PLAN OF WORK

Annual Report of Accomplishments and Results

Iowa State University

Iowa Agriculture and Home Economics Experiment Station

Iowa State University Cooperative Extension Service

Federal Fiscal Year 2000
(October 1–September 30)

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A. Planned Programs:

1862 Research

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

Overview

The Iowa Agriculture and Home Economics Experiment Station has made progress against all the impacts identified in the plan of work for Goal 1. Research outputs take a number of forms:

- 240 Refereed Publications, Research Papers, Manuscripts
- 196 Non-refereed Publications, Reports, Technical Papers
- 175 Proceedings, Published Abstracts
- 116 Extension Publications
- 377 Invited Presentations
- 175 Education Programs, Field Days, Tours
- 51 Books & Chapters
- 13 Patents
- 33 Theses, MS/Ph.D Programs Completed
- 56 Miscellaneous

Outputs, outcomes and impacts: Highlights of research at Iowa State University:

① Anthracnose fruit rot fungus of strawberry, Colletotrichum acutatum, was found to survive and multiply on symptomless strawberry leaves. This revealed a previously unknown aspect of the pathogen's life cycle, which suggests that disease control measures might be more effectively targeted during periods of a strawberry crop's growth when fruit are not present.

② Treating harvested fruit with the ethylene inhibitor 1-methylcyclopropene (1-MCP) was found to delay ripening for short-term periods of time. Ripening delays were associated with the concentration of 1-MCP and fruit stage of development with higher rates required at later stages of fruit maturity. Postharvest applications of 1-MCP could allow the fresh market tomato distributors to delay fruit ripening for predictable short time periods to compensate for changes in market demand and thereby minimize product loss.

③ One project is adapting the composting process to remove moisture, readily degradable compounds, and odor potential from biotechnology byproducts to enhance their use in biocomposite materials. A compost mixture containing 40% paper sludge, 20% (biomass) and 40% fiber produced a composite with the best properties, followed by the mixture containing 33% of each of the 3 different components. The results showed that with the addition of 50% wood fiber, both samples produced boards with similar properties and meet the standard industry specifications for this use.

④ Formulation changes have resulted in improvements in the performance properties of the soy-protein based adhesive for use in medium density fiberboard. The team has also started working with particleboard and oriented strand board in addition to fiberboard. This change was in response to the technology transfer effort with Heartland Resource Technologies (HRT), a company based in Oelwein, IA. HRT has plans to build a facility to produce soy protein-based adhesives. The research team is currently working with HRT assist them in the development of the soy protein-based adhesive that will be produced at their facility.

⑤ New plant genes involved in ergonomically important processes were discovered. Three novel corn genes involved in starch biosynthesis were discovered. The description of these genes has shed new light on the molecular processes that are responsible for assembly of starch. The genes that code for the enzyme acetyl-CoA synthase and pyruvate dehydrogenase were characterized in the model plant species *Arabidopsis thaliana*. From these data the particular chemical pathway used by plants to produce acetyl-CoA was identified. The genes that code for the enzyme acetyl-CoA carboxylase also were characterized, providing new insights into the process used by plants to direct the production of oil and control the rate and amount of oil biosynthesis. Another gene was discovered in the project codes for the enzyme methylcrotonyl carboxylase, which is involved in the plant processes that determine the amino acid content of seeds. Gene discovery accomplishments provide information that is highly likely to be useful for future engineering of plant metabolism to meet a wide variety of food, nutritional, and industrial raw material needs.

⑥ Mutants of maize that do not produce starch normally were characterized. A new understanding of the starch biosynthetic process has arisen from these data and corresponding analyses from numerous other institutions working in various plant systems. Analysis of starch architecture in plants indicates that novel starches have been produced, and these are now being analyzed in greater detail to determine whether they possess any properties of specific interest in industrial uses. This technology has been patented and optioned to a major agricultural biotechnology firm in the U.S.

⑦ Research has resulted in the following releases: Sixteen general use and specialty soybean varieties were released to seed producers; five dent corn inbred lines with central U.S. Corn Belt maturity were released for use by breeders and seed producers; two early synthetic populations were released as germplasm sources for breeding programs for earlier maturity corns; and seed of two popcorn breeding populations and one popcorn inbred line were released for use by popcorn breeders and producers.

⑧ Models to predict flower development in maize were combined with EPA models to predict particulate dispersal in order to develop a rational approach to quantify the extent of pollen movement from one field of corn to another. This new technology can be used to assess the risk of ‘contaminating pollen’ entering an isolated seed production field or to assess the risk of GM pollen entering a neighboring non-GM field.

⑨ Corn gluten continues to control weeds and produce better turf appearance from the release of nitrogen associated with the protein based corn gluten. The technology has been licensed to 15 companies in 11 states.

⑩ Research continues on using five dipeptides as a natural herbicide. The dipeptides were extracted from the hydrolyzed corn gluten meal. They will allow for a variety of formulations and combinations with other herbicides to improve weed control efficacy and reduce chemical herbicides in the environment.

❶ Soy isoflavones and conjugated linoleic acid have been identified to elicit bioactivity relative to muscle growth and immune response in monogastric animals. ISURF filed a provisional patent on the soy isoflavone technology. Bioactive compounds in plants (i.e., soybeans) have been identified and their ability to elicit beneficial responses in animals have been delineated. These plants have a greater monetary as well as biological value. U.S. producers, the principal producers of these plants, can generate greater dollar returns when the plants are sold domestically or internationally for use in animal feeds. These bioactive compounds represent a natural, safe technology for enhancing the health status of animals.

❷ RNA was purified from placental tissue of Yorkshire females selected over multiple generations for marked differences in placental size and litter size (small placental line, 13-14 live piglets/litter; large placental line, 7-8 live piglets/litter). Suppression subtraction libraries have been prepared to elucidate specific genes important in increasing litter size. Use of newly developed micro-chip technology to discover genes important in optimizing litter size will pave the way for the development of simple genetic testing procedures for on-farm use. This should aid agribusiness concerns who will develop the tests and producers who can more effectively select genetically superior animals.

❸ Dairy products have been made from cows that have favorable and unfavorable ratios of fatty acids to total fatty acids. Butter, cheddar cheese, and provolone cheeses made from the milk with favorable fatty acids will be test marketed by a commercial partner. It is believed that these more healthy products can be sold in a niche market and increase the net income for producers and be more healthy for those that consume them.

❹ Feeding 25-hydroxyvitamin D (the first compound produced in the metabolism of vitamin D) to steers for one day, four days before harvest, increases blood calcium and improves tenderness of beef muscle with no increase in vitamin D and greatly reduced accumulation of the metabolite in tissues. This provides a practical low-cost nutritional approach for improving tenderness of beef muscle and enhancing consumer acceptance of beef.

❺ It was discovered that a minor metabolite of the amino acid leucine (HMB) could slow the process of muscle breakdown. Studies conducted with healthy individuals and those with cancer and AIDS show that HMB, in combination with other amino acids, has been shown to reverse the wasting process of certain cancers. Improved quality of life for these patients should result. HMB is now part of products that are sold in the human nutrition market.

❻ Information garnered from a long-term project has been used to improve the management of culture ponds used for larval fish production. A technical bulletin printed by the North Central Regional Aquaculture Center has been developed as a tool for both private and public aquaculturists to manage the zooplankton prey of culture ponds.

❼ A 2-year project focusing on the culture of sunfish for aquaculture has resulted in valuable information about their usability for the private aquaculture industry. Fundamental information on feed conversion and growth rates will be of assistance to the aquaculture industry.

❽ Three new revenue products have been introduced commercially. Two of these products were developed at ISU. A new ISU designed livestock revenue product has been developed and should come on the market in 2002. A significant outreach effort was made to help farmers understand how these tools could be used to reduce risk and increase returns. The proportion of the corn and soybean crop covered by these new products now exceeds 60% and this portion is expected to rise to 80% in 2002. We anticipate that the new livestock product will be used by about 50% of Iowa livestock producers within two years of its approval.

❾ Research identified higher-risk LDP strategies and made this information available to producers through meetings, the internet, electronic news services, a CD ROM, and analytical software. The program provided training in evaluating risk bearing ability and development management strategies to limit risk exposure to acceptable levels. Through training, lenders were able to identify clients with limited ability to bear price/yield/LDP risks and higher risk strategies, and encouraged clients to take appropriate risk-management steps.

Assessment of accomplishments as measured against POW:

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, ①②
- more efficient use of agricultural chemicals, ①⑩
- yield gains through genetic improvements, ⑦❷
- new products and applications, ③④⑤⑥⑨❶❸❺❽
- improved quality and consistency of products, and ❹
- a better understanding and adoption of appropriate risk management practices. ⑧❻❼❽❾

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.

State and Hatch Funds $ 11,215,079

FTEs 73.0

Key Theme – Adding Value to New and Old Agricultural Products

Program 1: Food Crops

a. Description of activity

This program has focused on three major issues: (1) Better adapted fruit and vegetable cultivars, (2) a greater understanding of basic plant biological processes, and (3) more efficient cultural practices.

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.

b. Impact/accomplishment –

Short-term:

- Cultivar trials were conducted for bush beans, broccoli, cauliflower, tomato and sweet corn in 2000. Trials continue in the evaluation of asparagus, scab-immune apple, strawberry, and blueberry cultivars. These trials offered shareholders the opportunity to observe cultivars under local conditions at four field days or other visits. Results serve as the basis for state and multi-state recommended cultivar lists.

- Anthracnose fruit rot fungus of strawberry, Colletotrichum acutatum, was found to survive and multiply on symptomless strawberry leaves. This revealed a previously unknown aspect of the pathogen's life cycle, which suggests that disease control measures might be more effectively targeted during periods of a strawberry crop's growth when fruit are not present.

- Treating harvested fruit with the ethylene inhibitor 1-methylcyclopropene (1-MCP) was found to delay ripening for short-term periods of time. Ripening delays were associated with the concentration of 1-MCP and fruit stage of development with higher rates required at later stages of fruit maturity. Postharvest applications of 1-MCP could allow the fresh market tomato distributors to delay fruit ripening for predictable short time periods to compensate for changes in market demand and thereby minimize product loss.

- Crop rotation with native prairie plants enhanced soil tilth and exhibited potential as an alterative to methyl bromide fumigation when rotating strawberry fields. Strawberry growers learned during field days and conferences how to use cover crops, including native plants, to improve soil quality when rotating strawberry fields. Using cover crops will reduce the reliance on methyl bromide and enhance soil tilth.

- A replicated field study documented that the presence of straw between rows significantly suppressed row-to-row spread of strawberry anthracnose fruit rot pathogen, Colletotrichum

acutatum, but had no effect on fruit yield. Straw mulch could be an effective cultural technique for the management of strawberry anthracnose fruit rot.

- A grower-friendly, soil-based trickle(micro)-irrigation system that uses sensors (tensiometers) to initiate and terminate the irrigation events for field use (especially muskmelon) was developed. Demonstration results indicated water and energy was held to a minimum and melon quality was not sacrificed. Adoption of this system could reduce production costs and conserve water resources.

- Adaptability and productivity of 45 new apple cultivars in addition to 13 apple scab-immune varieties was evaluated. This has allowed Iowa apple growers to remain competitive as they have switched their orchards to satisfy consumer demand. This information has saved growers over $4,000 per acre by avoiding poorly adapted or unproductive cultivars. The evaluation of apple scab-immune cultivars has stimulated an interest in developing organic orchards in Iowa.

- Corn gluten meal, a by-product of corn wet-milling process was discovered to have natural weed control properties, as well as being a source of nitrogen in matted-row strawberries. At least 25 strawberry growers have experimented with using corn gluten meal instead of synthetic herbicides and nitrogen. Organic strawberry growers are seeking alternative, labor saving weed control methods.

Long-term:

- Two genes involved in controlling tuber growth have been identified. One gene has been characterized as a transcription factor that regulates a protein that controls growth. That protein interacts with another transcription factor to regulate growth via the gibberellic acid pathway. A unique gene that is expressed in potato in response to late blight infection has been isolated, identified, sequenced, and its function partially characterized. This gene makes a lipoxygenase enzyme that is a key component in the defense of a potato plant against this pathogen. The identification of two genes involved in controlling potato tuber growth can potentially lead to enhanced yields.

- A unique gene that is expressed in potato in response to late blight infection has been found and partially characterized. This gene makes a lipoxygenase enzyme that is a key component in the defense of a potato plant against this pathogen. Continued research on this gene will allow better control over crop protection in potatoes and lead to a tremendous reduction in the amount lost due to attack by this pathogen. Control over this defense mechanism against this fungus could lead to a significant decrease in pesticide use during potato production.

· Source of Federal Funds—Hatch

· Scope of Impact—State Specific; Integrated Research and Extension

Program 29: Value Added Agriculture

a. Description of activity

This program focuses on the goal of developing projects that identify value-added used for low-value commodities and waste streams in food and industrial applications; improving the quality and safety of commodity and processed products for the purpose of maintaining or increasing their value in the marketplace; and striving 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.

b. Impact/accomplishment -

Short-term:

χ. Characterization continues on ethylene glycol fatty acylatep-toluenesulfonate (EFAT), a new antioxidant that is unusually effective in preventing viscosity increase in vegetable oil-based industrial fluids. Samples have been provided to industry for testing. These studies will facilitate the use of soy and other vegetable oils as industrial fluids.

- Research determined that it was possible to process soybeans with different characteristics to produce meals and flours with wide ranges of properties, providing extruding-expelling operators with opportunities to market value-added products.

Long-term:

- The composting process to remove moisture, readily degradable compounds, and odor potential from biotechnology byproducts is being adapted to enhance their use in biocomposite materials. A compost mixture containing 40% paper sludge, 20% (biomass) and 40% fiber produced a composite with the best properties, followed by the mixture containing 33% of each of the 3 different components. Results showed that with the addition of wood fiber to the compost mixture (50:50), both samples produced medium density fiberboard with similar properties and meet the standard industry specifications for this use.

- Preliminary experiments successfully ensiled post-harvest corn stover at moisture levels ranging from 53 to 85% (wet basis). The goal is to optimize the ensilage conditions necessary to store crop residues safely and effectively for bioenergy production. While the more extreme moisture treatments appeared to remain stable at eight weeks, future experiments should be extended to 48 weeks to insure the strategies we develop will be effective for annual storage.

- Soy-protein based adhesives:

    - Formulation changes have resulted in improvements in the performance properties of the adhesive for use in medium density fiberboard. Work with particleboard and oriented strand board in addition to fiberboard has begun. Heartland Resource Technologies (HRT), a company based in Oelwein, IA. has plans to build a facility to produce soy protein-based adhesives. The research team is currently working with HRT to assist them

in the development of the soy protein-based adhesive that will be produced at their facility.

- Progress has been made in the technology of measuring the quality of the adhesive, particularly in the area of understanding the interaction of the protein and synthetic component in the adhesive.

- The adhesive market and what the needs of the customers of the adhesive are beginning to be understood. Meetings have been held with interested companies in the midwest (Wisconsin and Minnesota) and west coast (Oregon) about their interest in the soy protein adhesive technology. Results of these meetings have shown that there is significant interest; particularly in the areas of reducing cost and improving the air quality of the plant and emissions from plants that produce fiber-based composite products.

- Studies employing growth on different carbon sources show that some cultures potentially have hyperthermostable enzymes of interest. Extremophilic microorganisms are adapted to survive in extreme environments such as high temperatures, extreme pH's, high salt concentrations, hydrophobic rich environments and extreme pressures. These adapted thermophilic microorganisms will potentially produce hyrolytic enzymes that will also operate at extreme environments. Some potential food applications are meat tenderizers that are activated upon cooking, vegetable tenderizers that are activated at canning temperatures, and the bioremediation of food processing solid wastes into fermentable sugars at ultra high temperatures, thus bypassing medium sterilization for bioconverion to value-added products such as ethanol, lactic acid and others.

- Transport phenomena and food rheology:

  - A newly developed rheological sensor for viscoelastic testing overcomes common problems associated with traditional sensors. Upon the completion of this work, the ability to evaluate thixotropic, viscoelastic materials such as gelatinized starch, or yogurt as a function of storage time will greatly simplified.

  - A semi-empirical method to determine viscoelastic parameters of foods, evaluating sensory characteristics of soy yogurts, and applying numerical modeling techniques for use in food safety research and equipment design. Using textural mapping, ingredient functionality and texture of yogurt from soymilk and bovine milk as a function of processing conditions and ingredients are being evaluated. One of the goals of this project is to produce an acceptable soy yogurt-like product.

- A cheese-flavored spread has been produced from soy white flakes and milk fat by fermentation with typical cheese organisms. Demonstration of the possibility of producing cheese with good flavor from simulated milk fat may make possible the production of less atherogenic cheese.

- 84% of the enzyme glucuronidase (GUS) activity in transgenic corn could be recovered in 10% of the corn solids (germ) by steeping corn for 8 hours in water. A leading biotechnology

company has developed corn in which the enzyme glucuronidase (GUS) is expressed. Potentially other industrial enzymes could be expressed in corn, which creates a need for a processing method that will efficiently extract the enzymes without destroying their activity.

· Source of Federal Funds—Hatch

· Scope of Impact—State Specific; Integrated Research and Extension

Key Theme – Plant Genomics

Program 3: Fundamental Plant Sciences

a. Description of activity

This program focused on discovering the fundamental biochemical processes of crop plants that determine their utility as foods and sources of raw materials for a wide variety of industrial applications. The program also sought to develop novel methods to manipulate specific biochemical processes within living plants towards the general aims of increasing crop productivity and providing alternative crops for new markets. Finally, the program worked to make modifications in specific fundamental plant processes to develop new plant varieties with potential novel utilities.

b. Impact/accomplishment –

Short-term:

- A controlled debranching process utilized in the synthesis of starch has been determined. The molecular architecture of starch determines its potential uses, and modification of debranching enzyme function is now possible as a means of designing starches tailored for specific purposes.

- The maize genes *dull1* and *sugary1* have been exclusively licensed or optioned for the purpose of modification of starch structure and utilization. Patented technology using viral gene expression control mechanisms to express foreign genes in plants has been exclusively licensed and currently is under development in the industrial setting. Technology for the alteration of acetyl-CoA levels in plants also has been exclusively licensed and is under development towards the aim of regulating oil production in crops. The mini-vector technology for plant transformation is in wide use in the research community and will make a very broad contribution to the further accumulation of new knowledge regarding fundamental biochemical processes in plants.

- Mutants of maize that do not produce starch normally were characterized. A new understanding of the starch biosynthetic process has arisen from these data and corresponding analyses from numerous other institutions working in various plant systems. Analysis of starch architecture in plants indicates that novel starches have been produced, and these are now being analyzed in greater detail to determine whether they possess any

properties of specific interest in industrial uses. This technology has been patented and optioned to a major agricultural biotechnology firm in the U.S.

Long-term:

- New plant genes involved in ergonomically important processes were discovered. Three novel corn genes involved in starch biosynthesis were discovered. The description of these genes has shed new light on the molecular processes that are responsible for assembly of starch. The genes that code for the enzyme acetyl-CoA synthase and pyruvate dehydrogenase were characterized in the model plant species Arabidopsis thaliana. From these data the particular chemical pathway used by plants to produce acetyl-CoA was identified. The genes that code for the enzyme acetyl-CoA carboxylase also were characterized, providing new insights into the process used by plants to direct the production of oil and control the rate and amount of oil biosynthesis. Another gene was discovered in the project codes for the enzyme methylcrotonyl carboxylase, which is involved in the plant processes that determine the amino acid content of seeds. Gene discovery accomplishments provide information that is highly likely to be useful for future engineering of plant metabolism to meet a wide variety of food, nutritional, and industrial raw material needs.

- A method was designed for the adaptation of a molecular control mechanism from a plant virus for the expression of foreign genes in plants. New technology was developed that used the protein synthesis control mechanisms from a plant virus, and adapted them successfully for the production of specific targeted foreign proteins in crops. New, very small DNA vectors for the introduction of genes into plants were developed. Novel technology for high throughput mapping of plant genomes was developed. This technology has the potential to significantly speed up the rate at which information from plant genes can be obtained and exploited.

- Analysis from variegation mutants of Arabidopsis led to the discovery of a novel mechanism of regulation of carotenoid biosynthesis. The new information from the project is being used in the development of a new variety of vegetable that will help combat vitamin A deficiency and thus better meet the dietary needs of people in developing countries.

- To understand the effects of cold stress on the metabolism, a multidisciplinary project involving a plant biochemistry, an agronomy, and a plant molecular physiology has been initiated. The availability of DNA sequence for the expressed genes of corn has allowed the project to monitor global changes in gene expression using the new technology of proteomics. Differential analysis of the leaf proteins allowed the identification of proteins that are expressed in only the cold tolerant lines under stress conditions. These proteins will serve as markers in identifying the cold tolerant lines in a breeding program in the future.

- The BIO2 gene was discovered and characterized. Exploitating this discovery, the project demonstrated that biotin biosynthesis in plants occurs within a particular compartment within the cell, specifically the mitochondria. Molecular characterization of biotin-containing molecules of plants has demonstrated that these organisms contain five such proteins. Characterizations of these enzymes and corresponding genes have provided novel insights

into plant metabolic mechanisms that have never before been studied. Characterizations of the plant MCCase, is the only molecular insights into this enzyme in the entire biosphere. These characterizations may have applications in the molecular understanding of human inherited genetic metabolic disorders associated with biotin and leucine metabolism.

· Source of Federal Funds—Hatch

· Scope of Impact—State Specific

Key Theme – Plant Germplasm

Program 4: Plant Germplasm

a. Description of activity

This program focuses on germplasm, the basic resource for plant improvement. Major objectives are to: 1) increase the genetic diversity available for basic and applied plant science research, 2) 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, 3) develop and enhance elite germplasm resources to provide private and public breeding programs a greater array of elite germplasm for cultivar development, 4) improve germplasm to ensure systematic genetic advances of newly developed cultivars, 5) enhance specific plant and seed traits to permit alternative uses of the major crop species, and 6) provide unbiased data of corn hybrids available to Iowa producers.

b. Impact/accomplishment -

Short-term:

- Research has resulted in the following releases:
    - Sixteen general use and specialty soybean varieties were released to seed producers: one for moderate resistance to brown stem rot; two with superior yield; two with larger seeds and higher protein content; eight have small seed size; one with high seed yield and yellow hilum color; and two that are lipoxygenase free.
    - Five dent corn inbred lines with central U.S. Corn Belt maturity were released for use by breeders and seed producers. The five lines were extensively tested in hybrids and had good consistent performance across years and locations. Two early synthetic populations were released as germplasm sources for breeding programs for earlier maturity corns.
    - Seed of two popcorn breeding populations and one popcorn inbred line were released for use by popcorn breeders and producers.
- Corn performance trials for 2000 were conducted for seven districts and included 580 hybrids from 64 brands. The Iowa Corn Performance Test, which has been conducted for 81 consecutive years, provides hybrid performance data to growers.

Long-term:

- Collection, evaluation, and improvement of germplasm resources were primary goals in corn, forage grasses, popcorn, small grains, and soybean breeding programs and the germplasm maintenance effects at the North Central Regional Plant Introduction Station.

· Source of Federal Funds—Hatch

· Scope of Impact—State Specific; Integrated Research and Extension

Key Theme – Agricultural Profitability

Program 5: Crop Production and Management Strategies for Iowa

a. Description of activity

This project focuses on the production of high quality food and fiber. This encompasses balancing the need for a sustained high level of production and quality versus protecting the natural resource base for society. Topics under research include but are not limited to herbicide use; predictions of more variable weather; the need for 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; and forages that complement row crop production by supplying nutrients for animal production, enhancing soil conservation practices, and as an alternative source of energy.

b. Impact/accomplishment –

- Models to predict flower development in maize were combined with EPA models to predict particulate dispersal in order to develop a rational approach to quantify the extent of pollen movement from one field of corn to another. This new technology can be used to assess the risk of 'contaminating pollen' entering an isolated seed production field or to assess the risk of GM pollen entering a neighboring non-GM field.

- Stockpiling forage for autumn grazing is an effective means of extending the grazing season beyond the forage growing season. With the exception of sweetclover, all of the legumes evaluated in the study retained their leaves during the 28-day period following a killing frost and would be suitable for grazing during this period. The legume of choice for use as a protein source for stockpiled forage will depend on the nutritional needs of the livestock and nutritional characteristics of other forages available to them.

· Source of Federal Funds—Hatch

· Scope of Impact—State Specific; Integrated Research and Extension

Key Theme – Precision Agriculture

Program 6: Precision Agriculture

a. Description of activity

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. Although precision agriculture has tremendous potential, there are two major barriers preventing the full benefit of precision agriculture being realized. The first being the interpretation of spatial variability and the lack of decision support systems based on sound agronomic principals to assist in the development 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.

This project has been addressing these critical needs through the development of sensor technologies for the measurement of spatially and temporally varying crop production factors so that variability can be effectively quantified in crop fields. Significant progress has been made in the development of new analysis techniques to further understanding on the effects of in-field variability on crop yield variability and the effects of production practices on the environment. As the causes of variability are better understood, this understanding will lead to advances in farming management systems to protect the environment while increasing production efficiency.

b. Impact/accomplishment -

Long-term:

- Sensor technology:

  - Development of a real-time soil nutrient analysis system, based on ion-selective field-effect transistors (ISFETs) and micro-electro-mechanical systems (MEMS) technology, has been initiated in cooperation with the Agricultural Research Service. The work concentrates on the development of nitrogen sensors, due to the economic importance of these fertilizers and the potential environmental effects of excess fertilizer applications. There is potential for reduction in fertilizer inputs with negligible reductions in yields, while reducing the potential for environmental degradation due to excess nitrate in the environment.

  - Developed combine-mounted corn population sensors, which have been placed on a number of farmers combines in four states (Colorado, Illinois, Iowa, and Missouri) in cooperation with other researchers. During the past three years, the population sensors and a yield monitor were used to simultaneously map corn population and yield during harvest on farmers' fields. The yield and population information is integrated with other measured data (topography, soil nutrients) to determine yield limiting factors. This work has shown the importance of population on the yield potential and interpretation of yield limiting parameters within fields. A machine vision-based system to sense early season plant population has been developed and has shown significant promise.

Development of sensor technologies continues, which allows producers to effectively sense important parameters that limit crop production. The development of sensors is critical to the widespread adoption of precision farming methods, due to the prohibitive cost of manual sampling methods. Industrial partners are supporting some of this work and have shown a strong interest in the developments.

- Crop modeling and decision support systems:

    - Crop models have been used to identify spatial yield loss due to interacting factors and to evaluate the consequences of different spatial management strategies, including the forecasting of spatial yields during the season. The models have been successfully used to identify the relative effect of water stress, weed pressure and soybean cyst nematodes stress on soybean yield variability. Similar modeling techniques have been developed for corn that have shown corn population and water stress account for a significant amount of the spatial yield variability. These crop models have also been used to evaluate the consequences of different management decisions and the potential economic return from implementing these strategies.

    - A comprehensive problem-solving and decision-support system has been developed to improve analyses, simulation and visualization of field-scale impacts of precision agriculture practices on environmental quality and crop productivity. The system incorporates biophysical models, statistical analysis and plant growth models with Geographical Information Systems (GIS). Components of the system have been validated and evaluated using data from several farmers' fields and is made interoperable with standard commercial precision farming software. The decision support system includes an economic modeling component that can be used for risk-based assessment of effects of variable rate application on productivity and profitability of the farm operations while minimizing risk and improving environmental conditions. These methods have the capability to predict the economic and environmental risk associated with different management strategies under varying climatic conditions.

· Source of Federal Funds—Hatch

· Scope of Impact—State Specific

Key Theme – Ornamental/Green Agriculture

Program 7: Green Industry

a. Description of activity

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. This program has

focused on three major issues: (1) environmental protection, (2) plant improvement and protection, and (3) enhancement of the edaphic environment for plant growth.

b. Impact/accomplishment -

Short-term:

- Corn gluten continues to control weeds and produce better turf appearance from the release of nitrogen associated with the protein based corn gluten. The technology has been licensed to 15 companies in 11 states.

- Research continues on using five dipeptides as a natural herbicide. The dipeptides were extracted from the hydrolyzed corn gluten meal. They will allow for a variety of formulations and combinations with other herbicides to improve weed control efficacy and reduce chemical herbicides in the environment.

- Various sizes of “crumb” (from the tire chipping and screening process) and “buffing” (shreds of rubber ground directly from intact tires) rubber for use as a topdressing material on high-traffic grass areas was evaluated. Results were encouraging. Rubber materials reduced surface hardness and rubber materials resulted in 20% more turfgrass cover. Processed rubber can be useful in improving the performance and wear tolerance of turfgrass used on athletic fields.

Long-term:

- A study was initiated as a result of a study involving Kentucky bluegrass, which unexpectedly produced tissue-culture-regenerated plants that had shorter leaves than normal seedling plants. The study will determine if these mutants were the result of normal seedling variation or if they resulted from mutations during tissue culture. The results of this study will help in constructing more practical ways of screening for the desired short-leafed characteristic. Basic regeneration information should be useful for workers using transformation as a way of regenerating plants with inserted genes with practical benefits.

- The addition of inorganic amendments [porous ceramic clay (PCC), calcined diatomaceous earth (CDE), and polymer-coated clay (PC)] to sand based-based root zones on golf course putting greens has been evaluated. Compared to the conventional sand/peat root zone, all amendments demonstrated some advantages. The PCC primarily improved nutrient retention, especially potassium, and increased water movement through the profile. The CDE increased water retention by 13%. During this study it was observed that root zones were more compact in the fall and following spring thaw they were less compact. We believe that the amendments may be having a shrink/swell effect on the root zone that would further serve to reduce compaction and improve drainage and porosity.

· Source of Federal Funds—Hatch

· Scope of Impact—State Specific; Integrated Research and Extension

Key Theme – Grazing

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

The work described in this program is now being performed under multistate project NC-225.

Key Theme – Animal Production Efficiency

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

a. Description of activity

This program focuses on increasing efficiencies of producing food from animals. Key areas of research within this objective were to improve scientific understanding of physiologic mechanisms affecting reproduction, growth and performance.

b. Impact/accomplishment –

Short-term:

- Soy isoflavones and conjugated linoleic acid have been identified to elicit bioactivity relative to muscle growth and immune response in monogastric animals. ISURF filed a provisional patent on the soy isoflavone technology. Bioactive compounds in plants (i.e., soybeans) have been identified and their ability to elicit beneficial responses in animals has been delineated. These plants have a greater monetary as well as biological value. U.S. producers, the principal producers of these plants, can generate greater dollar returns when the plants are sold domestically or internationally for use in animal feeds. These bioactive compounds represent a natural, safe technology for enhancing the health status of animals.

- A novel method of moving piglets to a safe area away from the sow has proven to be promising. Using a heat lamp, this new invention (a simulated udder) has been able to keep piglets away from the sow, thereby decreasing the chance that they may become crushed. Widespread use of a method similar to this will help farmers increase pig production and increase both sow and piglet welfare.

- Increased growth advantage obtained by segregated early weaning can be realized by non-segregated early weaning. This important observation will allow farmers with only a few sows to benefit and be competitive with much larger swine producers.

- Replicated prenatal stress via injection of adrenocorticotropic hormone into dams was found to compromise the immune system of pigs. During stressful situations later in life, growth, health, reproduction and welfare may be compromised. Altering management practices in modern livestock production facilities to reduce stress on swine and other livestock may increase productivity.

Long-term:

- RNA was purified from placental tissue of Yorkshire females selected over multiple generations for marked differences in placental size and litter size (small placental line, 13-14 live piglets/litter; large placental line, 7-8 live piglets/litter). Suppression subtraction libraries have been prepared to elucidate specific genes important in increasing litter size. Use of newly developed micro-chip technology to discover genes important in optimizing litter size will pave the way for the development of simple genetic testing procedures for on-farm use. This should aid agribusiness concerns who will develop the tests and producers who can more effectively select genetically superior animals.

- Molecular features of a unique protein, synemin, have been characterized. It was discovered that synemin can interact with desmin and form heteropolymeric intermediate filaments (IFs). Significant progress has been made to elucidate mechanisms responsible for cytoskeletal integration involved in growth and development of muscle cells and thereby to help understand the overall process of muscle growth. This will allow for improvement in the efficiency of growth in meat animals.

- P. ponderosa contains a compound(s) which preferentially reduces blood flow to the caruncular arterial bed and thus nutrient and O2 delivery to the calf, causing late-term abortion in beef cattle. Research can be conducted to develop a strategy to prevent P. ponderosa-induced decreased in uterine blood flow and the resulting early parturition.

· Source of Federal Funds—Hatch

· Scope of Impact—State Specific; Integrated Research and Extension

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

a. Description of activity

This program has focused on five key objectives: 1) the bioregulatory roles of nutrition and cell signaling compounds on performance of animals, 2) quantification of the dietary nutrient requirements of animals, 3) enhancement of the nutritional value and consumer demand for animal products, 4) identification, development, and evaluation of novel nutrient sources for animal production, and 5) development of nutritional regimens to enhance the environmental integrity of animal production.

b. Impact/accomplishment -

Short-term:

- The composition of crop residues from bt-corn hybrids and the performance of cows grazing them did not differ from those for non-bt corn hybrids. As cattle producers are accepting winter grazing of corn stalks as a means of increasing profitability of beef cow-calf

production by reducing use of harvested feeds, the fact that bt-corn hybrids are not detrimental to grazing cows further enhances confidence in use of crop residues.

- Experiments with conjugated linoleic acid (CLA) indicate that CLA content of bovine milk and muscle, porcine muscle, and eggs can be increased by dietary supplementation of CLA. Several beef and dairy producers are including grazing in their production systems to enhance CLA content of beef and milk and marketing these products directly to consumers.

- Feeding 25-hydroxyvitamin D (the first compound produced in the metabolism of vitamin D) to steers for one day, four days before harvest, increases blood calcium and improves tenderness of beef muscle with no increase in vitamin D and greatly reduced accumulation of the metabolite in tissues. This provides a practical low-cost nutritional approach for improving tenderness of beef muscle and enhancing consumer acceptance of beef.

- A conventional system of summer rotational grazing of grass-legume pastures and winter drylot hay feeding with a year-round grazing system utilizing summer rotational grazing of grass-legume pastures and winter grazing of corn crop residues and stockpiled forages were compared. Results showed no difference in total calf production between systems while cows in the year-round grazing system required 87% less hay than cows in the conventional system. Results were used to develop a forage budgeting computer spreadsheet to develop year-round grazing systems. The overall benefits allow family farms to reduce feed costs for beef cows and to better distribute use of available labor.

- It was discovered that a minor metabolite of the amino acid leucine (HMB) could slow the process of muscle breakdown. Studies conducted with healthy individuals and those with cancer and AIDS show that HMB, in combination with other amino acids, has been shown to reverse the wasting process of certain cancers. Improved quality of life for these patients should result. HMB is now part of products that are sold in the human nutrition market.

Long-term:

- Dietary Eubacterium coprostanoligenes was found to decrease blood cholesterol of cynomolgus monkeys. This has increased the interest of commercial companies in adopting E. coprostanoligenes as a food supplement for people.

· Source of Federal Funds—Hatch

· Scope of Impact—State Specific

Key Theme – Animal Genomics

Program 10: Genetic Enhancement of Agriculturally Important Animals

a. Description of activity

Activities have been directed towards comprehensive research, education and technology transfer to enhance the genetic ability of agriculturally important animals for the efficient and

sustainable production of food for human consumption. Research efforts have focused on the use of quantitative methods for the genetic evaluation of breeding stock, the use of molecular genetic methods for identifying genes responsible for important traits in livestock and for improving the understanding of the genetic control of these traits. This research has included the integration of these technologies into effective selection programs for the genetic improvement of livestock populations. Extension efforts have focused on working with the stakeholders in the livestock industry, including producer organizations, individual producers, and the livestock genetics companies, to transfer and implement research results in practical genetic improvement programs. Research, education and extension efforts have focused on the main agricultural livestock species of dairy cattle, beef cattle, poultry, and swine. Expertise has been used to assist genetic programs for other important animal populations, such as seeing-eye dogs and to work with model species like the mouse.

b. Impact/accomplishment -

Short-term:

- Selection methods were developed over the past several years to maximize the benefit from using individual identified genes in selection programs. New statistical methods were developed in the past year for the analysis of molecular genetic data from selective DNA pooling, which is an extremely efficient strategy for detecting genes affecting economic traits in large livestock populations.

    - The impact of the STAGES program on the swine purebred seedstock producers in the NSR has shown annual genetic trend changes for each of the four purebred breeds: Duroc, Hampshire, Landrace and Yorkshire. The annual genetic improvements realized over the last five years in litter size, litter weight, growth rate and percent lean that has been accomplished by these purebred populations accounts for over $100 million in additional profits for their commercial customers.

- Dairy products have been made from cows that have favorable and unfavorable ratios of fatty acids to total fatty acids. Butter, cheddar cheese, and provolone cheeses made from the milk with favorable fatty acids will be test marketed by a commercial partner. It is believed that these more healthy products can be sold in a niche market and increase the net income for producers and be more healthy for those that consume them.

Long-term:

- Genetic and phenotypic population parameters have been estimated in the past year within and across sexes for ultrasound determined composition traits in live beef cattle. These estimates have been used in the development of full-animal multi-trait genetic prediction models. These models will have application for genetic improvement for many bos tarus breeds of cattle.

    - The decline in pork quality due to selection to produce leaner pigs has been addressed by molecular genetics. Nineteen regions of the genome in which there were genes that

helped to cause differences in meat quality traits like pH, color, marbling, taste, tenderness and cooking loss were pinpointed. This will eventually lead to the discovery of individual genes that control meat quality and will eventually allow pig producers to select pigs for better pork for the consumer.

- Several genetic markers and naturally occurring variation in specific genes that are associated with the speed, strength and persistence of antibody production in hens were identified. Genetic selection based on these DNA markers can produce healthy populations with greater capacity to keep themselves, and their eggs and offspring, healthy. This could provide an alternative means to the use of antibiotics to keep poultry healthy, which will help to assure a safe food supply and efficient poultry production.

- Over 8,000 genes (of about 20,000 genes expressed in reproductive tissues) have been sequenced, and the mapping of selected genes has begun. Such precise information will allow efficient use of biotechnology and molecular biology to map the location of hundreds of these genes so specific genes controlling reproduction can be identified and studied. Information generated will be made available to researchers at other institutions to improve understanding of pig reproductive biology and genetics for more rapid genetic progress.

· Source of Federal Funds—Hatch

· Scope of Impact—State Specific; Integrated Research and Extension

Key Theme – Diversified/Alternative Agriculture

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

a. Description of activity

This program has focused on alternative types of animal production in Iowa. 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. A growing number of Iowans are engaged in aquaculture (fish farming) and game ranching as a primary or supplemental income source. 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. This program provides 1) basic information on cultural and husbandry principles and techniques, pertinent regulations, and marketing that novices to production industries require, as well as 2) new research-based knowledge to maximize production efficiency, enhance profits, and ensure that their operations comply with environmental and health (animal and human) standards required by more advanced practitioners.

b. Impact/accomplishment -

Short-term:

- Information garnered from a long-term project has been used to improve the management of culture ponds used for larval fish production. A technical bulletin printed by the North Central Regional Aquaculture Center has been developed as a tool for both private and public aquaculturists to manage the zooplankton prey of culture ponds.

- A 2-year project focusing on the culture of sunfish for aquaculture has resulted in valuable information about their usability for the private aquaculture industry. Fundamental information on feed conversion and growth rates will be of assistance to the aquaculture industry.

Long-term:

- A mail survey was undertaken in September 1999 to assess Iowa's aquaculture industry. Most aquaculturists marketed locally with some branching out to both statewide and national markets. Concerns about governmental regulations and capital investment sources to the need for increased number of education materials and producers' cooperatives were indicated.

· Source of Federal Funds—Hatch

· Scope of Impact—State Specific; Integrated Research and Extension

Key Theme – Agricultural Competitiveness

Program 13: International Economic Competitiveness

a. Description of activity

Members of the department provided important analysis of a number of competition and trade issues: 1. Models of various portions of the world economy were developed to analyze the impacts of changes in technology or government policy on producers and consumers. 2. Concerns about disease, product quality and genetically modified organisms often affect international trade and barriers to trade. Factors or programs that influence these characteristics of products domestically also affect their acceptability in international trade. 3. Changes in the U.S. agricultural system will affect its competitiveness relative to other major producing and consuming countries.

b. Impact/accomplishment -

Short-term:

- A calibrated and stylized model soybean production and trade was used to investigate the impact of Round-up Ready (RR) soybeans. Domestic producers gain from the reduction in costs but may lose if there are increased yields. As foreign competitors adopt the RR technology these gains are eroded. Consumers all over the world benefit.

- Models developed by the Food and Agricultural Policy Research Institute (FAPRI) were used to analyze a number of important international issues including accession to the European

Union of eastern European countries, the role of China in world markets, the effects of U.S. sugar policy, and trade in dairy products. More specific models on Chinese meat demand and production were used to analyze the impact of China's membership in the World Trade Organization (WTO). The European Commission's use of this work, as compared to performing the analysis in-house or contracting with European universities, demonstrates the value these individuals place on the comprehensive and accurate nature of this ongoing project. The EC is now better able to discuss the likely impacts of further European integration.

- The Food and Agricultural Policy Research Institute (FAPRI) prepares outlook and policy information on a regular basis. Several-hundred industry specialists (industry groups, USDA, USITC, OECD, and Congressional staffers) attend FAPRI briefings and reviews (two series a year). There were 2200 hits on the FAPRI web site between August and December; 2000 alone looking at the world Agricultural Outlook. Individuals obtaining outlook and policy analysis information are better able to make informed decisions concerning agricultural policy and which policies to support and oppose. The debate on farm policy is better informed because of the unbiased information provided by this analysis.

Long-term:

- Research on U.S. government policy showed that price support and crop insurance programs increase U.S. supply thereby depressing the world prices. U.S. producers respond rapidly to price changes.

- A research study found that while Argentina produced most grains and beef at a lower cost compared to the U.S., this cost advantage was mostly lost in the marketing channel, as the U.S. marketing channel was far more efficient than that of Argentina. Maintaining the marketing advantage seems key to maintain the U.S. competitive edge. U.S. producers will realize that they have no inherent comparative advantage in producing many of the same crops and livestock produced in Argentina. They may want to consider alternative crops or production and production methods (identity preserved products, for example) to remain competitive. There is also an incentive to improve the marketing system or shift resources out of production agriculture.

- Theoretical work on systemic risks in food systems show that problems or failures in one small part of the food security system can lead to major overall problems. A model was developed to understand the nature of such systemic risk and how it might be mitigated or minimized. Risks may be more prevalent because incentive mechanisms are insufficiently focused to elicit the correct care-taking actions by participants in the food supply chain. The research shows that leadership on the part of one or more parties in the production process can mitigate the problem and enhance overall welfare. Individuals in the food system will realize that risks in one part of the system have spillover effects that are important. Policymakers will understand that leadership within the system may be necessary to obtain "good" outcomes.

- Economic analysis of Hazard Analysis Critical Control Point (HACCP), which is based on practices as compared to outcomes, shows that it is a cost effective way to monitor food safety. With no specific performance standards, it is difficult to implement in international trade and does not allow for a free flow of safety assured goods across borders.

· Source of Federal Funds—Hatch

· Scope of Impact—State Specific; Integrated Research and Extension

Key Theme – Risk Management

Program 14: Agricultural Risk Management

a. Description of activity

The changes in U.S. farm policy brought about by the 1996 Freedom to Farm act (FAIR) motivated a series of applied research projects designed to assist farmers respond to the new market structure. Many of the reported program elements were designed and delivered in cooperation with representatives from leading farm organizations, the lending community and government agencies. The overall design of the risk management program is multidisciplinary and addresses the needs of farm families drawing on the research and resources of economics and business, family and human development as well as technical agriculture.

b. Impact/accomplishment -

Short-term:

- Three new revenue products have been introduced commercially. Two of these products were developed at ISU. A new ISU designed livestock revenue product has been developed and should come on the market in 2002. A significant outreach effort was made to help farmers understand how these tools could be used to reduce risk and increase returns. The proportion of the corn and soybean crop covered by these new products now exceeds 60% and this portion is expected to rise to 80% in 2002. We anticipate that the new livestock product will be used by about 50% of Iowa livestock producers within two years of its approval.

- Visits to China and Brazil, two major international agricultural competitor countries, provided valuable insights into future trends in world corn and soybean competition. The resulting information and analysis quantified areas where the U.S. agricultural sector lacks competitiveness, and provided insights into ways of making U.S. exports of these products more competitive. It also quantified the cost disadvantages faced by U.S. soybean producers through high land costs, providing useful information for forthcoming agricultural policy discussions.

- Research identified higher-risk LDP strategies and made this information available to producers through meetings, the internet, electronic news services, a CD ROM, and

analytical software. The program provided training in evaluating risk bearing ability and development management strategies to limit risk exposure to acceptable levels. Through training, lenders were able to identify clients with limited ability to bear price/yield/LDP risks and higher risk strategies, and encouraged clients to take appropriate risk-management steps.

Long-term:

- Researchers studied incentive provision and risk in the context of processing tomato production using detailed data on quality outcomes (pH, soluble solids, "limited use," color) and processors' incentive contracts. Strong evidence supports the hypothesized tradeoff between incentives and risk, and developed measures of the magnitude of farmers' risk premiums (a measure of how much farmers dislike risk, and hence of the potential benefit of risk-mitigation policies). Work has stimulated further interest in rigorous economic study of agricultural contracting.

· Source of Federal Funds—Hatch

· Scope of Impact—State Specific; Integrated Research and Extension

Key Theme – Organic Agriculture

Program 20: Sustainable/Organic Agriculture

a. Description of activity

The organic agriculture program has focused on three major issues: (1) development of sustainable/organic horticultural and agronomic systems; (2) development of improved nutrient management and soil building systems; (3) development of value-added industry products through improved sustainable/organic production and postharvest techniques; and (4) development of research-based information in sustainable/organic systems for public training and advancement.

b. Impact/accomplishment -

Short-term:

- An interdisciplinary team of scientists from animal science, agricultural and biosystems engineering, economics and veterinary medicine partnered with the Leopold Center for Sustainable Agriculture to develop a research and outreach program to develop hoop structures—a small-scale, low-cost technology. Hoop structures are tent-like low-cost buildings that provide an environment conducive to alternative swine production. The seasonal effects of feeding pigs in deep-bedded hoop structures were documented. The number of swine producers in Iowa using hoop structures increased, and associated increases in production of natural and organic pork have occurred.

- A new interdepartmental Graduate Program in Sustainable Agriculture (GPSA), which will provide opportunities for students interested in understanding relationships between food security, environmental quality, rural development, and farming practice, was approved by the Iowa Board of Regents in July 2000. The first group of GPSA students will be admitted in fall 2001. Education will address and provide solutions for the stresses of environment and rural communities caused by increased agricultural productivity.

- A field study to analyze the root competition between kura clover and corn has shown that corn planted into established stands of kura clover generally has slightly lower yields than corn having no cover. Kura clover is a perennial legume used as a cover crop. Management of the kura clover has been a significant factor affecting corn yield. Improved understanding of kura clover/corn root interactions will help identify best management practices for this system. Enhancing use through improved management will reduce soil erosion losses and improve profitability of corn grain production.

- Research conducted to identify biological characteristics that provide woolly cupgrass and waterhemp ecological advantages in current agricultural practices show that these two species each possessed a unique emergence pattern that provided them an advantage over the traditional weed species (giant foxtail, velvetleaf, cocklebur, etc.) they have replaced in many fields across Iowa. The unique emergence patterns identified provide each species opportunities to capture resources and escape management tactics. Producers can use this information to design more efficient management systems that reduce inputs, cost of crop production and also reduce the potential for off-target movement of herbicides.

Long-term:

- Research examined the socio-economic organization and outcomes of a global livestock commodity system, as well as the emergence of locality based food systems, emphasizing community, sustainability, and closer links between producers and consumers.

    - Qualitative interviews with 34 Iowa swine producers with different sized operations and manure handling approaches found that producers view and treat manure as both waste and resource. Transition to a stronger resource view of manure may be occurring due to the interplay of increased knowledge, new testing and monitoring technologies and developing manure markets. Producers' accounts of water quality protection practices emphasized attention to manure placement, to application timing, to method of application and to mitigation or monitoring systems. Although farmers of all types and scales indicated the growing importance of water quality protection in their farming practice, they held sharply differing views as to whether large-scale intensive livestock production poses a significant environmental threat. Expected impacts include making manure management system engineering design more responsive to needs of small-scale and limited-resource farmers;

    - In 2000, standardized, secondary food system indicators were compiled for counties, an inventory of food system ventures (CSAs', farmers' markets, food pantries, grower coalitions, school programs, community gardens, etc.) was made, and qualitative

interviews were conducted with 24 rural food retail establishments to explore aspects of local and non-local food sourcing. Expected impacts include identifying ways local food system ventures contribute to community sustainability goals and illuminating opportunities, choices and constraints in local food systems so citizen/consumers can improve individual, community and environmental outcomes.

- New sustainable production and postharvest practices, which include vegetable, fruit, turfgrass, and greenhouse crops were investigated. Sustainable fruit and vegetable production systems for Iowa have been developed to include corn gluten meal for weed control. Compost and limestone-based products have been found to increase vegetable crop yields. Coconut coir dust and waste coffee grounds have been found to inhibit certain fungal root rot-causing pathogens. These materials will be incorporated into Sphagnum peat-based greenhouse substrates to determine their effectiveness against a broad range of fungal root rot-causing organisms. Efforts have resulted in a significant increase in acres farmed without pesticides or synthetic fertilizers and in horticultural operations managed with less synthetic chemicals. Organic farmers and horticultural producers have gained an increase in soil quality and an economic advantage in the marketplace through a reduction in inputs and premium prices for their products.

- First year field studies to investigate the effects of six phosphorus and nitrogen management systems on phosphorus, nitrate, and bacteria leaching with subsurface drain water were analyzed. Plots receiving fall application of swine manure at 160 kg N/ha resulted in the lowest crop yields of 154 bu/ac. This treatment resulted in highest nitrate concentrations in tile water in comparison to other treatments. Determining optimum N and P application rates to crop lands from liquid swine manure without significant bacteria leaching to shallow groundwater will allow producers to make management decisions that will balance nutrient utilization with natural resources protection.

- Research examining the impacts of composted swine manure (from hoop buildings) on weed seed survival, seedling emergence, and growth competitive ability suggest that by altering soil conditions, compost application can enhance corn growth and shift the relative proportions of species within weed communities. This project will provide needed information about relationships between soil-enhancing management practices, weed competitiveness, and weed community composition. Weed-related impacts of organic matter amendments, such as composted swine manure, may be anticipated more effectively.

· Source of Federal Funds—Hatch

· Scope of Impact—State Specific

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

Overview

The Iowa Agriculture and Home Economics Experiment Station has made progress against all the impacts identified in the plan of work for Goal 2. Research outputs take a number of forms:

- 44 Refereed Publications, Research Papers, Manuscripts
- 20 Non-refereed Publications, Reports, Technical Papers
- 27 Proceedings, Published Abstracts
- 4 Extension Publications
- 36 Invited Presentations
- 1 Book/Chapter
- 1 Patent
- 6 Theses, MS/Ph.D. Programs Completed

Outputs, outcomes and impacts: Highlights of research at Iowa State University:

- Rapid cooking protocols for beef roasts were developed in collaboration with Maytag Appliances and the Center for Advanced Technology Development to solve problems of delayed browning of rapidly cooked roasts (products appear to be undercooked even when internal temperature is adequate). This research established cooking protocols for rapid heating ovens that provide for short time cooking but with the finished appearance of doneness appropriate to meet consumer expectations.

- Supplementation of cattle diets with Vitamin D prior to slaughter has been demonstrated to improve beef tenderness. A patent on this technology, utilizing Vitamin D metabolites and analogs, has been developed and issued (U.S. Patent No. 6,042,855) to encourage commercial utilization of this concept for meat quality improvement.

- Irradiation processing of meat to be used for pepperoni and dry sausage was shown to eliminate the risk of *Escherichia coli* O157:H7 while retaining the traditional quality characteristics of pepperoni. No change in texture or hardness properties from the traditional, unheated product were detected. Irradiation provides processors with a means of producing dry sausage with traditional properties expected by consumers and which is guaranteed safe from *E. coli* O157:H7.

- A model for the use of milk cultures containing *Lactobacilli* to reduce the levels of *S. typhimurium* in swine is being developed. Preliminary results suggest that a dietary supplement of *Lactobacilli* milk cultures may trigger a localized immune response in the live pig, making the intestinal tract less hospitable for salmonellae. The technique, if fully developed, could result in healthier pigs and safer pork. The technique, which involves feeding a yogurt-like mixture to pigs, would be readily adaptable to virtually any hog production facility.

- Simulated environmental contamination studies showed that populations of Listeria monocytogenes were recovered from inoculated ready-to-eat (RTE) meats by surface plating on non-selective and selective media. L. monocytogenes was found not only to be capable of surviving for over 40 days at 22°C and 0% RH, but was able to attach to and be recovered

from the RTE meats after vacuum storage. More effective means of controlling this bacterium will be determined.

Assessment of accomplishments as measured against POW:

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 products①②③,
- greater public understanding of the principles of food safety and quality①④, and
- greater understanding of chemical, physical, and biological hazards to food safety③④⑤.

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.

State and Hatch Funds $ 902,157

FTEs 6.7

Key Themes – Food Safety and Food Quality

Program 16: Improving the Quality and Safety of Muscle Foods

a. Description of activity

This project focuses on improving 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 and safety of muscle foods, and packaging environments to improve product safety during storage and distribution.

b. Impact/accomplishment -

Short-term:

- Research has shown that package configuration is very important to the total pasteurization effect of products such as frankfurters [which are packaged as either double-row packages (10 per package), single-row packages (5 per package) or as single-packaged products]. A double-row package requires considerably greater heat treatment. This information has resulted in readjustments to the pasteurization processes based on package configuration in order to assure safety of these products.

- Rapid cooking protocols for beef roasts were developed in collaboration with Maytag Appliances and the Center for Advanced Technology Development to solve problems of delayed browning of rapidly cooked roasts (products appear to be undercooked even when internal temperature is adequate). This research established cooking protocols for rapid heating ovens that provide for short time cooking but with the finished appearance of doneness appropriate to meet consumer expectations.

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- Pork quality level has been improved at the producer level by providing more information on genetics, nutrition and handling, which allows producers to assess the impacts of specific production practices. Producers who have produced consistent high quality pork have been coupled with specific markets (white-table restaurants) which purchase these products at premium prices.

- Irradiation processing has been successfully developed for meat products and commercial use of this technology is currently in place with ground beef. Irradiation guarantees the safety of muscle food products such as ground beef, which is considered a high risk for food safety. Current research on additional products is expected to lead to even wider commercial application.

Long-term:

- The off-odor in irradiated products has been determined to be produced from sulfur-containing amino acids. This permits the evaluation of new strategies to combat and prevent the off-odor problem, making universal consumer acceptance of irradiated meat products more likely.

- Dietary administration of conjugated linoleic acid (CLA) to swine has been determined to affect meat quality. Less fat deposition with higher degrees of marbling makes CLA-treated pork more palatable but with less total fat content. Increased CLA content in pork is believed to have potential human health benefits.

- Several USDA-approved nonmeat ingredients have been found to be significant inhibitors of *Listeria monocytogenes*, the pathogen of greatest concern for ready-to-eat (RTE) meat products. Sodium pyrophosphate, sodium diacetate, sodium benzoate and sodium lactate were found to inhibit pathogens when applied to RTE meat. Post-packaging thermal pasteurization, irradiation pasteurization and packaging configurations have been shown to be important to control pathogens on RTE meats.

- A packaging system using 0.5% carbon monoxide with high (70%+) levels of carbon dioxide results in cherry red color in fresh meat with greatly extended shelf life has been determined.

Color is maintained by carbon monoxide even with irradiated beef products, which normally show brown discoloration.

· Source of Federal Funds—Hatch

· Scope of Impact—State Specific

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

a. Description of activity

This program focuses on evaluating chemical, physical and biological hazards that may be introduced during food production, and determining methods or procedures to reduce the risk from these hazards. The research from this year has focused specifically on animal production and the processing of cooked ready to eat meats, and has addressed biological hazards in both the animal production phase and processing phase of foods of animal origins. This research has led to knowledge that may provide a new method for control of foodborne pathogens, specifically salmonellae, at the animal production site. The use of specific lactobacilli in feed could be a readily available "user friendly" technique for animal production sites. Additional research has documented the survival of a serious food borne pathogen, Listeria monocytogenes, in a food processing plant environment. A more comprehensive understanding of the contamination issue will lead to research on more successful interventions.

a. Impact/accomplishment -

Short-term:

- Salmonella specific phage, as an alternative approach to control Salmonella in pigs, has been used to reduce the number of Salmonella in experimentally challenged pigs. When Salmonella phage administrated to pigs that were orally infected with *Salmonella typhimurium* at 3 hours after challenge, Salmonella phage administrated via both oral and intramuscular route significantly reduced the number of Salmonella in pig's tissues such as tonsil, cecum contents, resulting in healthier pigs and safer pork.

Long-term:

- A model for the use of milk cultures containing *Lactobacilli* to reduce the levels of *S. typhimurium* in swine is being developed. Preliminary results suggest that a dietary supplement of *Lactobacilli* milk cultures may trigger a localized immune response in the live pig, making the intestinal tract less hospitable for salmonellae. The technique, if fully developed, could result in healthier pigs and safer pork. The technique, which involves feeding a yogurt-like mixture to pigs, would be readily adaptable to virtually any hog production facility.

- Simulated environmental contamination studies showed that populations of Listeria monocytogenes were recovered from inoculated ready-to-eat (RTE) meats by surface plating on non-selective and selective media. L. monocytogenes was found not only to be capable of surviving for over 40 days at 22°C and 0% RH, but was able to attach to and be recovered from the RTE meats after vacuum storage. More effective means of controlling this bacterium will be determined.

· Source of Federal Funds—Hatch

· Scope of Impact—State Specific; Integrated Research and Extension

GOAL 3: A healthy, well-nourished population.

Overview

The Iowa Agriculture and Home Economics Experiment Station has made progress against all the impacts identified in the plan of work for Goal 3. Research outputs take a number of forms:

- 31 Research Papers
- 1 Patent
- 21 Invited Presentations
- 15 Educational Programs

Outputs, outcomes and impacts: Highlights of research at Iowa State University:

- Modification of feeding practices to raise pigs can alter the fatty acid composition of the meat to be more polyunsaturated compared to traditional pork. When fed to human subjects, polyunsaturated modified pork lowers serum cholesterol concentrations. This may influence the way pigs are raised so that the product could be improved from a human nutritional perspective.

- Supplementation of soy oil in the diet of cows is a more effective means to increase conjugated linoleic acid (CLA) content of milk than supplementation with CLA. CLA contents of milk and yogurt were increased 2.8-fold through soy supplementation versus 2-fold through CLA supplementation. CLA is a potential human health protectant found in animal-based foods.

- Phytic acid, as a dietary supplement, significantly reduced iron burden in liver as well as the damage caused by the presence of excess iron in an animal model for hereditary hemochomatosis (HH) (a genetic disorder associated with iron overload). This research will provide a basis to study the dietary approaches to treat iron overload in human subjects and to design therapeutic strategies by utilizing natural food components to overcome diseases associated with iron overload.

- Mechanisms by which retinoids (vitamin A compounds and derivatives) can abnormally alter folate function have begun to be elucidated. A key regulatory protein is inappropriately

activated by retinoids, causing liver damage such as the development of a fatty liver. Understanding retinoid/folate function interactions will provide a basis for establishing dietary recommendations directed at minimizing or preventing the development of liver damage that can lead to more chronic disease states.

- Isoflavones (components of soybeans implicated in chronic disease prevention) are biologically active as their glucaronide conjugates (major forms of isoflavones found in the human circulatory system). Glucaronide conjugates are capable of activating human natural killer cells, a first line of defense against tumor cells and certain viruses, in cultured cells. It may be possible to activate human glucaronide conjugates via dietary supplementation of isoflavones for chronic disease prevention.

- Critical events in skin cancer development are blocked in mice by feeding low-calorie diets. Understanding the mechanism of cancer prevention by underfeeding rodents will provide a gold standard for developing other dietary strategies for cancer prevention since caloric restriction is the most effective strategy for the prevention of a broad range of cancers.

- All acetyl-CoA carboxylase (ACCase) genes in the single organisms, Arabidopsis, have been identified. This provides the basis for addressing the question of whether the genes coding for ACCase have roles in determining the fatty acid content of plant tissues.

- A negative effect during the first month of life in humans from an overlap of breastfeeding and late pregnancy has been documented. Results of these studies serve as a basis of recommendations on breastfeeding by Ministries of Health throughout the world, recommendations needed so as to not wean toddlers prematurely and, at the same time, protect the health and well being of the newborn.

- Treatment of mid-life women during the menopausal transition with isoflavone-rich soy prevented bone loss from the lumbar spine; had no beneficial effect on the proximal femur bone mineral density or on the lipid profiles; did not adversely affect coagulation/fibrinolytic factors, which are typically adversely affected by estrogen replacement therapy; did have a beneficial effect on total antioxidant status, considered to be protective for cardiovascular disease; and did not provide relief of menopausal symptoms. This is a potential treatment alternative to hormone therapy for osteoporosis, providing disease-preventing, health-promoting choices with minimal side effects.

- College level nutrition science course prevented weight gain in freshman college students. Only the students in the education group were able to maintain weight. Students in the control group gained weight. Nutrition science education of students may be a valuable tool in weight control.

- Extent of intestinal absorption of beta-carotene in human subjects is influenced by the nature of ingested fat. Ingestion of beta-carotene with beef tallow, a more saturated fat, resulted in greater intestinal absorption of the beta-carotene than ingestion with sunflower oil, a polyunsaturated fat. This research finding is expected to result in the design of more effective

vehicles for fortification or supplementation with beta-carotene or vitamin A in order to alleviate vitamin A deficiency in at-risk populations.

- Evaluated plasma cholesterol lowering in subjects fed soybean *B*-conglycinin. Cholesterol was lowered only in subjects fed the protein with intact isoflavones and not in subjects consuming isoflavone free *B*-conglycinin compared to casein fed controls. These results are important in helping consumers and food industries select the soybean components that may be most effective in lowering circulating cholesterol.

- Daily consumption of plant sterols in lean ground beef effectively lowered serum cholesterol and low-density lipoprotein cholesterol (LDL) in young men with elevated cholesterol levels. Cholesterol lowering plant sterols can be successfully incorporated into nutritious foods other than just margarine and mayonnaise. Based on this study, ConAgra is expected to introduce new products in the spring of 2001.

Assessment of accomplishments as measured against POW:

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 (①②③⑤⑥⑦⑨❶❷❸),
- increase in risk-taking by food companies in developing improved foods (①❷❸), and
- increase in the public's awareness of health promoting dietary and feeding behaviors (④⑧⑩❷).

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 (①②③④⑤⑥⑦⑧⑨⑩❶❷❸).

State and Hatch Funds $ 566,543

FTEs 6.2

Key Theme – Human Nutrition

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

a. Description of activity

This project focuses on improving the foods people consume. The scope of the research covers improvements in all consumer aspects of foods including functional, sensory, economic, nutritional, and selection criteria. Research spans 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.

b. Impact/accomplishment –

- Modification of feeding practices to raise pigs can alter the fatty acid composition of the meat to be more polyunsaturated compared to traditional pork. When fed to human subjects, polyunsaturated modified pork lowers serum cholesterol concentrations. This may influence the way pigs are raised so that the product could be improved from a human nutritional perspective.

- Supplementation of soy oil in the diet of cows is a more effective means to increase conjugated linoleic acid (CLA) content of milk than supplementation with CLA. CLA contents of milk and yogurt were increased 2.8-fold through soy supplementation versus 2-fold through CLA supplementation. CLA is a potential human health protectant found in animal-based foods.

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recommendations needed so as to not wean toddlers prematurely and, at the same time, protect the health and well being of the newborn.

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- Evaluated plasma cholesterol lowering in subjects fed soybean *B*-conglycinin. Cholesterol was lowered only in subjects fed the protein with intact isoflavones and not in subjects consuming isoflavone free *B*-conglycinin compared to casein fed controls. These results are important in helping consumers and food industries select the soybean components that may be most effective in lowering circulating cholesterol.

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· Source of Federal Funds—Hatch

· Scope of Impact—State Specific; Integrated Research and Extension

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

Overview

The Iowa Agriculture and Home Economics Experiment Station has made progress against all the impacts identified in the plan of work for Goal 4. Research outputs take a number of forms:

- 164 Refereed Publications, Research Papers, Manuscripts
- 73 Non-refereed Publications, Reports, Technical Papers
- 52 Proceedings, Published Abstracts
- 29 Extension Publications
- 214 Invited Presentations
- 239 Education Programs, Field Days, Tours
- 19 Books & Chapters
- 40 Web Sites, Multi-Media
- 3 Patents
- 8 Theses, MS/Ph.D. Programs Completed
- 5,653 Pesticide Applicators Served
- 2 Miscellaneous

Outputs, outcomes and impacts: Highlights of research at Iowa State University:

- The Bear Creek Buffer Project, a major public and private research and demonstration program, continues to expand with 6 miles of stream corridor through privately owned land now fully buffered. Recent results demonstrate up to 92% reduction in rainfall runoff and a 93% reduction in sediment as a result of buffer placement. Nitrogen and phosphorus loss was reduced by more than 90% as surface water passed through a 20-m mixed vegetation buffer. Total numbers of bird species in buffer strips continues to increase as buffers mature with 42 species observed in the most recent survey compared to 7 species in riparian pasture areas. Private landowner participation in the Bear Creek demonstration project continues to increase as the value of stream side buffers is demonstrated. Increases in bird counts over a 10-year period provide strong evidence for the very positive impacts that buffers can have on increasing bio-diversity in intensively managed agricultural landscapes.

- Following a successful mill trial using phenol-formaldehyde cross-linked soybean adhesives for hardboard and medium density fiberboard, research has focused on improving the formulation for potential commercial use. A license agreement has been developed for the phenol-formaldehyde cross-linked soy based resin.

- Guidelines have been developed for managing carbon-to-nitrogen ratios in fiber-waste amendments so that decomposition occurs in the soil. Work with industry to develop the best management practices for using wastes products (such as fiber waste from the recycling of cardboard, biomass waste from enzyme production, fermentation byproducts, and waste from polymer-grade lactic acid production) as soil amendments has been completed. Waste products from a number of Iowa industries can be land applied, environmental risks of excess nutrient applications will be minimized, and costs for crop producers will be reduced.

- Research on natural products for the control of varroa mites in honeybee colonies yielded promising results. Four monoterpenes from essential oils (from plants) have been shown to be very highly selective. Their high potency on varroa mites and tracheal mites, together with

their very high safety margin for the honeybees, resulted in a patent application and field testing in four locations.

- Efforts are being made to improve the insecticidal activity of baculoviruses by accelerating their speed of kill with a class of enzymes that break down barriers to the progression of viral infection. Results so far indicate that the use of these enzymes can significantly improve baculovirus speed of kill. The success of this effort will pave the way for the widespread use of baculoviruses to control lepidopteran pests, which in turn will reduce the growers' dependence on chemical insecticides and provide a viable alternative to transgenic crops.

- Natural products from plants were investigated for their potential as insecticides and insect repellents. Monoterpenoids and sesqiterpemoids from plant essential oils were studied for their toxic and repellent effects. Cyanohydrins from flax were evaluated for their efficacy as insect fumigants. These alternatives to hard chemicals showed great promise for the control of insects in sensitive areas.

- Odor generation values from different animal production odor sources have been documented and some odor management practices have been evaluated for effectiveness. Significant work was done for the state of Colorado to determine the odor potential for anaerobic lagoons in the state and the effectiveness of some management practices. This information is the basis of a state regulation on anaerobic lagoon odors.

- Work was conducted to evaluate the effectiveness of several types of soil incorporation devices to mix or inject manure into the soil for odor control. The most effective techniques resulted in a 90% reduction of odor generation from the land application site. Public agencies in Iowa are using the results of many of the research trials on land application of swine manure to develop acceptable land application standards for manure. These results are being used in Iowa and around the country to help meet the objective of having adequate animal products produced while maintaining and improving the environment.

- Results to date indicate that surface water quality can be affected by runoff from manure covered land. Phosphorus and bacteria can be detected at higher levels when manure is surface applied prior to a runoff event. There is little evidence of bacterial contamination of shallow groundwater, i.e. subsurface drainage flow, when swine waste is applied at agronomically accepted levels. Determining the impact of land application of swine waste on surface and subsurface groundwater quality will allow producers to maximize use of these nutrients while minimizing the impact on water quality.

- One thousand visitors to Clear Lake and 900 residents were surveyed to estimate the value of potential water quality improvements. By focusing on both the aesthetic and recreational resources the lake provides, this study will provide valuable information for making decisions about how much improvement in water quality to seek and the most appropriate methods for doing so. Improved water quality will benefit Clear Lake visitors and residents by providing safer, non-threatening water conditions for the numerous activities enjoyed on and near the lake.

- A mathematical model was developed that identifies potential Topeka shiner habitat based on landscape-level environmental features. The model can be used to evaluate the risk of harm to Topeka shiner habitat that would be posed by waterway modifications and to guide future survey efforts and to identify areas that might be suitable for habitat restoration. The model is being used by the Fish and Wildlife Service, the IDNR, and a private conservation organization for such purposes.

- We have worked to help understand complex atmospheric computer models by organizing international intercomparison experiments using various regional climate modeling. We also are using the results of climate change simulations as input for crop production estimates. This will impact our clientele by providing a better understanding how climate variability impacts agriculture, the environment and ultimately our society.

- Researchers have been leading efforts to reestablish the regal fritillary, an orange and black butterfly, that is native to Iowa's prairies and is now rare throughout the Midwest. Researchers and students have helped restock some of the plants the fritillary feeds on and have begun efforts to reestablish this spectacular butterfly to the Neal Smith National Wildlife Refuge near Prairie City, Iowa, one of the largest prairie reconstruction efforts in North America. The goal is eventually to have as many native species at the refuge as possible.

Assessment of accomplishments as measured against POW:

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, ⑧⑨❶
- increased utilization of integrated pest management, sustainable, and organic agricultural practices, ①④⑤⑥
- adoption of better manure management practices, ⑦⑧⑨
- increased wetland restoration and improved riparian management on public and private lands, ❸
- greater societal recreational and economic benefits from surface water uses, and ⑩
- Iowa's agriculture being highly productive, economically profitable, environmentally friendly, and socially responsible. ①②③④⑤⑥⑦⑧⑨⑩❶❷❸

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.

State and Hatch Funds $ 4,002,609

FTEs 37.4

Key Theme – Forest Resource Management

Program 2: Forest Resource Enhancement

a. Description –

This McIntire-Stennis-funded program focuses 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.

b. Impact/accomplishment –

Short-term:

- The Bear Creek Buffer Project, a major public and private research and demonstration program, continues to expand with 6 miles of stream corridor through privately owned land now fully buffered. Recent results demonstrate up to 92% reduction in rainfall runoff and a 93% reduction in sediment as a result of buffer placement. Nitrogen and phosphorus loss was reduced by more than 90% as surface water passed through a 20-m mixed vegetation buffer. Total numbers of bird species in buffer strips continues to increase as buffers mature with 42 species observed in the most recent survey compared to 7 species in riparian pasture areas. Private landowner participation in the Bear Creek demonstration project continues to increase as the value of streamside buffers is demonstrated. Increases in bird counts over a 10-year period provide strong evidence for the very positive impacts that buffers can have on increasing bio-diversity in intensively managed agricultural landscapes.

Long-term:

- Windbreaks and shelter-belts reduce wind speed and alter temperatures in adjacent crop fields. Research to date demonstrates that strategically placed windbreaks can lead to a 6% increased soybean yields in dry years. At current prices this increase represents an increase in income on the order of $12.00 to $14.00 per acre. Continued progress will allow efficacy of windbreak placement to be tested under a variety of crop and landform situations across the Midwest.

- A third regional test of promising clones of *Populus* was initiated. Screening tests in FY 2000 for *Melampsora* rust infections and European corn borer damage showed that on average resistant *Populus* clones grew slower prior to outbreak but exceeded non-resistant clones in height growth after outbreak. Results indicate a single dominate gene controls *Melampsora* resistance. This discovery should make development of disease resistant clones easier. Disease and insect resistant clones of poplar will be key to the success of biomass plantations and wood fiber farms. These resistances will allow the environmental and economic costs associated with intensive culture to be reduced.

- Trees planted in response to utility sponsored planting programs have been sampled in 21 Iowa communities as well as in several other mid-western states. These data, in addition to assessing tree health and growth in urban settings, will be used in the UFORE model to predict the sequestration of carbon by these trees. A parallel study is assessing environmental constraints affecting tree survival and growth in urban, suburban, and rural areas. Because

several of the conifer species that have been used in landscape planting in the Midwest are no longer recommended due to insect and disease problems, an effort is underway to screen alternative conifer species as replacements. Results from this effort will provide alternative nursery crops for Midwest growers.

- Following a successful mill trial using phenol-formaldehyde cross-linked soybean adhesives for hardboard and medium density fiberboard, research has focused on improving the formulation for potential commercial use. A license agreement has been developed for the phenol-formaldehyde cross-linked soy based resin.

- In the area of fiber/plastic composites, research has concentrated on the use of switchgrass and soybean adhesives as additives to fiber/plastic composites. Switchgrass/high density polyethylene blends have been formulated for industrial mill trials. Should these trials prove successful, a new market for switchgrass fiber could be developed.

· Source of Federal Funds—McIntire-Stennis

· Scope of Impact—State Specific

Key Theme – Sustainable Agriculture

Program 19: Sustainable Agriculture

This program has been merged with, and is reported under, Program 20: Sustainable/Organic Agriculture, and Program 21, Sustainable and Environmentally Safe Management of Soil Resources.

Key Theme – Soil Quality

Program 21: Sustainable and Environmentally Safe Management of Soil Resources

a. Description of activity

This program is focused on four major issues: (1) management of crop nutrients in soils, (2) how microorganisms and their products function in soils, (3) the assessment and sustainable management of soil resources, and (4) the fate and transport of chemicals in soils.

b. Impact/accomplishment -

Short-term:

- Guidelines have been developed for managing carbon-to-nitrogen ratios in fiber-waste amendments so that decomposition occurs in the soil. Work with industry to develop the best management practices for using wastes products (such as fiber waste from the recycling of cardboard, biomass waste from enzyme production, fermentation byproducts, and waste from polymer-grade lactic acid production) as soil amendments has been completed. Waste

products from a number of Iowa industries can be land applied, environmental risks of excess nutrient applications will be minimized, and costs for crop producers will be reduced.

Long-term:

- Determined that acidic byproducts are suitable for land application in some instances. Commercially viable yields of blueberries were achieved following three years of research. Similar soil acidification may be expected from Quaker Oats' oat hull residue derived from furfuryl extraction. Tests with this material are being planned.

- Arbuscular mycorrhizal AM fungal populations were found to decrease drastically under the fallow treatment (versus continuous corn or continuous soybean treatments). Corn mycorrhizae produced higher numbers of spores than did soybean mycorrhizae throughout the study, materials from more poorly drained soils maintained higher AM fungal spore populations than materials from better drained soils, and a greater percentage of spores germinated in the soil materials from the well-drained soil than in those from the poorly drained soil.

- The Freundlich model was modified to assess more carefully the effects of organic carbon content and physical heterogeneity on the retention of hydrophobic organic compounds (HOCs) by soils, using naphthalene and phenanthrene as typical HOCs. This has resulted in an improved method to compare the ability of soil materials to retain HOCs.

- The activities of soil enzymes are impacted by lime application, even though carbon and nitrogen contents of the soils are not significantly influenced. It is believed that lime-induced increases in soil pH may have increased the population of soil microorganisms and its diversity, resulting in an increase in enzyme activity in the soil. With only one exception (acid phosphatase, which decreases with soil pH), the activities of 14 enzymes were positively correlated with soil pH. Two enzymes that were most affected by pH increases in the soil were L-glutaminase, which is involved in the release nitrogen during the decomposition of organic matter, and alkaline phosphatase, which is involved in the release of phosphorus during organic matter decomposition.

· Source of Federal Funds—Hatch

· Scope of Impact—State Specific; Integrated Research and Extension

Key Theme – Integrated Pest Management

Program 22: Integrated Pest Management

a. Description of activity

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. Research at Iowa State University was conducted in many different areas of IPM.

b. Impact/accomplishment -

Short-term:

- A new soybean pest, the soybean aphid, was detected in eastern Iowa soybeans. Chinese literature was translated to understand the pest's life cycle, ecology, damage potential, and management. Based on Chinese data, economic thresholds of physiological loss were calculated, and recommendations for scouting and management were conveyed to Iowa soybean producers.

- Laboratory tests were conducted to determine whether Bt pollen influences survival and weight of monarch butterfly larvae. These results help define the impact of the transgenics on nontargets and also define the importance of indigenous organisms on a pest insect.

- Research on natural products for the control of varroa mites in honeybee colonies yielded promising results. Four monoterpenes from essential oils (from plants) have been shown to be very highly selective. Their high potency on varroa mites and tracheal mites, together with their very high safety margin for the honeybees, resulted in a patent application and field testing in four locations.

- Many insect predators in alfalfa have been identified. *Coleomegilla maculata*, *Nabis roseipennis* and *Orius insidiosus* were shown to feed on *E. fabae* in laboratory studies. These data are useful when considering a conservation biological control program in alfalfa.

Long-term:

- A greenhouse study was completed to determine if the *pin2* proteinase inhibitor gene resistance characteristics in transgenic tissue culture plantlets were expressed in trees. CLB generations 1 and 2 usually can be managed effectively with biorational insecticides. Iowa State University has taken a national lead in developing pest management strategies and tactics to reduce damage from the cottonwood leaf beetle (CLB) and other short-rotation woody crop pests.

- Molecular variation at mitochondrial and nuclear genetic loci was studied in house flies. These continuing genetic studies will allow entomologists more effectively to manage harmful and beneficial insects by exposing weak links in their bionomics and allowing more precise applications of newer management techniques.

- For the 20th year, face flies, stable flies, and house flies were monitored in Ames, IA from March to November. Breeding structure was examined with genetic tools to provide measures of genetic differentiation and gene flow among populations, indirect estimates of population size, and the occurrence of earlier bottlenecks in population size. Ecological monitoring of fly populations allows the construction and verification of population models

that predict seasonal onset and abundance. There are predictable periods of minimum population size, age and breeding structure, when management techniques could be applied to optimize long term negative effects on target population size. The genetic data suggest much gene flow within continents and a surprising amount of inter-continental movement. They help to explain the rapid spread of insecticide resistance in house flies and indicate the geographic spreading of exotic pathogenic organisms.

- Efforts are being made to improve the insecticidal activity of baculoviruses by accelerating their speed of kill with a class of enzymes that break down barriers to the progression of viral infection. Results so far indicate that the use of these enzymes can significantly improve baculovirus speed of kill. The success of this effort will pave the way for the widespread use of baculoviruses to control lepidopteran pests, which in turn will reduce the growers' dependence on chemical insecticides and provide a viable alternative to transgenic crops.

- Egg production by European corn borer (ECB) moths infected with Nosema pyrausta (N.p.) and exposed to cool and wet conditions at the time of normal egg laying is reduced by as much as 50% compared to a moth not infected and laying eggs in a favorable environment. These data indicate if the weather is cool and wet during the egg laying period of ECB and the ECB are infected with N.p. the number of eggs laid will be substantially reduced.

- Natural products from plants were investigated for their potential as insecticides and insect repellents. Monoterpenoids and sesqiterpemoids from plant essential oils were studied for their toxic and repellent effects. Cyanohydrins from flax were evaluated for their efficacy as insect fumigants. These alternatives to hard chemicals showed great promise for the control of insects in sensitive areas.

- The insect genetics lab has developed genetic markers in mitochondrial DNA and microsatellite markers in nuclear DNA that support investigation of breeding structure and genetic differentiation of tsetse flies, *Glossina pallidipes* and *G. morsitans*, the vectors of African trypanosomiasis. Adequate control of tsetse flies is far too expensive and short term to be applied over economically useful land areas, so area-wide methods such as the sterile insect technique are being investigated with field trials. It is now necessary to learn rates of gene flow among contiguous populations and the degrees of genetic differentiation of tsetse populations so that cultured, sterilized, and released tsetse can be "matched" with their target populations and rates of re-invasion of eradicated areas may be estimated.

· Source of Federal Funds—Hatch

· Scope of Impact—State Specific; Integrated Research and Extension

Key Theme – Agricultural Waste Management

Program 23: Animal Waste Management

a. Description of activity

This program has had an integrated scientific approach to address several issues surrounding animal waste management. Research work has been accomplished on influence of diets on manure nutrients and odor, development and comparison of various odor-measuring techniques, development of manure management systems to better methods to utilize manure and avoid nuisance problems for sustainable agricultural production. Work is also continuing on systems to minimize indoor air quality problems in animal production facilities and to reduce air pollutant emissions from production units. In addition, studies are being conducted on water quality concerns associated with animal production and the public policy impacts on location of swine production units. This set of integrated research projects has the potential to help solve many of the problems besetting animal agricultural production today. Results of this work are being used to assist producers, public agencies and other stakeholders with usable results to minimize problems with animal production and the environment.

b. Impact/accomplishment -

Short-term:

- Protocols for odor panelist selection criteria; storage; and transport limitations for odor samples and comparison of olfactometry results with gas chromatography/mass spectrometry, as well as electronic nose results, have been developed to standardize olfactometry measurements in the USA. Odor measurement protocol has resulted in an agreement between most odor measurement laboratories in the country to use the same techniques so values can be compared.

- Odor generation values from different animal production odor sources have been documented and some odor management practices have been evaluated for effectiveness. Significant work was done for the state of Colorado to determine the odor potential for anaerobic lagoons in the state and the effectiveness of some management practices. This information is the basis of a state regulation on anaerobic lagoon odors.

- Work was conducted to evaluate the effectiveness of several types of soil incorporation devices to mix or inject manure into the soil for odor control. The most effective techniques resulted in a 90% reduction of odor generation from the land application site. Public agencies in Iowa are using the results of many of the research trials on land application of swine manure to develop acceptable land application standards for manure. These results are being used in Iowa and around the country to help meet the objective of having adequate animal products produced while maintaining and improving the environment.

- New information was collected on the nutrient excretion values from dairy cattle. Animal nutrition has major impact on nutrient excretion values and on odor quality. Dietary effects on dairy manure information are currently published in the latest Midwest Plan Service publication (MWPS-18) and are being used regionally and nationally.

Long-term:

- Odor control practices being evaluated include an odor masking system to mist products into the downwind air-stream when the odors would be carried to a downwind receptor, manure storage covers, and the use of biofilters on ventilation discharge air. Each of these studies indicated that management practices could have significant effects on odor discharges from animal production facilities.

- Air quality inside buildings is being measured to determine the potential impact on human health for workers and animal performance. Further work is being done with the interaction of dust and pathogen transfer inside and in the air stream downwind from production buildings.

- Results to date indicate that surface water quality can be affected by runoff from manure covered land. Phosphorus and bacteria can be detected at higher levels when manure is surface applied prior to a runoff event. There is little evidence of bacterial contamination of shallow groundwater, i.e. subsurface drainage flow, when swine waste is applied at agronomically accepted levels. Determining the impact of land application of swine waste on surface and subsurface groundwater quality will allow producers to maximize use of these nutrients while minimizing the impact on water quality.

· Source of Federal Funds—Hatch

· Scope of Impact—State Specific; Integrated Research and Extension

Key Theme – Water Quality

Program 24: Improving Water Resources Management in an Agroecosystem

a. Description of activity

This program focuses on several issues of importance to understanding the interrelationship between water quality and agriculture: 1) describing the sources of water quality problems and the feasibility of remedial measures for lake and watershed restoration; 2) calculating economic and cultural benefits derived from societal uses of the water resources; 3) constructing models of critical habitat for endangered fish and freshwater mussels that allow water resource development but maintain biodiversity; 4) evaluating the influence of suspended solids and pesticides on survival of larval fishes; 5) describing habitat requirements and trophic dynamics of economically important Iowa fishes, and 6) contributing to environmental databases for improved state and federal water resource management programs.

b. Impact/accomplishment -

Short-term:

- A mathematical model was developed that identifies potential Topeka shiner habitat based on landscape-level environmental features. The model can be used to evaluate the risk of harm to Topeka shiner habitat that would be posed by waterway modifications and to guide future

survey efforts and to identify areas that might be suitable for habitat restoration. The model is now being used by the Fish and Wildlife Service, the IDNR, and a private conservation organization for such purposes.

Long-term:

- One thousand visitors to Clear Lake and 900 residents were surveyed to estimate the value of potential water quality improvements. By focusing on both the aesthetic and recreational resources the lake provides, this study will provide valuable information for making decisions about how much improvement in water quality to seek and the most appropriate methods for doing so. Improved water quality will benefit Clear Lake visitors and residents by providing safer, non-threatening water conditions for the numerous activities enjoyed on and near the lake.

· Source of Federal Funds—Hatch

· Scope of Impact—State Specific; Integrated Research and Extension

Key Theme – Weather and Climate

Program 25: Interaction of Biosystems with Weather and Climate

a. Description of activity

This program focuses on understanding climate variations and their effects on production variation so that producers can maximize their efforts in conjunction with the governmental programs in place, and 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.

b. Impact/accomplishment -

Short-term:

- We have worked to help understand complex atmospheric computer models by organizing international intercomparison experiments using various regional climate modeling. We also are using the results of climate change simulations as input for crop production estimates. This will impact our clientele by providing a better understanding how climate variability impacts agriculture, the environment and ultimately our society.

- The graduate Global Change course was delivered online to a large fraction of the Natural Resource Conservation Service. The goal of delivering this course will be to provide county NRCS employees with authoritative resource materials for putting on programs and responding to local needs with regard to global environmental change. Because of this effort, society will be better equipped to understand the complexities of global change problems such as global warming.

- Weather models used by the National Weather Service in the US and several countries worldwide to forecast warm season precipitation were tested. Rainfall prediction was found to be sensitive to soil moisture, suggesting that more extensive soil moisture measurements will improve rainfall prediction. Published results detailing internet-based weather forecasting activities are used in university meteorology courses and are available for use worldwide by many groups in service and education.

- Research-based principles on risk management using climatic index trends were presented in educational programs to farmers. This addresses the difficulty agricultural producers have in planning near-future production practices primarily because of economic uncertainties and the weather unknowns. Numerous farmers have mentioned that the realization that May 1st would be the "high" crop value for the year 2000 was the factor that allowed them to have a successful year.

Long-term:

- The incidence of dew and disease in portions of the Midwestern United States and Costa Rica was monitored and related to weather and satellite observations. Models are being developed to describe these processes.

· Source of Federal Funds—Hatch

· Scope of Impact—State Specific

Key Theme – Natural Resources Management

Program 26: Improving Environmental Quality in a Changing Landscape

a. Description of activity

This program focuses on basic research on evaluating several habitat restorations, including prairies, wetlands, and grassland-savannas, as well as on deer-motor vehicle collisions and a simulation model that will help policy makers and resource managers to better understand the implications of agricultural policy on Iowa's wildlife populations.

b. Impact/accomplishment -

Short-term:

- Researchers have been leading efforts to reestablish the regal fritillary, an orange and black butterfly, that is native to Iowa's prairies and is now rare throughout the Midwest. Researchers and students have helped restock some of the plants the fritillary feeds on and have begun efforts to reestablish this spectacular butterfly to the Neal Smith National Wildlife Refuge near Prairie City, Iowa, one of the largest prairie reconstruction efforts in North America. The goal is eventually to have as many native species at the refuge as possible.

- Researchers have worked with the Iowa Department of Transportation, and by mapping the specific location of deer-motor vehicle collisions, have been able to pinpoint the kinds of situations where many of them occur. We hope to be able to reduce the number of deer on the road at those locations and warn motorists of where deer-vehicle collisions are most likely to occur, thereby reducing this hazard to Iowa motorists.

Long-term:

- A long-term study involved combining USDA data on agricultural land use in Iowa and data collected during an intensive study of ring-necked pheasant habitat use and movements in northern Iowa have resulted in a simulation model that can be used by policy makers and resource managers to better understand the implications of agricultural policy on Iowa's wildlife populations.

· Source of Federal Funds—Hatch

· Scope of Impact—State Specific; Integrated Research and Extension

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

Overview

The Iowa Agriculture and Home Economics Experiment Station has made progress against all the impacts identified in the plan of work for Goal 5. Research outputs take a number of forms:

- 57 Refereed Publications, Research Papers, Manuscripts
- 55 Non-refereed Publications, Reports, Technical Papers
- 11 Proceedings, Published Abstracts
- 11 Extension Publications
- 211 Invited Presentations
- 22 Books & Chapters
- 3 Web Sites/Multi-Media

Outputs, outcomes and impacts: Highlights of research at Iowa State University:

- Theoretical research on the impact of information on the decisions of producers and consumers of GMO products shows that optimal decisions can be made in the presence of freely accessible verifiable information if there is competition in the provision of such information. Presently, much of the information about the nature of genetically modified foods and the presence or absence of GMOs is not in the public view, is not verifiable if it is available, and may be more available to some parties than to others. In such a situation, some parties to transactions can use these information asymmetries for personal gain to the disadvantage to the market as a whole. The results indicate the need for more open information systems and uniform labeling. Consumer and producer groups within the marketing system clearly understand that overall welfare will increase with the free sharing of verifiable information about the risks of GMOs and their presence in food products. Understanding of this issue could lead to more cooperation in the provision of such

information, may encourage labeling or standards, and reduce the current problems resulting from asymmetric information and lack of clear standards.

- Enhanced understanding of local labor market conditions will help bridge the labor-skill mismatch available workers and jobs that are unfilled. This research provides insight on the impacts of changes in occupational opportunities in rural areas dominated by declining types of industries.

- The role that local communities play in influencing the support and involvement they receive from businesses—both positively and negatively—were highlighted, specific steps successful communities use to involve their business leaders in community betterment projects were identified, and the common features of business owners/managers most likely to work for community betterment were elaborated. This provides an unparalleled base of empirical data with which to answer questions about business social responsibility in the "new global economy."

- Multidisciplinary research has identified and measured the aspects of small business competitive strategy formation in the rural community environment. The most important marketing strategy used by these businesses involved presenting quality in their products and services, followed by presentation of strong business images. Their greatest problems involved complying with government regulations and finding qualified employees. Findings will serve as action plans for developing rural community business opportunities that lead to improvements in rural residents' quality of life through greater frequency of local marketplace exchange.

- Survey interviews revealed that rural transportation needs were a significant barrier to employment and access to childcare. This is a pilot study to assist Iowa Department of Human Services to develop, implement, and evaluate a strategy designed to address these identified needs. This has the potential to improve transportation for hundreds of public assistance recipients in rural Iowa.

- Accomplishments for home visits within Early Head Start included data collection using the final protocol developed with the National EHS Research Consortium for the longitudinal study of 222 Iowa children and their families (3000 in the national sample) through the children's entry into kindergarten. Supplemental funding was secured to describe children's perceptions of their child care experiences. Team members contributed to the Interim Report on Early Head Start outcomes that will be presented to the U. S. Congress next year, and that report will have a major influence on the distribution of EHS funds for the next five years. Locally, Mid-Iowa Community Action EHS staff members have received training, technical assistance and evaluation services based on project findings to date.

Assessment of accomplishments as measured against POW:

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, ②
- communities supporting development projects; increased capacity of communities, families, and individuals to improve their own quality of life, ③④
- 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 ①
- enhanced education of decision-makers at local, regional, and state levels; those initiating development projects; and those setting policies. ⑤⑥

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.

State and Hatch Funds $ 2,035,116

FTEs 18.6

Key Theme – Information Technologies

Program 15: Agricultural Information Technologies

a. Description of activity

Developments in information technology and biotechnology have impacted the agricultural sector in a number of important ways. Members of the department provided important analysis of these impacts in three key areas: 1) combining of information from soil testing, yield monitoring, and field mapping in order to optimally use fertilizer in crop production, 2) how information about genetically modified organisms (GMO) and their presence in products affects consumers, handlers, and producers of these products and their non-GMO counterparts, and 3) how biotechnology products should be regulated, labeled and handled within the marketing system.

b. Impact/accomplishment -

Short-term:

- Work involving the contamination of food grade corn with the Starlink gene from feed grade corn in the fall of 2000 was completed, providing timely information on the extent of the contamination, ways to insulate unaffected corn, and procedures to handle remuneration to producers. Ninety-nine percent of the contaminated corn was traced in a fairly short time period, and little contamination of food supplies occurred.

Long-term:

- Research was conducted to determine how signal noise (lack of precision in the collection of information) affects the optimal amount of information that should be collected in order to

implement variable-rate fertilizer application systems. There is a better understanding of why farmers may be reluctant to pay for more soil testing or soil mapping in the context of precision agriculture. Incentive now exists for extension to provide more accurate information about the true benefits of variable rate applications to producers and for researchers to reduce the noise-to-signal ratio of soil testing, yield monitoring, and mapping technologies.

- Theoretical research on the impact of information on the decisions of producers and consumers of GMO products shows that optimal decisions can be made in the presence of freely accessible verifiable information if there is competition in the provision of such information. Presently, much of the information about the nature of genetically modified foods and the presence or absence of GMOs is not in the public view, is not verifiable if it is available, and may be more available to some parties than to others. In such a situation, some parties to transactions can use these information asymmetries for personal gain to the disadvantage to the market as a whole. The results indicate the need for more open information systems and uniform labeling. Consumer and producer groups within the marketing system clearly understand that overall welfare will increase with the free sharing of verifiable information about the risks of GMOs and their presence in food products. Understanding of this issue could lead to more cooperation in the provision of such information, may encourage labeling or standards, and reduce the current problems resulting from asymmetric information and lack of clear standards.

· Source of Federal Funds—Hatch

· Scope of Impact—State Specific; Integrated Research and Extension

Key Theme – Impact of Change on Rural Communities

Program 27: Rural Development

a. Description of activity

This program examined how human systems affect and are affected by the structure of agriculture and life in rural communities to address five major issues: (1) enhancing economic opportunities and the quality of life in rural America, (2) building greater harmony between agriculture and the environment, (3) achieving sustained, long-term improvement in the competitive position of U.S. agriculture, (4) developing a safe and secure food system, and (5) encouraging a healthier, more well-nourished population.

b. Impact/accomplishment -

Short-term:

- Enhanced understanding of local labor market conditions will help bridge the labor-skill mismatch available workers and jobs that are unfilled. This research provides insight on the impacts of changes in occupational opportunities in rural areas dominated by declining types of industries.

- Inventoried and evaluated past programs to reach women landowners. This research synthesized existing data and collected additional data that will provide critical detail needed to reach a vital population—women landowners. This population is under-served by agricultural institutions and under-represented in decision-making bodies that shape natural resource policies and priorities, and information gained will be used by these groups to contact women landowners and obtain more input from them.

- Research identified key advocacy coalitions, the desired future conditions and mental causal models of each coalition, and potential bridging institutions that can work with them on achieving the shared desired future conditions for the bio-reserve Callampas-Cotacachi. This should help ease the conflict around this bio-reserve on who will manage it and to what ends.

Long-term:

- The role that local communities play in influencing the support and involvement they receive from businesses -- both positively and negatively were highlighted, specific steps successful communities use to involve their business leaders in community betterment projects were identified, and the common features of business owners/managers most likely to work for community betterment were elaborated, providing an unparalleled base of empirical data with which to answer questions about business social responsibility in the "new global economy."

- The factor that explained the most variation in telephone company innovativeness was found to be the degree to which the company was involved in local development activities. Future telecommunications programs may benefit from social action programs that involve broader, crosscutting constituencies from impacted communities.

· Source of Federal Funds—Hatch

· Scope of Impact—State Specific; Integrated Research and Extension

Program 31: Fundamental Social Sciences

This program has been merged with, and is reported under, Program 27: Rural Development

Key Theme – Other

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

a. Description

This program has focused on the following three main issues: 1) improvement of protective quality and use of fiber-related products by addressing challenges posed by occupational safety and health issues; 2) enhancement of individuals, family, and community socio-economic development through expansion and advancement of information, products, and

services related to textiles and clothing; and 3) facilitation of fiber-related product or industry process development to advance domestic and/or global market exchange.

b. Impact/accomplishment

Short-term:

- Analysis of 199 Iowans between the ages of 65 and 89 revealed that the strongest predictor of local community shopping was satisfaction with the local retail marketplace. Those consumers who were more satisfied with local retailers and their facilities were more loyal to local businesses regarding their textiles and apparel product purchasing. Enticing rural consumers age 65 and older to shop locally can help small businesses thrive and in turn contribute to community economic development.

Long-term:

- Multidisciplinary research has identified and measured the aspects of small business competitive strategy formation in the rural community environment. The most important marketing strategy used by these businesses involved presenting quality in their products and services, followed by presentation of strong business images. Their greatest problems involved complying with government regulations and finding qualified employees. Findings will serve as action plans for developing rural community business opportunities that lead to improvements in rural residents' quality of life through greater frequency of local marketplace exchange.

- Computer simulation-based research conducted at ISU represents the only quantitative methods of understanding the financial impact of assortment diversity. Executives trained to improve merchandising practices can potentially improve assortments so that merchandise offered better meets customers needs and reduces stockouts to improve customer satisfaction. This allows manufacturers to improve flexibility and makes it possible to accommodate both large and small retailers, allowing attention to be focused on factors other than the lowest labor costs.

· Source of Federal Funds—Hatch

· Scope of Impact—State Specific; Integrated Research and Extension

Program 30: Quality of Life

a. Description

This program focuses on sustaining and enhancing rural life quality by investing 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. Three main research areas are: Human Development and Family Well-Being; Hazards to Health and Safety; and Environmental Amenities.

b. Impact/accomplishment

Short-term:

χ. Accomplishments for home visits within Early Head Start included data collection using the final protocol developed with the National EHS Research Consortium for the longitudinal study of 222 Iowa children and their families (3000 in the national sample) through the children's entry into kindergarten. Supplemental funding was secured to describe children's perceptions of their child care experiences. Team members contributed to the Interim Report on Early Head Start outcomes that will be presented to the U. S. Congress next year, and that report will have a major influence on the distribution of EHS funds for the next five years. Locally, Mid-Iowa Community Action EHS staff members have received training, technical assistance and evaluation services based on project findings to date.

- Analysis of a sample of reports of bequests and inter-vivos financial transfers from their parents indicated that significant financial transfers occur primarily among wealthy families, including a substantial fraction who farmed. However elderly parents do not compensate adult children for differential economic success. Multivariate regression analysis of retirees' financial behavior determined optimal investments from historical performance data and a consumption/saving simulation based on the Survey of Consumer Finances. Results suggest that retirees should be more conservative with respect to their investments. These findings are being shared with extension family resource management staff to prepare new materials to advise elderly consumers about financial management. Improved decisions will increase saving for retirement, returns on investment while retired, and reduce dependency on financial transfers from their adult children.

Long-term:

- Survey interviews revealed that rural transportation needs were a significant barrier to employment and access to childcare. This is a pilot study to assist Iowa Department of Human Services to develop, implement, and evaluate a strategy designed to address these identified needs. This has the potential to improve transportation for hundreds of public assistance recipients in rural Iowa.

- A latent variable structural equation model (SEM) was used to examine the empirical credibility of a theory that specifies how the family of origin influences the competence of young adults for romantic relationships in a sample of nearly 500 rural Midwest families. Additional questions are being posed, such as whether and how harsh parenting may undermine emotional stability and trust and affect relationship success with implications for young children. Findings about parental influences on young adolescents' intimate relationships will be disseminated to formulate better programs for effective parenting education.

· Source of Federal Funds—Hatch

· Scope of Impact—State Specific; Integrated Research and Extension

1862 Extension

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

Overview

Outputs, outcomes and impacts of extension at Iowa State University:

Number of participants at educational meetings, conferences, and field days:	88,335
One-on-one educational consultations – telephone, email, letter:	56,271
One-on-one education consultations – farm/business or office visit:	15,249

1. Farm level changes, that involve reorganization or repositioning of the business often occur over a period of several years. ISUE has helped farm families improve their understanding of family and business goals, develop succession plans between parents, children and unrelated parties, and evaluate major changes in farm businesses from expansion to quitting farming for off-farm work. One family's response to attending Extension Strategic Advantage workshop is representative of the impact that management development programs can achieve. When the first Strategic Advantage workshops were offered this couple was among the first to sign up. One of the major impacts of their participation was to evaluate their resource base, identify their goals, and develop a plan to achieve those goals. Continued full-time farming did not fit the achieving of their goals. Therefore, in early 2000 they had a sale and reduced their beef cow herd by 80 percent, sold their excess machinery, converted their owned land to improved pasture, terminated their rented land, and have taken off-farm employment while continuing a reduced cow herd in a total grazing system. By their estimate, this change will improve their cash flow by $30-35,000 per year and provide them with more family time than while farming full time. The major catalyst to muster the courage to make this change was their participation in Strategic Advantage and using the process to plan their future.

2. Approximately one-fourth of the 804 commercial applicators who attended ISU Extension manure training plan to change their manure management practices because of information they received:

    - 29% plan to sample manure differently.
    - 29% will maintain better application records.
    - 25% will observe separation distances more closely.
    - 28% plan to encourage the producers they work with to sample manure.

· Educational programs were held to introduce farmers to the marketing tools available and how to use them. Farmers attending were introduced to crop pricing strategies to help them increase profitability. Nearly 200 producers attended the meetings. Twenty two of the

attendees said that the average dollar value of the program was $4,250 per farm. In addition a few of the respondents said that the meeting was worth over $20,000 to their farming operation.

- Land represents the single largest expense in crop production and over 50 percent of Iowa's farmland is leased. Over the past few years the structural changes in agriculture have changed the traditional tenant landlord relations. Extension works with both the tenants and the landlords. From one set of meetings alone 43 percent will be changing their rental rates and 14 percent will be changing the type of lease.

- The aesthetic, environmental, and functional benefits that come from using trees in urban and rural landscapes are well documented. But municipalities and individual homeowners alike frequently run into difficulties when selecting and planting trees, and maintaining this valuable community resource. Enter the Iowa State University Extension offering, *The Iowa Community Tree Steward Program*. This popular program provides 24 hours of instruction to green industry professionals as well as to interested citizens who are without formal training in the plant sciences. Participants (30/site) learn where trees should and should not be used in the landscape, how to plant and provide appropriate post-plant care, how to manage mature trees, and finally, how to identify potentially dangerous trees in the landscape. While students are not charged a fee for participating, they are expected to "give back" 24 hours of service to their communities performing various tree care related tasks. Since the inception of the program in 1992, over 11,000 volunteer hours have been recorded by Tree Steward graduates. This small army of trained volunteers undoubtedly has made a positive impact on Iowa's urban and community forest.

- The Iowa Beef Center SPA records constitute the most comprehensive cowherd performance, business analysis, and benchmarking program in the U.S. Iowa producers using SPA records documented $14,573 improvement in annual returns in 5 years.

- The Tri-County Steer Carcass Futurity Program (TCSCF) started in 1983 with 35 consignors and 106 steers. In 2000, over 200 consignors evaluated 4,464 head of steers and heifers. Iowans consigned 856 head. Over 3600 came from out of state. The TCSCF program has developed Extension and producer contacts in Iowa, Georgia, South Carolina, Indiana, Alabama and Missouri that assist in recruiting producers to feed cattle in southwest Iowa.

  Total dollars spent in southwest Iowa this year were $1,209,432. The economic impact to southwest Iowa of the TCSCF in 2000 may total $3.6 million or $7.2 million, depending whether you choose an economic multiplier of three or six. Direct beneficiaries include feedlots with a yardage income of $177,000, feedlots and feed dealers with feed usage of $739,000, truckers with $160,000 and veterinarians and pharmaceutical suppliers gaining $49,000.

- In 1997, Cow Herd Improvement Program Services (CHIPS) initiated a heifer development program. A board of directors developed the guidelines and goals (develop first calf heifers with acceptable growth rate and body condition, improve the genetic base of consignors replacements, implement latest production practices and breed by artificial insemination to

calving ease bulls). Twenty-two CHIPS cooperators consigned over 400 heifers the first three years. Heifers were developed at a central location over 300 days based on bids received by the board of directors.

For the three years, 92 percent of the 400 heifers were pregnant during the breeding period-with over 60 percent AI bred following the synchronization period. In 1998, six cooperators completed a follow-up survey after the calving season. They reported that three out of four heifers required no or only minor calving assistance. Total development costs are competitive at $1.10 to $1.15 per head per day, depending on the year.

· A survey conducted during 1999 in northwest Iowa indicated that pork producers wanted advanced information on swine artificial insemination (AI). From this request, ISU Extension developed a two day Advanced Artificial Insemination Conference. At the Allee Farm, sows, gilts and a boar were provided for the producers to have hands-on participation in the techniques demonstrated. A ranking and understanding of producer skill level was taken pre-session and post session. The following results were obtained:

  - Heat checking and insemination techniques, overall knowledge improved 11%.
  - Intra-uterine insemination techniques, overall knowledge improved 52%
  - Ultrasound pregnancy detection, overall knowledge improved 67%
  - Ultrasound carcass evaluation, overall knowledge improved 73%

· Much has been written about large dairies relocating from the West to Midwest states. Yet, Extension has assisted over 75 Pennsylvania Mennonite dairy farm families in relocating or beginning dairy farming in the Howard, Floyd, Chickasaw and Mitchell County area of NE Iowa. On average, these farms have 50 cows and most are 160 to 240 acres in size. By achieving high levels of milk production per cow they sell at least 20,000 lb. of milk per cow per year. With the 1999 Iowa average mailbox price of $13.61/cwt these herds have generated over $10,075,000 of additional milk income in Iowa. In addition these dollars would turn over about 2.29 times in the community. Most of these new Iowa farmers have built their dairies from the ground up adding additional dollars to the economy for building materials, equipment and cows.

· The efforts of value added ag activities are making a significant economic impact on individual farmers and communities throughout Iowa. This year more than 60 community and farmer-initiated groups were started or assisted by ISU Extension staff. This commitment ranged from facilitating a group during start-up to conducting in-depth feasibility studies for enterprises.

  For example, small cow-calf producers in the Raccoon River Valley area have united in a cooperative marketing effort to increase the net value of their calves and increase their competitive advantage as smaller calf producers. The net value added per calf through this program was $42.32 per head. This amounted to $13,244 for the 323 head.

· Black Hawk Master Gardeners recorded over 4000 hours of volunteer service in various activities for their community. They assisted 374 county residents with home horticulture

educational needs. Jan Guthrie, board member of Green Scene (volunteer organization which raises money to purchase plant material for community beautification projects) said, "They provided volunteer time and added …expertise to Green Scene at a time when it was needed." In addition to volunteering time to their community, Master Gardeners raised $33,000 for community betterment projects.

Assessment of accomplishments as measured against the POW:

The Goal 1 impact that "Iowa producers will reduce input costs, adopt new technologies and develop value added enterprises to meet the demands of global markets" was met as shown through the individual Program impact statements.

State and Smith-Lever Funds: $ 7,460,390

FTEs: 122

Key Theme – Managing Change in Agriculture

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

a. Description of activity

The economic downturn that began in 1998 and continued through 2000 had a significant impact on this plan of work. Many farm families found it necessary to focus their efforts on short-term survival — adjusting to low commodity prices, debt repayment problems and frequent changes in farm programs. As a consequence, ISUE field staff curtailed most of the formal workshop activities expected under this plan of work. Business strategy and management development, although highly relevant, are difficult programs to deliver during a period of financial stress and industry change.

Instead effort was reallocated to the following areas:

- Farm business adjustment to reduced prices and increasing debt loads
- Grain and livestock marketing and risk management
- Adjusting farm land leases
- Participation in and use of farm programs
- Development of generic competitive strategies for farm businesses
- Strategy development for beginning and other low-resource farm businesses
- Design of web-based or other asynchronous methods for developing strategic management skills for farm families

All of the reported program elements were designed and delivered in cooperation with representatives from leading farm organizations, the lending community and government agencies. The overall design of the strategic management program is multidisciplinary and

addresses the needs of farm families drawing on the research and resources of economics and business, family and human development as well as technical agriculture.

b. Impacts/accomplishment -

Strategic Management Workshops--Farm level changes, that involve reorganization or repositioning of the business often occur over a period of several years. A follow-up with participants of Strategic Advantage workshops held 2-3 years earlier identified some of the following impacts:

- Improved understanding of family and business goals
- Improved communication and coordination
- Development of succession plans between parents, children and unrelated parties
- Major changes in farm businesses from expansion of a dairy enterprise to quitting farming for off-farm work
- Improved operations management
- Development of business relationships with neighbors — machinery sharing, replacement heifer rearing for example

One family's response to Strategic Advantage is representative of the impact that management development programs can achieve. When the first Strategic Advantage workshops were offered in 1998 this couple was among the first to sign up. One of the major impacts of their participation was to evaluate their resource base, identify their goals, and develop a plan to achieve those goals. Continued full-time farming did not fit the achieving of their goals. Therefore, in early 2000 they had a sale and reduced their beef cow herd by 80 percent, sold their excess machinery, converted their owned land to improved pasture, terminate their rented land, and have taken off-farm employment while continuing a reduced cow herd in a total grazing system. By their estimate, this change will improve their cash flow by $30-35,000 per year and provide them with more family time than while farming full time. The major catalyst to muster the courage to make this change was their participation in Strategic Advantage and using the process to plan their future.

Four Roads Conference--On March 17, 2000, the Four Roads to the Future of Agriculture conference was held on the Iowa State campus to present information on four generic strategies that farmers might consider in responding to changes in the competitive environment in the agricultural sector. This conference was targeted at farm and community leaders. Several follow-up meetings were held in local communities in an effort to provide guidance to family farmers and communities on competitive strategy for farm businesses.

For example, the Monona County Extension Education Director (CEED) participated in the Four Roads to the Future of Agriculture. Local follow up discussions were held at a KIWANIS meeting, at a breakfast for local business professionals and with local councils and committees. The CEED served on a planning committee in NW Iowa to conduct an area follow-up conference. A Monona County producer described how his family made decisions to choose a new path for their operation, specializing in raising organic hogs. The CEED is working on a county committee to develop a local directory to assist agricultural families in

seeking services. Program participants reported a better understanding of business issues facing agriculture. Producers realize that there are alternative options for production. Community members are more aware of how agriculture is tied to the entire economy.

Successful Strategies--Farm succession, the transfer of an existing farm business from one generation to the next, is a problem being faced by a growing number of Iowa farm families. Without a carefully prepared succession plan, land and other assets will likely be acquired by existing operations thereby increasing the pace of farm consolidation. Beginning farmers, those who will take over an existing family business, or those who will spin-off a new farming operation often face a daunting task.

A statewide ICN workshop "Success Strategies For Your Agricultural Business — It Is Possible!" was presented on December 9, 1999 by IADA with the support of Iowa State University. The workshop was presented simultaneously at 30 sites across the state. Each site was hosted by a high school or community college agricultural instructor plus an ISUE field specialist.

Nearly 80 percent of the participants in this highly-rated program were under 30 years of age. The major benefits identified from participation include:

- Understanding the range of strategies available for beginning farmers
- Encouragement, hearing about positive outcomes
- Understanding support available from public and private institutions

c. Source of Federal Funds—Smith-Lever

d. Scope of impact—State Specific

Key Theme – Plant Production Efficiency

Program 103: Crop Nutrient Management

a. Description of activity

Issue 1 – Manure Applicator Certification (MAC):

In a statewide survey of Iowa crop producers, only 47percent reported they adjusted commercial fertilizer rates after applying manure to fields, and 59 percent used judgement alone when determining manure application rates. As a result of this survey and other factors, the Iowa legislature in 1998 passed legislation requiring both confinement site and commercial manure applicators to become certified before applying manure.

The Iowa Department of Natural Resources was given the lead agency role to implement the law. They contracted with Iowa State University Extension to conduct the training and continuing education programs that were required under law before a producer could become certified.

ISU Extension formed an advisory committee consisting of representatives of farm organizations, statewide commodity groups, Department of Natural Resources, Natural Resource Conservation Service and others to work on specific tasks, such as Study Guide development, teaching materials preparation, and related activities.

Efforts have been made to train Hispanic applicators and others, including the use of interpreters; and plans are being made to translate written information and develop a Spanish-speaking videotape presentation.

ISU Extension has worked with North Carolina, Illinois, Nebraska and other states in a collaborative effort to produce training materials.

Issue 2 – IMMAG Clearinghouse:

The Iowa Manure Management Action Group (IMMAG) is a state-level committee with representation from the following private and public sector groups: Natural Resource Conservation Service (NRCS), Iowa Environmental Council, Agribusiness Association of Iowa, Iowa Farm Bureau, Iowa Pork Producers Association, Iowa Cattlemen's Association, Iowa Poultry Association, Conservation Districts of Iowa, Farm Credit Services of America, Iowa Department of Natural Resources (IDNR), Division of Soil Conservation of the Iowa Department of Agriculture and Land Stewardship (DSC-DALS), Iowa Beef Center, Iowa Pork Industry Center and Iowa State University Extension, and the College of Agriculture.

The goal of IMMAG is to identify and share manure management information and educational programs which can be used by producers, technical agencies, educational institutions, researchers, and the general public. Many producer organizations, in particular, are concerned that among all the sponsored manure management activity, information is accumulating among numerous organizations without a systematic plan for collection and dissemination of the information. At the same time, complete and accurate information is becoming a priority need for producers and their technical and legal advisors.

In response to the need for information regarding manure management, IMMAG has established an electronic clearinghouse. The objectives of the clearinghouse are: 1) to provide access to comprehensive information on manure management research and application, 2) identify relevant manure management publications and educational programs and convert these to electronic form, if needed, 3) solicit needed resources from qualified sources, and 4) maintain the Clearinghouse on a web site that is easily accessible.

b. Impact/accomplishment -

Manure Certification Workshops--Approximately one-fourth of the commercial applicators who attended training plan to change their manure management practices because of information they received:

- 29% plan to sample manure differently.
- 29% will maintain better application records.

- 25% will observe separation distances more closely.
- 28% plan to encourage the producers they work with to sample manure.

Confinement site applicators attending the training also plan changes:

- 20% will maintain adequate freeboard on formed pits, earthen pits, and lagoons.
- 34% will maintain records on application of manure.
- 25% will implement separation distances for land applications of manure.

About 60% of the commercial and confinement site manure applicators indicated that they were already using these practices before the training.

Manure Storage--The Department of Natural Resources rules for farmers to receive construction permits require that new manure storage structures, and existing facilities, be at current specifications. Farmers are required to have licensed engineers develop the engineering plans and supervise any construction during critical times. Not all licensed engineers are familiar with agricultural manure storage structures and manure handling.

An individual pork producer asked an ISU Extension Field Specialist to visit a gestation and farrowing facility that he was expanding. He had questions about the construction plan developed by a licensed engineer and asked to provide a review. After reviewing his plan it was determined that a proposed second lagoon was not needed and that, based on current Iowa State University Extension bulletins, his existing lagoon was already larger than required for the expansion. This change provided a savings of $40,000 to $50,000 to the producer. Additional savings were found for unneeded manure transfer equipment, and increased income potential from improvement in ventilation in the farrowing buildings. Lost income from unoccupied facilities during delays in planning and construction (estimated at $8,000 per month for 6 months) could have been avoided with a proper construction plan.

Manure Nurient Management Plans--The impending deadline for submitting manure nutrient management plans as required by a new Iowa Department of Natural Resources program had caught some producers with little time to accomplish their task. The education needs of these producers in manure management planning was met by holding several emergency manure nutrient management planning workshops. These workshops provided the necessary information on plan development, plan submission, and crop nutrient utilization so the producers could successfully develop their own plans.

As a result of these workshops 17 producers did complete their manure management plans on time. A post meeting survey completed by attending producers indicated the average return for development of the plans was $24 per acre. The average savings (based on a 425 acre sized farm) is $10,200 per farm. Additional savings will be realized in subsequent years since the producers understand the nutrient planning process and have identified lower crop fertilizer needs.

Manure Credits--An Iowa Farm and Rural Life poll conducted a couple of years ago indicated that only 47% of Iowa farmers reduced fertilizer rates when manure had been

applied to their crop ground. A Leopold Center grant funded 2 focus group studies, a survey sent to 1221 producers (from the FSA mailing list and returned by 315), and a sample/study of the nutrient content in many swine manure storage facilities.

As a result of the focus group and survey work, several roadblocks to utilizing manure as a nutrient have been identified, including testing, application methods, applying the correct rates, and soil compaction. We also learned that the continual education on this topic in NW Iowa has paid off, according to the survey. Survey results say that 95% of Sioux County farmers who applied manure to cropland reported a reduction in commercial fertilizer use, compared to the statewide survey conducted in 1998 that showed slightly less than 50% reduced fertilizer applications where manure had been applied.

One of the questions asked was if the manure they applied had been analyzed for nutrient content. Producers who answered yes to this question also showed a much larger reduction in commercial fertilizer use. Fifty producers are already signed up to have their stored manure tested for nutrient levels this fall in Sioux County - proof that they are making management changes.

IMMAG--In Fiscal Year 2000, the IMMAG web page received 557,992 hits. The average length of time spent at the site for a user was 8 minutes and 22 seconds. IMMAG received 220 additional requests for information via phone or email. These requests were fulfilled by mailing fact sheets, bulletins, or forms to private producers. Over 300 copies of manure management plan forms were distributed by the IMMAG coordinator. In addition, IMMAG developed a list of needed manure management publications as identified by IMMAG members and the public and is working with partners to develop and distribute these materials. The first publication, “Emergency Action Plans” will be distributed in December 2000.

Value of Swine Manure--To better define the value of swine manure in a corn-soybean rotation, a research project was started in 1998. Plots were conducted at the SE Research Farm and at the Rob Stout Farm near West Chester. Field days for producers were held in 1999 and 2000 at the plots. Plot data was used during the ISU Confinement Site Manure Applicators Training programs.

Over 110 producers participated the Manure Management Field Days. Many of the participants commented on the usefulness of having local results to use in making manure management decisions. Rob Stout reported having several of the field day participants ask him for copies of yield results from this year’s plots.

Results from both locations over two years show that using swine manure at rates suggested from manure test results produced top corn yields. Adding more manure did not increase yields and only added to the nitrogen in the soil. The impact of producers using appropriate manure application rates is greater profits and reduced impact of nitrogen and phosphorous on surface and shallow groundwater.

c. Source of Federal Funds—Smith-Lever

d. Scope of Impact—State Specific and Multistate (through the Midwest Planning Service) ND, SD, KS, MO, MN, MI, WI, IL, IN, OH, NE

Key Theme – Agricultural Profitability

Program 104: Agricultural Financial Management

a. Description of activity

This program focused on ways to address both the short and long-term financial problems facing Iowa farmers. These problems include source and level of net farm income and also the changing structure facing farmers.

One-to-one, individual contacts were the primary method used to deliver individual financial analysis. Group sessions were used to demonstrate the records necessary for complete financial analysis and how to use these records in a complete financial analysis.

Improving marketing of the existing commodities is one way to improve the financial performance of the farm. Meetings were held to illustrate the use of the futures market and other marketing tools. Home study courses were also used as a means of market education. Finally, facilitating development of marketing clubs was also a strategy that was employed. The marketing clubs enable farmers to learn from one another.

The government program provided the basis for all of Iowa's net farm income in 1999. This program provided an analysis of the government programs and how the farmers could get maximum benefit under the provisions. Additionally, the longer-term conservation reserve program was analyzed to illustrate the possible advantages of this program to some farmers.

Several programs were held to inform the public about the current tax regulations. It is possible to save considerable money and to use the tax provisions as a part of financial management; these meetings illustrate the potential for Iowa farmers.

Computers offer a remarkable tool for financial analysis, marketing, and purchasing. However, some farmers are still not computer literate. This program offered a course in basic computer literacy for farmers. Specific applications were covered and the ability to further use the computer in the farming operation was taught.

This program used a variety of delivery methods and worked with a variety of partners. Delivery methods included one-on-one, meetings, home study courses, and facilitating marketing clubs. Partners included the traditional farm groups, community colleges, mental health workers, and members of the faith community. This program also worked with other land grant institutions in the region.

b. Impact/accomplishment

One-on-one education--Due to low prices, poor production, and a variety of other factors some agricultural producers find it difficult to procure operating capital to continue farming.

One bank sent letters to 10 clients saying they where not going to have their credit lines renewed. ISU Extension met with these 10 clients individually to examine their debt loads, profitability and efficiency. We were able to restructure their debt, reduce expenses, increase income, and find new sources of capital. This included working with new lenders.

The 10 families are still farming and productive members of society. They have a better understanding of financial analysis. They are now working and paying off the debts. This scenario occurred all over Iowa in 1999. This particular one was chosen to present because it happened to be one bank and all at one time. Most often it is individual situations; handled individually.

Evaluating Production Contracts--There is an increasing number of Iowa producers using either marketing or production contracts. On one hand using contracts is a means of reducing risks but contracts can also provide the producers with considerably lower returns and actually make the producers worse off.

A series of meetings were scheduled around the state. The meetings were jointly sponsored by Extension and the Iowa Pork Producers. The meetings featured experts from Michigan and from the Iowa Attorney General office. Farmers have to evaluate contracts from several perspectives including legal. Over half the attendees rated the program as good and 25 percent rated it as outstanding. Seven respondents to the questionnaire indicated an average of $5,000 to $10,000 impact on their business profitability from the meeting

Teaching Computer Literacy--Computer literacy varies considerably among farmers. Although many farm homes have computers, often they are little used for decision-making for the farm business. Working with the Farm Bureau a computer class was presented at the area community college. The computer class presented courses in word processing and spreadsheet use. The spreadsheet was used for computerized accounting classes. The primary focus was to relate the accounting information to on-farm business decision-making.

The knowledge and abilities of using computerized accounting increased by 92 percent according to the after course survey. One of the organizing groups won a national award for this effort.

Crop Pricing Strategies Program--The new farm bill encourages farmers to rely on the market for their income. Most producers do not use all the marketing tools available to them. In 2000 farmers did not aggressively forward price their crops in anticipation of a drought. The prices rallied and a drought did not materialize. As a result farmers missed out on pricing opportunities.

Several meetings were held around the state trying to introduce farmers to the marketing tools available and how to use them. One series of meetings combined two extension areas and a grain marketing organization. There were two meetings held in the summer to try and increase attendance. Farmers attending were introduced to crop pricing strategies to help them increase profitability.

Nearly 200 producers attended the meetings. Twenty two of the attendees said that the average dollar value of the program was $4,250 per farm. In addition a few of the respondents said that the meeting was worth over $20,000 to their farming operation.

Land Leasing Meetings--Land represents the single largest expense in crop production and over 50 percent of Iowa's farmland is leased. Over the past few years the structural changes in agriculture have changed the traditional tenant landlord relations. This means that farmers have to be very careful in determining what type of lease they are going to choose and how much rent they will pay.

Extension provides numerous meetings, publications and one-to-one consultations to help people analyze their options and alternatives. Extension works with both the tenants and the landlords. In some cases the landlords are not even familiar with the basics of modern agriculture. From one set of meetings alone 43 percent will be changing their rental rates and 14 percent will be changing the type of lease. Over 3000 publications on rents are distributed each year.

c. Source of Federal Funds—Smith-Lever

d. Scope of Impact—State Specific

Program 106: Commercial Greens Industry

a. Description of activity

The production, marketing, installation, and maintenance of horticultural crops creates many jobs for Iowans. Commercial horticultural enterprises in Iowa include, fruit, nut, and vegetable producers, lawn care companies, golf courses, school and professional sport athletic fields, turfgrass sod producers, production wholesale nurseries, landscape design and installation firms, retail garden centers, landscape maintenance companies, arborists, greenhouse crop producers, retail florists, and Christmas tree growers. Other important clients include public utilities, and city, county, and state public lands. Program 106 has focused on three important issues: (1) increasing the quality and percentage of marketable crop per acre and increasing profitability of businesses without harming the environment, (2) improving and enhancing the quality of life for all Iowans through the use of horticultural crops, and (3) insuring the safety of commercial horticulture workers and all users of the cultivated and managed landscapes they design, build, and maintain.

Issue 1. A significant challenge for Iowa's commercial fruit and vegetable producers is remaining competitive in our uncertain global economy. Thanks to the research efforts of state Extension specialists, our clients are planting high quality, disease resistant, tree and small fruit varieties. Based on results from apple rootstock research and delivered via Extension fruit tree training programs, clients are planting fruit trees with dwarfing rootstocks in high density orchard systems. These improved management practices have resulted in higher quality products and increased profits for commercial producers.

Issue 2. We are currently evaluating a broad selection of fruits, vegetables, turfgrass varieties, and woody and herbaceous ornamental plants for quality (both aesthetic and edible use), pest resistance, and tolerance to environmental conditions in the upper Midwest.

Issue 3. The *Iowa Pesticide Act* provides two options for commercial pesticide applicator certification renewals. Commercial and public applicators may renew their certification by testing once every three years or attending approved instructional training each year (2 hours/year). Many Commercial Extension Horticulture programs (conferences, workshops, field days, etc.) offer participants the opportunity to earn recertification credit and learn about safe handling and application of pesticides. The Iowa State University *Shade Tree Short Course* (sponsored by the departments of Entomology, Forestry, Horticulture, and Plant Pathology) has been approved by the Iowa Department of Agriculture and Land Stewardship for two hours of recertification credit. During the *44th Annual Shade Tree Short Course*, March 14 and 15, 2000, approximately 200 participant/pesticide applicators attended several qualifying workshops to earn their required recertification credits.

The Commercial Greens Industry group is a multi-disciplinary amalgamation of scientists and Extension professionals dedicated to solving problems faced by producers and end users of horticultural crops and services. Departments committed to helping Iowa's citizens use horticultural crops to enhance their quality of life include Animal Ecology, Entomology, Forestry, Horticulture, and Plant Pathology.

b. Impact/accomplishment

Landscape Plant Evaluation. Landscape plants bring many aesthetic, functional, and economic benefits to our working and living environments, and have a profound and positive effect on the quality of life for all Iowans. Our *Landscape Plant Evaluation Program* is designed to answer the question, "which landscape plants have the best chance of withstanding pest pressures and climatic vagaries found in the upper Midwest?" Shade trees, flowering trees, and shrubs are evaluated for winter and summer hardiness, insect and disease resistance, and aesthetic benefit. Results and information derived from these plant trials aid green industry professionals as they decide which plants they will offer to their retail clients, or use in a commercial or residential landscape design setting.

Ornamental and Turfgrass Pesticide Applicator Training. Pesticide applicators must receive recertification credit each year. Twice annually, special programs are offered by Iowa State University Extension and delivered via the ICN network to help applicators receive required instructional training. This year, under the leadership of Dr. Mark Shour, Extension specialists in Entomology, Plant Pathology, and Horticulture delivered programs that covered safe handling of pesticides and making wise pest management decisions. In addition, the program included a thorough discussion of Scotch pine decline. Scotch pine is an economically important conifer species in Iowa, and in many parts of the state, the tree is under attack from several biotic stressors. Participants attending these sessions learned how important site and environmental stresses are in predisposing Scotch pine to insect and nematode pests.

Iowa State University Turfgrass Summer Field Day. One, if not the best-attended "field day" in the state of Iowa is the *Turfgrass Summer Field Day* sponsored by the Departments of Horticulture, Plant Pathology, Entomology, and in cooperation with the *Iowa Turfgrass Institute.* Over 500 participants attended the *Field Day* last year (July 13, 2000) and were treated to a wide variety of topics and demonstrations including, recommended turfgrass varieties, summer turfgrass maintenance, plant growth regulators, sand green management, disease control, and tree care. All participants receive the *Iowa Turfgrass Research Report* which provides descriptions of, and results from the various research projects taking place at the ISU Horticulture Research Station.

Scheduling Irrigation Saves Water and Improves Melon Quality--Trickle irrigation, also known as microirrigation, has been rapidly adopted by Iowa muskmelon producers. Microirrigation, compared to traditional overhead sprinkler systems, can reduce water waste to a negligible amount and minimize the transport of contaminants to surface and groundwater supplies. A problem in its efficient use has been grower understanding of a scheduling procedure (when to turn it on and off). There are many available scheduling techniques available that rely on soil, plant, and/or climatic conditions. The most grower friendly is the soil-based system which uses sensors to initiate and terminate irrigation events. The soil-based technique using tensiometers (instruments that measure water available to the plant) was demonstrated with a north-central Iowa melon producer who previously had not used any scheduling technique. With assistance from the grower, tensiometers were installed in a 10 acre muskmelon field and instructed the grower on their use. The grower managed the irrigation and noted any concerns. Results from the adoption of this new management practice were encouraging:

- Water and energy use were held to a minimum.
- Melon quality was not sacrificed.
- The grower plans to purchase tensiometers to manage the remainder of his melon acreage next year.

The Iowa Community Tree Steward Program--The aesthetic, environmental, and functional benefits that come from using trees in urban and rural landscapes are well documented. But municipalities and individual homeowners alike frequently run into difficulties when selecting and planting trees, and maintaining this valuable community resource. Enter the Iowa State University Extension offering, *The Iowa Community Tree Steward Program*. Offered at two different geographic locations in Iowa each year (Mason City and Clinton in 2000), this popular program provides 24 hours of instruction to green industry professionals as well as to interested citizens who are without formal training in the plant sciences. Participants (30/site) learn where trees should and should not be used in the landscape, how to plant and provide appropriate post-plant care, how to manage mature trees, and finally, how to identify potentially dangerous trees in the landscape. While students are not charged a fee for participating, they are expected to "give back" 24 hours of service to their communities performing various tree care related tasks. Since the inception of the program in 1992, over 11,000 volunteer hours have been recorded by Tree Steward graduates. This small army of trained volunteers undoubtedly has made a positive impact on Iowa's urban and community forest.

Horticulture Seminar–*The Professional Horticulture Seminar Program,* sponsored by the Page County Extension Service and Iowa State University Extension, has provided horticultural training in Page and several adjoining counties in southwest Iowa for more than 18 years. In the beginning, the program was designed to service green industry professionals in the nursery-rich Shenandoah and Hamburg area. As several of the larger nurseries in the region down-sized or closed, the emphasis of the meeting shifted to helping smaller businesses and Master Gardeners who use the training for recertification. Speakers for the program are mostly Iowa State University Extension Specialists with training in horticulture, entomology, plant pathology, and weed control. At the February 2000 program, concurrent sessions were offered. Nursery and greenhouse professionals were offered topics tailored to their level of expertise, while Master Gardeners and hobbyists received training and instruction at a slightly less rigorous level. The high quality and long-standing tradition of the *Professional Horticulture Seminar Program* attracts an audience between 50 and 70 clients each year.

Iowa Apple Growers Shift to High-density Orchard Management Systems Based on Dwarfing Rootstocks--The trend in the North American apple industry has been toward high-density orchards based upon dwarfing rootstocks and new training systems. These innovative orchard practices allow fruit growers to remain competitive by reducing the time it takes to bring an orchard into production. But because of the higher initial investment associated with high-density orchards (more trees per acre) and the need for a system to support the young trees, Iowa apple growers have been slow to adopt these new practices. Recently, Iowa State University Extension, the Iowa Fruit and Vegetable Growers Association, and the Leopold Center sponsored a high-density orchard management workshop conducted by nationally recognized experts in orchard training systems, dwarfing rootstocks, and disease management. Because of this workshop and subsequent follow-up sessions, apple growers are planting higher density orchards and have become interested in additional information about new training systems. These practices also will make it easier for producers to keep pace with ever-changing consumer demand. Because high-density orchards can be brought into production sooner, growers can replace less popular varieties with more popular selections with minimal impact on production.

Crabapples for Midwestern Landscapes–Crabapples are the most widely used small landscape tree in the northern United States and southern Canada. Approximately 200 selections currently are available from nursery sources, and dozens more become available each year. But with this abundance comes confusion and skepticism over the quality and uniqueness of each selection. Thanks to years of crabapple evaluations conducted at Iowa State University, we have a better understanding of this important contributor to the Iowa landscape. And now this important information is available to our clients via a new Extension publication, *Crabapples for Midwestern Landscapes. Crabapples* provides the professional nursery and landscape audience colorful images and the most up-to-date information about this useful group of small flowering trees. With this information, green industry professionals can make informed decisions about which crabapples to carry in their inventory of green goods. *Crabapples* has garnered national attention, winning the *Extension Division Educational Materials Award* from the *American Society for Horticultural Science.*

In addition, 2,000 copies were purchased by the *Urban Forestry Center for the Midwestern States* for distribution throughout the Midwest.

Rubber Tire Particles as a Topdressing Amendment for Intensely Trafficked Grass--The rubber tire recycling industry produces several grades, sizes, and shapes of processed rubber that could be useful in improving the performance and wear tolerance of turfgrass used on athletic fields. Suitable materials for athletic fields must be free of all metal fibers and slivers, and be of an appropriate size so that it will easily filter through the turf canopy and not interfere with several important cultural practices. We conducted a study to evaluate various sizes of "crumb" (from the tire chipping and screening process) and "buffing" (shreds of rubber ground directly from intact tires) rubber for use as a topdressing material on high-traffic grass areas. Rubber materials were hand spread and raked into plots consisting of grass stubble and core holes. Traffic simulation occurred from April to June and again from September to October (to simulate spring and fall athletic activity). Results from our study were encouraging:

- Rubber materials reduced surface hardness.
- Rubber materials resulted in 20% more turfgrass cover.

Effect of Organic and Mineral Mulches on Soil Properties and Growth of Fairview Flame ® Red Maple Trees–Non-living groundcover mulches (wood chip, shredded bark, and various mineral products) are a common occurrence in the Iowa landscape. Nursery and landscape professionals use them in residential and commercial landscapes to conserve soil moisture, improve plant growth, and create a harmonizing effect on the landscape. But several concerns about the use of organic (unacceptable appearance, potential fire hazard, and rapid decomposition) and inorganic rock mulches (high temperatures, alkalinization of the soil, mechanical injury to the stems of plants) have caused many in the green industry to reexamine their rationale for using them. We designed an experiment to evaluate the effects of five mineral (crushed red brick, pea gravel, lava rock, carmel rock, and river rock) and three organic mulches (finely screened pine bark, pine wood chips, and shredded hardwood bark) on soil properties and growth of red maple trees. Our results indicate:

- Soil temperatures were highest and moisture percentages lowest under mineral mulches.
- Trees growing in river rock, crushed brick, pea gravel, and carmel rock had larger stem diameters than those growing in shredded bark plots.
- Trees growing in crushed brick, pea gravel, and carmel rock produced more leaves than those growing in shredded bark. *The capacity of mineral mulches to conduct heat to soils below, particularly in early spring, may be responsible for better tree growth in plots covered with mineral mulches.*
- Trees growing in wood chip covered plots grew as well as those in plots covered with mineral mulches.
- Blanket statements and generalizations regarding the performance of landscape plants mulched with organic or inorganic materials are unwise. In the final analysis, cost and maintenance considerations dictate which mulch materials will be used.

Responses of 11 Fraxinus Cultivars to Ash Yellows Phytoplasma Strains of Differing Aggressiveness--The phytoplasmal disease ash yellows retards growth of *Fraxinus* (ash) species and causes or contributes to decline of intolerant species. *Fraxinus americana* (white ash) and *Fraxinus pennsylvanica* (green ash) are extremely important shade trees in many regions of the U.S., however, the relative abilities of *Fraxinus* cultivars (selections) to tolerate infection by ash yellows phytoplasmas are unknown. Researchers at Iowa State University and Cornell University (Ithaca, New York) collaborated on a research project to (1) characterize the relative levels of tolerance of 11 commercial ash cultivars to several ash yellows phytoplasma stains, (2) assess differences in aggressiveness of these strains under field conditions, and (3) detect possible cultivar/phytoplasma strain interactions. Results reported here may serve as a basis for choosing cultivars least likely to be severely infected by the phytoplasma causing ash yellows:

- No cultivar exhibited high tolerance of infection.
- Green ash cultivars 'Bergeson', Dakota Centennial®, and 'Patmore', and the white ash cultivar Autumn Applause® demonstrated above average tolerance to the ash yellows phytoplasma at both research locations.
- White ash cultivars 'Champaign County' and 'Rosehill' suffered severe growth depression at both research locations.

Selection Preferences of Crabapple Cultivars and Species--Flowering crabapples are extremely popular ornamental trees in many parts of the U.S. and Canada. Literally hundreds of selections are available, however, this abundance of choice makes it difficult for nursery and landscape professionals to decide which crabapples they should include in their inventories. In addition, disease susceptibility information pertaining to the various crabapple selections can vary with geographic location. The combination of these two factors creates confusion among professional horticulturists and generates ill-will among consumers. This study was initiated to (1) characterize crabapple selection preferences across the U.S., and (2) determine if disease pressure varies with geographic location. A survey questionnaire was designed to gather information and was sent to nursery and landscape professionals in the states of Washington, Oregon, Utah, Colorado, Minnesota, Iowa, Missouri, Illinois, Indiana, Michigan, Ohio, Pennsylvania, and New York. Completed questionnaires were received from 485 firms (27% response rate). Preliminary findings will be of great interest to nursery and landscape professionals throughout the country:

- The Sargent crabapple (*Malus sargentii*) was the most popular dwarf form, 'Pink Spires' the most popular upright form, and 'Red Splendor' the most popular selection for attracting birds.
- The most popular fruitless selection was 'Spring Snow'.
- Across the country, apple scab was identified as the most troublesome disease (28%), however, respondents in Colorado and Utah saw the bacterial disease fireblight as their greatest disease problem.

· Source of funding: Smith-Lever

· Scope of impact: State specific and Integrated Research Extension

Key Theme – Animal Production Efficiency

Program 107: Iowa Beef Center

a. Description of activity

The program has focused on three primary issues: 1) increase beef quality and improve safety practices, 2) reduce cost of producing beef, and 3) improve the competitive position of Iowa's beef producers. These priorities were identified by an advisory board, comprised of beef producers, farm organizations, input suppliers, university researchers, and extension specialists.

Issue 1: The overall objective of Issue 1 is to increase producers' adoption of management practices that improve beef quality and safety. This project worked with producers to demonstrate the economic advantage of producing and marketing quality beef. Carcass data from cooperators' cattle were collected and analyzed on four different packer value-based "grids" using software researched and developed as part of the project. Producers learned what types of carcasses receive premiums, which receive discounts, and how to match cattle to the appropriate market. Centralized steer tests with feedlot performance and carcass data collection provided numerous producers the opportunity to learn more about their cattle and value-based marketing. The Iowa Beef Center worked with the Iowa Cattlemen's Association to develop and deliver Beef Quality Assurance education. The Iowa Carcass and Tenderness Progeny Evaluation is one of the first in the nation to evaluate sires on tenderness as beef quality measures evolve to include consumer driven characteristics.

Issue 2: The overall objective of Issue 2 is to make producers aware of their costs of producing beef and to benchmark their costs against those of other producers. Standardized Performance Analysis for production and financial parameters provided a consistent protocol for record collection and analysis. These results are published and widely utilized by producers and their consultants, lenders, and other allied industries. Research and producer education on extending the grazing season identify production systems that reduce stored feed costs, the largest single expense for beef herds. Centralized cooperative heifer development programs provide producers a cost-effective method of producing replacements and an accurate analysis of these costs.

Issue 3: The overall objective of Issue 3 is to position Iowa beef producers to be cost effective producers of high-quality beef in the 21st century. In addition to value-based marketing and production cost benchmarking described above, the Iowa Beef Center worked to increase opportunities for producers beyond the farm gate. The Iowa Beef Center provided information and technical assistance to the Iowa Cattlemen's Association in their attempt to build a producer owned harvest and processing facility in Iowa. The Center also assisted the Iowa Quality Beef Supply Network when negotiating a value-based grid with a packer, and assisted Precision Beef Alliance in building a carcass database. Other assisted groups include the Raccoon Valley Cow-Calf Association cooperative value-added feeder cattle project, Chariton Valley Beef programs for the grouping of market ready cattle from smaller producers, and Iowa Bankers Association to better understand modern cattle production.

Iowa Beef Center assisted Iowa feedlots in attracting cattle to be fed in Iowa from Missouri, Georgia, Alabama, South Carolina, and Indiana.

b. Impact/accomplishment

Grid marketing project: This two-year demonstration project involved 60 Iowa producers and more than 5200 head of cattle. IBC staff analyzed the carcass data and compared the cattle on 4 packer grids. Data indicated the animals would have averaged a $20/head premium over the available cash market price. In addition to providing direct assistance to these farms, the data were developed into educational materials and presented to thousands of producers across Iowa. Current estimates are that possibly more than 10% of Iowa cattle are now sold on a grid where the vast majority receives a premium over the cash market. A second product of the project was the Grid Market Calculator spreadsheet that producers can download and use to evaluate complex marketing alternatives. This tool and the data collected were used by the Iowa Cattlemen's Grid Committee to negotiate a grid with Excel that is estimated to have produced over $1 million in premiums to Iowa producers in the first 10 months of 2000.

Tenderness project: Beef industry research indicates that 1 out of 4 consumers have had an unsatisfactory beef eating experience, and lack of tenderness is a significant reason. It is estimated that 25-30% of tenderness variation is of genetic origin. The Iowa Beef Center is in the second year of the Iowa Beef Tenderness and Carcass Evaluation Project to evaluate progeny of Iowa owned sires. This project will educate all producers about factors impacting beef quality and position Iowa seedstock breeders and their commercial cow-calf customers at the forefront on this trait.

Drought ICN: Dry conditions early in the growing season left beef cowherds in southwest, south central, and west central Iowa with significantly less forage than normal. The Iowa Beef Center hosted an ICN conference June 14 at 32 sites attended by 275 producers. The inter-agency informational meeting provided an update on government programs and management strategies for dealing with the dry conditions.

Standardized Performance Analysis: The Iowa Beef Center SPA records constitute the most comprehensive cowherd performance, business analysis, and benchmarking program in the U.S. Iowa producers using SPA records documented $14,573 improvement in annual returns in 5 years.

Tri-County Steer Carcass Futurity Program--Impact of Custom Feeding on Southwest Iowa Economy--Custom cattle feeders in southwest Iowa indicate one of their greatest problems is finding new customers (people to place cattle in their lots). Cow-calf producers indicate a lack of trust prevents them from retaining ownership and placing calves in a custom lot.

The Tri-County Steer Carcass Futurity Program (TCSCF) started in 1983 with 35 consignors and 106 steers. In 2000, over 200 consignors evaluated 4,464 head of steers and heifers. Iowans consigned 856 head. Over 3600 came from out of state. The TCSCF program has developed Extension and producer contacts in Iowa, Georgia, South Carolina, Indiana, Alabama and Missouri that assist in recruiting producers to feed cattle in southwest Iowa.

Total dollars spent in southwest Iowa this year was $1,209,432. The economic impact to southwest Iowa of the TCSCF in 2000 may total $3.6 million or $7.2 million, depending whether you choose an economic multiplier of three or six. Direct beneficiaries include feedlots with a yardage income of $177,000, feedlots and feed dealers with feed usage of $739,000, truckers with $160,000 and veterinarians and pharmaceutical suppliers gaining $49,000. There was $81,000 in miscellaneous expenses going to bankers, beef processors, fence and concrete suppliers and travel agents. In addition, one Georgia producer said, "this is about farm families working with farm families."

Understanding Marketing Cattle on "The Grid"--Iowa beef producers are concerned about the unknowns of value-based marketing and the risks associated with selling finished cattle on "the grid."

The Chariton Valley Beef project in southern Iowa has assisted and counseled 70 producers in the collection of carcass data and the marketing of cattle into added value grids during the past year. Resource materials were developed and six "Understanding the Grid" workshops were held. Background was provided on how grid base prices are established, and the premiums and discounts on various grids were explained. In addition, ideas were gathered for the new Iowa Quality Beef Supply Network grid, under development by the Iowa Cattlemen's Association and Excel Corporation. Diana Bodensteiner, Chariton Valley Beef Coordinator, designed a web page to provide current and historical price data used in many grids, plus information on how grids work. The web page also links into the Iowa Beef Center web site, which includes a downloadable version of the Iowa Beef Center Grid Analyzer.

From February 2000 through May of 2000, members of the Chariton Valley Beef project marketed twenty-eight loads of cattle (1170 head) on various grids. The average premium received by CVB members was $22 per head, with some loads netting $50 per head premiums. Total added value to local beef producers was $25,740. To date, over 1000 producers, staff and agri-businesses have accessed the CVB web site. CVB members have marketed into seven different grids during the first two months the web site was up and running. The CVB web page is used as a resource for grid price decision-making.

Raccoon Valley Cow-Calf Association—Adding Value--Midwest cattle feedyards want feeder cattle in uniform semi-load lots. The typical cow-calf operation in Iowa averages only 40 cows. Therefore, average or smaller sized herds operate at a competitive disadvantage on feeder calf price.

The Raccoon Valley Cow-Calf Association was formed to offer cow-calf herds in central Iowa the opportunity to participate in a four-month custom backgrounding program. Nine producers enrolled 467 calves in the program. Calves were delivered pre-weaned and "Green Tag" vaccinated to the backgrounding lot. They were individually weighed and sorted by color, sex, condition score and genetics. All calves were ear-tagged visually and electronically. A marketing committee marketed the calves via private treaty to finishing feedlots. Some consignors chose to retain ownership and have the calves finished on a

custom basis. Detailed source verified data went to both the consignors and to the feedlots purchasing calves.

A total of 323 calves were direct marketed to feedlots and consignors retained 144 calves in feedlots. Net value added per calf (sale weight times price minus backgrounding expenses) was $42.32 per head. A total of $13,244 was added to the value of the 323 direct-marketed calves. The quantity of feedlot performance and carcass data feeding back to the original consignors will be available in the future.

CHIPS Heifer Development Program--Beef heifer development is a challenge for most cow-calf producers in southern Iowa. Handling heifers, as a group, separate from the cowherd, requires extra facilities, extra labor, a growing feeding program (different than cows) and the use of calving ease bulls.

In 1997, Cow Herd Improvement Program Services (CHIPS) initiated a heifer development program. A board of directors developed the guidelines and goals (develop first calf heifers with acceptable growth rate and body condition, improve the genetic base of consignors replacements, implement latest production practices and breed by artificial insemination to calving ease bulls). Twenty-two CHIPS cooperators consigned over 400 heifers the first three years. Heifers were developed at a central location over 300 days based on bids received by the board of directors.

For the three years, 92 percent of the 400 heifers were pregnant during the breeding period-with over 60 percent AI bred following the synchronization period. In 1998, six cooperators completed a follow-up survey after the calving season. They reported that three out of four heifers required no or only minor calving assistance. Total development costs are competitive at $1.10 to $1.15 per head per day, depending on the year.

c. Source of Funding: Smith-Lever

d. Scope of Impact: State Specific, Integrated Research and Extension

Program 108: Iowa Pork Industry Center

a. Description of activity

Since 1996, the USA has been a net exporter of pork, with Iowa leading these efforts. The industry has rapidly segmented into larger commercial operations and smaller specialty marketers. The Iowa Pork Industry Center (IPIC) maintains intensive linkages with pork producers and allied industry; state and national producer groups; state and federal regulatory agencies; local, state and federal extension programs; and other education and support organizations for the pork industry. In June 1999, a wide-ranging stakeholder retreat was held and identified needs for development of profitable, interdependent markets; emerging technology demonstrations; enhancement of business and management skills; and disease prevention and eradication efforts.

IPIC outreach vehicles include scheduled quarterly Iowa Communication Network (ICN) broadcasts, programs with extension specialists and individual consultations. ICN program attendance has ranged from 100-650 producers at 25-35 sites throughout Iowa. A major educational effort was required by the Iowa legislature's passage of constrictive pseudorabies (PRV) eradication requirements. This state legislation, passed in April 2000, directly impacted most producers and allied businesses. During spring and summer, 25 local meetings were held with over 900 participants. An ICN drew over 100 producers at 25 sites. The IPIC Web site is maintained as a resource for producers and allied businesses. A page designed for 4-H-related questions is maintained. These combined efforts have assisted in reducing the number of infected sites from over 450 to less than 235, with a continued downward trajectory. IPIC field research has demonstrated the applicability of using meat extracts (juice) as a detection method for PRV antibodies in market swine, the first such use in the USA. It offers new potential for development of efficient market swine surveillance, currently not available.

Field based research and demonstration projects were funded and monitored through IPIC. These field specialist-designed projects ranged from composting of swine mortalities, comparison of facilities, effects on productivity and quality parameters to development of new specialty markets information. These projects totaled $21,560 and have yielded reports for the 2000 ISU Swine Research Report. Additional publications will be presented in this fiscal year. IPIC contributed to research/demonstration projects at the Lauren Christian Research and Demonstration Farm dealing with varied gestation and farrowing systems.

IPIC continued development efforts to assist alternative markets through educational programs and by direct assistance with individuals or groups. Four producer groups and multiple individuals have been counseled about quality parameters and market opportunities. Ultrasound on live animals and carcass evaluations have provided educational materials. Food safety (microbial contamination) field research has examined farm to harvest interactions and identified previously unknown relationships.

b. Impacts/accomplishments

Iowa is the last state requiring aggressive PRV eradication efforts in swine. PRV-infected sites have decreased from over 450 to less than 235 this past year. This downward trend continues into the current year (125 sites). Educational programs (more than 30 reaching over 900 producers), approximately 15 radio interviews, Web site materials and news articles that encouraged intensified vaccination, enhanced bio-security and blood testing, coupled with greater enforcement, have generated these results. Producers have changed attitudes and practices to conform to these educational and regulatory objectives. Continued educational efforts maintain industry awareness.

Routine market swine surveillance for PRV has not been practical because of identification and sample procurement difficulties. Development of meat juice technology enables efficient and accurate procurement of surveillance samples. Correlation of meat juice and blood antibody levels was proven through IPIC efforts. This information enables current

development of a national market swine PRV surveillance program, and potential programs with food safety, bio-terrorism and foreign-animal disease (FAD) components.

Advanced Artificial Insemination Conference--A survey conducted during 1999 in northwest Iowa indicated that pork producers wanted advanced information on swine artificial insemination (AI). Many of these same producers had attended an AI clinic we sponsored in northwest Iowa in 1998. A number of scientific changes have taken place in this field since that time.

From this request, ISU Extension developed a two day Advanced Artificial Insemination Conference. At the Allee Farm, sows, gilts and a boar were provided for the producers to have hands-on participation in the techniques we were demonstrating:

- Intra-uterine Insemination
- Ultrasound pregnancy detection
- Ultrasound carcass evaluation
- Heat checking techniques
- Improved insemination techniques
- With the use of a video we showed the new concept of robotic boars

A ranking and understanding of producer skill level was taken pre-session and post session. The following results were obtained:

- Heat checking and insemination techniques, overall knowledge improved 11%.
- Intra-uterine insemination techniques, overall knowledge improved 52%
- Ultrasound pregnancy detection, overall knowledge improved 67%
- Ultrasound carcass evaluation, overall knowledge improved 73%
- A total of 51 males and females attended the second day conference at the Allee Farm

Producers were asked to estimate the value on knowledge gained from this workshop, by saying they could increase their business income level as follows:

- 47% indicated a value of up to $2,500
- 39% indicated a value of up to $5,000
- 14% indicated a value of up to $10,000

Composting Swine Mortalities - Solving an Age Old Problem--Even with the best of care, livestock on farms die. Iowa law requires animals to be buried, rendered, composted or incinerated within 24 hours of death. For most producers, the rendering option was most commonly used due to the convenience and relatively low cost. Over the past several years the cost of rendering has doubled or in cases tripled, and in some areas has ceased to exist. Producers have scrambled to find an option that was environmentally friendly, yet cost effective. Producers want a solution that works without the smell and fly problems associated with decaying animal flesh. Composting can provide this solution.

Iowa State University Extension started conducting on-farm research with several producers to gain experience and knowledge about the process. Compost thermometers were given to three producers who kept track of temperatures and collected data as to the loading of compost piles. Three different materials were used as cover products to determine which worked the best and was the most economical. During this on-farm research, several problems developed with overloading, frozen conditions and improper cover. These problems were all dealt with and solved before recommendations were made to the general farming community.

Demonstration compost projects were started at two research farms to show farmers how it worked and thermometers were given to 20 farmers who agreed to keep records on their compost piles. Through this approach, ISU Extension is teaching good producers how to carefully compost livestock in an environmentally friendly way.

At two field days held in June and August, over 75 people attended. Twenty producers took compost thermometers and started composting on their farms. One producer reports a saving in rendering costs of over $600 since he started with this project. The producer also reports that watching the thermometer and turning the pile when the temperature starts to fall really helps. “I’ve only spent thirty dollars for a wood shavings pile four months ago, and it’s not gone yet. I normally spend thirty-six dollars a week.”

There have been no complaints from producers and interest continues as rendering costs escalate. ISU Extension’s on-farm research and trouble shooting have made the Extension service the place to call with questions about composting.

Swine Marketing Education Series--As a result of publicity by the Iowa Pork Industry Center (IPIC), we were invited to present marketing information to a group of producers in Norfolk, Nebraska on August 15 and 22, 2000. This program was initially offered in Iowa through an IPIC grant. Materials from the Chicago Mercantile Exchange, other materials developed by Extension staff and guest speakers were used to provide a variety of information for participants. The objective of the seminar is for producers to leave with a written marketing plan under development for their operation.

Eighteen independent swine operations marketing approximately 157,000 pigs per year were represented at each of the two meetings. In addition, Farm Credit Services (FCS) employees also participated. Each meeting ran from 4-9 p.m. with a meal served midway through the program.

A local broker was invited to talk to the group during the second evening, and Mike Brumm and Al Proesch, Nebraska Extension specialists, also presented information to the group at various times during the two sessions.

End-of-meeting surveys were completed at the last session by each person who attended. Eighty-four percent indicated that the knowledge gained during the workshop and the written material they received for home study was above average in usefulness. Ninety-four percent indicated that they definitely would attend a seminar offering more advanced marketing

information. Twenty-eight percent of producers indicated that they had not used futures and options, but planned to do so as a result of attending the workshop and becoming more familiar with the procedures involved in Chicago Mercantile Exchange trading. All participants said they would use futures and options as part of their marketing plan in the future. Six percent of participants indicated that they a written marketing plan prior to the seminar. By the end of the second session each person had begun to formulate a written marketing plan.

Pseudorabies Rules Meetings--During the winter of 1999-2000 the number of swine herds determined to have pseudorabies increased dramatically. With increased pressure to eliminate pseudorabies in Iowa, the legislature passed a law during the 2000 session that gave the Iowa Department of Agriculture and Land Stewardship (IDALS) more authority in writing rules, and increased the requirements for pork producers. The new law and developed rules set out a fairly short timeline for producers to make changes if those changes were necessary in their operations.

This livestock specialist contacted several veterinarians, producers and veterinarians from the IDALS. A series of four meetings was arranged in the second half of May, shortly after the law went into effect. The state and district veterinarians presented information on the rules and responded to questions from producers. Approximately 140 producers, veterinarians, and ag business people attended the meetings.

No formal evaluation was done but several post-meeting comments from area veterinarians and producers follow:

- “I am glad you had the meetings as soon as you did. If producers wait too long to learn about the rules they could be put in a bad situation.”
- “Although I don’t like the rules I appreciated being able to discuss them with the people in charge.”
- “I am not sure anyone would have informed us on the rules if you had not had this meeting.”
- “I was aware some changes were being made but I did not know how they might affect me. Thanks for organizing the meeting.”

The state and district veterinarians were complimentary of Extension and appreciative of the effort made in organizing the meetings and getting the word out to producers.

While the impact of the meetings themselves may be hard to determine, being able to respond in a short period of time to get information to producers might have helped some producers take steps in their operation more quickly so that they could meet the legal timeline with less financial impact to their operation. The final impacts may be to see how many of the producers attending can meet the legal requirements and stay in business, and to determine whether pseudorabies can be eliminated through producers cooperating with the eradication program. Subsequent to these meetings and the imposition of state rules requiring increased vaccination, blood testing and movement restrictions, the total number of infected

sites has steadily declined on a monthly basis. Fewer new infections have been reported and clean-up plans have been accelerated.

- Source of Federal Funding: Smith-Lever

- Scope of Impact: State Specific and Mulitstate (through the Pork Industry Handbook) ND, SD, NE, MN, MO, WI, MI, IL, IN, OH, and Integrated Research and Extension

Program 109: Strengthening Iowa's Dairy Industry

a. Description of activity

Issue 1. Human resource management: Increasing dairy management skills was a key presentation at the Professional Dairy Management Seminar (PDMS) that targeted dairy owners and their employees. Dairy milker training and feeding schools have been held in the Northwest Iowa. A four-state effort is being developed to address continuing human resource program needs of the dairy industry.

Issue 2. Risk management: Three Iowa counties are involved in the Dairy Options Pilot Program (DOPP) with an additional 8 counties being added by USDA in 2001. A presentation at the PDMS aimed at cost-effective strategies for future dairying. In addition, numerous producers were provided economic and cost analysis information on custom rearing heifers and 3 field days were held on this topic. With the increasing interest in using corn silage in dairy rations, workshops were held with presentations on the hybrid selection and on systems of processing and storing corn silage. Two out-of-state dairy study tours were conducted to appraise the competitiveness of the Iowa dairy industry.

Issue 3. Business planning and arrangements: A mail-in survey was conducted in NE Iowa to determine the business structure being used. 1700 farms were surveyed with over a 68% response rate. Tabulation of the survey findings is underway.

Issue 4. Improving production practices: Ten county based Dairy Days were conducted and a Four-State Dairy Management program was held this past year. Heat stress was a major topic of the PDMS and the 4-State Management programs. Another 4-state project was to develop a Transition Cow CD-ROM containing 45 short, specific learning modules on various concerns with transition cows. In addition, workshops and field days were conducted where small groups of dairy farmers practiced hands-on techniques in management of these animals. Dairy Youth Classic taught dairy youth methods of ranking animals based on productivity, growth, reproduction and genetics.

Issue 5. Environmental quality is being handled by Program 103.

Issue 6. Food safety and quality: Milk quality issues are being addressed by individual farm calls, most times with agri-businesses or milk plant personnel. We conducted learning workshops for dairy plant personnel each year at their annual meeting and workshops for DHIA technicians.

Issue 7. Although the structure of agriculture is being handled by Program 101, we did address the continuing shrinking of the industry. The Western Dairy Alliance was formed to bring further added value to the industry and to assist producers in developing knowledge and management skills needed in today's industry. The NE Dairy Initiative was designed to assist producers in developing skills to compete in the industry, gain competitiveness, provide a post secondary curriculum that gave students an advantage in the job market and to increase the adult learning and applied research opportunities.

Numerous cooperators and stakeholders have been engaged, including Dordt College, Northeast Iowa Community College, The Iowa Institute of Coops, Iowa Farm Bureau , The Western Iowa Alliance, and the NE Iowa Dairy Foundation in added-value ventures. Two producer-agribusiness-state university relationships were formed, both are involved in expanding dairy educational opportunities as well as post secondary and applied research initiatives. Work continued with the Iowa Veterinary Medical Association and the Iowa Dairy Products Association in educational endeavors of benefit to their memberships.

Three groups of dairy clients have the potential to be under served. Assistance was provided to help a Jewish dairy farmer develop the ability to have his dairy's milk processed into Kosher cheese. Dairy programming is located in communities which are convenient for Mennonite and Old-Order Amish populations. Iowa has been involved with Minnesota, Illinois and Wisconsin in multi-state sharing of research and publications, and more recently in program develop and delivery.

b. Impact/accomplishment -

- Dairy farmers were able to stay on the cutting edge of their industry because of 4-State Extension programming that brought unique resources and speakers to a widely dispersed dairy audience. The Transition Cow CD-ROM opened new ways for clients to learn beyond the classroom. This type of multi-state/multi-institutional collaboration brought out-of-state experts face to face with our audiences on 5 of the 7 issues.

- Dairy farmers with milk quality problems increased income per cow per year by approximately $280 when they adopted milk quality suggestions made by Extension. This does not include the value of reduced culling or reduced drug use nor does it put a value on the reduced potential for antibiotic contamination of the farm's milk.

- Much has been written about large dairies relocating from the West to Midwest states. Yet, Extension has assisted over 75 Pennsylvania Mennonite dairy farm families in relocating or beginning dairy farming in the Howard, Floyd, Chickasaw and Mitchell County area of NE Iowa. On average, these farms have 50 cows and most are 160 to 240 acres in size. By achieving high levels of milk production per cow they sell at least 20,000 lb. of milk per cow per year. With the 1999 Iowa average mailbox price of $13.61/cwt these herds have generated over $10,075,000 of additional milk income in Iowa. In addition these dollars would turn over about 2.29 times in the community. Most of these new Iowa farmers have built their dairies from the ground up adding additional dollars to the economy for building materials, equipment and cows.

Milk Quality and Food Safety--Iowa has a maximum somatic cell level in milk of 750,000 cells per cubic centimeter of farm milk. Dairy farmers are not allowed to sell their milk if the somatic cell count (SCC) is persistently above this level. There is also a reduced price paid for high SCC milk and a reduction in productivity per cow.

Extension used a combination of collaborative farm trouble shooting calls, producer educational meetings, and dairy plant field personnel training to address this food quality issue. Two herds serve to show the impact a timely trouble-shooting visit by Extension and dairy plant personnel can have. The first is a 42-cow herd near the Minnesota border in Winneshiek County. At the time of our visit the herd had 46 milking cows and a herd average SCC of 1,036,000. After a visit in February they 1) changed milking order, 2) bacteria cultured all cows for contagious mastitis, 3) raised the vacuum level 1/2 inch, and 4) used multiple dry cow treatments in concert with their veterinarian's advice. By October of this year their 40 cows average SCC was 363,000. This translates into an annual increase of $4032 in additional milk and $10,248 in additional milk protein and quality premiums.

The second farm in Fayette County had a 614,000 SCC on 29 cows. Extension suggested the following steps:1) continue using a milking order he just started, 2) add a vacuum gauge in the milk house, 3) culture several late lactation cows to determine type of bacterial infection, 4) use his DHIA "Hot Sheet" to keep highly infected cows out of the bulk tank, 5) use a 0.5% Iodine post teat-dip 6) consider selling persistently infected cows and 7) milk fresh cows last with a separate milk bucket. By November the 28 cows average SCC was 259,000. This herd increased annual milk income $3072 and $6,173 in milk premiums for an average annual income increase of $289 per cow.

Transition Dairy Cows--The period beginning 3 weeks prior to calving and extending through the first 3 weeks post calving is one of the most stressful periods of a cows life. How well cows perform during this period, often termed the transition period, will have a tremendous impact on their performance during the ensuing lactation. As milk production levels of cows increases, due to better genetics and improved feeding and management practices, the challenge of dealing with transition cows also increases.

A cooperative 4-state effort, involving dairy extension personnel from the University of Illinois, the University of Minnesota, the University of Wisconsin-Madison, and Iowa State University, along with Monsanto Dairy Business developed a CD-ROM containing 45 modules or topics dealing with management of the transition cow. This CD was then used as a reference and supplemental material for a series of dairy producer targeted workshops. Participants learned to do urine screening of pre-fresh cows, monitor rumen function with a stethoscope, body condition score their cows, shake their rations for particle size analysis, and screen manure for undigested particles.

Post-workshop farm visits were made with 4 participating farms. Death losses during the transition period have ceased on 2 farms and peak milk yield has increased on 3 farms. The fourth farm had a problem with metritis due to unsatisfactory maternity pens and has since redesigned the pens to eliminate the problem.

Dairy Heifer Rearing in Southern Iowa--The topography of southern Iowa is gently rolling, which makes it better suited for forage crops than for row crops. Given the increasing interest in developing new dairy farms and expanding existing dairy farms in northwest and northeast Iowa, there is a growing market for replacement dairy heifers. Consequently, Neeley-Kinyon Farm livestock advisory board identified grazing dairy heifers as a priority research and demonstration project at the farm.

All replacement dairy heifers from the ISU dairy herd that were confirmed pregnant and more than 60 days from their estimated calving date were taken to Greenfield and reared on pasture during the grazing season in 1999 and 2000. During 1999, an average of 36 heifers were allowed to graze on approximately 37 acres of mixed bluegrass and bromegrass, which was divided into 8 paddocks and intensively managed. Growth of heifers was monitored by weighing, body condition scoring and measuring wither height every 28 days while on pasture. A floating plate was used to estimate available forage and remaining forage in each paddock as heifers were moved into and out of the paddock.

In comparing all costs, except labor, the total cost per day for heifers on pasture was $0.69 versus $0.82 for similar heifers fed in a dry lot environment at ISU. Heifers had similar performance with average daily gains of 1.61 lb. Pastured heifers also gained on average 2.54 in. and increased body condition score by 0.4 units during the time they were grazing.

Monitoring Growth of Replacement Dairy Heifers--Replacement dairy heifer growth charts are available for dairy producers to utilize as a way of monitoring growth of their replacement dairy heifers, but these charts are based on measurements from the mid-1980s. Since then, the industry has progressed in terms of genetics and in management practices used to accelerate growth rates of heifers so that they can calve at a younger age, thereby reducing the time period for rearing. Additionally, much of the data was based on a single observation per animal rather than repeated measures of the same animal.

A project was initiated at the ISU dairy farm whereby every heifer was weighed, measured, and body condition scored every 28 days from weaning through calving. Data is being summarized separately for each of the six major breeds of dairy cattle and new growth charts are being developed. This is an ongoing project and data continues to be collected. The initial drafts of the growth charts will be made available to extension personnel and to dairy producers.

c. Source of Federal Funds—Smith-Lever

d. Scope of Impact—State Specific

Key Theme – Adding Value to New and Old Agricultural Products

Program 121: Value-Added Agriculture

a. Description of Activity

The ISU Value Added Ag program has worked with communities and individual entrepreneurs this past year to build long-term economic, environmental and socially sustainable capacities.

Iowans consume more than $8 billion of food annually with less than five percent sourced locally. Through the Community Supported Agricultural (CSAs) emphasis, Extension helped to facilitate and coordinate 22 groups of producers and communities who have an interest in developing local markets. This past year more than 90 events at ISU featured locally sourced meals.

Agricultural processors are beginning to request products with specific traits and attributes. ISU Extension worked with several pilot projects encouraging Iowa farmers to develop supply chains. One project included facilitating the efforts of producers who are seeking up to 100,000 acres under cultivation for next year. Extension has also developed several first-in-the-nation pilot projects working to certify producer networks in ISO. Among them are projects at the Colusa Elevator in Wever, Iowa, Farnhamville Elevator in West Central Iowa, Ruthven Elevator and several livestock supply alliances.

Through consultation on feasibility, marketing and business plans, ISU staff work with groups starting a value added ag business. Extension developed five "generic" feasibility studies of starting a beef or pork processing unit, specialty poultry processing, ethanol facilities and a value added ag business start-up curriculum to help producers evaluate these options. These studies and other relevant information can be found on the new web page, entitled www.iowaagopportunity.org. This past year several in-depth feasibility studies and pilot projects have been conducted for community based groups. For example:

β. South Central Iowa beef producers called Chariton Valley Beef (CVB) have been searching for ways to add value to all segments of the beef industry. This year more than 200 producers have participated in programs offered by CVB and a direct marketing effort was established.
χ. Corn producers in the Shelby County Area have joined together to form BioMass Agri Products (B/MAP), a corporation that is working to increase the returns per acre to Iowa's corn farmers by uncovering new uses for corn stover.
δ. Farmers in Worth County are establishing a restaurant and meat market at the Top of Iowa Welcome Center where area farmers can deliver high quality products directly to consumers.

Iowa has traditionally grown commodities such as soybeans and corn. Extension has worked closely with producers to examine market opportunities and niche development. Emphasis such as a project to increase organic soybean production, helped to source locally grown organic soybeans. A soybean processing company in west central Iowa was purchasing more than 50 percent of its organic soybeans from outside the US. Development of the Iowa and other domestic organic soybeans suppliers has allowed the company to purchase all of its soybeans within the US.

ISU has been a leader in facilitating efforts among states. This past year several events were sponsored in which service providers from more than 15 states convened to discuss value

added ag activities, explore ways for collaboration and facilitating efforts so the various groups could work or market collectively.

e. Impacts/accomplishments –

The efforts of value added ag activities are making a significant economic impact on individual farmers and communities throughout Iowa. This year more than 60 community and farmer-initiated groups were started or assisted by ISU Extension staff. This commitment ranged from facilitating a group during start-up to conducting in-depth feasibility studies for enterprises.

For example, small cow-calf producers in the Raccoon River Valley area have united in a cooperative marketing effort to increase the net value of their calves and increase their competitive advantage as smaller calf producers. The net value added per calf through this program was $42.32 per head. This amounted to $13,244 for the 323 head.

Other market opportunities such the assistance ISU Extension brought to link a Japanese broker and three Iowa farmers to establish a supply network for the production of natto soybeans have proven to be successful. The financial agreement reached in this supply network will increase the farmer's incomes $30,000 to $40,000 per year over producing commodity soybeans.

ISU has is currently assisting several farmer groups who are looking at the dry corn milling industry as a way to add value to their commodity corn. Currently more than $175 million dollars of investment is planned in these plants. If these proposed plants come to fruition this will represent more than 500 jobs with an economic multiplier in which every dollar in the local economy turns approximately 2.5 times. Significant effort has been made to ensure these groups worked cooperatively to leverage their position in the marketplace and are utilizing the most-up-to-date technology and efficiencies to assure survivability.

Ag Ventures Alliance--"Given the low profit margins and uncertain future in farming, we have decided to explore opportunities for moving farther up the food chain" says Rich Hanna, Iowa farmer and President of a new group formed in Iowa called Ag Ventures Alliance. "Rather than sell raw commodities, we are pooling our resources to further process our farm products. This puts more money in the farmer's pocket and helps our local economy at the same time" adds Brad Petersburg Iowa farmer and Vice President of Ag Ventures Alliance.

With assistance from Don Hofstrand, Extension Farm Management Specialist in NC Iowa, Rich, Brad and more than 300 farmers and agribusiness people have formed a new group called Ag Ventures Alliance. To-date the group has been involved in a variety of value added ventures.

ϕ. Ag Ventures teamed up with a farmer-owned cooperative in Minnesota called Golden Oval Eggs helping them to increase their membership enough to build a $40 million egg laying and egg breaking facility in North Central Iowa.

γ. Ag Ventures recently helped create a new entity, Midwest Grain Processors Cooperative, which is planning to create an ag industrial park including a 40 million gallon ethanol facility. The ethanol plant would use about 15 million bushels of corn annually and cost roughly $50 million to construct.

η. Ag Ventures is also exploring the possibility of marketing Iowa grown farm products directly to consumers, exploring the possibility of building a cooperatively owned dairy, and exploring several possibilities in the area of soybean processing.

"We used the ethanol manual that ISU Extension provided as we began to develop the feasibility study for our ethanol plant. Everything that we needed to know was there for us to tailor for our local needs and develop all the financial projections. The manual saved us thousands of dollars in consulting fees, that we were able to use for our project. It was great." said Robert Butcher, President of American National Bank, Holstein, Iowa.

The ISU Extension value added ag team worked with many groups like the ethanol group wanting to market their own product. To the ISUE staff many of the questions and information that the groups needed to get started was similar for each commodity effort. To help cut weeks and sometimes months of time and thousands of dollars of consultant's fees, several generic feasibility studies and organizational guides were developed. A start-up primer on how to start your value added business, ethanol feasibility, a guide for beef or pork processing, specialty niche poultry markets and development of an organic business were developed and available on a new web site--iowaagopportunity.org. In these manuals, groups can find typical break even costs, market size and competition, regulatory requirements for the industry and other tools to help move value added ag groups further up the food chain--faster and cheaper.

Iowa Quality Producers Alliance--Jim Andersen says, "The main reason I joined the Iowa Quality Producers Alliance was to gain more bargaining power and increase profits for myself and other farmers, especially in output marketing; also to exploit niche markets for specialty grains. Identifying processing investment opportunities is another important reason for joining the alliance."

Assisted by Jill Euken, ISU Extension Field Specialist Jill Euken, Andersen and 79 other southwest Iowa farmers have joined together to form the limited liability company called Iowa Quality Producers Alliance (IPQA). Membership in the alliance costs $1000.

- The mission of the alliance is: to create earnings and opportunities for members beyond what each member can generate individually.
- The vision for the alliance is: to create a system in which grain producers are able to earn a fair return on their investment, maintain their independence, respond effectively to changing enhanced-value grain markets, and participate in value-added supply chains and grain processing opportunities.
- Since January of 2000, the IQPA Board of Managers has accomplished the following:
- Hosted 15 membership meetings with over 300 people attending; 80 memberships have been sold;
- Filed articles of incorporation and developed an operating agreement for the company;

- Successfully applied for $20,000 grant from the Iowa Department of Economic Development to cover certain project development, legal and consulting expenses incurred by the company;
- Received donations totaling $3000 from seven county Farm Bureau boards;
- Conducted membership survey of acres planted, types of crops grown, technology skills, communication technology used, etc.;
- Met with Cybus Capital to obtain their assistance in developing contract relationships with grain processors and end-users and a detailed business plan for the company;
- Hosted informational meetings to acquaint members with opportunities in quality management systems for grain like ISO 9000;
- Visited with nine companies about specialty marketing contracts and/or agreements for 2001 crop;
- Negotiating (currently) for specialty growing and merchandising agreements on behalf of the alliance membership for the 2000 crop and the 2001 crop

Organic Poultry Production-- "As organic farmers, we are committed to getting the most value from all of the grains grown in the organic crop rotation. One proven way to accomplish this is with livestock. After examining various markets, we decided on certified organic and natural poultry production because this would provide the critical natural fertilizers that we need in the crop rotation and increase our incomes by providing a niche product that is in demand at this time. We knew what we wanted, but had very limited experience in the skills necessary to get there. Iowa State University Extension has been a wonderful resource and the value added ag team provided the much needed technical and financial assistance to get our project up and running," says an organic farmer and board member for the Iowa Farm Fresh Poultry, Inc.

With the help of an Extension grant, the Southeast Iowa group put together a resource handbook and organized an advisory panel that sponsored a conference on specialty and niche poultry production. That conference was quite successful with more than 65 attendees. From that gathering of farmers, came significant ideas and a plan for their future.

Byron Leu, ISU Extension livestock field specialist from southeast Iowa worked with Marsha Laux, of the ISU Extension value added team to set up goal setting sessions where a timeline was developed. Marketing studies have begun and the group is forming a cooperative that will oversee production quality standards, processing and marketing. With the assistance of the value added team, the group with finalize their business plan and begin an equity drive in the near future.

· Source of Federal Funds—Smith-Lever

· Scope of Impact—State Specific

Key Theme – Home Lawn and Gardening

Program 146: Consumer Horticulture

a. Description of activity

Each year gardeners spend billions of dollars on plant materials, products, and supplies for their lawn and garden. A healthy, attractive home landscape increases the property value and enhances quality of life. While there are many sources of information available to horticulture consumers, few provide accurate, research-based information. Assess to accurate information and programs will help consumers make wise decisions in plant selection, culture, and pest management.

b. b. Impact/accomplishment -

Master Gardener Program--Master Gardeners contributed significant amounts of time on a wide variety of community projects across Iowa. A sampling of the contributions this army of knowledgeable horticulture volunteers includes; answering phone and e-mail inquiries at extension offices, writing gardening-related articles for local and state distribution, judging at county and state fairs, assisting in training of others, operating "diagnosis clinics" during the growing season, planning, planting, and maintaining gardens for schools, retirement centers, and local communities, to name a few. The impact of these volunteers on their local community is impossible to define. For example, Polk county Master Gardeners plan, plant, and maintain the Discovery Garden at the State Fairgrounds. At the 2000 State Fair over 150,000 people visited the garden during the two weeks of the fair. The number of Iowans Master Gardeners reach with their "gardening messages" is certainly staggering.

The Iowa Community Tree Steward Program--A joint offering between the Departments of Forestry and Horticulture, the Iowa Community Tree Steward Program offers over 20 hours of instruction to horticulture professionals and gardening enthusiasts on tree selections, establishment, management, and removal. Participants are asked to "put their knowledge to work" by volunteering on tree project in their local communities.

Market Vegetables in the Home Garden--Sean Sullivan, a chile pepper grower in Central Iowa, was concerned about supplying sufficient water to his maturing pepper crop. After contacting Consumer Extension Specialists, he installed a trickle irrigation system beneath black plastic. This system was so successful, his pepper sales were up 100% during the first half of the production period. Mr. Sullivan comments, "this extra pepper production has improved my gross sales and usable pepper supply over $2000.00"

Marshall County Master Conservationist Program--With the cooperation of ISU Department of Animal Ecology, Marshall County Extension, and the Marshall County Conservation Board the Master Conservationist program was offered to county residents. Similar to the Master Gardener Program, participants receive 32 hours of instruction and volunteer 32 hours in local conservation programs. The program focuses on environmental sustainability and the interconnection between the earth, plants, animals, and humans. Feedback from the 27 participants in the program indicated a high degree of satisfaction and a "greater appreciation of Iowa's natural resources". Participants also indicated a need for additional environmental and conservation programs.

Weed Control in a Farm Windbreak--Allamakee extension specialist helped a local farmer plan a weed management program for an evergreen windbreak worth $5000. With the assistance of ISU Extension Forestry specialists and information provided by the DNR, a chemical, mechanical, and cultural program was established. Herbicides, mechanical removal, and buffer strips were recommended for both s short and long-term weed management regime between tree rows. The client was pleased with the reasonable and feasible solution provided to him by Allamakee County Extension.

Master Gardeners Make a Difference--Black Hawk Master Gardeners recorded over 4000 hours of volunteer service in various activities for their community. They assisted 374 county residents with home horticulture educational needs. Jan Guthrie, board member of Green Scene (volunteer organization which raises money to purchase plant material for community beautification projects) said, "They provided volunteer time and added … expertise to Green Scene at a time when it was needed." In addition to volunteering time to their community, Master Gardeners raised $33,000 for community betterment projects.

Home Demonstration Gardens--At ten research farms across Iowa, the Home Demonstration Garden welcomed the public to visit and listen to extension staff during field days in late summer. Over 500 people from surrounding communities attended the Home Demonstration Garden Field Days in late summer. Extension staff and farm superintendents discussed selection and maintenance of plant materials. Attendees and staff evaluated the performance of new flower and vegetable varieties marketed to the home gardener. In addition, management methods and cultural practices to prevent or reduce pest and disease problems for home gardens were discussed.

c. Source of Federal Funds—Smith-Lever

d. Scope of Impact—State Specific

Goal 2: A safe and secure food and fiber system

Overview

Iowa's Extension Plan of Work, "330 - Nutrition: Choices for Health," speaks to the federal goal 2. Food safety education to Iowa's 99 counties is provided by Nutrition and Health field specialists and paraprofessionals in the Expanded Food and Nutrition Education Program (EFNEP) and the Family Nutrition Program (FNP) with support from a campus team of food safety educators. The field and campus specialists partner with a variety of agencies at the state and local levels. ISUE partnered with Purdue University Extension to develop new educational materials about food safety for pregnant women and preschoolers. Field and campus specialists use resources developed by USDA such as the FightBac materials, Partnership for Food Safety Education, and food safety web-sites, including the ISU Food Safety and Quality web-site at http://www.extension.iastate.edu/foodsafety/, FDA-CFSAN sites, Foodsafety.gov, and others. Resources in biotechnology, irradiation, and HACCP, are provided at a companion site maintained by the campus specialist to support food safety: http://www.foodsafety.iastate.edu/. Food safety rules and regulations specifically for Iowa have been developed with the State of

Iowa and Iowa State University and posted at a web-site used by the Iowa food safety educators at: http://www.exnet.iastate.edu/Pages/families/hrim/publications.htm).

a. Output/Impact -

- 4,573 food safety participants including youth and adults
- 333 volunteers in food safety
- 17,699 individuals received food safety education through individual consultations
- 4 food safety web sites developed and supported:
  - Food Safety http://www.extension.iastate.edu/foodsafety/ (2,744,880 hits in FY 2000)
  - Kitchen Incubators http://www.exnet.iastate.edu/pages/families/incubator.html
  - Iowa HACCP http://www.iahaccp.iastate.edu
  - Consortium Food Safety http://www.foodsafety.iastate.edu

b./c. Outcomes -

- 160 school food service mangers responsible for 80,000 daily meals attended a sanitation certification program and planned to adopt six food safety practices. A four-month follow-up survey of class members documented that 80% of the managers (128) had applied the knowledge gained and changed their food safety practices.

- Three Child Nutrition Program Directors (school food service) successfully implemented HACCP procedures in their operations that serve 36,000,000 meals annually.

- 91% of 4,573 food safety program participants plan to adopt one or more recommended food handling practices (3,162 surveyed).

- 99% of 400 individuals responding to follow up surveys (682 surveyed/403 responding) actually adopted one or more food handling practices following programs.

- A study of the costs and benefits of Iowa EFNEP, completed in August 2000 and tailored after the Virginia Tech study, showed that for every $1 spent to deliver nutrition education in Iowa, $10.75 is saved in future health care costs.

- Three hundred forty-five (18%) graduates of the EFNEP program demonstrated acceptable practices in food safety and food resource management at graduation from the program, as compared to only 55 (3%) at enrollment.

d. State's assessment of accomplishments - Original performance goals were exceeded.

e. Total expenditures by source of funding - State and Federal funds, $1,600,610.

SYs - 20.37.

Key Theme – Food Accessibility and Affordability

a. In the Expanded Food and Nutrition Education Program (EFNEP) and the Family Nutrition Program (FNP), 63 paraprofessionals delivered nutrition education to 4,231 adults and 17,816 youth in either small group settings or individually in the home. Pregnant teens and women at risk of having low birthweight babies are special target audiences of EFNEP/FNP. EFNEP/FNP served 333 pregnant and/or breastfeeding women under the age of 20, or 8% of the total audience. Staff partnered with a variety of agencies at the local level, including WIC, food stamps, Head Start, Promise Jobs, empowerment boards, and others, which resulted in increased funding, more effective audience recruitment, and enhanced program delivery. At the state level, ISUE partnered with Purdue University Extension to develop new educational materials about food safety for pregnant women and preschoolers. In addition, ISUE has a Memorandum of Understanding between WIC and EFNEP to formalize and expand reciprocal referrals between the two programs. This past year, this partnership has resulted in the development of 6 new joint publications. ISUE also partners with the Iowa Department of Human Services to fund the Family Nutrition Program and to provide local EFNEP/FNP units with a monthly list of referrals.

b. Impact -

- A study of the costs and benefits of Iowa EFNEP, completed in August 2000, showed that for every $1 spent to deliver nutrition education in Iowa, $10.75 is saved in future health care costs. The $10.75 in health care savings occur because participants: learn safe food handling practices, thus have fewer food-borne illnesses; eat better during pregnancy, resulting in fewer low birth weight babies; are more likely to breastfeed their babies, resulting in fewer childhood diseases; and improve their overall diets, resulting in delay or prevention of chronic diseases.

- Three hundred forty-five (18%) graduates of the EFNEP program demonstrated acceptable practices in all three categories of behaviors taught (nutrition, food safety, and food resource management) at graduation from the program, as compared to only 55 (3%) at enrollment.

c. Source of Federal Funds - Smith-Lever 3b and c

d. Scope of Impact - State Specific

Key Theme – Food Safety

a. This past year, we worked with 4,573 food safety program participants including youth and adults; additional 17,699 individuals received food safety education through individual consultations. Over three hundred citizens served as volunteers in Extension food safety programming. The field and campus specialists partner education on programs with the Iowa Department of Inspections and Appeals, the Iowa Hospitality Association, the Iowa Bureau of Food and Nutrition, local schools, hospitals, and community organizations, the Food Safety Consortium (Iowa, Kansas, Arkansas), WIC, food stamps, Head Start, Promise Jobs, and empowerment boards. ISUE partnered with Purdue University Extension to develop new educational materials about food safety for pregnant women and preschoolers. ISUE also

partnered with the Iowa Department of Human Services to fund the Family Nutrition Program which incorporates food safety programming in its series of meetings with families. Field and campus specialists use resources developed by USDA, such as the FightBac materials, Partnership for Food Safety Education, and food safety web-sites, including the ISU Food Safety and Quality web-site at http://www.extension.iastate.edu/foodsafety/, FDA-CFSAN sites, Foodsafety.gov, and others. Resources in biotechnology, irradiation, and HACCP are provided at a companion site maintained by the campus specialist to support food safety: http://www.foodsafety.iastate.edu/. Food safety rules and regulations specifically for Iowa have been developed with the State of Iowa and Iowa State University and posted at a web-site used by the Iowa food safety educators at http://www.exnet.iastate.edu/Pages/families/hrim/publications.htm). 264,000 consumers accessed 467,000 page views through the ISU Food Safety Web-site home page or one of its links, for a total of 2,744,880 hits last year. A presentation on biotechnology has been download over 300 times since its posting in a 3-month period. Over 38,000 consumers have accessed and completed one of the four interactive food safety lessons.

The Iowa Regional Section of the Institute of Food Technologists and the Department of Food Service and Human Nutrition jointly participated in a meeting to explore academic/industry relationships. Department resources and research expertise were highlighted in a poster session and a symposium featured speakers from academia and industry. Fifty-seven people representing 25 Iowa food companies participated.

b. Impact -

- 160 school food service mangers responsible for 80,000 daily meals attended a sanitation certification program and planned to adopt six food safety practices. A four-month follow-up survey of class members documented that 80% of the managers (128 managers) had applied the knowledge gained and changed their food safety practices.

- Three Child Nutrition Program Directors (school food service) successfully implemented HACCP procedures in their operations that serve 36,000,000 meals annually.

- 91% of 4,573 food safety program participants plan to adopt one or more recommended food handling practices (3,162 surveyed).

- 99% of 400 individuals responding to follow up surveys (682 surveyed/403 responding) actually adopted one or more food handling practices following programs.

- A study of the costs and benefits of Iowa EFNEP, completed in August 2000, showed that for every $1 spent to deliver nutrition education in Iowa, $10.75 is saved in future health care costs. The $10.75 in health care savings occur because participants:

    - learn safe food handling practices, thus have fewer food-borne illnesses;
    - eat better during pregnancy, resulting in fewer low birthweight babies;
    - are more likely to breastfeed their babies, resulting in fewer childhood diseases; and
    - improve their overall diets, resulting in delay or prevention of chronic diseases.

- Three hundred forty-five (18%) graduates of the EFNEP program demonstrated acceptable practices in all three categories of behaviors taught (nutrition, food safety, and food resource management) at graduation from the program, as compared to only 55 (3%) at enrollment.

c. Source of Federal Funds - Smith-Lever 3b and c

d. Scope of Impact - State Specific, however ISUE partnered with Purdue University Extension on food safety lessons. Also, the food safety and quality web site is accessed nationally and internationally.

Goal 3: A healthy well-nourished population

Overview

Iowa's Extension Plan of Work, "330 - Nutrition: Choices for Health," speaks to federal goal 3. Nutrition education to Iowa's 99 counties is provided by Nutrition and Health field specialists and paraprofessionals in the Expanded Food and Nutrition Education Program (EFNEP) and the Family Nutrition Program (FNP) with support from campus nutrition educators. The field and campus specialists partner with a variety of agencies at the state and local levels. Key collaborations formed include: Iowa Nutrition Education Network; Iowa Department of Public Health, Iowa Department of Education, Iowa WIC Program, Iowa Department of Human Services, Head Start, local substance abuse programs, local food pantries, Leopold Center for Sustainable Agriculture, commodity groups, local empowerment boards, team nutrition schools, and the Iowa Hospitality Association.

a. Output/Impact -

- 30,523 nutrition education participants, including youth and adults.
- 2,913 individuals received one-on-one nutrition consultations.
- 885 EFNEP volunteers were recruited and contributed more than 5200 hours
- Educational resources developed- 4websites, 3 curricula, 3 audiovisual material kits, 22 bulletins

b./c. Outcomes -

- Of 8,476 individuals receiving nutrition education this year, a survey showed that 98% planned to adopt at least one recommended nutrition behavior and 82% (6,950) actually made the behavior change, such as increasing consumption of fruits and vegetables or fat-free dairy products.

- A study of the costs and benefits of Iowa EFNEP completed in August 2000, showed that for every $1 spent to deliver nutrition education in Iowa, $10.75 is saved in future health care costs.

- Three hundred forty-five (18%) graduates of the EFNEP program demonstrated acceptable practices in (nutrition, at graduation from the program, as compared to only 55 (3%) at enrollment.

d. State's assessment of accomplishments - Original performance goals were exceeded.

e. Total expenditures by source of funds - State and Federal funds, $1,600,610.

SYs, 20.37.

Key Theme – Human Nutrition

a. Nutrition and health programs were offered in 99 counties to groups of adults, children, and youth. Over 2,900 Iowans also received nutrition information through individual consultations. Target audiences were elementary school-age children, employees at worksites, older adults, women at risk for chronic disease, farm families, child-care providers, and health professionals. The focus of nutrition education programs this year was increased fruit and vegetable intake, reduced risk for osteoporosis, cardiovascular disease and cancer, and increased opportunities for family meal time. A particular effort was the "5-A-Day Across Ioway" promotion for eating more fruits and vegetables. Extension staff and volunteers, dressed in fruit and vegetable costumes, traveled from town to town collecting signatures on pledge cards. Signers pledged to try to eat at least 5 servings of fruits and vegetables each day. The first signer was the Governor of the state. Extension staff worked in 89 community coalitions to address local health needs, including breastfeeding coalitions, Team Nutrition coalitions, and Food Security coalitions. Fifty-five of the coalitions focused on increasing fruit and vegetable intake by children. Both county- and campus-based Extension staff wrote successful grant proposals to support key programs. Many new educational materials were developed, as noted below, to support educational efforts. These materials included web sites, print materials, curricula, and displays. Iowa State University organized a conference via satellite attended by 5,000 health and educational professionals throughout North America. The topic was "Nutrition and Cognition."

   In the Expanded Food and Nutrition Education Program (EFNEP) and the Family Nutrition Program (FNP), 63 paraprofessionals delivered nutrition education to 4,231 adults and 17,816 youth in either small group settings or individually in the home. Pregnant teens and women at risk of having low birthweight babies are special target audiences of EFNEP/FNP. EFNEP/FNP served 333 pregnant and/or breastfeeding women under the age of 20, or 8% of the total audience. Staff partnered with a variety of agencies at the local level, including WIC, food stamps, Head Start, Promise Jobs, empowerment boards, and others, which resulted in increased funding, more effective audience recruitment, and enhanced program delivery. ISUE has a Memorandum of Understanding between WIC and EFNEP to formalize and expand reciprocal referrals between the two programs. This past year, this partnership has resulted in the development of 6 new joint publications. ISUE also partners with the Iowa Department of Human Services to fund the Family Nutrition Program and to provide local EFNEP/FNP units with a monthly list of referrals.

b. Impact -

- 98% of individuals receiving nutrition education this year planned to adopt at least one recommended nutrition behavior and 82% actually made the behavior change, such as increasing consumption of fruits and vegetables or fat-free dairy products (8,476 surveyed).

- In a book-bag project in one rural county, parents in 121 families with 2nd grade children read a nutrition picture book on family meal-time to their child; 86% of the children practiced reading the book to their parents; 80% of the parents did at least one suggested food-related activity with their child; and 50% of the parents and children planned and cooked a meal together. Parents described eating meals as a family and having pleasant discussions, playing mealtime trivia, turning off the TV during mealtime, and enjoying family time.

- A study of the costs and benefits of Iowa EFNEP, completed in August 2000, showed that for every $1 spent to deliver nutrition education in Iowa, $10.75 is saved in future health care costs. The $10.75 in health care savings occur because participants:

  - learn safe food handling practices, thus have fewer food-borne illnesses;
  - eat better during pregnancy, resulting in fewer low birthweight babies;
  - are more likely to breastfeed their babies, resulting in fewer childhood diseases; and
  - improve their overall diets, resulting in delay or prevention of chronic diseases.

- Three hundred forty-five (18%) graduates of the EFNEP program demonstrated acceptable practices in nutrition at graduation from the program, as compared to only 55 (3%) at enrollment.

c. Source of Federal Funds - Smith-Lever 3b & c

a. Scope of Impact - State Specific

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

Overview

Outputs, outcomes and impacts of extension at Iowa State University:

Number of participants at educational meetings, conferences, and field days:	41,740
One-on-one educational consultations – telephone, email, letter:	12,476
One-on-one education consultations – farm/business or office visit:	4,389

Approximately 3200 producers and agribusiness personnel paid $40 subscribe to the *ICM Newsletter*. In addition, there were 980,373 page views to the web-based IPM Newsletter and its companion *Home Horticulture Newsletter* (IPM strategies for homeowner pest control) during calendar year 2000. Through this newsletter, current issues are highlighted and university

recommendations are available. And, the Iowa Certified Crop Adviser (CCA) board is purchasing subscriptions for all newly certified CCAs.

A survey of the impact of extension was sent to 47 producers who are extension clients in Northwest Iowa. Thirty surveys were returned. Based on direct contact with extension specialists, 31% of respondents reported that they made management changes in their operation directly because of an extension recommendation. Another 22% reported that they used extension information to confirm their management plants. Economic impacts of extension assistance in crop management decision making were also assessed, and 24 of the 30 respondents offered comment. Estimated value was as follows:

1	respondent	greater than $100 per acre
1	"	between $50 and $75 per acre
5	"	between $26 and 50 per acre
6	"	between $11 and 25 per acre
7	"	between $5 and $10 per acre
4	"	less than $5 per acre

The private pesticide applicator training program conducted 361 meetings and had 22,306 participants from December 1, 1999–April 15, 2000. A post-training survey showed that the program was a success. Overall, 93% agreed that the information presented was useful for their farm operation. In order to assess behavioral changes, the survey asked respondents if they would change their farming practices as a result of attending the training session. Of the 56 percent who indicated they use the Roundup Ready system for corn or soybean, 47% said they adopted cultivation practices recommended at the sessions in 1998–1999. Also, 79% stated that they would use preemergence applications, sequential postemergence applications; or tillage as an alternative to a single-pass postemergence herbicide program; and 66% stated that they did keep clean copies of pesticide labels in an accessible place for family members and other workers. 44% of applicators followed the advice provided in 1998–1999, and took soil samples to determine the presence of soybean cyst nematode in their fields. Overall, 57% rated the program as good and 37% rated the program as excellent, a total of 94 % approval.

Details about calibrating sprayers and reducing drift were two of the topics covered during each pesticide applicator training program. The applicators were asked if as a result of training they would calibrate their sprayers and check nozzle output for accuracy using one of the methods discussed during training. A total of 88% indicated that they had adopted or would adopt these methods as a result of training. A second question asked if they would use a wind meter or other device to measure and record wind speed and direction at the time of pesticide application. Fifteen percent of the applicators replied that they had already adopted this practice, but an additional 44 percent said they would adopt this practice because of training. Both responses indicate that ISUE training will help farmers be more accurate in their pesticide application.

General Sustainable Agriculture:

- Number of Community Supported Agriculture groups (CSAs) increased to 50 from 35 the previous year and from none five years ago

- Virtually all Extension field staff hired before May 2000 have received introductory sustainable agriculture training. More than 200 agricultural professionals in USDA and state agencies in Iowa have received introductory sustainable agriculture training

Organic Agriculture:

- Iowa State University Extension sponsored a two day Multi-State Organic Workshop. The workshop was attended by 35 Extension staff from Iowa, Missouri, and Wisconsin
- Number of research/demonstration plots established to develop sustainable/organic systems: 13
- Number of producers utilizing sustainable/organic practices: 353
- Number of acres in certified organic production: 150,000
- Number of diversified or alternative community marketing systems or alliances established: 5
- Iowa's organic acreage has increased from 22,000 in 1996 to over 150,000 acres in 1999.

Assessment of accomplishments as measured against the POW: The Goal 4 impact that "Iowa producers will make more efficient use of resources, which will reduce the potential for negative environmental impacts" was met as shown through the individual Program impact statements.

State and Smith-Lever Funds: $4,782,382

FTEs: 38

Key Theme – Integrated Pest Management

Program 142: Integrated Pest and Crop Management

a. Description of activity

Crop growing conditions and pest populations in crop year 2000 varied dramatically throughout the season. And these conditions varied from place to place across Iowa. As is typical in the farming business, producers faced crop management situations that required different approaches to some problems, and also the development of new problems in 2000.

- Black cutworm trapping network—ISU Extension staff coordinate an annual black cutworm pheromone trap survey to pinpoint the arrival reproductive moths from Southern U.S. overwintering sites. From these data, ISU staff use degree days to project the estimated dates when farmers should begin scouting for damaging cutworm populations. This information is disseminated in the *Integrated Crop Management* newsletter and also by news releases and farm radio broadcasts.

- In 2000, we added a manager's section to our annual crop scout school, so that employers of crop scouts could come in at the same time with their scouts, but pay a reduced rate. The two scout schools held in March and April 2000 trained 168 scouts in techniques to improve crop advice in Iowa.

- High populations of bean leaf beetles (BLB) caused problems on several fronts in 2000. In addition to direct soybean damage, BLB is a vector for bean pod mottle virus (BPMV). BPMV infections can cause soybean yield reduction during seasons with adverse weather conditions. Extension efforts concerning these paired problems of BLB and BPMV consisted of assisting entomology researchers in efforts to determine the statewide incidence of BLBs that carry BPMV, and to arrange research sites with cooperating producers and crop advisors. In turn, ISU researchers have provided information for dissemination through extension publications, media releases and other extension programs.

- Corn flea beetles (CFB) occasionally cause damage to corn seedlings, especially in southern Iowa. Like BLB, CFB vector a bacterial disease of corn called Stewart's disease. Unusually warm and open conditions during the winter of 1999-2000 and early planting in most of Iowa led to some severe early infestations of CFB. Extension staff spent considerable time in one-on-one, group meeting, and media notices about assessing stands and treatment thresholds and options for this pest. The high populations of CFB made concern about Stewart's disease a considerable issue. Stewart's disease is a serious concern in seed corn production. However, although hybrid corn is often infected, in general there is reasonable resistance to the Stewart's disease bacterium. Again, extension staff linked with local media outlets and in community meetings to put relative risk of Stewart's disease in perspective.

- A survey of schools began in the fiscal year to assess pest control practices and to outline IPM strategies that can be successfully implemented in Iowa school campuses. These survey and follow-up activities will be carried out in the coming year.

- Search in Iowa began for a new soybean pest, the soybean aphid. In August, 2000 there were soybean fields in Michigan, Illinois and Wisconsin that were damaged by this pest that is new to North America. Extension staff responded to

- Degree day monitoring with attendant pest scouting advisories helped focus control strategies for black cutworm, alfalfa weevil, European corn borer, and bean leaf beetle. Our ISU Extension radio program continued. Weekly live discussions with specialists with timely and topical information were aired on Mondays at 12:30 p.m.—during the noon hour—on WOI-AM.

- Two posters were developed for posting in agricultural dealerships to respond to agronomic situations: *IPM 65* Better practices for better profits (alternative practices to reduce pesticide use) and *IPM 66* Don't Go Until it's 50ºF or Below! (Nitrogen loss reduction from better anhydrous ammonia application)

· Impacts/accomplishments -

Approximately 3200 producers and agribusiness personnel paid $40 to subscribe to the *ICM Newsletter*. In addition, there were 980,373 page views to the web-based IPM Newsletter and its companion *Home Horticulture Newsletter* (IPM strategies for homeowner pest control)

during calendar year 2000. Through this newsletter, current issues are highlighted and university recommendations are available. And, the Iowa Certified Crop Adviser (CCA) board is purchasing subscriptions for all newly certified CCAs.

Extension field staff reported sponsorship or co-sponsorship of 87 meetings and 39 field days statewide and an additional 71 invited presentations. Attendance at these events totaled 6,932 clients. Also 10,500 direct contacts were made by phone email or letter. The highest-intensity contact with clients is one-on-one, direct farm/business/walk-in meetings. Approximately 4,500 direct contacts were reported for the fiscal year.

One-on-one contacts--Problems occur each season in crop production—hail, herbicide injury, replant decisions, plant diseases, tillage or planting problems—the list goes on. Producers can often get answers from many sources—ISU Extension is one of these. ISU seeks to provide unbiased research based information.

During the crop-growing season, one-on-one contacts with producers are common. Problem identification and resolution are an important part of extension's service to farmer clients during the growing season. These decisions can mean thousands of dollar's difference in profits in some instances. Answering these questions from clients is a priority especially during the first half of the growing season.

A survey of the impact of extension was sent to 47 producers who are extension clients in Northwest Iowa. Thirty surveys were returned. Based on direct contact with extension specialists, 31% of respondents reported that they made management changes in their operation directly because of an extension recommendation. Another 22% reported that they used extension information to confirm their management plants. Economic impacts of extension assistance in crop management decision making were also assessed, and 24 of the 30 respondents offered comment. Estimated value was as follows:

1	respondent	greater than $100 per acre
1	"	between $50 and $75 per acre
5	"	between $26 and 50 per acre
6	"	between $11 and 25 per acre
7	"	between $5 and $10 per acre
4	"	less than $5 per acre

If a weighted average is taken of these values, the average per acre value reported by farmers is approximately $16 per acre. Total land managed by these farmers was about 20,000 acres. For this sample group, we can project savings reported by growers as $320,000.

Bean Leaf Beetle--Dry soils in the spring of 2000 contributed to reduced soybean plant populations in Southeastern Iowa. In addition, bean leaf beetle populations were exceedingly high. Because there were fewer soybean plants, and exceptionally high bean leaf populations, early-season feeding damage was substantially greater than normally observed. This led to a desire among many producers to apply insecticides to limit the perceived damage.

Economic treatment guidelines for early-season bean leaf beetles on soybean have been established through land-grant research efforts. The key to treatment decisions for this situation is to scout, examining seedling beans for damage and counting beetle populations for accurate estimates. Extension staff worked closely with agricultural dealerships and with clusters of local farmers to demonstrate these scouting practices. As a representative example, ISUE staff met with 6 producers at a soybean field in Wapello County. Producers counted bean leaf beetles and determined that although the soybean damage was obvious, the numbers present were far below economic thresholds established by ISU. Counts of soybean plants revealed populations ranging from 100,000 to 120,000 plants per acre. Earlier a major seed company had recommended replanting this field. From ISU recommendations, that population has been shown to be sufficient to produce a reasonable crop, and would not warrant the cost involved in replanting.

From this session, the results were that the producer chose not to apply an insecticide treatment, saving about $7.50 per acre. The field was 150 acres, so that resulted in savings just from omitting the insecticide treatment in that one field of more than $1,000. And, the cost savings from not replanting the soybean field were nearly $4,500, for total trip savings in that field of $5,500. The other five producers took that information and applied improved IPM techniques in decision making on their home farms.

Soybean Cyst Nematode--Soybean cyst nematode (SCN) is the top yield-reducing pest for Iowa soybean producers. Oftentimes, the losses are hidden to producers, because the soybean plants can suffer significant yield losses and yet show few if any visual symptoms. Early identification of the problem can increase grower profits through the alteration of crop rotation, or the use of SCN-resistant varieties.

In 1999, a local soybean producer asked me to look at his soybeans because he noticed some yellow spots that had not been observed previously. On examination, I discovered a sizeable infestation of SCN, and suggested he soil test to get a handle on the level of infestation. Also, I urged him to begin including SCN-resistant varieties in his future crop rotation.

The producer had reported to me that he estimates a direct increase in profits from several of his fields ranging from $26 to $50 per acre. This from a field that likely had yields suppressed from SCN nematode infestations for several years prior to the onset of symptoms.

· Source of Federal Funds—Smith-Lever

· Scope of Impact—State Specific, Integrated Research and Extension

Key Theme – Pesticide Application

Program 143: Pesticide Applicator Training

a. Description of activity

Pesticide Applicator training is required by statute for all commercial pesticide applicators and those private pesticide applicators that apply restricted use pesticides. ISU extension is

mandated by the State to develop and deliver training programs to meet those training requirements. The primary emphasis from October 1, 1999–September 30, 2000 was the development for and delivery of continuing instructional courses (CICs). These CICs provide both commercial and private pesticide applicators with the necessary training for non-exam recertification. Meetings were held in all 99 Iowa counties for private applicators, and 30 programs for commercial applicators in 21 certification categories and sub-categories.

Extension staff in each county answered pesticide-related questions from applicators and the general population. State staff members were consulted by other agencies about emerging and emergency pesticide-related concerns.

During the summer of 2000, program planning was initiated with the director of the Iowa Greenhouse Growers Association to provide commercial pesticide recertification for their fall Growers Meeting. This new linkage helped us to reach more clients with pesticide recertification programs and fostered interaction with greenhouse growers in both Iowa and Nebraska.

β. Private Pesticide Applicator CICs: 361 meetings with 22,306 participants from December 1, 1999–April 15, 2000.
χ. Commercial Pesticide Applicator CICs: 30 CIC programs covering 21 categories of pesticide application were produced with 6,735 participants attending.
δ. Initial training for was provided to the public as preparation for taking the exam to become a certified pesticide applicator. commercial: 3 sessions, 44 participants; private: 34 sessions, 1416 participants
ε. Exams completed and sent to the Iowa Department of Agriculture and Land Stewardship: 6
ϕ. Program Training Materials were created and revised to support the pesticide applicator training program:
- Extension Publications: 7 new, 8 revised
- Commercial Pesticide Applicator Slide Sets (1)
- Private Pesticide Applicator In-service Training, Slide Sets and Scripts 1999–2000 (7)
- Pesticide Applicator Training In-Service Videotape (distributed to all counties)
- Citizens (non-certified applicators) Educated in Pesticide Safety: 958

· Impact/accomplishments -

The private pesticide applicator training program conducted 361 meetings and had 22,306 participants from December 1, 1999–April 15, 2000. A post-training survey showed that the program was a success. Overall, 93% agreed that the information presented was useful for their farm operation. In order to assess behavioral changes, the survey asked respondents if they would change their farming practices as a result of attending the training session. Of the 56 percent who indicated they use the Roundup Ready system for corn or soybean, 47% said they adopted cultivation practices recommended at the CIC session in 1998–1999. Also, 79% stated that they would use preemergence applications, sequential postemergence applications;

or tillage as an alternative to a single-pass postemergence herbicide program; and 66% stated that they did keep clean copies of pesticide labels in an accessible place for family members and other workers. 44% of applicators followed the advice provided in 1998–1999, and took soil samples to determine the presence of soybean cyst nematode in their fields. Overall, 57% rated the program as good and 37% rated the program as excellent, a total of 94 % approval.

Details about calibrating sprayers and reducing drift were two of the topics covered during each training program. The applicators were asked if as a result of training they would calibrate their sprayers and check nozzle output for accuracy using one of the methods discussed during training. A total of 88% indicated that they had adopted or would adopt these methods as a result of training. A second question asked if they would use a wind meter or other device to measure and record wind speed and direction at the time of pesticide application. Fifteen percent of the applicators replied that they had already adopted this practice, but an additional 44 percent said they would adopt this practice because of training. Both responses indicate that ISUE training will help farmers be more accurate in their pesticide applications. This will in turn help them save money, improve pest management, and limit plant damage. Use of the wind metering devices will help prevent application of pesticides when the wind is too strong and will help to minimize environmental damage.

Commercial pesticide applicators were offered training at approximately 37 pesticide education programs conducted by area and state extension specialists during this reporting period; over 8,000 received at least two hours of training. Post-training evaluations are conducted on most of these programs. For example, 728 producers attended the Ornamental and Turfgrass Applicators Continuing Instructional Course. As a result of attending the training session, 88% indicated that they had a better understand of Japanese beetles, white grubs and other insect pests. An additional 58% indicated that they will be able to improve their timing of fungicide applications and 56% indicated that they would use the notification information for urban lawn applications.

Sorrel Brown, PIAP Liaison for Iowa, received a grant from IDALS through the EPA and the Small Business Regulatory Enforcement Fairness Act (SBREFA) to produce a videotape titled *Protecting Your Community: A Guide to EPA Regulation Compliance*. The videotape targets commercial pesticide applicators and focuses on how dealers, in anticipation of emergencies, can plan who they should work with in their communities and how to deal with media. A survey measuring the effectiveness of the videotape was distributed through Agribusiness Association of Iowa. Of 59 respondents, 90% said the videotape cleared up questions they had about EPA regulations and 93% found the information useful to their business. And, 98% percent said they would recommend the videotape as a resource to other dealers with 24% or respondents saying they would make changes in their operations as a result of watching the videotape.

Due to the number of acres treated by aerial applicators, and the time available during the season, effective calibration of equipment has been difficult to achieve by aerial pesticide applicators. A cooperative effort between Iowa State University Extension and the Iowa Agricultural Aviation Association (IAAA) is helping to improve the accuracy and efficiency of aerially applied pesticides and reduce their potential movement into nontarget areas. With

the aid of a $25 000 grant obtained from the Iowa Legislature, the Pest Management and the Environment Program was able to purchase the computer-based equipment needed to accurately analyze aerially applied spray patterns and indicate what subsequent adjustments may need to be made. Two three-day Fly-in Clinics ere held at the Oskaloosa Airport in 1998 and 1999. A Single 3-day clinic was conducted at the Storm Lake Airport in 2000, which attracted the largest number of aerial applicators to date.. These clinics were available at no cost to IAAA members. Non-members were charged a $75 fee per test flight. In 2000, a cooperative agreement between Iowa State University Extension and the Wisconsin Agricultural Aviation Association (WAAA) resulted in a 3-day clinic being conducted at the Baraboo Airport.

· Source of Federal Funds—Smith-Lever

· Scope of Impact—State Specific

Key Theme – Sustainable Agriculture

Program 147: Sustainable Agriculture

1 Description of activity

In a year of continued low profits for Iowa's staple agricultural products, interest in sustainable agriculture continued to grow in Iowa and the region. Increasing consumer demand for organic products was accompanied by an increase in certified organic acreage in Iowa. Iowa now has its own state organic certification program, as well as a number of private certifiers serving a quickly growing population of organic farmers.

In addition, consumer and farmer commitment to local and sustainable food systems grew, as demonstrated by the growth in farmers markets, CSAs, and retail markets for locally produced foods. The formation of the Secretary of Agriculture's Local Foods Task Force and the Governor's Food Policy Council attests to the recognition of this issue at the highest policy levels of the state.

Most of Extension's field staff have received at least introductory training in sustainable agriculture principles. In addition, ISU Extension has provided sustainable agriculture training to many USDA field staff, including Natural Resources Conservation Service employees and staff from the Farm Service Agency. For example, last year training was provided on local food systems, sustainable nutrient management, sustainable weed management, and legal and business issues for direct marketing. Many of these agricultural professionals are in turn providing outreach on sustainable agriculture practices and approaches, both in their regular programming and through special projects.

Projects are underway involving exploration of alternative crops for Iowa, integrated pest management including biological control of plant pests, development of alternative livestock production systems, non-target effects of transgenic crops, etc.

The organic agriculture program has focused on three major issues: (1) development of sustainable/organic horticultural and agronomic systems; (2) development of improved nutrient management and soil building systems; (3) development of value-added industry products through improved sustainable/organic production and postharvest techniques; and (4) development of research-based information in sustainable/organic systems for public training and advancement.

2 Impacts/accomplishments -

General Sustainable Agriculture:

2 Number of Community Supported Agriculture groups (CSAs) increased to 50 from 35 the previous year and from none five years ago
3 Virtually all Extension field staff hired before May 2000 have received introductory sustainable agriculture training. More than 200 agricultural professionals in USDA and state agencies in Iowa have received introductory sustainable agriculture training
4 More than 15 farmers used as trainers for Extension sustainable agriculture events
5 Iowa Farm Bureau and Iowa Pork Producers co-sponsoring sustainable agriculture events and including sustainable agriculture concepts in regular programming

Organic Agriculture:

6 Iowa State University Extension sponsored a two day Multi-State Organic Workshop. The workshop was attended by 35 Extension staff from Iowa, Missouri, and Wisconsin
7 Number of research/demonstration plots established to develop sustainable/organic systems: 13
8 Number of producers utilizing sustainable/organic practices: 353
9 Number of acres in certified organic production: 150,000
10 Number of diversified or alternative community marketing systems or alliances established: 5
11 ISU Extension Organic Pork Task Force: Mark Storlie, Northeast Iowa Area Livestock Specialist, is working with producer-members of the Organic Valley pork pool, organizing them into a functional unit that can coordinate transportation and make decisions. ISUE-PFI Farming Systems Coordinator Rick Exner is working on farms with ISU veterinary microbiologist (emeritus) George Beran to research gastrointestinal parasite infestations and their management.
12 Percentage new products (out of total market) for the value-added market: 2%
13 Percentage income increase for family farmers from adoption of sustainable/organic practices: (Long-range determination began in 2000)

Organic Research Benefits Producers and Educators in Iowa-- Organic agriculture is based on the principles of sustaining the environment and minimizing health risks through avoidance of potentially polluting synthetic chemicals. Organic agriculture has become a major industry in the U.S. and Europe in the last 15 years, growing at a rate of 20% annually, with assets totaling $6 billion in the U.S. “Certified Organic” is defined as crops produced on

land free of petroleum-based chemicals for at least three years. Iowa's organic acreage has increased from 22,000 in 1996 to over 150,000 acres in 1999.

When Ronald Zelle completed his training in Iowa State University's Organic Crop Production course in April 2000, he wanted to share what he had learned. He proposed to class coordinator and ISU Assistant Professor Kathleen Delate that he distribute her organic farming reference book to the Iowa Association of Agriculture Education, a group of 200 educators in the state. The multiplier effect of the course that Delate had organized as an eight week, intensive course taught by an interdisciplinary team of 14 professors and 13 farmers suddenly doubled, with the potential of reaching 4,000 students over the course of a year. This course was the first course on organic agriculture at Iowa State University, offered as a dual extension and university class, with Continued Education Units or two college credits to the 43 students and 125 producers who registered for the course.

Eighty-five percent of the participants in the Organic Crop Production course stated that they gained valuable information from the course, which they would apply to their current operations. The Organic Program plans to track these producers to determine changes in their environment. Because organic agriculture strives for long term economic stability, environmental soundness, and positive social impacts, it is anticipated that a measurable increase in soil quality parameters, such as microbial biomass and carbon, will accrue as producers transition from conventional to organic production. At the Neely-Kinyon (N-K) Long-Term Agroecological Research (LTAR) site in Greenfield, Iowa, a 128% increase in microbial populations was observed after one year in organic production. Comparable yields to conventional systems have also been obtained for organic crops at all LTAR sites across the state with avoidance of petroleum-based fertilizers and pesticides. In addition, economic returns from organic crops garner a 100-400% premium, depending on the crop and season. Economic analysis from the organic soybeans at the N-K LTAR site demonstrated a 368% increase in returns over conventional soybeans. In addition to tracking environmental benefits from adoption of organic practices, the Organic Program will also monitor economic growth of those producers transitioning to organic production.

- Source of Federal Funds—Smith-Lever

- Scope of Impact—State Specific

Goal 5: Enhanced economic opportunity and quality of life for Americans

Overview

Several Iowa plans of work support federal goal 5, including:

145 – Farm Safety (submitted in our federal POW under goal 3, however, instructions are to now report under federal goal 5.)
200 – Building Community Capital
300 – Money 2000
310 – Strengthening Family Relationships

311 – Developing Community Housing Assets
320 – Child Care That Works
340 – Family Policy That Works
410 – Understanding Youth Needs
420 – Out of School Time
430 – Youth Workforce Prep
440 – Science and Technology Literacy
450 – Strengthening Volunteer Development and
460 – Urban Youth

This overview covers work done for 145, and 200-340. 4-H Youth programs 410-460 output and outcome/impact are covered in a separate overview following this section.

a. Output/Impact-

- A total of 4,343 older Iowans and caregivers of older Iowans attended workshops to plan for their own futures, to assist family members or to assist clients.

- A total of 8,507 individuals received child care training and education. 2,712 Child Care That Works Self Study Packets were accessed by child care providers in 92 counties.

- During this reporting year, over 600 youth and their parents have taken part in the Strengthening Families Program for Parents and Youth 10-14 (SFP 10-14) in 71 communities across Iowa. 370 agency staff and community personnel have been trained in the SFP 10-14.

- Extension staff in 25 counties presented in-school farm safety programs that reached about 4,400 students.

- ISUE staff reached 6,600 people and participated in 370 local community collaborations on reforming community support systems to become family-centered, based on prevention, and participation.

- Interactive housing exhibits at home shows and fairs, home planning workshops, teaching kits with assistive devices, and site visits to AgrAbility families were used to help 4, 000 people plan homes with universal design features and make their homes more convenient and comfortable after experiencing a disability.

- Community development - 104 Interorganizational collaborations formed.

- Change on Rural communities - studies for 28 organizations/communities, 15 focus groups for 6 organizations, county specific fact sheets on four separate issues, 500+ medial contacts, 32,000+ monthly visits to internet site with average exploration of 8 pages of data per visit.

- 468 Business entrepreneurs trained, 4401 community leaders trained, 2234 governmental officials trained, 620 service providers trained, 61 service providers certified, 1080 youth trained. Using self assessment tools, increased skill and aspiration, i.e. human capital, increased among 90+ percent of participants, aspirations for taking on new leadership roles is 90+ percent of participants.

b./c. Outcome/ Impact -

- 293 new and 1,428 existing child care businesses were created and or strengthened by extension involvement.

- 60 percent of child care program participants surveyed indicated that they actually adopted one or more recommended child care practices.

- Creston and Dubuque community strengthening programs initiated with CYFAR funds remain self sustaining at the end of the five year federal funding.

- Iowa families participating in the Money 2000 program and responding to a follow-up survey increased personal savings by $1,415,148 and reduced their debt by $791,954 (11% response rate).

- 366 parents providing surveys at the close of the SFP 10-14 have reported significant change in positive behaviors towards youth, e.g. before the program, 56 said they wait to deal with problems until they have cooled down, compared to 260 after the program. Before the program, 136 parents said they help their youth understand what the family rules are, compared to 313 after the program. Before the program, 177 parents say they listen to the youth when he or she is upset, compared to 316 after the program.

- 339 youth who filled out surveys at the end of the SFP 10-14 reported positive changes: e.g., before the program, 121 (36%) said they know steps to take to reach one of their goals, compared to 292 (86%) after the program. Before the program, 99 (29%) said they do things to help them feel better when they are under stress, compared to 244 (72%) after the program. Before the program, 50 (15%) use peer pressure resistance steps when they are urged to do something wrong, compared to 197 (58%) after the program.

- 75% of participants in the Iowa AgrAbility Program who have received on-site visits have implemented one or more home improvements to improve accessibility to accommodate a disability.

- Community development - 24 leadership structures diversified, 211 organizations assisted and strengthened, 43 organizations created, 1609 individuals placed into organized networks, 12 business expanded, 1 business started, 10 jobs created, 2 bond issues passed, 15 grants were awarded

- State's assessment of accomplishments – exceeded our goals in key theme areas in regard to farm safety, parenting, child care, aging, community and youth development. Housing goals were slower at being accomplished at the community level than originally planned.

- Total expenditures by source of funding - FY 2000, SYs – 39.6, state and federal funding $3,107,067

Overview – 4-H Youth Development Programs

ISU Extension 4-H Youth Development Programs had an outstanding 1999-2000 year. Statewide enrollment showed 135,039 non-duplicated youth enrolled for 6 hours or more, a market share of 25.28% of the total school enrollment in Iowa K-12. This represents an 11% increase in total enrollment over the previous year. Additionally, the 135K figure represents an all-time high for Iowa 4-H youth program enrollment.

Our 4-H Club program continues to be strong, with all 100 Iowa counties conducting ongoing 4-H Club programs. We have worked hard to support the club program in a time of very real pressure on the rural communities of Iowa due to the onset of mega farms and the shrinking rural demographics. We have implemented a 4-H club survey questionnaire to help local clubs self-evaluate their areas of needed improvement. Our focus is on the quality of the educational content of 4-H club meetings. Our 4-H Club enrollment has remained steady throughout the 1990's at the 32,500 to 34,000 level. This is a testament to the hard work of staff and volunteers, the terrific support of the Iowa 4-H Foundation in support of local and state club program efforts, and the wonderful support of local businesses and individuals throughout Iowa.

Our Iowa 4-H program is getting younger, with nearly 40,000 of our 135,000 enrollment at the K-3 level. We provide excellent curriculum with our 4-H Clover Kids curriculum and many other age-appropriate, educationally sound projects and programs specially designed for little kids to have fun with their friends and be introduced to the positive environment of a 4-H-like setting. We established this past year a 4-H Clover Kid K-3 Advisory Committee to work with our state staff in giving leadership to the program statewide.

Youth development is the foundation of 4-H youth programs, and we take that very seriously in Iowa. We established the Targeting Life Skills (TLS) evaluation system, and have trained 169 professionals in Iowa and other states in the model and system. In Iowa, 918 groups were evaluated using the model. We also trained 1549 staff and volunteers in the Circle of Courage and 1935 in the Critical Elements of Youth Development, both of which are foundational youth development curricula.

Youth development focused programs delivered included 4-H Challenge adventure education with 1514 youth statewide, Boomerang character education 3030, Strengthening Families Program 1380, Talking with TJ 1386 and Girl/Guy Talk 498.

We have concluded Year One of the Governor's After-School Initiative, a program aimed at middle-school at-risk youths in 8 sites statewide. ISU 4-H is the contractee with the Governor's Commission on Volunteerism and the Iowa Department of Education to lead the hiring, training

and curriculum for the program at all sites. Total dollar amount in Year One was $230,000. Year Two began September 1, 2000 with 7 additional sites and a budget of $450,000.

We have completed Year One of a contract with the Iowa Department of Human Rights to deliver a Disproportionate Minority Confinement (DMC) program in 5 urban areas of the state. We have secured additional time on the topic of disproportionate minority confinement on the training agenda for law enforcement personnel at the Iowa Law Enforcement Academy.

Workforce preparation programs continue to be a focus in some counties. 431 youth and 45 adults from all 7 Extension areas participated in a CarrerTrek program that includes a visit to ISU to learn of possible futures for young people. For the fourth year, we received $20,000 from the Kauffman Foundation to conduct YESS: Mini-Society® programs in entrepreneurialism. A total of 80 youths participated in these programs for 30 hours each. A total of 954 youth and 32 adults were involved in work related training programs through Extension, and 203 youths learned about future planning in the "I'll Take Charge" program.

According to Iowa Department of Education statistics, 38% of the youth of Iowa live in our seven designated urban counties, and our 4-H enrollment reflects that demographic. While all of these counties have 4-H Club programs, the dominant was of impacting urban youths is the school enrichment delivery mode, with EFNEP, Growing in the Garden, Science and Technology as outstanding examples of curricula delivered in schools.

Statewide 99 counties participate in school enrichment programs and 98 in special interest programs, so Iowa is utilizing all delivery methods to impact youths. School enrichment enrollment statewide was 79,851, with special interest at 39,117.

Volunteer development is of course the backbone of Iowa 4-H programs, with 16,479 youth and adult volunteers enrolled statewide. Teachers become our "volunteers" in school enrichment programs, and agency personnel become trained in 4-H curricula as well to use with tier pre-formed groups. New volunteer recruitment resources were developed this past year called "Become a 4-H Youth Volunteer--Do It for Youth, Do It for You." A statewide Horse Leader Training was conducted for the first time through ICN, with 203 leaders trained. Nearly 2000 volunteers were trained in topics such as youth development foundations, youth development research and application, youth development assessment and process planning, cognitive/creative life skills, health/physical skills and vocation/citizenship skills.

Our Extension Science, Engineering, and Technology (ESET) program continues to train and deliver programs to large numbers of adults and youths. State and Field 4-H Specialists trained over 900 educators, and the following youth were impacted by ESET:

aerospace and aeronautics	4633
biotech education	5676
engineering and technology	4614
physical science	1630
assorted camps	3282
Total	18,825

A $20,000 grant from the Iowa Corn Growers Association was received to work on a 4-H Biotechnology Project Manual.

We look forward to continuing high quality and quantity in Iowa State University Extension 4-H Youth Development Programs

Key Theme – Aging

a. Description of activity

Adult Children and Aging Parents: Conversations Between Generations, a series of educational program components introduced in 1999 reached 728 people. Participants attended to plan for their own futures, to assist family members or to assist clients. Area agencies on aging, an assisted living facility, community churches and hospitals partnered in program sponsorship. "*Transferring Non-Titled Property: Who Gets Grandma's Yellow Pie Plate?"* reached 2,563 older Iowans. Other educational programs on aging issues involved 1,052 individuals on understanding memory loss and Alzheimer's disease, grandparents and other relatives as parents, and strengthening intergenerational family relationships.

Forty-five field and campus staff learned to use intergenerational dialogue as a tool for encouraging intentional involvement of all generations in community problem solving. The program was partially funded by a grant from Humanities Iowa. A new interactive web page, "Sharing Your Stories," further promoted intergenerational awareness by providing a place for all generations to read and share stories about their experiences and perceptions. A statewide literacy and family story-telling project by Iowa's first lady promotes the page as a family story telling tool. Field staff around the state participated in 16 coalitions on aging issues.

b. Impact - Two months after the intergenerational dialogue workshop, two communities reported a successful dialogue experience. Three-month follow-up responses from 52 participants in Adult Children and Aging Parents series indicated more than half of attendees were using more effective ways to talk about difficult later life topics, had discussed advance directives with their families, and reported knowing community information sources to help with later life.

c. Source of Federal Funds - Smith-Lever 3b & c

d. Scope of Impact - State Specific

Key Theme – Child Care

a. Description of activity

A total of 8,507 individuals received child care training and education. 2,712 Child Care That Works Self Study Packets were accessed by child care providers in 92 counties. Participants received Iowa Department of Human Services credit for licensing and registration requirements. 58 percent of the kits were accessed by center-based programs; 42 percent

were accessed by family child care programs. 8,267 self study video kits have been checked out since the program's inception in 1997. An additional 5,795 participants received training and education through workshops, on site training and consultation. 1,281 of these individuals attended Better Kid Care Satellite programs conducted in collaboration with Penn State University. 266 individuals received playground safety training or consultation. The National Network for Child Care web site (NNCC) managed by Iowa State University receives over 4 million hits annually with an average of 100,000 user sessions per month. The web site is actively supported by 37 states and is accessed by over 127 countries.

b. Impact -

- 90 outdoor environments and playgrounds were improved with technical assistance and consultation from ISUE.
- 23 new child care centers or early childhood programs were established with direct Extension involvement increasing child care availability for over 300 children.
- 270 new family child care homes/businesses serving 381 children were established with direct Extension involvement.
- 99 existing child care or early childhood programs were strengthened with Extension involvement.
- 1,329 existing family child care homes/businesses were strengthened with Extension involvement.
- 335 individuals were employed as a result of new or expanded child care center programs or home businesses.
- 91 percent of child care program participants (n=2,813) indicated that they planned to adopt one or more recommended child care practices.
- 60 percent of child care program participants surveyed indicated that they actually adopted one or more recommended child care practices.

c. Source of Federal Funds - Smith-Lever 3b & c

d. Scope of Impact - State Specific, however, the National Network for Child Care website (NNCC) managed by Iowa State University is actively supported by 37 states and is accessed by over 127 countries.

Key Theme – Children, Youth and Families at Risk

a. Description of activity

Through CYFAR funding, mini-grants were offered to four communities. Henry County hosted a series of community forums to build understanding of children and family issues, establish community priorities, formulate program directions and develop action plans for children, youth and family issues. The ROWEL Poverty Simulation was conducted in 12 communities; 636 participants were involved. The Copin County simulation, developed a year ago, was distributed nationally. Through the simulation, individuals experience a process for local policy development around the issues of childcare, transportation, jobs/job training and food security, health and housing. In cooperation with the Iowa Department of

Public Health, a simulation was held for 110 health professionals at their statewide annual meeting. Results from major ISU Extension research conducted on welfare reform in Iowa, "Family Well-Being and Welfare Reform," was reported back through community forums, legislative hearings, and national conferences to more than 1,000 policy makers.

Extension supports the ISU Center for Family Policy, created to assist in policy understanding and evaluation. Extension worked in partnership with the Center and the Iowa Office of Empowerment/Department of Management to: conduct a statewide survey of local empowerment areas to determine the extent of need for technical assistance for program evaluation; participate in the development of a Results Framework; and co-host a conference for 180 participants on program evaluation.

ISUE staff reached 6,600 people and participated in 370 local community collaborations on reforming community support systems to become family-centered, based on prevention, and participation. Iowa continues to host and manage the National Network for Child Care (NNCC) website. 1,307 individuals learned about the Earned Income Credit. 1,635 individuals learned about Iowa's Child Health Insurance Program for low-income children.

b. Impact - NNCC receives over 4 million hits annually with an average of 100,000 user sessions per month. Over 127 countries actively access the website.

- 1,307 individuals learned about the Earned Income Credit.
- 1,635 individuals learned about Iowa's Child Health Insurance Program for low-income children, Healthy and Well Kids in Iowa.
- Poverty Simulation participants continue to express increased awareness and sensitivity as well as a more favorable attitude toward families/individuals on welfare and in poverty. Since 1995, over 4.800 individuals have participated in this simulation experience.
- The CYFAR Project Director in the Creston targeted project continues to be employed, beyond the CYFAR grant, through funding from the city, county board of supervisors and businesses.
- Neighborhood associations in Dubuque, another CYFAR grant funded targeted community, are assuming leadership responsibility to sustain the effort begun while funded as a project under the CYFAR grant.
- Human Resource Managers from various industries in Henry County surveyed current and proposed family friendly work policies at each of the industries. The survey is a starting point for discussion and growth in the community. In Story County, Parents as Teachers expanded from a city to a countywide program. This community is also in the process of establishing a one-stop-shop for families and agencies to meet their parenting needs.
- Copin County Simulation participants reflected in that they are less fearful of being involved in the community decision-making process and found the role-playing process very helpful and thought provoking. Many commented that they would work to get more consumers involved in local decision making through involvement on boards/task forces and representation at community meetings. Others committed to attending local boards of

health meetings and/or county supervisors' meetings as well as becoming familiar with local policy makers.

c. Source of Federal Funds - Smith-Lever 3b & c

d. Scope of Impact - State Specific, however, the National Network for Child Care website (NNCC) managed by Iowa State University is actively supported by 37 states and is accessed by over 127 countries.

Key Theme – Community Development

a. Description of activity

Organized in-state around Building Social capital – Visioning, planning and organizational capacity building are prerequisites for strong communities. Six separate projects have social capital as a central feature. These include a) *Community Visioning,* changing the landscape and physical entryways to 20 communities; b) *ad hoc planning and visioning,* locally supported efforts to address one or more elements of community capital in 7 communities; c) *Resident-led watershed planning,* facilitation and organizational development support to citizen based planning in 4 watersheds; d) *Community Outreach Partnership Center* (COPC), a multi-faceted community capital building project in the Des Moines Enterprise Community, and e) *Women, Food and Agriculture Network*, a grassroots project offering learning and networking opportunities for women landowners, f) *Land use planning,* fact sheets expert assistance provided to communities, municipalities and counties.

b. Impact: 104

- Interorganizational collaborations formed
- 24 leadership structures diversified
- 211 organizations assisted and strengthened
- 43 organizations created
- 1609 individuals placed into organized networks
- 12 business expanded
- 1 business started
- 10 jobs created
- 2 bond issues passed
- 15 grants were awarded.

· Source of Federal Funds – Smith-Lever 3a & c, leveraged with state funds, user fees, DOT, HUD, and not for profit organization contracts

· Scope of Impact - State Specific

Key Theme – Family Resource Management

a. Description of activity

A total of 9,611 Iowans participated in Extension programs that addressed financial management skills. In addition, Extension staff worked with local schools to implement the High School Financial Planning Program, reaching 4,909 high school students in 129 schools. More than 17,000 school children and their families received Centsible Parenting, a newsletter designed to develop financial literacy among grade-school children.

Extension staff worked with financial institutions, state agencies and non-profit organizations, and media outlets to encourage 1,146 Money 2000 participants to reduce credit balances and increase personal savings. Partnering with local communities and the Iowa-based Institute for Social and Economic Development (ISED), Extension staff taught financial literacy workshops for low-income Iowans and refugees who are saving through Individual Development Accounts (IDAs), and also taught workshops for enrollees in the ISED Microenterprise Training Program targeted to welfare recipients.

More than 1,600 Iowans participated in credit education programs and 922 developed skills in saving and investing wisely. Interest in consumer privacy issues led to 1,930 individuals participating in workshops and presentations based on a series of fact sheets prepared by Extension staff and reviewed by the Iowa Office of the Attorney General.

A major focus of Extension programs was building basic skills in goal-setting, organization of financial records, and planning or budgeting. More than 2,500 individuals attended meetings, computer workshops, and learn-at-home programs, including a number of programs that emphasized preparing for the Y2K transition. Efforts to reach underserved populations included simultaneously translated workshops for Latino families and train-the-trainer in-services for professional and para-professional staff that directly serve low-income populations.

Many Extension programs focused on specific financial decisions and a target audience. Three hundred mid-life and older women participated in the AARP-cosponsored, 7-session series, Women's Financial Information Program. More than 400 attended workshops held in communities that have experienced plant closing or significant layoffs of a local workforce. Finally, 269 Iowans benefited from a new series of retirement planning workshops that are directed toward mid-life and younger consumers and encourage a long-term planning horizon for retirement needs.

b. Impact - The following outcome data are reported from surveys of program participants. Survey response rates are included in parentheses.

- Iowa families participating in the Money 2000 program and responding to a follow-up survey increased personal savings by $1,415,148 and reduced their debt by $791,954 (11% response rate).
- 95% (406 of 428 respondents) of resource management program respondents adopted practices to reduce debt and/or increase savings (41% response rate).
- 88% (202 of 230 respondents) of resource management program respondents adopted practices to improve consumer decision making (39% response rate).

- 43% of resource management program respondents adopted practices to improve family communication (39% response rate).
- 97% of youth participating in resource management programs learned to improve consumer decision making (76% response rate).
- 9 in 10 attendees at consumer privacy programs plan to take actions to increase privacy and security of financial documents and data (response rate NA).

· Source of Federal Funds - Smith-Lever 3b & c

· Scope of Impact - State Specific, however, note that: Iowa and Wisconsin Extension staff worked jointly on new credit education materials for Money 2000 participants.

Key Theme – Farm Safety

a. Description of activity

A target group identified in Iowa is farm youth. The Iowa State University farm fatality summary for the 1988 to 1999 continues to show a decrease in the number of farm fatalities during those years. The number of deaths recorded for 1988 to 1997 were 63, 63, 60, 33, 53, 34, 57, 34, 31, 49, 42, and 49 respectively. The number of children (under 19 yr.) who died during 1999 represents 16 percent of these total deaths. Farm safety day camps, in-school educational programs and other activities are conducted to reduce the number of injuries and fatalities.

The most effective method of reaching the target audience of youth in Iowa has been the farm safety day camps. Iowa State University Extension staff hosted 34 farm safety day camps and contacted nearly 4,000 youth between 4 to 13 years old. The average attendance for these camps is about 115 youth per camp. Extension participated with external partners to help sponsor or participate in additional camps. A partnership was developed with a national sponsor, Progressive Farmer. Iowa State University Extension program provides supporting materials of publications and demonstrations to these camps.

Iowa State University Extension delivered education to public schools with our in-school programs. This is an effective way to reach youth about farm safety. Extension staff in 25 counties presented in-school farm safety programs that reached about 4,400 students. These programs have grown in the past few years and are expected to continue this trend. These in-school programs combined with farm safety day camps reach Iowa's youth audience.

The tractor and machinery training programs certifies specific requirements to operate tractors and machinery that meets the federal guidelines and include 24 hours of training. Eleven counties in Iowa sponsored the program with 108 students. The tractor and machinery virtual classroom, (TMVC) developed by Iowa State University Extension on the World Wide Web is being used nationally. This experimental program provides interactive learning modules about tractor and machinery operation for anyone connect to the World Wide Web.

Full-time farmers are another target audience identified in Iowa. This audience is most receptive to publications, demonstrations, and mass media events. Safe Farm is an Iowa State University Extension program helping to make Iowa farms a safer place to work and live. The focus of the Safe Farm program has been a combination of media campaign and various educational efforts.

The media campaign also included weekly scheduled radio interviews on farm safety. The radio interviews provided over 214 minutes of quality radio programming. These radio interviews were mailed to 68 radio stations for 52 weeks. During National Farm Safety Week, the program also uses 4 pre-recorded public service announcements to increase awareness. Each tape included four PSAs 60-seconds in length and printed script for each PSA.

The Safe Farm agricultural health and safety pages on the World Wide Web were updated. These pages provide current and timely information to both the county extension offices and Iowans. The address of the page is <http://www.ae.iastate.edu/safety.htm>. Items found on these pages include: listing of farm safety day camps, location, date, contact person, listing of tractor and machinery certification classes, county, contact person, links to camera ready printable version of all Safe Farm fact sheets, listing of information about available farm safety displays, and links to other farm safety organizations and their efforts.

Implementation Plan for Program Development

- *Enhance efforts to reach under served populations and develop farm safety programs in all Land Grant Colleges and Universities in Iowa.*

Iowa has only one land grant institution within its borders so no multi-Land Grant Institutional programs will be developed. Iowa State University has developed and continues to maintain cooperative relationships with Iowa Center for Agricultural Safety and Health (I-CASH) at the University of Iowa and the National Education Center for Agricultural Safety (NECAS) at the Northeast Iowa Community College. I-CASH has established farm health and safety programs designed to reduce the incidence of disabilities suffered by persons engaged in agriculture that results from disease or injury.

- *Build external support for the Extension Farm Safety Program and develop consensus on how to address controversial farm safety issues though an advisory committee or other method.*

Iowa State University Extension Farm Safety Leader is forming an advisory group that has as its expressed purpose for existence the reduction of injuries related to agricultural production. Members will include farmers, insurance company representatives, equipment dealers, health departments and health care professionals. This group will advise the farm safety program leader as to the priority of needs and programs and serve as a transfer mechanism to distribute safety information through their organizations and out to the population they represent.

- *Develop and implement a strategy for securing adequate resources to develop an Extension Farm Safety Program that addresses the priority farm safety issues in your State.*

Iowa State University Extension will involve the advisory committee during the development of a strategy for securing adequate resources for an Extension Farm Safety Program that addresses the priority farm safety issues. A core of experts located on Iowa State University campus and partners from centers, not-for-profit organizations, public health departments, and other groups will be teamed together to produce effective and fundable projects. These teams will be formed and re-assigned for each project undertaken.

b. Impact/Accomplishment

Farm Safety Program Objective A: Provide leadership and expertise to the development and implementation of state and national Farm Safety Programs.

Indicator A.1: The total targeted number of committees on which state farm safety specialists and para-professionals with primary responsibility for farm safety serve on an annual basis by providing information and expertise on farm safety.

Fiscal Year	Total Targeted	Multi-Organizational State	Multi-Organizational National	1890 & 1994 SLGUC	CES	Professional Societies
1998	24	10	2	0	1	11
1999	28	8	3	0	1	16
2000	25	4	3	0	1	17

Indicator A.2: The total targeted number of publications, instructional programs and mass media events the state farm safety specialists or para-professionals with primary responsibility for farm safety participated in or on an annual basis by providing information and expertise on farm safety.

Fiscal Year	Publications		Instructional Programs		Mass Media	
	Extension	Professional Journal or Proceeding	Instructor	Coordinator	Radio or TV	Popular Press
1998	3	5	7	15	81	301
1999	12	1	8	63	87	320
2000	3	2	9	70	88	310

Indicator A.4: Resources generated from other sources to support the Extension Farm Safety Program. Estimated targeted value of both funding and in-kind support in thousands of dollars.

Fiscal Year	State		NIOSH		USDA		Other Federal		Non-government	
	Fund	i.k.	fund	i.k.	fund	i.k.	fund	i.k.	fund	i.k.
1998	72K	0	0	0	19K	0	5K	0	0	0

1999	73K	0	0	0	17K	0	0	0	0	0
2000	72K	0	2.5	0	17K	0	0	0	25K	0

Farm Safety Program Objective B: Enhance collaborative efforts with all Land Grant Colleges and Universities to reach under served populations and develop farm safety programs in:

Indicator B.1: Build Collaboration with all Land Grant Colleges and Universities within the State or Territory. Note: This indicator is not applicable to Iowa State University.

Has a collaborator(s) in the 1890 Institutions in your state been identified? NA
Has a collaborator(s) in the 1994 Institutions in your state been identified? NA
Has a collaborator(s) in the Hispanic-Serving Institutions in your state been identified? NA
Has a collaboration plan with 1890 Institutions in your state been developed? NA
Has a collaboration plan with 1994 Institutions in your state been developed? NA
Has a collaboration plan with Hispanic-Serving Institutions in your state been developed? NA

Farm Safety Program Objective C: Farm Safety Extension programs will reach minority and under served populations.

Performance Goal C.1: Number of farm workers who will receive farm safety training by extension professionals.

Performance Goal C.2: Number of new Extension farm safety materials that will be developed by extension professionals in non-English formats to reach under served populations.

Performance Goal C.3: Number of small farm farmers who will receive farm safety training by extension professionals or from educational materials developed by extension professionals.

Performance Goal C.4: Number of (target population selected by state) who will receive farm safety training by extension professionals.

Fiscal Year	Goal C.1	Goal C.2	Goal C.3	Goal C.4
	Target #	Target #	Target #	Target #
1998	33	0	120	9,532
1999	1681	0	120	13,453
2000	1681	0	130	10,092

Farm Safety Program Objective D: Farm families and workers will increase their understanding of how to minimize and control farm work and work site hazards and risks through Extension Farm Safety programs.

Performance goal D.1 ____ % of those completing evaluation cards will improve their understanding of specific hazards discussed.

Performance goal D.2 ____ % of those completing evaluation cards will learn new information from the program.

Performance goal D.3 ____ % of those completing evaluation cards will agree that the program helped to meet their farm safety education needs.

Performance goal D.4 ____ % of those completing evaluation cards would recommend this program to others.

Fiscal Year	Goal D.1	Goal D.2	Goal D.3	Goal D.4
	Target %	Target %	Target %	Target %
1998	0	0	0	0
1999	0	0	0	0
2000	90	88	100	91.3

Farm Safety Program Objective E: The Cooperative Extension System will provide leadership and coordination of farm safety programs for youth.

Performance Goal E.1: Number of youth who will participate in a youth farm safety activity in which Extension provided instruction.

Performance Goal E.2: Number of youth who will participate in a youth farm safety activity in which Extension provided coordination.

Performance Goal E.3: Number of youth that will receive hazardous occupation certification through an Extension hazardous occupation-training course.

Fiscal Year	Goal E.1	Goal E.2	Goal E.3
	Target #	Target #	Target #
1998	4,356	5,176	70
1999	8,069	3,625	78
2000	4,369	3,934	108

Ringold County-- Thirty-five youth, ages 8-13 benefited from farm safety day camp sponsored by Progressive Farmer and Iowa State University Extension. Youth learned about PTOs, ATVs, grain suffocation hazards, first aid, disabilities, electrical safety, poison prevention, and fire safety. Youth experienced hands-on activities practicing safety and learning about appropriate behavior in everyday life on the farm or while visiting. This event educated youth to household items that looked, smelled or tasted exactly like a poison. This was a different emphasis than usually pursued and provided to be value knowledge for youth.

97% of youth reported increased learning after the day's activities. 100% of youth indicated they would share information learned with family members and friends. Adults and teen leaders indicated they had learned new information as a result of participating in this program.

Grundy County--Progressive Farmer and Extension Farm Safety Day Camp was hosted to create an awareness of farm hazards, to assist youth in understanding the difference between safe and unsafe behaviors on the farm, and to decrease the number of farm related injuries. Youth in grades 3 and 4 attended a one-day session at the Grundy County Fair Grounds and participated in 12 mini workshops. The subjects were grain bin safety, bike safety, chemical safety lawn

mowers safety, machinery safety, disability awareness, first aid, sun safety, livestock safety fire safety, electrical safety and tractor safety.

Youth attending the camp were made aware of the consequences of poor decisions through personal stories. The evaluations showed that 91% learned to consider the consequences of their decisions and 96% reported that they learned to be responsible for their own decisions. The youth also completed a pre and posttest on their knowledge.

Selected results are:

- 72% on pre test knew that there should be only one person on a tractor and posttest showed a increase to 92%.
- 84% knew you could be covered with flowing grain in less than 10 seconds and posttest showed an increase to 94%,
- 68% understood the importance of tight fitting clothing around PTOs and posttest showed an increase to 81%.
- 100% indicated that the farm safety camp was a fun place to learn new things
- 96 % would recommend farm safety day camp to a friend

Johnson County--A Donovan-farm safety Day Camp was hosted to inform youth about hazards on farms and teach them ways to be safe. Youth in 4, 5, and 6 grades participated in a 1-day session for 7 hours with counselors from grades 9-12. They learned about firearm injury prevention, fire and burn safety lawn mower safety, hidden hazards on the farm, animal safety, chemical safety, first aid, electrical safety, power tool safety, tractor and PTO safety, Skid steer loader safety, and grain safety.

The impact on the youth audience was evaluated and the results are:

96% of the youth would think about possible alternatives before making a decision.
93% of the youth would consider the consequences of decision their would make.
96% of the youth would avoid risky behavior.
93% indicated that they had some control over events in their life.

c. Source of Federal Funds—Smith-Lever

d. Scope of Impact—State Specific

Key Theme – Impact of Change on Rural Communities

a. Description of activity

Organized locally around Data for Decisions – Communities and organizations are supported with objective statistical social and economic data as input to informed decisions. The support is in the form of archived on-line and print data (Midwest PROfiles, Iowa Census Services), custom designed and localized fact sheets and graphic media (Iowa Census Services), analysis and interpretation in reports and presentations to audiences. Additionally, support is provided organizations and communities to generate custom designed data by

providing technical services for applied sample surveys and focus groups (CD-DIAL, Iowa Farm and Rural Life Poll)

a. Impact - studies for 28 organizations/communities, 15 focus groups for 6 organizations, county specific fact sheets on four separate issues, 500+ medial contacts, 32,000+ monthly visits to internet site with average exploration of 8 pages of data per visit.

b. Source of Federal Funds – Smith-Lever 3b & c

c. Scope of Impact – State specific; geographical contiguous states (Midwest PROfiles)

Key Theme – Leadership Training and Development

a. Description of activity

Organized in-state around Building Human Capital. Iowa citizens were taught leadership skills from a portfolio of six programs. The development of human and social capital is central to the ability of communities to solve their problems. In FY2000, these included a) *Developing Dynamic Leaders*, a six-session skill-building program in group formation, goal setting, group dynamics, decision making, and assessing community needs and direction; b) *Governing Cities: A Leadership Toolbox*, a six-session program for elected city officials offered in partnership with Iowa League of Cities on communication and building public trust, c) *Iowa's Institute for Public Leadership*, a bi-partisan cooperative the three branches of state government emphasizing collaboration; d) *Nonprofit management Institute*, a 13 session (2 days each session) certificate program targeting the special concerns of nonprofit organizations such as governance by volunteer boards, legal and regulatory concerns, and developing diversified revenue sources; e) *Tomorrow's Leaders Today*, a cooperative program targeting potential leaders from Des Moines' Enterprise Community and focusing on skill building, community projects, and local issues, and f) *Municipal Clerk's Institute*, a 3-year tiered program with a curriculum build around budget and finance, communications, city records, ordinance development, community development, intergovernmental relations and technology updates. Emerging leaders were offered training in basic skills and seasoned leaders particpated in advanced training in building civic communities and in developing and maintaining community coalitions.

b. Impact: 468 Business entrepreneurs trained, 4401 community leaders trained, 2234 governmental officials trained, 620 service providers trained, 61 service providers certified, 1080 youth trained. Using self assessment tools, increased skill and aspiration, i.e. human capital, increased among 90+ percent of participants, aspirations for taking on new leadership roles is 90+ percent of participants.

c. Source of Federal Funds: Smith Lever 3b&c, leveraged with state funds, user-fees, and not-for-profit organizational contracts

d. Scope of Impact: State specific

Key Theme – Parenting

a. Description of activity

Extension staff has greatly increased their support of sequenced programming designed to build parenting skills. Research funded at over 22 million federal dollars and carried out by Project Family at the Institute for Social and Behavioral Research at ISU has informed the widespread dissemination of the 7-week Strengthening Families Program for Parents and Youth 10-14 (SFP 10-14), which has been shown to reduce substance abuse in youth, build skills in parents, and strengthen the family unit. From fall 1999 through fall 2000, over 600 youth and their parents have taken part in the program in 71 communities across Iowa. 370 agency staff and community personnel have been trained in the SFP 10-14. A similar program for parents and younger children, the 8-week Celebrate Families Program, has reached 274 families. Girl Talk/Guy Talk programs, designed to increase positive communication about sexuality issues between youth and parents over four sessions reached 320 families. A series of new publications and media releases for stepfamilies were made available in the state. A home-study approach for parents in stepfamilies reached a total of 200 families. Extension received DHS money to hire three program assistants to provide parent education through home visits, reaching 140 families. Other approaches included a new, interactive web site for fathers; parent classes at Headstart sites; a series of book discussion groups for parents of teens; sending book bags home with Headstart children to encourage positive interaction with their parents; and an Academy of Parent Education, a series of five classes, which helps prep our participants to interact with parents effectively in a group setting.

b. Impact - 370 facilitators throughout the state have been trained to teach the Strengthening Families Program: For Parents and Youth 10-14 (SFP 10-14), thus building community capacity for the continuation of the program in Iowa.

- *366 parents providing surveys at the close of the SFP 10-14 have reported significant change in positive behaviors toward youth, e.g., before the program, 56 said they wait to deal with problems until they have cooled down, compared to 260 after the program. Before the program, 136 parents said they help their youth understand what the family rules are, compared to 313 after the program. Before the program, 177 parents say they listen to the youth when he or she is upset, compared to 316 after the program.

- *339 youth who filled out surveys at the end of the SFP 10-14 reported positive changes e.g., before the program, 121 (36%) said they know steps to take to reach one of their goals, compared to 292 (86%) after the program. Before the program, 99 (29%) said they do things to help them feel better when they are under stress, compared to 244 (72%) after the program. Before the program, 50 (15%) use peer pressure resistance steps when they are urged to do something wrong, compared to 197 (58%) after the program.

c. Source of Federal Funds - Smith-Lever 3b & c

d. Scope of Impact - State Specific

Key Theme – Promoting Housing Programs

a. Description of activity

Universal Design and Home Accessibility. ISUE continued strong programming efforts in universal design and home accessibility. Interactive housing exhibits at home shows and fairs, home planning workshops, teaching kits with assistive devices, and site visits to AgrAbility families were used to help 4, 000 people plan homes with universal design features and make their homes more convenient and comfortable after experiencing a disability. Target audiences included elders, people with disabilities, health care workers, and builders. Partnering groups and agencies that with these efforts during FY 2000 included Easter Seals Iowa, Minnesota AARP, Mall of America in Minneapolis, Polk County Senior Fair, Franklin County Home Health Agency, leaders of Iowa AgrAbility Friends and Family program, Franklin County Fair, Iowa State Fair, ISU field staff, and ISU faculty with housing-related interests. Over $1 million was received from USDA for the Iowa AgrAbility Project since 1991 to work with farm families affected by disabilities. A major component of project monies was used to consult with families about accessibility and universal design issues. More than 700 families received on-site assistance to adapt their homes and farms to accommodate a disability through the Iowa AgrAbility Project, a collaborative effort with Easter Seals Iowa, since 1991. More than 500 individuals participated in all-day workshops on building a new home or doing major remodeling during the past five years. Extension staff worked with state and municipal governments, lenders and the realtors to offer first-time homebuyer workshops to 219 Iowans.

Healthy Home Housing Project- A contract between ISUE, Polk County, and the Polk County Department of Public Works funded a four-year effort to reach 100 low-income residents of Saylor and Delaware townships, including the unincorporated village of Norwoodville. Many households lived in housing that needed structural repairs, especially safety and health improvements. An Extension educator made three home visits to each home annually, to deliver home maintenance information, self-study materials and group workshops. Topics included carbon monoxide and radon, household hazardous waste disposal, and other indoor air quality issues. $100,000 was received for the Healthy Homes Project to develop educational materials, workshops and self-study kits.

b. Impact -

- 75% of participants in the Iowa AgrAbility Program who have received on-site visits have implemented one or more home improvements to improve accessibility to accommodate a disability.
- Half of the 100 low-income households that received regular on-site visits in the Healthy Homes Housing Project began regular home maintenance activities and another 25 percent engaged in one or home maintenance activities during the past three years.

c. Source of Federal Funds - Smith-Lever 3b & c

d. Scope of Impact - State Specific

Key Theme – Workforce Preparation – Youth

a. Description of activity

Iowa continues to have a shortage of a qualified workforce. Employers are concerned that youth are leaving the state to find better employment opportunities. The Iowa 4-H Youth Development program has the goal of increasing the workforce readiness skills of young people through extension programming efforts.

- Three 4-H'ers and 1 adult participated in the Youth 2K Summit on School to Work issues in Kansas City. One 4-H'er was one of twelve youth to represent four states in Washington DC to report to the National School to Work state directors, US Secretary of Education and deputies of education.

- 431 youth and 45 adults participated in Career Trek from the seven extension areas.

- ISU has become a service provider in youth leadership training for the Youth Workforce Development councils.

- $20,000 was received from the Kauffman Foundation for YESS: Mini-Society® programming. Eighty youth were reached through four different Mini-Societies. Each society provided 30 hours of programming for the participants. The grant dollars have provided leverage to triple the amount of money available to groups to conduct their programming.

- Through the county reporting process, 954 youth and 32 adults were involved in work related training. 630 youth worked on developing marketable skills.

- West Pottawattamie County conducted the high-school Career Ed classes. This was done in four 1 ½-hour classes. Topics were teamwork, decision-making, communication, and assertiveness. Sixty youth were reached and it is projected that approx. 300 youth will be served in the upcoming year.

- In Wapello County 203 youth were involved in the "I'll Take Charge" program, which helped youth start to think about their future. They started thinking about jobs and money, and they gained information from creating a career research paper.

b. Impact

- The Iowa group (youth) to Youth 2K Summit presented to the Iowa Department of Education administrative group ideas on how to change the education system to be more effective in preparing young people for the world of work. Several members have been asked to be resources as individual divisions plan their in-service training for the upcoming year. Ashley Dierenfeld, participant of Youth 2K summit reflects – "As a result of the conference in Kansas City, I realized how many kids have no idea what they want to do and schools have no way to help them. From talking to my school board, state 4-H council and to the state department of education, I realized each student can make a difference in the education process if they try."

- Iowa continues to receive funding from the Kauffman Foundation for Mini-Society® programs because of types of programming happening in Iowa. Each year a new grant has been received (total of $80,000 over 4 years) due to the continued amount of local support for the program. The focus will be for a major expansion effort in the upcoming year. We have two former facilitators who have started the process to be Iowa trainers for the program.

- Teacher reflections include: "Mini–Society® encourages respect, cooperation, teamwork and success. Children who typically have behavioral problems in the classroom find Mini-Society® gives them an avenue to express themselves in a positive manner." "Almost all the businesses were successful. The children appeared to shop at everyone's store out of respect for one another. Although this may not be realistic in the business world, the program staff appreciated the children's cooperation."

- West Pottowattamie High School career class of 61 participants stated that as a result of this session they learned to always or usually:
  To think about possible alternatives before making a decision – 81%To consider the consequences of decisions I make – 78%
  To listen carefully to what others say – 96%
  To clearly state my thoughts, feelings and ideas to others – 85%
  To contribute as a member of a team – 91%
  To feel comfortable saying "no" to things I don't want to do – 91%

- I'll Take Charge taught in Wapello County to 203 youth. The participants stated the following
  93% I'll Take Charge challenges me to do my best
  92% I'll Take Charge will help me prepare for the future
  76% state they learned to accept responsibility for doing a job
  76% state they learned to set goals for their future
  69% felt they had some control over the events in their life

- Three areas submitted evaluations on Career Trek. Of the 98 students responding the following percentage chose always or usually for the following statements:
  82% now understand how my high school classes are preparing me for the future
  89% I am more aware of choices available to me for employment or education following high school
  83% my knowledge about careers/education beyond high school has improved.
  92% learned to contribute to a team

c. Source of Federal Funds – Smith-Lever 3b & c

d. Scope of Impact – State Specific and National Conference presentation

Key Theme – Youth Development/4-H

This section is further divided into key themes as named in Iowa's state plan of work.

Key Theme – Understanding Youth Needs

a. Description of activity

The Iowa 4-H Youth Program mission is to create supportive environments for culturally diverse youth and adults to reach their potential. In the 1999-2000, fiscal year Iowa 4-H reached 135,000 youth through a variety of programming.

- Iowa developed a Targeting Life Skills pilot evaluation system and conducted youth self-reported evaluations on youth development programs offered through ISUE 4-H directly to youth. The TLS Model provides a format incorporating major points of youth program planning. This is the second year data has been gathered to show the impact of Iowa 4-H programs on the development of youth. There were 124 individual consultations, 918 groups meetings, and 169 professionals and volunteers were trained on the model and evaluation process.

- Youth development needs assessments: There were 182 individual consultations and 529 individual and group meetings concerning needs assessments. Staff were also involved in transferring information about the process of creating youth development needs assessments in the form of 333 individual consultations, 960 group meetings, and 292 professionals and volunteers involved in training.

- ISUE 4-H Youth Development professionals gathered information, research, and up to date pedagogy methods to increase capacity among internal and external audiences through individual consultations and group meetings.

- 1336 adults were trained on ages and stages, 413 on youth behavior statistics, 1654 on the Search Institute Asset model, 1549 on Circle of Courage youth development model, 586 on Youth as Partners and 1935 on the Critical Elements of youth development. Staff also trained other professional staff and volunteers on these models –744 (could be duplicates).

- In collaboration with the Iowa Division of Criminal and Juvenile Justice ISUE 4-H is engaged in the effort of increasing awareness of the disproportionate number of minority youth in confinement to such groups as the Iowa law enforcement.

- Planning was conducted for a statewide youth development conference to be held in November, 2000. Components of the agenda include: statewide youth development research conducted by the Iowa Department of Education, research on creating vibrant youth programs, tools and techniques for working with youth, experiential education, risk management, etc.

- Staff and volunteers delivered a number of high profile youth development programs to youth including: 4-H Challenge – 1514 youth; Boomerang – 3030 youth; Strengthening Families – 1380 youth; Talking with TJ – 1386 youth; Girl Talk/Guy Talk – 498 youth.

- Funding was secured for the Governor's After-School Initiative funded directly by the Governor's discretionary funds to 15 Extension After-School Youth-at-Risk programs. Sites were set up and personnel trained.

- A statewide youth leadership institute was piloted.

ISUE 4-H participated in the Iowa Youth Development Collaboration, a statewide gathering of youth agencies and organizations committed to promote positive and community youth development throughout the state.

b. Impact:

- As evidenced by the pilots conducted in all 100 counties on the Targeting Life Skill Evaluation, youth believe they are learning how to become better team members, developing leadership skills, learning the value of community services and are gaining skills to make them prepared for the future. These were the types of responses obtained after youth participated in Boomerang, 4-H Challenge, and Talking with TJ.

- By conducting needs assessments, staff influence the quality of life of community members including youth. In Marion County, a youth alliance advisory council was formed to help provide safe and nurturing programs for youth in the community. In Grundy County human service providers, including Extension provided meaningful activities for youth after athletic events to create safe environments for local teens.

- County Extension staff received more than $750,000 in local monies to fund youth programming in the 1999-2000 fiscal year.

- The Iowa Youth Development Collaboration had success in developing a common youth development language and working to simplify grant planning and funding processes. Being a part of the Collaboration has resulted in ISUE 4-H receiving at the disproportionate minority youth in confinement (DMC) contract and partnering with several other youth organizations.

- Linkages exist with 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, Iowa State Dept. of Education, Area Education Agencies, Private Family and Youth Agency Providers, CAP Agencies, and Iowa StateDHHS/Decat.

c. Source of Federal Funds – Smith-Lever 3b & c

d. Scope of Impact – State Specific

Key Theme – Out-of-School Time

a. Description of activity

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

- Twenty-two counties reporting involvement in out-of-school time programming. Programs in these counties have involved over 3100 youth.
- Counties report that the 4-H Youth Development staff participate in partnerships or collaborations in nineteen of these counties.

b. Impact:

- Youth will have gained significantly in the appropriate life skills as indicated by the life skills evaluations, and, ISU Extension 4-H Youth Development will be identified as a key resource for communities with this identified need.

  Examples of life skills evaluated include; listen carefully to what others say, follow instructions as given, interested in learning, ask questions to get information they needed, observe more closely what is happening, learn to share with/help others in the group, listen when others are talking, etc. The life skill evaluations indicate the following: 88% indicated the camp helped them learn to be more interested in learning; 81% indicated they learned to ask questions to get the information they needed; 93% indicated they learned to listen carefully to what others said; 93% indicated they learned to follow instructions as they are given to them.

- 4-H Youth Development being identified as a key resource for communities is indicated with the following examples: The County Extension Council identified programming in out-of-school time as a priority and financed these community programs; three community collaborative efforts continue with the County Extension Education Director providing coordination of these groups; due to the efforts of the County Extension staff the community youth and families task force has received over $120,000; and the County Extension Education Director was asked to work with the community in developing a five year youth and families plan for the city.

- At the state level the 4-H Youth Development Program has received over $490,000 in state and federal funds to coordinate and manage out-of-school time programs for three other state agencies.

c. Source of Federal Funds – Smith-Lever 3b & c

d. Scope of Impact – State Specific

Key Theme – Science and Technology Literacy

a. Description of activity

This plan of work focuses on improving science and technology literacy of American students through experiential activities within and outside the school classroom.

- Providing teacher workshops in five Area Education Agencies and planning to be in seven AEA's in 2001 has given 4-H an opportunity to be a presence in schools all over Iowa.

- At the 2000 Iowa State Fair, with the assistance of several Youth Field Specialists and members of the Iowa Youth Technology Team, a science activity was conducted with 3,500 fair attendees. This activity helped promote the E-SET website to families and other community groups.

- The Iowa Youth Technology Team continued to expand its programming role. Supported by a grant from Rockwell International, team members were workshop facilitators at the National 4-H Technology Conference in D.C., Iowa 4-H Youth Conference, and organizers of five Teens Teaching Technology to Senior Citizens Workshops around the state.

- A $20,000 grant was received from the Iowa Corn Growers Association for development of a 4-H Biotechnology Project Manual. This is a two-year project with release scheduled for the spring of 2002. The Extension Biotech Team is working with the Iowa State University Office of Biotechnology in development of activities and materials.

- The Elementary Engineering – Bridge Design curriculum and materials is a joint project between the College of Engineering and 4-H Youth Development. Bridge Design Kits and training has been provided to all seven areas of extension.

- E-SET continues to provide science experiences for K–12 youth and Iowa educators through sponsoring elementary science programs on Iowa Public Television and partnerships with the Iowa Space Grant Consortium. Grants were awarded to six formal and two non-formal educators to pursue opportunities to improve science education in their areas.

- E-SET curriculum presentations were provided to Iowa Science Teachers Section, Regional Science Teachers Conference, National Science Teachers Conference, National 4-H Youth Technology Conference, National Association of Extension 4-H Agents, National Biotech Symposium, and Iowa 4-H Youth Conference.

- Youth reached through E-SET educational programs include:

Aerospace & Aeronautics	4,633
Biotech Education	5,676
Engineering & Technology	4,614
Physical Science	1,630
Assorted Camps	3,282

b. Impact:

- One Iowa Youth Technology Team member was chosen to be a member of the National Youth Technology Team. This youth has facilitated workshops in Washington D.C., Nashville, Denver, Minneapolis and Ames. She has also conducted a press conference at the National Technology Conference, helped to redesign and build the National Technology Team Website and has been involved with a program through HICFA called Bridging the Digital Divide.

- Youth reached through E-SET educational programs include:

Aerospace & Aeronautics	4,633
Biotech Education	5,676
Engineering & Technology	4,614
Physical Science	1,630
Assorted Camps	3,282

- E-SET training video has been produced and sent to all fourteen Area Education Agencies and five major local education contacts in Iowa.

- E-SET curriculum and materials are being used in after school, school enrichment, home school areas as well as summer library programs.

- Using recommendations from the Advisory Committee, formal educators and ISU Extension staff, the E-SET web site has been redesigned.

c. Source of Federal Funds – Smith-Lever 3b & c

d. Scope of Impact – State Specific and National Conference presentations

Key Theme – Strengthening Volunteer Development

a. Description of activity

One of the primary ingredients of a successful and thriving 4-H Youth Development Program is a well-trained volunteer work force. The performance goal of enhancing and expanding the roles of volunteers to initiate a comprehensive volunteer management system in their counties is the focus of this plan of work.

- Based on Extension staff needs, new volunteer recruiting resources were designed following the theme, “Become a 4-H Volunteer Do it for Youth, Do it for You.” Products included: One large display (for malls), small display for county display panels, and an accompanying brochure.

- Presentations at Governor’s Conference on Volunteer Service delivered by ISU Extension staff and youth from the State 4-H Council included: Showcase of Iowa’s

Promise … Our Youth, Youth Leadership in Community Projects – Where to Start, and Involving Youth as Decision Makers; Supporting Youth/Adult Partnerships.

- 170 4-H leaders attended the East Central Area 4-H Leader's Conference sponsored by Hills Bank.

- 67 adults attended the State 4-H Leader's Retreat at the Iowa 4-H Education and Natural Resources Center near Madrid with theme, 4-H Opening the door … to the 21st Century. Planning and teaching for the retreat is done through an extension staff and 4-H leader partnership.

- 203 4-H Horse Project Leaders participated in a two-night ICN training designed to share new educational resources and to strengthen local horse project meetings and workshops.

- Number of adult and youth volunteers trained through 4-H as reported through the Annual Statistical included: 2,168 youth; 4,042 adult volunteers; 539 other adults; on the topics of leadership, parenting and other.

- 1277 school teachers, extension staff, Master Gardeners, education program leaders attended 1 to 6 hour workshops/training on Growing in the Garden

- 200 educators were trained seven 6 hour workshops on 4-H Fish Iowa, a new educational resource designed through a collaborative effort with the Iowa Department of Natural Resources Aquatic Education Program, County Conservation Boards, county extension offices and ISU Extension campus 4-H and Animal Ecology Department faculty, for volunteers to increase the number of youth and families enjoying the out of doors.

- Specialized training on youth development topics provide volunteers and professional staff with information on subject matter and best practices. These figures represent a duplicated audience.

Youth Development Foundations	1034		
Youth Development Research & Application		956	
Youth Development Assessment & Process Planning			780
Cognitive/ Creative Life Skills	804		
Personal/Social Life Skills	118		
Health/Physical Life Skills	708		
Vocation/Citizenship Life Skills		638	

b. Impact:

- 16,479 youth and adult volunteers serving community 4-H clubs, special interest groups, camping and school enrichment programs were reported on this year's statistical.

- The National Association of Extension 4-H Agents selected the new volunteer recruiting package as a regional award winner.

- Nine federally funded VISTA workers addressing the America Reads program in 8 Iowa counties, recruited 1229 volunteers, contributing 5,302 hours of service. 1,530 youth were enrolled in the Literacy Book Bag program and 257 involved in tutoring activities. Two significant impact statements secured through evaluations are: "We are starting a meeting Tuesday and will continue each week." "We have limited our kids activities for more family time."

- In an effort to encourage local youth groups to partner with another community group to plan and carry out a community service project, $5,000 was granted by the Iowa Commission on Volunteer Service to ISU Extension 4-H to administer this new program. Forty requests were received with 22 grants funded. An additional $59,582 was contributed by community agencies/groups and involved a total of 1496 volunteers.

- 45 high school age youth from across Iowa serve on the state 4-H council. As the result of special skill training and setting ambitious goals they created a brochure on Beyond the County Opportunities, helped facilitate group team-building activities at state 4-H conference, increased participation at the conference to over 950 delegates, and were workshop presenters at the Governor's Conference on Volunteerism, a regional school-to-work conference, and an out-of-state 4-H conference.

- After several years of leadership skill training by Extension Specialists, the Sioux City Mayor's Youth Commission has grown to 126 high school age youth. Selected Commission accomplishments include: developed a unity tree in the downtown area; United Way day of caring; recruited volunteers for three United Way youth serving agencies that resulted in a savings of $1300 in maintenance and upkeep for these agencies; provided the City Council with feedback on a proposed skate park; and created a Youth Leadership Forum for 96 8th grade youth.

c. Source of Federal Funds – Smith-Lever 3b & c

d. Scope of Impact – State Specific

Key Theme – Urban Youth

a. Description of activity

According to the Iowa Department of Education statistics, 38% of the school age youth live in the seven designated urban counties. Urban is considered a setting rather than a program or way of delivering programs. A concentration on issues concerning diversity will continue to be a focus for this three-year plan.

- Increase by approximately 3000 youth in special interest programs. Examples include: Polk county 300 youth in Computer connections, Scott county 160 youth in evening treatment program for drug and alcohol abuse, Linn county 250 youth were involved in science and art programs, Dubuque county had 250 youth in science education, and Black Hawk county 250 youth in a first offenders program.

- Increase of youth and community awareness about diversity. The “Invent” curriculum was purchased for each of the seven counties. In Linn county 268 youth were involved with the program.

- In all seven counties coalitions have increased with extension and school districts, libraries, and other youth serving agencies. This networking effort has increased grant dollars, and shared programming dollars from state agencies.

- Davenport Youth Fest –Scott County Extension youth staff also cooperated with several other community agencies, businesses and other groups and individuals to plan, promote, and host the Davenport Youth Fest this past summer. This event grew out of efforts to support the America’s Promise and the Iowa Summit on Volunteerism in 1998. The Davenport Youth Fest has continued to be an annual event since 1998. Over 1200 youth attended this half-day event this year. The theme “Youth Fest, World 2000” focused on appreciating the diversity in the world. Carnival games, face painting, crafts, and learning were all included in this busy fun-packed morning of hands-on activities.

b. Impact:

- From the 250 in the first time offenders program: 90% indicated the program helped them learn to consider the consequences of decisions; 98% said the program helped them learn to be responsible for their own actions. and 98% said the program helped them learn to respect the rights and property of others.

- From the invent curriculum: Staff noted that there was a higher mix of ethnic participants at the sites where this was offered. They were looking for ethnic role models. By the end of the summer a youth program switched to a family program. Youth were teaching the adults concepts. Adults were asking for more information about George Washington Carver.

- Disproportionate Minority confinement project: The DMC coordinator has been successful at getting additional training time on the subject for law enforcement personnel at the Iowa Law Enforcement Academy Training center. DMC web site has been developed to provide information and resources to those interested. Due to contacts made with communities other than Des Moines, the contract from CJJP has been renewed for a second year.

- The following results were reported in a 4 month follow-up evaluation for the Tools for Leadership program (16 participated in the program, 5 completed the follow-up survey. Of those 5: 4 youth indicated they learned to always accept opinions different than their own. One indicated they usually did. Three reported they learned to value the contributions of others and two reported they usually did. Five reported they learned to be friends with people unlike themselves. Five reported they had taken new leadership roles in school, church or community group.

c. Source of Federal Funds – Smith-Lever 3b & c

d. Scope of Impact – State Specific and the Davenport Youth Fest involved Illinois youth

B. Stakeholder Input Process:

1862 Research:

a. The Iowa Agriculture and Home Economics Experiment Station (IAHEES) undertakes a wide range of actions to seek stakeholder input and make it an on-going process that encourages participation. These actions occur on many levels within the AES and take many forms, both formal and informal.

   At the administrative level, the dean of the College of Agriculture and director of IAHEES has an external advisory committee, composed of Iowa producers representing the gamut of production interests, that formally encourages participation by stakeholders. In the past nine months, the dean/director has hosted day-long sessions at five locations in the state to reach out to local stakeholders and invite their comments and questions during open question and answer periods. The college and AES administrators also attend and interact with numerous outside organizations and commodity groups on a regular basis to provide information and solicit comments and ideas for consideration. This routine interaction assures traditional farm organizations of input and participation in various institutional funded initiatives. In addition, it helps to focus administrative awareness on key and developing issues facing large segments of ag producers and agribusinesses.

   Heads of the various departments and centers affiliated with the AES also are actively engaged in seeking stakeholder input and participation. Almost every center within the AES (see list) has an external advisory committee to promote engagement with their respective audience. For example, the Leopold Center for Sustainable Agriculture is composed of an Advisory Board of Directors, of which producers, state agency personnel, Iowa private universities, Iowa agribusiness and Iowa State University are represented. Department heads and center directors meet with numerous stakeholder organizations through the course of the year and solicit input. For example, the head of the Department of Agronomy may regularly attend producer meetings and receive weekly calls from various organizations and citizens to share concerns or suggest department actions.

   The widest base of stakeholder input and activity is with the faculty and staff, particularly those who hold an extension appointment. At literally thousands of meetings in the state, faculty and staff receive feedback from stakeholders on issues and concerns facing local producers and agribusinesses. Furthermore, faculty and staff log thousands of calls and emails from producers and citizens seeking to comment on college and AES programs.

b. Using the 80-page Iowa Department of Agriculture and Land Stewardship's annual "Iowa Agricultural Organizations," the AES administration has identified all Iowa-based groups that work publicly towards goals related to Iowa agriculture and interacts with every group at some level. These groups are diverse and include commodity-based organizations, non-traditional farmer organized groups, state agencies, community organizations, and

environmental groups. Individuals representing these groups comprise the general pool of participants that are invited to participate in formal and informal needs assessment efforts.

In addition, the AES works with the Iowa Department of Economic Development and the many partners identified on the Department's web page.

c. Input from stakeholders is used to augment AES, departmental and center program priorities. Stakeholder input is represented in the goals established in our Plan of Work. Stakeholder input is also used on a regular basis to determine what research efforts will be funded by the AES and various units and to develop educational curriculum and delivery methods.

d. Interactions with external groups:

Input is continually received through various external advisory councils and boards.

- Relevant colleges with external advisory committees:
  - College of Agriculture
  - College of Veterinary Medicine
- Departments with external advisory committees:
  - Agricultural and Biosystems Engineering
  - Agricultural Economics
  - Agricultural Education and Studies
  - Agronomy
  - Biochemistry, Biophysics and Molecular Biology
  - Horticulture
  - Textiles and Clothing
- Centers with external advisory committees:
  - Brenton Center for Agricultural Instruction and Technology Transfer (internal advisory board)
  - Center for Designing Foods to Improve Nutrition (internal advisory council; external advisory board being formed)
  - Center for International Agricultural Finance (advisory board being formed)
  - Food Safety Consortium (steering committee of university, government, and industry representatives)
  - Iowa Pork Industry Center (ad hoc internal advisory committee plus an external advisory board)
  - Leopold Center for Sustainable Agriculture (external board of directors)
  - Midwest Agribusiness Trade Research and Information Center (advisory board with both internal and external members)
  - National Soil Tilth Laboratory (advisory board under the USDA Advisory Committee)
  - North Central Regional Aquaculture Center (advisory board (academicians) and an industry advisory council (aquaculturists) consisting of members throughout the North Central Region, also a technical committee consisting of researchers and extension specialists)

- North Central Regional Center for Rural Development (board of directors consist of internal and external members)
- North Central Regional Plant Introduction Station (consults with the NC-7 regional technical advisory committee, plus seeks advice from 11 different national crop germplasm committees)
- Seed Science Center (an internal and an external advisory board)
- Institute for Social and Behavioral Research (public policy advisory board consisting of internal and external members)

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. Thus, the following stakeholder organizations have a regular opportunity to provide input:

- Adams Community Economic Development Corporation
- Adams County Rural Development Committee
- Ajinomoto
- All Iowa community colleges
- Alta School District
- American Society of Animal Science
- American Meat Science Association
- Ames High School Environmental Group
- Ames Waldorf Association
- Bethesda Lutheran Church
- Book Family Farms
- Buena Vista County Hospital and Board of Supervisors
- Calkins Nature Area
- Cargill
- Cedar Rapids *Gazette*
- Central Iowa Regional Planning Board: School-to-Work Partnership
  - Clarion-Goldfield Schools
- Coalition of Ag Image Promotion
- Committee for Agricultural Development
- Corning Future Farmers of America
- County Youth Council
- DeKalb Swine Breeders
- Denison Job Corps
- Des Moines Public Schools (Urban Campus)
- Dunbar/Jones Partnership, Landscape Architects
- Economic Development Center
- Evangelical Lutheran Church in America
- Fairfield Chamber of Commerce
- Federal Bureau of Apprenticeship and Training
- First National Bank
- Fort Dodge Animal Health
- Grand Laboratories
- Green Hills Produce and Craft Association
- Growing the Future
- Guthrie Center High School
- Harlan *Tribune*
- Heartland AEA
- Heartland Resource, Conservation, and Development
- Heartland-Lysine
- HyVee Foods
- IBS
- I-CAN Americorp
- ICI Seeds
- Indianola Learning Center
- Institute of Food Technology
- Iowa 4-H Foundation
- Iowa Agribusiness Association
- Iowa Agriculture Awareness Foundation
- Iowa Association of Alternative Education
- Iowa Association of Business and Industry

- Iowa Association of Soil and Water Conservation District Commissioners
- Iowa Beef Industry Council
- Iowa Broadcaster's Association
- Iowa Cable Television Association
- Iowa Cattlemen's Association
- Iowa Comprehensive Human Services
- Iowa Corn Growers Association
- Iowa Corn Promotion Board
- Iowa Crop Improvement Association
- Iowa Dairy Products Association
- Iowa Department of Agriculture and Land Stewardship
- Iowa Department of Economic Development
- Iowa Department of Education
- Iowa Department of Natural Resources
- Iowa Economic Development Commission
- Iowa Egg Council
- Iowa Falls Community High School
- Iowa Farm Bureau Federation
- Iowa FFA Foundation
- Iowa Health Systems
- Iowa Network for Community Agriculture
- Iowa Newspaper Association
- Iowa Newspaper Foundation
- Iowa Pork Producers Association
- Iowa Poultry Association
- Iowa School-to-Work Office
- Iowa Sheep and Wool Promotion Board
- Iowa Soybean Association
- Iowa Soybean Promotion Board
- Iowa State Dairy Association
- Iowa State Horticultural Society
- Iowa State University Agricultural Foundation
- Iowa Student Environmental Coalition
- Iowa Turkey Federation
- Iowa Vocational Agriculture Teachers Association
- Jefferson County Board of Supervisors
- Jefferson County Farm Service Agency
- Jefferson County Natural Resources Conservation Services
- Jefferson County Soil and WaterConservation District
- Jefferson-Scranton High School
- K.E. Johnson Consultants
- Keystone Laboratories
- Kinsey Elementary School
- Labor Institute for Workforce Development
- Magic Beanstalk CSA
- Marriott Conference Center
- Mason City *Globe-Gazette*
- Maytag Foundation
- Metz Baking
- MidAmerica International Agricultural Consortium
- Mid Iowa Community Action
- Moravia High School
- Moulton Elementary School
- National 4-H Council
- National Animal Disease Center
- National Catholic Rural Life Conference
- National Soil Tilth Laboratory
- Neighborhood Advisory Board
- Newton Basics and Beyond Alternative High School
- Northminster Presbyterian Church
- Northwest Iowa Drug Treatment Unit
- Ottumwa High School
- Paton Churdan Community Schools
- Pfizer Animal Health
- Pharmacia & Upjohn, Inc.
- Pioneer Hi-Bred International
- Pocahontas Area Community Middle School
- Practical Farmers of Iowa
- Presbyterian Hunger Program
- Radio Station KDAO
- Regional School-to-Work Districts
- Roquette America
- Rural Family Program

- Sibley-Ocheyden High School
- Sierra Club
- Sigourney High School
- Sioux Central High School
- Sioux City Judicial District Juvenile Justice
- Siouxland Animal Hospital
- Southeast Iowa Organic Producers Group
- Southern Cal Community School
- Southern Iowa Ag Diversity Corporation
- St. Luke's Regional Medical Center
- St. Patrick Grade School
- Storm Lake Chamber of Commerce
- Storm Lake Middle School
- Storm Lake Public Schools
- Storm Lake School District
- *Successful Farming*
- Target Alliance for Workforce Development
- The People Place
- United Church of Christ Congregation
- United Environment Fund
- University of Iowa
- University of Northern Iowa
- US Department of Labor
- USDA Natural Resources Conservation Service
- USDA Rural Economic and Community Development
- VetSmart
- Wallace Foundation for Agricultural Research and Development
- WCW Consortium Schools
- Western Iowa Tech
- Whink Products
- William Penn College

Extension:

a. Iowa State University Extension undertakes a wide range of actions to seek stakeholder input and make it an on-going process that encourages participation. These actions occur on many levels throughout the organization, both formal and informal.

   At the administrative level, the Vice Provost for Extension has an external advisory committee that formally encourages participation by stakeholders, composed of Iowa interests associated with families, youth, communities, agriculture and business. In addition, the Vice Provost has hosted/participated in day-long sessions at locations in the state to reach out to local stakeholders and invite their comments and questions during open question and answer periods. The program directors and Area Directors also attend and interact with numerous outside organizations and commodity groups on a regular basis to provide information and solicit comments and ideas for consideration. This routine interaction is inclusive and participatory and invaluable on developing issues.

   Each of the state program plan of work committees routinely involve stakeholders and participants in designing activities, and in reviewing outputs and outcomes associated with those efforts. At the county level, county extension councils meet monthly to review program efforts, provide input and help keep needs of citizens in front of staff.

   The widest base of stakeholder input and activity is at the field level. At literally thousands of meetings in the state, faculty and staff receive feedback from stakeholders on issues and

concerns facing Iowans. Furthermore, faculty and staff log thousands of calls and emails from Iowans seeking to comment on Extension programs.

b. Within the Extension organization, each educator is charged with responsibility of needs assessment and stakeholder identification as part of the ongoing program planning process. Staff receive training regularly in a variety of needs identification methods, as well as stakeholders specific to the needs. Through statewide plan of work committees and with the help of Extension councils at the local level and administrators throughout the organization, Extension staff reach out to a wide group of stakeholders, as identified and reported on in our narratives.

   Input from stakeholders is used to augment Federal, State, and locally identified program priorities. Stakeholder input is represented in the goals established in our Plan of Work. In addition, stakeholder input is used on a regular basis to determine research efforts, educational curriculum and delivery methods.

   Iowa State University Extension staff are active in providing technical assistance or in partner relationships with organizations and community groups that conduct broad based needs assessment and asset mapping for their planning needs. For example, the CD-DIAL project conducts more than twenty such projects annually. Statewide needs assessments are collaboratively done with organizations ranging from agriculture commodity groups to human service agencies. In FY 2000, ISU assisted the Governor's strategic planning council in conducting a state of Iowa strategic plan. Products of these efforts were regularly used by appropriate program planning committees.

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c. Program Review Process:

The review process has been revised to more closely follow AREERA regarding which activities require merit review and which require scientific peer review. Specifically, treatment of Hatch projects has been differentiated so that while multistate Hatch projects undergo scientific peer review, regular Hatch projects undergo merit review. The revised program review process is provided below:

a. Merit Review

   Extension (unchanged)

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.

Research – Regular Hatch

All regular Hatch projects undergo a merit review. The head of the submitting department 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 but are not directly involved in the project. 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.

b. Scientific Peer Review

All projects funded under the Hatch Act of 1887 Multistate Research Fund undergo a scientific peer review. Reviews are conducted at the regional level by administrative oversight committees, the multistate research committees, and the experiment station directors prior to submission to the CRIS office for final approval.

d. Evaluation of the Success of Multi and Joint Activities:

1) Did the planned programs address the critical issues of strategic importance, including those identified by stakeholders?

The planned programs were based on input from stakeholder groups and scientists who identified the most critical issues. In many cases, stakeholders are involved in the implementation of applied research efforts and educational/demonstration programs. In other situations, stakeholders through their commodity groups, provide additional funding to address issues of strategic importance.

2) Did the planned programs address the needs of under-served and under-represented populations of the state?

Examples of work with underrepresented and underserved groups: In general, all research programs have a multicultural group of graduate students.

- Program 1 is providing input on redeveloping the Iowa grape industry, is assisting new and potential grape growers by disseminating production and management information, and is cooperating with the newly formed Iowa Grape Growers Association. Field extension personnel were trained in viticultural site selection and establishment practices during in-service field training, and an interdisciplinary team of faculty in plant pathology, horticulture and entomology provided strategies for pest management in a grape and small fruit pest management guide.

- Program 12 works with existing commodity organizations 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. This program also assists Iowa producers of more exotic species such as llama, ostrich, fallow deer, and pheasant.

- Programs 19 and 20 on sustainable and organic agriculture

- Program 21 collaborates with the Zuni Indian Tribe in New Mexico. This program also compares the impact on soil of conventional versus Amish farming practices.

- Program 22 has worked with strawberry growers to sample for and identify flower thrips (*Frankliniella tritici*) and tobacco thrips (*F. fusca*) as the two insect species believed to have caused significant levels of damage to fruit in 1999. Identification of the insect species is the first step in IPM.

- An ongoing and long-term project in Program 27 estimates residents by race and Hispanic origin. This program is also gathering information necessary to reach out to women landowners.

- Program 109 provided assistance to three groups of dairy clients: a Jewish dairy farmer developing the ability to have his dairy's milk processed into Kosher cheese, and Mennonite and Old-Order Amish populations.

- Program 145 has a number of extension farm safety materials being developed in non-English formats to reach a broader audience.

The following examples provide support to the fact that ISU Extension is committed to working with traditionally underserved and underrepresented populations, and in doing that works closely with researchers at ISU and across lines in multi state efforts:

- **Universal Design and Home Accessibility:** ISUE working with ISU researchers continue strong programming efforts in universal design and home accessibility. Interactive housing exhibits at home shows and fairs, home planning workshops, teaching kits with assistive devices, and site visits to AgrAbility families were used to help people plan homes with universal design features and make their homes more convenient and comfortable after experiencing a disability. Target audiences included elders, people with disabilities, health care workers, and builders.

- **Healthy Home Housing Project:** A contract between ISUE, Polk County, and the Polk County Department of Public Works funded a four-year effort to reach low-income residents of Saylor and Delaware townships, and the village of Norwoodville. Many households lived in housing that needed structural repairs, especially safety and health improvements. An Extension educator using research based information made three home visits to each home each year, to deliver home maintenance information, self-study materials, and assist with problem solving and group workshops. Topics included carbon

monoxide and radon, household hazardous waste disposal, and other indoor air quality issues.

- **Infant Care in Warren County:** There is a 49% gap in the child care supply. The Warren County Empowerment Board received TANIF funds to increase the availability and quality of child care. Funds increased the hours of home visits with providers to present training and activities with the children in their care. Funds also assisted with mini-grant projects for family day care providers to; became Child Net Certified, complete ten hours of training, become state registered, join the food program and/or expand care. And for centers to: complete self evaluation and set goals and objectives for improvement, complete a training plan, and/or expand care. The program also allowed for the purchase of equipment. Families in transition with medical emergency, job search or job change, and met the income guidelines were eligible to receive a scholarship for four weeks of child care.

- **Dubuque's PATH (Pathways Affordable to Homeowners) Program:** In Fall 1998 the Dubuque (IA) Housing Trust Committee received a $350,000 Federal Home Loan Bank grant to help low-income families purchase a home. The PATH (Pathways Affordable to Homeowners) Program provided grants to help with the down payments, closing costs and repairs. All families applying for the PATH grants completed a 6-hour homebuyer workshop and received 4 hours of individual financial counseling sponsored by Iowa State University Extension (ISUE). More than 180 individuals completed 6-hours of education. Thirty-nine families purchased homes with the help of PATH grants and over $238,000 of personal funds for down payments and closing costs. Homes worth $2.5 million were sold to PATH families with $1.9 million in mortgages written by local lenders. The 39 PATH families received 150 hours of individual financial counseling provided by ISUE. A survey of 93 homeowners who had received money from the City or attended the educational workshops, indicated: 67% of the PATH respondents reported making at least one behavior change, 62% reported starting a reserve savings account for future housing expenses, 82% of the PATH families reported that budgeting and record-keeping was the most helpful part of the financial counseling sessions.

- **Financial Literacy Workshops for Individual Development Account (IDA) Participants: "Iowa Saves":** "Iowa Saves" is a federally-funded initiative to boost participation in the state's Individual Development Account (IDA) program. "Iowa Saves," administered by the non-profit Institute for Social and Economic Development (ISED), added to metropolitan IDA sites and provides technical support to existing IDA programs. IDAs are matched with state and federal funds up to $4,000 for the purposes of education, homeownership, or a business startup. ISED contracted with Iowa State University Extension to teach a series of financial literacy workshops for IDA participants at the new Des Moines (Polk County) site. The Purdue Extension curriculum "Making Your Money Work" was used to develop a four-session series totaling 8 hours of instruction on basic money management. Three workshop series have been offered and a total of 43 IDA clients have completed the series. This includes a series specifically targeted to refugees. Pre- and post-evaluations indicate significant learning occurred in the following areas: How to develop a spending plan and track spending; ways to save

money and cut expenses; the cost of using credit; and the importance of paying bills on time. Participants also felt more confident in handling money.

- **Money Management Education for Latino Audiences:** Storm Lake (Buena Vista County) has a growing Hispanic population, drawn to the community by employment opportunities in meat and poultry processing plants. ISUE offered a series of four one-hour money management workshops in coordination with English as a Second Language (ESL) classes. Local volunteers provided translation services and print materials in English and Spanish were used to teach goal setting, record keeping, budgeting, credit and banking services. Forty-five Spanish-speaking residents attended the Latino Money Management series. Participants demonstration of many basic concepts and plans to implement new management strategies. They also discussed ways to share information, such as rent-to-own costs, with others who are new to the country and the Storm Lake community. Participants, translators and the ESL instructors expressed interest in repeating the workshop series.

- **Financial Management Classes for Microenterprise Owners:** The non-profit Institute for Social and Economic Development operates the Microenterprise Training Program which gives participants the opportunity to learn how develop a business plan and manage as a new business owner. Approximately 42% of the businesses assisted by the program are owned by welfare recipients. Iowa State University Extension partnered with ISED to provide personal finance classes as part of the training program. End-of-meeting evaluations were completed by 62 of the 82 participants; 90% plan to consider needs and values before making financial decisions, keep track of expenses, and reduce costs. Over 80% plan to set financial goals, develop and follow a spending plan, set aside money for emergencies and occasional bills, use credit wisely, reduce debt, and talk with family members about money. Businesses started as a result of the program include: a news source serving the African-American community, licensed in-home child care, home cleaning and lawn care.

- **EFNEP and FNP staff increasing teaching of culturally diverse families:** Through program statistics available through EFNEP, over the past four years Hispanic participation has increased from 8% of total participants to 15% of total participants. African-American participation is currently at 12% and Asian participation is 4%. As the cultural diversity of nutrition education audiences have increased, paraprofessional staff have increasingly asked for more resources and inservice training to help them become familiar with different cultures and how to adapt nutrition education to reflect the foods that are common to different cultures. Four projects were carried out to help staff become more culturally competent. a) Joanne Ikeda was featured as the keynote speaker for the EFNEP/FNP Nutrition Education Conference to discuss “Culturally Relevant Approaches in Nutrition Education.” b) A 2 ∏ hour “cultural foods tour” took place during the conference, and included stops at a Latino market, two Bosnian supermarkets, an Asian market, and a tortilla maker. c) A cultural food demonstration was given at the conference to show how foods are prepared in Latino, Asian, and Bosnian cultures d)A cultural foods photograph set to supplement Dairy Council food models for nutrition education is in development. The cultural foods photograph set will include 54 foods

common to the Hispanic, Asian, and African-American cultures in Iowa and will have an accompanying booklet descibing how to purchase, store, and prepare each of the foods. Evaluation data show that staff are more aware of other cultures and are developing skills to adapt nutrition education to different cultures.

- **ROWEL Poverty Simulation:** 561 Iowans participated in the ROWEL Poverty Simulation. Participants report an increase in their awareness of issues faced by low-income families. (October 1, 1999 - August 30, 2000)

- **State Strengthening Project Web (CYFAR):** The State Strengthening Project Web (CYFAR) is accessed an average of 2500 times each month to learn about and access resources related to building capacity to work with children, youth, and families living in at-risk environments.

- **Parenting for African-American families:** Our Families Life state extension specialist assisted in the development of a successful $3,126,000 proposal funded by the US Department of Health and Human Services to develop and test a parenting curriculum for low-income African-American parents and youth.

- **Family Development Certification Training:** ISU Extension to Families supported by the college Family and MarriageCouseling Center trained 123 family development in a 60 hour curriculum over a six month time period. Individuals completing the rigorous training are able to demonstrate the skills for using an empowering, strengths-based approach to working with families. The training is approved by the Iowa Department of Human Rights for employees that are funded through state appropriations for work with Iowa's most disadvantaged youth and adults.

- **Family Wellbeing and Welfare Reform Project:** More than 1,000 local, state and national leaders and policy makers participated in community forums, legislative hearings, and national conferences in which findings from the ISUE "Family Well-Being and Welfare Reform" project were presented. A project report was disseminated to a wide range of state and local community leaders and to scholars nationwide through the Family Policy that Works web site. Community leaders have used project findings to inform the design and to prioritize programs to meet the needs of low-income families with children. Findings from the project were shared in a Congressional Research Briefing on Rural Dimensions of Welfare Reform in June, 2000. The goal of the Congressional briefing was to inform federal policy makers who will shape re-authorization of the welfare reform law in 2002.

- **Transportation Options and Barriers Facing Iowa Families:** ISUE and an interdisciplinary team of campus researchers received $180,000 to design and implement a pilot survey to study the feasibility of linking state-level surveys with the federal Survey of Program Dynamics. The project examines the transportation options and barriers facing Iowa families who are entering the labor force and meeting the requirements of Iowa's welfare reform policies. Data collection is scheduled for early

2001 with findings disseminated to local, state and federal policy makers by September 2001.

- **Project Teamwork:** 15 teams of disabled consumers, family members, and service providers participated in a six-weeks pilot program called Project Teamwork to learn ways to work together to help consumers make better decisions about where and how they will live. Service providers and parents identified many ways consumers had increased their decision-making skills and requested additional workshops for other consumer teams in the future.

- **Rural Pastors Connect with Families:** Over 350 individuals participated in a collaborative effort sponsored by ISU Extension, USDA Agencies, and Ecumenical Ministries of Iowa to help rural pastors connect with assistance for their farm and rural family constituency, resulting to date in one community being funded with a rural development grant for sewage treatment.

- **Rural Mental Health:** About 40 Iowa rural leaders participated in a Governor's Summit on Rural Mental Health, which lead to ISUE involvement in an Iowa Department of Human Services block grant for training rural mental health professionals and volunteers in service delivery and referrals for farmers and rural families.

- **Life Skills Training:** 28 Iowa middle school teachers and counselors were trained in the second year *Life Skills Training* curriculum, supporting a research project from the ISU Institute for Behavioral Sciences. Those trained taught resistance skills to over 1200 Iowa 8th graders in 24 rural schools.

- **Welfare to Work:** Successful living skills improve both family and work life, and are all about self-confidence in ones ability to cope with life change and difficult situations. In the past program year, 126 participants attributed the following changes in their self-confidence to the *Building Resourceful Families* program used at several Promise Job sites:
  - I am confident to interview for a job + 32.4%
  - I feel good about myself + 37.3%
  - I feel responsible for the direction my life takes + 24.6%
  - I can better deal with problems at home + 42.8%
  - I plan and use my time effectively + 34.2%
  - I can develop a process for solving family problems + 41.4%
  - I feel positive about being a good parent + 22.2%
  - I keep track of how I spend money + 37.3%
  - I use the food guide in preparing meals + 27.8%
  - I can handle problems in my relationships + 31.8%

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

The planned programs developed specific outcomes that would occur over a period of five years. In some programs, outcomes and impacts have occurred in the first year but many impacts will occur throughout the five-year period and beyond. Under each Goal, specific progress towards the outcomes and impacts are documented.

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

At ISU, research and extension programs have had a historic and strong connection that increased the effectiveness of both programs. In most programs, the results of extension education and demonstration activities inform the research agenda while all extension education programs are research-based. Specific examples of the effectiveness of integrated programs are described under section F of this report.

· **Multistate Extension Activities:**

1. Midwest Plan Service

The Midwest Plan Service (MWPS) enhances the outreach, research, and teaching programs of the land-grant universities of the 12 states in the North Central Region by preparing and distributing educational materials that are based on the coordinated recommendations of the extension and research units of the participating institutions. These materials include, but are not limited to agricultural engineering and the interaction of engineering with other disciplines. Iowa Extension supported the multi-state work of MWPS through a payment of $22,248 during FY2000.

2. NELD

The National Extension Leadership Development Program (NELD) was created to enhance leadership in Cooperative Extension at all levels and to provide current and future extension leaders with the vision, courage, and tools to deal with a rapidly changing world. This program is a part of extension's overall national leadership effort. During FY2000, Iowa Extension supported the National NELD program with a payment of $3,687. There is also a NELD program supported by extension in the North Central Extension region. Iowa Extension has three staff currently participating in the North Central NELD Program. Expenses for these three staff amounted to $7,212 during FY2000.

3. North Central Regional Center for Rural Development

The North Central Regional Center for Rural Development (NCRCRD) is a cooperative program among the 12 states in the North Central Extension region. NCRCRD initiates and facilitates rural development research and education programs in the region. NCRCRD also provides regional and national leadership in rural development by identifying, developing and supporting programs on emerging issues. Iowa Extension supported the multi-state work of NCRCRD through a payment of $2,553 during FY2000.

4. Pork Industry Handbook

The Pork Industry Handbook (PIH) is a national project supported by state extension services. The project has published over 125 new and over 125 revised fact sheets using the services of over 800 authors and reviewers from 49 states as well as USDA. Versions of the PIH are available on CD-ROM. Iowa Extension supported the multi-state work of the PIH through a payment of $7,926 during FY2000.

5. Agriculture and Natural Resources Extension Program Director

   The State Director for Extension Agriculture and Natural Resources (ANR) programs in Iowa spent time during FY2000 on national and regional programs/activities. These activities included a small farm task force, sustainable agriculture (SARE), integrated pest management, pesticide applicator training, multi-state organic agriculture training, North Central Region pest management center, and general ANR program coordination among the state ANR program directors. This represented about 10% of the ANR Director's time, which was equal to $10,500 in salary during FY2000.

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

titution: Iowa State University
te: Iowa

eck one: _X_ **Multistate Extension Activities**
____ **Integrated Activities (Hatch Act Funds)**
____ **Integrated Activities (Smith-Lever Act Funds)**

	Actual Expenditures				
e of Planned Program/Activity	**FY 2000**	**FY 2001**	**FY 2002**	**FY 2003**	**FY 2004**
lwest Plan Service	22,248				
LD	10,899				
rth Central Regional Center for Rural velopment	2,553				
k Industry Handbook	7,926				
Prog Director (National & Regional Resp.)	10,500				
al	54,126				

_____ _____
Director **Date**

F. Integrated Research and Extension Activities:

Hatch Act Funds:

First, a correction is in order. In our plan for integrated activities for Hatch Act funds submitted August 1, 1991 as a supplement to our Plan of Work:

- the activities described and estimated costs for "Crop Production and Management" are actually for our "Plant Germplasm (Program 4)" program,

- the activities described and estimated costs for "Precision Agriculture" are actually for our "Crop Production and Management (Program 5)" program, and

- estimated costs actually total $476,673 for each of the five years.

A significant portion of our integrated activities is determined by participation of faculty with split (research/extension) appointments in multistate activities. Occasional adjustments are made in faculty appointments, and from time to time the Iowa representation on and participation in multistate activities changes. Thus, some unplanned movements in resources have and do occur. While the overall expenditure of resources for integrated activities meets our planned commitment submitted last summer, there has been some shifting among the various programs and activities.

Brief statements follow on the integrated activities funded from Hatch funds:

Food Crops (Program 1):

- Research showed that crop rotation with native prairie plants enhanced soil tilth and exhibited potential as an alterative to methyl bromide fumigation when rotating strawberry fields. Strawberry growers learned during extension-sponsored field days and conferences how to use cover crops, including native plants, to improve soil quality when rotating strawberry fields. Using cover crops will reduce the reliance on methyl bromide and enhance soil tilth.

- Field testing has shown strong interactions to exist between sites and rootstocks that emphasize the importance of localized testing. Plantings serve as a vital tool in Extension programming by allowing apple growers to observe how the rootstocks perform under local conditions and learn the new training systems used to grow the trees. By avoiding an improper rootstock selection, growers have saved from $3,000 to over $7,000 per acre in establishment costs. Several extension publications are produced each year based on the results of these field trials.

- A replicated field study documented that the presence of straw between rows significantly suppressed row-to-row spread of strawberry anthracnose fruit rot pathogen, *Colletotrichum acutatum*, but had no effect on fruit yield. Progress on these programs was reported to shareholders at four field days or other visits, two state, and three multi-state and two out-of-state conferences, published as research summaries in an extension publication.

Plant Germplasm (Program 4)

- Trials for 2000 were conducted for seven districts and included 580 hybrids from 64 brands. The Iowa Corn Performance Test was the 81st consecutive year that the test was conducted; hybrid performance data is provided to growers.

Crop Production and Management Strategies (Program 5)

- Research has provided valuable information on optimal row spacing, plant density, and planting dates. This information is disseminated through field days, crop clinics and workshops. Based on attendance at these functions and by the number of telephone calls and email messages received, Iowans are using this information to make informed decisions regarding their production systems.

- Research has identified unique emergence patterns of two weeds that permit these species opportunities to capture resources and escape management tactics. This information has been used to develop several popular extension bulletins, which have increased farmers' awareness of the importance of biological characteristics of weeds in determining the effectiveness of weed management tactics.

- Research results have contributed to an extension publication, *Soybean Replant Decisions*.

Green Industry (Program 7)

- Research results from 30 different studies, including such projects as species and cultivar trials, herbicide and growth regulators, turfgrass diseases, fertilizers, environmental research, and soil modification of sand-based systems, were presented at the 2000 Turfgrass Field Day at the Horticulture Research Station, Ames Iowa. The field day forum has been very popular and it allows for a free exchange of ideas between university faculty and turf practitioners. Over 500 Iowans participated in the field day, and recommendations presented in the written report (a 79-page 2000 Iowa Turfgrass Research Report, FG-466) and at the demonstrated research trials can be implemented immediately by the industry.

Improved Grazing Systems (Program 8)

- Research results showing that rotational grazing can increase the carrying capacity of pastures by as much as 33% and winter grazing of corn crop residues and/or stockpiled perennial forage can reduce winter feed costs by $75 to $150 per cow. To facilitate implementation of these practices, a forage budgeting computer spreadsheet to develop year-round grazing systems was distributed by extension personnel to select farmers. The summer grazing module of the spreadsheet accurately predicted forage production in the summer of 2000 in spite of drought conditions. This allowed the producers to manage summer forage so that no supplemental hay was needed during summer in spite of the drought As a result, they have excess hay to market.

Physiological Basis of Animal Reproduction (Program 9)

- Extension specialists from the upper midwest have formed a consortium that will interact with the NC-113 regional research project group pertaining to cattle reproduction. To demonstrate the collaborative nature of this group, 10 research abstracts and 3 extension abstracts derived from activities performed by members of this group will be presented together at the forthcoming 2001 Midwestern Section meeting of the American Society of Animal Science/American Dairy Science Association.

Genetic Enhancement of Agriculturally Important Animals (Program 10)

- The primary recorder of purebred swine in the United States is the National Swine Registry (NSR). This organization is responsible for the pedigree maintenance and genetic improvement program for the four major breeds of swine in the country: Duroc, Hampshire, Landrace and Yorkshire. Iowa is the state with the largest membership in the NSR. The national program for genetic improvement for the breeds of the NSR is the STAGES program. Iowa State University geneticists are in charge of the research, development and conduct of the STAGES program. In the latest 2000 National Sire Summary, Iowa purebred swine producers were the dominant state in production and access to the trait leader sires for the Yorkshire and Duroc breeds. Participation and success in this program has allowed purebred seedstock swine producers in Iowa to maintain a competitive advantage to purebred producers in other states. This is due in part to the leadership role of Iowa State University swine geneticists working with the STAGES program and the Iowa State University swine extension program through the Iowa Pork Industry Center.

- A major activity of the swine geneticists at Iowa State University is participation in TEAMPork. This is an interdisciplinary team of extension specialists, coordinated by swine geneticists, that is designed to assist Iowa pork producers in expanding and updating their operations through genetic and environmental improvements, consultations and development of business plans. Complete business plans have been developed for a total of 53 producers with the following economic impact: $36.5 million in total potential investment in Iowa Pork Industry , $ 77.6 million in estimated direct and indirect output from investments, creation of 296 jobs, creation of $11 million in direct and indirect personal income. In a 1996 survey, 83% of producers served would recommend TEAMPork to others. Also, 91% of producers served thought they were improved managers due to TEAMPork. The impact of TEAMPork was recognized when the team of specialists received the Team Award presented by the ISU College of Agriculture at the 1999 spring semester convocation.

Potential of Alternative Livestock (Program 12)

- Recent activities have primarily focused on aquaculture. A meeting of officers of the Iowa Aquaculture Association was hosted in January 2000. A survey was conducted of Iowa aquaculturists to determine producers' products and their business concerns. A manual for sunfish culture was completed, and a new research project on fish culture pond fertilization strategies and techniques was initiated. Contributions on topics of aquaculture and of bison and elk ranching were made to a university "think tank" on animal production. We also contribute to a regional aquaculture web page sponsored by the USDA North Central

Regional Aquaculture Center, and are preparing an alternative livestock web page for Iowa producers.

International Economic Competitiveness and Agricultural Risk Management (Programs 13 and 14)

- A one-day continuing education seminar was offered covering such major topics as new crop and revenue insurance programs for farmers, and how to select the right coverage for each farm business. Attendance was 206 agents and educators. Evaluations showed that participants felt more competent to assist their farmer customers with risk management decisions, and strongly desired that the seminar be offered annually.

- Research identified higher-risk LDP strategies and made this information available to producers through meetings, the internet, electronic news services, a CD ROM, and analytical software. The program provided training in evaluating risk bearing ability and development management strategies to limit risk exposure to acceptable levels. Through training, lenders were able to identify clients with limited ability to bear price/yield/LDP risks and higher risk strategies, and encouraged clients to take appropriate risk-management steps.

- The outreach component is a key element in the Center for Agricultural and Rural Development. Results from econometric research and policy analysis projects provide many insights and policy alternatives for agriculture and are used by policy makers at the national and state level, by trade associations, and by other entities involved in ag policy development. Research results and analysis are published in journals, and in ISU and other publications. Research faculty and staff address various conferences and meetings.

- The Food and Agricultural Policy Research Institute (FAPRI) prepares outlook and policy information on a regular basis. Several hundred industry specialists (from Industry groups, USDA, USITC, OECD, and Congressional staffers) attend FAPRI briefings and reviews (2 series a year). There were 2200 hits on the FAPRI web site between August and December 2000 alone looking at the world Agricultural Outlook. The entire site receives about 1,000 hits a month. Individuals obtaining outlook and policy analysis information are better able to make informed decisions concerning agricultural policy and which policies to support and oppose. The debate on farm policy is better informed because of the unbiased information provided by this analysis.

Agricultural Information Technology (Program 15)

- 1) Research and extension programs have been coordinated from the outset in that data collected has been used to improve program/course delivery and contributed to our knowledge of learning processes. 2) Several distance education and computer technology studies have been and continue to be conducted, with information fed back to educational program development. 3) Studies have centered on student learning about agriculture and education’s role in this process as it is related to our Teacher’s Academy and Pizzathon efforts.

- A large number of internship programs are conducted with county extension offices, high schools, and agribusinesses.

- Research was conducted to determine how signal noise (lack of precision in the collection of information) affects the optimal amount of information that should be collected in order to implement variable-rate fertilizer application systems. These results have been shared with extension personnel, field crop specialists, agronomists and agricultural engineers working for agricultural cooperatives and others to help them better understand why farmers may be reluctant to pay for more soil testing or soil mapping in the context of precision agriculture. They can now work to provide more accurate information about the true benefits of variable rate applications to producers. Researchers in agronomy and agricultural engineering have an increased incentive to reduce the noise to signal ratio of soil testing, yield monitoring, and mapping technologies.

- See also the Starlink item under the "Grain Quality" activity.

Food Safety (Program 17)

- Research developments on lactobacilli as a dietary supplement to pigs for the inhibition of salmonellae (resulting in healthier pigs and safer pork) have been disseminated through various printed and televised media.

- Technical support (knowledge and testing) is provided to several Iowa-based companies.

Improving Human Foods (Program 18)

- Research faculty serve in transferring research results: 1) Providing technical advice and recommendations regarding new equipment and interacting with plant employees regarding other aspects of operation from analytical procedures to seed selection and resources to a Kazakhstan oilseed processor. 2) Providing production and regulatory information about edible sprouts and the current regulatory climate to state inspectors for regulatory purposes. 3) Providing sensory testing services to enable researchers without expertise in or facilities for conducting these tests to include sensory evaluation studies as part of their research projects, and collaborating with a company to obtain more complete sensory profiles for its products than otherwise would have been possible.

Soil Resources Management (Program 21) and Sustainable Agriculture

- Research results from projects addressing such issues as adequate/excessive nutrients, application of agricultural by-products, and application of animal wastes in an environmentally sound fashion are being used in educational programs for clients. Clients include: County sanitarians in Iowa, Iowa crop producers, John Deere and Co., Ag Chemical Dealers, International Soil Tillage Research Organization, National Resource Conservation Service Subcommittee on Nutrient Management, North Central Regional Soil Survey Planning Conference, and University of Florida.

- Many small and medium sized family-based pork producers are looking for viable small-scale technologies that are environmentally sound and socially acceptable for producing pigs. Hoops are large, low-cost, tent-like structures that can be use to house pigs. An interdisciplinary team of scientists from animal science, ag engineering, economics and veterinary medicine partnered with the Leopold Center for Sustainable Agriculture to develop a research and outreach program to develop the small-scale technology. A focus group meeting of the researchers with 15 swine producers provided stakeholder input to identify nutrition, manure management, behavior, environment, health and economics as relevant research areas. A conference held in February 1999 was organized by the Leopold Center to address pig production in hoop structures and attracted 375 attendees. A second focus-group meeting was held in June 2000 to continue the engagement with swine producers to identify research priorities.

- Significant impact was made during the year in the certification of animal confinement operators and custom manure applicators. The materials presented in the certification program were based on research efforts addressing nutrient needs, loss pathways, and expected nutrient use efficiencies.

- A major research and extension effort was conducted throughout the state to address the potential groundwater pollution potential of earthen waste storage structures. Research efforts focused on measuring and quantifying leakage rates and impacts of leakage to shallow groundwater resources. Extension efforts transfer the information to producers and the general public via electronic communication as well as face-to-face meetings.

- Research efforts to measure the impact of various rates of fertilizer, herbicides and manure on the quality of water discharged from subsurface drainage systems in Iowa show that there are optimum levels of fertilization to meet both production and environmental objectives and that herbicide selection and use is important to minimize the impact of these agrichemicals in the shallow groundwater. This information is being incorporated into extension recommendations for fertility and for weed control for producers in Iowa.

Integrated Pest Management (Program 22)

- Researchers have investigated the biological control of purple loosestrife, an exotic wetland weed, and have worked together with Iowa DNR and APHIS-USDA to create public awareness of 1) the problem, and 2) leaf-feeding beetles as a biological control agent.

- Natural miticides were and continue to be investigated for control of Varroa mites in honeybees. Cooperation between producers and Department of Entomology personnel provided excellent integration of research and extension activities.

- Dr. David Thompson, IR-4 fungicide specialist, addressed the Iowa Fruit and Vegetable Growers Conference in Des Moines, IA, on February 25, 2000. The approximately 75 commercial growers heard Dr. Thompson describe IR-4's purposes and progress to date as well as inform them about upcoming fungicides.

- Integrated pest management information was disseminated through a variety of educational formats to numerous groups and individuals. These educational efforts were primarily directed toward livestock and poultry pest management, public health pest management, and stored grain pest management. Other areas in which IPM information was provided included presentations at Pesticide Applicator Training Meetings and Fly-In Clinics, and to youth groups.

- Economic thresholds and an understanding of bean leaf beetle population ecology were used in recommendations to soybean producers. The implementation of these by Iowa soybean producers saved more than an estimated $500,000 in unnecessary insecticide treatments and, in turn, contributed significantly to environmental conservation.

Animal Waste Management (Program 23)

- Animal nutrition has major impact on nutrient excretion values and on odor quality. New information was collected on the nutrient excretion values from dairy cattle. These values are currently published in Midwest Plan Service (an organization of extension and research agricultural engineers from the 12 North Central universities, plus representatives of the USDA) publications for public use.

Improving Water Resources Management in an Agroecosystem (Program 24)

- Information on the Iowa distribution and ecology of the Iowa shiner, a federally endangered species, was shared with Iowans, especially farm groups. A landscape-level model of its Iowa distribution was developed for use in evaluating whether habitat disturbances, like agricultural drainage ditch maintenance, is likely to negatively impact populations of the shiner.

Improving Environmental Quality in a Changing Landscape (Program 26)

- This project includes components of public education and participation in land stewardship activities. Examples include the Neal Smith National Wildlife Refuge where up to 8700 acres of prairie and savanna are being restored and public education on prairie ecology is going on, and the Iowa Gap research program comparing environmental characteristics throughout the state with distribution patterns and models of habitat requirements for wildlife species for use in identifying areas of special importance for management as wildlife habitat.

Rural Development (Program 27)

- The North Central Regional Center for Rural Development (NCRCRD), located at Iowa State University, is one of four regional centers coordinating rural development research and education throughout the United States. The mission of the NCRCRD is to initiate and facilitate rural development research and education programs to improve the social and economic well-being of rural people in the region. The NCRCRD also provides leadership in rural development regionally and nationally by identifying, developing and supporting programs on the vanguard of emerging issues.

- Community Supported Agriculture research identifies potential for agricultural diversification, new markets, and resource protection in rural areas. Womens networks research shows strategies employed by women to realize their potential in a globalizing economy and still patriarchal rural and agricultural culture. Spin-offs of this research continue to bring technical assistance and education to women starting food-related micro-enterprises. The results of these two research foci were disseminated at a three-state conference for women in sustainable agriculture in November co-organized by the investigator. Immigration research identifies ways that rural Midwestern communities are responding to challenges associated with increased Latino/a immigration. Results have informed funded proposal and programming implemented for Extension and Latino/a audiences.

Fiber Related Products (Program 28)

- Research has enhanced our understanding of protective clothing and its use to minimize pesticide exposure. Recommendations were subsequently published in educational flyers and a slide set for use statewide in Pesticide Applicator Training sessions and other educational efforts. Iowa Department of Public Health statistics show very low incidence (1% of all reported agricultural injuries in 1999) of acute chemical injury, indirectly supporting the notion that instruction offered based on this research has reached the public and had a positive impact on health and safety.

- Research also has resulted in the publication of educational materials and research manuscripts to provide sun safety information for the public. Presentations at the CYFAR (Children Youth and Families at Risk) and Priester Extension Health and Safety Conference shared information about how textile products can be used to minimize ultraviolet exposure to the sun. A presentation at the National Institutes of Farm Safety Conference provided results of an ISU headgear wear study to professionals in farm safety. In each case, extension staff or faculty members from other states have requested the use of the Iowa-prepared materials.

- Research results from the multistate protective clothing project (NC-170) were published in several extension publications including “Shirts & Stuff for Sun Safety” and the Family Pesticide Safety series: “Understand Label Precautions”, “What to Do When Clothes are Soiled with Pesticide”, “Wear the Right Gloves”, “Wear Coveralls and Aprons”, and “Use Eye and Lung Protection”.

Value Added Agriculture (Program 29)

- The Center for Crops Utilization Research seeds to add value to corn and soybeans. Center staff assist grain producers and processors link with scientists who can assist them in developing new technologies and in helping ISU scientists find companies who are interested in the technologies developed at ISU.

    - Characterization continues on EFAT (ethylene glycol fatty acylatep-toluenesulfonate), a new antioxidant that is unusually effective in preventing viscosity increase in vegetable

oil-based industrial fluids. Samples have been provided to industry for testing. These studies will facilitate the use of soy and other vegetable oils as industrial fluids.

- Formulation changes have resulted in improvements in the performance properties of the soy-protein based adhesive for use in medium density fiberboard. The team has also started working with particleboard and oriented strand board in addition to fiberboard. This change was in response to the technology transfer effort with Heartland Resource Technologies (HRT), a company based in Oelwein, IA. HRT has plans to build a facility to produce soy protein-based adhesives. The research team is currently working with HRT assist them in the development of the soy protein-based adhesive that will be produced at their facility.

- The FSHN Food Science extension/outreach program provides onsight workshops and seminars at small food industries throughout Iowa. Aspects of food safety, quality, and packaging are covered in the presentations. Research results are applied as appropriate into the presentations and consultations.

- The Iowa Grain Quality Initiative has had a major impact on the grain industry in Iowa by assisting growers and processors develop specialty crop systems for specific markets. The major work of this project has been to identify specific traits needed by specific industries, measurement of these specific traits, assisting with producer-broker contracts, and study logistic issues surrounding specialty grain production, transport, and processing. GMO issues were addressed through a statewide ICN meeting to assist producers in planning for the 2000 crop year.

Quality of Life (Program 30)

- The findings from the work on inter-family financial transfers and retirement investment and spending behavior are being shared with extension family resource management staff to prepare new materials to advise elderly consumers about financial management. Improved decisions will increase saving for retirement, returns on investment while retired, and reduce dependency on financial transfers from their adult children.

- Findings about parental influences on young adolescents' intimate relationships will be disseminated to formulate better programs for effective parenting education. The specific mechanisms were featured at the Youth Development Research Symposium hosted by Michigan State University for Extension and 4-H youth leaders in Fall 2000, where participants discussed critical ideas regarding what youth need to succeed.

- Team members contributed to the Interim Report on Early Head Start outcomes that will be presented to the U. S. Congress next year, and that report will have a major influence on the distribution of EHS funds for the next five years. Locally, Mid-Iowa Community Action EHS staff members have received training, technical assistance and evaluation services based on project findings to date.

Activities:

Poultry Production Systems

- Research has been conducted to show the impacts of intermittent sprinkling of birds to assist with cooling during extreme heat stress to prevent death and loss of production from laying hens. This technique has been demonstrated to producers on farm and is being incorporated into many production systems to assist with production and the well being of laying hens in confinement.

Grain Quality

- In the Fall of 2000 traces of the Starlink gene were found in taco shells intended for human use. Corn containing this gene, which provides resistance to the European Corn Borer, is not approved for human consumption due to concerns about possible (but not documented) allergic reactions in humans. Given that producers were not supposed to sell this for human use, there was considerable concern about errors in handling, misunderstandings about appropriate use, or the possibility of cross-pollination with non-Starlink corn. Regulators felt it was essential to identify all Starlink corn grown and ensure that it only went into animal feed. Members of the Grain Quality Initiative Team at Iowa State University took immediate action to provide essential information to producers, grain handlers, and government regulators. A series of white papers documenting what was happening was posted on the Team web site. They were updated on a daily or weekly basis. Maps showing the locations where Starlink were grown were also posted. Information about remuneration to producers was also available on the web site. Members of the team met regularly with grain handlers and leaders of producers groups as well as members of the United States Department of Agriculture (USDA) to facilitate the collection of Starlink corn as well as efficient methods to compensate producers who delivered the corn to separated handling facilities. Members of the team also gave numerous public talks on the problem and how it was being handled in order to minimize panic. Producers, handlers, and consumers of corn could go to one site and obtain a large amount of clear, unbiased, and up to date information concerning the Starlink situation. By providing accurate information in real time, the team was able to smooth the process of removing the Starlink grain from the market in a timely and cost-effective manner.

Seed Science

- Research results are shared with ~1800 academic and nonacademic seed professionals worldwide via the *Seed Science Newsletter*, a biannual publication. Other communication efforts to answer inquiries on seed quality with research-based information are supported.

- Research at the Seed Science Center has supported an active extension program directed at seed industry professionals. The center is used for many short courses to train industry employees how to best use sophisticated seed conditioning equipment to obtain the best results in cleaning, sorting, and grading seeds for commercial uses. An annual conference is held to report the findings of recent research in all phases of seed science including improved methods to improve germination, seed health, and viability.

Smith-Lever Act Funds:

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

Program 107. Iowa Beef Center

Dan Loy and Dan Morrical (faculty members in Animal Science on joint appointments between research and extension):

In the extension program to the beef industry, *The Iowa Beef Research Report* details comprehensive results on research in nutrition, breeding, economics, health and other areas. During FY2000, these reports were made available to producers and others through extension's publication system, and they were also sent to other universities. Recent research reports were also posted on the Web sites of Iowa State's Iowa Beef Center. For example, the beef Web site included downloadable progress reports on beef tenderness and carcass evaluation, and grid marketing. Field days were carried out in the summer and fall at Iowa State's outlying research and demonstration farms to review the current status of beef, sheep and swine studies. These farms also published annual reports that were distributed to visitors at field days and other times.

One example of research programs being influenced by stakeholders related to feedlot research at the Armstrong Farm in Lewis. A beef feedlot committee met to prioritize research, demonstration and extension programs that were relevant to the local needs in Southwest Iowa.

Another good example is the advisory group that worked with the Animal Issue Team of ISU's Leopold Center for Sustainable Agriculture. This 30-member group included livestock producers from every corner of Iowa, plus state and federal government agency officials, business representatives and extension and research specialists. The group helped to identify important or emerging issues in livestock production. When livestock producers reported fears that cows would not eat cornstalks from Bt-corn varieties, ISU research responded with a study that showed the fears were unfounded. And producers can ask questions or make comments on the "Bull Pen," an online bulletin board for discussion of topics related to the Iowa beef industry. The Bull Pen, located on the Iowa Beef Center Web site (www.ibc.iastate.edu/), provides feedback from ISU Extension specialists.

Integrated activities for Dr. Loy, such as those described above, represented about 33% of his total time and accounted for a salary expense of $26,000 during FY2000. Integrated activities for Dr. Morrical, such as those described above, represented about 31% of his total time and accounted for a salary expense of $23,000 during FY2000.

Goal 4: An agricultural system that protects natural resources and the environment

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

Robert Hartzler (faculty member in Agronomy on joint appointment between research and extension):

The primary delivery of research results for Dr. Hartzler during FY2000 was through the extension weed science webpage. This provided a direct conduit to deliver field research results to producers and agribusinesses. The webpage also provided updates on research in progress that

pertained to specific problems during the growing season. The webpage was also used to deliver research results from beyond Iowa State. Many of the articles were reviews of papers from journals such as *Weed Science* or *Weed Technology*. This proved to be a useful link to transmit research results from a larger body of researchers back to producers who can utilize the information in actual production.

Results of a long-term weed emergence study were delivered using a wall poster that was sent to agrichemical retailers statewide. By using a non-traditional approach, such as this poster, the information was more accessible, visible, and reached a wider audience. In addition, research results were delivered via the Extension Field Specialists and County Extension Education Directors via meetings, one-on-one assistance, and media articles/interviews.

Interactions with growers and agribusiness through grower meetings, field days, and field/office calls emphasized many current topics, which were of concern to these groups. An increasing number of questions concerning common waterhemp control influenced research to focus on studies that could aid in developing better ways of managing this late emerging weed. In response to new management practices influenced by precision farming, research has also explored many common questions about the use of precision farming for weed control.

Integrated activities for Dr. Hartzler, such as those described above, represented about 26% of his total time and accounted for a salary expense of $18,000 during FY2000.

Stephen Barnhart (faculty member in Agronomy on joint appointment between research and extension):

Dr. Barnhart is a Forage Production and Management Specialist. Forages are integral to crop, livestock and conservation enterprises in Iowa. During FY2000 he contributed forage species and management recommendations and experimental treatment suggestions in several on-going, cooperative research projects. He also served as Principal Investigator on applied research projects. Input for many of the treatments and research problems came from interaction with extension clientele. Extension clientele were included in research planning discussions, cooperated with on-farm research and demonstration activity, and served an important role in advising during the development of educational materials and university outreach programs.

Integrated activities for Dr. Barnhart, such as those described above, represented about 31% of his total time and accounted for a salary expense of $22,000 during FY2000.

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

titution: Iowa State University
te: Iowa

eck one: ____ **Multistate Extension Activities**
_X_ **Integrated Activities (Hatch Act Funds)**
____ **Integrated Activities (Smith-Lever Act Funds)**

	Actual Expenditures				
e of Planned Program/Activity	**FY 2000**	**FY 2001**	**FY 2002**	**FY 2003**	**FY 2004**
d Crops	26,852				
nt Germplasm	627				
p Production and Management	20,009				
en Industry	4,000				
proved Grazing Systems	43,868				
mal Physiology	6,589				
mal Genetics	92,036				
ernative Livestock	6,400				
rnational Economic Competitiveness	31,864				
icultural Risk Management	33,477				
ricultural Information Technology	3,770				
d Safety	3,830				
proving Human Foods	17,575				

	Actual Expenditures				
e of Planned Program/Activity	**FY 2000**	**FY 2001**	**FY 2002**	**FY 2003**	**FY 2004**
l Resources Management	21,518				
grated Pest Management	30,635				
mal Waste Management	4,339				
ter Resources Management	6,650				
vironmental Quality	6,750				
al Development	47,444				
er-Related Products (Textiles and Apparel)	16,266				
ue Added Agriculture	7,330				
ality of Life	587				
in Quality: Marketing & Delivery	25,760				
ltry Production Systems	7,750				
d Science	22,555				
al	489,481				

Director **Date**

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eck one: ____ **Multistate Extension Activities**
____ **Integrated Activities (Hatch Act Funds)**
_X_ **Integrated Activities (Smith-Lever Act Funds)**

	Actual Expenditures				
e of Planned Program/Activity	**FY 2000**	**FY 2001**	**FY 2002**	**FY 2003**	**FY 2004**
f Center	49,000				
I/ICM	40,000				
al	89,000				

_____ _____
Director **Date**

rm CSREES-REPT (2/00