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 2005
(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, including:

- 272 Refereed Publications, Research Papers, Manuscripts
- 162 Non-refereed Publications, Reports, Technical Papers
- 263 Proceedings, Published Abstracts
- 74 Extension Publications
- 278 Invited Presentations
- 292 Education Programs, Field Days, Tours (14,955 participants)
- 1443 individual consultations
- 968 Volunteers
- 68 web pages supported
- 37 Books & Chapters
- 8 Patents
- 65 Theses, MS/Ph.D. Programs Completed
- 2 ICN programs; 2 software developed; science symposium; 4 documentaries

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

① An improved method of potato transformation has been developed that saves time in genetic analyses of specific genes and can be utilized to transform any potato line. Also, hairy root cultures were established in Echinacea species that produce novel secondary products that may have bioactivity; this system can be used to be produce large amounts of bioactive compounds with efficacy for human health

② Ultra-low linolenic acid and low linolenic acid soybean oils were developed that have significantly better frying stability than regular soybean oil. The ULL and LL oils had improved flavor, oxidative and frying stability, and produce less cancer-causing free radicals. They contain no trans fatty acids that cause coronary heart disease and will be used to replace hydrogenated soybean oils. The productions of ULL and LL soybean oils have increased the value of soybeans produced in Iowa.

③ Soy protein-based plastics have been used to develop foam products, molded articles and sheets to replace petroleum-based plastic products. Containers made from soy protein foam provide good thermal insulation, similar to Styrofoam products. Molded products provide good mechanical properties. After use, the containers can be ground and used for compositing, soil conditioners, and stimulants for plant growth to achieve a sustainable environment. The technology has been licensed for commercial applications.

④ ISU has been working toward the completion of the transfer and commercialization of the soy protein hydrolysate that will be used in the formulation of soy protein-based adhesives. We have been working with West Central Cooperative, based in Ralston, Iowa, and currently the largest manufacturer of biodiesel in the United States, to commercialize this technology as a new value-added use for the soybean meal produced in the biodiesel manufacturing process.

⑤ Models are being developed to help researchers understand impacts of crop rotation and tillage practices on weeds. Detailed measurements of inputs and outputs to the soil weed seed bank indicate that 70% to 93% of the seeds "expected" to be present were missing due to decay, fatal germination, or removal and consumption by vertebrate and invertebrate seed predators. Demographic models indicate that seed losses of this magnitude strongly contribute to the success of weed suppression in diversified crop rotation systems receiving lower-than-normal doses of herbicides.

⑥ In pigs, new genes associated with improved sow longevity and improved meat quality were discovered. The economic impact of using these genes in breeding programs will be worth over ten million annually.

⑦ Sales of two products developed under the Agricultural Risk Program continue to grow. In 2005 premiums from the Revenue Assurance product in Iowa equaled $215 million and sales from the Group Income insurance program in Iowa equaled $22 million. Premiums for the hog gross margin product in Iowa equaled $2 million. These products were used as the primary risk management tool on 13 million acres of Iowa crop ground and provided revenue guarantees to Iowa crop and livestock producers that exceeded three billion dollars.

- ISU participation in the following multistate research projects also contribute to goal 1: NC0007, NC0100, NC0107, NC0131, NC0136, NC0140, NC0202, NC0213, NC1003, NC1004, NC1006, NC1007, NC1008, NC1009, NC1010, NC1119, NC1020, NC1021, NC1142, NE1010, NE1016, NE1020, NE1022, NRSP007, NRSP008, S0294, S1005, S1007, S1008, S1010, W0173, W1128, W1168 W1171, W1177 and W1181.

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,
- more efficient use of agricultural chemicals, ⑤
- yield gains through genetic improvements, ⑥
- new products and applications, ①②③④
- improved quality and consistency of products, and ①②
- better understanding and adoption of appropriate risk management practices. ⑦

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 $ 12,305,934

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 provides a primary or secondary income for many Iowans. To remain competitive in our rapidly changing global economy, these commercial food crop producers must adopt new cultivars 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, and the results made available to stakeholders. In keeping the industry competitive, we also need to understand the basic processes associated with these applied problems.

b. Impact/accomplishment

Advances in the knowledge base:

- An improved method of potato transformation has been developed. This new method produces stable transformed plants in less than four weeks. This improvement saves time in genetic analyses of specific genes and can be utilized to transform any potato line.

- Un-translated sequences in the RNA of a BEL1-like transcription factor that affect potato growth have been identified. These transgenic lines can produce tubers under long-day conditions in a photoperiod-responsive cultivar. This discovery provides novel information on photoperiod control and on the role of RNA as a signaling factor.

- Established hairy root cultures in Echinacea species. These cultures produce novel secondary products that may have bioactivity. This system can be used to be produce large amounts of bioactive compounds with efficacy for human health.

Long-term:

- Cultivar testing continues to identify wine grape cultivars best adapted to the regional growing conditions and those cultivars best suited for making wine under those conditions. This testing is also identifying cultivars not adapted to the colder regions of Iowa. With the rapidly expanding wine grape industry in Iowa, and with vineyard establishment costs of over $5,600 per acre, grape growers can not risk investing in non adapted cultivars.

c. Source of Federal Funds—Hatch

d. Scope of Impact—State Specific; Integrated Research and Extension

Program 29: Value Added Agriculture

a. Description of activity

This program focused on developing new and improved technologies that add value to agricultural products produced in Iowa. Our efforts strive to increase demand and the prices farmers receive and to improve life of people. The outcome of this program contributes to rural economic development by creating new uses of crops and job opportunities in Iowa. Goals of this program are: 1. To develop food and bio-based, value-added products from agricultural materials, including low-value commodities and waste byproducts. 2. To improve the quality and production efficiency of these commodities and to improve their market values. 3. To conduct technology transfer activities that increase rural development, employment, and the profitability of growers and processors.

Research activities of the program in 2005 were focused on following crops. **Soybeans:** uses of soy protein for plastics, adhesives, and various food products, removing odor and beany flavor of soy material, isolating and fractionating soy protein for healthy food application, using low and ultra-low linolenic acid soy oil as replacement of hydrogenated oil that contains trans fatty acids, sphingolipids isolation from soy flakes, development of new lubricants from novel fatty acids, using high-pressure processing with other additives to delay oil oxidation, and using the oleaginous yeast Cryptococcus curvatus as a way to encapsulate fat. **Corn:** characterization of cornstarch and relating the starch structure to enzyme hydrolysis and alcohol production, development of resistant starch to improve human health and intervention obesity and diabetes, isolation and fractionation of pharmaceutical proteins from corn. **Apple and other fresh produce:** sanitizing washes of apples and other fresh produce using food grade organic acids to reduce microbial contamination and prevent food poisoning. **Oats:** production of high beta-glucan oat lines to provide healthy oats products for food. **Eggs:** fractionation and characterization of egg yolk lecithin. **Research Centers:** The Center for Crops Utilization Research continues providing industry-incubating facilities to companies. NASA Food Technology Commercial Space Center (FTCSC) worked with varieties of food companies to develop commercial and space foods.

b. Impact/accomplishment

- New soybean oils as replacement of hydrogenated oil: New soybean oils with an ultra-low linolenic acid (ULL) concentration of 1.5% and a low linolenic acid (LL) concentration of ~2.5% display significantly better frying stability than a control soybean oil with a typical linolenic acid concentration of ~6%. The ULL and LL oils had improved flavor, oxidative and frying stability, and produce less cancer-causing free radicals. The ULL and LL oils contain no trans fatty acids that cause coronary heart disease and will be used to replace hydrogenated soybean oils. The productions of ULL and LL soybean oils have increased the value of soybeans produced in Iowa. A farmer-

owned company, Asoyia LLC, has received two awards, Monsanto Professional Certification Service Award and the State of Iowa Economic Development Award for developing the ULL soybean oil product.

- Effects of starch structures on the rate of enzyme conversion of starch: Molecular structures of starch and internal structures of starch granules were revealed, and their impacts on the enzyme digestibility have been established. The understanding of relationships between the structures and enzyme hydrolysis of starch will improve the efficiency of glucose production from starch and, in turn, alcohol production.

- Sanitizing wash for fresh produce to reduce food-borne disease: The occurrence of human enteric pathogens on fresh produce eaten raw is a major food safety problem. When fresh produce is washed with a food-grade organic acid-based sanitizer significantly reduces populations of Escherichia coli O157:H7 and Salmonella spp. on the surface of fresh produce and will improve the microbial safety of these popular food products.

- Soy protein-based plastics for disposable food packaging: Soy protein-based plastics have been used to develop foam products, molded articles and sheets to replace petroleum-based plastic products. Containers made from soy protein foam provide good thermal insulation, similar to Styrofoam products. Molded products provide good mechanical properties. After use, the containers can be ground and used for compositing, soil conditioners, and stimulants for plant growth to achieve a sustainable environment. The technology has been licensed for commercial applications.

- Soy-based food products in the market: A technology was developed, optimized, and validated by consumers to produce textured soy chicken flavored ‘bits’ and ‘tenders’ for an Iowa Company. A company has adopted the technology and received a U.S. grant to commercialize this product. The company has received orders from a foreign country.

- Fractionation of major components from soy protein: The technology of fractionation of the major components of soy protein to enhance functional properties and health benefits developed at Iowa State University is in the process of being transferred to a start-up company, SafeSoy. A new plant is being built in Ellsworth, IA by this company.

- Commercialization of soy protein hydrolysate for adhesives: ISU has been working toward the completion of the transfer and commercialization of the soy protein hydrolysate that will be used in the formulation of soy protein-based adhesives. In addition, Iowa State University has been working with West Central Cooperative, based in Ralston, Iowa, to commercialize this technology. West Central is currently the largest manufacturer of biodiesel in the United States and expects to expand production in the coming year. A key component of the expansion is to identify new value-added uses for the soybean meal that is produced from the process, and the protein hydrolysate is a co-product of the biodiesel industry.

- Industry incubator facilities: The Center for Crops Utilization Research continues to house Proliant and Kemin Industries in the industry incubator facility. A previous

occupant, ExSeed Genetics moved to the ISU Research Park. During the course of being in the industry incubator facility, the company grew from three employees to over 35. The company has since been purchased by BASF. Another previous occupant, Ajinomoto, also moved to the ISU Research Park and grew from one person to three during the period in our facility.

c. Source of Federal Funds—Hatch

d. Scope of Impact—State Specific; Integrated Research and Extension

Key Theme – Plant Germplasm

Program 4: Plant Germplasm

a. Description of activity

This project develops, distributes and deploys genetic information, technologies, phenotypic information, methods, theory and varieties of crop species to improve the productivity, sustainability and profitability of regional agricultural systems by enabling the development of improved crop genotypes.

b. Impact/accomplishment

Several hundred commercial varieties of soybean, corn, alfalfa, oat, barley and triticale were evaluated at more than 20 Iowa locations to help identify the subset of those varieties with the best adaptation to the 30 million acres in Iowa annually planted with these species. Such unbiased information enabled farmers to choose crop cultivars to optimize genetic adaptation to their unique farming system and to produce crops from those cultivars valued at several billion dollars as commodities and as tens of millions of dollars used to purchase seed of varieties adapted to specific areas.

Overall, the project released 17 corn inbreds with 291 licenses issued, 14 soybean culivars with unique oil and grain properties, 1 oat variety (3 licenses issued) and developed a method for producing hybrid soybeans.

c. Source of Federal Funds—Hatch

d. 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

- *Identify and solve soybean production problems to improve farmer's economic well-being*. Research is underway to identify key areas where farmers can optimize their production systems in a more economic and environmentally way. Variable include crop

rotation, replant decisions, soil fertility, inoculum, and hail injury. Preliminary results suggest current recommendations for soybean management in Iowa need to be adjusted so that production efficiency and farmer profitability can be improved. Recommendations may need to be adjusted for diverse soils.

- *Improve understanding of the biology and ecology of weeds in the agroecosystem*. Despite differences in herbicide and fertilizer inputs, weed seed density declined in each rotation system tested, and corn and soybean yields in the three-year and four-year low input rotations were as high or higher than in the two-year conventional system. Without including government subsidy payments, average net returns were higher in the four-year system ($474/hectare/year) than in the two-year system ($427/hectare/year) and three-year system ($395/hectare/year). These results indicate that diversified rotation systems can contribute to farm profitability while reducing requirements for herbicides and N fertilizer. A model integrating seed dispersal, seed burial and seed demand was developed. Factors related to seed availability were more important in determining seed losses due to predation than those related to seed demand.

- *Develop improved pasture management systems*. Field experiments to evaluate site-specific adaptation of legumes to landscape positions showed 1) species richness and diversity index were greatest on back slope positions, 2) slope and soil ECa data identify sites where legumes can be successful in pastures, and 3) legumes should be seeded on back slope positions in pastures, N fertilizer not be applied, and grass competition be reduced before seeding legumes in pastures. Studies on the productivity and nutritive value of cool-season pastures, value of warm-season grasses for summer grazing, and effects of pasture sequence on productivity of season-long grazing systems showed greater weight gains for cattle grazing sequences that included pastures inter-seeded with kura clover, rotating cattle to warm-season grass pastures during summer was less advantageous than having them remain on cool-season pastures, and grazing sequences with warm-season grass pastures performed well under some conditions.

- *Increase quality and value of agricultural products*. Seed produced under a conventional cropping system had better seed quality than in an organic system. Seed quality under organic system was affected by late planting, low temperatures during pollination and premature harvest due to potential frost. Seed quality is crucial for a satisfactory crop establishment in target environments under restricted conditions.

- *Develop technologies to improve yield and genetic purity in hybrid seed production*. A model ‘Nick Manager’ was developed to simulate kernel set in hybrid seed production. Predicted kernel set in six commercial seed fields with harvested kernel number varying from 8.4 to 23.1 million kernels per female hectare was closely correlated with measured values. With a minimum of information about the inbred pair, the program also can be used to define management strategies that maximize seed production per female hectare or establish initial production requirements for new combination of inbreds. The Anthesis-Silking Interval and the Pollen Sources Interval had the greatest impacts on kernel production. But ‘Nick Manager’ is designed to allow the user to adjust several management variables simultaneously to assess their additive and synergistic effects.

b. Impact/accomplishment

- *Soybean production*: Enhanced understanding of interactions between management systems, pest, and pathogens that will lead to improved yield stability and profitability. Replant decision of soybean may be improved by variable costs. Seed and chemical costs account for a large part of the soybean production costs. New herbicide technologies reduced soybean plant population when replanting in the spring. Understanding the interactions in the corn-soybean rotation between cropping sequence, pathogens, tillage system, and the environment will enhance the efficiency of crop production in Iowa while improving protection of soil and water resources. A more efficient nutrient management plan for soybean will improve farmer's profitability but will also protect soil and water resources.

- *Weed ecology*: Insights into weed population dynamics enhance evolution of farming practices, decision-making tools, and management systems that increase production efficiency while protecting soil and water resources. The models being developed help researchers understand impacts of crop rotation and tillage practices on weeds. Detailed measurements of inputs and outputs to the soil weed seed bank indicate that 70% to 93% of the seeds "expected" to be present were missing due to decay, fatal germination, or removal and consumption by vertebrate and invertebrate seed predators. Demographic models indicate that seed losses of this magnitude strongly contribute to the success of weed suppression in diversified crop rotation systems receiving lower-than-normal doses of herbicides.

- *Pasture management*: Recommendations for pasture improvement should be made based on landscape position, stocking method, defined management cells, and on-site characteristics. Spatial variation should be used to optimize seasonal production based on plant species growth patterns. Grazing management should be based on seasonal productivity of management cells. Site-specific management of pastures could be used to optimize productivity.

- *Modeling kernel formation*: The approach developed for simulating kernel production provides a rational basis for minimizing out-crossing or self-pollination. It is an enabling technology designed to help managers achieve the desired balance between kernel production and seed purity. It also provides a practical mechanism to quantify the impact of alternative field management strategies on optimizing seed yield and genetic purity in maize hybrid seed production. Combined with our models to quantity the dispersal of adventitious pollen, this technology is applicable to management of pharmaceutical and industrial products in transgenic corn.

c. Source of Federal Funds—Hatch

d. Scope of Impact—State Specific; Integrated Research and Extension

Key Theme – Precision Agriculture

Program 6: Precision Agriculture

a. Description of activity

Recent technological advances and the Global Positioning System (GPS) have led to increased interest and adoption of the concept of precision agriculture, which holds the promise of both economic and environmental benefits. Although precision agriculture has tremendous potential, there are two major barriers preventing the full benefit of precision agriculture being realized. The first major impediment to widespread implementation of precision agriculture is gathering the requisite information to describe the spatial and temporal variation of important factors. The second 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.

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. Advances in computational capability and sensor technology, along with reduced component costs, have opened up promising new possibilities for sensing in agricultural and biological systems. A number of these technologies are being explored to develop real-time sensing systems for agricultural production and machinery systems. Research has been conducted on the application of machine vision, and hyper-spectral sensors in the audio, visible and near-infrared of the electromagnetic spectrum for the development of robust agricultural sensing systems.

The integration of these sensors with GPS and other information technologies will lead to "intelligent" machines; which not only use information to perform basic agricultural functions (intelligent/advanced control/autonomous vehicles), but also harvest information from the fields for agronomic and environmental management (precision agriculture, environmental protection) and capture data to track inputs and products throughout the production and delivery chain to satisfy increasing regulatory and consumer requirements throughout the food production system (bio-terrorism, food safety, identity preservation, environmental monitoring).

b. Impact/accomplishment

Advances in the knowledge base:

- Developed multiple methods for automatic sequencing video of corn row scenes for estimating corn plant populations and plant spacing. Through this work, we better understand the trade-off between real-time operation and sequencing robustness. We were able to demonstrate the potential of ultra-high scale resolution ground-based remote sensing for characterizing corn plant population across crop fields. The data layer from such sensing technology is critical to characterizing yield variability, and using crop growth models to manage nitrogen.

- Developed automatic guidance simulation environment for the development of next generation navigation control technology for agricultural vehicles. One example of advanced navigation control technology is the use of four-wheel-steering on sprayers. With four-wheel-steering, the potential exists to reduce crop damage due to rear wheel off-tracking and reduce application error by controlling the turning radius of the vehicle. We are furthering this work by developing virtual reality simulations as well as hardware-in-the-loop simulation. These advances lead to more rapid advance of automatic guidance and field automation which should lead to greater precision and efficiency of field operations.

c. Source of Federal Funds—Hatch

d. Scope of Impact—State Specific

Key Theme – Ornamental/Green Agriculture

Program 7: Green Industry

a. Description of activity

Successful establishment of glyphosate ready creeping bentgrass (Agrostis stolonifera) requires removal of competition from conventional grasses early in the establishment process. A nutritional study showed that grasses can tolerate wider calcium to magnesium ratios than once thought. Weed control studies showed that an experimental compound, mesotrione, can selectively remove creeping bentgrass from Kentucky bluegrass turf. Turfgrass cover in athletic fields at the end of the playing season was realized for perennial ryegrass, tall fescue and Kentucky bluegrass using higher seeding rates. Identification of a low input turfgrass species suitable for North Central region is currently underway. Work with Alnus maritima revealed its capacity to associate with nitrogen-fixing bacteria can be exploited in both low- and high-oxygen soils. Research also showed that most horticultural taxa in the Rhamnaceae do not serve as winter hosts of the Asian soybean aphid, that physical and chemical treatments can improve seed germination of Dirca spp., and that a promising native species of Rhamnus likely will be less invasive in managed landscapes than introduced species. A procedure was established for isolating, disinfesting, and culturing immature inflorescences of Indiangrass (Sorghastrum nutans). Several plantlets have been established and placed for vernalization. Expressed Sequence Tag (EST) study revealed several novel genes to be involved in cold acclimation of Rhododendron, some with roles in membrane transport and protection from photoinhibition. Research shows that constitutive freezing tolerance in Rhododendron may be regulated by molecular pathway that is distinct from that in herbaceous annuals. Method was developed to use intron-flanking EST-PCR markers for mapping studies. Results from a survey indicated that landscape contracting decision-makers would like business-focused exercises and skills to be integrated into existing horticulture and landscape construction coursework.

b. Impact/accomplishment

Advances in the knowledge base:

- A procedure was established for isolating, disinfesting, and culturing immature inflorescences of Indiangrass (Sorghastrum nutans). Several plantlets have been established and placed for vernalization. Establishing a routine regeneration procedure is a first step toward inducing pollen-sterile mutations in tissue cultured Indiangrass.

- Expressed Sequence Tag (EST) study revealed several novel genes to be involved in cold acclimation of Rhododendron, some with roles in membrane transport and protection from photoinhibition. Research shows that constitutive freezing tolerance in Rhododendron may be regulated by molecular pathway that is distinct from that in herbaceous annuals. Understanding the molecular basis of cold acclimation and deacclimation will be useful in developing cold hardy horticultural plants.

c. Source of Federal Funds—Hatch

d. Scope of Impact—State Specific; Integrated Research and Extension

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

Advances in the knowledge base:

- Growth hormone (GH) released from pituitary under direct control of hypothalamic releasing (i.e., GHRH) and inhibiting (i.e., sst or SRIF) hormones is an anabolic hormone that regulates metabolism of proteins, fats, sugars and minerals in mammals. Isolation and characterization of ghrelin, the natural ligand for GHS receptor, has opened a new era of understanding to physiology of anabolism, feeding behavior, and nutritional homeostasis for GH secretion and gastrointestinal motility through gut-brain interactions. Other peptide hormones (i.e., motilin, TRH, PACAP, GnRH, leptin, FMRF amide, galanin, NPY, NPW) from gut, brain and other tissues, also play a role in modulating GH secretion in livestock and lower vertebrate species.

- We have identified all three members of the peroxisome proliferator-activated receptor (PPAR) family in ovarian and liver tissues from cattle. Metabolic disturbances, such as fatty liver disease, can negatively impact reproductive performance of dairy cattle. The PPARs play a role in fatty acid metabolism. Further study of their role in the bovine ovary and liver may allow for the development of management practices to enhance reproductive performance.

- The peripheral layer of myofibrils in striated muscle cells is attached to the sarcolemma at sites called costameres. Nucleic acid aptamers that detect ADP-ribose groups on arginine residues have been prepared and shown to label ADP-ribosylated desmin. This technique provides a novel research tool to elucidate the role of ADP-ribosylation in muscle development.

- Bradykinins are peptides produced in the neonatal lung at high oxygen tensions that act to constrict umbilical and placental vessels during delivery. Our research has shown a decreased responsiveness of umbilical vessels from cloned calves to these compounds, which explains the high rate of postnatal umbilical issues in these calves.

c. Source of Federal Funds—Hatch

d. Scope of Impact—State Specific; Integrated Research and Extension

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

a. Description of activity

The objective of this program is to increase the biological capacity and efficiency of animals to produce food, pharmaceuticals, clothing, and pleasure. The primary areas of research are elucidation of factors regulating key biological processes, quantification of the nutrients required to support these processes, development and evaluation of novel feedstuffs, greater awareness of the impact of animal production on the environment, and the quality and wholesomeness of animal-derived foods.

b. Impact/accomplishment

Advances in the knowledge base:

- Winter grazing of stockpiled tall fescue-red clover pastures reduced cost of maintaining bred two-year old cows by $0.43/cow/day compared with hay feeding in two winters with normal or above normal snowfall.

Long-term:

- Air and water quality issues as impacted by diet:
  - Established emission data for swine and laying hens as well as demonstrated affordable dietary (source control) mitigation practices.
  - Modification of swine diets reduced ammonia emission 40 to 50% with no negative effects on performance.
  - Altering diets of laying hens by addition of 10% dried distillers grains with solubles, 5% soy hulls or 5% wheat mids reduced ammonia emission from manure 30 to 50%.
  - Limiting or controlling access of grazing cows to pasture streams limited the time that cattle remained in or near the stream thereby maintaining forage mass and minimizing soil erosion/deposition at the stream bank.

- A three-step reduction in the concentration of supplemental protein as cattle matured during the finishing period reduced the quantity of nitrogen fed over 12 lbs per head without affecting response to anabolic agents, overall performance or carcass value.
- Replacing corn grain with corn processing co-products fed to cattle increased phosphorus intake and excretion but did not change the relationship between phosphorus intake and excretion.

- Hoops
  - The research and outreach related to alternative swine production (feeds and housing) formed the basis of the niche pork market in the United States. Currently there are 35 niche pork markets in Iowa – the largest group has 400 producers.
  - The research on alternative swine production was featured at an international conference in the Ukraine with over 300 people in attendance. A company that manufactures and sells hoop barns translated five of the research publications into Russian.

c. Source of Federal Funds—Hatch

d. Scope of Impact—State Specific

Key Theme – Animal Genomics

Program 10: Genetic Enhancement of Agriculturally Important Animals

a. Description of activity

Ongoing activities focus on comprehensive research to identify and characterize (molecular) genetic control of important production, quality, and health and welfare traits in domesticated animals, on development of statistical methods to analyze and use phenotypic, molecular, and genomic data in selection and mating systems, and on technology transfer. Emphasis is on traits related to product quality, disease, and efficiency in the main livestock areas of dairy cattle, beef cattle, poultry, swine, emerging agricultural species such as shrimp, and on companion animals. Research efforts range from quantitative analyses of phenotype using comprehensive databases from experimental and producer herds, to development and use of genomic tools to discover the genetic control of traits. Additional emphasis is on the genetics of diseases in companion animals. The latter, along with animal models such as mouse and rat, are also used for comparative purposes and for the study of human health. Substantial focus is on integration of phenotypic and genomic methods and data for genetic analysis and genetic selection. Education and outreach activities focus on assisting stakeholders in domesticated animal industries (producers and their organizations, breed associations, genetics companies) with design and implementation of genetic systems that will enhance genetic progress for important traits

b. Impact/accomplishment

Long-term:

- Semen samples from all of the highly inbred chicken research lines at Iowa State University were collected, cryopreserved and sent for long-term storage in the National Animal Germplasm Repository in Ft. Collins, CO. This action is protecting critical infrastructure in agriculture, as has been recognized by inclusion in the Department of Homeland Security website agriculture section. The protection of germplasm against unanticipated losses of the living stock will allow the recovery of specific, characterized alleles without the repetition of the 50 to 75 years of research and selective breeding that lead to the generation and characterization of these inbred research lines.

- In pigs, new genes associated with improved sow longevity and improved meat quality were discovered. The economic impact of using these genes in breeding programs will be worth over ten million annually.

- Sow longevity is of importance in pork production both economically and in terms of animal welfare but has low heritability. It was found that leg conformation at 100 kg is associated with sow longevity. A series of three posters and a pocket guide were developed to help pork producers select reproductively sound replacement females with proper feet and legs and distributed to 26,000 people. In addition, a spreadsheet to help producers determine how long a breeding herd female must remain in the herd to reach profitability was developed. It has been used by producers from 15 States and 33 countries with influence on over 25 million sows.

c. Source of Federal Funds—Hatch

d. Scope of Impact—State Specific; Integrated Research and Extension

Key Theme – Agricultural Competitiveness

Program 13: International Economic Competitiveness

a. Description of activity

Activities at CARD's FAPRI division involve the economic analysis of international agricultural trade policies. Issues that have been investigated over the project year have included grain trade and invasive species risk and damages, dairy policies and markets in Asia, sugar policy reform in several countries, the US-Japan apple dispute, and the Doha round of WTO negotiations.

Other activities include:

- Evaluation of the economic impact of PRRS on the cost of pork production, the evaluation of hoop production facilities in pork production, and wage rates and benefits in the pork production industry.

- Studying the consequences of sector organization to protect against infectious animal disease for animal sector competitiveness. The industrialization of agriculture has also been investigated. In particular, it has been shown how either of cost seasonality or

heterogeneous raw materials entering processing can impede the development of higher-value agricultural products.

- A multi-university partnership that addresses the need to have a common framework to guide modeling and data collection efforts to improve food safety and reduce health loss through better allocation of resources – both public and private. Other efforts in the food safety area use consumer surveys to consider the market and public policy implications of foods differentiated in product quality.

- An alternative dimension to competitiveness regarding the role of in-state resources in facilitating economic growth. A line research focuses on the factors that explain rural economic and employment growth in the Upper Midwest (Iowa plus the states bordering Iowa). Important factors that have been identified include knowledge creation, outdoor recreation amenities, water quality, growth in livestock activity, and less reliance on agricultural incomes. In particular, the development of knowledge creation and outdoor recreation amenities are being analyzed in a spatial context with indications that local spillovers are important in explaining rural growth. Further, real options methods of ethanol and wind energy were used to determine viable scales for bio and other renewable investment when adding value in rural areas.

- A program emphasizing energy sources, and in particular ethanol production. Corn prices close to ethanol plants were studied, as were the extent, variability, and origins of plant scale economies.

- Work pertaining to International Competitiveness involved the economics of genetically modified (GM) agricultural products. Issues addressed included the implications of uneven international regulations of GM products and the economics of intellectual property rights (IPRs).

b. Impact/accomplishment

Advances in the knowledge base:

- The 2005 FAPRI US and World agricultural outlook activities were undertaken in fall 2004 and spring 2005. The FAPRI outlook website has been consulted by more than 372,000 views and 162,000 visits since January 2004. It is used by academics, producer groups, and world industry leaders. An investigation of dairy markets in Asia was completed and published by Food Policy. It assessed Asian dairy markets, with four case studies (China, India, Japan, and Korea), a prospective analysis of future regional patterns of consumption, and a policy analysis of trade liberalization of Asian dairy markets. Over all research projects undertaken, Beghin's CARD working papers were downloaded 13,600 from the CARD website from October 2004 to September 2005.

- *Food Safety*. Consumer surveys were used to elicit consumer willingness to trade off organic production methods and the cosmetic appearance of apples. Although consumers were willing to pay more for organic apples – about nine cents per pound – as cosmetic damage of the fruit increased, consumers were no longer willing to pay a premium.

Consumer preferences over product quality and other attributes also have implications for valuing the effects of trade barriers in international trade, a finding confirmed by analysis of trade in apples with Japan. Information on consumers' preferences and valuation of organically grown fruit can be used to guide growers in decisions about the use of organic methods of plant disease control.

- *In-State Resources*
  - Analyses have found that outdoor recreation amenities have a positive and significant impact on rural economic growth in Upper Midwest counties during the 1990-2001 period. A five percent increase in amenities in a local county and neighboring counties resulted in over $100 higher per capita incomes in the county holding all other things constant. Further, if amenity spillovers from neighboring counties were not included, own county amenities only had about a $50 impact on local per capita incomes. Similarly, local federal recreation amenities, such as COE swimming areas had about a $70 impact on county per capita incomes. Current efforts underway with the Iowa DNR expand on this investigation and estimate the return on amenity investments in the State of Iowa should produce more detailed results.
  - Growing livestock activities in rural counties had a positive and significant impact on county income while share of personal income from farming had a negative impact. Increasing county cash receipts from livestock activities by ten percent over the 1990-2001 period increased county per capita income by approximately $70 per capita, while a ten percent increase in share of county personal income from farming would have decreased county per capita income by over $130. The economic implication is that current agriculture production activities with limited value added are a drag on economic growth, but increasing livestock production adds value and contributes to local economic growth assuming this is accomplished in an environmentally responsible fashion.

- *Renewable Energy Resources*
  - Research indicates that an ethanol dry-mill plant needs to have an annual capacity of 40 million gallons and a wet-mill plant of 60 million gallons to be economically viable. Although smaller plants are frequently proposed, most ethanol plants under construction meet these minimum requirements.
  - Research indicates that the extent of local competition for corn near ethanol plants is a factor in determining the local corn price level and spatial rate of change in that price level. Evidence suggests that the governance form of ethanol plants is a factor in determining local corn prices and how they change with distance from the processing plant. Regarding scale economies for dry mill ethanol plants statistical evidence found that scale economies do exist but are not as strong as for a typical processing enterprise. Dry mills in place may be somewhat smaller than is optimal, but average capital costs vary greatly with location due to such issues as water availability and environmental compliance.

- *Genetically Modified Organisms.* A project was completed concerning the assessment of European Union's (EU) policies that aim to ensure the "co-existence" of genetically modified (GM) food with conventional and organic (or quality-enhanced) products. EU

regulation in this setting envisions the co-existence of GM food with conventional and quality-enhanced products, mandates the labeling and traceability of GM products and allows only a stringent adventitious presence of GM content in other products. All these elements are brought together within a partial equilibrium model of the EU agricultural food sector. The model comprises conventional, GM, and organic food. Demand is modeled in a novel fashion, whereby organic and conventional products are treated as horizontally differentiated but GM products are vertically differentiated (weakly inferior) relative to conventional ones. Supply accounts explicitly for the land constraint at the sector level and for the need for additional resources to produce organic food. Model calibration and simulation allow insights into the qualitative and quantitative effects of the large-scale introduction of GM products in the EU market. It is found that the introduction of GM food reduces overall EU welfare, mostly because of the associated need for costly segregation of non-GM products, but the producers of quality-enhanced products actually benefit.

Long-term:

- *International Trade Policy*. A book, edited by John Beghin, was completed and published in November 2004 by the World Bank, summarizing a series of studies looking at the impact of reforming trade and farm policies in commodity markets and their implication for developing countries. The work included in the book has had a high impact beyond the academic community and is being referenced by developing countries' leaders, the WTO and other stakeholders in the current agricultural trade negotiations. Briefings were conducted at the World Bank, WTO, OECD, FAO, and IFAD headquarters, as well as with the press. The book won a prestigious publication award from the American Agricultural Economic Association.

- *Animal Disease*. The study on the economic impact that PRRS has on the cost of pork production was the baseline study for the pork production industry on the need to develop a policy or goal of PRRS control and eradication on the regional level. The National Pork Board has proceeded with a PRRS control and eradication focus for the U.S. based on the study results.

- *Hog Buildings*. An ongoing study of the analysis of hoop production systems in the pork industry has shown that they are a competitive alternative production system. This information has allowed producers to meaningfully evaluate these systems and adapt them. Use of hoop production systems have expanded rapidly over the past few years. The hoop production system work has received extensive exposure both nationally and internationally.

c. Source of Federal Funds—Hatch

d. Scope of Impact—State Specific; Integrated Research and Extension

Key Theme – Risk Management

Program 14: Agricultural Risk Management

a. Description of activity

We continue to develop and rate insurance products for producers. This year we introduced LGM for cattle, a gross margin insurance guarantee for cattle producer. This product will be available in Iowa and in several other states in January 2006. We also completed work on a drought insurance product for Iowa and plan to submit this for approval in January 2006. In 2007, the USDA will introduce a new crop insurance product that will replace all existing yield and revenue products for all program crops.

b. Impact/accomplishment

- Sales of two of the products developed under this program continue to grow. In 2005 premiums from the Revenue Assurance product in Iowa equaled $215 million and sales from the Group Income insurance program in Iowa equaled $22 million. Premiums for the hog gross margin product in Iowa equaled $2 million. These products were used as the primary risk management tool on 13 million acres of Iowa crop ground and provided revenue guarantees to Iowa crop and livestock producers that exceeded three billion dollars. We are not aware of any other ISU research output that has such a large financial impact on Iowa agriculture.

c. Source of Federal Funds—Hatch

d. Scope of Impact—State Specific; Integrated Research and Extension

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, including:

- 41 Refereed Publications, Research Papers, Manuscripts
- 24 Non-refereed Publications, Reports, Technical Papers
- 25 Proceedings, Published Abstracts
- 10 Extension Publications
- 6 Invited Presentations
- 6 Education Programs, Field Days, Tours
- 12 individual consultations
- 3 books, chapters
- 7 theses, MS, PhD completed

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

① Genetic relationships to pork quality are being defined. Genetic markers for calpastatin were found that are associated with dry-cured ham quality. Because dry-cured hams are one of the greatest value-added products of the pork industry, this discovery has great potential to improve the profitability of this part of the pork industry.

② Safety of pork, beef and poultry meat products is being improved through use of combined technologies for greater antimicrobial impacts and for quality retention of the products for greater consumer acceptance. Irradiation, antimicrobial ingredients, high pressure processing and modified atmosphere packaging have been demonstrated to be highly effective when combined with other technologies such antioxidants for improved product quality as well as safety. These results provide consumers with a greater assurance of safe products without changes in expected quality characteristics.

- ISU participation in the following multistate research projects also contribute to goal 2: NC0100, NE1009, S0292, and S0295.

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 products, ①②
- greater public understanding of the principles of food safety and quality, and
- greater understanding of chemical, physical, and biological hazards to food safety. ②

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—$ 832,675

FTEs—4.0

Key Themes – Food Safety and Food Quality

Program 16: Improving the Quality and Safety of Muscle Foods

a. Description of activity

The role of the calpain/calpastatin system in development of tenderness and water holding capacity of muscle is being defined. Calpain degrades the intermediate filament desmin, resulting in increased tenderness, better water retention, and improved protein functionality in pork muscle. Rate of post-mortem pH decline and muscle oxidation-reduction potentials affect calpain activity. Muscle protein gelation during heating is directly affected by pH and temperature and has an important impact on moisture retention and texture of cooked, processed products. Research on safety improvements for meat products included development of practical reduction/elimination strategies for control of food-borne pathogens through use of irradiation, antimicrobial ingredients, high pressure processing and modified atmosphere packaging. Combining various treatments such as packaging systems with antimicrobials such as lactate and diacetate to provide a greater barrier to pathogens is being

investigated. Use of dietary supplements, including Vitamin E, selenium and conjugated linoleic acid for turkeys, has been studied as a means to improve quality of irradiated turkey breast meat. Research on eggs has included developing efficient and economical separation methods for value-added components from egg yolks and whites. Efforts are underway to produce functional ingredients from the separated egg components to further increase the value of eggs and to diversify the use of egg and egg products.

b. Impact/accomplishment

Advances in the knowledge base:

- Genetic relationships to pork quality are being defined. Genetic markers for calpastatin were found that are associated with dry-cured ham quality. Because dry-cured hams are one of the greatest value-added products of the pork industry, this discovery has great potential to improve the profitability of this part of the pork industry.

- Improved separation methods for egg components are providing new opportunities for the egg industry. Separation of several components of egg yolks and egg whites allows these components to be developed as separate functional ingredients for uses in other products. This increases the value and diversifies the use of eggs and egg products.

- Safety of pork, beef and poultry meat products is being improved through use of combined technologies for greater antimicrobial impacts and for quality retention of the products for greater consumer acceptance. Irradiation, antimicrobial ingredients, high pressure processing and modified atmosphere packaging have been demonstrated to be highly effective when combined with other technologies such antioxidants for improved product quality as well as safety. These results provide consumers with a greater assurance of safe products without changes in expected quality characteristics.

c. Source of Federal Funds—Hatch

d. Scope of Impact—State Specific

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, including:

- 60 Refereed Publications, Research Papers, Manuscripts
- 2 Non-refereed Publications, Reports, Technical Papers
- 39 Proceedings, Published Abstracts
- 2 Extension publications
- 24 Invited Presentations
- 7 Individual consultations

- 15 Books/Chapters
- 1 Patent filed
- 9 Thesis, MS/PhD Programs Completed

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

① We have demonstrated that a theory-based model of behavior change is effective in increasing the willingness of low-income young adults to consume fruits and vegetables. This group of young adults is often hard to reach, susceptible to food insecurity, and has inadequate access to health care.

- ISU participation in the following multistate research projects also contribute to goal 3: NC0100, NC0129, NC0170, and NC0219.

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

- increased public awareness of health promoting dietary and feeding behaviors, and ①
- increased dissemination of information through ISU extension project 330 ((Nutrition: choices for healthy FY 2000-2004). (see program 330)

State and Hatch Funds—$ 773,732

FTEs—5.6

Key Theme – Human Nutrition

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

a. Description of activity

During the past year our team has been very productive in researching the role of dietary components, food ingredients and whole foods in health promotion and disease prevention. We have developed novel food ingredients from plant and animal sources that provide unique functions in food products and also have potential benefits in the human body. We have explored the cellular and biochemical mechanisms in human metabolism that are affected by known nutrients such as vitamin A, iron, folate and vitamin B6, as well as food components such as soy protein, soy extracts, modified starches and lipid fractions. We have developed and tested educational programs to encourage behavior changes in young adults that will lead to increased consumption of fruits and vegetables. We have explored the use of probiotics in foods to increase their nutritional value and examined the role of micro-organisms in the digestive tract in metabolism of plant-derived compounds. We have studied the influence of dietary soy proteins and isoflavones on women's health and markers of cardiovascular risk.

b. Impact/accomplishment

Advances in the knowledge base:

- We have demonstrated that a theory-based model of behavior change is effective in increasing the willingness of low-income young adults to consume fruits and vegetables. This group of young adults is often hard to reach, susceptible to food insecurity, and has inadequate access to health care.

- We observed that dietary protein composition (isoflavone-rich soy vs isoflavone-poor soy vs whey control) by women did not adversely affect coagulation/fibrinolytic factors, which are typically adversely affected by estrogen replacement therapy. Yet a beneficial effect of soy on total antioxidant status, considered to be protective for cardiovascular disease was found, thus providing a dietary mechanism to reduce risk in this population.

- We have shown that Type 1 diabetes is a condition that dramatically perturbs the metabolism of folate, methionine, and homocysteine. The mechanistic basis for this interaction resides in the ability of a diabetic state (i.e., lack of insulin, elevated glucocorticoid leves) to activate a number of key proteins that regulate folate, methionine, homocysteine, and phospholipid metabolism. Through diet modification the consequences of diabetes may be ameliorated.

- We have found that traditional processing methods for cultured dairy products (including yogurt and cheeses) do not significantly increase the content of conjugated linoleic acid (CLA) in these products. The addition of probiotic bacteria and hydrolyzed fat sources during processing contributed to increases in CLA contents of yogurt products which will enhance the nutritional value of these foods.

c. Source of Federal Funds—Hatch

d. 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, including:

- 48 Refereed Publications, Research Papers, Manuscripts
- 56 Non-refereed Publications, Reports, Technical Papers
- 76 Proceedings, Published Abstracts
- 40 Extension Publications
- 74 Invited Presentations
- 154 Education Programs, Field Days, Tours (2,014 participants)
- 157 individual consultations
- 65 volunteers trained

- 3 Books & Chapters
- 104 Web Sites, Multi-Media
- 15 Theses, MS/PhD Programs completed
- 4 videos; 1 international conference; 5 US Crop Biosecurity Strategic Planning

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

① We have fine-tuned guidelines for liquid manure management to reduce surface runoff and to reduce commercial fertilizer use. The outcome of this project helped reduce commercial N fertilizer use by 50% for participating farmers, saving farmers approximately $20-30 per acre.

② Green manure derived from leguminous crops can contribute significant amounts of nitrogen to soils. In a controlled greenhouse and laboratory study, we measured the rate of nitrogen release as crop residues decomposed. The rate of nitrogen release was affected by the residues' contents of organic carbon and nitrogen, lignin, polyphenols, cellulose, hemicellulose, and amino acids. This information will help us predict the bioavailability of nitrogen in green manures used in field settings.

③ Monitoring plans have been developed to measure the effectiveness of Alternative Technology run-off control systems for four Iowa feedlots. The completion and submission of these monitoring plans to regulators were required before the facilities could be permitted for operation. All four feedlots have now received NPDES permits. The issuance of these permits clears the way for facility construction of the first NPDES permitted AT systems on beef feedlots in the nation. These feedlots will then be monitored for a two year period by ISU as part of an EPA funded research project to quantify the performance of alternative treatment systems for beef feedlot runoff.

④ 28 new putative species of fungi were discovered in the sooty blotch/flyspeck fungal complex (SBFS) in the Upper Midwest (Iowa, Missouri, Wisconsin, and Illinois). This discovery has revolutionized scientific understanding of the SBFS complex, which was previously thought to contain only four species. The work has created a new paradigm of genetic diversity in this pathosystem.

⑤ Field experiments showed that warning systems for diseases of apples and muskmelons saved 2 to 3 fungicide sprays per season compared to conventional spray timing, reducing input costs by $50 per acre per year. These experiments provide commercial growers with practical models of how to reduce fungicide use without sacrificing yield or quality.

- ISU participation in the following multistate research projects also contribute to goal 4: NC0100, NC0205, NC0218, NC1005, NC1012, NC1017, NC1119, NE1021, NRSP004, S0291, S0303, S1000, S1004, W0082, W1133, W0170, W0187, and W188.

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

- increased utilization of integrated pest management, sustainable, and organic agricultural practices, ①②④⑤
- adoption of better manure management practices, and ①③
- increased wetland restoration and improved riparian management on public and private lands.

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—$ 2,492,165

FTEs—21.3

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

- *Integrated approach to tillage and manure management*. We have fine-tuned guidelines for liquid manure management to reduce surface runoff and to reduce commercial fertilizer use. The outcome of this project helped reduce commercial N fertilizer use by 50% for participating farmers, saving farmers approximately $20-30 per acre.

- *Green manure*. Green manure derived from leguminous crops can contribute significant amounts of nitrogen to soils. In a controlled greenhouse and laboratory study, we measured the rate of nitrogen release as crop residues decomposed. The rate of nitrogen release was affected by the residues' contents of organic carbon and nitrogen, lignin, polyphenols, cellulose, hemicellulose, and amino acids. This information will help us predict the bioavailability of nitrogen in green manures used in field settings.

- *Soils, Society, and the Environment*. A new book titled "Soils, Society, and the Environment" (published by American Geological Institute) was co-authored by T.E. Loynachan. Each member attending the 2006 World Soil Science Congress will receive a copy. The book stresses how soils are closely related to societal future and a clean, healthy environment. It is hoped that this book will influence policy makers and soil users on the importance of maintaining soil resources.

- *Strip intercropping*. Complex cropping systems have significant potential to serve more than one purpose. Strip intercropping with three crops in the system was shown to be more productive than traditional systems and delivered tile drainage water lower in nitrate than other systems deliver. Farms with goals of increasing net return per land area and increasing ecosystems services may find this system both economically and environmentally favorable and aesthetically appealing. Economic value is dependent on the value of ecosystem services (which are undefined) and crop commodity prices.

- *Coated urea fertilizer*. We evaluated the efficacy of a coated urea fertilizer for corn production for the past three years. Data-to-date suggest that the material shows promise in terms of increasing corn grain yields while minimizing the amount of nitrogen remaining in the soil following harvest. Average grain yield increases are in the range of 6 to 13 bu/A at 6 of 8 sites.

- *Analysis of water-treatment lime sludge*. A project determining an improved method of sieve analysis of processed water-treatment lime sludge was completed. Standard sieve analysis procedures greatly under-estimate sieve score and hence reactivity of water-treatment lime sludge. The results of this study are the basis for new sieve-analysis procedures used by the State of Iowa.

- *Measuring soil water content*. We evaluated the ability of two methods, time-domain reflectometry (TDR) and a heat-pulse method, for determination of soil water content. Studies of eight soils showed that both TDR and heat-pulse methods gave reliable soil water content data, with root mean square errors 0.02 m3 m-3, when compared to gravimetrically measured water contents. The TDR method showed less sensitivity to soil spatial variability than did the heat-pulse method. The heat-pulse technique seemed better suited than TDR for water content measurements on soils with relatively high organic matter content. These research findings may encourage other researchers and soil manager to employ a heat-pulse method to make accurate determinations of soil water content.

c. Source of Federal Funds—Hatch

d. Scope of Impact—State Specific; Integrated Research and Extension

Key Theme – Integrated Pest Management

Program 22: Integrated Pest Management

a. Description of activity

- Research is underway to identify key areas where farmers can optimize their production systems in a more economic and environmentally way. Studies include: crop rotation, replant decisions, soil fertility, inoculum and hail injury.

- The major foci of integrated management of diseases of apples were on characterizing species diversity in the sooty blotch/flyspeck complex on apples and field evaluation of

site-specific weather data for application to disease-warning. In addition to evaluation of site-specific anthracnose warning for muskmelons, research focused on the development of alternatives to conventional pesticides for management of bacterial wilt of muskmelons.

- Quantitative temporal and spatial epidemiological methods and models are coupled with GPS and GIS technologies to develop models to assess the risks and benefits of new agricultural biotechnologies, as well as to predict the risks and potential impacts of new and emerging plant pathogens that threaten US (and Iowa) agriculture.

- Field monitoring was conducted for black cutworms, western bean cutworm and rotation-resistant corn rootworms. The black cutworm monitoring is published in the Integrated Crop Management Newsletter to alert growers when it is time to sample for the presence of larvae in corn. The western bean cutworm monitoring demonstrated that this parasite had spread across the state. Corn rootworm samples documented that the rotation-resistant variant was present in east-central Iowa.

- Efforts were under way to enhance crop production efficiency in Iowa by facilitating improved disease management through an increased awareness of crop pathosystems by crop production professionals and producers.

- Before 2001, insecticide input for soybean production was limited to few if any economic insect pests within the North Central region. With the arrival of the soybean aphid this trend has changed and currently insecticide costs range from $7-14 per acre. The focus of the Soybean Entomology Laboratory at Iowa State University was on the soybean aphid, Aphis glycines, an invasive pest that produced high populations during the 2005 growing season resulting in an estimated 2 million acres of soybeans treated with a foliar insecticide.

b. Impact/accomplishment

- Replant decisions for soybean may be improved by optimizing variable costs. Seed and chemical costs account for a large part of production costs. New herbicide technologies allow farmers to reduce soybean plant populations if replanting is required in the spring.

- 28 new putative species of fungi were discovered in the sooty blotch/flyspeck fungal complex (SBFS) in the Upper Midwest (Iowa, Missouri, Wisconsin, and Illinois). This discovery has revolutionized scientific understanding of the SBFS complex, which was previously thought to contain only four species. The work has created a new paradigm of genetic diversity in this pathosystem.

- Field experiments showed that warning systems for diseases of apples and muskmelons saved 2 to 3 fungicide sprays per season compared to conventional spray timing, reducing input costs by $50 per acre per year. These experiments provide commercial growers with practical models of how to reduce fungicide use without sacrificing yield or quality.

- Satellite imagery is being used and processed to develop algorithms that can detect, monitor, and quantify the impact of Asian soybean rust on soybean crops in other countries (Brazil, Paraguay, Argentina, and South Africa), and in the US (Florida, Alabama, and Georgia). Multiple images obtained over time have enabled us to differentiate Asian soybean rust from other biotic stresses.

- The Iowa State Model developed to forecast (pre-plant) the risk of Stewart's disease is considerably more accurate than previous models. It successfully predicted the seasonal and county-level risk for Stewart's disease in Iowa since 1999. GIS disease risk maps provide pre-plant risk information that allows seed corn producers to select planting sites with a low seasonal risk for Stewart's disease.

- Previously it was assumed that disease severity must increase in logarithmic steps before a person (rater) can perceive a difference in disease severity levels. It was shown, using psychophysical methods, that raters actually perceive increasing levels of disease severity in a linear fashion. These findings have tremendous implications regarding visual disease (and insect injury) assessment theory and practice, as assessment scales, diagrammatic keys, and methods should be linear, not logarithmic.

- Research was completed during the 2005 growing season resulting in the development of a scouting and economic threshold for soybean aphid management. Use of the threshold developed at ISU with regional partners resulted in improved insecticide performance and greater yield protection than a preventative, calendar approach to insecticide application.

- Based on surveys conducted in 2005, over 75% of growers and commercial applicators in Iowa indicate that they are aware of Iowa State University recommendations for soybean aphid management and use some if not all of these recommendations when making their management decisions.

c. Source of Federal Funds—Hatch; Smith-Lever

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

Key Theme – Agricultural Waste Management

Program 23: Animal Waste Management

a. Description of activity

The program has focused on a number of waste management issues, including but not limited to the following:

- developing a framework for process-based ammonia emission models for livestock production,
- emissions: monitoring, pre- and post-excretion mitigation strategies, and effects of ammonia emissions,
- determination of building ventilation rates,

- effects on nutrients of animal manure used as fertilizer,
- disposal of livestock mortalities, and
- feedlot runoff control models.

b. Impact/accomplishment

Advances in the knowledge base:

- *Concentration and Extraction of Phosphorous from Swine Manure*. Results have shown that struvite can be used as a method to extract phosphorous from swine manure slurries. Formation of struvite has been shown to be feasible in swine manures through the addition of magnesium chloride brine in laboratory tests.

- *Monitoring Ammonia Emissions from Broiler Houses*. Mobile Monitoring Emissions Units were developed that can be used as a pattern for others that may be needed in the upcoming national Air Quality Consent Agreement. Photo-acoustic units have been shown to be a highly accurate and reliable method for monitoring ammonia in animal housing facilities by the results to date.

- *Open Feedlot Runoff Control Model Peer Review Completed*. The peer review process for four models, the Effluent Limitations Guideline Model (ELG), Vegetated Treatment Area Model (VTA), Vegetated Infiltration Basin Model (VIB) and the Combined Vegetated Treatment Area / Vegetated Infiltration Basin Model (VIB/VTA), was completed. The use of these models will be required for the successful design and permitting of first alternative treatment systems to be permitted in the nation under the 2003 revised Concentrated Animal Feeding Operation regulations. The successful completion of the peer review process was required before any alternative treatment systems for beef feedlot run-off in Iowa could be permitted. The first alternative treatment system permits for CAFOs in the nation are expected to be issued based on the ISU model results for six beef feedlots in Iowa. These feedlots will then be monitored for a two-year period by ISU as part of an EPA funded research project to quantify the performance of alternative treatment systems for beef feedlot runoff.

- *Open Feedlot Alternative Technology Runoff Control Monitoring Plans Developed*. Monitoring plans have been developed to measure the effectiveness of Alternative Technology run-off control systems for four Iowa feedlots. The completion and submission of these monitoring plans to regulators were required before the facilities could be permitted for operation. All four feedlots have now received NPDES permits. The issuance of these permits clears the way for facility construction of the first NPDES permitted AT systems on beef feedlots in the nation. These feedlots will then be monitored for a two year period by ISU as part of an EPA funded research project to quantify the performance of alternative treatment systems for beef feedlot runoff.

- *Research & tech transfer program on environmentally safe and sustainable disposal of routine poultry and livestock mortalities*. This research program is one of the very first in the U.S. to comprehensively demonstrating and scientifically documenting the feasibility, environmental impacts, and bio-security of using composting for disposal of large

numbers of carcasses in the event of a disease outbreak or agro-terrorism. The bio-security component of the is project carried out by faculty in ABE and Veterinary Medicine at ISU demonstrated good potential for composting to retain and inactivate viruses such as Newcastle Disease virus, and avian encephalomyelitis.

- *Research & tech transfer program on environmentally safe and bio-secure emergency disposal of poultry and livestock mortalities*. Composting has been widely used for disposal of small species (poultry, swine) but the practicality and environmental impacts of using it for very large carcasses has not been well documented. This project monitored composting of 54 tons of 1,000-lb cattle carcasses and demonstrated its practical feasibility and minimal impact on air, soil, and water resources.

- *The Effects on Nutrients of Animal Manure Used as Fertilizer*. Animal manure is frequently used as a nutrient resource for crop production rather than commercial fertilizer. However, there are questions related to the environmental impacts of this practice especially on subsurface drained lands. Our program has found that when animal manure is applied at similar fertilization rates as commercial fertilizer, the nitrate-nitrogen loss through subsurface drainage is similar. With rising costs of commercial fertilizer efficient use of animal manure as a fertilizer resource will improve the economic return for producers.

- *The Effects of Ammonia Emissions from Commercial Layer Houses* (collaborated with KY and PA). The findings also have been disseminated to the egg industry and allied industries through local, regional and national extension/education workshops. The data contribute to the much needed baseline emission information for animal feeding operations under U.S. production conditions.

- *We are developing a framework for process-based ammonia emission models for dairy, swine and poultry* (in collaboration with CA). The model provides a comprehensive evaluation of production practices on ammonia emission. Once completed and validated, it is anticipated to be a powerful tool for estimating emission inventories and predict impacts of various best management practices on reduction of ammonia emissions.

c. Source of Federal Funds—Hatch

d. 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

Increased climate variability has contributed to large year-to-year variations of crop production throughout the Midwest during the last two decades, following a relative "benign" period from the fifties through the seventies. This shows the importance of understanding climate variations and their effects on production variation so that producers can maximize their efforts in conjunction with the governmental programs in place. A

concern is that natural or human-induced climate changes, as suggested by observations and global climate models, could have marked impact on crop production. There is a particular need to address climatological trend interpretation and climate change at regional scales, especially warm season rainfall, which is of great importance to agricultural interests. Because of the interconnection of the global climate system and the global agricultural economy, it is also important to understand climate variability in other regions of the world which may affect markets and agricultural competitors.

b. Impact/accomplishment

- We manage the Iowa Environmental Mesonet, http://mesonet.agron.iastate.edu, which collects weather and climate data from many sources and makes these data available over the World Wide Web. Alerts issued through the Mesonet were directly responsible for saving lives and property in the central Iowa tornados of November 12, 2005. We received an award from KCCI TV in recognition of the Mesonet's contribution.

c. Source of Federal Funds—Hatch

d. Scope of Impact—State Specific

Key Theme – Water Quality

Program 24: Improving Water Resources Management in an Agroecosystem

a. Description of activity

- Over 500 grade control structures (GCS) have been placed in the loess soils region of southwestern Iowa since 1991 to protect infrastructure and farmland. These structures consist of a vertical sheetpile dam and a downstream apron of rock rip-rap. Increases in habitat heterogeneity near these structures may positively influence both macroinvertebrate and fish communities in reaches near GCS compared to reaches not associated with GCS. However, reports that sport fish populations have declined since the installation of GCS in the region have spurred an investigation of fish movement over these structures.

- Plastic-lined ponds at the Rathbun Fish Hatchery and Fish Culture and Research Facility can not accommodate high stocking densities of channel catfish. Without sediment to adsorb over-abundances of phosphorus added from feed, dissolved oxygen deficiencies are possible. If feed is restricted to control nutrient levels, growth of the channel catfish fingerlings will be compromised.

b. Impact/accomplishment

Advances in the knowledge base:

- Our research, using mark-recapture methods to evaluate fish movement over 1:4 and 1:15 sloped GCS in Turkey Creek, Cass County, IA, involves seasonal electrofishing sampling to determine the effects of GCS on fish communities in Turkey Creek, and

macroinvertebrate sampling from GCS rip-rap and non-GCS sites in Walnut Creek, Montgomery County, IA to evaluate the effects of GCS on macroinvertebrate assemblages. Baseline data shows that channel catfish, flathead chub, and creek chub are able to pass over structures of 1:20 slope in Walnut Creek but have far reduced rates of movement and restriction of movement over 1:4 sloped structures in Turkey Creek. To-date there has been a limited amount of information related to fish's ability to navigate bridge-protection barriers. Conclusions from this study may be used by decision makers concerning the new construction, modification, or possible removal of grade control structures in the region.

- The optimal stocking densities for these plastic-lined ponds should be between 38,000 and 75,000 fish/ha using a lower protein catfish diet. By using lower stocking densities the Iowa Department of Natural Resources can use less feed while culturing a larger and healthier fish that will survive better once stocked into public waters. Also, costs can be reduced since the feed will contain lower protein levels.

c. Source of Federal Funds—Hatch

d. Scope of Impact—State Specific; Integrated Research and Extension

Key Theme – Natural Resources Management

Program 26: Improving Environmental Quality in a Changing Landscape

. Description of activity

The goal of this research is to bring together diverse research capabilities to study how large scale environmental changes, such as changes in the landscape of agro-ecosystems, global warming or energy development impact on natural processes that influence the distribution, abundance, and diversity of animal and plant species. During the past year, a major interdisciplinary effort was focused on studying the economic value and perceptions concerning lake water quality and usage in Iowa. Economists and ecologists linked physical and ecological parameters of water quality with household perceptions regarding on recreational lake usage. The results can be used to guide water quality improvements in the state. A second set of activities attempted to estimate the costs of implementing a variety of conservation practices across the landscape and simultaneously estimated the improvements in water quality that the set of practices implied.

Another researcher is examining the environmental impacts of wind energy developments. Although placing developments in agricultural landscapes may appear to pose limited environmental risk, wind farms were shown to cause measurable impact on migrating bats and birds. Learning more about bat migration routes should lead to better guidelines for development sites.

Our collaborations continue to lead to improved understanding of ecological mechanisms from which we can more reliably predict the impacts of environmental change on biodiversity. The research has practical implications that range from management of invasive species, integrated pest management, and economic valuation of wildlife. This year we have

focused particularly on developing spatial statistical tools to quantify the movements of animals and plants at scales ranging from local (e.g. to predict habitat selection of animals) to regional (e.g. to predict shifts in species distributions as a result of climate change or species invasions). We continue to work in a wide variety of nationally-prominent as well as locally important ecosystems, including the Rocky Mountains, the Great Plains, the Southeast, the Gulf Coast, and most prominently the corn belt of Iowa. We had extramural funding from NRCS, USFS, USGS, NPS, USFWS, USEPA, IADNR, and IADOT. We expend considerable effort on outreach to the public; in one case the public were actively involved in data collection.

a. Impact/accomplishment

- Studies of insects, birds, and mammals within landscapes revealed that the size, shape and linkages among habitat patches had substantial influence on the ecological processes. Using projections based on landscape configurations under various scenarios and modeling population responses (http://www.eeob.iastate.edu/faculty/ClarkW/html/poweshiek.htm) we have been able to provide the Natural Resource Conservation Service and federal agricultural policy makers updates on the projected fish and wildlife benefits of farm bill conservation programs.

- The Iowa Lakes' Project that involves a number of the researchers in our group was designed to summarize water quality in 132 of Iowa's lakes, and to study the ecological processes in individual lakes, such as Clear Lake. In all the watersheds, water quality is related to the landscape and land use within the watershed that results in different nutrient inputs, particularly phosphorus, in turn influencing bacteria, algae and the rest of the ecological components of the system. Understanding the system can be used to predict future water quality under various scenarios of improved watershed characteristics.

b. Source of Federal Funds—Hatch

c. Scope of Impact—State Specific

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, including:

- 45 Refereed Publications, Research Papers, Manuscripts
- 124 Non-refereed Publications, Reports, Technical Papers
- 26 Proceedings, Published Abstracts
- 14 Extension Publications
- 51 Invited Presentations
- 79 Education Programs, Field Days, Tours (3,073 participants)

- 99 individual consultations
- 70 volunteers trained
- 106 web pages supported
- 13 Books & Chapters
- 2 patents
- 27 Theses, MS/PhD Programs Completed

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

① The Horizon Program provides leadership training and community support to small rural communities across eight states in an effort to reduce poverty and increase citizen capacity in local decision making. The program's leadership component provided training to over 170 residents in three Iowa communities that have a written vision statement with action plans. One community received over $130,000 to create Circles of Support in order to address poverty.

② Integrated research and outreach programming concerning the application of experience economy concepts was done to improve the competitiveness of small rural retail and hospitality businesses. Results were shared at the ITAA 2005 Annual Meeting to approximately 150 clothing professionals. Additionally, the experience economy outreach projects have provided service learning opportunities for nearly 500 FCS students to date in six small Iowa communities.

③ Longitudinal results suggest that mothers' entry into employment had positive consequences for adolescents' mental health, while exits from employment increased behavior problems. Additionally mothers' exits from welfare reform enhanced adolescent cognitive achievement and reduced drug and alcohol abuse. Findings from an assessment of the impact of welfare reform on maternal well-being and child functioning have been shared with national and regional legislators to prepare for re-authorization.

④ A combination of survey data from community leaders and analysis of community characteristics was used to study the role of local housing decisions for rural economic vitality. The proportion of elderly and availability of services and housing for them emerged as critical factors. Results are being shared with the community leaders, and for housing and development professionals.

⑤ Results from an experimental study of the impacts of an intensive workshop-based training program for infant and toddler caregivers have been shared with regulators to highlight the importance of inspections and licensing for family child care improvement. Iowa legislation to implement a quality rating system is under consideration to provide information to parents about the relative quality of their children's early care and education program.

- ISU participation in the following multistate research projects also contribute to goal 5: NC0100, NC1001, NC1011, NC1014, NC1016, NC1100, NE0167, NE1011, and S0296.

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

- communities supporting development projects; increased capacity of communities, families, and individuals to improve their own quality of life, ①④
- improved cooperation between the university, state and federal agencies, industries and communities to transfer technology that will lead to industrial growth and rural development [also see value added program under goal 1], and ②
- enhanced education of decision-makers at local, regional, and state levels; those initiating development projects; and those setting policies. ①②③④⑤

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—$ 1,630,974

FTEs—15.6

Key Theme – Impact of Change on Rural Communities

Program 27: Rural Development

a. Description of activity

The purpose of this program is to develop research and outreach activities to improve the efficiency, productivity, and sustainability of agriculture and the prosperity and well-being of people who live in rural Iowa. The program seeks to inform potential development policies and projects that can be provided through education and outreach.

Critical issues related to rural development involve the changing structure of agriculture and rural communities, as well the relationships between rural and urban sectors. Topics raised by stakeholders include assessing the image of agriculture and the quality of health and rural life among rural residents, evaluating environmental issues, training rural leaders, educating rural residents through outreach, considering the increased diversity in the rural population and job market, educating future scientists while also sharing research ideas and results with the general public, and examining potential implications of policies related to rural areas.

b. Impact/accomplishment

- The Horizon Program provides leadership training and community support to small rural communities across eight states in an effort to reduce poverty and increase citizen capacity in local decision making. The program's leadership component provided training to over 170 residents in three Iowa communities that have a written vision statement with action plans. One community received over $130,000 to create Circles of Support in order to address poverty.

- The food insecurity project strengthened local partnerships among public and private organizations in one county through the mapping of all local safety net organizations. The

mapping project offered a concrete focal point for building partnerships and provides a model for programs on food insecurity. The ISU hunger website (www.extension.iastate.edu/hunger) had 191,628 hits in 2005, an average of 473 hits daily. This web site includes Iowa county level poverty and food profiles, five policy briefs on Iowa food insecurity, educational materials for developing a local food insecurity program, techniques and instruments for gathering local data, and links to state and national food insecurity sites.

- The development of two Watershed citizen/farmer groups in NE Iowa supported by USDA 406 Water Quality grants has resulted in strong partnerships among farmer organizations, local farmers, and ISU Extension with the goal of developing a performance based environmental management model. This model resulted in farmers setting common goals for their watersheds and committing to land practices that accomplish those goals. In the process farmers are learning to gather and utilize better data about N and P for specific crops and soils.

c. Source of Federal Funds—Hatch

d. Scope of Impact—State Specific; Integrated Research and Extension

Key Theme – Other

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

a. Description of activity

Research continues in a number of areas:

- Small town consumers' shopping behavior (Internet and other distribution channels) to assess change in information search over time for food and fiber products.
- Enhancement of consumer well-being, including consumer stereotypes of obese individuals and consumer assessments of government publications about overweight and obesity.
- Factors determining consumer acceptance of new e-commerce technology.
- Improving the competitiveness of small rural retail and hospitality businesses, including small Iowa retailers' use of computers and the Internet at home and at work, and their use of the Internet for commercial buying and selling of goods and services.

b. Impact/accomplishment

Advances in the knowledge base:

- Analysis continued on longitudinal panel data on rural and small town consumers' shopping behavior (Internet and other distribution channels) that will assess change in information search over time for food and fiber products. Findings from this study provided important strategic information for small rural retailers regarding use of the Internet in their business models.

- Research indicates that pleasure, ease of use, and usefulness are important factors determining consumer acceptance of new e-commerce technology. For image interactivity technology (i.e., virtual model or 'mix and match' apparel website features), in particular, the pleasure of the use experience was just as important as the enhanced product information derived from the technology. In addition, the technology should simulate the product experience created in the bricks-and-mortar store to have a positive impact on consumers' attitude, willingness to purchase, and willingness to return to the website. Combining mass customization with the co-design processes in Internet shopping sites allows manufacturers to mass-produce customized goods and provide customers the opportunity to individualize products.

- Integrated research and outreach programming concerning the application of experience economy concepts was done to improve the competitiveness of small rural retail and hospitality businesses. Results were shared at the ITAA 2005 Annual Meeting to approximately 150 clothing professionals. Additionally, the experience economy outreach projects have provided service learning opportunities for nearly 500 FCS students to date in six small Iowa communities.

- Research suggests that retailers' personal use of computers and the Internet does foster their application of e-commerce technology for business purposes. Rural retailers' engagement in e-purchasing was related to financial performance, but not to selling goods on-line. Results provide a basis for business consulting and rural community development programs targeted to the specific technology needs of small retail firms. Another project with the rural Iowa retailer data focused on development and testing of a model based on the diffusion of innovations perspective and the Technology Acceptance Model (TAM). Findings revealed that technology use did significantly influence marketing capabilities for small rural firms and their relative firm performance. However, technology use did not significantly impact the implementation of on-line selling for these retailers. Two phases of research findings regarding small retailer computer and Internet use were presented to the Iowa Retail Federation (IRF), Urbandale, IA. This trade organization represents approximately 3,000 Iowa retail firms, the majority of which are independently owned and operated. Results of the initial descriptive study and model testing were synthesized for lay audiences and presented to IRF constituencies on their website and in newsletter form.

c. Source of Federal Funds—Hatch

d. 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 community and social services and support to families. These investments must be based on scientifically valid research that responds to a variety of challenges: population aging and

employment needs, changing family structure, and the devolution of social service policymaking to the community level.

b. Impact/accomplishment

- Longitudinal results suggest that mothers' entry into employment had positive consequences for adolescents' mental health, while exits from employment increased behavior problems. Additionally mothers' exits from welfare reform enhanced adolescent cognitive achievement and reduced drug and alcohol abuse. Findings from an assessment of the impact of welfare reform on maternal well-being and child functioning have been shared with national and regional legislators to prepare for re-authorization.

- A combination of survey data from community leaders and analysis of community characteristics was used to study the role of local housing decisions for rural economic vitality. The proportion of elderly and availability of services and housing for them emerged as critical factors. Results are being shared with the community leaders, and for housing and development professionals.

- Results from an experimental study of the impacts of an intensive workshop-based training program for infant and toddler caregivers have been shared with regulators to highlight the importance of inspections and licensing for family child care improvement. Iowa legislation to implement a quality rating system is under consideration to provide information to parents about the relative quality of their children's early care and education program.

c. Source of Federal Funds—Hatch

d. Scope of Impact—State Specific

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:

- 21 Refereed Publications, Research Papers, Manuscripts
- 82 Non-refereed Publications, Reports, Technical Papers
- 35 Proceedings, Published Abstracts
- 114 Extension Publications
- 791 Invited Presentations
- 12,108 Education Programs, Field Days, Tours (70,570 participants)
- 64,420 one-on-one consultations
- 993 volunteers trained
- 5,086 web pages supported
- 2 Books and chapters

- 1 Patent
- 5 Theses, MS/PhD Programs Completed
- 2 videos
- 36 newsletters
- 38 radio/tv
- 5 software programs developed

① Iowa State University provides the educational portion of the state law required manure confinement and commercial applicator certification programs. Pre-surveys of applicators in 2004 and post-surveys in 2005 programs documented adopted adoption of manure management practices due to information learned in the certification programs. For commercial manure applicators: emergency action plan or spill kit – 37% planned and 53% actual adopted; meeting manure application rates as specified in manure plan – 15% planned and 50% actual adopted. For confinement site applicators: emergency action plan or spill kit – 59% planned and 56% actual adopted; implementing bio-security measures – 27% planned and 68% actual adopted.

② Members have worked to help Iowa's grape and wine industry grow by holding local demonstrations and workshops, regional meetings, one-on-one consultations, and contributing to a comprehensive web site that provides up-to-date information. This information, learned through these contacts, has been put to immediate use in the vineyards and/or wineries. Iowa's wine-grape industry has gone from five vineyards, 32 acres, 13 wineries in 2000 to 271 vineyards, over 600 acres and 52 wineries in 2005. An industry that produced 50,000 gallons of wine in 2003 has gone to over 123,000 gallons of wine in 2005. An industry that held 2.1% of Iowa wine sales marketshare in state fiscal year 2002 has gone to 4.1% market share in state fiscal year ending on June 20, 2005.

③ Education provided in the Master Woodland Managers Program has contributed to the improvement and expansion of tree resources in Iowa by the actions and examples of these volunteer "woodland ambassadors." Participants from the first 30 sessions have already contributed over 22,400 hours of documented public service.

④ The 'Iowa Bull Clinics: Selection Decisions 2005' series was developed and facilitated to address three focus points: 1) What is the market of the future?; 2) How do producers wade through the data to select the 'best' bull for their operation?; and 3) Gene markers – what products are available? A new computer sire sort program (Selection Emphasis Module) was demonstrated during this workshop. Thirty-two percent reported a financial impact of $500-$1,000.

⑤ ISU Extension has organized several companies to help producers collectively sell either a specific genetic line or breed or a label such as "natural" or produced by family farms, and has worked with several of the groups to create a business structure to meet short- and long-term goals of the core groups' values, principles and goals. Many of these pork niche groups are bringing back between $8 and $12 per cwt above the spot market for the producers' hogs. Additionally the ability for producers to participate in the equity growth of the company and brand is also extremely important since that contributes to individual wealth creation in rural Iowa.

⑥ As a result of ISU Extension meetings, as well as individual personal contacts, farm visits, and continuous monitoring, somatic cell counts in 16 herds (5094 cows) was reduced to an average of 230,000 (range 100,000 – 460,000). Based on increased milk potential of 400 pounds/cow (200 pounds in first lactation), this resulted in an increase of 1.68 million pounds of milk or $252,180 ($15/cwt milk price). An extra quality premium associated with higher quality milk ($.50/100 pounds of milk) adds an additional $582,754 of revenue for these 16 herds.

⑦ ISU Extension has been working closely with the research arm of ISU in expanding the seed supply of the new varieties of low linolenic acid. The FDA is requiring that transfats be labeled in packaged foods starting January 1, 2006. The pending labeling requirement has spurred a great interest in finding alternatives to using hydrogenated soybean oil. Two local Iowa farm producer groups have picked up the project and are expanding the seed supply and arranging processing and final markets for the new soybean oil. One of the groups has moved up the value chain and is partnering with local agricultural cooperatives to merchandise seed and contract acres to be crushed with another value chain partner, the soybean crusher and refiner. They have also moved up the value chain further by making marketing agreements with oil distributors to market the product. The group is ISO certified and maintains a traceable trail from seed to end user. The group sells a branded oil product and operates as a LLC. Another local Iowa producer group is also expanding the seed supply and working on developing processing and marketing partners up the value chain. ISU Extension has been very active in assisting these groups in all phases of organization, development, and execution of their program. Impacts have included better health alternatives (foods without or with less transfat) and a major economic impact for the State of Iowa. Farmers are receiving a $.75 to $1.00/bu. premium for growing the beans, processors are getting business, and marketing profits are going back to Iowa investors. At the present time five FTE jobs have been created and more will follow.

⑧ ISU Extension, along with their partners from the University of California and Kansas State University, has developed an electronic center for farmers on value added agriculture. The website — www.AgMRC.org — receives more than three million hits per month. It has more than 8,000 links and features more than 200 detailed profiles on various products and commodities, links to all the relevant state laws for value added agriculture, in-depth features on business development and information on markets and industries. The staff responded to 529 phone calls for more information and more than 600 emails.

⑨ The Iowa Master Gardener Program is an educational and volunteer service program of ISU Extension and the College of Agriculture. This year 500 adults were trained to become Master Gardeners. In calendar year 2005, Iowa's Master Gardeners in 81 of Iowa's counties reported over 81,990 hours of volunteer educational service to their communities. Assuming a value of $11.46 per hour for volunteer time, the Iowa Master Gardener program provided approximately $940,000 of education and service to local communities.

⑩ The Iowa Community Tree Steward Program includes six 4-hour training sessions over a six-week period, and is offered at two different locations each year throughout Iowa. Participants contribute 24 volunteer hours of service to their community forests. To date, 599 participants

have completed the Iowa Community Tree Steward Program and have donated 15,996 hours of volunteer service to their communities.

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

This project focuses on developing the farmers' strategic and organizational management skills. Key elements of the program for FY 2005 were:

- Ongoing workshops and other educational activities to improve the skills of farmers and landowners in developing, assessing and managing leasing arrangements.
- Programs within "Annie's Project" that examine business strategy and resource acquisition – with an emphasis on leasing and risk management.
- Conversion of the "Strategic Advantage" workshop material to a web-delivered course through the Agricultural Management E-School (AMES).
- Material presented through Pro-Ag meetings that examines the competitive position of Iowa farm businesses relative to external threats and opportunities.
- New material development that examines the role of value-added investments in farmers' long range financial planning.
- Research and outreach materials developed to examine the impact of ethanol expansion on the competitive position of Iowa's soybean industry.

b. Impact/accomplishment

- *Ethanol and the soybean industry*. The growth of the ethanol industry in Iowa and the U.S. has been viewed as an unambiguous success for agricultural producers and agribusiness. However, soybean producers and processors have become concerned that increased paying prices for corn and a glut of co-products from ethanol production could result in a loss of soybean acres, processing plants and infrastructure. At the request of the Iowa Soybean Association, Extension Economists prepared a firm and market level analysis of the possible impact ethanol industry expansion could have on farmer's planting decisions, paying prices for corn and soybeans and farm incomes. The key result was that soybean acreage would likely decline in Iowa, but this decline can be mitigated by the rotational benefits of soybeans and improvement in soybean productivity and

utilization. The results of this analysis were presented to leadership groups within the soybean industry as part of their strategic planning activities.

- *Leasing farmland*. Leasing is one of the primary means, through which farmers acquire land resources. Leasing allows farmers to leverage their owned land, machinery and managerial skills – often in a more efficient way than would be possible through ownership. With changing technologies, farm program provisions and risk management tools, leases must be continually updated. Workshops and written materials on leasing and leasing arrangements are of vital importance to farmers as they seek to improve their competitiveness through improved efficiency and financial structure. One of the key components in leasing education is accurate information on leasing rates. An annual survey of cash rental rates is conducted by Extension Economists. This information is disseminated through the farm press and is incorporated into leasing workshops and written reports, cost of production estimates and risk management programs. During FY 2005, this information was downloaded from our Ag Decision Maker and Extension websites more than 24,000 times.

a. Source of Federal Funds—Smith-Lever

b. Scope of impact—State Specific

Key Theme – Plant Production Efficiency

Program 103: Crop Nutrient Management

c. Description of activity

Having nutrients readily available for plant uptake is essential for crop production. Management of all nutrient sources, including fertilizer and manure, within the constraints of farm production systems and operational goals are prerequisite for both profitable crop production and environmental sustainability. Inappropriate management can lead to lower economic return and potential environmental degradation. Recognizing that fertilizer use is a major input cost for crop production touches on the importance of recognizing and appropriately using alternate sources of nutrients in crop production systems, such as manure. Doing so will help Iowa producers optimize systems for comprehensive farm planning and maintain long-term economic viability and environmental stewardship.

d. Impact/accomplishment

- *Identifying Sulfur Deficiency Problems in Alfalfa*. The last few years many alfalfa fields in northeast Iowa have exhibited areas of light green color and poor growth. After investigation of several possible causes, the problem was determined to be sulfur deficiency. After conducting on-farm research and providing educational programs producers responded by using of sulfur fertilizer with average net profit of $40 per acre and improved alfalfa forage quality.

- *Manure Applicator Certification Program Evaluation*. Iowa State University is designated to provide the educational portion of the state law required manure

confinement and commercial applicator certification programs. Pre-surveys of applicators in 2004 and post-surveys in 2005 programs were used to document if applicators had adopted specific manure management practices due to information learned in the certification programs. For commercial manure applicators: emergency action plan or spill kit – 37% planned and 53% actual adopted; meeting manure application rates as specified in manure plan – 15% planned and 50% actual adopted. For confinement site applicators: emergency action plan or spill kit – 59% planned and 56% actual adopted; implementing bio-security measures – 27% planned and 68% actual adopted.

- *Compendium of Research Reports on Use of Non-Traditional Materials for Crop Production Web Site*. Non-traditional products are continually promoted to producers for use in crop production. To increase the availability of research-based information on efficacy of these products, a searchable web site was created to allow easy access to research publications. From the time the site went on-line March 1, 2005, through September 30, 2005, the site had 1,250 visits and 2,500 page views.

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

Women involved in farming in Iowa often have primary responsibility for accounting records, insurance, government program details, and marketing decisions. Iowa State University Extension offers many educational programs and tools to help improve people's abilities to make these decisions. Many farm women feel more comfortable learning about financial and risk management decisions in an all-female audience, and value the contacts and relationships developed in such an environment. At least four different education programs, some with multiple sites, were carried out during the 2004-2005 reporting period that were targeted directly toward female audiences. These were organized under the names of Annie's Project, Overall Women, Women in Denim, Iowa Women in Agriculture, and Women, Land and Legacy. In most cases ISUE personnel were directly involved in the organization and teaching, while in some cases they served as consultants and program presenters.

b. Impact/accomplishment

From October through September, 15 Annie's Project groups were formed in Iowa, with 345 women enrolled. Six workshops were held for each group. A follow-up evaluation of the participants six months later showed the following increases in the percent who responded "yes" to questions about the risk management practices each of them followed:

Risk Area	Increase in "Yes" Responses

Production	18%
Marketing	37%
Financial	33%
Legal	12%
Human resources	26%

It is too early to measure the long-term financial impacts of adopting these practices, but it is expected that they will be positive and significant.

"Women in Denim" and "Overall Women" were both two-day workshops with keynote speakers and breakout sessions. Total attendance was 356.

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 and forestry crops create many jobs for Iowans. Forestry and commercial horticultural enterprises in Iowa include, timber, fruit, nut, herb, flower, and vegetable producers, lawn care companies, golf courses, school and professional sport athletic fields, corporate grounds care, 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 and private woodland owners. Program 106 has focused on three important issues for performance goals: (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 and forestry crops; and (3) insuring the safety of commercial horticulture workers and all users of the cultivated and managed landscapes they design, build, and maintain.

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 and forestry crops and services. Departments committed to helping Iowa's citizens use horticultural crops to enhance their quality of life include: Entomology, Natural Resource Ecology and Management, Horticulture and Plant Pathology.

b. Impact/accomplishment

- *Performance Goal 1.* (see http://www.ag.iastate.edu/iaexp/POW.pdf, Program 106 for goals)

    - Program 106 members have worked to help Iowa's grape and wine industry grow by holding local demonstrations and workshops, regional meetings, one-on-one

consultations, and contributing to a comprehensive web site that provides up-to-date information. This information, learned through these contacts, has been put to immediate use in the vineyards and/or wineries. Iowa's wine-grape industry has gone from five vineyards, 32 acres, 13 wineries in 2000 to 271 vineyards, over 600 acres and 52 wineries in 2005. An industry that produced 50,000 gallons of wine in 2003 has gone to over 123,000 gallons of wine in 2005. An industry that held 2.1% of Iowa wine sales marketshare in state fiscal year 2002 has gone to 4.1% market share in state fiscal year ending on June 20, 2005.

- *Performance Goal 2.*

  - Forestry extension at Iowa State University (ISU) and the Forestry Division of the Iowa Department of Natural Resources (Iowa DNR) launched a new educational program in 1988 entitled 'Master Woodland Managers Program'. This educational program has been conducted in 34 different locations in Iowa from 1988 through 2005, involving 885 individuals. Cooperators and sponsors for this program have included county conservation boards, the Natural Resource Conservation Service, ISU county extension offices, Resource Conservation and Development (RC&D) units, the Iowa Tree Farm Committee, and the Iowa Woodland Owners Association. The objective of this program is to develop a network of highly-motivated, well-trained volunteers in Iowa to assist land management professionals in the improvement and expansion of woodlands tree resources in the state.

    A total of 20-30 participants are selected and trained for each location. Course instruction focuses on various aspects of woodland management including basic tree identification and biology, ecology, land and tree measurements, inventory procedures, silviculture, protection, economics and marketing, tree planting, wildlife management, wood utilization, and other topics important to land managers. A total of 32 hours of intensive training was provided that involved both classroom and field instruction. Participants received a certificate upon course completion. Each graduate is then expected to contribute at least 32 hours of public service during the next two years. Examples of service projects include instructing youth in outdoor classrooms, developing demonstration areas in woodlands, hosting an educational meeting for other landowners, speaking on forestry topics to service groups, or assisting professionals in various ways. Volunteers are encouraged to work with local natural resource professionals in accomplishing their service projects.

    Education provided in the Master Woodland Managers Program has contributed to the improvement and expansion of tree resources in Iowa by the actions and examples of these volunteer "woodland ambassadors." Participants from the first 30 sessions have already contributed over 22,400 hours of documented public service.

e. Source of funding—Smith-Lever

f. Scope of impact—State specific and Integrated Research Extension

Key Theme – Animal Production Efficiency

Program 107: Iowa Beef Center

a. Description of activity

The Iowa Beef Center is a central contact point for "all things beef" at Iowa State University. Its mission is to enhance the vitality, profitability, and growth of the Iowa beef industry through timely and relevant producer education, applied research, and improved access to information. A core group of campus and field extension specialists and applied researchers from five departments in two colleges work together to deliver statewide conferences, published materials, local meetings, one-on-one consultations and a dynamic user-friendly website. Fundamental program areas were developed with significant input from producers, regulators, USDA agencies, and extension staff. In addition to a formal advisory board that meets annually, the Iowa Beef Center conducts producer listening sessions at several locations across Iowa to identify the priority areas that direct our program.

b. Impact/accomplishment

- *Seedstock conference*. Seedstock producers can be overwhelmed by new beef genetics technologies, their practical use on the farm, and their long-term economic impact. A one-day conference featuring nationally recognized experts was developed and presented to assist seedstock producers in the science surrounding beef genetics. This Iowa Beef Center (IBC) team assembled industry experts from Cornell University, Colorado State University, ABS Global, Iowa State University, the Charolais Association, and selected seedstock producers to address the challenges and practical use of this advancing technology. The conference was held on December 2, 2004, at the Starlite Village in Ames. Over 120 producers and agribusiness representatives attended the 2004 Beef Seedstock Conference. 87% of the attendees indicated that their bottom line would be improved due to the information presented at the program. Due to the positive feedback and interest generated in the Beef Seedstock Conference, future educational efforts will be explored by the IBC.

- *Bull Clinics*. Commercial bull selection is an important but challenging process. Many producers are confused and overwhelmed by the amount of information being generated and used in bull selection. As a result, the 'Iowa Bull Clinics: Selection Decisions 2005' series was developed and facilitated to address three focus points: 1) What is the market of the future?; 2) How do producers wade through the data to select the 'best' bull for their operation?; and 3) Gene markers – what products are available? By addressing these three points, producers would have a more clearly defined bull criteria from which to make their selection(s). The educational segment of the program discussed the three points followed by a hands-on workshop with attendees. This approach incorporated the presented information into a bull buying exercise for the participants – using their own operation's information/data and future goals. A new computer sire sort program (Selection Emphasis Module) was demonstrated during this workshop. Thirty-two percent reported a financial impact of $500-$1,000. In other words, over 50% reported a financial improvement of over $500! The areas identified as most valuable were the EPD

discussion segment and the hands-on bull selection exercise. Overall, 90% indicated the program provided an increased economic impact to their operation.

- *Estrus Synchronization Webcast*. Developing and incorporating an estrus synchronization program into a beef operation can be challenging, as well as expensive. Numerous synchronization options and alternatives are available – all requiring detailed, specific procedures and protocol. As a result, the Beef Estrus Synchronization Webcast addressed estrus synchronization recommendations for implementing a successful breeding program. Topics included 'fixed-time' AI, methods of estrus control, and a breeding female evaluation system. The Iowa Beef Center's Estrus Synchronization Planner was featured during the program. The web cast was delivered to a total of 29 sites in three states – Iowa (25 sites), Minnesota (three sites), and North Dakota (one site). Over 78% of the responses indicated that participants intended to make changes in their operation as a result of the information presented at this program.

- *Summer Heat Results to Nitrate Testing*. Following the extremely dry weather conditions this summer, ISU Extension offered several opportunities for livestock producers to test corn stalks for nitrate levels. Under stress conditions such as drought, the corn plant can develop potentially high nitrate levels that can affect animals consuming the stalks. Corn silage or green chop containing elevated nitrate levels could cause reduced productivity, secondary health problems, and in some cases, animal death in dairy and beef cow herds as well as beef feedlot animals.

  In August, 40 producers submitted over 220 samples from 12 southeast Iowa counties to be tested by a nitrate "quick test". The testing process involved evaluating the stalk at different points to determine the nitrate level in the stalks. The results indicated that approximately 66% of the samples had elevated nitrate levels. Based on the individual results, ISUE Livestock Field Specialists gave specific recommendations to the project participants to ensure a safe and cost efficient use of available feeds. Recommendations varied according to the nitrate levels, giving producers options to incorporate in their management program. For long-term safety, over 60% of the producers were encouraged to have their silage tested for actual nitrate levels after the ensiling process was completed.

  As a result, producer awareness of nitrate nitrogen in drought-injured corn was increased, animal death due to green chopped high nitrate corn was averted, and the interaction between crop growth and animal feeding needs was increased.

a. Source of Funding—Smith-Lever

b. Scope of Impact—State Specific, Integrated Research and Extension

Program 108: Iowa Pork Industry Center

. Description of activity

The Iowa Pork Industry Center (IPIC) is a coordinated effort across the colleges of Agriculture and Veterinary Medicine, and focuses on programs that are integral and

complementary to work by Iowa State University (ISU) Extension and the Iowa Agriculture and Home Economics Experiment Station. Extensive use of traditional as well as emerging technologies from private and public partners enhances the organization and delivery of these programs, and improves access to all Iowans.

The IPIC works closely with faculty that have responsibilities for teaching, research, and extension in the College of Veterinary Medicine and in the Departments of Agricultural and Biosystems Engineering, Animal Science, and Economics within the ISU College of Agriculture. More than 20 extension field specialists in swine and other livestock, farm management, and agricultural engineering areas, as well as county extension education directors (CEEDs), from all 100 Iowa counties work with the IPIC to provide program delivery.

The IPIC sponsors educational programs designed to assist all segments of the pork industry. The IPIC demonstrated its commitment to providing timely, accurate and unbiased information to producers through several avenues and delivery modes including in-person producer meetings, research projects, satellite delivery, and print, electronic and Internet resources.

A series of five environmental education meetings held in different Iowa locations helped provide a variety of current information to Iowa pork producers. In addition to hearing from Eldon McAfee (legal counsel for the Iowa Pork Producers Association), producers learned about nutrient management planning, the Iowa Phosphorus Risk Index, and where to start in the nutrient management planning process from Dr. Robert Burns of ISU Agricultural and Biosystems Engineering, and the requirements for obtaining financial assistance through the Environmental Quality Incentive Program, and for receiving payments under the Conservation Security Program from Dennis Pate, director of planning with Validus. IPPA, IPIC and ISU Extension continue to sponsor this series in an ongoing effort to keep Iowa swine industry members apprised of research findings and regulations that apply to the industry.

In cooperation with ISU Extension field specialists, the IPIC has aided in development and/or funding of several demonstration projects, applied research projects, and educational opportunities designed to help answer producer questions about costs and benefits of various technologies and to provide information on the financial impacts. Projects include updating and creating several software programs for various production types and stages; coordinating a National Research Initiative grant that integrates research, education, and extension in addressing production challenges faced by farmers raising hogs for niche markets; and field-based integrated crop and livestock demonstration projects.

a. Impact/accomplishment

IPIC faculty and staff members conservatively reached an estimated 50,000 people from Iowa, the Midwest, the U.S. and the world in a variety of settings. Constituent groups include producers, youth, consumers, veterinarians, packers and processors, scientists, international audiences, allied industry professionals, and students.

The February 2005 edition of the annual series of Iowa Pork Regional Conferences (co-sponsored with Iowa Pork Producers Association) focused on supplying information on technologies and strategies to maximize the grow-finish phase of swine production. Based on producer input, the series was expanded to eight locations over five days and attracted more than 300 people total. Using a four-point scale (1 = poor, 2 = fair, 3 = good, 4 = excellent) more than 98% of survey respondents rated the program as good or excellent. Sixty-seven percent indicated they owned and/or managed their farm. Of those who indicated an amount, 52% said they estimated the possible increase in their operation's annual income as at least $1,000, based on applying knowledge they gained by attending. Two highly-rated sessions, based on amount of beneficial information available, were both presented by Mike Brumm of the University of Nebraska: "Water: Getting the Plumbing Right" was rated 4.54 and "Out of Feed Events" was rated 4.41. All sessions were rated on a scale of 1 (not at all beneficial) to 5 (very beneficial.)

The IPIC continues to update existing software programs and create new applications to assist producers in making appropriate choices and decisions in their operations. The Sow Longevity Spreadsheet (first available in 2004) has been provided to producers, consultants, university, industry and financial representatives in more than half the United States and nearly 30 other countries, representing more than 25 million sows. IPIC also has released swine budget and cashflow software, Group Tracker ™ updates, and a manure nutrient value calculator.

- *Pork Niche Groups*. There have been several companies in Iowa that ISU Extension has organized to help producers collectively sell either a specific genetic line or breed or a label such as "natural" or produced by family farms. ISU Extension has worked with several of the groups to create a business structure to meet short- and long-term goals of the core groups' values, principles and goals. The Extension team strives to use a process that is transparent, inclusive and robust, to develop a structure that would build and maintain working capital without heavy borrowing and to develop a structure that could allow for producer ownership in the brand.

  Many of these pork niche groups are bringing back between $8 and $12 per cwt above the spot market for the producers' hogs. Additionally the ability for producers to participate in the equity growth of the company and brand is also extremely important since that contributes to individual wealth creation in rural Iowa. The ability for producers to market through this company knowing that the working capital is there to support their business through low markets is important to their individual growth and success.

b. Source of Federal Funding—Smith-Lever

c. Scope of Impact—State Specific and Multistate (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

The primary concerns of Iowa dairy producers are issues that affect profitability, while consumers want safe, nutritious foods. Both are concerned about air and water quality. Consequently, the most important dairy-related issues affecting Iowa are (1) human resource management; (2) risk management; (3) business planning and arrangements; (4) improving production practices; (5) environmental quality;(6) food safety and quality; and (7) structure of agriculture and public policy.

b. Impact/accomplishment

- Business planning and arrangement:
  - ISU Extension assisted eight dairy producers as they performed a Dairy TRANS financial and benchmark analysis of their dairy operations to review and set financial goals for their operations. Two producers reported a minimum of $5,000 improvements each year in their operation as a result of this analysis. One producer, who has done the analysis for five years, credits increased profits of over $40,000 since initially performing the analysis.
  - Twelve dairy producers constructed low cost parlors after receiving design assistance from ISU Extension, saving an average of $20,000 per parlor compared to more traditional systems. Total savings exceeded $240,000 in equipment costs. As a result of ISU Extension efforts, two milking equipment dealers implemented design changes in their parlor construction on four, low-cost milking parlors. This saved the producers an average of $40,000 per parlor for a total savings of $160,000.
  - Twenty-six dairy producers implemented changes in dairy facility design as a result of ISU Extension suggestions. They equated these changes to increased cow comfort and increased milk production by $30 per cow. These herds averaged 70 cows for a total increased income of $54,600.

- Improving production practices:
  - Records are vital to a business in order to know how they are doing and where they are headed, and dairy operations are no different. Dairy production records are at the cornerstone of dairy herd management, with approximately 50% of the dairy herds enrolled in the DHI program. A series of workshops were developed by ISU Extension to train producers how to use the information for informed management decisions. Thirteen of the 31 participants returned the survey that was sent out seven months following the conclusion of the program. Seven of the 13 indicated that they made management changes as a result of the workshop, and nine of the 13 indicated they've increased their use of the DHI records.
  - Feed costs typically represent 40-60% of the cost of producing milk, due in part to the high expense of equipment, labor, and fuel to harvest and store forages. Rotational grazing represents an alternative that greatly reduces the labor, fuel and equipment needs of dairy producers. ISU Extension has promoted this approach as a low-cost method for start-up dairy operations and others who are looking for ways to reduce input costs on their operation. Four dairy producers implemented rotational grazing in their operation and estimated an improved profitability per cow of $50. Their herd sizes averaged 76 cows for a total improvement of $15,200.

- Shortening the length of the dry period was a program topic at several ISU Extension meetings. The 2005 Iowa Dairy Industry survey indicated 54% of the producers have adopted a shorter dry period. “Exact days” was not asked, but research indicated each day a dry period is shortened means an increase in revenue of $5.00 per cow per day. Additional benefits include reduced metabolic problems and reduced somatic cell counts at calving time.
- One of the primary focuses of the Dairy Days and other programs was on monitoring reproductive performance to increase pregnancy rates (PR). Six herd owners (ranging from 60-800 cows) worked intensely to monitor and improve reproductive performance. Average PR increased nine percent (range 6-14%) from 10.5 to 19.5%. Based on differences within herd and increased revenues of $16.60, $15, and $13/cow for each one percent increase in PR at 10, 15 and 20% pregnancy rates, total increased economic values was $170,696 (range of $7200–$72,800 depending on herd size and initial and ending pregnancy rates).
- Lowering somatic cell counts (SSC) and clinical mastitis incidence can enhance milk quality and safety, and provide substantial economic returns associated with increased milk production and milk price through quality premiums, and decreased disease expenses. Sixteen dairy herds (5,094 cows) with an average starting somatic cell count of 425,000 cells/ ml (range 200,000 – 900,000) implemented changes to reduce SCC as a result of ISU Extension meetings, as well as individual personal contacts, farm visits, and continuous monitoring. SCC was reduced to an average of 230,000 (range 100,000 – 460,000). Based on increased milk potential of 400 pounds/cow (200 pounds in first lactation), this resulted in an increase of 1.68 million pounds of milk or $252,180 ($15/cwt milk price). An extra quality premium associated with higher quality milk ($.50/100 pounds of milk) adds an additional $582,754 of revenue for these 16 herds. Clinical mastitis rates in 3 dairies (2275 cows) were monitored and decreased from 10% /month average (range 8-12%) to 2.5% (range 2-3). This equates into a savings of $18,639/month (171 cows @ $109 / clinical case) or $223,668 annually.

- Food safety and quality:
  - ISU dairy extension personnel developed an easy to use, cost-effective, non-antibiotic dry cow product that is currently used by 16% of dairy herds in North America (Hoard’s Dairyman annual survey). Research and field estimates indicated a 20% decrease in overall mastitis (40% of dry cow mastitis which represents 50% of all mastitis) which translates to losses being reduced by $133 million on the herds who have implemented this technology.

a. Source of Federal Funds—Smith-Lever

b. Scope of Impact—State Specific

Key Theme – Adding Value to New and Old Agricultural Products

Program 121: Value-Added Agriculture

a. Description of activity

Value Added Agricultural programming at Iowa State University (ISU) has focused on working with producer groups and individual entrepreneurs to build long-term economic, environmental and socially sustainable capacities. Emphasis this year has been working with existing value added agriculture groups, development of value chains, and working to develop quality systems to ensure accountability and safety in the food system.

Additional programming has included:

- Capacity building and training for producer value added ag groups, with a special emphasis on beginning farmers. An in-depth tour with follow-up mentoring was held to acquaint beginning farmers with value added ag opportunities.
- Through educational programming, ISU has provided hands-on workshops to the wine industry and for organic producers.
- Development of niche value markets for producers. Working with nine pork marketing groups, ISU Extension has been assisting producers in determining the highest market for their products.
- A major emphasis this year has been working with further development of web-based resources for U.S. farmers. Analytical tools such as break-even analyses can be downloaded. Enhanced technology such as streaming video programming has been added on several websites.

b. Impact/accomplishment

- *Biodiesel Industry in Iowa*. Prior to the recent signing of the Renewable Fuels Standard, interest in expanding the biodiesel industry in Iowa was reaching a feverish pitch. Numerous individuals and groups from around the state were seeking information about the potential and opportunities for building biodiesel plants. Most potential investors looked at the recent success of ethanol and believed that biodiesel presented the same opportunities and seemed anxious to be one of the first entities to get the next plant up and running.

  Two state-wide information meetings to provide biodiesel industry overviews were held. Both meetings had over 200 attendees and were sponsored by ISU and many other statewide partners. Additionally the ISU staff met with at least eight local farmer/community groups to discuss the potential for biodiesel production in their communities. These meetings also outlined the due-diligence needed to develop potential projects. Several of these groups have received assistance from ISU to conduct biodiesel feasibility studies.

  More than 500 producers/investors have been provided with current and relevant information regarding biodiesel potential in Iowa. Outcomes will continue to be measured over the next one-to-two years, as many of the groups assisted are still in the planning and evaluation stages and have not made a determination as to proceeding. Currently one plant is under construction, and at least a dozen groups are still in evaluation stages. Equally as important, a similar number of individuals/groups have opted not to pursue projects based on the information provided.

- *Value Chain with Low Linolenic Acid Soybeans*. ISU Extension has been working closely with the research arm of ISU in expanding the seed supply of the new varieties of low linolenic acid soybeans that were developed by Walt Fehr, an ISU professor. These soybeans have positive health benefits that allow soybean oil to be used in industry applications without being hydrogenated. The hydrogenation process produces transfatty acids, which have been deemed undesirable for human health by the FDA. The FDA is requiring that transfats be labeled in packaged foods starting January 1, 2006. The pending labeling requirement has spurred a great interest in finding alternatives to using hydrogenated soybean oil. Two of the local Iowa farm producer groups that the Value Added Agricultural Program at Iowa State has been working with for a number of years have picked up the project and are expanding the seed supply and arranging processing and final markets for the new soybean oil. One of the groups has moved up the value chain and is partnering with local agricultural cooperatives to merchandise seed and contract acres to be crushed with another value chain partner — Cargill the soybean crusher and refiner. They have also moved up the value chain further by making marketing agreements with oil distributors to market the product. The group is ISO certified and maintains a traceable trail from seed to end user. The group sells a branded oil product and operates as a LLC. Another local Iowa producer group is also expanding the seed supply and working on developing processing and marketing partners up the value chain. ISU Extension has been very active in assisting these groups in all phases of organization, development, and execution of their program.

  Impacts have included better health alternatives (foods without or with less transfat) and a major economic impact for the State of Iowa. Farmers are receiving a $.75 to $1.00/bu. premium for growing the beans, processors are getting business, and marketing profits are going back to Iowa investors. At the present time five FTE jobs have been created and more will follow.

- *Ag Marketing Resource Center*. Because of the previous work done in value added agriculture, ISU has established a strong foundation of case studies, feasibilities, outreach, training and experience. ISU Extension, along with their partners from the University of California and Kansas State University, have received through grants and federal appropriations more than $9 million from USDA Rural Development to develop an electronic center for farmers on value added agriculture. The website — www.AgMRC.org — receives more than three million hits per month. It has more than 8,000 links and features more than 200 detailed profiles on various products and commodities, links to all the relevant state laws for value added agriculture, in-depth features on business development and information on markets and industries. The staff responded to 529 phone calls for more information and more than 600 emails.

c. Source of Federal Funds—Smith-Lever

d. Scope of Impact—State Specific

Key Theme – Home Lawn and Gardening

Program 146: Consumer Horticulture

a. Description of activity

According to the National Gardening Association, 78% of the U.S. population participates in one or more types of do-it-yourself indoor and outdoor lawn and garden activities. Further, gardening consumers spent $38.4 million in retail sales for lawn and garden products in 2003, or an average of $465 per household. The Iowa State University (ISU) Extension Consumer Horticulture and Forestry programs provide research-based education and information about plants and their care in the home lawn, landscape, garden and woodland. As a result, horticulture consumers are better able to make wise decisions in plant selection and maintenance and pest management.

b. Impact/accomplishment

- The Iowa Master Gardener Program is an educational and volunteer service program of ISU Extension and the College of Agriculture. University faculty and staff in the departments of entomology, horticulture, plant pathology, animal ecology and agronomy and Extension field specialists work with county extension staff to provide research-based horticultural information to the citizens of Iowa through the volunteer efforts of trained Master Gardeners. This year 500 adults were trained to become Master Gardeners. In calendar year 2005, Iowa's Master Gardeners in 81 of Iowa's counties reported over 81,990 hours of volunteer educational service to their communities. Assuming a value of $11.46 per hour for volunteer time, the Iowa Master Gardener program provided approximately $940,000 of education and service to local communities.

- In 2004 Iowa State University Extension partnered with Iowa Gardening Magazine to produce timely gardening educational videos for distribution to television stations in Iowa. Thirty-four, two-minute video segments on gardening were developed by ISU Extension and Iowa Gardening Magazine. Each week from March through October, six television stations in Iowa air the gardening videos. This is an increase of two more stations compared to a year ago, giving Gardening in the Zone coverage to 100% of Iowa compared to 90% a year ago, as well as reaching viewers in southwestern Wisconsin, northwest Illinois, eastern Nebraska, and northern Missouri. A Gardening in the Zone weekly column highlighting each television segment is published by approximately 13 newspapers in Iowa. Video clips are also available for viewing on the web directly at the Gardening in the Zone webpage (http://129.186.89.193/gardening) and are linked from the Iowa State University Extension main page and Yard and Garden Online, the main page for consumer horticulture (http://www.yardandgarden.extension.iastate.edu). The success of this programming partnership has been reported in the Journal of Extension [vol. 42(6); www.joe.org/joe/2004december/iw1.shtml] and at the American Society for Horticultural Science 2005 national meeting [abstract in HortScience 40(4):1113].

- The Iowa Community Tree Steward Program includes six 4-hour training sessions over a six-week period, and is offered at two different locations each year throughout Iowa. Participants contribute 24 volunteer hours of service to their community forests. To date, 599 participants have completed the Iowa Community Tree Steward Program and have donated 15,996 hours of volunteer service to their communities. In 2005, Dr. Janette Thompson and Lynetta V. Clevaland (Department of Natural Resource Ecology and Management) surveyed 374 randomly selected participants and found 86% of respondents had finished their 24 hours of volunteer service. The following activities were conducted to complete the hours: 88% involved with tree planting, 84% with pruning, 72% promoting tree care in their community, 48% providing leadership (tree board members, Trees Forever), and 30% had conducted street tree inventories for the community. Seventy-two percent had been in contact with ISU Extension or other tree professionals for continued training.

c. Source of Federal Funds—Smith-Lever

d. Scope of Impact—State Specific

Goal 2: A Safe and Secure Food and Fiber System

and

Goal 3: A Healthy Well-Nourished Population

Overview

Iowa's state Plan of Work 330 "Choices for Health" covers Federal Goals 2 and 3 through several programming efforts including Expanded Food and Nutrition Education (EFNEP), the Food Stamp Nutrition Education Program (FNP), food safety, and nutrition education for families and at-risk populations.

a. Output/Impact

NUTRITION

- 68,835 individuals participated in nutrition education, including youth and adults
- 2,034 individuals received nutrition and health education through individual consultation
- 20,000 adults and 6,000 youth in Iowa participated in Lighten Up Iowa and Go the Distance
- 250 uninsured/underinsured women ages 40-64 participated in the WiseWoman cardiovascular risk reduction program, a series of 12 healthy lifestyle sessions for a total of 1,051 total session contacts
- 1,350 school staff (administrators, teachers, school food service personnel, and school nurses), representing 40% of Iowa's school districts, participated in Iowa Communication Network (ICN) sessions regarding the local school wellness policy federal mandate (an additional 600 staff have attended rebroadcasts of these sessions)
- 176 individuals participated in a 4-H judges food safety/nutrition training at 15 sites across the state via the Iowa Communications Network

- The Food and Nutrition website is maintained and updated weekly.
- ISU Extension co-hosted with NASULGC, one of four regional workshops, on youth overweight and obesity, 230 attended.

FOOD SAFETY

- 2,901 individuals were consulted about food safety.
- 178 volunteers were trained in safe food handling.
- 24 food processors received information about food safety/HACCP
- 129 Grocery Store Managers received food safety training in the SuperSafeMark® program
- 651 Foodservice Managers and employees were trained in the ServSafe® Program
- 80 Foodservice employees were trained in the DineSafe® Program
- 192 Childcare providers received food safety training
- 200 School Foodservice Managers and lead employees of Child Nutrition Programs attended Extension-sponsored short courses. Managers reported that they were responsible for nearly 100,000 meals/day.
- 3 Food Safety Websites were supported and updated daily or weekly:
    - Food Safety Project: www.iowafoodsafety.org
    - Iowa HACCP Information Center: www.iowahaccp.iastate.edu
    - Food Safety Consortium: www.foodsafety.iastate.edu
- The Iowa Food Safety website had 141,680 unique visitors who had 1,925,000 page views. There were over five million hits on the website.

EFNEP and FOOD STAMP NUTRITION EDUCATION

- Number of enrolled program families for FY05 = 2,702 (36% minority)
- Number of youth in a series of nutrition classes = 16,724 (33% minority)

b./c. Outcomes

NUTRITION

- Of 396 respondents (n = 489 response rate 81%) in face to face nutrition education programs, 89% reported adopting one or more nutrition and health behaviors
- Of adult teams reporting weight in Lighten Up Iowa, 93,332 pounds were lost
- Of adult teams reporting physical activity in Lighten Up Iowa, 24.7 million miles of activity were logged
- Of youth teams reporting physical activity in Go the Distance, 2,103,896 thousand miles of activity were logged

FOOD SAFETY

- 94% of those responding to follow up surveys indicated that they had adopted one or more safe food handling practices (414 surveyed, 314 responded, 293 affirmative).
- 100% of food processors receiving HACCP/food safety information changed protocols to reflect new training.
- 85% of those taking ServSafe® certification exams passed.
- 95% of those taking the SuperSafeMark certification exam passed.

EFNEP and FOOD STAMP NUTRITION EDUCATION

- The percentage of 1,649 EFNEP/FNP program graduates who reported diets that contained half or more of the recommended servings from all five food groups increased from 19% at the beginning to 55% at the end of the program. A positive change in at least one food group was noted in 95% of the participants graduating from the program.
- Results from the food behavior checklist of 1,472 adult graduates showed:
    - 88 percent of participants showed improvement in one or more nutrition practices;
    - 83 percent of participants showed improvement in one or more food resource management practices; and,
    - 66 percent of participants showed improvement in one or more food safety practices.
- 25% of 5,194 youth from 246 groups increased nutrition knowledge and 27% of this same group improved practices in food preparation and safety.

d. State's Assessment of Accomplishments—Original performance goals 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. Description of activity

Forty-eight EFNEP and FNP paraprofessionals enrolled 2,702 low-income adults and 16,724 youth in a series of nutrition classes in small group settings, schools, or homes. One-time nutrition education was delivered to an additional 1,532 individuals participating in 138 groups in 35 counties. Partnerships with Head Start, Promise Jobs, empowerment boards, and others resulted in increased funding, more effective audience recruitment, and enhanced program delivery. ISUE initiated an effort to meet with staff at local food assistance (Food Stamp) offices to share our education strategies and offer to provide newsletters, referral cards and/or displays as needed. Response to our effort was positive. Space limits what we can do in some offices. We hope the relationship will initiate referrals to nutrition education.

b. Impact/accomplishments—Refer to Overview

c. Source of Federal Funds—Smith-Lever 3b and c; Food Stamp Nutrition Education matching funds

d. Scope of Impact—State Specific

Key Theme – Food Safety

a. Description of activity

Extension worked with over 4,000 food safety program participants including those that work with at-risk groups such as seniors and children. Several hundred participants were trained in safe food handling for volunteer food delivery projects including fair concession

stands, the Annual Great Bike Ride Across Iowa, and others. Extension field and campus specialists partnered education programs with the Iowa Department of Inspections and Appeals, the Iowa Restaurant Association, the Iowa Bureau of Food and Nutrition, local schools, Area Agencies on Aging, hospitals, community organizations, the Food Safety Consortium (Iowa, Kansas, Arkansas), WIC, food stamps, Head Start, Promise Jobs, and empowerment boards. Field and campus specialists used resources developed by USDA, the Partnership for Food Safety Education's FightBac® materials, and food safety web-sites. Biotechnology, irradiation, foodborne pathogen information and HACCP resources are provided at the Iowa Food Safety web site (www.iowafoodsafety.org) and are maintained by the campus specialists who support food safety. Twenty-four food processors received information and training in HACCP and food safety. Iowa State University Extension (ISUE) and the Iowa Turkey Grower's cooperative have formed a partnership to create a workforce knowledgeable and capable of providing safe food from plants in SE Iowa. Successful completion of this training may result in employment. A second and third level of training are implemented as employees end three months of employment and then again at the end of the year. In 36 ServSafe® training sessions, field specialists trained 615 restaurant and foodservice personnel in safe food handling. The passing rate on the exam was over 85%. A newly established food safety program, SuperSafeMark, trained 129 grocery store managers with a success rate on the certification exam of 95%. More than 141,000 visitors had over 1.9 million page views of content on the ISU Food Safety Web-site home page or one of its links to total over five million hits last year.

b. Impact/accomplishment

- 130 food safety programs were done for over 4200 participants including at-risk consumers and food handlers.
- 36 ServSafe® food safety training programs with 615 participants. Eighty five percent of participants received a passing score and were certified.
- 24 food processors received food safety and HACCP training.
- 200 school foodservice managers and lead employees of child nutrition programs attended Extension sponsored short courses. Managers report they are responsible for more than 100,000 daily school foodservice meals.

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

d. Scope of Impact—state specific. However, ISUE partnered with USDA, USDA/FDA National Agricultural Library, the FDA Center for Food Safety and Applied Nutrition (CFSAN), seven universities, 12 different state health departments, 28 city and county health departments, and others to design and maintain web-based food safety resources including the "Ask a Food Safety Expert" web site.

Key Theme – Human Nutrition

a. Description of activity

Nutrition and health programs were offered in 167 communities in 82 counties. Targeted audiences were adults, youth, employees at worksites, older adults, child-care providers,

primary and secondary school staff and health professionals. The primary focus of nutrition education programs this year was overweight and obesity among children and adults. Delivery methods included audiovisual presentations, bulletins, displays, ICN sessions, and a national satellite videoconference for health professionals. Audiences learned about the myriad of factors in the current socioeconomic environment contributing to overweight and obesity including genetics, the feeding relationship, lack of physical activity, increase in technology, portion distortion, and food availability. Community advocacy was promoted as a measure to meet the demands of this growing problem. This was a core theme of the ICN sessions, which highlighted the requirements of the federal mandate for school wellness policies; 1,330 school personnel attended representing 40% of Iowa's school districts. Lighten Up Iowa and Go the Distance are an adult and youth program designed to encourage more physical activity and healthy eating habits among Iowans using friendly team competition. Lighten Up Iowa had 20,000 adult participants and Go the Distance had 6,000 youth participants in 2005. WISEWOMAN, a community-based intervention designed to reduce prevalence of risk factors for heart disease among middle-aged women who lack health insurance and access to health care continued this year. A total of 250 women were enrolled in the program and attendance at the 12 lifestyle sessions resulted in a total of 1,051 total session contacts. Data is currently in progress for this research study. Extension staff actively participated in 67 community coalitions to address local health needs. County and campus-based Extension staff is supported by grant funds for key areas of programming. Program collaborations were established with the Iowa Department of Public Health, Iowa Department of Education, University of Iowa, College of Public Health, and the Iowa Games. Iowa State University Extension, in partnership with NASULGC, hosted one of four regional conferences on Youth Overweight and Obesity, March 28-29,2005, with 230 participants.

b. Impact/accomplishments—Refer to Overview

c. Source of Federal Funds—Smith-Lever 3b & c; WISEWOMAN (CDC grant), Team Nutrition (USDA), NASULGC

Scope of Impact—State Specific, Youth Overweight and Obesity Conference was one of four regional meetings held in partnership with NASULGC

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

Overview

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

- 25 Refereed Publications, Research Papers, Manuscripts
- 58 Non-refereed Publications, Reports, Technical Papers
- 49 Proceedings, Published Abstracts
- 66 Extension Publications
- 133 Invited Presentation
- 401 Education Programs, Field Days, Tours (25,154 participants)

- 25,702 individual consultations
- 686 Volunteers trained
- 23 Web pages supported
- 7 book/chapter completed
- 8 theses, MS, PhD completed
- 244 radio taps, 30 TV performances, 10 powerpoint presentations, 165 soybean cyst nematode soil samples handled, 173 plant disease clinic samples, 55 herbicide injury samples

① A coordinated series of meetings was conducted to alert agronomists and farmers in southwest Iowa to the issue of soybean aphids. Farmers attending represented more than 63,000 acres, with about half producing soybeans. Respondents reported an average of $23.65 per acre of "value" from the meetings, representing a value of ISU Extension information of nearly $750,000.

② The private pesticide applicator training program conducted 330 meetings with 18,865 participants from December 2004 - April 2005. As a result of the program, 40% of the participants said they would update the required information on restricted-use pesticide (RUP) applications in a booklet or their computer, and 85% said that they now review the label requirements to determine the proper protective equipment (PPE) needed for using a pesticide. In addition, 65% of respondents maintain that they now make sure copies of the section 18 and 24c labels were in their possession at the time of application, if using that type of pesticide. This evaluation indicates private pesticide applicators are making the decision to adopt and actively employ safer pesticide use practices in Iowa.

③ Interseeding flax with red clover or alfalfa provided a best management practice for weed management and meeting certified organic production requirements in providing a soil-building legume crop following flax. Five intensive winter workshops on organic flax were held across the state in 2005 for 150 farmers in conjunction with Practical Farmers of Iowa and Spectrum Organics/ BIOWA Nutraceuticals. As a result of this cooperative project, organic flax production increased from 75 acres in 2004 to 300 acres in 2005. Savings from avoiding petroleum-based fertilizers and pesticides on these 300 acres amounted to approximately $30,000, in addition to countless environmental benefits, such as reduced nitrate leaching from the use of cover crops in place of highly mobile synthetic nitrogen. Revenue generated per farm averaged $500/acre, compared to $200/acre for conventional corn.

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 (repeat from research program 22)

Program 142: Integrated Pest and Crop Management

a. Description of activity

Insects, weeds, plant-parasitic nematodes, and diseases are continuing threats to Iowa's crops, particularly field corn, soybean and alfalfa. Every crop acre in Iowa is subject to yield reduction resulting from one or more of these pests. Additionally, management practices for cultural and chemical control of these pests represent costs to the farm operation that if managed properly can enhance profits. Additionally, adoption of Integrated Pest Management results in more efficient use of resources and enhanced environmental stewardship. Barriers to adoption of Integrated Pest and Crop Management practices include barriers that prevent knowledge-based information from reaching crop management decision-makers in understandable, easily used form.

b. Impact/accomplishment

- Western bean cutworm is an insect pest of corn that emerged as an economic pest in west-central Iowa in the last decade. Western bean cutworm is difficult to manage with conventional insecticides, and field infestations are often missed. Iowa State University staff organized a near-real-time reporting website to share moth emergence data with managers to allow for effectively timed scouting. In addition, the website provides information on pest identification, economic thresholds, and suggested insecticides. The effort gained cooperation from Pioneer Hi-Bred International, extension field crop specialists, and extension personnel at the University of Illinois. Cooperators gathered data and reported them via a specialized website from 198 reporting fields covering 126 counties in Iowa, Illinois, Missouri, and Minnesota.

  Effective management for this pest lies in knowing if there are reproductive populations of the insect in the area. A post-season survey of trap cooperators showed that 18 of the 39 that responded, reported they had scouted fields based on the trap data. Among those scouting, two thirds (12) found larvae or eggs, with eight finding infestations exceeding the economic threshold. Based on data from the 39 respondents, projected corn yield loss in 2005 was $125,000; five others reported feeding but did not estimate losses.

- In an adjunct Western Bean Cutworm activity, Clarke McGrath, extension field specialist for crops in southwest Iowa, conducted a three-hour, in-field training session on western bean cutworm with local private sector agronomists. In a follow-up survey, all participants reported value from the training. Clients indicated that they saved $9—14 per acre on approximately 15,000 acres, or $180,000 savings for the acres they would have, but did not treat because of scouting.

- A coordinated series of meetings was conducted to alert agronomists and farmers in southwest Iowa to the issue of soybean aphids. Farmers attending these meetings that completed evaluations represented more than 63,000 acres, with about half producing soybeans. From post-meeting follow-ups, those who responded reported an average of

$23.65 per acre of "value" from the meetings, representing a value of ISU Extension information of nearly $750,000.

- Asian soybean rust is a serious threat to soybean production in Iowa and the rest of the U.S., and the disease was first discovered in the continental U.S. in November 2004. To facilitate rapid and effective identification of the disease in Iowa, ISU extension faculty and staff arranged and conducted training sessions for nearly 700 agribusiness personnel in 2004 and 2005. Training was done for these individuals to serve as "first detectors" for Asian soybean rust in Iowa. The names and contact information for trained "first detectors" were made public and the "first detectors" agreed to serve growers and others in their home county as well as some adjacent counties. "First detectors" had expedited contact with 40 field extension staff who were trained to serve as "triage team" members when samples suspected as being Asian soybean rust were received. "Triage team" members were trained to take suspected Asian soybean rust samples directly to the staff of the ISU Plant Disease Clinic in Ames for rapid and accurate diagnosis.

c. Source of Federal Funds—Smith-Lever

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

Key Theme – Pesticide Application

Program 143: Pesticide Applicator Training

a. Description of activity

Federal and state law requires that all people who purchase and apply restricted use pesticides and any applicator that applies pesticides for hire be certified according to established standards. ISU Extension is mandated by the State of Iowa to develop and deliver training programs for all commercial pesticide applicators and private pesticide applicators.

The primary focus for the commercial pesticide applicator was program development and delivery for the continuing instructional courses. These activities occurred during January—July and October—December. During these months, 37 programs were provided to 8,086 commercial applicators in 23 certification categories and subcategories.

In addition, initial training for commercial pesticide applicator certification was provided to ISU students through a course, ENT 283. Commercial certification was emphasized for the 114 students enrolled in this course including a core background on pesticide application and specialization in agriculture, forestry and horticultural pesticide application.

The primary focus for the private pesticide applicator was program development (August—November) and delivery (December—April). During the training season, 330 programs were conducted in all 99 counties in the state. In addition, initial training for private pesticide applicator certification was provided to 55 individuals throughout the State of Iowa.

b. Impact/accomplishment

The private pesticide applicator training program conducted 330 meetings with 18,865 participants from December 2004 - April 2005. A post-training evaluation indicated the program was successful. Overall, 98% of the respondents indicated that the program was excellent or good. In addition, 96% of the respondents strongly agreed or agreed the information presented was useful for their farm operations.

To determine if the private program had an impact on the participants, the evaluation examined specific areas to assess behavioral changes towards safer pesticide use practices. As a result of the program, 40% of the participants said they would update the required information on restricted-use pesticide (RUP) applications in a booklet or their computer.

In addition, this post-training evaluation examined if participants had indeed successfully implemented new pesticide safety activities, as a result of the previous year of private pesticide applicator training. According to the respondents, 85% of the participants said that they now review the label requirements to determine the proper protective equipment (PPE) needed for using a pesticide. In addition, 65% of respondents maintain that they now make sure copies of the section 18 and 24c labels were in their possession at the time of application, if using that type of pesticide. This evaluation indicates private pesticide applicators are making the decision to adopt and actively employ safer pesticide use practices in Iowa.

c. Source of Federal Funds—Smith-Lever

d. Scope of Impact—State Specific

Key Theme – Sustainable Agriculture

Program 147: Sustainable Agriculture

. Description of activity

In 2005, Iowans remain concerned about profitability, the environment, and the quality of life associated with agriculture. Sixty percent of farmers polled in 1994 believe there is too much reliance on agricultural chemicals in farming, and only 20% felt that their quality of life had improved during the last five years. Sixty-two percent felt that increased use of sustainable farming practices would help maintain the natural resource base. A continuing need exists to provide sustainable agriculture education and training in Iowa to help stabilize profit, promote good environmental practices, and enhance quality of life.

a. Impact/accomplishment

- *High Tunnel Workshop*. Farmers in Iowa are seeking alternative sources of income through adoption of new technology and practices. Inexpensive, practical, part-time enterprises are needed to supplement farm income.

  The ISU Extension Sustainable Ag Program developed a response for a High Tunnel Workshop. Program planning was developed through stakeholder farmer and key staff leadership. An interactive workshop and field tour of technology was planned with

participation by farmer presenters, multi-state faculty involvement (Kansas State University), and industry. Seventy-nine (79) participants participated in the workshop (output). The individual behavioral changes of 34 participants were measured through a Retrospective Pretest. This evaluation showed that base-line knowledge of participants was low (avg. 2.8) ranging from 1-7 (on a 1-10 scale; 1 = little knowledge to 10 = very knowledgeable). As a result of the Extension response, knowledge gained by the field tour of the high tunnel structure and the interactive workshop was assessed at 7.1 (avg) and ranged from 4-10. The most frequently reported score for initial knowledge was 1.0 (mode) while the change in behavior expressed as knowledge gained was 7.0 (mode). These data suggest that participants' behavior was modified dramatically through education. Learning was documented as a behavioral change.

- *Organic Flax Production*. Flax was once produced in significant quantities in Iowa but was replaced with increasing acres of corn and soybean. In 2004-2005, we led a cooperative research and extension project supported by the Leopold Center for Sustainable Agriculture, the Practical Farmers of Iowa, and Spectrum Organics/BIOWA Nutraceuticals, processors of organic flaxseed oil. Initial fertility management schemes identified red clover and soybean as ideal crops preceding flax, with corn supplying insufficient fertility and maintaining the largest weed seedbank. Interseeding flax with red clover or alfalfa also provided a best management practice for weed management and meeting certified organic production requirements in providing a soil-building legume crop following flax. Yields were as high as 36 bushels/acre in Sutherland, Iowa. Flax was processed into flaxseed oil at BIOWA Nutraceuticals in Cherokee, Iowa, where essential fatty acid content met quality standards.

  Five intensive winter workshops on organic flax were held across the state in 2005 for 150 farmers in conjunction with Practical Farmers of Iowa and Spectrum Organics/ BIOWA Nutraceuticals. As a result of this cooperative project, organic flax production increased from 75 acres in 2004 to 300 acres in 2005.

  Savings from avoiding petroleum-based fertilizers and pesticides on these 300 acres amounted to approximately $30,000, in addition to countless environmental benefits, such as reduced nitrate leaching from the use of cover crops in place of highly mobile synthetic nitrogen. Revenue generated per farm averaged $500/acre, compared to $200/acre for conventional corn.

- *Helping Beef Producers Meet Regulations*. Regardless of size, all beef feedlots must meet the minimum requirements for manure control and land application. A minimum level of manure control requires that all feedlots must have some type of solids settling system in place. ISU Extension staff partnered with the Iowa Cattlemen's Association, Farmers Coop Society in Sioux Center, Farmers Elevator Company in Rock Valley and Farmers Elevator Cooperative in Rock Rapids to co-sponsor four meetings reaching 191 producers and agri-business staff. Information about environmental regulations for open beef feedlots and methods to control beef feedlot run-off was presented. As a result of the meetings, 24 producers responded by inviting Kris Kohl, an ISU Extension Ag Engineer Field Specialist, to make on-farm visits to develop solids settling systems for their beef feedlots. One current feedlot manager for the Farmers Coop Society remarked, "the

majority of our feedlot producers who attended the meeting did something". Some made changes in their existing facilities, while others built new systems. During the summer of 2005, the majority of feedlot producers at these four meetings took behavioral action to bring their feedlots into compliance with Iowa environmental regulations.

c. Source of Federal Funds—Smith-Lever

d. Scope of Impact—State Specific

Program 150: Environmental Stewardship

. Description of activity

Focus on conservation

- State and federal water programs exist to support individual landowners in implementation of land use practices that reduce erosion and excessive nutrient losses to local creeks and water bodies. In some cases, technical specialists do not have skills or understanding of how collective landowner efforts within a watershed can effectively address water quality concerns and provide responses to sustaining farm and land use changes.

- Conservation practices include the design of systems that prevent agricultural pollutants, specifically nitrate-nitrogen, to nearby surface water bodies. Subsurface drainage has allowed for excellent agricultural production within many areas of Iowa but can contribute to Hypoxia in the Gulf of Mexico. Future system designs will need to incorporate not only economic but also the environmental aspects of drainage.

a. Impact/accomplishment

Watersheds.

- Iowa State University (ISU) Extension constructed a manual, "Renewing Local Watersheds: Community Leaders' Guide to Building Watershed Communities", for developing community leadership in building watershed communities. ISU Extension staff has worked with a number of Iowa water specialists in IDALS and USDA NRCS, as well as extension educators, to implement many of the practices and strategies offered in the manual. As a result of resources made available to help with the partnership building process, an advisory group of five farmers in the Camp Creek Watershed volunteered to work together to develop strategies to get themselves off the impaired water body list. The group has actively met throughout 2005 and is working at encouraging landowners along the creek to adopt a variety of recommended practices.

  Overall producer benefits include a better understanding of site-specific tillage and manure management. The importance of manure applicator calibration and manure application rates was clearly demonstrated, where 82% of the cooperators began applying manure as the only source of nutrients. This project also gave producers the confidence to adjust manure application rates to determine site specific needs. Producers were able to gain a better understanding of the ability to evaluate in-season nitrogen needs and post-

season nitrogen use utilizing the late spring soil and fall stalk nitrate-nitrogen tests. Most of the cooperators (79%) felt that they now manage their manure more efficiently because of their involvement in this project.

Drainage systems.

- Educational programming took place that considered the topics of: drainage design that considers economics and the environment, field days that highlighted agricultural drainage practices and water quality, the effectiveness of an integrated approach of tillage and nutrient management strategies in improving crop performance and nutrient use efficiencies, workshops that focused on environmental stewardship by use of conservation practices of erosion control and runoff-related nutrients that targeted both urban and rural citizens, and connecting youth educators to agriculture, natural resources, food, and people through hands-on, research-based lessons that they can easily implement in their classrooms and out of school programs

- Based on long-term design simulations, narrower tile drain spacing may not always produce greater yields but will produce greater subsurface drainage volumes, which could be detrimental to the environment. As a result, if producers design for long-term maximum yields they may be able to use wider tile drain spacing and save on the order of $200 per acre when installing a drainage system. This could reduce the investment from approximately $600 to $400 per acre, providing both economic and environmental benefits.

c. Source of Federal Funds—Smith-Lever

d. 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
200 – Building Community Capital
300 – Money for Life
310 – Strengthening Family Relationships
320 – Child Care That Works
340 – Family Policy That Works
410 – Youth/Staff Development
420 – Out of School Time
440 – Science and Technology Literacy
450 – Strengthening Volunteer Development
460 – Urban Youth

This overview covers work done for 145.

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

Descriptions of Output Performance Measures	Outputs
Number of people that received farm safety training	3,469
Number of farm workers that received farm safety training	984
Number of youth participating in youth safety activities coordination by extension	2,421
Number of individual consultations	35
Number of youth that received hazardous occupation certification	54
Refereed publications, research papers, and manuscripts	1
Non-refereed publications, reports, and technical papers	1
Proceedings and published abstracts	3
Number of Thesis (MS/PhD programs competed)	1
Books and chapters	2
Videos	2
Number of Web pages supported	5
Media release and popular press articles	14
radio interviews	54
Participation on state, national, and professional societies safety committees	31

This overview covers work done for Iowa's Plans of Work, 200.

a. Output/Impact

- 121 inter-organizational collaborations formed
- Four comprehensive land use plans developed and adopted
- Three land use ordinances changed
- One bond issue passed
- 395 business entrepreneurs trained
- 468 organizations assisted and strengthened
- 45 service providers certified
- 17 organizations created

This overview covers work done for Iowa's Plans of Work, 300–340.

a. Output/Impact

- 486 Iowans participated in ISUE sponsored learning opportunities related to later life issues.
- 5,507 individuals received child care training and education.
- 883 child care providers received training through Child Care that Works self-study programs
- 1,067 Iowans attended Better Kid Care satellite programs.
- Extension staff conducted 266 child care center and program assessments.
- ISU hosts and manages the National Network for Child Care site averaging 149,502 visits by unique users monthly.
- ISUE provides oversight and management for the Early Childhood section of CYFERnet.

- The CYFAR New Community Project supports 3 projects in Davenport, Petty, and Sioux City.
- The Rowel Poverty Simulation was used in 19 simulations with 1, 154 participants.
- 848 individuals increased their understanding of public issues.
- 42 communities were involved with Child Care Lasts a Lifetime campaign.
- 14,363 Iowans learned about resource management.
- 13,895 Iowa high school students in 202 schools enrolled in the High School Financial Planning Program.
- 12,399 Iowans participated in parent education programs.
- 1,112 professionals and volunteers received in-depth training to deliver parenting education.

b./c. Outcome/Impact

- 8 adults were certified as Powerful Tools for Caregivers class leaders.
- 379 individuals were employed as a result of new or expanded child care businesses.
- 247 new child care centers, early childhood and family child care programs were started and 890 existing programs were strengthened.
- 86% of participants in consumer credit workshops took steps to reduce debt.
- 97% of participants in retirement panning workshops gained greater control of their current spending, savings and financial security.
- 78% of parents participating in the ISUE Strengthening Families Program for parents and Youth ages 10-14, reported letting their child know expectations regarding alcohol and drug use as compared to 58% before participating.

Overview – 4-H Youth Development Programs

This overview covers work done for 410-460.

a. Output/Impact

- A total of 127,426 youth were involved in Extension 4-H Youth Development sponsored community clubs, special interest groups, school enrichment programs, overnight camping and other programs. Nearly one-in-four Iowa school age youth participate in a 4-H Youth program.
- A total of 12,247 youth and adult volunteers contributed their time, energy and expertise to helping youth learn life skills.
- A total of $105,854 in scholarships were given by the Iowa 4-H Foundation and its partners to 102 4-H'ers.
- 968 high school youth and 100 adults attended State 4-H Youth Conference, held on the campus of Iowa State University, and participated in educational seminars and community service opportunities.
- Over 5,300 educators, school teachers, school administrators, and parents participated or were trained in science related extension 4-H sponsored youth curriculum.
- A total of 2,523 youth volunteers, 3,699 adult volunteers, and 344 other adults were trained in leadership, parenting and other topics.

- 1,950 adults and youth contributed 11,023 volunteers hours to improve their communities through the Governor's AmeriCorps After-School Initiative, State
- 4-H Youth Conference service projects, Iowa's Promise Youth grants and Pioneer Community Improvement grants.
- All 100 counties reported involvement in out-of-school time programming. 65,207 youth participated in one or more of the out-of- school time offerings.

b./c. Outcome/Impact

- Governor's AmeriCorps After-School Initiative middle school students' average homework completion rate was 88%; average GPA increase was.43 points; average school attendance increased by 24% by the last programming quarter; and average problem-based school referrals decreased by 40% by the last programming quarter.
- An example of a partnership developed in one county resulted in all youth attending the program being able to identify the six "Pillars of Character" and identifying ways that they could utilize the pillar content at home, school, and/or in the community.
- In a partnership with a school, the school reports engaging troubled youth in a program that has had significant results with the students' attitudes. Examples of self-reported outcomes are: "I took a lot of risks and I overcame my fear of trusting other people." "I help others more." "I can do almost anything if I put my mind to it."
- The "Growing Up Developing Self-Esteem" program was offered to classrooms in Waterloo and Cedar Falls and reached 1,086 youth in grades K-5. Evaluations in the 1st-3rd grade classes showed the following results:
    - 95% learned to work and play cooperatively
    - 93% learned appropriate behavior in a group
    - 97% learned to handle conflicts agreeably
    - 98% learned to listen when others are talking

  Evaluations from the 4th and 5th grade classes were as follows:
    - 93% learned to consider the consequences of decisions they make
    - 91% learned to consider how their actions affect others
    - 90% learned how to settle arguments in ways that are not harmful
    - 94% learned to be responsible for their own actions
    - 95% learned to feel comfortable saying "no" to things they don't want to do
- As part of the Waterloo Summer School Program, 4-H & Youth EFNEP teamed together to offer a program on "water" at two different school sites. In addition to learning about water and the animals found in water, participants also learned about the nutritional value of water, food guide pyramid and nutritious snacks. The program reached 520 youth in grades 1-5. Evaluations showed:
    - 28% of the youth chose healthy snacks prior to the program and 78% reported that they chose healthy snacks after the program.
    - Prior to the program only 17% of the youth reported eating three servings of vegetables a day, at the conclusion of the program 56% of the youth reported eating three servings of vegetables a day.

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

e. Total expenditures by source of funding—State and Federal funds, $3,107,067.

SYs, 39.6.

Key Theme – Aging

a. Description of activity

In FY05, 486 Iowans participated in ISUE sponsored learning opportunities related to family decisions and relationships in mid-life and later-life. An additional 1,535 participants learned about the benefits of universal design to help make homes more convenient and comfortable for the later years, as well as facilitate aging in place.

Powerful Tools for Caregivers, a six-week, 15-hour curriculum reached 75 Iowa family caregivers for a total of 1,125 contact hours of education. Eight adults were certified as Powerful Tools for Caregivers class leaders in 20 hours of training. 403 people attended additional aging-related informational presentations and workshops including Adult Children and Aging Parents: Conversations between Generations workshop series, and Memory and Aging.

ISUE managed a growing Iowa Powerful Tools for Caregivers program providing resources for 34 trained class leaders from extension and community agencies, coordinating training opportunities for new leaders and supporting class leaders in their work with caregivers.

Universal Design Display Trailers with life-size exhibits that illustrate the benefits of universal design in kitchens and bathrooms were demonstrated at 15 locations, such as fairs, conferences, home shows, and senior lifestyle events. Staff from collaborating agencies, including the Iowa Department of Elder Affairs, Area Agencies on Aging, and the Iowa Able Foundation, were trained to assist with interpreting and demonstrating exhibit features.

b. Impact/accomplishment

- Powerful Tools for Caregivers class leaders implemented the educational series for family caregivers in 10 Iowa communities.
- 100% of the participants in one rural Iowa class series reported that the classes provided them with helpful information about community resources. 83% reported both communication tools and action plan tools learned were extremely helpful. Three Iowa area agencies used Iowa Family Caregiver Support funds to allow staff members to train as Powerful Tools for Caregivers class leaders. Iowa Department of Elder Affairs supported class leader training for two staff members.
- Agency professionals from other states have been impressed by the universal design display trailers and have requested—and provided funding—to transport the exhibits to conferences and workshops in Illinois, Missouri, and Nebraska.

c. Source of Federal Funds— Smith Lever 3b & c, state and local funds; SAMSHA funds were also used for training staff and clients in the Powerful Tools program.

d. Scope of Impact—Statewide

Key Theme – Child Care

a. Description of activity

5,507 individuals received child care training and education, onsite training and consultation. 93% of participants completing follow-up evaluations of the training indicated they had adopted one or more recommended practices to improve early childhood program quality.

883 providers received training through the Child Care that Works Self study program reaching individuals in 45 counties. Providers participated in this program received Iowa Department of Human Services credit for licensing requirements. Center based programs accessed 55% of the self study kits; 45% were accessed by home-based child care programs. 15,208 study video kits have been checked out to providers since the program's inception in 1997.

1,067 Iowans attended Better Kid Care satellite programs conducted in collaboration with Penn State University. Infant and toddler caregiver training was conducted for 988 individuals and literacy training was provided for 146 individuals. Health and safety training was conducted for 247 individuals.

Iowa State University Extension is actively involved in a national research study with the Midwest Child Care Research Consortium. During the 2004-2005 program year, Extension staff conducted 266 assessments of child care centers and programs for this study.

Iowa State University hosts and manages the National Network for Child Care Web Site. During the 2004–2005 program year, NNCC received an average of 149,502 visits by unique users per month for a total of 1,794,024 per year. International visits represent 11% of all visits, visits from the US average 68% and visits from unknown origins represent 21%. Currently, there are 2,331 peer-reviewed resources on nncc.org that represents information from universities in all 50 states. Iowa State University Extension also provides oversight and management of the Early Childhood section of the CYFERnet web site for the Children, Youth and Families Education Research Network (CSREES).

b. Impact/accomplishment

- 123 playgrounds were improved with technical assistance or consultation from ISUE.
- 247 new child care centers, early childhood and family home child care programs were started as a result of direct Extension involvement. These programs serve 1,923 children
- 890 existing childhood programs and businesses were strengthened with Extension involvement.
- 379 individuals were employed as a result of new or expanded programs or businesses.

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

d. Scope of Impact— programming in-state, child care assessments/evaluations of four Midwest states, NNCC national and international.

Key Theme – Children, Youth and Families at Risk

a. Description of activity

The statewide goals for Iowa's Children, Youth, and Families at Risk (CYFAR) project are to improve the ability of families at risk to raise healthy, contributing citizens, to improve the well-being of children, youth, and families, and build community capacity to support these families. Iowa's New Community Project (NCP) continues the integration and expansion of CYFAR programming into ISU Extension, continues to strengthen collaborations, and supports three community projects in Davenport, Perry, and Sioux City. The ISUE CYFAR web site averages more than 6,500 visits per month. The LeClaire project in Davenport offers youth summer and after-school programming and community gardening. Hispanics United for Perry (HUP) focused on three priorities: full citizenship participation among Hispanics; more parent involvement with their children; and reduce language barriers. HUP sponsored and assisted with multiple community activities and celebrations, worked to bridge barriers and conducted a leadership training in Spanish. The Westside Resource Center in Sioux City offers a wide variety of educational and parenting programming in addition to health and safety screenings and resource and referral services to neighborhood residents.

The ROWEL Poverty Simulation proves effective in increasing participants' awareness of poverty issues to those living in poverty. From October 2004 through September 2005, ISU Extension staff conducted 19 simulations for 1,154 participants.

b. Impact/accomplishment

- Poverty Simulation participants show increased awareness and sensitivity to needs of families - (i.e., reduced requests for donations from students for field trips, more participation in school breakfast programs, learning more about resources and programs within communities to help limited resource families, etc.).
- Educational programming in the three local CYFAR projects reached 626 children and youth and 290 adults. Volunteer commitment is an indicator of success in reaching the community. This past year 133 youth and adult volunteers contributed 1,636 hours of their time.
- From October 2004 to September 2005, 118 youth at LeClair House in Davenport developed citizenship, leadership, literacy, and life skills. HUP sponsored a fall Latino/a Festival that drew over 1,000 citizens.
- The Westside Resource Center provided resource and referral services to 3,745 people.

c. Source of Federal Funds—Federal CYFAR dollars, also state and local support and federal Smith-Lever 3b & c funds

d. Scope of Impact—State and national

Key Theme – Family Policy

. Description of activity

848 individuals increased their understanding of public issues; 68 percent of those who responded to a survey reported taking action to improve their communities following a meeting or forum about quality child care, poverty, food insecurity or economic development issues. Careful thought and deliberation help Iowans understand complex issues and consider courses of action.

42 communities were actively involved with the awareness and educational phases of the Child Care Lasts A Lifetime campaign; 125 individuals received information about quality child care, which included a legislative update about current child care issues. Fourteen counties/communities submitted proposals and were accepted to receive mini-grants to convene a community dialogue (forum) about quality child care. A discussion frame and video that outlined three policy approaches was created and piloted for use in these fourteen communities.

b. Impact/accomplishment

Eight individuals attended the ISUE Family Development Certification Training and were certified as specialists who practice a strengths-based approach to help limited-resource families set goals and access resources they need to become self-reliant. ISUE partnered with community action agencies in eighteen regions to reach limited resource families with information and education about nutrition, financial resource management and parenting.

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

d. Scope of Impact—State specific

Key Theme – Community Development

. Description of activity

Community development programming in Iowa is organized around building and sustaining community capitals (human, social, physical, environmental and fiscal). Such activities as visioning, planning and organizational capacity building are prerequisites for strong communities. Six separate projects address multiple community capitals as a central feature. These include a) Community Visioning, changed the landscape and physical entryways to an additional eleven communities this past year, and over 110 rural Iowa communities since the beginning of the program; b) Community Planning and Visioning, locally-supported efforts to address one or more elements of the community capitals in 27 counties and 13 communities, often a combination of student assistance and Extension programming; c) Resident-led watershed planning, facilitation and organizational development support to citizen-based planning in three watersheds; d) Land Use Planning and Geographical Information Systems, assistance provided to ten communities and two counties, and GIS training provided to 387 local officials and leaders from 40 Iowa counties.

a. Impact/accomplishment

Evaluation of the past five years of the Community Visioning program found that of the 113 communities that have participated, 95% used design elements derived from changes in their

physical built environment (streetscapes, entrance ways, signage, etc.) This program received a national award from the USDOT Federal Highway Administration in 2003 for Environmental Excellence for promoting Excellence in Livable Communities. It is also slated to receive a similar award in 2006 from the American Planning Association.

b. Source of Federal Funds—Smith-Lever 3b & c, leveraged with state funds, user fees, DOT, HUD, not for profit organization contracts, and contracts with local governments.

c. Scope of Impact—State specific.

Key Theme – Family Resource Management

a. Description of activity

The goal of family resource management programs is to help Iowans build knowledge, skills, and attitudes that enable them to achieve their financial goals, improve their quality of life, and enhance their financial security. A total of 14,363 Iowans learned about resource management by participating in a wide range of learning activities. 11,916 Iowans participated in ISU Extension financial management workshops or individual consultations that emphasized preventive education in the "basics" of financial management—budgeting, record keeping, credit management, homebuyer education, privacy, savings and investing, and retirement planning. 1,038 of those learners participated in workshops on financial security in later life and 150 received a PowerPay debt reduction computer analysis. 1,526 consumers participated in individual consultations about their finances. 13,845 Iowa high school students in 244 schools enrolled in the High School Financial Planning Program.

In addition, limited-resource Iowans were targeted in Earned Income Credit (EIC) campaigns and child health insurance outreach efforts, EIC workshops reached 1,445 in face-to-face, and 852 learned about the Healthy and Well Kids in Iowa (HAWK-I) program—Iowa's Child Health Insurance Program for uninsured low- and moderate-income children.

b. Impact/accomplishment – The following outcome data are reported from surveys of program participants.

- 86% of participants in consumer credit workshops took steps to reduce debt
- 97% of participants in retirement planning workshops gained greater control of their current spending, saving and financial security
- 11% projected their personal retirement financial needs
- 14% increased contributions to an employer-based retirement plan
- 10% increased contributions to a personal retirement investment
- A 2003–2004 survey of a national sample of high school students who completed the High School Financial Planning curriculum documented: 60% increased knowledge about credit, auto insurance and investing; 60% changed their savings patterns; 59% changed their spending patterns; 40% began to write goals for managing money, saving money, and tracking expenses; and 41% increased confidence in making financial decisions.

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

d. Scope of Impact—State Specific, “Secure Your Dreams” retirement curriculum is linked on the Financial Security in Later Life national initiative website.

Key Theme – Farm Safety

a. Description of activity

The Iowa farm fatality summary ten year average for 1988 to 1997 was 48 deaths per year. The farm fatality summary continues to show a decrease in the number of these fatalities. The number of deaths recorded for 1998 to 2004 were 42, 49, 38, 22, 26, 38, and 41 respectively. A target group identified in Iowa is farm youth. Farm safety day camps, safety 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 21 farm safety day camps and educated over 2,000 youth between 7-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 continued with a national sponsor, Progressive Agriculture Foundation. Iowa State University Extension program provides supporting materials of publications and demonstrations to these camps.

Iowa State University Extension delivered education to Iowans with in-school and public educational programs. Extension staff in 22 counties presented farm safety programs that reached about 1,000 Iowans. The Certification program fulfills the youth requirements to operate tractors and machinery that meets the federal guidelines and include 24 hours of training. Four counties in Iowa sponsored the program with 54 students.

Safe Farm, an Iowa State University Extension program, helped to make Iowa farms a safer place to work and live by the combination of a media campaign and various educational efforts. A structured farm safety media campaign included weekly scheduled radio interviews. The radio interviews provided over 62 minutes of quality radio programming. During National Farm Safety Week, Iowa State University Extension coordinated a multi-organizational promotion to increase awareness. The Safe Farm agricultural health and safety pages on the World Wide Web contribute to the media campaign by providing current and timely information to both the county extension offices and Iowans. The address of the page is <www.abe.iastate.edu/safety >. Items found on these pages include: a list 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.

b. Impact/accomplishment

- 54 youth ages 14-16 years of age received federal required certification for being legally eligible for agricultural work opportunities off their parents’ or legal guardians’ farm.

These youth can now enter the agricultural workforce and reduce the potential occurrence of agricultural-related injuries to this age group.

- 2,421 youth ages 8-14 years of age received one day of farm safety education from participation in farm safety day camps hosted throughout the state. These camps offered a variety of farm safety messages tailored by local community and stakeholders. These camps created awareness of farm hazards; developed an understanding of safe and unsafe behaviors; created a positive life-long acceptance of safety responsibilities; and decreased the incidence of farm youth injuries and fatalities.

c. Source of Federal Funds—Smith-Lever

d. Scope of Impact—State Specific

Key Theme – Leadership Training and Development

. Description of activity

Iowa citizens were taught leadership skills from a portfolio of eight programs that were organized in-state around Building Human Capital. The development of human and social capital is central to the ability of communities to solve their problems. In FY 2005, 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) Nonprofit Management Institutes, a 13-session (two 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; d) Horizons, an intensive three-community organizing leadership and poverty reduction project supported in part by the Northwest Area Foundation; e) Municipal Clerks' Institute, a three-year tiered program with a curriculum built around budget and finance, communications, city records, ordinance development, community development, intergovernmental relations and technology updates; and f) Election Officials Training, two-level, three-day workshops for county auditors and staff to better manage Iowa's elections; g) Township Trustee Training on the official role and responsibilities of these elected officials; h) Planning and Zoning officials training for planning and zoning volunteer boards.

a. Impact/accomplishment

Extension leadership training and development was available in each of Iowa's 100 Extension districts and specific programs were held in 18 counties and 12 communities.

During the year,

- 468 organizations were assisted or strengthened
- 45 service providers were certified
- 2,662 community leaders or local government officials received training, and
- 294 service providers and 852 youth were trained

- In follow-up surveys, 80 percent of leadership program participants reported they had taken on new roles in community organizations or changed their roles to be more effective

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

c. Scope of Impact—State specific.

Key Theme – Parenting

a. Description of activity

Iowa State University Extension (ISUE) continued to train professionals and volunteers to implement sequenced parenting education, as well as provided training directly to parents through individual consultations and workshops on various parenting topics. Together, ISUE parenting education programming efforts reached 12,399 Iowans.

Seven hundred seventy-four individuals were trained to deliver sequenced parenting education programs; this included 551 individuals from 20 different states, plus Wales, trained to deliver The Strengthening Families Program (SFP) (for parents and youth 10-14). Other sequenced programs individuals were trained in include: Girl Talk/Guy Talk (designed to increase communication about sexuality issues between parents and teens); Celebrate Families (program for parents and school-age children); Great Beginnings for Families (program for parents of children 0-5 years); The Incredible Years (program for parents of children 2-7 years); and Partnering with Parents (training series designed to strengthen the core competencies of parenting educators). 136 sites in 21 states reached approximately 800 professionals in their state through the two-part satellite series "The Impact of Couple and Marital Relationship on Parenting and Child Outcomes." Iowa State University, in collaboration with Pennsylvania State University, is in its fourth year of a five-year research/extension project (PROSPER, Promoting School Community and University Partnerships to Enhance Resiliency). This project (funded at $21 million from the National Institute of Drug Abuse) involved 28 schools, community stakeholders, and more than 11,000 families in sustainable evidence-based programs to build resiliency among youth and reduce substance abuse.

b. Impact/accomplishment

- 89% (n = 973) of individuals who participated in parenting education programs reported adopting one or more recommended parenting practices.
- 78% (n = 134) of parents who participated in The ISU Extension Strengthening Families Program for Parents and Youth (SFP 10-14) reported letting their child know specifically what they expect regarding alcohol and drug use most of the time or a good bit of the time after participating in SFP 10-14, as compared to 58% (n = 100) before participating in SFP 10-14.
- 80% (n = 115) of youth who participated in SFP 10-14 reported using the Peer Pressure steps when they are pressured to get into trouble most of the time or a good bit of the

time after participating in SFP 10-14, as compared to 58% (n = 84) before participating in SFP.

- Preliminary research results for PROSPER: The students in PROSPER intervention communities, compared with students in the comparison communities, were more likely to report that their parents used consistent discipline and less harsh discipline and that their families were more cohesive. Overall, families in PROSPER communities appear to be functioning more positively than families in comparison communities. These findings are consistent with findings in other research projects that use the same or similar evidence-based programs.

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

d. Scope of Impact—State specific; PROSPER project includes Pennsylvania; Partnering with Parents online training reached educators in nine states; ISU Extension Strengthening Families Program for Parents and Youth 10–14 reached individuals in 20 states and in another country; The Impact of Couple and Marital Relationship on Parenting and Child Outcomes satellite series reached individuals in 21 states.

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 – Youth/Staff Development

a. Description of activity

The mission statement of the Iowa 4-H Youth Development Program is to empower youth to reach their full potential working and learning in partnership with caring adults. To fulfill this mission it is essential that all staff, paid and volunteer, have a working understanding of the research basis of positive youth development. This will assure that the programming opportunities within the 4-H Youth Development Program are designed to enhance the chances of youth reaching their full potential. To fulfill this mission it is also necessary that the 4-H Youth Development staff work with other youth workers in the state to make certain they have a working understanding of positive youth development.

b. Impact/accomplishment

- 175 Extension staff received training in the 4-H Youth Development Program new outcomes for youth.
- 850 youth from all over the state of Iowa were trained in the youth/adult partnership concept at the 4-H Youth Development State Conference. As a result 44 out of of 57 counties participating in the conference report having an organization that includes both youth and adults making decisions in their county.
- An example of a partnership developed in one county resulted in all youth attending the program being able to identify the six "Pillars of Character" and identifying ways that they could utilize the pillar content at home, school, and/or in the community.

- In a partnership with a school system, the school reported that youth involved in a mentoring program have enhanced their leadership skills and teachers have reported significant impact on students' self-esteem and improved social interaction.
- In a partnership developed with a local bank that has involved 80 youth, all of the students have gone on to post-high school education.
- In a partnership with a school, the school reports engaging troubled youth in a program that has had significant results with the students' attitudes. Examples of self-reported outcomes are: "I took a lot of risks and the fear I overcame was trusting other people." "I help others more." "I can do almost anything if I put my mind to it."
- The result of involving young people in leadership training was that the youth took on the leadership role of planning and implementing a safe, healthy event in the community. America's Promise awarded the group $1000 for these efforts and another $2500 grant was awarded to the group for their event.
- Due to young people involved in specific training on first aid, two different situations resulted in lives being saved by these youth. One youth saved his younger bother in a choking situation and another controlled the bleeding of his father which was caused from a severe accident.

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 safety and appropriately meeting the needs of young people (K-6) during their out-of-school time.

Throughout the state staff are engaged in a number of activities to fulfill these two goals. The types of activities include 4-H clubs, Clover Kids, Day Camps, summer residential camps, out of school days, and after school programs such as the Governor's AmeriCorps After-School Initiative and the Polk County After School Boys group. Specific Iowa 4-H curriculum used included: Challenge, Nutrition Education Activities, Health, Science (including agriculture and the environment) and other character and subject matter curricula. To provide these efforts, state staff work with community-based collaborations, volunteers and various state and local agencies. These programs use 4-H research-based curricula and educator preparation programs to teach life skills to youth.

- ISU Extension 4-H coordinates programming for middle schools that enhance out-of-school time programming for a diverse audience including inner city and at-risk youth.
- ISU Extension 4-H manages the Governor's AmeriCorps After-School Initiative in 9 school districts for at-risk middle school youth year-round.
- Iowa afterschool, club and residential camps targeting military family youth have been designed and implemented to support families and educate the public about issues facing kids/families with a family member deployed.

b. Impact/accomplishment –

Youth 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 in our traditional day camps, club and afterschool programs.

Examples of life skills evaluated included: character building- setting goals for the future, considering how your actions affect others, volunteer time for community service, value the contributions of others, being friends with people who are different from me, avoiding risky behaviors, and feeling comfortable saying "no" to things youth do not want to do.

ISU Extension provides programming to meet the needs of youth locally. Polk County initiated, with support from the community, afterschool programs in response to community needs for pregnancy prevention and fostering male involvement. After completion of the program:

- 66% felt they learned how to make better decision in their life as well as learned to focus on life goals.
- Youth shared that they found that talking to an adult, learning about things and learning to be respectful was the most helpful part of the program.
- 36% of attendees later became involved in a Youth Development Partnership coordinated by Human Services Planning allowance with the goal of helping to plan youth programming.

Scott County Extension provided a career exploration program called Bright Futures. This youth center provides treatment programs for youth who need varying degrees of assistance with peer relationships, aggression, self-defeating behaviors, conduct disorders, substance abuse, and delinquent behaviors. The youth participated in weekly discussion and instruction that included self-assessment of interests, skills, and education. The focus was to increase self-awareness and self-management skills.

- As a result of this experience, youth viewed the world through the eyes of employers, were exposed to the real-life consequences of mismanaging money, and assessed their own goals in terms of "reality." At the beginning of this program, youth expressed their goals to be related to "getting out of treatment" or "making a million dollars." By the end of the program, youth were asking for assistance to complete personal budgets and research vocational programs, colleges, and careers. In addition, youth showed tremendous growth in their insight regarding adult expectations in the "real world."

Governor's AmeriCorps After-School Initiative in nine school districts for at-risk middle school youth reached 603 middle school students.

- AmeriCorps members and community volunteers provided 198 middle school students tutoring assistance.
- As a result of participation in tutoring services and 4-H educational enrichment the average quarterly G.P.A.'s increased.43 points, attendance by 24% by the last programming quarter, and students' problem-based school referrals decreased 40% by the last programming quarter.
- 563 middle school students participated in a total of 2493 service learning hours. 203 different community partnerships were developed or strengthened. These partnerships

benefited youth by providing direct programs, media coverage, funding for program supplies, provision of curricula resources and youth job shadowing experiences.
- 300 volunteers were recruited to assist with tutoring and the organization of enrichment activities. The volunteers provided 2208 volunteer hours.

Iowa 4-H's Operation: Military Kids project is an outreach program for the children of Guard and Reserve soldiers who were deployed to fight the Global War on Terrorism. Purple campers interacted with other military kids facing similar stressors caused by deployment, developed and strengthened their communication skills, reflected on their own situations, and looked at their ability to impact their world.

- Forty-three middle school and high school military kids who either had a parent currently or previously deployed participated in the week long, expense paid camp at the Iowa 4-H Center.
- The campers designed Mobilization Packets for other military kids, wrote and performed a skit using puppets, and participated in Speak Out for Military Kids (SOMK), a program designed to teach kids how to use verbal and non-verbal communication to educate others about the impact of deployment on military kids and families.
- ISU Extension joined Central Lee Schools in their efforts to support military families during the month of October. Central Lee has offered an after school program for military kids every Tuesday since deployment began.
- Local teens help the military kids with homework, read to them and played games.

c. Source of Federal Funds—Smith-Lever 3b & c and special grants

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. Performance goals include marketing the science programs to Iowa Educators; helping K-12 youth understand the relationship between science and technology; providing K-8 youth with non-formal, experiential science activities that will develop science life skills; and delivering technical assistance, curricula, kits and professional development workshops to Iowa formal and non-formal educators.

b. Impact/accomplishment

- E-SET curriculum presentations were made at NAE4-HA Annual Conference, ISSEC, Iowa 4-H Youth Conference, CYFAR National Conference, AEA and LEA Teacher workshops, and area leader trainings. 24,803 youth and adults were reached through E-SET programming through these and other efforts.
- Youth Reached through E-SET Educational Programs include: 18,999
- Youth Enrolled in Science and Technology Project Areas: 550

- E-SET partnered with AEA 10, College of Engineering, Office of Biotechnology, Space Education Initiatives, Nature Mapping, Iowa Conservationists, Illinois Extension, Texas Regional Education Office, Iowa Board of Regents, and others.
- USDA/Army Partnership: 776 Youth, 239 adults

Connecting Learning and Living: Growing in the Garden, Where We Live, and Food, Fiber and Environmental Science Programs

- 7,536 youth participated in at least six hours of lessons.
- 689 adults (teachers, youth program leaders, naturalists, etc) were trained.
- All lessons have been correlated with national standards and benchmarks, thinking skills, content knowledge, and context for the Iowa Test of Basic Skills in reading, math, science, and social studies.

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

d. Scope of Impact—State Specific

Key Theme – Strengthening Volunteer Development

a. Description of activity

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. Selected activities include: 1) a random sample of 113 volunteers responded to a survey on volunteer training and needs; 2) 152 volunteers and 25 staff participated in Safety and Education in Shooting Sports training 3) 344 volunteers and staff planned and participated in two volunteer conferences in the state; 4) 17 Iowa volunteers and staff participated in the North Central Region Volunteer Forum (NCRVF) in Indianapolis, IN; 5) 45 high school age youth from across Iowa served on the State 4-H Council; 6) 73 4-H Horse Project Leaders participated in a ICN training designed to share new educational resources and to strengthen local horse project meetings and workshops; and 7) A club survey designed to strengthen youth as partners programming in Iowa 4-H community clubs was completed by 11 clubs, 211 4-H'ers and 62 adult leaders and parents.

b. Impact/accomplishment

- 74.1% of volunteers who completed the volunteer survey indicated a newsletter would be a valuable tool to support their efforts. The Volunteer Development POW team mailed two newsletters (spring and fall editions) to over 6,000 volunteers who have direct, long term contact with 4-H members. Newsletter printing was donated by the Iowa Bankers Association and Meredith Publishing.
- 59.8% of volunteers who completed the volunteer survey indicated the state 4-H volunteer website was a valuable resource. The Volunteer Development POW team revised the website to expand resources to support volunteers' efforts.
- Extension's fastest growing 4-H program is Safety and Education in Shooting Sports (SESS). Certified volunteers lead shooting programs in more than half of Iowa's counties. 152 volunteers participated in Safety and Education in Shooting Sports training.

Only one discipline certification may be achieved at a single state sponsored training and certification workshop except coordinators. A participant must attend all of the training sessions at a state 4-H sponsored workshop which includes 12 hours of discipline instruction and an additional six hours on topics of SESS philosophy, youth development, risk management, planning county programs and additional topics identified by the State 4-H SESS Committee.

- Involvement in out-of-county volunteer training empowers volunteers to expand their leadership abilities. Five volunteers who attended the NRCVF were instrumental in providing leadership for a volunteer conference attended by 130 volunteers and staff. Volunteers who take on planning and administrative roles are role models for other volunteers and free paid staff for programming and educating.
- $8,000 was granted by the Iowa Commission on Volunteer Service to ISU Extension 4-H to administer this program to encourage local youth groups to partner with another community group to plan and carry out a community service project. Twenty-seven grants were funded. The original $8,000 grant resulted in projects totaling $43,357.41 aided by 591 youth volunteers and 271 adult volunteers working together for 5,502 volunteer hours.
- Eighty-three people were recognized for their outstanding contribution to the 4-H program by their induction into the 2005 Iowa 4-H Hall of Fame. Over 1,000 4-H members, alumni, and supporters were present at the induction ceremony at the Iowa State Fair to honor these volunteers and staff members.

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 Iowa Department of Education statistics, 40.2% of school age youth live in the seven designated urban counties. The total population of school age youth in Iowa is generally stable, with some decline; however, the ethnic diversity of youth continues to increase. According to census data, the population of school age youth of color is increasing, with the largest increase in youth of Hispanic origin. Minority school enrollment is twice the Iowa state average in four of the seven urban counties. There is a continued increase in the number of single parent families in urban counties. A need to increase the math and science skills of all youth has previously been identified. The urban 4-H program must adapt to meet the diverse needs of these young people and their families.

b. Impact/accomplishment

- 45,245 youth participated in 4-H Youth programs in the seven urban counties. This is an increase of nearly 6000 youth (+15.2%) above FY2004 and represents 22.1% of school age youth reached through ISUE programming in the seven urban counties.
- Programming involving partnerships and collaborations continues to increase resulting in targeted programs for specific community needs. Examples include 21st Century

Community Learning Centers, BASICS nutrition education programs, AmeriCorp programs, Tobacco Prevention projects, Growing in the Garden programs, Adventure Learning Center, and Positive Behavioral Supports programs.

- Programs specific to science and math activities are conducted in the urban counties. These programs include curriculum in both the physical and life sciences.
- AmeriCorp program sites are established in three urban centers – Davenport (Scott County), Dubuque (Dubuque County), and Sioux City (Woodbury County). Positive Behavioral Supports demonstration sites are operating in two urban centers – Des Moines (Polk County) and Dubuque (Dubuque County). An additional PBS site is located in an urban suburb – Central City (Linn County). Extension specialists work with PBS school staff to engage youth and community partners in the implementation of PBS strategies throughout the community.
- A new 4-H club reaching an underserved audience was established in Waterloo (Payne Church). New youth service programs were established in collaboration with community partners in Black Hawk, Polk, and Scott counties.
- Personal Development programs to develop life skills were offered in all urban areas. Programming included (but not limited to) the topics of: anger management, asset building, character education, conflict resolution, nutrition, cultural awareness, drug prevention, gardening, leadership development, money management, pregnancy prevention, healthy relationships, problem solving, and teamwork.

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

d. Scope of Impact—State Specific

B. Stakeholder Input Process:

The Iowa Agriculture and Home Economics Experiment Station (IAHEES) and Iowa State University Cooperation Extension (ISUE) Service undertake 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 and take many forms, both formal and informal. Many of these were listed in the FFY00 report and will not be repeated here. [Incorporated by reference: 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, Section B. Stakeholder Input Process].

Below, find examples how stakeholder input, on an ongoing basis, has had programmatic impact.

1862 Research:

- Program 4. Stakeholder input in the form of Crop Germplasm Meetings and participation in determining crop collection/evaluation priorities happens each and every year. A National Program 301 Workshop was conducted to provide a formal vehicle for stakeholder input to our programs. The soybean breeding program has extensive interactions with farmers and companies that produce and market soybeans for food uses. Corn Breeding and evaluation studies were initiated to identify corn germplasm and selection methods needed to support organic production methods

- Program 5.
  - Studies on hail injuries were designed and conducted after consultation with the National Hail Insurance Company. Outcome from these studies will be distributed to Iowa farmers and hail adjusters to help assess hail injuries on soybean.
  - Technologies to improve yield and genetic purity of hybrid seed production were developed in cooperation with the hybrid corn seed industry, which also provided financial support. The model outputs were tailored to address the need of the seed industry to meet increasingly stringent customer demand for genetically pure seed products. This technology also has direct application for designing isolation strategies for production of plant made pharmaceuticals and industrials in the future.

- Program 6. The sensors and machinery design projects have all been supported by industry partners, and involved substantial collaboration. Industrial partners participated in the research and provided feedback on the objectives of subsequent work.

- Program 10. This past fall, the National Beef Cattle Evaluation Committee held a one-day retreat to discuss improving the healthfulness of beef (i.e. what can be done to make beef healthier to consume). This resulted in a new research to determine the heritability of compounds in beef that have human health implications, in collaboration with the National Cattleman's Beef Association. In poultry-directed accomplishments, we worked closely with geneticists of two poultry breeding companies to design and conduct cooperative research studies to meet industry needs in poultry genetics and breeding. In swine directed accomplishments we worked with; stakeholders, Iowa Pork producers, and the national Pork board to develop successful swine genome sequencing efforts; with stakeholders to develop ideas on DNA testing; and with stakeholders who have requested assistance with methods to improve pork quality for niche markets.

- Program 11.
  - A group including USDA (Iowa) -NRCS, Iowa-DNR, Iowa Corn Growers, Iowa Cattlemen, ethanol producers and ISU scientists are meeting to address the issue of overfeeding phosphorus to livestock fed distillers co-products.
  - A team composed of Iowa cattle producers, Iowa-DNR, USDA-NRCS, area livestock extension specialists and ISU research and extension faculty, continue to serve as an Animal Management Issue Team to identify project areas of importance to beef cow-calf production to be addressed in the forage grazing research program.
  - Farmers used alternative production systems to produce pork for niche markets; representatives from Practical Farmers of Iowa, local research organizations and the Pork Niche Market Working Group of the ISU Leopold Center for Sustainable Agriculture are consulted to identify areas of research and educational outreach programs.
  - Farmers, ISU scientists, staff from an organic cooperative, and the local RC&D Coordinator participated in a USDA SARE funded project to investigate the effects of consumption of milk, milk products and meat produced from grass-based ruminant systems on parameters of human health in support of on the farm research to enhance the conjugated linoleic acid content of milk and beef.

- Program 13.

- FAPRI outlook activities seek and formalize the influence of stakeholders input in the annual FAPRI DC reviews occurring each year in December, during which stakeholders from producer groups, industry and government an international agencies provide input and feedback on our world agricultural outlook activities. These reviews are then integrated into the outlook activities in the following month of January.
- Stakeholder input had a direct influence for both the economic impact of PRRS on the cost of pork production, the hoop analysis projects, and the swine industry labor study. Industry stakeholders were directly involved in study design and funding. Baseline data for the analysis of PRRS on the cost of pork production was obtained directly from pork producers and industry personnel. A case study of 12 pork producers was conducted, using the actual farm records to document production efficiency impacts from a PRRS outbreak. A second approach was a survey conducted of pork industry personnel to obtain their insight into pig production efficiency impacts. The hoop project results are based on actual on-farm production efficiency of the systems. The swine labor study is based on a survey of pork producers and industry employees.
- Stakeholder input has been very important throughout investigations on the role of in-state resources in promoting economic growth. Feedback has been obtained directly from stakeholders when the projects were initiated, during the investigations, at presentations of the preliminary results. Stakeholder input has been critical in designing the analyses, assessing the impacts, and interpreting the results. For example, factors thought important in explaining what rural counties grew and which declined. When possible, we quantified and tested the significance of these explanatory factors. Occasionally, stakeholders questioned our measures and results pertaining to their county or region and we went back and verified or corrected the outcome. Finally, the actual interpretation of the findings benefited from the insights of local stakeholders, especially in appreciating the underlying mechanism of growth impacts.
- The research work on renewable energy was largely driven by stakeholder demand. Some of the output reported on above resulted from a request by the Iowa Renewable Fuels Association.

- Program 16. Concerns for pork quality by producers and by the meat industry have resulted in an effort by the Agricultural Marketing Service of the USDA to develop pork palatability standards. The AMS-USDA has recruited ISU meat scientists to contribute to the development of these standards in response to stakeholder input.

- Program 18. We have been responsive to the food commodity groups regarding development of novel foods and food ingredients that have health benefits.

- Program 22.
  - The Corn and Soybean Initiative (CSI) began in 2004. The objective of the initiative was to team Agricultural Businesses with Iowa State University pest management and crop production specialists to focus research on key issues of the clients. During 2005 a stakeholder (the CSI private partners) meeting was held. In the workshop the clients were asked to list the key issues that required research to enhance corn and soybean production and protection in Iowa. The responses were collated and prioritized and used to issue a call for research proposals. From the applications received from State Specialists, four

that matched the clients stated needs were selected for funding. The projects are being designed by the State Specialists and will be executed in partnership with the Agribusiness clients.

- In response to requests for practical horticultural information by Amish and Mennonite growers in eastern Iowa, a team obtained a $40,000 grant from the North Central Risk Management Education Center. The grant funded a series of 6 field days and 9 workshops for this clientele at 3 locations in eastern Iowa. These initiatives were backed by a resource notebook for each attendee and a reference shelf, including $600 in basic commercial horticulture and greenhouse reference books as permanent additions to 9 ISUE county extension offices and three Amish/Mennonite produce auctions in eastern Iowa. The probable impact of this stakeholder-driven activity has been to increase the profitability of these growers.
- Studies on hail injuries were designed and conducted after consultation with the National Hail Insurance Company. Outcome from these studies will be distributed to Iowa farmers and hail adjusters to help assess hail injuries on soybean.
- A Consortium of Seed Corn Companies was formed to support IPM research concerning Stewart's disease of corn, resulting in a new insect sampling protocol and a model that predicts the seasonal and county-level risk for Stewart's disease of corn. Based upon Stakeholder feedback, we are conducting research that will provide information concerning field-level (site-specific) risk for Stewart's disease of corn.
- The Iowa Soybean Association and the North Central Soybean Research Program have both requested that specific research objectives be addressed. These grower-sponsored, check-off funded organizations have addressed very specific questions (insecticide tank-mixes, planting date considerations) that Iowa soybean growers face in managing the soybean aphid.

- Program 25. Stakeholders have recommended new sites and display routines that have been included in the Iowa Environmental Mesonet. We welcome stakeholder input and concerns through a wide variety of media such as email, instant messages and K-12 teacher in-service days.

- Program 26. All of the accomplishments highlighted above are undertaken with specific guidance and feedback from the agencies which support them. In particular we have very close-working collaborations with staff of the Iowa Department of Natural Resources and the Natural Resource Conservation Service.

- Program 27. In the goat meat project the brokering relationship was in direct response to the need of Muslim stakeholders for a source of local (fresh) Halal goat meat. Producer marketing strategies were altered based on increased knowledge of the local market and through the personal interaction and crossing of cultural barriers facilitated by the research project.

- Program 30. The Iowa Department of Education and Iowa Coordinating Council for Child Care requested follow-up to the Midwest Childcare Research Consortium findings, to assess the impacts of infant-toddler caregiving workshops on the quality of early care and education from family home care providers. Relatively weak impacts were found. An implication for

future study is that lax licensing regulations may create weak incentives for family providers to improve child care quality.

Extension:

- Program 101. All programs developed involve significant stakeholder input – both in identifying the need for a program, developing educational materials and in the delivery of the program. For example, farmer directors and association staff played a significant role in assessing the strategic impacts of ethanol expansion on the soybean industry. They defined the problem area, reviewed materials as they were developed, assisted with the presentation and dissemination of results and also provided financial support for the research.

- Program 104. The Annie's Project groups formed in Iowa came about directly from the success of similar groups in Illinois, Missouri and other states, and requests from Iowa farm women for similar opportunities. The Overall Women and Women in Denim programs originated from actions by stakeholder groups that included female farm partners, agribusiness persons, and Extension educators, all of whom were deeply involved in the planning process of the seminars. In addition, Extension specialists served as advisors to a group of farm women who created a formal organization called Iowa Women in Agriculture (IWIA), and assisted them in obtaining grant funds with which to establish their organization. This group is planning a series of educational programs in the near future in which Extension educators will participate.

- Program 106. All programming is at least in part derived from conversations and surveys from current and potential clients.
  - The comprehensive Iowa Turfgrass Survey is regularly consulted when programming is designed for the Iowa Turfgrass Industry. See: http://www.iowaturfgrass.org/survey/surveyhome.htm
  - Three produce auctions were new to Iowa in 2003. The founders of the auctions requested help when they found that ISU Extension had research and practical knowledge on the production of fruits, vegetables, bedding plants, flowers, and potted plants. In part because of these new and unique grower needs, Program 106 secured a grant from the North Central Risk Management Education Center in 2005 to help educate them on production and safety techniques in 2005 and 2006.

- Program 107. In January 2005 the Iowa Beef Center, in conjunction with Iowa Cattlemen's Association, surveyed two groups of Iowa cattle producers regarding their current operation, how they receive information, and what they saw as the greatest opportunities and obstacles for the state's cattle sector. The goal of the study was to better understand current marketing and management practices, the highest priorities for research, education, and policy, and how producers receive information. In response to the survey, we wrote and were awarded a grant that address the priorities they identified. The information will also be provided in the desired formats (correspondence course and weekday workshops). The grant is from the USDA Risk Management Agency and is funded October 2005 – September 2006.

- Program 109. Agri-business contacts in Iowa and The Netherlands have resulted in the New Farms Project. It recognized the need to grow the Iowa Dairy business from a community

development aspect and the need to find alternative dairy locations for Western European dairy farmers being squeezed by urban expansion, high land prices and high milk quota prices.

- Program 121. Prior to the recent signing of the Renewable Fuels Standard, interest in expanding the biodiesel industry in Iowa was reaching a feverish pitch and numerous individuals and groups from around the state were seeking information about the potential and opportunities for building biodiesel plants. Two state-wide information meetings to provide biodiesel industry overviews were held (sponsored by ISU and many other statewide partners) and ISU staff met with at least eight local farmer/community groups to discuss the potential for biodiesel production in their communities. Several of these groups have received assistance from Iowa State University to conduct biodiesel feasibility studies.

- Program 142.
  As Iowa agriculture has restructured in the past two decades, the traditional extension role of having a professional agriculturalist in each county office has changed, with more and more regional extension agronomists serving increasingly larger areas. Correspondingly, major agribusinesses have also joined together, and now instead of serving a single community, they cover multi-county service areas. These two developments have led to the slow loss of connection between ISU Extension and private-sector agri-businesses. Through a survey conducted by campus IPM/ICM staff, we learned that these stakeholders still have a need for knowledge-based Extension information, but needed a better process to share needs and gain information with the university.

  In December 2004, ISU publicly announced the Corn and Soybean Initiative. The purpose of this initiative is to help integrate and coordinate Iowa State's applied research and extension programs and expertise in corn and soybean production with a goal of increasing Iowa growers' productivity and global competitiveness. The initiative facilitates a close working relationship between Iowa growers and agribusiness and ISU faculty and staff in agriculture and biosystems engineering, agronomy, economics, entomology and plant pathology as well as ISU Extension field crop specialists across the state. Essentially, the initiative provides a "front door" for partners to access corn and soybean production information and education.

  The initiative has nine organizational partners (industry and commodity groups and major agricultural print media) and 26 agribusiness partners (mostly agricultural input retail suppliers).

  Major accomplishments of the first year of the initiative include establishment of the partnerships and subsequent identification of ISU Extension staff to serve as partnership managers for the relationships. Also in 2005, a monthly newsletter for partners, titled Partnership Matters, was created. Partnership Matters highlights ISU personnel and programs and describes new corn and soybean production and pest management research being conducted at ISU. A research roundtable discussion was held in March 2005 with initiative agribusiness partners to learn about the research needs of the partners. And in the summer of 2005, Partnership Perks was created. Partnership Perks are timely notifications (sent as PDF

files via e-mail) to initiative partners notifying them of significant happenings in some aspect of corn and soybean production. In the fall of 2005, initiative staff began working with ISU researchers and initiative partners to jointly develop and fund four on-farm research projects, each conducted cooperatively with several initiative partners, to address based on the research needs identified at the research roundtable conducted in March.

- Program 143. Stakeholder input is important for the development of the optional topics presented at the commercial and private pesticide applicator training meetings. Each year, the state staff elicits topic ideas from producers and state field crop specialists. The optional programs for the private pesticide applicator training meetings are directly related to current concerns and emerging issues throughout the state. Last year, several emerging pest concerns were addressed through the development of learning modules. These modules include: Asian soybean rust update, soybean aphid update, corn rootworm variants (i.e., northern corn rootworm extended diapause and western variant corn rootworm) and invasive or emerging weed problems in Iowa. These programs emphasized proper identification of the pest, accurate scouting techniques to determine pest populations, use of thresholds to make sound management decisions, and implementation of safe and effective management practices.

- Program 145. Iowa State University has developed and maintains cooperative relationships with Iowa Center for Agricultural Safety and Health (I-CASH) at the University of Iowa, the National Education Center for Agricultural Safety (NECAS) at the Northeast Iowa Community College, and other farm safety-focused organizations. These organizations have input mechanisms for stakeholder that are used in developing the farm safety programming. Iowa State University Extension Farm Safety Leader also uses an advisory group that has members who are farmers, insurance company representatives, equipment dealers, health departments and health care professionals. This informal group advises the farm safety program leader as to the priority of needs and serve as a transfer mechanism to distribute safety information through their organizations and out to the population they represent.

- Program 147. The ISU Extension Sustainable Ag Program contacted Iowa stakeholders (11/04), Extension field staff (1/05), and campus faculty (6/05) concerning new enterprise needs of farmers in SW Iowa. Stakeholders identified information and technology awareness was needed for high tunnel production systems for alternative horticultural crops. The ISU Extension Sustainable Ag Program developed a response (2005 PDP POW) for a High Tunnel Workshop. Program planning was developed through farmer and key staff leadership. An interactive workshop and field tour of technology was planned with participation by farmer presenters, multi-state faculty involvement (Kansas State University), and industry.

C. Program Review Process:

There has been no change in the review process.

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 4. We are in the process of developing a relationship with Haskell Indian Nations University to provide training for American Indian students in plant genetic resources and conduct collaborative research projects suitable for 8 week internships. Programs with Practical Farmers of Iowa were conducted for forages, small grains, soybeans and corn. Asoyia is an Iowa-based company formed by Iowa farmers to produce and market 1% linolenic soybean varieties developed at Iowa State. Innovative Growers is a farmer-based organization that produces and markets low-saturated fat soybean varieties. There are many other companies that grow and market the ISU food-grade varieties.

- Program 10. Research that focuses on meat quality will assist small farm owners in meeting needs of niche markets.

- Program 11. The alternative swine program is designed to provide technology and information for small diversified farmers interested in pig production. The grass-based beef and dairy work is targeted towards small beef and dairy producers in Northeast Iowa and Southwest Wisconsin.

- Program 13. The research reported above is readily available to all interested parties through online working papers, where many are at the CARD websites http://www.card.iastate.edu/publications/. Presentations of the results have included under-represented individuals and groups as have private follow-up consultations. In many cases, the subject matter should be of particular interest to individuals with fewer means. For example, hoop production systems have low resource requirements and are potential production alternatives for limited resource farmers. They are also an efficient alternative for small farm owners and operators. Their sizes for efficient adoption are quite flexible. The swine industry labor study evaluated wage rates, etc. for the different populations in the industry.

- Program 16. Contributed lectures to the Pork Board Trucker Quality Assurance Program. This is a group of small business owners who have not been previously targeted for educational programs that will benefit the pork industry.

- Program 22. Three field days in eastern Iowa in June and July 2005 were attended by a total of 125 Amish and Mennonite growers of vegetables and greenhouse crops.

- Program 26. One of the faculty members in our group is a co-principal investigator (with administrators, biologists, engineers, philosophers and sociologists) on an NSF ADVANCE Institutional Transformation grant proposal designed to transform opportunities for women in academia.

- Program 27.
  - The Horizon Program has increase involvement of women, youth and limited resource individuals in leadership roles in their communities. The program promotes interaction among a cross section of community organizations that represent commitment to inclusive leadership. Although funding is terminating, the communities continue to work toward achieving their goals by providing ongoing training to community residents and seeking new ways to involve residents in local decision making.
  - Research in the goat meat project explicitly focused on immigrants from southeast Asia: Muslims from the Middle East, Africans, Indians, Pakistanis, and Latino/as. The majority are limited resource clients. Goat farmers also may be considered an under-served clientele.
  - A project examining the relationship between business networks and community economic vitality is working with extension and NGO collaborators to create a state wide network of agricultural producers for alternative markets, a Hispanic business network in Ottumwa, and a entrepreneurship network in Atlantic.

- Program 30. For a multi-state study of rural low-income families, research in Iowa is focused entirely on Latino families in two counties. Two interviews were conducted for each participant family, about support from informal networks and community social service agencies, to assess rural family well-being among immigrants. Iowa community policy makers are being informed to help them evaluate current services and potentially formulate new practices to assist Latinos.

The following examples provide support to the fact that ISU Extension is committed to working with traditionally under-served and under-represented populations, and in doing that works closely with researchers at ISU and across lines in multi-state efforts:

- Program 101.
  - Annie's Project and the newly established Iowa Women in Agriculture group are closely linked to Economics Extension programs in business strategy, finance and risk management.
  - Women landowners are a major audience for farm leasing education programs.

- Program 104. All of the women in agriculture programs were directly aimed at a female audience, a group that has historically been underrepresented in financial and risk management education. Women working professionally in agriculture were involved in the planning, organization and teaching aspects of the programs, and program topics were specifically defined to address responsibilities on the farm that traditionally are carried out by females.

- Program 106.

- The Amish/Mennonite communities had recently started produce auction houses in three areas of Iowa (Riceville area between Howard and Mitchell County, Frytown area located north of Kalona in Johnson County, and Bloomfield area of Davis County) in 2003. These were initiated to provide an additional marketing channel for fresh grown Iowa fruit, vegetables, flowers, and plants. Many of the producer participants were new or had limited experience in produce production. Some, though not all, do not use any electricity due to religious beliefs. Most had no previous contact with Iowa State University. ISU Extension Field Specialists, CEEDS, and campus based staff helped educate over 250 participants at two winter meetings, three summer field days, and individual consultations and field visits. Produce quality, yields, and price were similar to the 2004 growing season. However without the ISU expertise there more likely would have been a reduction of produce and of quality since two of the three sites had a prolonged drought in 2005 as compared to near ideal growing conditions in 2004.
- Program 106 specialists have provided on-site consultations, hands-on workshops, and training sessions related to horticulture activities for inmates, staff, and volunteers at the North Central Correctional Facility (NCCF) in Rockwell City. Some inmates say that Extension training has given them confidence and a positive attitude, and staff members claim that inmates who get this training have better behavior and fewer problems. Produce yields have continued to increase since the time when ISU Extension became involved in 1996 and in 2005 the estimated net value of the horticulture crops produced at the NCCF was $500,000.

- Program 107. Many Iowa Beef Center activities are with limited resource clients, farm couples, and female producers. The center of Iowa's cow-calf industry is located in southern Iowa, a region with an aging population and low income levels. The Iowa Beef Center is serving this client base with one-to-one assistance in business arrangements such as custom grazing and cow share leasing, as well as cost reduction strategies featuring extended grazing and balanced cow wintering rations. More programming is offered via web site and non-traditional meeting times to better serve clients with off-farm employment.

- Program 109. A special project to assist a paraplegic dairy farmer get back into the dairy business has involved the local NRCS, Easter Seals of Iowa, ISU Bio-Systems Engineering, ISUE Field Specialists, the Regional RC&D coordinator and local farmers. A special milking claw holder has been developed and tested, a "no-steps" parlor and free stall has been designed and further work is being done on a personal cooling system for the paraplegic farmer. Another dairy farmer is being assisted in at least a one-year business arrangement with a local young dairy farmer. This was caused by the older farmer loosing a leg in a farm accident. Doctors tell us there is a good possibility that the disabled farmer will be able to return to his dairy profession in about a year.

- Program 146.
  - The Iowa Master Gardener Program trains approximately 500 to 700 adults per year to become Master Gardener volunteers. Training is provided to accommodate adult learners with physical limitations. In the past, we have used closed captioning and

hearing assistance devices for hearing impaired learners. This year, special efforts were made to accommodate mobility impaired learners at county extension offices and campus. Accommodation allowed volunteers to successfully complete the course and to serve their community through horticulture volunteer service.

- The ISU Polk County Master Gardeners continue a special project to assist persons with disabilities through a demonstration enabling garden in Altoona IA. This garden has been professionally designed with input from master Gardeners. Construction has been accomplished using professional and volunteer labor. When completed, the garden will provide opportunities for people of all ages and abilities to share the beauty of nature and the joy of gardening. The enabling garden will feature level and firm pathways, raised beds, vertical gardening and barrier free gardening with containers.

- Program 147. Nationally, the demand for goat meat outstrips the domestic supply. Demand is also growing in Iowa. Growing markets promise increased income streams for producers who choose to diversify by adding goats to their farming systems. The project undertaken by ISU targets the following: From the consumer side, to provide detailed information about the market for goat meat among recent Latino/a, Asian, and Muslim immigrants to Sioux City area; from the producer side, to identify the barriers to raising goats and marketing goat meat. Activities in 2005: three listening sessions, two case studies of goat meat producers (one direct marketing and one marketing conventionally), two focus groups (combined with sampling goat meat dishes), four surveys at farmers' markets and ethnic celebrations, two field days featuring goat browsing (with Agren, Inc. as lead partner), two project advisory committees have brought together goat meat producers and consumers.

  This work has identified specific consumer preferences by groups of varying national origins, and ethnic and religious backgrounds, as well by demographics such as income level and rural or urban roots. It has also identified barriers to the increased production and marketing of goat meat including inadequate meat processing infrastructure; production/technical system unknowns ranging from fencing and watering to parasite control; and the reluctance of most Iowans of longer term residence, and of northern European background to eat goat meat.

- **Los Chicas**. ISU Extension offered a series of three monthly nutrition classes for Hispanic teens in Waterloo. Six completed entry and exit food recalls and questionnaires. At entry, two of the seven teens reported eating one serving from each of the food groups. At exit, four of the six had eaten at least one serving of food from each food group.

- **Spanish Family Literacy**. Hispanic families with limited English language and literacy participated in the Family Literacy Program in cooperation with SW Iowa Latino Resource Center. The Family Storyteller program was adapted so English and Spanish versions were available. Each week an ISU Extension Specialist modeled reading a book and shared specific literacy skills. Twenty-four individuals attended.

- **Successful Outreach to Immigrants in Marshalltown**. Two series of three financial programs each were conducted in coordination with ESL classes at Marshalltown

Community College and in partnership with the newly-formed Immigrant Service Providers Network. Funding provided translation and child care, as well as healthy refreshments and a mini-lesson in nutrition for 40 participants. Financial topics included: credit and debt, buying a home, renters' rights, avoiding fraud, and saving.

- **Nutrición en Español: Nutrition Education for Spanish-speaking Families**. Through Food Stamp Nutrition Education funding from the Iowa Department of Public Health and ISU Extension, a bilingual educator taught the food guide pyramid, importance of eating fruits and vegetables, food safety practices, and importance of physical activity to 40 Spanish-speaking adults in SE Iowa.

  Post evaluation showed increases to: name all five food groups, thinking about healthy food choices for meals, planning meals and snacks that include five servings of fruits and/or vegetables, washing hands before preparing foods, and thawing frozen foods at room temperature. Physical activity increased by about 80%.

- **Stories From Dad, Me & My Dad Visitation Kit**. "Me & My Dad," a kit of materials for checkout to inmates with minor children during visitations, was developed by staff in SE Iowa to facilitate positive parent/child interaction during visitation. A community partnership in support of the effort yielded 150 children's books, 13 volunteers, promotional materials, recording equipment, space and supervision, tapes, mailing supplies and postage to get the project started.

  16 fathers participated. Twenty-four children received books and their father's voice recorded on tape. The checkout materials continue to be cleaned and put in good order by an advisory group of 18 inmates who have gone through parenting education Extension classes.

- **Nutrition for Everyday Living (A Workshop for African-American Women).** Creative Visions, a non profit organization that benefits the minority in Des Moines, was targeted for this workshop on nutrition and exercise by the Central Iowa Family Educator. Topics included: Food Guide Pyramid; serving sizes; breakfast; lunch; dinner; healthy snacks; and food group variety. One participant who did not eat breakfast before starting said she felt much more energized and lost 20 pounds by attending the workshops faithfully.

- **Universal Design for Caregivers**. Universal Design for Better Living is a curriculum developed by the ISU Extension Housing Specialist through an Iowa Department of Elder Affairs grant. Module #1 Universal Design: Better Tools was presented at the AEA 14 Agency on Aging Workshop in Creston. Thirty-eight family caregivers, private caregivers, or residential employees compared standard home tools to universal design tools which compensate for loss of strength, vision, hearing, or dexterity. Participants discussed advantages of the new designs and applications in their home or business location.

- **Issues Related to Aging**. Extension conducted six workshops with aging persons and/or their family members. Topics included dealing with changing needs and establishing

good communication techniques. Nearly 200 families were reached during six program sessions in Iowa Falls and Ft. Dodge. End-of-meeting evaluations showed increased awareness for the need to discuss aging-related issues with family members before a crisis among 90% responding and intent to hold such discussions among 67% of participants.

- **Volunteer Income Tax Assistance (VITA) Program — NE Ia**. Iowa State University Extension staff in NE Iowa provided a media blitz on the Earned Income Tax Credit (EITC) and a Volunteer Income Tax Assistance (VITA) site in three county offices for one day in February. Twenty-four tax returns were filed with a total of $28,450 in tax refunds. Of this, $15,394 came from 14 returns eligible for the Earned Income Tax Credit, and $4,137 from the Child Tax Credit of three families. The majority of the money received by these 24 families in terms of tax refunds will be returned back into the community in forms of bills paid and savings for future assets. ISU Extension and the Institute of Social and Economic Development (ISED) are partnering to expand this program to a six county area.

- **Volunteer Income Tax Assistance (VITA) Program — SW Ia**. In 2004, IRS estimated over 3,700 taxpayers would not claim the EITC in nine SW Iowa counties. ISU Extension recruited and trained ten individuals to be IRS Volunteer Income Tax Assistance (VITA) workers. They provided free services at 20 sites during January-April 2005, marketed through media, churches, financial institutions, and programs serving lower income families including HeadStart, WIC, etc. A follow-up workshop, Smart Spending and Saving, was held in Clarinda with nine participants.

  Over 200 taxpayers requested tax appointments with 131 returns prepared. The total EITC claimed was $104,708 from 74 taxpayers, an average EITC of $1,415. The Child Tax Credit was also claimed by 33 of the taxpayers, totaling $43,686. These credits were reflected in a total federal refund amount of $198,076 received by 115 of the taxpayers. State refunds totaling $18,568 were also received by 97 taxpayers.

- **Low Income Home Buyer Programs Dubuque**. In 1997, Dubuque County ISUE started the first-time home buyer workshops, taught by the Family Resource Management Field Specialist. The demand for workshops increased, so ISU Extension and the Dubuque Housing Services Director met with mortgage lenders in Dubuque to request funding for a part-time Housing Educator. The Housing Program Assistant also represents ISU Extension on the Dubuque Housing Commission, The Housing Board of Review and Dubuque Housing Trust Fund Committee.

  This mutually beneficial relationship developed over the past eight years between ISU Extension and the Dubuque lenders has helped hundreds of low-income families become successful homeowners.

- **Affordable Housing in Jefferson**. The 2005 Jefferson City Strategic Planning process identified housing as the number one need. ISU Extension provides leadership for the Greene County Economic Development Corporation (GCDC) Housing Committee. Representatives from various agencies (USDA Rural Development, Region XII, etc.)

interested in housing, work with them at different times. The Jefferson City Council was educated on Tax Increment Financing (TIF) as an outgrowth of the work of the GCDC Housing Committee.

Lenders and realtors learned more about programs available through Region XII for low and moderate income first time home buyers as an outgrowth of the Housing Committee's work:

- First home purchased 10/29/05 for back taxes. After inspection and removal of asbestos, GCDC offered the lot to local builders on for construction of either an energy efficient stick-built or modular home.
- Twenty-six participants learned about purchasing or building a home in Greene County during the first GCDC Housing Fair.
- The need for comfortable rental apartments was identified and a housing committee began exploring possibilities.
- A local developer purchased 120 acres to provide a higher end sub-division for over 50 homes, allowing professionals from local business and industry to live in Greene County rather than commuting. Some current home owners are expected to build and then sell their more affordable current homes, thus expanding available housing. The City Council approved the annexation request.
- The feasibility of an affordable subdivision and rental units are being explored.
- The committee continues to look for a home to rehab with available grant funds.
- A county wide survey was conducted in March to learn more about housing needs.

- **Certified Financial Counseling Program — SE Area**. Nine volunteers, through ISU's financial counseling certification program, are providing financial counseling and educational classes throughout rural counties in the SE area, including two who are bilingual in Spanish and English. Funding was from the SAMHSA grant "Iowa State University Extension to Families for Rural Outreach."

  Four counselors have completed over 160 hours of service. They have provided one-on-one counseling with individuals and families on issues such as budgeting, debt management, opening a checking account, insurance planning, using community resources, purchasing a home, financial challenges from health problems, etc. A total of 93 people have been reached through one-on-one counseling services and 430 through 39 group presentations. The High School Financial Planning Program series was taught to 15 students who have a Hispanic background.

- **Spanish and English Home Ownership Program**. ISU Extension partnered with a bank in NW Iowa, along with a grant from Iowa Home Ownership Education Program, to provide First Time Home Buying programs in Sioux County. Ten participated in the Spanish speaking class and four in the English speaking class. Sessions included credit, borrowing basics, types of mortgages, the mortgage loan process, and a panel of professionals (a realtor, appraiser, and banker).

- **The Family Storyteller Program — Lucas County**. The Family Storyteller is a literacy program for parents and preschool children. Children's books, video tapes and language

activities are used to teach 14 reading techniques. Lucas County Extension partnered with The Nest to offer the program in Chariton during 2004/2005. Lucas County Empowerment funded the program. Participants enjoyed a language enhancing activity offered each time. This provided a comfortable atmosphere for informal conversations about reading to children along with other child rearing topics. Over one-third of the participants were Russian women with a wide range of English-speaking abilities. The facilitator initiated conversations about bilingual reading on several occasions.

- **Military Kids.** Iowa 4-H's Operation: Military Kids project is an outreach program for the children of Guard and Reserve soldiers who were deployed to fight the Global War on Terrorism. In July 2005, OMK hosted an Operation Purple Camp, sponsored by the National Military Family Association and funded by the Sears American Dream Campaign. Forty-three middle school and high school military kids who either had a parent currently or previously deployed participated in the week long, expense paid camp at the Iowa 4-H Center. Purple campers interacted with other military kids facing similar stressors caused by deployment, developed and strengthened their communication skills, reflected on their own situations, and looked at their ability to impact that world. The campers designed Mobilization Packets for other military kids, wrote and performed a skit using puppets, and participated in Speak Out for Military Kids (SOMK), a program designed to teach kids how to use verbal and non-verbal communication to educate others about the impact of deployment on military kids and families.

  ISU Extension joined Central Lee Schools in their efforts to support our military families during the month of October. Central Lee has been offering an after school program for military kids every Tuesday since deployment began. Kids catch up on homework, do fun activities, and enjoy a meal together while giving caretakers a break one night a week. Members of the 4-H teen council covered a variety of topics such as nutrition, hand-washing, exercise, art, trees and leaves. Each military kid did several art activities including paper marbling, leaf collages and painting with their teen partner. They then compiled them into a journal which most are giving to their dad or mom for Christmas. The entire group prepared dinner and ate together. "I liked the little pizzas we made from English muffins," said one participant. "This is a great opportunity to spend some time with these kids and let them know that we appreciate the sacrifices they are making," said Skyler Holtkamp, 4-H teen member. The teens helped the military kids with homework, read to them and played games.

- **Hispanic youth.** In response to low-participation in more traditional 4-H activities, Page County delivered five programs at the Hispanic Center for youth, ranging in ages from six to ten. Each time there were seven to ten participants, often the mothers stayed. ISUE materials were used to teach 4-H concepts such as visual design and understanding rockets. As a result, 4-H was asked to have an exhibit at the Hispanic Health Fair and to involve youth with future activities. Hispanic youth have now begun to sign up for summer camps as a result.

  A Williamsburg program evolved into an after school experience providing quality educational opportunities to 45 Hispanic youth. Each day small groups of older youth were given the opportunity to prepare snacks for the whole group. When youth were

interviewed and completed an evaluation, “getting to cook” was a highlight of the program for older members. Additional resources and books were left with the group after the events to be used by the center as well. A family life specialist also talked with parents and grandparents who were very pleased to have had the activities for their children. Youth shared that they would either be watching TV, bored, fighting with others, or cleaning house if they were not participating in the after-school program. Instead, feedback shared that they learned about food safety, to try new foods, about different fruits and vegetables, how to plant seeds and how to make snacks themselves.

- **At-Risk Youth.** Scott County Extension provided a career exploration program called Bright Futures for six teens at the Annie Wittenmyer Youth Center. This youth center provides treatment programs for youth who need varying degrees of assistance with peer relationships, aggression, self-defeating behaviors, conduct disorders, substance abuse, and delinquent behaviors. The youth participated in weekly discussion and instruction that included self-assessment of interests, skills, and education. The focus was on job/career readiness by increasing self-awareness and self-management skills. As a result of this experience, youth viewed the world through the eyes of employers, were exposed to the real-life consequences of mismanaging money, and assessed their own goals in terms of “reality.” At the beginning of this program, youth expressed their goals to be related to “getting out of treatment” or “making a million dollars.” By the end of the program, youth were asking for assistance completing personal budgets and researching vocational programs, colleges, and careers. In addition, youth showed tremendous growth in their insight regarding adult expectations in the “real world.”

  The ISUE 4-H in-school and after-school food, fiber, environmental science program called Growing in the Garden includes several nutrition and gardening activities that help students apply language arts, math, science, and social studies concepts to the land where they live and the food they eat. Underserved audiences where more than 5,000 Iowa youth participate in at least six hours of Growing in the Garden include schools that are eligible for 50% or more free or reduced lunches, home schools, rural Iowa schools where farmers and other people living in the community will not report their income so their schools cannot qualify for government funded programs, after-school programs at schools or facilitated by the Y, Boys and Girls Club, neighborhood organizations, community garden sites, WIC, Park and Recreation Departments, libraries, county conservation programs, homeless and other shelter houses, school for the deaf, classes for special needs students, and church-related programs.

3) 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.

4) 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.

E. Multistate Extension Activities:

0. NASULGC/NELD

The National Association of State Universities and Land-Grant Colleges (NASULGC) assessed fees to promote national initiatives. During FY 2005, Iowa State University Extension paid fees totaling $67,488 to support e-Extension as well as $2,446 to directly support NASULGC's assessment for NELD initiatives. Total paid to NASULGC in FY 2005 came to $69,934 for these joint efforts.

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. In addition to the national program, there is also a NELD program supported by extension in the North Central Extension region of the country. Iowa Extension has staff currently participating in both the national and regional. Expenses paid by Iowa for these staff amounted to $8,342 during FY 2005.

1. 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 FY 2005.

2. Agriculture and Natural Resources Extension Programs

Dr. DeWitt spent time on multi-state and national programs and activities in FY2005 that included: Regional SARE Administrative Council membership, Regional SARE PDP proposal review committee, Region VII PAT manual planning committee, Served as chair of NCR 201 Committee, served as representative to NC IPM coordinators group, served as Iowa representative to NC SARE PDP coordinators group, serves as NC regional representative to National SARE 2006 Conference planning committee, and served as representative to NC PAT coordinators group. This represents approximately 10.2% of Dr. DeWitt's time or equivalent to approximately $11,652 of salary support.

The Senior Associate Dean for the College of Agriculture spent time during FY 2005 on national and regional programs/activities. These activities included a regional dairy conference to develop a proposal for joint research, extension and teaching programs in

dairy. Other activities included serving as administrative advisor to NCR-201 (a joint extension and research north central committee), serving as a representative to the North Central IPM Center (a joint extension/research center), serving on the Board of the North Central Regional Community and Rural Development Center (a joint extension/research center) and serving on the committee to establish extension and research programs through the National Swine Research and Information Center. This represented about 5% of the Senior Associate Dean's time, which is equal to $8,748 in salary during FY 2005.

The Associate Dean for Extension Programs and Outreach spent time during FY05 on national and regional activities. These activities included serving as the administrative advisor to NCERA-3, Soil Survey; NCERA-59, Soil Organic Matter: Formation, Function and Management; and NCCC-9, Midwest Plan Service. Other activities include serving as a member of the Board of Directors for: 1) the National Center for Manure and Animal Waste located at North Carolina State University, 2) the Animal and Poultry Waste Management Center at North Carolina State University, 3) the North Central Regional Aquaculture Center, 4) the Committee for Shared Leadership – Water Quality, USDA-CSREES National Coordination Committee, and 5) Project Coordinator for the Heartland Regional Waster Coordination Committee, a four-state project involving the states of Iowa, Kansas, Missouri, and Nebraska. These activities easily represent five percent of the Associate Dean for Extension Programs and Outreach time, which is equal to $7,288 in salary during FY 2005.

3. Families Extension Program Director

During the federal fiscal year 2005, The Families Program Director spent more than eight percent of her time on activities associated with multi-state programming. She co-chaired a committee sponsoring a two day regional conference on Youth Overweight and Obesity at ISU, in March of 2005. The program was attended by more than 230 participants, and funded by securing $21K in financial support from colleges and program units including NASULGC. She represented the NCR on the planning committee for the Food and Society Meeting National Roundtable Discussion on Obesity and Youth in Washington DC, June 19 - 20, 2005. Her work has continued in this area, resulting in her being named a tri-chair of the national USDA/CSREES and NASULGC task force on youth and young adult obesity. In addition, she has been an active participant in discussions related to multi-state efforts associated with the development of the new plan of work. She has also been engaged regionally in developing programs associated with parenting and financial management. Time and effort towards multistate activities equaled $9,632 in salary during FY 2005.

4. 4-H Youth Extension Program Director

The State Director for Extension 4-H Youth programs in Iowa spent time during FY 2005 on national and regional programs/activities. The Director served on the National 4-H Cooperative Curriculum System Board of Directors focusing on personnel issues and developing a new strategic direction for the organization. He was also as a member of the North Central 4-H Administrators Council and serves as their vice-chair. This past year discussions have been focused on developing a new federal plan of work related to the three national mission mandates of science and technology, healthy lifestyles and youth in civic engagement. Other activities by the Director included national and regional meetings with

ongoing efforts in the areas of staff development, volunteer development, and curriculum development. Time spent on these multistate activities represented ten percent of effort or $10,075.

5. Iowa Cooperative Extension Director

   The Director of Extension for the state of Iowa is involved with many committees dealing with regional and national Extension activities. During FY 2005, participation and presentations at regional and national meetings included Subcommittee work for the DOE Farm Bill Task Force; the National Water Quality Conference; National Center for Food and Agricultural Policy (NCFAP); ECOP Directors and Administrative Meeting; National Agricultural Research, Extension, Education, and Economics (NAREEE) Advisory Board meeting; and National Association of State Universities and Land-Grant Colleges (NASULGC) meetings. During FY 2005, salary paid for multistate extension activities totaled $7,415.

6. Iowa Cooperative Associate Extension Director

   In addition, the Associate Director for Extension also participated in regional and national Extension activities. Meetings and duties included the following: Multi-State Cooperation In Land-Grant University Agricultural Programs; National Association of State Universities and Land-Grant Colleges (NASULGC) meetings; North Central Cooperative Extension Association meetings; as well as time spent as Vice Chair of the ECOP Budget and Legislative Committee; and serving as Extension Administrative Representative on the board of the North Central Region Rural Development Center. During FY 2005, salary paid for multistate extension activities came to five percent equaling $7,813.

F. Integrated Research and Extension Activities:

Hatch Act Funds:

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 occasionally, 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, there is some shifting among the various programs and activities.

Most multistate research projects (all newer ones) contain an outreach/education plan – a plan for how the results of the project are to be made available in an accessible manner to the intended users of the information via publication, workshops, field days, etc. Therefore we consider most multistate activities to be integrated in nature. We have chosen to take a conservative approach and have only include expenditures related to specific research committees where participating faculty from Iowa State University hold at least a partial extension appointment.

Approximately 12.5% of the total is non-multistate in nature. This represents programs (not part of the multistate system coordinated through NIMSS) of faculty with split research/extension appointments.

Brief statements follow on the integrated activities funded from Hatch funds:

Food Crops:
- NC-140: (Dr. Paul Domoto) See outreach plan and annual SAES-422 reports in the National Information Management and Support System (NIMSS), incorporated by reference.
- W-1128: (Dr. Henry Taber) See outreach plan and annual SAES-422 reports in NIMSS, incorporated by reference.

Crop Production and Management:
- NC-1012: (Dr. Mahdi Al-Kaisi) See outreach plan and annual SAES-422 reports in NIMSS, incorporated by reference.
- Dr. Micheal Owen. Dr. Owen's objective in extension programming is to develop information about weed biology, ecology and herbicides that can be used by agricultural clientele to manage weeds with cost efficiency and environmental sensitivity. Management systems that emphasize a combination of alternative strategies and conventional technology are the primary goal. Research is developed to support the extension program responsibilities.

Animal Physiology:
- NC-1119: (Dr. Wendy Powers-Schilling) See outreach plan and annual SAES-422 reports in NIMSS, incorporated by reference.
- W-173: (Dr. Hongwei Xin) See outreach plan and annual SAES-422 reports in NIMSS, incorporated by reference.

Animal Genetics:
- NC-1004: (Drs. Thomas Baas and John Mabry) See outreach plan and annual SAES-422 reports in NIMSS, incorporated by reference.

Agricultural Risk Management:
- NC-1014: (Dr. Robert Jolly) See outreach plan and annual SAES-422 reports in NIMSS, incorporated by reference.

Food Safety:
- S-292: (Dr. Dong Ahn) This multistate activity was written prior to the requirement for an outreach/education plan; however, Dr. Ahn holds an extension appointment and regularly provides information to the poultry industry through one-on-one consultations and provides technology transfer through individual meetings and consultations. Annual SAES-422 reports in NIMSS, incorporated by reference.

Soil Resources Management:
- NC-1017: (Dr. Mahdi Al-Kaisi) See outreach plan and annual SAES-422 reports in NIMSS, incorporated by reference.
- Dr. John Sawyer. Dr. Sawyer coordinates and provides leadership for extension soil fertility and nutrient management programs to support production of agronomic crops in Iowa. He studies the chemistry of plant nutrients in soils, nutrient management, and implications of soil management related to soil fertility, tillage, and the environment, and conducts applied research related to efficient fertilizer use and nutrient, manure, and limestone management.

- Dr. Antonio Mallarino. Dr. Mallarino's research focuses on cost-effective and environmentally sound management practices for phosphorus and potassium (especially in conservation tillage) including soil and tissue testing, fertilizer placement, and precision farming technologies. Extension and other activities include support to extension for programs related to phosphorus and potassium, supervising the ISU Soil Testing Laboratory, and developing fertilizer recommendations.

Integrated Pest Management:
- Dr. Mark Gleason. See below under program 106.

Animal Waste Management:
- S-1000: (Dr. Wendy Powers-Schilling) See outreach plan and annual SAES-422 reports in NIMSS, incorporated by reference.
- S-291: (Drs. Wendy Powers-Schilling and Hongwei Xin) This multistate activity was written prior to the requirement for an outreach/education plan; however, both Drs. Powers-Schilling and Xin hold an extension appointment and regularly share information and research results with livestock producers via a web site and through extension publications. Annual SAES-422 reports in NIMSS, incorporated by reference.

Rural Development:
- NC-1100: North Central Regional Center for Rural Development. See outreach plan and annual SAES-422 reports in NIMSS, incorporated by reference.
- NC-1001: (Drs. Lois Wright Morton and Lorna Butler) See outreach plan and annual SAES-422 reports in NIMSS, incorporated by reference.
- NE-1011: (Dr. Daniel Otto) See outreach plan and annual SAES-422 reports in NIMSS, incorporated by reference.

Quality of Life:
- Dr. Beverlyn Allen. Dr. Allen's areas of interest include community studies and development, social organization and social inequality. Her research emphasis is on race, class and gender inequality with a particular interest in housing, female networks, and social capital in the community development process. She is currently focusing her research on homeownership among non-married women, housing and new immigrants in rural communities, and housing and social capital. She has been able to weave her extension program that focuses on community enhancement of leadership, group relations and organizational activities with her research inquiry into social injustice. She serves as the team co-leader for the Extension-to-Communities Leadership Program.

Grain Quality:
- NC-213: (Drs. Charles Hurburgh, Roger Ginder) See outreach plan and annual SAES-422 reports in NIMSS, incorporated by reference.

Poultry Production Systems:
- NE-1022: (Dr. Hongwei Xin) See outreach plan and annual SAES-422 reports in NIMSS, incorporated by reference.

Seed Science:

- W-1168: (Dr. Manjit Misra) See outreach plan and annual SAES-422 reports in NIMSS, incorporated by reference.

Sustainable/Organic Agriculture:
- Dr. Kathleen Delate. Dr. Delate holds a joint position between the departments of Horticulture and Agronomy. Her research lab conducts projects across the state at ISU Research Farms and as on-farm trials. These include research/demonstration plots of organic agronomic crop production with various crop rotations; organic soybeans following CRP land; variety trials; production of organic herbs, fruits and vegetables; long-term agroecological plots comparing conventional and organic systems; and pest management. Organic agriculture information is presented via workshops and publications with publications available on general production and marketing information, weed management, soil quality, and transitioning from conventional to organic production.

Iowa Pork Industry Center:
- Dr. John Mabry. Dr. Mabry's research focuses on the development of breeding strategies that maximize profitability of swine production systems, development and implementation of cross-herd genetic evaluation programs in swine, and usage of swine data management systems. Dr. Mabry's extension responsibilities include the administration of the Iowa Pork Industry Center and work with producers on swine breeding and genetics improvement programs and swine production record systems.

Iowa Beef Center:
- Dr. Dan Morrical. See below under Program 107.

Smith-Lever Act Funds:

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

Program 101. Strategic Advantage: Management Development for Iowa's Farm Businesses
Program 104. Agricultural Financial Management

Robert W. Jolly: Research forms the basis of Dr. Jolly's outreach programs in agricultural finance and agribusiness management. His educational and professional development programs are targeted to farmers, lenders, financial regulators, agribusiness mangers, public officials and Extension field staff. The primary means used to transfer research-based information to these client groups are:

- In depth professional development programs such as the Agricultural Credit School: http://www.ucs.iastate.edu/mnet/iowaacs/home.html
- Targeted short-term training programs directly organized by Extension or by trade and professional associations and private firms.
- Internet-delivered publications and data such as Choices magazine: http://www.choicesmagazine.org/
- Distance learning programs and courses such as the Agricultural Management e-School (AMES): http://www.extension.iastate.edu/ames/
- Direct interaction with print and broadcast media

Dr. Jolly's recent research activities have focused on 1) quantifying the relationships between financial management and the competitiveness of the farm firm and related agribusinesses, 2) examining the competitiveness of agricultural credit markets and institutions serving agriculture and rural areas, and 3) examining the impact of biofuel expansion on farmers' choice of cropping systems, investment portfolios and income.

Specific projects for FY05 include:

- Monitoring the financial status of Iowa's farm businesses to examine the impact of and their response to changing economic and policy conditions. Farmers and lenders remain concerned about the differential impacts of policy and economic changes on the financial status of farm businesses. This work demonstrated that larger, well-managed commercial farms are growing at significantly higher rates compared to the majority of farm operations. Recently, information from this project was incorporated into financial and risk management educational programs offered by Iowa Women in Agriculture (IWIA), a new organization for women involved in managing agricultural enterprises. IWIA was established with assistance from ISU Extension and the USDA's Risk Management Agency: http://www.iowawomeninag.org/index.html
- Identifying and measuring the role of specific financial performance factors on the ability of farm businesses to sustain a competitive advantage under varying price and policy regimes. This work was undertaken because of the need expressed by agricultural lenders for sound risk rating systems that can also identify managerial strategies that would improve farm financial performance.
- Developing financial models of value-added agribusinesses to examine risk and returns to farmer-investors, timing of investments in response to anticipated policy changes and dividend policy and its relationship to risk management strategies. Lenders and farmers requested analytical tools that produce objective, independent assessments of value-added investments. Preliminary work on this project was presented at the annual meeting of NC 1014 Agricultural and Rural Finance Markets in Transition.
- Developing a model to examine the role of value added investments in farmer's portfolios. The key issue in this project was to examine the appropriateness of horizontal (expanding the farm business) versus vertical (investing in value added projects) growth strategies for specific farm businesses. A master's thesis was completed. A paper based on this work was presented at the 2005 meetings of the American Agricultural Economics Association. Work is currently underway to obtain survey data on farmers' attitudes toward value-added businesses that would test the results obtained from the portfolio analysis reported earlier. This project was undertaken at the request of Extension staff working on value added businesses.
- Analyzing the impact of the Rabobank (July, 2004) offer to purchase the Omaha-based Farm Credit Services of America. This was an unprecedented event that directly impacted 50,000 FCSA members. A small team of ag economists at Iowa State and the University of Illinois was assembled to prepare information and analysis on the proposed transaction. This information was made available through a dedicated website. Our research results appeared in all major farm press outlets. The website was also used by Congressional staffers as a source of information for public officials and agency staff. In early 2005, we worked with a group of agricultural finance researchers at several other universities to prepare a series of

articles on the future of agricultural finance. These articles were published in Choices: http://www.choicesmagazine.org/2005-1/lending/index.htm.

- A research project was undertaken at the request of the Iowa Soybean Association to examine the impact of the expansion of ethanol production in Iowa and in the U.S. on the soybean industry. Results from this project indicated that a significant shift in acreage is possible as a result of the ethanol expansion. Soybean acreage could drop by a third – a shift that would have significant impacts on the soybean industry's infrastructure and profitably. With the pace of current expansion, ethanol plants will be required to bid corn away from export, feeding and other uses. Information from this analysis was presented to soybean industry leader. This work was also presented at the 2006 USDA Outlook Conference in Washington DC.

In all of the examples, Dr. Jolly's research projects are driven by the needs of his outreach programs and, in most cases, involve direct interaction with stakeholders. In turn, the research results are directly disseminated through training and informational programs.

Program 106. Commercial Greens Industry (Consumer Horticulture)

Jeff Iles: Research projects led to improved methods of landscape plant installation, enhanced awareness of adapted landscape plant species, varieties, and cultivars, and the discovery of efficient and cost-effective management strategies that sustain landscape plants and reduce their dependence on fertilizers and pesticides. Integration between research and extension activities was achieved by rapidly disseminating this information to green industry professionals at Iowa Nursery & Landscape Association functions, the Iowa Turfgrass Field Day, Iowa Turfgrass Conference, ISU Shade Tree Short Course, International Society of Arboriculture – Midwest Conference, and the Sherman Nursery Field Day in Charles City, Iowa. Of particular note was training provided to Iowa's nursery and landscape professionals at the Iowa Nursery & Landscape Association Road Show on August 4, 2005. During this day-long educational event, participants toured several newly installed commercial landscapes in the Des Moines area, and were encouraged to discuss each project, identify the positive and negative aspects of each, and suggest ways to reduce maintenance and improve the sustainability of the landscape at each site. End of meeting evaluations were overwhelmingly positive and the decision has already been made to offer this program again during the summer of 2006.

Mark Gleason: During 2004 and 2005, Gleason's lab characterized temperature optima for mycelial growth of the unidentified fungus that causes leaf spot of Japanese tree lilac (Syringa reticulata). This work will be published after identity of the leaf spot pathogen (either a Cercospora sp. or a Septoria sp.) is confirmed by hsitological studies in summer 2006. In summer 2005, PhD student Zhihan Xu prepared 25,000 sclerotia of two soilborne fungi, Sclerotium rolfsii and Sclerotium rolfsii var. delphinii, for use in an overwinter survival study (2005-2006) in Iowa, North Dakota, North Carolina, and Georgia. She also completed the first year of a field trial evaluating six hosta cultivars for resistance to hosta petiole rot, caused by S. rolfsii var. delphinii, at the ISU Horticulture Research Station; the trial will be repeated in 2006. I also led a multi-state collaboration (Iowa, Georgia, North Carolina) to produce a 16-page extension bulletin, "Hosta Diseases and Pests," in print and on the web, in March 2005.

Turfgrass research consisted of fungicide trials on golf course greens and roughs. Diseases targeted in these field trials in summer 2005 included brown patch (pathogen: Rhizoctonia solani), dollar spot (pathogen: Sclerotinia homoeocarpa), and fairy ring (pathogens: various Basidiomycete fungi). Results were shared with turfgrass management professionals at the ISU Turfgrass Field Day in July 2005.

Program 107. Iowa Beef Center

Dan Morrical: Activities with the Iowa Beef Center in the grazing area in FY 2005 focused on efforts to educate producers on improving their grazing management. Dr. Morrical conducted a series of Grazing Days with state NRCS staff around the state. The target audience was producers who had received EQUIP grazing contracts. These meetings incorporated hands on pasture walks along with a large three ring notebook of reference materials. Dr. Morrical also serves as the Animal Science representative for Iowa Forage and Grassland Council and the Iowa Grasslands Initiative. Those duties include identifying producer problems in the grazing area and assisting research faculty in developing projects to address those concerns. In response to the growing ethanol industry, a project was initiated to evaluate the use of self fed distillers to stocker cattle in a continuous grazing system. The objectives of this work were to demonstrate using dried distillers grains in grazing systems and producing grass based finished cattle for a niche market. Further technology transfer was carried out via a Frequently Asked Grazing Questions on the Iowa Beef Center Web site.

Dan Loy: The Iowa ethanol industry continued to be a major emphasis for the extension beef program. Demonstration projects evaluating storage and consistency of the wet co-products were continued. These programs were coordinated with on campus research led by Dr. Allen Trenkle. This program is expected to continue to be an area of emphasis for the foreseeable future with more plants under construction and planning. A spring 2005 Iowa Beef Center survey of Iowa beef producers identified this area as an important need for both research and education. Grants are currently pending that would develop on farm storage and feeding demonstrations.

BRANDS (Beef Ration and Nutritional Decision Software) - Nutritional software for the beef industry was developed by Garland Dahlke, Daryl Strohbehn and Dan Loy. This software integrates models published by the National Research Council with new research concepts in a format that is easily used by producers. Researchers Allen Trenkle and Jim Russell assisted in model development for this program. Training programs were conducted with users of the program as well as extension staff in Missouri.

Program 108. Iowa Pork Industry Center

Tom Baas: Emphasis placed on lean, fast growing pigs over the past decade has contributed to a general decline in pork quality. As a result, fresh pork quality has become very important and has received more attention as producers and processors try to meet consumer demand for high quality, nutritious products. Many different traits have been identified as indicators of pork quality that should result in greater consumer acceptance of fresh pork. These include color, firmness, pH, intramuscular fat percentage (marbling), water-holding capacity, tenderness, juiciness, and flavor.

To date, the only method to accurately assess pork quality in seedstock populations has been to slaughter a representative sample of pigs and evaluate pork quality on the carcass. This method has been expensive, time consuming, and delays the rate of genetic improvement in a seedstock herd.

Intramuscular fat percentage (IMF) is one meat quality trait that has been measured in the live animal using real-time ultrasound, and it has also been shown to have favorable genetic correlations with many other meat quality traits. Greater amounts of IMF have been shown to positively impact sensory panel traits such as tenderness, juiciness, and flavor, along with mechanical measures of tenderness. Research at ISU using real-time ultrasound has resulted in the development of a prediction model that can accurately estimate IMF in the live animal. This prediction model has been incorporated into computer software that is being marketed to producers to use in estimating IMF in their herds. Education sessions that will be used to train technicians in the proper application and use of the software are planned. Use of this technology will aid seedstock producers in selecting for IMF, resulting in improved pork quality in the industry.

John Mabry: The pork industry has become highly competitive in the commodity product sector as profit margins are very thin. In order for a commodity pork producer to survive, they must address all avenues possible to reduce their cost of production. One such area that has not been addressed from a genetic standpoint is in reducing non-productive sow days (NPSD) through genetic selection. These non-productive sow days occur when a sow is in the herd, but is not in a stage of production of product. Examples of NPSD are the interval from weaning to estrus, the interval from entry to service, days open due to an unsuccessful mating. The sows incur feed costs, fixed costs and labor costs, but are not producing any product to pay for these costs. Reduction in NPSD will lower the cost of production and therefore increase profit.

The first step in making genetic progress in reducing NPSD is to determine the genetic control of the trait. This has been addressed using data directly from stakeholders (pig producers). Most of the business-oriented pig producers utilize computerized data management systems to monitor their reproductive records. Dr. Mabry has developed procedures for data extraction from each of the most popular software packages so that datasets could be created from stakeholder swine herds that have the NPSD performance and pedigree information in one file. The next step was to utilize mixed model technology to estimate the genetic variances and covariance between NPSD and other traditional reproductive traits in swine. This has been done using the data from several swine herds and it has been found that the weaning to first service interval (W2E) portion of NPSD is an easily measured trait that also has heritability in the range of 0.10 to 0.25.

The next step was to include this non-productive sow day trait in the selection programs of our stakeholders, in conjunction with the most accurate breeding value estimation technology, BLUP. BLUP technology was first utilized in the 1980s by the dairy and beef industries. In the 1990s this technology was adapted for use in pig populations by Dr. John Mabry (with funding from the National Pork Board). Dr. Mabry has adapted this technology for use in pig populations on personal computers. In his extension role Dr. Mabry has started a pilot project testing the use of the BLUP breeding value estimation software on NPSD data collected at commercial swine farms. The first producers to try the software were in NW Iowa. Their experiences with the software were essential in modifying the programs for maximum ease of usage and to document

success. Stakeholder input was an essential part of this product development. This phase of the project has now extended to pork producers in SE Iowa, Central Iowa, and NC Iowa.

Knowing that the BLUP technology was the most accurate for identifying genetically superior animals, Dr. Mabry then developed an interface between the reproductive management software and the BLUP programs for the pork producer to use. This package of software called BLUP Sow Indexing was the first to include NPSD in a genetic evaluation program and is now available from the Iowa Pork Industry Center at Iowa State University. This is an example of how research can be integrated with extension for the good of the pork industry. This software has been highlighted in invited presentations to the Pork Academy at the World Pork Expo, the American Association of Swine Veterinarians annual meeting, the International Pig Veterinary Society Congress, the Iowa Pork Congress, IPIC regional seminars and several international invited presentations. Recently, Dr. Mabry was asked for access to the BLUP genetic evaluation programs by programmers of several popular swine reproductive data management systems. Their goal is to include the BLUP Sow Indexing as a module within their software systems. He is now working with them so the technology will have easier access by the commodity pork industry.

Goal 4: An agricultural system that protects natural resources and the environment

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

Robert Hartzler: Weed management systems for corn and soybean have become increasingly reliant on postemergence applications of glyphosate made possible by the introduction of glyphosate resistant (GR) corn and soybean varieties. One of the primary reasons for the rapid adoption of GR crops is the increased flexibility due to glyphosate's ability to control larger weeds than alternative control strategies. While this flexibility provides farmers a significant benefit, it creates the risk that crop yields may be reduced by early-season competition with weeds prior to the postemergence application. A second concern with the heavy dependence upon glyphosate is the risk of herbicide resistance evolution within weeds.

Field research was conducted to determine the role of preemergence herbicides in enhancing the profitability of weed management systems utilizing GR crops. In addition, the impact of preemergence herbicides on glyphosate selection pressure on weed populations was studied. An emphasis was placed on determining how preemergence herbicides influenced the critical period for early-season competition. The critical period is the time that weeds can be allowed to coexist with the crop without impacting yields.

Preemergence herbicides effectivlye extended the critical period by reducing the densities of weeds that emerged with the crop. An important finding was that reduced rates of the preemergence herbicides were effective at extending the critical period since full-season control is not needed due to the planned application of glyphosate. This may enhance adoption of the practice since many farmers may be hesitant to use additional herbicides after paying for the GR trait and the glyphosate application. The research also found that preemergence herbicides were only partially effective at reducing the selection pressure on weeds by glyphosate. This indicates that adopting a cropping system utilizing continuous GR crops creates a risk of selecting

glyphosate resistant weeds, even when additional herbicides are included in the management program.

A variety of methods were used to communicate the results of the research to interested clientele. The primary tool was the ISUE Weed Science webpage. Several articles were prepared that described the importance of integrated management systems and the role of preemergence herbicides in GR crops. The value of the information is documented by a request from a leading biotech corporation to place the information on their website. In addition to the internet, the information has been presented at numerous extension meetings and a scientific conference.

Stephen Barnhart (faculty member in Agronomy on joint appointment between research, extension and teaching): Dr. Barnhart is a Forage Production and Management Specialist. Forages are integral to crop, livestock and conservation enterprises in Iowa. During FY 2005 he contributed forage species and management recommendations and experimental treatment suggestions in several on-going, cooperative research projects with Iowa State University colleagues and with private producers. He also served as principal pnvestigator on applied research projects. Extension clientele are included in: research planning discussions, the selection of study treatments, and, they serve an important role in advising during the development of educational materials and Extension outreach programs. One example of stakeholder involvement is an ongoing series of research projects being implemented with members of the Iowa Prairie Network. A member of that organization reported that one of his efforts to establish a diverse prairie restoration was in an old alfalfa field. The prairie enthusiast's observation was that there was enough recovery of alfalfa the year following the prairie planting that he could recover some economic return form the alfalfa for at least one year, to defray some of the cost of the prairie restoration. Two research projects have been started with members of the Iowa Prairie network to quantify the alfalfa yields while prairie species are establishing, and to determine the feasibility of the opposite scenario, establishing an alfalfa or red clover stands in an existing prairie planting. It is possible that a dual cropping system can produce a harvested forage crop while maintaining the soil, water and wildlife conservation benefits of a diverse prairie. Dr. Barnhart, members of the Iowa Prairie Network, and cooperating ISU Research Farm staff and cooperating private farmers completed the first establishment season on this project in 2005. Only limited data have been collected to-date. Input from stakeholders was highly valued when planning the various treatment alternatives, and will be used in evaluating the research and assisting in the education and demonstration programs being planned around the projects. The findings will be of interest of a wide array of private and public organizations and agencies with an interest in prairie restoration in the midwest U.S.

Marlin Rice: Research results were integrated into Extension efforts during 2005 using a broad array of delivery techniques.

1. **Farmer survey**. A self-administered questionnaire was sent to 1,000 corn farmers in each of five states (Illinois, Indiana, Iowa, Minnesota, and Nebraska) to evaluate their perceptions of transgenic corn designed to control the European corn borer and corn rootworms. Respondents returned 1,313 surveys (26.2%). Farmers with small acreages planted a greater portion of their corn (54.5%) with transgenic corn for control of European corn borer than farmers with large farms (39.2%). The majority (75.2%) of farmers use crop rotation to control the corn rootworm. Nine insecticides comprised 92.2% of the commercial soil

insecticides used for control of corn rootworm larvae. One-third of Iowa farmers (33.3%) treated first-year corn for corn rootworm, primarily due to extended diapause corn rootworms. When asked whether they would plant transgenic corn protected against the corn rootworm, 35.0% of farmers responded they would, whereas 40.5% said they were unsure. The two greatest farmer concerns about transgenic corn were the ability to sell harvested grain (59.3%) and additional technology fees (54.8%). Respondents indicated that less farmer exposure to insecticide (69.9%) and less insecticide in the environment (68.5%) were the primary benefits of transgenic corn. Farmers who had no concerns about transgenic corn for rootworm control were more likely to purchase the product (46.8%). The most common refuge-planting options farmers favored were adjacent fields (30.9%) and split fields (29.9%). Farmers (21.1%) observed a yield increase (23.7 bu/ha [9.6 bu/acre]) when using transgenic corn for European corn borer control compared with nontransgenic corn. These data can help in understanding farmers' knowledge and concerns regarding transgenic corn.

This information is of value in guiding extension specialists and researchers in designing insect resistance management and integrated pest management programs.

2. **Integrated Crop Management newsletter**. Approximately 31 articles were written on the biology and management of insect pests of corn, soybeans, and alfalfa. Research relevant to chemical, cultural, and mechanical methods of insect control were included in the newsletter when appropriate. This information is published weekly during the growing season and is posted online at http://www.ipm.iastate.edu/ipm/icm/. I have served as the Executive Editor of this extension publication for 17 years.

   Most articles are written based on questions from or discussions with stakeholders (farmers or agribusiness personnel) or field specialists−crops.

3. **Integrated Crop Management Conference**. Results from current research and field observations on pest populations were presented on two different topics at the ICM Conference in Ames. These included 1) eastern movement of the western bean cutworm in Iowa, and 2) performance of neonicotinoid insecticides for managing seed-attacking insects in corn and soybeans. This two-day annual conference hosted 925 agribusiness professionals and farmers, providing them an opportunity to hear the latest research on these topics. These presentations were published in the *Proceedings of the Integrated Crop Management Conference*.

   Presentations are developed are written based on questions from or discussions with stakeholders (farmers or agribusiness personnel) or field specialists−crops.

4. **Extension clinics or workshops**. Approximately 30 presentations were conducted which presented research information. Most of these meetings were under one of three extension banners: Crop Advantage Series, Ag-Chem Dealer Meetings, or the Field Extension Education Laboratory (FEEL).

   Corn−soybean producers and agribusiness professionals were presented crop management information and given opportunities for interaction and discussion. Clinics and workshop

topics are developed based on interaction from stakeholders and current insect problems occurring in Iowa's field crops.

5. **Extension publications**. Seven extension publications or Pesticide Applicator Training modules were written to address insect management issues in field crops. Four of these publications were co-authored with other entomologists or specialists:
   0. Soybean aphids in Iowa—2004.
   1. A grower's handbook: controlling corn insect pests with Bt corn technology.
   2. Alfalfa analyst, 3rd edition.
   3. Eastern movement of the western bean cutworm.
   4. Neonicotinoid insecticides—insect management with seed treatments in corn.
   5. Seed treatments: What can we expect in terms of broad-spectrum control for soil insects?
   6. Alfalfa management guide.
   7. Western bean cutworm update

   These publications were the result of collaborative efforts with other extension specialists and were directed at answering pest management questions from agribusiness clientele and farmers.

6. **Popular press**. Approximately 15 contributions to the popular farm press and five presentations on radio relating to insect pest management in Iowa were developed.

   All popular press contributions are done at the request of agribusiness stakeholders.

7. Recent research. Recent research has focused on the ecology and management of the bean leaf beetle and bean pod mottle virus complex in soybeans. This research was initiated after working with soybean producers in Woodbury County. Here it was discovered that the virus was apparently widespread in the area and possibly one of the causes of declining soybean yields. A collaborative research team was assembled to investigate this problem. The team consisted of Drs. Pedigo (now retired), Dr. John Hill in plant pathology, Dr. Mark Westgate in agronomy, and myself. We have worked on this pest complex since 2000. A Ph.D. student is finishing a three-year research project on these two pests which concentrates on management tactics.

   This research has been supported by the Iowa Soybean Promotion Board and Pioneer Hi-Bred International. We receive annual suggestions from them on research directions regarding these pests.

Additional research was conducted on:

0. Efficacy of a pyrethroid and a systemic seed-treated insecticide to manage an insect-pathogen complex in soybean.
1. Measuring the effects of insecticide on bean leaf beetle mortality and repellency on soybeans.
2. Validation and application of predictive models on bean leaf beetle (Coleoptera: Chrysomelidae) population dynamics in central Iowa.
3. A decision guide for managing bean leaf beetles (Coleoptera: Chrysomelidae) and bean pod mottle virus (Comoviridae: *Comovirus*).

4. Invertebrate seed predation of giant foxtail, *Setaria faberi*, in two-and four-year crop rotation systems.
5. Western bean cutworm competition with corn earworm; flight potential; and pheromone trapping evaluations.

Program 147. Sustainable Agriculture

Kathleen Delate: All research projects in this program have an integral Extension component. Research under this program has focused on methods of improving soil quality and pest management in organic and transitioning systems. Integrated research and extension activities for Program 147 during FY 2005 included a "Transitioning to Organic" intensive workshop and a 15-session "Iowa Organic Conference" reaching 340 farmers and ag. professionals total. Partners in these activities included Extension, USDA-Natural Resources Conservation Service (NRCS), Risk Management Agency (RMA), and the Iowa Department of Agriculture and Land Stewardship. A continuing partnership with Tuskegee University in "Organic Integrated Weed Management" included organic research, extension and educational training to assist limited resource students and farmers in organic farming activities. Four meetings with organic advisory committee and producer stakeholder groups helped focus research and extension plans in FY 05. Stakeholders have provided valuable input in shaping the sustainable agriculture research and Extension agenda by advocating for practical solutions adapted for local conditions, including new weed management techniques such as the Organic No-Till System from the Rodale Institute. A total of 41 presentations at Extension/research meetings and field days reached an additional 2,558 agricultural professionals in all sustainable agriculture programs in FY05. Impacts of these integrated research and Extension activities included adoption of organic practices, leading to increases in soil quality and an increase in farm income from premium prices for certified organic crops.

The ISU Organic Ag webpage <http://extension.agron.iastate.edu/organicag/> continues to be an excellent venue for dissemination of sustainable/organic agriculture information. The USDA Organic Ag. Consortium website, OrganicAgInfo: <http://www.organicaginfo.org/> also contains research and Extension information from the ISU Organic Ag. Program.

Integrated activities for Dr. Delate, such as those described above, represented about 70% of her total time and accounted for a salary expense of $42,000 during FY2005.

Paul Domoto: Research projects have allowed commercial fruit growers to remain competitive through the selection of better adapted cultivars and rootstocks, and the adoption of cultural practices that promote early production, improved quality and sustainability. Integration between research and extension by rapidly disseminating this information to the industry during the Iowa Fruit and Vegetable Growers Association conference, Iowa Grape Growers Association conference, and regional extension seminars and workshops. The research plots serve as a focal point to field days and allow growers to see cultivars perform under local conditions and the fine points associated with a new cultural practice. Research progress reports are prepared and published in the Annual Fruit/Vegetable Progress Report (ISUE FG-601 revised), in annual progress reports published for the ISU Research and Demonstration Farm on which the research is conducted, and are made available on the web. Particularly noteworthy has been getting information out to the rapidly growing grape industry which has gone from less than 30 acres in

2000 to well over 600 acres in 2005. With little research base, and working with clients that had little knowledge of the crop, it was critical to provide information on adapted cultivars and cultural practices as quickly as possible the ISU Viticulture Home Page (www//viticulture.iastate.edu/home.html) was created. With input from established grower/winemakers, two grape cultivars trials were established. In the spring of 2002, a grape cultivar by management system trial supported by a grant from the Leopold Center for Sustainable Agriculture was established at two sites representing different soil and climatic conditions. The trial included ten wine cultivars and five seedless table cultivars which are being grown under three levels of pest management (calendar-based, IPM, organic approved). In 2003, a cultivar trial sponsored by a grant from the newly formed Iowa Grape Growers Association was established to include two additional regionally diverse sites. This trial is evaluating 20 wine cultivars with cultivars from the 2002 trial being included at the new sites. These trials are now being funded through State wine tax dollars administered by an industry wine and grape commission. Results from these trials have reported at state-wide grape conferences and regional meetings; published in annual progress reports and posted on the ISU Viticulture and Research and Demonstration Farms web sites. The plantings have served as a resource for field days, pictorial essays demonstrating planting a vineyard and installing a vineyard trellis that are posted on the Viticulture Home Page, for developing videos demonstrating cultural practices, and for obtaining photographs and images of various pests and cultural practices. The plantings serve as a valuable resource for individual growers to visit to observe the various cultivars, cultural practices, and to learn cultivar characteristics related to wine quality. The plantings have also served as a model for developing three interactive vineyard feasibility workbooks for estimating the cost to establish a vineyard under different training systems. These down-loadable workbooks are on the ISU Agricultural Marketing Recourse Center web site http://www.agmrc.org/.

U.S. Department of Agriculture
Cooperative State Research, Education, and Extension Service
Supplement to the Annual Report of Accomplishments and Results
Actual Expenditures of Federal Funding for Multistate Extension and Integrated Activities
(Attach Brief Summaries)
Fiscal Year: 2005

Select One: ☐ **Interim** ☒ **Final**
Institution: Iowa State University
State: Iowa

	Integrated Activities (Hatch)		Multistate Extension Activities (Smith-Lever)		Integrated Activities (Smith-Lever)	
Established Target%	7.86	%	0.75	%	5.00	%
This FY Allocation (from 1088)	$5,831,582		$9,133,255		$9,133,255	
This FY Target Amount	$ 458,362		$ 68,499		$ 456,663	
Title of Planned Program Activity						
Food Crops	$ 48,965		0		0	
Crop Production and Management	19,765		0		0	
Animal Physiology	23,406		0		0	
Animal Genetics	25,290		0		0	
Agricultural Risk Management	31,994		0		0	
Food Safety	49,854		0		0	
Soil Resources Management	27,440		0		0	
Animal Waste Management	7,316		0		0	
Rural Development	95,783		0		0	
Quality of Life	8,393		0		0	
Grain Quality: Marketing & Delivery	76,304		0		0	
Poultry Production Systems	44,427		0		0	
Seed Science	14,122		0		0	
NASULGC/NELD	0		$ 10,788		0	

	Integrated Activities (Hatch)	Multistate Extension Activities (Smith-Lever)	Integrated Activities (Smith-Lever)
E-Extension	0	67,488	0
North Central Regional Center for Rural Devel.	0	2,553	0
Directors (national & regional responsibilities)	0	0	0
Agriculture & Natural Resources Extension Prog.	0	27,688	0
Families Extension Program Director	0	9,632	0
4-H Youth Extension Program Director	0	10,075	0
Directors of Extension	0	15,228	0
Farm/Ag Financial Management	0	0	$ 21,649
Consumer Horticulture	0	0	63,780
Beef Center	5,479	0	114,847
Pork Center	17,508	0	95,825
IPM/ICM	10,772	0	167,189
Sustainable Agriculture	3,730	0	64,426
	0	0	0
	0	0	0
Total	$ 510,548	$ 143,452	$ 527,716
Carryover			

Certification: I certify to the best of my knowledge and belief that this report is correct and complete and that all outlays represented here accurately reflect allowable expenditures of Federal funds only in satisfying AREERA requirements.

Director **Date**

Form CSREES-REPT (Revised 09/04)