Promote alternative markets-analyze, facilitate, educate, support alternative marketing strategies
7. Keep conventional markets accessible, available, competitive, and fair Environmental Goals (to target 50 percent of the producers)
8. Reduce the reliance of Iowa farmers on pesticides and fertilizers
9. Enhancement of soil quality

Composite Goals (to target 250 persons annually (#10) and to target 4 commodity groups annually (#11)
10. Provide initial and update training to key agricultural professionals in SA principles and practices-producers, lenders, NRCS, FSA, landowners,
Extension, and private consultants
11. Mainstream the principles of sustainability into conventional Iowa agriculture

Output Indicators:

- educational meetings
- field days
- workshops
- publications
- mass media dissemination
- one-on-one contacts
- phone contacts
- research and demonstration grants
- direct teaching events.

Outcome Indicators:

- # of producers and acres in certified organic production
- # of hoop houses in alternative swine production
- # of Community Supported Agriculture projects (CSAs) active
- # of producers and acres involved in management intensive grazing (MIG)
- # of acres in integrated crop management (ICM) programs
- # of producers adopting practices to improve or protect soil quality
- # of diversified or alternative community marketing systems or strategies
- # of trained or updated key agricultural professionals in sustainable agriculture
- # of commodity groups or farm organizations mainstreaming sustainable principles
- # of producers trained and certified in manure management
- # of producers trained and adopting Pesticide Applicator Training (PAT) practices
- # of farmers serving as trainers in sustainable agriculture educational programs
- # of key ag professionals who plan to and recommend sustainable practices
- # of producers who plan to and adopt sustainable practices

Key Program Components:

- Analysis of the impact of legislation on sustainable agriculture

- Showcase and study of creative, successful, sustainable agriculture operations
- Integrated Crop Management
- Organic agriculture program
- Integrated Planning Approaches
- Strategic Advantage program,
- Holistic management
- PFI workshops and field days
- Sustainable agriculture in-service
- Manure Management Certification Training
- Value Added workshops
- Community Supported Agriculture workshops and field days
- Leopold Center for Sustainable Agriculture workshops and conferences
- Small farm workshops and programs
- Sustainable agriculture workgroup
- Extension 21 projects
- PAT
- Alternative livestock systems
- Swine programs and workshops
- Pastured Poultry workshops
- MIG programs and pasture walks

Internal and External Linkages:

Internal:

- Leopold Center
- Outlying Research and Demonstration farms
- ISU researchers
- Colleges of Veterinary Medicine and Family and Consumer Sciences

External:

- PFI
- FSA
- Commodity groups
- IDED
- S&WCD RC&D
- SARE
- Purdue University
- NC Extension Services
- World Bank
- IFBF
- NGO's
- NRCS
- IDALS
- INCA
- IDNR
- ATTRA
- Center for Rural Affairs
- Missouri Alternative Ag Center
- IA Forage and Grassland Council
- IA Agribusiness Assoc.
- US-EPA
- Ag chemical dealers

Target Audiences:
ISU and Extension staff, key ag professionals, producers, small farmers, local resource development staff, crop consultants, land owners, consumers, legislators, key decision makers, lenders, NGO's. Targeted awareness, access, and service are provided to women, minorities, small farmers and alternative producers interested in sustainable agriculture.

Project Duration:
This is a long-term project expected to extend more than 5 years.

Plans for Resource Development:
Resources and support are targeted from Federal (USDA-CSREES, NRCS and EPA), Regional (SARE), National Foundations (Organic Farming Research Foundation), State (Leopold Center, IDALS, IDED, IDNR), and Iowa commodity groups and farm organizations.

Allocated Resources:

Year	SYs	State and Federal funds
FY99	3	$ 270,479
FY00	3	274,252
FY01	3	278,100
FY02	3	282,025
FY03	3	286,029
FY04	3	290,113

GOAL 4: Impacts
Iowa producers will make more efficient use of resources, which will reduce the potential for negative environmental impacts.

GOAL 5: Enhanced economic opportunity and quality of life for Americans.

Program 200. Building Community Capital

Statement of Issue:
Capital is used to create or enhance value. It is invested to provide additional value through returns to the investor. Community capital takes five forms: human, social, environmental, constructed physical, and financial. Many Iowa communities face a deficit in one or more of these capitals. According to needs identified through Iowa's county Extension education directors and reports from stakeholders in Iowa communities, priority capital development categories include social and human capital (citizen involvement and leadership), financial capital (economic development especially with regard to employment), and attraction and retention of residents, especially young people. The overall quality of life in the local community includes all the capitals and places emphasis upon environmental and cultural amenities, the quality of local jobs, and physical infrastructure (schools, roads, utilities, and technology). By

building community capital communities become more place competitive and are more desirable locations for individuals and families to live and work.

Performance Goals:
Iowa communities will have the capacity to identify and develop their social, human, environmental, physical, and financial capital, utilize them to articulate a vision for their future, and take positive steps to implement community improvements. Specific goals relating to the development of each capital are:

- Social capital: A higher percentage of residents will become involved in a) community civic networks; b) enhanced citizen participation in community events, organizations and projects; and c) greater representation of citizens of diverse backgrounds involved in the community.

- Human capital: Community leadership skills will be enhanced through participation in leadership workshops and institutes; greater attention toward child care and increased quality and availability of care sites will occur; adult education opportunities for lifelong learning will be increased; and collaboration among local and regional providers and agencies on public health issues will be expanded.

- Environmental capital: Community environmental assets will be identified and maximized in planning decisions.

- Physical capital: Investment in constructed capital will be made, such as transportation and communications networks, and utilities.

- Financial capital: Retention and local investment of community wealth will be expanded with a goal of upgrading as well as expanding employment.

Output Indicators:

A. An inventory of local resources organized by community capitals will be completed in 100 communities throughout the state.

B. In each of those communities, Extension staff will assist the community to
   1) increase the percentage of citizens involved in community projects,
   2) increase the diversity (in gender, socio-economic class, age, length of residence, and ethnic, religious and racial background) of local organizational memberships, citizens involved in community projects and leadership roles,
   3) increase collaboration among local agencies as well as external agencies to promote regional development perspectives and efforts, and
   4) increase investment the local financial resources.

A. We will develop and conduct inservice training workshops for Extension staff and partnership agency staffs about community capitals, opportunity recognition, and the resource inventory approach to community development.

B. We will collaborate with external partners regarding building community capital.

Outcome Indicators:

In each of the 100 communities indicated above, there will be an integrated strategic vision and plan to develop all five capitals (local resources) and at least one tangible product, event, or change identified and implemented as a result.

Key Program Components:

- Resource inventory tools: The Community Profiles component of the Building Communities for Tomorrow program (BCT), Iowa Profiles, Census Services, land use inventories, asset mapping, economic in-put output models, retail analysis, landscape design, housing needs assessments, CD-DIAL, Take Charge, and specially designed leadership programming for the urban enterprise community in Des Moines.
- Human and social capital building programs: Developing Dynamic Leaders, a modified BCT community development program, study circles.
- Financial capital: Retail Trade Analysis, Business Retention and Expansion, Take Charge, Quality Jobs.
- Analysis of and building physical and environmental capital: Landscape design, rural action, visual approaches to community betterment.

Internal and External Linkages:

External:

- Governor's Strategic Plan (Iowa 2010)
- USDA—Rural Development
- Iowa State Association of Counties
- RC&D
- Small Business Development Centers
- Iowa Rural Development Council
- United Ways
- Iowa Departments of Economic Development, Transportation, Agriculture and Land Stewardship, Natural Resources, Education, and Health.

Internal:

- County Extension Education Directors, other units of ISU Extension and the "seamless" university.

Target Audiences:

Local elected officials, current and emerging community leaders in voluntary roles, concerned citizens, Extension and rural development staff; emphasis on reaching diverse groups.

Project Duration:

5 years.

Plan for Resource Development:

We will continue to collaborate with the state of Iowa departments to offer joint programming, develop funded programs on the subjects of this plan, both competitive grants and contract-for-service. Additionally, we will explore internal monetary resources as contractors to develop and conduct training in such areas as community health, transportation, conservation, neighborhood improvement, and economic programs. USDA-Rural Development, the Iowa Energy Council,

the Leopold Center for Sustainable Agriculture, the Wallace Foundation, Iowa State Association of Counties, and Iowa League of Cities, among others, share components of our mission and provide financial resources for specific programs, research and training. We will develop additional collaborative projects with them for staff training and work with communities. Grants initiated from ISU will invite partnerships in delivery from other organizations where appropriate and will be inclusive of both campus- and field-based staff.

Allocated Resources:

Year	SYs	State and Federal funds
FY99	39.6	$ 3,062,703
FY00	39.6	3,107,067
FY01	39.6	3,152,319
FY02	39.6	3,198,477
FY03	39.6	3,245,557
FY04	39.6	3,293,579

Program 300. Money 2000

Statement of Issue:
Families and individuals at all income levels face important decisions related to the use of resources (i.e. time, skills, and money). Some of these choices and decisions relate to major life events, others relate to day-to-day activities. Surveys show that a large percentage of the population lacks knowledge and basic skills in financial management to achieve short-term and long-term goals. The low household savings rate, the abuse of credit and the rise of bankruptcies are symptoms of the need for basic financial management education. New lending programs are available to help high-risk borrowers become homeowners, but with the requirement that they participate in homebuyer education programs. Iowans need to recognize the choices they make and to consider the trade-offs inherent in those decisions. Iowans also need to recognize that individual stress and family conflict can result from these decisions. This is especially true when income opportunities are limited by the loss of employment or by the lack of adequately paid jobs.

Performance Goals:
- Individuals, including youth, will learn basic financial skills and use them to improve their current and future financial well-being
- Individuals will increase savings and decrease debt.
- Individuals and families will be better prepared to make decisions about resources (i.e. time, skills, and money) that improve the quality of their lives.
- Individuals and families will increase their ability to communicate effectively about resource use.

Output Indicators:

- 7,000 high school age students in Iowa will participate annually in the HIgh School Financial Planning Program.
- Increase adult participation annually in one or more programs designed to teach basic financial skills by 10% (starting at 18,000 in 1999 and building to 26,353 by 2005).
- 50% of family resource management programs targeted to adults will include information on decision making.

Outcome Indicators:

- Youth who have participated will demonstrate improved goal setting, decision making and financial management skills. The following statements will be used to create end of meeting evaluations. In this program I have learned:
  - to look up information I need
  - to ask questions to get the information I need
  - to manage my time so I get important things done
  - to set goals for my future
  - to set priorities for what I can afford
  - to plan and use a budget
  - to keep accurate and useful records
  - the life-long importance of keeping records
  - to use records to improve my decision making
- Individuals and families who have participated will demonstrate increased levels of financial knowledge and report improved financial practices. The following statements will be used in end of meeting and follow up evaluations. I plan to/ have adopted practices to:
  - reduce debt
  - increase savings
  - talk with family members about money
- Individuals and families who have participated will demonstrate increased decision making skill and report improved decision making practices. The following questions will be used in end of meeting and follow up evaluations. I plan to/have adopted practices to:
  - set goals for my future
  - manage my time, money, skills so I get important things done
  - reflect on my choices and decisions why do I want this? how will it add to my life? how long will this decision affect my life? what am I willing to cut back on to have/do this?

Key Program Components:

Several key programs support the project. The major objective of these programs is to teach basic financial management skills: My Money, My Self, This is the Way I spend My Money, 4-H Consumer Management project area, Money 2000(tm), High School Financial Planning Program, ABCs of Managing Your Money, Building Resourceful Families, Consumer Privacy, Women's Financial Information Program, and home buyer education. In addition, components of each of those programs focus on decision making and communication objectives. Money Sense for Your Children, Money Mechanics, Investment Basics, and Take Control of Your Finances

are learn-at-home programs that teach basic financial skills as well as decision making. A major objective of the Adult Children, Aging Parents program is improved family communication and decision-making related to later life events. A series of retirement planning lessons and bulletins is under development and will be available by early 2000.

Internal and External Linkages:
Potential partners in research include County Extension Councils, other subject matter disciplines within ISUE, the Department of Human Development and Family Studies and the Center for Family Policy.

Potential external linkages include collaborations with employers, community groups and agencies interested in teaching basic financial skills; with businesses, community groups and agencies interested in teaching consumer management skills; and with community groups interested in teaching homebuyer education.

Target Audiences:
The targeted audiences are those who face decisions related to the use of resources: youth, limited resource families and individuals, young families and individuals, families in midlife, and families in transition. Some program components are specifically targeted to first time homebuyers, female and culturally diverse audiences.

Project Duration:
Long term.

Plan for Resource Development:
Resource development activities will focus on developing relationships with potential funding partners. These may include employers, communities, service clubs and foundations. Opportunities to increase resources through contract work will also be pursued.

Allocated Resources:

Year	SYs	State and Federal funds
FY99	16.97	$ 1,314,791
FY00	16.97	1,333,842
FY01	16.97	1,354,769
FY02	16.97	1,373,083
FY03	16.97	1,394,795
FY04	16.97	1,413,910

Program 310. Strengthening Family Relationships

Statement of Issue:
Families across the lifespan face needs in parenting children and youth, planning for and adjusting to aging, and dealing with change, transition, and loss. Parents need to build positive attitudes and specific skills to nurture and guide youth from infancy through adolescence.

Persons in later life seek information that helps them live positively with change while continuing to contribute to family and community.

Performance Goals:

1. Families will strengthen communication and decision-making skills to plan for and adjust to change in later life.

Output and Outcome Indicators:

- 1,800 of the 2000 persons attending workshops for adult children and aging parents will plan to adopt one or more recommended practices and 1,400 will actually adopt one or more recommended practices.
- 1000 family or professional caregivers will receive information about adult dependent caregiving through Extension program efforts.
- 900 caregiver program participants will plan to adopt one or more recommended practices and 800 will actually adopt one or more recommended practices after programs.

1. Families will strengthen parenting and family communication to nurture and guide children and teens.

Output and Outcome Indicators:

- 30,000 parents will receive information and change attitudes by reading extension publications and newsletters.
- 5,400 of the 6,000 parents attending workshops will PLAN to adopt one or more recommended parenting practices.
- 4,800 parents attending workshops will ACTUALLY ADOPT one or more recommended parenting practices.

1. Families will build positive attitudes and skills to work through change and loss.

- 900 families of the 1,000 participating in workshops on adapting to change and loss will plan to adopt one or more recommended practices.
- 800 families will actually adopt one or more recommended practices on adapting to change and loss.

Key Program Components:

1. Extension will implement sequenced programming to strengthen later life families through "Adult Children and Aging Parents: Conversations between generations," by:
   A. introducing workshop topics on change and communication, aging in place, health care and legal decisions, organizing records; and increasing programs using "Who Gets Grandma's Yellow Pie Plate?"- transferring non-titled property.
   B. developing additional program topics including:later life partner relationships, long-distance caregiving, adult development, and self-esteem.
   C. exploring non-workshop methods for disseminating program information.
1. Extension will assist communities and agencies in development of programs to support grandparents who are parenting their grandchildren.
   A. collaboration with national grandparent networks
   B. increasing community awareness
1. Extension will strengthen skills of professional and family caregivers.
   A. increase programming with "When Dependency Needs Increase,"

B. collaborate with state agencies to explore use of “Partners in Caregiving, “ to encourage communication between long-term care staff and families.

1. Extension will strengthen sequenced programming to build skills in parents and youth through the Strengthening Families Program, Girl Talk, Guy Talk and Celebrate Families through:
   A. training for state drug prevention grant
   B. developing supporting videos for Celebrate Families
   C. refining strategies for effective recruitment
1. Extension will develop strategic media campaign on
   A. Building awareness and positive attitudes in step families
   B. Building awareness and providing information for strengthening the couple relationship
1. Extension will support programming for parents of 0 to 6 through:
   A. Parenting the First Year newsletter
   B. Identifying or adapting appropriate workshop series
1. Extension will explore new methods for educating parents including:
   A. Developing a parent mentoring program
   B. Implementing a Parent Warmline through the Iowa Concern Hotline
   C. Developing materials and marketing a statewide family week or month
   D. Developing an interactive website for educating parents
1. Extension will coordinate and disseminate existing information and program materials for staff on transition and adjustment to change by:
   A. Assisting staff in responding to community needs related to balancing work and family, dealing with loss and change of employment, as well as community and personal change.

Internal and External Linkages:

- Institute for Social and Behavioral Research
- Pennsylvania State University
- Division of Criminal and Juvenile Justice (Iowa Department of Human Rights)
- Iowa Department of Education
- Iowa Department of Elder Affairs
- Iowa Department of Public Health
- Alzheimer’s Association chapters of Iowa
- University of Iowa Gerontology program
- Iowa State University Gerontology program
- Iowa AgrAbility

Target Audiences:

Parents of youth 0–18, staff and agencies who work with parents and youth, communities who identify the need for family education to prevent substance abuse, families experiencing loss and change, minority families, families with disabilities, family members in mid and later life, grandparents who are parenting grandchildren, staff and agencies who work with elderly populations.

Project Duration:

Long-term

Plan For Resource Development:

State of Iowa Drug Prevention grant, Office of Criminal and Juvenile Justice grant, potential A*DEC project, Brookdale Foundation Relatives as Parents Program

Allocated Resources:

Year	SYs	State and Federal funds
FY99	13.58	$ 1,051,833
FY00	13.58	1,067,074
FY01	13.58	1,083,815
FY02	13.58	1,098,467
FY03	13.58	1,115,836
FY04	13.58	1,131,128

Program 311. Developing Community Housing Assets: A Self-Help Approach

Statement of Issue:
Finding decent and affordable housing is a continuing concern for individuals and families in non-metro Iowa communities. Iowa has an aging housing stock, a lack of affordable housing, housing that is not accessible for persons with disabilities, and limited housing options for older adults. The problem is especially severe in isolated, non-metro communities that do not have professional housing staff. Because a community housing needs assessment is usually required in order to be eligible to apply for a housing grant, an outside housing consultant is often hired to conduct a quick housing survey. The resulting reports frequently are not studied or used because there was little or no involvement with community residents. Also, the consultant is not around to provide leadership to help implement the recommendations. The waste of resources on an unused housing report that isn't implemented contributes to further discouragement and disillusionment that anything can be done to solve community housing problems.

Performance Goals:

- Community housing groups in non-metro Iowa communities will identify community housing strengths, using asset mapping techniques; develop a self-help action plan that uses these assets to address "small" housing needs; and implement the action plan in a brisk, methodical fashion (2 years or less).

  Output Indicators:
  - housing/demographic housing trends package prepared for 8 participating communities
  - catalog of successful (and not successful) self-help housing ideas prepared for small, non-metro communities
  - housing website with useful information for project communities is continuously updated
  - training guide for conducting a community housing asset mapping project in nonmetro communities is prepared
  - pilot programs conducted in two Iowa communities during years 2 and 3.
  - project team staff (7 people) trained to do community housing asset mapping
  - community housing groups in 8 communities trained and mentored by project team staff on community housing asset mapping

Outcome Indicators:

- 8 community housing groups pay fee to participate in Community Housing Assets Project.
- 8 community housing groups will complete housing asset reports
- 4 community housing groups will implement one or more self-help housing action projects (such as accessibility improvements for elderly; rehabilitation for low-resource families; spec housing on a vacant lot)
- ISU Housing Website updated and used weekly by participating community housing groups
- self-help housing projects are completed to the satisfaction of community housing groups within 2 years in 2 pilot communities
- No community housing groups request a refund of fees for participating in a Community Housing Assets Project.

Key Program Components:

Training on Community Housing Asset Mapping.

Objective: Housing Project Team members will be trained to use community housing asset mapping techniques.

Housing Demographic Trends Package.

Objective: Community housing groups will be aware of impact of housing on community vitality.

Colorful visuals and educational packages will be prepared, based on research of Cook and Crull at ISU on housing and community economic vitality in nonmetro counties. The information will also be posted on the ISU Housing Web Site.

Catalog of Self-help Housing Ideas.

Objective: Community housing groups will be aware of self-help housing strategies that have been successful in small communities.

Catalog of self-help housing ideas will be prepared and shared with participating community housing groups. The information will also be posted on the ISU Housing Web Site.

Selecting Pilot Communities.

Objective: Community housing groups will be selected by Housing Project Team in two communities to participate in pilot programs. Groups will apply to participate in the project and be required to pay a modest entrance fee, based on size of community (10 cents per resident, with a minimum fee of $250). The fee will be kept by the local CEED to use for program expenses. Satisfaction with participation is guaranteed: the fee will be refunded (from state source of funds) for unsatisfactory performance by the Extension Housing Project Team.

Training Community Housing Groups.

Objective: To multiply efforts, community housing teams from 6 additional communities will be selected, trained, and mentored to conduct self-help housing programs.

ISU Housing Website.

Objective: Iowans will have access to a comprehensive array of housing information from one central web site page. The Project Team will continue to update the comprehensive ISU housing website and integrate housing information from a variety of objective sources. Materials and training will also be provided to promote and publicize the web site with a wide array of housing audiences.

Internal and External Linkages:

- Research Partners: Cook and Crull in Department of Human Development & Family Studies will support project with research on relationship of housing to community economic vitality, as well as Census and other demographic data.
- Disciplines Involved: Extension staff with expertise in housing, community development, family resource management, family life, and public policy will serve on the Project Team.
- State Partners: Department of Economic Development and Regional Councils on Government (COGs).
- Multi-state Partners: Housing Specialists in North Central Region.
- Community Partners: Members of community who are committed to implementing self-help housing solutions and wish to become a member of the Community Housing Team.

Target Audiences:

- nonmetropolitan communities that have completed a broad-based housing needs assessment survey and are interested in implementing self-help housing solutions (with the support/mentoring of Extension Housing Project team).
- Community residents with housing assets (such as County Extension Education Director, industrial arts/technology teacher, local handymen, churches, schools, low resource people).

Project Duration:

- Two Pilot Projects (Intermediate)
- Follow-on with New Community Housing Projects (Long-term)

Plan for Resource Development:

- Participation fees: Participating community groups will be required to pay a modest entrance fee, based on size of community (10 cents per resident, with a minimum fee of $250). Satisfaction is guaranteed: the fee will be refunded (from state source of funds) for unsatisfactory performance by the Extension Housing Project Team.
- Grant opportunities: The Department of Economic Development and local COGs will be contacted for potential support.

Allocated Resources:

This plan is a subset of the Strengthening Family Relationships Project.
Financial information and FTEs are included within the Strengthening Family Relationships Project.

Program 320. Child Care That Works

Statement of Issue:

The need for accessible, affordable, quality, child care in Iowa has become a critical economic development issue. Iowa ranks second in the nation with the percentage of women who are in the workforce with children under the age of 6. An estimated 70 percent of Iowa mothers with children younger than six, and 82 percent of women with children between the ages of six and 17, are in the labor force. Rural communities seeking to attract industry find that child care is a key issue for potential employers. Funding and community resources for the development of

rural child care is greatly limited. In many communities there are acute shortages of school-age child care. In Iowa, only about one in ten public schools offer before and after school care programs.

Evening or weekend care is lacking as well. In Iowa fewer than one out of six providers offer care after 6 p.m. or overnight. Infant and toddler care is extremely costly and in short supply. Child care for a 12 month-old in a child care center in Iowa in 1997 averages $5211, but could cost as much as $7280. The shortage of available care is compounded by the lack of suitable buildings for child care centers in many communities. Deteriorating and unsafe playgrounds are also a serious concern. State training requirements have increased 400% in the last two years, yet training is not readily available in most areas of the state. The situation is accentuated by the high 40-60% turnover rate of providers. Turnover is linked to lack of training and low wages. In 1996, the average annual wage of child care workers in Iowa was only $11,620.

Performance Goals:
Child care providers will strengthen knowledge, skills and abilities.

Output and Outcome Indicators:
- 1500 of the 2000 child care professionals participating in quality child care training will plan to adopt one or more recommended practices.
- 1000 will actually adopt one or more recommended practices

Child care facilities and playgrounds will be safer.

Output and Outcome Indicators:
- 15 of the 20 child care facilities, schools or communities that receive information and training will plan to adopt one or more recommended practices.
- 13 child care facilities, schools or communities will actually adopt recommendations.

Output and Outcome Indicators:
- 10 of 20 communities will plan to adopt recommended practices
- 8 will actually adopt recommended practices

Parents will become better consumers of quality child care

Output and Outcome Indicators:
- 3000 parents will access and use resources on identifying and selecting quality child care.

Child Care Providers and programs will improve their parent education efforts.

Output and Outcome Indicators:
- 800 of 1000 child care providers and agencies will plan to adopt recommendations that will strengthen their parent education efforts.
- 700 will actually adopt one or more recommended practices to strengthen parent education efforts.

Key Program Components:

1. Extension will strengthen the knowledge and skills of child care professionals by:
   A. Implementing the Child Care That Works self study video program
   B. Sponsoring the Child Care That Works website
   C. Developing the Iowa Healthy Child Care warmline
   D. Conducting workshops on selected child care topics
   E. Developing newsletter articles and publications.
1. Extension will assist communities in creating safe, well-designed facilities and playgrounds by:
   A. Consultation and technical assistance with selected communities
   B. Sponsoring a state-wide and regional playground conferences and local workshops.
   C. Distributing playground safety resource kits and displays.
   D. Developing interactive website information.
   E. Distribution of publications and videos.
1. Extension will enhance community child care economic stability and quality by:
   A. Providing information and assistance on child care employer and community options
   B. Assisting with community assessment and planning
   C. Providing technical assistance on child care center start-up and finance.
1. Extension will help parents will become better consumers of child care though:
   A. Development of comprehensive media strategies (newsletter, radio, TV)
   B. Development of "Choosing Child Care" and "Getting Along with Your Provider" fact sheets
   C. Development of Child Care That Works internet resources and workshops.
1. Extension will help parents improve parenting skills that compliment child care program goals through:
   A. Development of collaborative programs such as the Getting Along Family Violence prevention program.
   B. Development of Child's Play activities that support parent -child interaction and learning.

Internal and External Linkages:

Internal: The ISU Department of Human Development and Family Studies provides the research base for Child Care That Works. The program is supported by a network of ISU Extension campus, field and county staff and includes interdisciplinary efforts from Extension to Youth, Extension to Families, and Extension to Communities.

External: Iowa State University Extension is a collaborative partner with the National Network for Child Care NNCC)— representing 16 land grant universities. ISUE manages the NNCC website and publication distribution center. ISUE also is a collaborative partner of CYFERNet and has a USDA funded subcontract to develop the CYFERNet—Child Website that will secure and promote related documents and publications from the multi-state University Land grant system. Additionally, ISUE has a subcontract from USDA to work with the USDA Child And adult care food program and USDA Rural Development to link child care data and information from all 50 states. ISUE is also a collaborative partner of the UDSA Child Care Initiative. Lesia Oesterreich serves on the steering committee and is the co-chairs the infant and toddler subcommittee with Marlene Glasscock from Kansas State University.

The Child Care That Works program is also supported by a network external partners including, Resource and Referral, Iowa Dept. of Economic Development, Iowa Rural Development

Council, Iowa Child Care and Early Education Network, Iowa Head Start Collaboration, Iowa Department of Public Health, Iowa Department of Education, Iowa Family Child Care Association, Iowa Association for the Education of Young Children, Iowa Early Care and Education Professional Development Taskforce, Iowa Area Education Agencies, Iowa Department of Human Services.

Target Audiences:
Home-based providers; center-based providers; center directors and administrators; schools; extension and other child care professionals who are, or can be, trained and certified to train others; employers; parents and other family members; community citizens; policy makers. Efforts will be made to include minority audiences.

Project duration:
Intermediate

Plan for Resource Development
Collaborative funding efforts with external partners
Charge for resources /publications (Families In the Know)
Charge for training /services
Grant funding opportunities with Empowerment Boards or Zones, Head Start , Iowa Department of Education, Iowa Department of Human Services, Iowa Department of Public Health, Iowa Department of Economic Development, Federal agencies and private foundations.

Allocated Resources:

Year	SYs	State and Federal funds
FY99	10.19	$ 788,875
FY00	10.19	800,305
FY01	10.19	812,861
FY02	10.19	823,850
FY03	10.19	836,877
FY04	10.19	848,496

Program 340. Family Policy That Works

Statement of Issue:
Policies related to welfare reform, empowerment, and decategorization at the local, state and national levels impact the ability of families to meet their needs and thrive. Although these initiatives include the involvement of citizens in effecting public policy we have experienced a decline in local citizen participation. People feel disenfranchised, fewer people run for political offices at all levels of government. Current empowerment legislation being implemented in communities calls for increased input at the grassroots level. Policy changes being implemented through these efforts require an understanding of effect as the changes impact local communities and individual citizens. As citizens are asked to assume leadership for these initiatives, they, along with Extension staff, professionals, and policy decision-makers need a better understanding of the effects and issues that may result from those changes. All involved need the

capacity to effectively and collaboratively develop, govern, deliver, and evaluate these new system arrangements in order to improve outcomes for children and families.

Performance Goals:

- Citizens will develop their skills and opportunities for participating in private and public policy decisions affecting their lives i.e. build their capacity to act on their own behalf.
- Using a set of principles for guiding family policy workcommunities/community partners will have increased ability to collaborate and effectively involve citizens in decisionmaking
- Extension staff will be able to apply and use these principles to form linkages internally and across disciplines/program areas.

Output Indicators:

- 80% of community collaboratives involving Extension personnel will report usage of strategies/tools to involve all citizens in public policy decisionmaking
- Three communities will develop a community action plan to address a local family policy issue of concern
- Self-directed learning opportunities will be offered to Extension staff

Outcome Indicators:

- Staff will show increased knowledge and level of comfort using strategies to effect change of policy at the local level
- Community citizens will report increased involvement in decisionmaking about family issues within their community
- Selected communities will report increased voter turnout
- Selected communities will report increased citizen participation in leadership roles
- Communities will report changes in policies within organizations, communities

Key Program Components:

Awareness Activities—Immediate

- Develop and promote set of guiding principles for family policy development process (to be used in program planning, in evaluating existing programs)
- Continue to offer the poverty simulation and Copin County simulation; adapt Copin county simulation by adding housing and health care; work with NCR states to create the additional modules
- Trendletter—Working with other project teams, identify specific topics for four issues of an informational trendletter over the first year and continue each succeeding year; examples of topics might be: single parent families (fathers), health care policy, affordable housing
- Further develop and promote the family policy Website that is updated weekly to inform of trends, legislative issues, and external linkages related to policy concerns
- Share welfare reform research and explore implications for communities
- Offer self-directed learning opportunities for staff (study circles conducted via chat groups on the Internet, promote self-directed work efforts.
- Partner internally and externally to conduct legislative day on identified topic
- Coordinate with youth development committee on broadened character education programming
- Adapt/update FCL, PPEP and other existing resources for use within communities

Technical Assistance—2–4 years

- Select one community each year and use participatory research approach to help them apply family policy principles to their particular issue; link internally with project teams on child care, housing, communities etc to identify topics and communities; use asset mapping approach
- Create opportunity for citizens to engage in public dialogue (study circles, National Issues Forum) within their communities targeted to issue of concern--Link externally with other partners to offer conferences,related to collaboration, community-based programming with expectation that community has ready the resources (people, etc.) to continue the policy work

Internal and External Linkages:

- Internal: Link with other Extension project teams to identify specific issues for the selected community efforts (Youth Development, Housing, Child Care ,and Communities; also link with program assistants to reach our audience
- College: Explore linkages with FCS Ed and Studies department/Iowa teachers; partner with Center for Family Policy on research, evaluation External Organizations: Consider coordinating with AAUW, League of Women
- Voters to conduct conferences and/or forums related to legislative issues
- State: IPTV, State agencies, Governor's Office
- Regional: CARD, RUPRI, Coordinate development of resources within NCR (ex: work with KS to develop additional modules for Copin County simulation)

Target Audiences:

Decategorization and empowerment groups, individuals and families without a voice (work closely with program assistants in EFNEP and FNP), community decisionmakers, citizens, extension staff.

Project Duration:

Awareness building and informational activities (immediate)
Creation of guiding principles (immediate)
Technical Assistance activities (2–5 years)
Dissemination of framework for family policy development work (FOURTH AND FIFTH year)

Plan For Resource Development:

Access community funding streams such as empowerment and decatecorization
Access local community-based economic development projects
Persue grant opportunities/foundations constantly; include publications/resource development
Coordinate with other project teams to include a policy component in their funding streams budget
Explore state funding opportunities specifically for NIF development (have potential lead with Governor's Office)

Allocated Resources:

Year	SYs	State and Federal funds
FY99	6.79	$ 525,916

FY00	6.79	533,537
FY01	6.79	541,907
FY02	6.79	549,233
FY03	6.79	557,918
FY04	6.79	565,564

Program 410. Understanding Youth Needs

Statement of Issue:
The mission of Iowa's 4-H Youth Development Program is to create supportive environments for culturally diverse youth and adults to reach their potential. In order to significantly enhance the lives of Iowa's youth, we need to understand the associated imperatives, skills and tasks that taken together create a climate conducive to healthy development of youth. While we know a good deal about the developmental needs of youth, we know much less about how to apply this knowledge in effective ways. Additionally, while we are challenged to promote young people's development, we have no reliable markers of that status. Through research, we must become knowledgeable about the challenges and benefits of a Youth Development approach. The Youth Development Approach enables youth to develop skills, interact with other young people from various backgrounds and in different stages of maturation. You can't build programs around a "common enemy" such as teen pregnancy or drug use, and promote positive, holistic youth development. We must reengineer or reinvent, rather than simply reorganize, the business of Youth Development work:

- We must emphasize offering a complement of effective services and opportunities available to all young people.
- We must accept that youth input is not youth involvement or empowerment.
- We must become advocates to help policymakers, practitioners, and community members value youth as cultural and economic resources.
- We must effectively assess youth development, and our efforts to promote it.

Performance Goals:

1) Gather and conduct youth development research to help adults understand youth needs.

   Output Indicators:
   - Number of research projects being conducted
   - Local assessments of 4-H Youth Development programs, and other youth-serving programs
   - Research reviews completed, analyzed and clearly communicated
   - Research summarized and reported

   Outcome Indicators:
   - Usable and quality data made available for state and local youth development efforts
   - 3 Youth Development research projects conducted and completed.

1) Build awareness and knowledge of youth development research and needs among family members, policy makers, practitioners, and community members.

Output Indicators:

- Extension staff and volunteers representing all counties trained in understanding research-based youth needs; Outcome Indicators:
- 10 publications, 6 teaching guides, one Understanding Youth Needs homepage developed;
- 25 families, neighborhoods, schools or youth organizations trained in understanding research-based youth needs;
- 5 Community groups using youth development assessment information to create more effective youth programs.

1) Apply research-based youth development concepts to families, youth programs and policies to maximize the effectiveness of community resources and to help youth reach their potential.

Output Indicators:

- 50% of all county youth programs will work towards redesigning and expanding programming for youth to more effectively meet research-based youth needs;

Outcome Indicators:

- 50 community groups will request assistance in applying youth needs research;
- 25 community collaborative will work towards redesigning and expanding programming for youth to more effectively meet research based youth needs;
- 100 community groups will be assisted in designing strategies and tools to evaluate and select quality effective youth programs and youth needs assessment.

Key Program Components:

- Establishment of a Youth Development Research Center
- Youth Development Training Institute

Objectives:

- Research will assist families, policy makers and community members in recognizing that promoting youth development requires strengthening families and communities.
- Internal Application- Consultation/Facilitation;
- Policy makers, practitioners, and community members will understand the critical elements needed to design programs and policies to meet the needs of youth.
- Development of Youth Development Publications, Web Pages, Presentations, & Media
- Research and strategies will be designed to reach under-served youth audiences, such as: adjudicated youth, youth with disabilities, and urban audiences.

Internal and External Linkages:

Internal:

- Families Extension Staff
- Community Development Staff
- 4-H Volunteers
- 4-H Families

- Extension Councils
- ISU College of Education
- ISU College of Family and Consumer Science
- 4-H Foundation
- Rural Family Mental Health Research Center

External:

- Iowa State Dept. of Education
- AEA's
- Private Family and Youth Agency Providers
- CAP Agencies
- Iowa State DHHS/Decat.
- Youth Leadership Institute
- UNI
- School of Social Work
- UI
- Local School Districts
- Local Religious Communities
- Civic Organizations
- Policy Makers
- Center for Youth Development & Policy
- Reclaiming Youth at Risk International, Inc.
- World Organization for Resilient Kids, Inc.

Target Audiences:
Extension Staff, Youth-serving Volunteers, Policy makers, Family Members, Practitioners, Youth, Community Leaders, Empowerment Boards/Decat/Child Welfare

Project Duration:
411 Project goals are sequential and ongoing - long-term project duration.

Plan For Resource Development:
4-H Foundation, Other youth-serving organizations, Ford Foundation, Kellogg Foundation, Service fees.

Allocated Resources:

Year	SYs	State and Federal funds
FY99	22.1	$ 1,707,689
FY00	22.1	1,732,426
FY01	19.3	1,537,950
FY02	19.3	1,560,469
FY03	19.3	1,583,438
FY04	19.3	1,606,867

Program 420. Out-of-School Time

Statement of Issue:
Communities have identified that a large number of elementary students are going home to empty houses. It has been shown that the 3-6 P.M. time period is the prime time when youth are making decisions that lead to difficulty for the youth and their family. Youth need safe structured opportunities to develop life skills. There is also evidence that young people are interested in learning about a variety of topics, such as photography, food, safety, art, science, etc. Communities lack the resources, financial and human, to plan and implement age appropriate programs to meet these growing needs. However, communities are not without any resources. To identify and coordinate available resources and, to develop new resources, communities will need to collaborate to address the non-structured, free time of youth (K-6).

Performance Goals:
1) To create safe, structured, educational opportunities for young people (K-6) during their out-of-school time that will result in positive life skill development.

   Output Indicators:
   - Within the first three years 1/3 of the counties in Iowa will have youth participating in programs addressing this need.
   - Within five years 2/3 of the counties in Iowa will have youth participating in programs addressing this need.

   Outcome Indicators:
   Participating youth will be able to: gain attention in appropriate ways; gain acceptance of others; be more self confident; work and play cooperatively; handle conflicts agreeably; make new friends; participate in group discussions; listen when others are speaking; identify several choices; choose one from a few choices; choose appropriate behaviors; ask questions to gain information; participate “hands-on” in the learning experience.

1) To assist the community in fulfilling its concern of safely and appropriately meeting the needs of young people (K–6) during their out-of-school time.

Output Indicators:

- Within the first three years Iowa State University Extension 4-H Youth Development will be collaborating with partners in 1/3 of the counties in Iowa to meet this program need.
- Within five years Iowa State University Extension 4-H Youth Development will be collaborating with partners in 2/3 of the counties in Iowa to meet this program need.

Outcome Indicators:

- Community leaders will identify Iowa State University Extension 4-H Youth Development as a key resource in addressing this community need.
- The community partnerships will include allocating financial resources to Iowa State University Extension 4-H Youth Development to provide the needed assistance to meet this program need.

Key Program Components:

- Content components include complete lesson plans with scripts containing lesson content designed for 1 1/2 to 2 hour sessions for a total of 6+ hours of educational activities and learning. The resource kits will contain "props" and other teaching tools with lists of those materials and supplies that are consumable and need to be replaced with each use.
- Promotional materials and evaluation instruments will be developed for each topic/curriculum. Examples of possible curriculum topics: Funtivities; Science; Food/Nutrition; Group Activities; Wood Working; K-3 Curriculum; Fish Iowa; ESET Curriculum; My Money/My Self; And Others.
- Delivery components include structured activities to address any of the following time frames: After School (short term and long term); Summer; Week-ends; Before School; Early Outs at School; In-Services at School; Home Schooled Students.
- Process components include training of volunteers to facilitate the activities, recruiting for the activities, and collaborating with the community to provide the "how to" in program development.

Internal and External Linkages:

Internal: Extension Programs in Families, Agriculture, and Communities. Also, the Extension technology unit and several Iowa State University departments.
External: City Government, County Government, Spiritual Community, Schools, National 4-H Council, Empowerment Zones, State Agencies, Community Action Agencies, Cooperative Curriculum System.

Target Audiences:

K–6 youth and their families; Iowa Communities; Program efforts will be coordinated with the "after school initiative" of the urban County Extension Education Directors in Iowa. These program activities will be open to all youth in the target audience regardless of their ability to pay participation fees, ability to provide transportation, physical or mental limitations, race, or religion.

Project Duration:
Short Term:

- Identify collaborators; Identify model programs; Identify curriculum resources; Identify financial resources;
- Prepare resources by enhancing curricula already available or by developing new "kits"

Intermediate:

- Build community collaborations; Develop community specific activities; Obtain start up funds; Train staff and volunteers; Prepare resources by enhancing curricula already available or by developing new "kits".

Long Term:

- Conduct ongoing training for staff in the process; Identify future financial resources.

Plans For Resource Development:
Identify foundations, federal agencies, and state agencies which have a common interest and possible financial resources for this need; Develop a fee structure and/or private donations to meet the community needs; Utilize city, county, and school financial resources as a part of the collaboration; Develop an Iowa State University Extension budget line item for this project.

Allocated Resources:

Year	SYs	State and Federal funds
FY99	2.8	$ 213,461
FY00	2.8	216,553
FY01	5.5	439,414
FY02	5.5	445,848
FY03	8.3	678,616
FY04	8.3	688,657

Program 430. Youth Workforce Preparation

Statement of Issue:
Iowa has identified a shortage of qualified workers. Youth need more opportunities at a young age to develop attitudes and values that prepare them to contribute in positive ways as they enter the workforce. The five nationally recognized workforce competencies (SCANS): working with others, utilizing resources, understanding systems, using information and working with technology can be learned by children (grades 4-12) in out-of-school settings when the curriculum is coordinated with formal learning.

To successfully prepare Iowa's youth there must be a joint effort between the private and public sectors; statewide, local, multi-state and national organizations. (Example: Regional Workforce Development Councils, Department of Education, Department of Economic Development, National 4-H Councils, local businesses, non-profit organizations and civic groups.

The ISUE workforce project will address the need for experiential education experiences, technical assistance and/or curricula, and develop collaborative efforts that support workforce readiness and career development.

Performance Goals:

1) To provide opportunities for youth (grade 4–12) to develop life skills to increase their workforce readiness through a series of non-formal experiential education experiences.

   Output Indicators:
   Enrollment in YESS Mini-Society, Entrepreneurship Camp, Community Club, Tractor Certification, School Enrichment pilots w/ career education curriculum (WOW! Wild Over Work, Rising To The Occasion, Getting Into A Food Mood, I'll Take Charge)

   Outcome Indicators:
   Evaluate youth using "targeting life skills"
   - to meet and work with people from other cultures 6008
   - to solve problems that occur in my life 8002
   - to follow instructions as they are given to me 8004
   - to use time and money efficiently 8005
   - to contribute as a member of a team 8007
   - to accept responsibility for doing a job 8008
   - to be responsible for my own actions 4005
   - to consider how my actions affect others 4007

1) To provide technical assistance and/or curricula to schools and communities by way of internal/external linkages.

   Output Indicators:
   First year will collect baseline numbers
   - # of communities/partnerships provided technical assistance (training to educators/volunteers, development of entrepreneurship camp, establishment of a shadowing program, evaluating programs, community facilitation, developmentally appropriate programming)
   - # of trained volunteers who participate and support specified workforce programs
   - # of School-To-Work, Chamber of Commerce, or committees that extension staff serves that address workforce issues
   - # of requests/contacts for general assistance or support to an individual/group related to workforce issues

   Outcome Indicators:
   - Increase number of requests for technical assistance in workforce preparation
   - Increase in number of education units (schools, after school projects)
   - Increased utilization of ISUE as a resource for workforce issues
   - # of letters of support Extension gives to school/community groups for youth workforce prep issues
   - # of general assistance contacts answered or referred related to workforce or career

1) To develop long term public/private sector collaborative efforts in the community to more directly support and sustain the career development and workforce readiness of young people.

Output Indicators:

- # of workforce preparation collaborative efforts
- # of times ISUE is called upon to participate or facilitate on collaborative efforts
- # of young people and adults impacted by collaborative efforts
- # of state/regional workforce boards/councils that ISUE has a membership or representative
- # of School-To-Work committees ISUE staff has membership

Outcome Indicators:

- How communities have changed their relationships from networking to collaboration (Via Collaborative Framework Survey- Jeff Miller, North Dakota)
- Increase in the involvement of youth in the collaborative process
- Sustain community workforce efforts after federal School-to-Work dollars are terminated through local funding efforts

Key Program Componentss:
Workplace Systems Programs—legal, ethical training concerning child labor laws; Youth Entrepreneurship; CAREER TREK to ISU statewide; Career Education focused Curricula—WOW! Wild Over Work, Getting Into A Food Mood, Rising To The Occasion, I'll Take Charge; Leading The Way—collaboration; Partnering With Youth (Extension/Rural Development)—collaboration; The Collaborative Framework Model; Train The Trainer and Volunteer Leader Training; 4-H Club/Group Workforce Readiness Kit/Theme (NEW); Infusion of Workforce Skills to Youth Programs Tool (NEW) (i.e. for baby-sitting clinic, lawn mower clinics, for 4-H project work)

Internal and External Linkages:
Kauffman Foundation; Pappajohn Foundation; National 4-H Council; State School-To-Work; Iowa Workforce Development Councils: Youth Councils; Iowa Association of Business and Industry; Chamber of Commerce; RC&D Rural Economic Development; Iowa Banks; Iowa Farm Bureau (district and county offices); Schools; AEA's; ISU Extension Communities; ISU Money 2000- Entrepreneur; ISUE Strategic Advantage; CIRAS; Ag Education/FFA; Other Youth Groups; Collaborate with other North Central States; VISION 2020; Iowa 4-H Foundation; Explore partnerships with: Iowa Department of Labor

Target Audiences:
Grade 4–12 Youth

Project Duration:
1–5 years

Plans For Resource Development:

- To explore cooperative grant opportunities with VISION 2020, Iowa 4-H Foundation, ISU Pappajohn Center,
- Continued funding from Kauffman, National 4-H Council Cargill Workforce Preparation grants,
- To explore in-kind contributions like resources and staff technical training from the State School To Work office.
- Helping ISUE staff explore local business and industry financial and human resources.

Allocated Resources:

Year	SYs	State and Federal funds
FY99	2.8	$ 213,461
FY00	2.8	216,553
FY01	2.8	219,707
FY02	2.8	222,924
FY03	2.8	226,205
FY04	2.8	229,552

Program 440. Science and Technology Literacy

Statement of Issue:
Performance of American students on the Third International Mathematics and Science Study (TIMSS), 1998 was above the world average at the fourth grade level, below average at the middle school level, and significantly below average at the high school level. This issue needs to be approached from multiple prospectives with changes inside the classroom and added science enhancement activities outside the classroom.

Performance Goals:
1) Development of a strategic marketing plan to increase the knowledge and involvement of Iowa educators in the E-SET program.

   Output Indicators:
   E-SET will develop a marketing plan which will include the following resources: E-SET video for K-12 educators with training plan; oak frame display; redesigned web page with connections to AEA/LEA web sites; and an electronic newsletter for educators.

   Outcome Indicators:
   - evaluation results from presenters and participants who view the video
   - # of times video/display are used
   - # of educators who subscribe to the electronic newsletter
   - increased number of hits on the E-SET web page
   - linkages to 75% of AEA/LEA web pages

1) To provide youth grades K–12 with understanding about the relationship between science and technology and to develop the abilities of technological design. (correlated to National Science Education Standards)

Output Indicators:

- The Iowa Youth Tech Corps project will be implemented and continued for at least three years.
- Develop templates for use of computer software in non-formal settings.
- Develop and implement technology curricula/kit on the topics of astronomy, robotics and bridge design.
- Enrollment in E-SET curricula Marsville, Mars City Alpha, Biotechnology, World in Motion, and Toys in Space.

Outcome Indicators:

- Evaluate youth using "targeting life skills" for decision making
- # of educators using the technology kits and curricula in the classroom
- Increase utilization of E-SET software check-out library

1) To provide youth grades K-8 with non-formal experiential science activities that will develop science life skills.

Output Indicators:

- Implement the K–3 Youth Experiences in Science (YES) program statewide.
- Develop after-school program templates for current E-SET curricula.
- Develop at least three new sci/tech Cloverkids lessons each year.
- Design and implement a sci/tech after-school program with the ten urban counties.
- Partner with Childcare to implement training for school age child care professionals in the use of the SERIES and YES sci/tech curricula.

Outcome Indicators:

- Evaluate youth using "targeting life skills" for science life skills and attitudes toward science and math using the NSF Funtivities Evaluation Instrument.
- Increase # of youth involved in non-formal sci/tech programs in the ten urban counties
- # of daycare providers involved in sci/tech training opportunities and their evaluation of the experience

1) To provide technical assistance/curricula/kits and/or professional development workshops to Iowa schools through partnerships with AEA's and LEA's.

Output Indicators:

- # of educators involved in professional development workshops and using resources
- # of times E-SET is called upon to participate or facilitate in collaborative efforts with AEA/LEA's

Outcome Indicators:

- How educators have changed their teaching methods through implementation of E-SET resources and national science standards. (via E-SET educators impact survey to be available on the E-SET web site)

Key Program Components:

- National Science Standards
- Biotechnology School Enrichment
- SERIES—Science Experiences and Resources for Informal Educational Settings
- YES—Youth Experiences in Science
- New materials—Robotics, Astronomy, Bridge Building and Design
- Current E-SET curricula and kits

Internal and External Linkages:

- Iowa Math and Science Coalition and Iowa Academy of Science
- Iowa Space Grant Consortium
- Area and Local Education Associations and Iowa Department of Education
- Iowa Public Television
- Iowa 4-H Foundation
- 4-H Agriculture and Natural Resources Programs
- ISUE Childcare Committee
- ISU Office of Biotechnology
- ISU College of Engineering (develop relationship)
- CYFAR Network
- USDA

Target Audiences:

Youth Grade K–12; Non-formal Educators of youth grades K–12; Formal Educators of youth grades K–12

Project Duration:

long term

Plan For Resource Development:

- Iowa Space Grant Consortium
- Proposal to Iowa Corn Growers Association for development of biotechnology programs.
- Explore cooperative grant opportunities with Iowa 4-H Foundation.
- Explore grant opportunities with CYFAR (Children, Youth and Families at Risk)

Allocated Resources:

Year	SYs	State and Federal funds
FY99	5.5	$ 426,922
FY00	5.5	433,106
FY01	5.5	439,414
FY02	5.5	445,840
FY03	5.5	452,411
FY04	5.5	459,105

Program 450. Strengthening Volunteer Development

Statement of Issue:
Helping youth learn to make better decisions through developing personal assets is an essential component of the 4-H program. Today, dynamic changes are taking place regarding our demographics, family needs, youth interests, technology and organizational funding. This dictates new ways of reaching youth and volunteers. These changes are effecting 4-H volunteers and their roles. Today's volunteers are seeking short-term experiences that match their interests. Current and potential volunteers are not interested in making a volunteer commitment that will last for years and involves major time allocations. However, they do want direct contact with youth, working with them on issues that make a difference in youth's lives and that impact their community.

Now is the time to train Extension staff and volunteers in the initiation of a comprehensive volunteer management system for their counties. The effective management of volunteers will produce a well-trained workforce that can create increasingly positive adult/youth relationships that will enrich youth's life skills development and society.

Performance Goals:
- Enhancing and expanding the roles of volunteers in Iowa's 4-H Youth Development program through training of 4-H staff leadership teams (key volunteers; Program Assistants; County Extension Education Directors; 4-H Youth Development Specialists, field and state; and Administrators) to initiate a comprehensive volunteer management system in their counties.
- All 100 county teams will be trained within three years for phase 1, phase 2 within four years. Phase 1 training will include vision, mission/purpose, objectives/goals, action plan, job design and recruitment.
- Phase 2 training will include interview, place, train/support, recognition, supervision and evaluation. The ultimate goal of this training will be that every 4-H youth will have a positive relationship with a caring adult.

Output Indicators:
- 60% of counties that attend training will set annual goals to implement 2 or more components of a volunteer management system.
- 60% of counties that attend training will increase volunteer utilization by 20%.

Outcome Indicators:

- Opportunities for positive youth/adult relationships will increase by 30% after phase 1 training.
- Opportunities for youth/adult leadership will increase by 20% after phase 1 training.

Key Program Components:
- Twenty-five counties will receive Phase 1 training in October 1999.
- Additional training will be ongoing every six months. Counties will be asked to recruit a leadership team (paid and volunteer staff) to implement the process. Phase 2 will begin in April 2000 for the first 25 counties to add to their management system.

Internal and External Linkages:
- Extension Annual Conference theme is on volunteerism. Mutual goals and resource persons will be explored.
- Other Extension volunteer programs will be able to use these management resources.
- Identifying other states expertise in this area will be explored.
- United Way Volunteer Centers and DMACC Volunteer Management staff will be sources for collaboration.
- Extension staff will become an expert resource for other community agencies that utilize volunteers.
- Iowa 4-H Youth Program is a member of the Points of Light Foundation.
- ISU Extension is a member of the State Commission on Volunteer Service.

Target Audiences:
Extension paid and volunteer staff at multiple levels.

Project Duration:
Intermediate with long term support and supplemental training. Phase 1 and 2 trainings will identify future volunteer management system needs.

Plans for Resource Development:
- Potential scholarships for volunteer training teams will be explored through the Iowa 4-H Foundation.
- Program resources costs will be shared between state and local sources.
- Potential external grants will be explored.

Allocated Resources:

Year	SYs	State and Federal funds
FY99	16.6	$ 1,280,767
FY00	16.6	1,299,319
FY01	16.6	1,318,243
FY02	16.6	1,337,545
FY03	13.8	1,131,027
FY04	13.8	1,147,762

Program 460. Urban Youth

Statement of Issue:
According to Iowa Department of Education statistics, 38% of the school age youth live in the seven designated urban counties. There is a big concern about the decreasing number of youth in Iowa. Between 1970-1990 there has been a decline of 27.7 % in youth in urban counties. This decline is expected to continue until at least 2003. According to Kid Count data there has been an increase of 130.9% in single parent families between 1970 and 1990. According to the demographic trends the youth of color have increased by 63% between 1987 and 1997, with the largest increases in African/American and Latino origin. The high school graduation rate is on the increase, however there is a need to increase the math and science skills of youth and volunteers. The urban 4-H program must change to meet the diverse needs of the young people and their families.

Performance Goal:

1) The Urban setting will become a positive environment where youth (grades K-12) will develop life skills while having a positive relationship with a trained adult volunteer.

   Output Indicators:
   - year one—half of the urban counties will have staff and volunteer teams who will participate in the Comprehensive Volunteer management system training, the rest of the urban counties in year two.
   - increase of programming efforts in out-of-school-time diversity training/understanding for both youth and adults in the urban setting

   Outcome Indicators:
   Youth will learn
   - to accept opinions different from mine (6002)
   - to value the contributions of others (6003)
   - to be friends with people who are different from me (6006)
   - to meet and work with people from other cultures (6008)

1) To develop a county wide marketing and recruitment plan that will reach the urban audience for all delivery methods.

   Output Indicators:
   - year one—half the urban counties will have started the marketing plan development, year two the rest of the urban counties will have started the process.
   - marketing efforts will be total county inclusive Outcome Indicators
   - 80% youth involved in 6 hours of extension programming will know they are 4-H members, this figure will increase as the marketing plan is implemented
   - positive information about the accomplishment of youth in the 4-H program will appear on a year round basis in all forms of media
   - youth membership in group settings will maintain while the base population decreases

1) To provide youth grades 4–8th with out of school time science/math activities that will better prepare them for the workplace of the future.

Output Indicators:

- increase in staff of 7 FTE through securing outside funding to support program effort
- teachers/volunteers/day care providers trained in science/math related curriculums

Outcome Indicators:

- youth will learn the life skills related to: Learning to learn, Decision making and marketable skills.
- # of youth with skills to enter technical fields of school or employment.

Key Program Components:
Marketing plans, volunteer training plans, diversity training, science/biotech training, workforce readiness awareness

Internal and External Linkages:

- Community collaborations in each urban area
- after school care providers
- ISU office of Biotechnology
- Space Grant
- Women and Science in Engineering
- community colleges
- technology related businesses
- schools

Target Audiences:
Youth K–12, extension committees, volunteers, extension staff

Project Duration:
Intermediate—development of marketing plan
Long term—volunteer management system, science/technology career readiness

Plans For Resource Development:
Iowa 4-H Foundation, private foundations, science related foundations/grant sources, private business, National 4-H Council

Allocated Resources:

Year	SYs	State and Federal funds
FY99	5.5	$ 426,922
FY00	5.5	433,106
FY01	5.5	439,414
FY02	5.5	445,848
FY03	5.5	452,411
FY04	5.5	459,105

GOAL 5: Impacts
Iowans will improve their individual and family financial wellbeing and strengthen their family relationships. Youth will develop life skills while having a positive relationship with trained

adults. Communities will develop their community capital and proceed with a vision to implement community improvements.

1862 Extension: Summary of Allocated Resources*:

Funding Source	FY 99 (Base)	FY 00	FY 01	FY 02	FY 03	FY 04	Total FY 00–04
Goal 1							
Federal $	2,856,613	2,826,841	2,856,975	2,887,712	2,919,064	2951043	**14,441,635**
State $	7,503,750	7,643,137	7,724,416	7,807,520	7,892,285	7,978,747	**39,046,105**
Total $	**10,360,363**	**10,469,978**	**10,581,391**	**10,695,232**	**10,811,349**	**10,929,790**	**53,487,740**
SYs	141.3	141.3	141.3	141.3	141.3	141.3	**706.5**
Goal 2							
Federal $	145,009	145,009	145,009	145,009	145,009	145,009	**725,045**
State $	380,909	388,527	396,298	404,224	412,308	420,555	**2,021,912**
Total $	**525,918**	**533,536**	**541,307**	**549,233**	**557,317**	**565,564**	**2,746,957**
SYs	6.8	6.8	6.8	6.8	6.8	6.8	**34.0**
Goal 3							
Federal $	44,472	44,981	45,366	45,819	46,278	46,740	**229,184**
State $	120,240	121,617	123,156	124,665	126,208	127,788	**623,434**
Total $	**164,712**	**166,598**	**168,522**	**170,484**	**172,486**	**174,528**	**852,618**
SYs	2.0	2.0	2.0	2.0	2.0	2.0	**10.0**
Goal 4							
Federal $	689,077	695602	716,959	738689	760853	783461	**3,695,564**
State $	1,810,068	1,880,704	1,938,446	1,997,197	2,057,124	2,118,247	**9,991,718**
Total $	**2,499,145**	**2,576,306**	**2,655,405**	**2,735,886**	**2,817,977**	**2,901,708**	**13,687,282**
SYs	25.0	25.0	25.0	25.0	25.0	25.0	**125.0**
Goal5							
Federal $	3,036,657	3,036,657	3,036,657	3,036,657	3,036,657	3,036,657	**15,183,285**
State $	7,976,695	8,136,229	8,298,953	8,464,932	8,634,230	8,806,916	**42,341,260**
Total $	**11,013,352**	**11,172,886**	**11,335,610**	**11,501,589**	**11,670,887**	**11,843,573**	**57,524,545**
SYs	142.3	142.3	142.3	142.3	142.3	142.3	**711.5**
Annual							
Federal $	6,771,828	6,749,090	6,800,966	6,853,886	6,907,861	6,962,910	**34,274,713**
State $	17,791,662	18,170,214	18,481,269	18,798,538	19,122,155	19,452,253	**94,024,429**
Total $	**24,563,490**	**24,919,304**	**25,282,235**	**25,652,424**	**26,030,016**	**26,415,163**	**128,299,142**
SYs	317.4	317.4	317.4	317.4	317.4	317.4	**1,587.0**

* The federal and state funds represent 82.8% of the total received. The remainder of the funds are allocated to county administration and general administration including finance, human resources, communication and computer staff.

II. Stakeholder Input Process:

Research

- Ongoing: input is continually received through various external advisory councils and boards. Also, most of the college and department administrators serve as ex officio committee members for or regularly meet with one or more external organizations and receive feedback through these interactions.
- Specific Actions: all departments and centers were asked to identify the organizations and agribusinesses they interact with; additional organizations were identified via the Iowa Department of Agriculture and Land Stewardship and Cooperative Extension Service. If individuals were specified, they were included. A special attempt was made to include underrepresented groups—those not routinely included in information gathering efforts in Iowa such as the dairy goat, elk breeder, ostrich, honey producer, grocery industry, library, newspaper, rural school, black farmer, women, and education associations, as well as representative processors and marketers—with some success (the library association, two education associations and one marketer participated and provided input). The leaders of these groups were contacted with an invitation to attend or to send a representative to one of a series of listening sessions/focus groups scheduled around the state. A professional facilitator was used to stimulate discussion and assist with these sessions. The stakeholders identified and prioritized issues important to agriculture in general and the State of Iowa in particular, with suggestions as to the role Iowa State University should be taking. It is our intention to hold these listening sessions/focus groups on a regular basis and to continue to encourage participation by the underrepresented and underserved populations of Iowa.

Animal Health and Disease Research Program at Veterinary Medicine

- The State of Iowa has a standing advisory council, Iowa Livestock Health Advisory Council (ILHAC), composed of livestock producers and veterinarians. The ILHAC was established in 1977 and provides advice in the expenditure of state funds allocated to Iowa State University for livestock disease research. This Council will provide stakeholder input on 1433 Formula Fund grant proposals on the relevance of research to the needs of the livestock industry. ILHAC has 10 voting members: three pork producers appointed by the Iowa Pork Producers Association, three beef cattle producers appointed by the Iowa Cattlemen's Association, one dairy cattle producer appointed by the Iowa Dairy Association, one poultry producer appointed by the Iowa Turkey Growers Association and Iowa Poultry Association, one sheep producer appointed by the Iowa Sheep Producers Association, and a veterinarian appointed by the Iowa Veterinary Medical Association. Each member serves a maximum of two, three-year terms. In addition, representatives of Iowa Cattlemen's Association, Iowa Pork Producers Association, Iowa Sheep Producers Association, Iowa Poultry Association, Iowa Turkey Growers Association, Iowa Veterinary Medical Association, State of Iowa Veterinarian, and Dean and Associate Dean for Research of the College of Veterinary Medicine serve as ex-officio nonvoting members. The commodity groups annually prepare a list of research priorities, which are shared with the College of Veterinary Medicine. The ILHAC will review proposals submitted in the 1433 Formula Funds competition and provide input to the associate dean for research. The final decisions on funding allocations will be made by the associate dean for research and the dean based on the scientific merit ranking provided by the Research Advisory Council and the stakeholder input provided by ILHAC.

Extension

During the 1999 program year, Iowa State University Extension initiated a statewide needs process throughout our entire system. Over 450 community and state meetings were held, involving more than 12,000 citizens in the needs identification process. An additional 17,000 citizens participated via 115 surveys, focusing on needs identification for the year 2000–2004. In total, more than 30,000 citizens were directly involved in needs identification. Secondary sources, primarily community needs identification surveys done during the past year, were also cited by the majority of staff in rounding out the needs identification process at both the field and state level.

County extension education directors visited widely with constituents in their locale using a variety of needs identification processes. Extension program directors in Agriculture and Natural Resources, 4-H Youth, Families and Communities asked the same questions of university researchers, state agencies and program collaborators, federal partners, advisory groups, field and state specialists.

Individuals and groups who contributed needs information included:

- Farmers, commodity groups, producers, elevator operators, ag lenders, bank boards, Farm Bureau
- Rural and community development committees, environmental commissions, chambers of commerce
- Families, human service and public health agencies, ecumenical ministerial alliances
- Youth, youth committees, teachers, school boards, fair boards, 4-H councils
- Legislators
- Area Education Agencies, community colleges

After soliciting needs from citizens at the county level, each of Iowa's 100 county directors involved their publicly elected, nine-member county extension councils in prioritizing 4–7 needs to send forward to the state. Program directors did a similar process with state level stakeholders. Each need sent forward included information on:

- What is The Need
- Describe Size and Scope
- Other Organizations Involvement
- Extension's Local Role
- How Need Was Identified
- Number of People Involved in Identification

Needs Assessment:

For the needs assessment portion of the program planning process, the administrative team reviewed the individual needs sheets from counties and state. Similar needs were grouped together, and using several "filters", i.e., fit with mission, vision, and values, frequency counts from counties, federal base and initiative programs, and program balance, priorities were determined. This resulted in a list of "projects" as well as ongoing programming efforts that require support by Extension during the 2000–2004 period. Projects are defined as major system

wide efforts requiring a multi-disciplinary approach, are of long term, involve state and local funding partners to be successful, and have a strong, clearly identified research partnership.

Designing the statewide plan:

The administrative team appointed state "project" committees made up of field and campus staff to provide program leadership. Committees developed the initial plans using the following template: statement of issue, performance goals, output indicators, outcome indicators, key program components, internal and external linkages, target audiences, project duration, and plans for resource development. Plans will be in a continual process of updating, and are available on a public web site (http://www.exnet.iastate.edu/Pages/families/2000-index-1.html) and staff only web site. The staff only web site contains evaluation tools, committee minutes, and activity forms. Each staff member develops a "rolling" personal plan of work, updated every six months, based on the statewide plan.

Underrepresented/Underserved:

Racial diversity in Iowa continues to show slight changes. Our population has changed from 1990 estimates of 97.4% white, 1.4% black, 0.9% Hispanic, and .3% other to 95% white, 1.9% black, 1.7% Hispanic and 1.4% other in 1996. The Hispanic increase is predicted to accelerate within our state over the next five years. Ag processing firms serve as employers of many of these new residents in rural areas.

To give some detail to the "other" category, some rural Iowa communities are now working with residents speaking up to nine different languages. For example, new residents in Postville, Iowa, population 1400, includes 400 individuals from: Nigeria, Kazakhastan, El Salvador, Kyrghystan, Guatemala, Bangladesh, Philippines, Bosnia, Kosovo, Ukraine, Russia, Czechoslovakia, Albania and Mexico. Individuals in this community are employed by two ag industries.

In addition to people of color, our programs have been expanded to include members of other traditionally under represented audiences, for example: physically challenged; mentally challenged; men in family service/care programs; i.e., parenting, child care and nutrition; women in agriculture; individuals and families in poverty; families education for adult partners; older Iowans; and incarcerated Iowans.

Individuals from traditionally underserved and/or represented groups were included in the initial needs identification process and in the program allocation process by a variety of means. Each county with 200 or more minorities, made special efforts to recruit views of minority citizens in the needs identification process. In addition:

- A statewide needs identification effort associated with a social marketing effort focused on nutrition education for limited resource families using fifteen focus groups; seven groups of mothers, three of fathers, five of childcare providers. One mothers group was conducted in Spanish.
- A community needs identification process in Northwest Iowa focused on Hispanic families moving into the community and the support they desired to achieve success and acceptance in the school and the community.
- Needs identified by families who are part of the welfare reform research/extension project were recorded through ethnographic interviews by staff.

- Follow up to parenting programs with hearing impaired children and adults included dialogue regarding additional needs.
- A nationwide satellite conference on grandparents raising grandchildren included needs identification session.
- The CYFAR state strengthening project evaluations included needs identification with families at high risk.
- Iowa county councils are made up of elected representatives; these councils were also involved in the local program allocation process. Counties are strongly encouraged to recruit candidates with gender and ethnic background similar to the population of the county. For example, in East Central Iowa county council membership is 61 male, 52 female, with 3 vacant seats. Three council members are people of color.
- Members from the State Association of County Councils and the Citizens Extension State Advisory group were also involved in the program allocation process. Both of these groups include gender balance and ethnic participation.

III. Program Review Process:

a. Merit Review

Program Directors identified similar program efforts and audiences in Missouri, Minnesota and Wisconsin and asked those states to review sections of the plan. In addition, we asked the Iowa Association of County Extension Councils to review the entire plan. We provided the feedback from reviewers to the project committees, and changes were made as appropriate. Written comments from reviewers are available upon request.

b. Scientific Peer Review

All projects funded under the Hatch Act of 1887 Multistate Research Fund undergo a scientific peer review. For regular Hatch projects, the department head recommends a minimum of three (on campus) to six (a combination of on-campus and off-campus) potential reviewers who are expected to have expertise in a relevant field and to possess appropriate scientific and technical standards. The experiment station administration selects reviewers and requests that they review a project, with particular attention to the criteria listed in the *Administrative Manual for the Hatch Act as Amended* plus additional criteria required by the Iowa Agriculture and Home Economics Experiment Station. For multistate Hatch projects, reviews are conducted by administrative oversight committees, the multistate research committees, and the directors prior to submission to the CRIS office for final approval.

IV. Multistate Research and Extension Activities

a. Hatch Multistate Research

The Iowa Agriculture and Home Economics Experiment Station projects the following fiscal resources for multistate projects:

	FY 99 (Base)	FY 00	FY 01	FY 02	FY 03	FY 04
Total Hatch and matching funds	$3,253,566	$3,318,637	$3,385,010	$3,452,710	$3,521,764	$3,592,200

The Iowa Agriculture and Home Economics Experiment Station participates in the following multistate projects:

REE Goals	Project number	Title	Participants include:
	DC 97-13	Development of new processes and technologies for the processing of poultry products (writing committee for new project)	
1, 4	DC 98-03	Systems for controlling air pollutant emissions and indoor environments of poultry and livestock facilities (writing committee for S-261 replacement)	
1	NC-007	Plant germplasm and information management and utilization	IN, IA, KS, NE, OH, IL, MI, MN, MS, ND, SD, WI
1	NC-062	Enteric diseases of swine and cattle: prevention, control and food safety	AZ, IL, IN, IA, KS, MI, MN, MO, NE, OH, SD, PA, WA, NADC, UCSD, U-IA, MN-MED
4	NC-094	Climate and agricultural landscape productivity analysis and assessment in the North Central Region	IA, IL, IN, KS, MI, MN, MO, NE, SD, WI
N/A	NC-100	RRF administration, planning and coordination	IA, IL, IN, KS, MI, MN, MO, ND, NE, OH, SD, WI
1	NC-107	Bovine respiratory diseases: risk factors pathogens, diagnosis, and management	CA, IL, IN, IA, KS, LA, MI, MN, MS, MO, NE, ND, OH, OK, SD, TN, TX, WI
1	NC-113	Methods to increase reproductive efficiency in cattle	IL, IA, KS, MI, MO, OH, WI
1, 4	NC-119	Management systems for improved decision making and profitability of dairy herds	AL, AZ, CA, FL, GA, IL, IN, IA, KS, MI, MN, MO, NE, NH, NM, NYC, OH, PA, SD, TN, TX, VA, WA,

			WI
1, 4	NC-125	Biocontrol of soil-borne plant pathogens	ARS, IA, IL, IN, KS, MI, MN, ND, OH, WI
1, 2	NC-129	Fusarium mycotoxins in cereal grains	GA, IL, IN, IA, KS, MI, MN, MO, NE, ND, PA, WI, USDA-ARS, CANADA
1	NC-131	Molecular mechanisms regulating skeletal muscle growth and differentiation	ARS, AL, AZ, CA, CTS, IA, IN, MI, MN, MO, NE, NYC, OH, SD, WA, WI
1	NC-136	Improvement of thermal processes for foods	CA, FDA, FL, IN, IA, MI, MN, MO, NE, NJ, NYG, NYC, NC, ND, OH, OR, PA, TX, WA, WI, Nat'l Ctr Food Safety and Tech
1	NC-140	Rootstock and interstem effects on pome- and stone-fruit trees	AR, CA, CO, GA, IL, IN, IA, KS, KY, MA, MD, ME, MI, MN, MO, NC, NJ, NYG, OH, OR, PA, SC, SD, TN, UT, VA, VT, WA, WI, WV
1	NC-142	Regulation of photosynthetic processes	AZ, FL, GU, IL, IA, KS, MI, MN, MO, NE, NV, ND, OR, PA, WA, WI, USDA/ARS
1, 4	NC-157	Crop and ruminant systems to conserve Midwestern unglaciated soils and water quality (Lancaster)	IA, IL, IN, MN, WI, USDA-ARS
3	NC-167	Role of n-3/n-6 polyunsaturated fatty acids in health maintenance	CA, CO, IN, IA, KS, LA, MI, MN, NE, OH, OR, TX, WI
1	NC-168	Advanced technologies for the genetic improvement of poultry	ALX, AR, CA, CANADA, DE, IL, IA, MD, MA, MI, MN, NC, OH, IN, VA, WI, USDA/ARS
3	NC-170	Occupational safety and health through the use of protective clothing	CA, CANADA, GA, IA, IL, MD, MI, NE, NYC, OK
1, 4	NC-174	Management of eroded soils for enhancement of productivity and environmental quality	ARS, IA, IL, MI, MN, MO, ND, NE, OH, SD, WI
1	NC-185	Metabolic relationships in supply of nutrients for lactating cows	AL, AZ, CA, FL, IL, IN, IA, KS, KY, MD, MI, MN, MO, NH, ND, OH, PA, SD, UT, WA, WI, USDA/DFRC, USDA/RN
1	NC-189	Forage protein characterization and utilization for cattle	IA, IL, IN, KS, MI, MN, MO, MT, NM, NYC, ND, NE, OH, OK, SD, WI
1	NC-202	Biological and ecological basis for weed	CO, IN, IA, MT, MI, MN,

		management decision support systems to reduce herbicide use	OH, NE, SD, WI
1, 4	NC-205	Ecology and management of European corn borer and other stalk-boring lepidoptera	DE, IL, IA, KS, KY, MD, MA, MI, MN, MO, NE, NYG, NC, ND, OH, PA, SC, TX, WI
1	NC-208	Impact analysis and decision strategies for agricultural research	AL, CA, FL, GA-Athens, ID, IA, LA, MI, MN, MO, MT, NE, NJ, NYC, TX, VA, WI
1	NC-209	Genetic improvement of cattle using molecular genetic information	AZ, CA, IL, IA, MA, MI, MN, OH, SD, USDA/ARS, VA, WI
1	NC-210	Positional and functional identification of economically important genes in the pig	IL, IA, KS, MI, MN, NE, OK USDA/ARS, UT/BYU
1, 2	NC-213	Marketing and delivery of quality cereals and oilseeds	AR, IL, ID, IN, IA, KS, MI, MN, MT, NE, ND, OH, TX, WA, WI, USDA-ERS, USDA-ARS
1, 4	NC-215	Overwinter survival of heterodera, pratylenchus, and associated nematodes in the North Central Region	AR, IL, IN, IA, KS, MI, MN, MO, NE, ND, SD, WI
3, 4, 5	NC-216	The adoption of sustainable farming systems: implications to agricultural education	IA, IN, KS, MI, MN, ND, OH, WI
5	NC-217	The role of housing in rural community vitality	U of AL, ID, IN, IA, KS, LA, MN, NE, NYC, IL State U, West MI U, MOX, U Dayton, E Carol. U, UT
4	NC-218	Characterizing nitrogen mineralization and availability in crop systems to protect water resources	IL, IN, IA, KS, MI, MN, MO, NE, OH, SD, WI, USDA-ARS
3	NC-219	Using stages of change model to promote consumption of grains, vegetables and fruits by young adults	AZ, IA, KS, ME, MI, NE, OH, OR, SD, WI
1	NC-220	Integration of quantitative and molecular technologies for genetic improvement of pigs	AL, GA, IN, IA, NE, NC, NCX, OH, OK, VA, USDA/ARS
1, 2, 4, 5	NC-221	Financing agriculture and rural America: issues of policy, structure and technical change	AR, IL, IN, IA, KS, KY, MN, MI, NYC, ND, OH, TX, Fed Res Bank of Kansas City, USDA/ERS
1, 5	NC-222	Impact of technology on rural consumer access to food and fiber products	CO, NYC, IL, IA, KY, MN, MS, NE, ND, OH, OK, WI
5	NC-223	Rural low-income families: Monitoring their well-being and functioning in the context of welfare reform	CA, CO, ID, IN, KY, LA, MA, MI, MN, MO, NE, NH, OH, OR, UT, WY (IA, SD, WI participating in annual

			meeting)
1	NC-224	Competitiveness and value added in the U.S. grain and oilseed industry	AR, GA, IL, IA, KS, LA, MN, MS, NE, ND, OH, OK, OR, USDA/ERS, USDA/ACS
1	NC-225	Improved grazing systems for beef cattle production	IA, KS, MO, NE
	NCA-001	Crop and soil research	
	NCA-002	Animal health advisory committee	
	NCA-004	Horticultural crops	
	NCA-005	Human science research	
	NCA-006	Livestock production	
	NCA-010	Forestry and forest products	
	NCA-012	Agricultural economics	
	NCA-013	Rural sociology	
	NCA-014	Plant pathology	
	NCA-015	Entomology and economic zoology	
	NCA-016	Agricultural engineering	
	NCA-022	Food science and human nutrition	
	NCA-023	Fisheries and wildlife	
	NCA-024	Agricultural education research	
	NCR-003	Soil survey	
	NCR-009	Midwest Plan Service	
	NCR-013	Soil testing and plant analysis	
	NCR-021	Quantitative genetics	
	NCR-022	Small fruit and viticulture research committee	
	NCR-025	Corn and sorghum diseases	
	NCR-031	Physiological aspects of forage management	
	NCR-042	Swine nutrition committee	
	NCR-046	Corn rootworms	
	NCR-052	Family economics	
	NCR-057	Reproductive physiology	
	NCR-059	Soil organic matter	
	NCR-065	Social change in the marketplace: consumer/retailer/producer interface	
	NCR-084	Potato genetics	
	NCR-087	Beef cow-calf nutrition and management committee	
	NCR-089	Swine management research committee	
	NCR-097	Regulation of adipose tissue accretion in meat animals	
	NCR-101	Controlled environment technology and use	
	NCR-103	Specialized soil amendments, products,	

		growth stimulants, and soil fertility management programs	
	NCR-125	Arthropod biological control	
	NCR-131	Animal care and behavior	
	NCR-134	Applied commodity price, analysis, forecasting and market risk management	
	NCR-137	Soybean diseases	
	NCR-148	Migration and dispersal of insects and other biotic agents	
	NCR-159	Expanded utilization of oilseeds in the industrial sector	
	NCR-167	North Central Regional corn breeding Research Committee	
	NCR-168	Epidemiology and economics of animal health management	
	NCR-170	Research advances in agricultural statisticians	
	NCR-174	Synchrontron X-ray sources in soil science research	
	NCR-179	Agricultural and rural transportation system	
	NCR-180	Site specific management	
	NCR-183	Utilization of animal manure and other organic residuals in agriculture	
	NCR-184	Management of head scab of small grains	
	NCR-185	Optimizing nutrient intake by feedlot cattle for growth, retail product and environmental concerns	
	NCR-187	Enteric diseases of poultry	
	NCR-189	Air quality issues associated with animal facilities	
	NCR-190	Increased efficiency of sheep production	
	NCR-191	Avian respiratory diseases: pathogenisis, epizootiology and control	
	NCR-192	North central regional turfgrass	
	NCR-193	Maintaining plant health: managing insect pests and diseases of landscape plants	
	NCR-194	Research on cooperatives	
	NCR-195	Mississippi river watershed nutrient sources and control	
	NCR-196	Watersheds and landscapes: integrating social and biophysical data at a regional scale	
	NCS-003	IPM	IA, IL, IN, KS, MI, MN, MO, ND, NE, OH, SD, WI

	NCS-005	Water quality research strategy and coordination	IA, IL, IN, KS, MI, MN, MO, ND, NE, OH, SD, WI, USDA/ARS, EPA
	NCT-174	Soybean consumption and human health maintenance	IL, IN, IA, MI, MN, MO, NE, OH, SD, USDA/ARS
	NCT-175	Development of pest management strategies for forage alfalfa persistence	IL, IN, KY, MD, MI, MN, MO, NE, NY, OH, OK, PA, SD, VA, VT, WI, WY
	NCT-176	Information management for agricultural production systems	IA, IL, IN, MI, MN, NC, ND, NYC, OH, TX, WI (OK, PA, TN unofficial participants)
	NCT-177	Agricultural safety and health research	
	NCT-179	Riparian management in Midwestern agricultural and forest ecosystems	IL, IN, IA, MI, MN, MO, NE, WI
1	NE-060	Genetic bases for resistance and immunity to avian diseases	AL-UAB, ARS, CA, CANADA, IA, MA, MA-SMITH, MA-FRAM, MCGILL, NH, NYC, NC, PA, Univ of PA
1	NE-112	Mastitis resistance to enhance dairy food safety	CA, CTS, IL, IA, KY, LA, MI, NYC, OH, PA, TN, VT, VA, WA, USDA/ARS
1	NE-127	Biophysical models for poultry production systems	AR, CTS, IL, IA, MI, MD, MN, NE, NYC, PA, TX, WI
1	NE-144	Forage crop genetics and breeding to improve yield and quality	CANADA, IA, KS, KY, MN, NYC, SD, WV, USDA-ARS
5	NE-162	Rural economic development: alternatives in the new competitive environment	AZ, CA, DE, GA, IN, IA, KY, MI, MN, MO, NV, NYC, NH, NC, OH, OR, PA, RI, SC, UT, TX, VA, WA, WI, USDA/ERS/ED
1, 2, 5	NE-165	Private strategies, public policies, and food system performance	AR, CA, CTS, FL, GA, IL, IN, IA, KS, LA, MD, MA, MI, MN, MT, NE, NH, NJ, NYC, NC, OH, RI, TX, VA, WI, USDA/ERS, USDA/RBS, USDA/AMS, USDA/PSA, CDCP, FDA, GAO
5	NE-167	Family business viability in economically vulnerable communities	HI, IN, IA, IL, MN, MT, NE, ND, NYC, OH, PA, RI, UT, VT, WI, CANADA
2, 4, 5	NE-185	Commodities, consumers, and communities: local food systems in a globalizing environment	CA, IA, KS, LA, ME, MI, MN, MO, NJ, NYC, NC, PA, PR, TX, WA, WV, WI,

			Wallace Inst. for Alternative Agric.
	NEC-063	Commodity promotion programs	
	NRSP-001	Research planning using the Current Research Information System	
1, 4	NRSP-004	A national agricultural program to clear pest control agents for minor uses	
	NRSP-005	Develop and distribute deciduous fruit tree clones that are free of known graft-transmissible pathogens	
	NRSP-006	Inter-regional potato introduction	
	NRSP-007	A national agricultural program to approve animal drugs for minor species and uses	
1	NRSP-008	National animal genome research program	
5	S-259	Rural labor markets in the global economy	AR, GA, IA, KS, KY, LA, MD, MI, MN, MS, NYC, OH, PR, NC, SC, WI, AL, HUNTSVILLE, USDA/ERS
1, 2	S-263	Enhancing food safety through control of foodborne disease agents	AL, AR, GA, IA, KY, LA, MI, MN, MS, NE, NC, SC, TX, VA
1	S-268	Evaluation and development of plant pathogens for biological control of weeds	AL, AR, FL, IA, MN, IL, USDA/ARS, LA, MA, MD, MS, NYC, WI
4	S-273	Development and application of comprehensive agricultural ecosystems models	AL, FL, GA, IL, IA, KY, LA, MD, MN, NCSU, OH, OK, TN, TX, VA, NCX, USDA-ARS
1	S-274	Integrated management of arthropod pests of livestock and poultry	AL, AR, FL, GA, IA, IN, IL, KS, KY, LA, MN, MO, NE, NH, NM, ND, NYC, OK, PA, TN, TX, WY, USDA-ARS, FLX, CANADA
1, 4	S-275	Animal manure and waste utilization, treatment, and nuisance avoidance for a sustainable agriculture	AL, CA, FL, GA, HI, IL, IN, IA, KY, LA, MN, NC, OR, SC, TN, TX, VA, WI, USDA-ARS
1, 4, 5	S-276	Rural restructuring: causes and consequences of globalized agricultural and natural resource systems	AL, IA, KY, LA, MI, NC, OH, PR, SC, TX, GAX, NCX
1, 3, 5	S-278	Food demand, nutrition and consumer behavior	CA, FL, GA, IL, IN, IA, KS, LA, ME, MN, NJ, NYC, NC, OH, OR, SC, TN, TX, VA, WA, WI, U of NC, USDA/ARS, USDA/CNPP,

			USDA/ERS, USDA/FCS, US/BLS
1	S-281	Dynamic soybean insect management for emerging agricultural technologies and variable environments	AR, FL, GA, IL, IN, IA, KY, LA, MS, NE, OH, SC, TN, TX, VA
1, 2	S-284	Genetic enhancement of health and survival for dairy cattle	IL, IN, IA, LA, MN, NE, NYC, NC, PA, VA, WI, AIPL, U of Guelph
2	SERA-IEG-2	Food Safety	
4, 5	SR-IEG-070	Economics and management of risk in agricultural and natural resources	
4	W-082	Pesticides and other toxic organics in soil and their potential for groundwater and surface water contamination	AZ, AR, USDA-ARS, CA, FL, HI, IA, IN, KS, MN, MT, NV, TVA, NMIMT, NYC, WA
1	W-102	Integrated methods of parasite control for improved livestock production	ARS, AZ, CA, FL, IA, KS, LA, MN, MO, MT, UT, VA, WA
1	W-128	Micro-irrigation: management practices to sustain water quality and agricultural productivity	ARS, AZ, CA, CO, GU, HI, IA, KS, MI, NM, OR, TX, VA, WA, WY
4, 5	W-133	Benefits and costs of resource policies affecting public and private land	CA, CA-D, CO, GA, IA, ME, MA, MI, NV, NH, NM, NYC, OH, OR, TN, UT, WA, WV
1	W-168	Seed biology and technology	ARS, USDA/FS, AZ, CA, CO, IA, IN, ID, KS, KY, LA, NYG, NYC, NC, OH, OR, VA, WA
4	W-170	Chemistry and bioavailability of waste constituents in soils	ARS, CANADA, CA, CO, FL, HI, IA, IL, NM, KS, MI, MO, MT, NM, OH, WA, WI, WY
1	W-171	Germ cell and embryo development and manipulation for the improvement of livestock	AR, CA, CO, IA, IL, LA, OR, UT, WA
1	W-173	Stress factors and their effects on performance of farm animals	AZ, CA, CO, HI, IA, KS, MS, MO, NE, NYC, OR, TN, TX, UT, USDA/ARS
1, 2	W-177	Enhancing the global competitiveness of U.S. red meat	CA, CO, ID, IA, KS, NE, NV, NM, OK, SD, TX, UT, VA, WA, WY, USDA/ARS, USDA/ERS
	W-181	Modifying milk fat composition for improved manufacturing qualities and consumer acceptability	CA, ID, IL, IA, MN, NYC, OH, SC, SD, UT, VA, WA, WI

5	W-183	Improvement of rural and agricultural sample survey methods	AZ, ID, IA, MT, NYC, OR, PA, WA
1, 4, 5	W-187	Interactions among bark beetles, pathogens, and conifers in North American forests	CA, CO, FL, GA, IA, MS, OR, UT, WI, AZ.NAU, LA(BOTONY), USDA/FS
4	W-188	Improved characterization and quantification of flow and transport processes in soils	AZ, CA, CO, DE, IN, IL, IA, KS, MT, NV, ND, UT, WA, WY, ARS
	WCC-001	Beef cattle breeding research in the western region	AZ, CO, IA, MT, NM, TX, WA, WY, CANADA, USDA/ARS
	WCC-058	The production, transition handling, and reestablishment of perennial nursery stock	AZ, CA-R, HI, IA, MI, NJ, OH, OK, OR, TX, UT
	WCC-060	Science and management of pesticide resistance	AL, AZ, CA-D, CO, IA, IL, IN, KS, LA, MI, MN, MT, NC, NE, NY, OK, OR, SC, UT
	WCC-076	The impact of immigration on rural America	CA-D, CA-R, CO, FL, IA, MI, NM, NY, WA, USDA/ERS, DOL
	WCC-084	Community, institutional change and migration in rural America	CA-D, CO, IA, NV, UT, WA, USDA/AREC
	WCC-100	Implementation and strategies for national beef cattle evaluation	CO, FL, GA, IA, IN, KS, MI, MN, MT, NE, NY, OK, SD, WA, USDA/ARS
	WCC-101	Assessing the Chinese market for U.S. agricultural products	AR, CA-B, CA-D, CO, DE, GA, IA, ID, LA, ND, NY, OH, OR, WA, USDA/ERS, USDA/FAS

In addition, Iowa State University was a founding member of the Multistate Consortium on Animal Waste (which currently includes Iowa State University, Michigan State University, University of Missouri, North Carolina State University, Oklahoma State University, and Purdue University). This is an intermediate-term, multistate, multidisciplinary effort supported by funds from the Environmental Protection Agency, agricultural research formula funds provided by the Hatch Act, and the State of Iowa. Proposed projects are subject to review and are selected through a competitive process. Projects selected for funding in FY00 cover such diverse but relevant topics as

- near infrared technology to determine manure nutrients;
- developing an objective approach to odor characterization while assessing diet as a tool to manage odor emission;
- internet-based computer programs for comprehensive nutrient management planning and recordkeeping, and integrating animal manures into precision nutrient management planning;
- quantifying the impact of soil test phosphorus and manure application on phosphorus losses from benchmark soils, impact of diet manipulation on manure phosphorus

production by swine, poultry, beef and dairy cattle and soil properties of the generated manure phosphorus, assessment of the impact of manure applications on soil phosphorus and water quality, and amino acid manipulation of swine diets to reduce nitrogen excretion, ammonia and odor;
- reducing excretion of zinc and copper in swine waste through dietary manipulation and evaluation of the excretion and retention of zinc and copper from nursery pigs fed either an organic or inorganic mineral source, and
- evaluating commercial systems for controlling dust-borne odorants emitted from swine buildings and effects of dust, sample handling and other factors on quantification of swine house odor and gases.

This is an innovative approach to jump-starting new avenues of multistate, multidisciplinary research.

b. Smith-Lever Multistate Extension

ISU Extension participates in many multistate programs funded by both state and federal funds. These programs are listed below. When the guidelines for audit procedures are determined, a final report on the percentage of Smith Lever funds allocated to multistate efforts will be provided to USDA.

Goal 1

- Midwest Planning Service—provides structure and staff for coordination of preparation and the printing and distribution of handbooks and other educational material across the region. Presently the subject matter relates primarily to agricultural engineering, but is reorienting to serve other agricultural and natural resources program areas. Financially supported by all NC states.
- Tri-State Swine Workshop—A three-day, tri-state swine workshop is held in SE South Dakota or NE Nebraska, focused on intense swine production. Supported by Iowa, South Dakota and Nebraska.
- Tri-State Dairy Program—A tri-state dairy program is offered in Iowa, South Dakota and Nebraska for producers. In the past, the program has been offered in one or two sites in each state, with extension specialists contributing to the programs.
- Four-State Dairy Program—Iowa, Minnesota, Wisconsin, and Illinois have developed a cooperative project targeting dairy producers. Specialists from the four states share materials and do joint programming across state lines. The program includes dairy management seminars and in-service training in each state, four-state DHIA board training and a four-state "Dairy Live" videoconference.
- NCR Sheep Task Force—all NCR states
- Pork Industry Handbook—all NCR states
- Midwestern Soybean Conference—all NCR states
- National Extension Corn Specialists Meeting (Am Seed Trade Assn)
- National Extension Soybean Specialists Meeting (Am Seed Trade Assn)
- 4-State Forage Industry-Extension Council (SD, MN, IA WI)
- MINK Forage-Livestock Systems Group (MO, IA, NE, KS)

- Mapping Soil and Field Characteristics to Understand Soybean Yield (MO, MI, SD, IA)
- Advisory Comm & National Intensive Alfalfa Training Schools (with The Alfalfa Council)
- Bi-State Horticulture Clinic (IA, IL)
- Great Plains Vegetable Conference (NE, IA, MO, and KS)
- Illinois/Iowa Fruit & Vegetable Conference (IA, IL)
- Regional Farm Management Committee
- NCR Publications—all NCR states

Goal 2

- Food safety curriculum for EFNEP and FNP (proposal)—IN, IA
- Sharing EFNEP resources regionally—IA develops a calendar annually used by several NCR states, Building a Healthy Diet is an Iowa curriculum being explored by several states within the region for possible use.
- Disseminate of daily food safety news on the Iowa FS&Q web-site done in cooperation with the FoodSafety Network (FSNet), headquarted at Guelph, Ontario. Iowa in turn maintains the searchable archive of food safety news for Guelph.

Goal 3

- AgrAbility Project: Collaborating with Colorado, Delaware, Indiana, Kentucky, Minnesota, Mississippi, Missouri, Nebraska, North Carolina, North Dakota, Pennsylvania, South Dakota, Tennessee, Texas, Utah, and Wisconsin

Goal 4

- Regional Sustainable Agriculture Professional Development Project—This joint venture is developing and leading a three-year program in the NC region to better train Cooperative Extension faculty, Natural Resources Conservation Service personnel, and other educators in concepts of sustainability. Lead states are NE and OH.
- 3 State Weed Management Short Course (WI, MN, IA)
- North Central Regional USDA/IPM Weed Management Project (WI, MN, IA, IL, USDA)
- NCR Pesticide Education Committee
- NCR Integrated Pest Management Committee
- NCR Pesticide Impact Assessment Committee
- NCR Small Farm Committee
- NCR Alternative Pork Production Committee
- NCR Water Quality Coordinators Committee
- National Nutrient Management Committee
- NCR Publications—all NCR states

Goal 5

- Money 2000—national
- Adoption and Diffusion project for prevention Education for Youth and Families (proposal) —PA, IA
- Housing Projects in the North Central Region:

1. Home Ownership Education: Iowa, Kansas, Michigan, Missouri, Nebraska, and Wisconsin.
2. Community Planning for Affordable Housing in Rural Communities: Iowa, Kansas, Michigan, Missouri, Nebraska, and Wisconsin.
3. Regional Housing Web Site: Iowa, Illinois, Kansas, Michigan, Minnesota, Missouri, Nebraska, Ohio, and Wisconsin.
4. Exploring whether to set up regional home maintenance hotline: Iowa, Illinois, Kansas, Michigan, Minnesota, Missouri, Nebraska, Ohio, and Wisconsin.
5. Regional Specialists Housing List Serve: Iowa, Illinois, Kansas, Michigan, Minnesota, Missouri, Nebraska, Ohio, and Wisconsin.

- Textiles and Clothing—Textile and Apparel Manufacturing Directory
- National Network for Child Care—national
- Copin County Simulation (developing a health scenario) —IA, OH
- Rural Policy Research Institute (RUPRI) Welfare Reform Research Panel—Oregon State, Iowa, Missouri, Mississippi State, Kentucky, Cornell, Penn State, Washington, Wisconsin, Tuskegee, Clemson
- Workforce prep collaboration on resources and data collection with the states in the NC region, especially WI, MN and IA.
- Science and Technology Literacy—IA, MN, AL, CA, MI
- Revitalizing the 4-H Club—IA, MN, WI, MO, IL

V. Integrated Research and Extension Activities

Extension programs are directly linked with the research base of Iowa State University and other universities. Presently, there are 112 faculty with appointments split between research and extension working across the five program goals. This represents an extension allocation of $2.75 million (state and federal dollars) and an AES allocation of $3.04 million (state and federal dollars) toward integrated research and extension programs.

The coordination of research and extension programs occurs on a daily basis as campus-based faculty and staff (with both research and extension appointments) and field staff (extension and research and demonstration farm coordinators) interact to discuss current problems (disease outbreaks, weather related problems, etc.), to plan research and extension education programs and to implement these programs. The interaction that occurs is a two-way street as research is used to support educational programs and new issues that needed to be researched are shared with faculty.

This coordination/planning occurs in both a formal and informal basis. While some of the most productive planning occurs during informal discussions, a more formal approach is used with all of the programs included in the POW. The committees that developed the plans based on stakeholder need, meet to implement the plan.

The faculty interaction is mirrored by college and extension administrators who meet regularly to discuss research and extension program response to emerging issues (farm economy, welfare reform, etc.). Furthermore, administration has strongly supported the development of key centers, issue teams and programs that integrate disciplines to address key issues. One example is the Iowa Beef Center (see page 81) that has developed a process to engage research and extension faculty from several departments and colleges, field staff and producers.

The funding for integrated activities comes from state and federal funds. When the guidelines for audit procedures are determined, a final report on the percentage of Smith Lever and Hatch funds allocated to integrated efforts will be provided to USDA.