

**PLAN OF WORK**  
**ANNUAL REPORT**  
**OF**  
**ACCOMPLISHMENTS AND RESULTS**

**PURDUE UNIVERSITY**  
**COOPERATIVE EXTENSION SERVICE**

**FEDERAL FISCAL YEAR**  
**2003**

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**April 1, 2004**

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## **PREFACE**

The “Indiana Annual Report of Accomplishments and Results” which follows provides information about accomplishments resulting from work performed by faculty and staff of the Purdue University Cooperative Extension Service during FY 2003. The report is organized so as to correspond with the five national goals and our plan as submitted under those goals. The Annual Report includes six components: Planned Programs; Stakeholders’ Input Process; Program Review Process; Evaluation of the Success of Multi and Joint Activities; Multi-state Extension Activities; and Integrated Research and Extension Activities. This report indicates acceptable progress toward our overall goals.

Impact statements from Purdue's Schools of Agriculture, Consumer and Family Sciences, and Veterinary Medicine, and the Cooperative Extension Service may be viewed at the following website: <http://www2.agriculture.purdue.edu/impact/>.

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## A. PLANNED PROGRAMS

**Goal One. *An agricultural system that is highly competitive in the global economy.*** Through research and education, empower the agricultural system with knowledge that will improve competitiveness in domestic production, processing, and marketing.

### Overview

Purdue Extension focused on several programs related to Goal One. For FY 2003, a total of 10,312 contact days were devoted to primarily three programs: Agricultural Competitiveness, Horticulture and Turf, and Alternative Agricultural Enterprises and Practices. Through state-wide and county based workshops, test plots, conferences, and educational materials, extension staff concentrated on crop and animal production systems, marketing, and risk management strategies that improves production efficiencies, makes producers more competitive, and adds value to Indiana agricultural products. Indiana's state population is 99% non-agricultural. Urban needs place a great demand on the state's natural resources as well as Purdue Extension's resources to meet these needs. The increased demand for home and consumer horticulture has caused us to reallocate resources to deliver programs and educational information to areas such as Master Gardeners, urban gardening, pond management, and urban forestry and wildlife preservation. These efforts resulted in a reported 187,755 people being contacted among these three programs. A fourth area of emphasis was in Agricultural Awareness and Understanding, targeting both youth and adults. These four programs will be discussed in greater detail below and in the Key Themes section of this report.

Educating the general public on agricultural animal and crop issues is important if producers are to remain competitive and have their products accepted. Both adults and youth were introduced to the various aspects of environmental issues that are everyday challenges to the farmer and to the new emerging technologies or adaptive tools that are available to him as a means to improve his competitiveness. This past year field and campus staff, combined with help from our state and federal conservation partnering agencies, devoted 2,022 days to programs that exposed 115,346 adults and school aged youth to an awareness and understanding of agricultural issues.

Indiana is experiencing a rapid growth in diversification of crop and livestock production opportunities. Producers in Indiana have faced a multifaceted farming shift over the past decade, whereby small to mid-size farmers of traditional corn, soybeans, and swine production have had to take off-farm employment, and large producers have had to diversify their cropping system in order to stabilize their economic situation. Many traditional agronomic crop and livestock producers are adding horticultural crops to their mix of crops and are contracting with food processors for an increasing acreage of Indiana farmlands. This is a new but rapidly increasing area of outreach for the state, and Purdue Extension is building a local and statewide agency network to address this demand for transitioning to alternative opportunities. Last year Purdue Extension spent 437 days and made 4,957 direct contacts with citizens of the state who were

exploring the feasibility of alternative agricultural opportunities, which ranged from home-based businesses to organic crop and livestock production to direct marketing of produce.

Purdue Extension works closely with the extension programs in other states on issues of agricultural competitiveness. Many of the campus Extension staff have research appointments. They use these appointments to address the outreach needs of Indiana crop and livestock producers. Ongoing research and extension programs, in collaboration with research and extension staff in other states, are addressing the issue of on-farm quality assurance of value-added grains and livestock production as well as working on the proper and legal use of animal manure as crop nutrients. Several examples on this collaboration will be given in the Key Themes section of this report.

Purdue Extension feels that the accomplishments we are making in the issue areas identified under Goal One are positive and are meeting the intended objectives and goals that the stakeholders identified as needs for the state. Short-term outcomes of awareness and knowledge gained are being accomplished in our Agricultural Awareness programs, while we are noticing intermediate and long-term outcomes of adoption of practices and technology changes with the other identified issues. Great strides have been made at improving the competitiveness of the beef cattle and small diversified producers of Indiana through the efforts of Purdue Extension programs.

### **Resources**

Approximately \$ 4,179,205.40 and 51 FTEs have been invested in Goal 1. This is a best estimate and these are not presented as auditable numbers.

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

### **Bull Evaluation Breeds Success for Cattle Producers**

Beef production is an important part of Clark County agriculture. The county ranks seventh among Indiana counties in cattle production, with 5,100 head. Cattle numbers could be bigger - and profits larger - for the 325 Clark County beef producers, if bulls with reproductive and other physical problems could be identified. Annual bull breeding soundness clinics take place each spring before breeding season begins. Veterinarians check semen samples, to determine fertility and mobility. Bulls also are evaluated for body condition, structural conformation, scrotal circumference and reproductive tract health. An animal health products manufacturer donates deworming medication, vibrio/lepto vaccine and pinkeye bacterin for bulls that pass the evaluation.

Impact: Clark County beef cattle producers are improving the reproductive efficiency of their herds by having their bulls evaluated at breeding soundness clinics co-sponsored by the Purdue University Cooperative Extension Service. The program has saved producers more than \$500,000 in lost income. Since the first clinic in 1989, 477 bulls have been through the breeding soundness evaluation. Of those, 52 bulls - or nearly 11 percent - were found infertile or

unsatisfactory. At an average Clark County herd size of 21 beef cows per farm those 52 bulls could have impregnated 1,092 cows. Based on a calf value of \$400 each at weaning as feeder calves, county beef producers would have lost \$436,800 in production alone. Estimated extra feed costs of \$75 each for the 1,092 cows would have cost producers another \$81,900. Combined, lost income would total \$518,700 or \$34,580 per year if the unsatisfactory bulls were not identified.

Source of Funds: Smith-Lever, State

Scope of Impact: State Specific

### **Corn Masa Flour Processing Plant Premium Producers Association A New Generation Cooperative**

The face of Agriculture is changing. Producers are looking to remain competitive by moving along the value chain. 20 years ago, \$0.38 of every dollar spent on food went back to the farmer. Today, it has decreased to \$0.23. The traditional methods of diversifying by producing different crops/livestock have been replaced by finding ways to add value to commodities. Commodity Agriculture which is production oriented is moving to Product Agriculture which is Market/Consumer driven. In order to capture those dollars that have been lost at the farm gate and to level out the commodity price fluctuation the Premium Producers Association, a new generation cooperative was formed. A total of 152 members paid \$750 each to join the PPA to investigate the feasibility of building a corn masa flour plant in Southwest Indiana. Grants totaling approximately \$156,000 were applied for and received by the Association and used to conduct the feasibility study, and write the business plan.

Impact: The Premium Producers Association was able to complete the process of conducting a feasibility study, writing the business plan and officially offering stock for sale to its members and other potential investors. Grants totaling approximately \$156,000 were applied for and received by the Association and used to conduct the feasibility study, and write the business plan. The Premium Producers Association was able to complete the process of conducting a feasibility study, writing the business plan and officially offering stock for sale to its members and other potential investors. If the stock offering is successful, the processing facility will be built in Southwest Indiana which will process 1.6 million bushels of corn into 70 million pounds of flour per year. There will be a total of 25 to 30 employees with a \$1.2 million payroll. Gross sales of the plant will be \$13 million per year. If the stock offering is successful, the processing facility will be built in Southwest Indiana which will process 1.6 million bushels of corn into 70 million pounds of flour per year. There will be a total of 25 to 30 employees with a \$1.2 million payroll. Gross sales of the plant will be \$13 million per year.

Source of Funds: Smith-Lever, State

Scope of Impact: IN, IL

## **Beef 101**

The cattle-producing public desired a basic production class that the cattleman could afford and could participate in at a convenient time. The need came from the fact that many people were attempting to raise cattle, but lacked the basic understanding of nutrition, cattle physiology, and how everything was interconnected. In Beef 101 we made the subjects simple and easily understood. The Pike County Extension Educator offered an affordable, basic beef production class in the evenings to 25 participants. He used experts from the area, as well as Purdue Extension specialists. The class met each Monday for seven weeks at three hours each night. Topics covered were: Introduction of Beef Management, Beef Nutrition, Beef Frame scoring, Selection and Management of Bulls and Heifers, Birthing and Calving Problems, Pasture Management, Fencing Needs, Medications, and Marketing and making a profit.

Impact: The 25 participants in Beef 101 saved an average of \$1,000 each by learning the basics of proper nutrition determination, feeds and forage selection, recognition of good and bad heifer and bull characteristics, recognition of potential calving problems, and how to form beef alliances and finding a niche market in their home areas. Participants also saved money as they culled their herds 10 to 40%, based on unsound animal problems as well as unproductive cows.

Source of Funds: Smith-Lever, State

Scope of Impact: State Specific

## **Key Theme: Agricultural Competitiveness**

### **2003 Crop Management Workshops**

Agribusiness personnel including fertilizer and chemical dealers, county Extension Educators, seed and company agronomists and crop consultants, need updated pest management and pesticide information throughout the year. These "Pest Managers" must be kept up-to-date on pest populations, outbreaks, and management strategies, as well as pesticide label changes, environmental issues related to pest control, the use and application of pesticides, pesticide safety and principles, etc. Producers rely on agribusiness professionals to identify and inform them of existing or potential pest problems on their farms and to assist with appropriate management tactics and issues related to pesticides. The better informed these agribusiness personnel are, the greater their ability to guide producers toward economically and environmentally sound pest management decisions. The Purdue Pest Management Program coordinates a series of all day winter meetings, Crop Management Workshops, held at five locations throughout Indiana. Extension Specialists representing the Department of Botany and Plant Pathology, the Department Entomology from Purdue University and the Office of the Indiana State Chemist present in-depth information on pest management, pesticide regulations, pesticide safety, pesticide application equipment and calibration, and more. The goals of the Crop Management Workshops are to educate Pest Managers on economical and environmental pest (identification, biology, damage, sampling, and thresholds) and pesticide (chemistry, application, regulation, calibration, safety) management.

Impact: The Crop Management Workshops effectively reach a targeted audience of agribusiness personnel, "pest managers," that make significant pesticide input decisions on Indiana's farms. Nearly 100% of the Pest Managers participating in a series of all day winter meetings, Crop Management Workshops, coordinated by the Purdue Pest Management Program, indicated by written evaluation that their pesticide decision making abilities were improved. In 2003, 734 agribusiness personnel attended the Crop Management Workshops. Some of the practices and information discussed included the use of resistant crop varieties to reduce pest damage, the proper identification of pests and their damage to eliminate needless chemical treatments, using the proper timing and most efficacious products and rates when pesticides are justified, pest trends and anticipated problems for the upcoming season, that chemical rates or products may need changing if there are indications of herbicide resistance with some weed species, and recognition of biological control of pests in field situations. Participants highly rated the educational value of the meetings as the following evaluation values indicate: 96% of the participants indicated that the Crop Management Workshop improved their pest management decision making ability and 95% indicated that the Crop Management Workshop was worth their time and expense to attend.

Source of Funds: Smith-Lever, State

Scope of Impact: IN, OH, IL

### **Managing for Success - Grain Growers**

As agriculture gets more complicated and farms expand in size, sound management becomes more of a necessity for long term survival. Many farmers have had little formal training in management philosophy and techniques. Participants in this program will learn skills to make them better managers. The goal of the program is to provide growers with instruction on how to assess their operations philosophy, the goals they desire to reach, and the tactical plan to get there. Management curricula were presented at four meetings held in February 2003 focusing on management issues. Nine farmers attended representing 8 farming operations.

Impact: It was evident that participants had accumulated knowledge that they plan to implement on the farm. The act of producing a mission statement helped many of them focus their long range goals and desires for their operation. All participants created a mission statement for the farming operation. The following is compiled from a survey of 8 participants: All reported the workshop helped them evaluate their farm business. Six farmers said the workshop helped them greatly in assessing the strengths and weaknesses of their management. Seven farmers felt more confident in their problem solving ability. Seven farmers were quite confident that they would reorganize their farm's internal organizational framework. Eight farmers thought it would be helpful to adopt some standard operating procedures for the farm.

Source of Funds: Smith-Lever, State

Scope of Impact: State Specific

## **Monitoring Western Corn Rootworm in Soybean**

Over a decade ago, Purdue University Extension Specialists and County Extension Educators identified western corn rootworm (WCR) larvae in northwestern Indiana cornfields planted into soybean stubble (first year corn). Corn damage from this pest can include root pruning, plant lodging, goose-necking, and yield loss. The application of a rootworm soil insecticide at planting is the primary control treatment for this pest. However, not every first-year corn field in the affected area contained economically damaging rootworm populations. Purdue University Extension Entomologists have developed a method for effectively scouting soybean fields for adult populations, the year prior to corn planting, in order to help growers identify fields with a high probability for WCR damage. With funding from the Center of Integrated Pest Management (CIPM), County Extension Educators, Purdue Ag Center Superintendents, and Extension Entomology Specialists are cooperating with over 40 Indiana farmers interested in utilizing this IPM technology on their farms. This project allows Extension personnel to continue to evaluate the migration of the pest in Indiana, examine economic thresholds over a larger pool of treatments, and promote the use of this IPM practice as a sound alternative to indiscriminate use of soil insecticides. Educational resources that have been developed include a project website and power point program for utilization by County Educators at Private Pesticide Applicator Recertification programs. Project presentations were made at the National Integrated Pest Management (IPM) National Meeting, the National Center of Integrated Pest Management (CIPM) National meeting, and the White County Conservation Tillage Day.

**Impact:** Of the 40 fields trapped for Western Corn Rootworm in Soybean in 2002, only 29% contained populations above threshold levels, although all fields scouted did have WCR adults. Preliminary data from 2003 indicates that the percentage of fields with WCR above threshold level could be much lower. Field days, pesticide applicator training programs, research updates and other educational tools will be used to promote this IPM concept. Growers who utilize this IPM practice and find WCR populations below threshold levels in soybean, could eliminate the use of soil insecticide for control of WCR larvae and reduce their corn input cost by \$15 to \$19 per acre. Data from 2002 indicates that first year Western Corn Rootworm adults in soybean were found in all of the 14 counties and 4 Purdue Research Centers that were surveyed in northern and central Indiana. However, in only 29% of the fields were populations of WCR adults above the threshold level of 5 beetles per trap per day. A high percentage of growers in the affected area are currently applying Rootworm insecticide on all of their first year corn acres, even though not all corn acres contain populations above thresholds levels. Preliminary data from the project for the summer of 2003 indicates that WCR adult populations in soybean appear to much lower in all counties tested.

Source of Funds: Smith-Lever, State

Scope of Impact: IN, IL, WI

## **Farm Bill Decision Time**

The 2002 Farm Bill had several options and decisions for landowners and Producers to evaluate. The consequences of the decisions made would not only affect the profit/loss of the farmer operator but also to value of the farmland itself. The Farm Bill sign-up process was a very intimidating. The County Educator showed the Purdue Farm Bill Decision Support spreadsheet (designed by the Purdue Agricultural Economics Department) to the Newton County Farm Service Agency. They were impressed with the simple input and output process of the program. Producers also found the spreadsheet simple to interpret. The Farm Service Agency offered three informational meetings on the 2002 Farm Bill. The Purdue spreadsheet was introduced and demonstrated by the local Extension Educator at each of these meetings. The website for the spreadsheet was given for those who wished to access the information themselves. Extension also offered to run the analysis for them at the Newton County Extension Office. A fourth meeting was held in cooperation with the Newton County Farm Bureau in which we invited an Agricultural Economist to give another perspective on the Farm Bill and answer further questions on the Purdue Decision Support spreadsheet.

Impact: Farm Bill Status report for Newton County indicated 100% of the farms were contacted and had the opportunity to enroll. According to the Newton County FSA Office sixty percent of the farms in Newton County used the Farm Bill Decision Support Spreadsheet to help in their enrollment process for a total of 630 farms. On an acreage basis, over 120,000 acres were impacted using Purdue resources. Financially, Purdue Extension helped impact the decision making process on at least \$23 million in Farm Program support (120,000 acres x average payment of \$32acre/year x six years). Approximately 40 producers came directly into the Newton County extension office for analysis of their options and discuss the decision making process. Some of these producers had not previously used the extension office.

Source of Funds: Smith-Lever, State

Scope of Impact: State Specific

## **Key Theme: Agricultural Profitability**

### **Passing the Baton: A Farm Management Series**

As the quantity of land available for food and fiber production decreases and development pressures increase, farmers must utilize their competitive advantages to maintain sustainable operations. In addition to sustainability tools, producers need to be able to gracefully exit the business. The objectives of Passing the Baton are two-fold: 1) participants will realize increased agricultural opportunities and increased economic sustainability and 2) participants will take steps to set up and implement retirement and estate plans. Over a period of six weeks, Passing the Baton addresses estate planning, land asset management, and diversified agricultural opportunities. Speakers included an Extension specialist or educator along with a professional from the private sector. A panel of producers utilizing alternative agricultural opportunities was included in the final session. This program series was designed to identify some of the questions

to ask as well as provided a framework and some tools for making the decision to remain in business or to exit the operation. Each session of the series augmented the other two. To evaluate the program's success, a pre-assessment was given at the beginning of the program series. A post evaluation was mailed out to the program participants in August 2003, six months after the conclusion of the final session, to determine the intermediate impact of the program.

**Impact:** Because of Passing the Baton, participating farmers are better able to plan and manage their estates, have the skills and knowledge to positively affect their farm business, and increase their operation's sustainability by identifying appropriate business opportunities. Twenty-three participants attended the first session, 11 attended the second with 14 participating in the final session. When asked on the pre-assessment if the participants felt confident about planning and managing their estate, 53% of the respondents indicated that they agreed. The same question on the post evaluation resulted in 80% of the respondents agreeing. Participants were asked if they had the knowledge, skills, and ability to affect their business position in a positive manner. 63% of the participants initially agreed with 5% strongly agreeing. Six months later, the responses to the same question were 60% agree and 40% strongly agree. After the final session, 80% of the respondents agreed with the statement "I can identify business opportunities that are appropriate for my situation". This is in contrast to the 68% agreement on the pre-assessment. As a result of Passing the Baton, 60% of the participants began working on business assessments, setting business and financial goals, and identifying retirement or future income needs and how to meet those needs. As one participant put it when asked about business property transfers, "[Passing the Baton] taught us things to look at for our future production and in what direction we might want to look at with all the building around us."

Source of Funds: Smith-Lever, State

Scope of Impact: State Specific

### **2003 Commercial Producer Project**

To successfully market their products, businesses that sell to agricultural producers must be aware and knowledgeable about their customer base. Agribusinesses must understand the marketplace they are in and focus their advertising and promotion dollars to the most important sectors of the market. The Commercial Producer study is completed on a 5 year basis to gauge the longitudinal changes and shifts in the production agricultural community's characteristics and attitudes. Another key component of the study is the change in demographics in the agriculture industry. By maintaining a close watch on the agricultural industry, Purdue researchers are better able to provide empirical evidence of producers' characteristics, attitudes and buying behaviors to be used in Extension programs. A survey was developed using the 1993 and 1998 questionnaires as a starting point. The questionnaire was developed and updated to include pertinent topics of 2003 agriculture. The questionnaire covered 3 main topics: 1) Farm Information, 2) Operator Information, and 3) Decision-making Processes. The section on Farm Information gained insight into units of production, risk management tools used, contracting, and other pertinent topics to the farm business. Operator Information sought information about the farm operator such as age, gender, education level, and other such demographic questions. The

final section, Decision-making Process was devoted to how the purchasing decision was made this included outside influence, information gathering, buying behavior, and other important topics. The questionnaire was mailed to 14,301 agricultural producers across the United States. Top Producer magazine provided the names from their database. The total number of returned surveys was 2,424 for a response rate of 16.9%. These results were then entered into a computer and analysis was completed. From the analysis approximately 500 PowerPoint slides were developed. From these slides 4 separate presentations for agribusiness companies were made. These presentations were designed to stimulate discussion and raise awareness for these companies. Another means of sharing the information is through publications. To date 6 articles have been submitted for publication in popular press media. These results are designed to stimulate interest in the study and to convey the current situation of the agricultural industry. It is planned that many more articles will come out of the data and research associated with the study. One proposal based on this research has already been proposed to the International Food and Agribusiness Management Association (IAMA).

Impact: Agricultural producers are interested in the trends and the plans of their colleagues while agribusinesses are interested in the outlook and purchasing decision processes of their potential customers. Interest in the study and the results has been strong. The Commercial Producer Study has national impact in regards to the state of the agricultural and agribusiness industry. The research results will be presented across the United States on both the local and national level and will be mailed to all respondents that indicated an interest in the results. The respondents can then see how their responses matched in comparison to their peers. The National Conference for Agribusinesses is probably the most impact that the study will have. The conference is focused solely on the results of the study and will therefore shape the topics and ideas discussed. As the official public roll out of the data the National Conference will definitely be impacted by the Commercial Producer Project, approximately 200 agribusiness professionals will be in attendance at the conference. In addition 6 popular press pieces have already been published highlighting key findings from the data.

Source of Funds: Smith-Lever, Hatch, State

Scope of Impact: Nationwide

## **Key Theme: Animal Health**

### **Midwest Swine Nutrition Conference**

Improving information available for Nutrition consultants, swine veterinarians, pork producers and academic nutritionists. A multi-state conference was held on September 9, 2003 to update the various clientele on the latest relevant research in the Swine Nutrition field.

Impact: A successful 3rd annual Midwest Swine Nutrition Conference was held that attracted approximately 80 participants from 7 states. This conference was the 3rd annual such meeting and the impact is increasing as evidenced by the continual increase in attendance. We started with about 40 people in year one and reached double that number this year. An evaluation indicated that the conference was well received. Fifty-six of 60 people that completed

evaluations indicated an overall satisfaction level of 4 or 5 based on a scale of 1 to 5 (5=best). Several comments were complimentary of the program and several also indicated where improvements could be made.

Source of Funds: Smith-Lever, State

Scope of Impact: IN, IL, IA, KY, MI, MN, MO, OH

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

### **Swine Growth Modeling Extension Project**

Pork producers are striving to produce quality lean pork as efficiently as possible with minimal environmental impact. Feed represents approximately 60% of the costs of pork production. Feeding pigs the optimal levels of essential amino acids and phosphorus will reduce feed costs while reducing environmental impact. Recently a feed additive, Paylean™ has been approved to increase the rate and efficiency of lean growth. The use of Paylean™ must take into account the marketing system and product system economies.

A stochastic version of the pig compositional model has been developed. The model predicts a compositional growth live weight growth and feed intake curve for each pig in a 1000 head finisher. The program has been used to (a) evaluate the optimal marketing strategy with and without Paylean™; (b) the cost of fixed scheduling; (c) the impact of errors in the timing of the initiation of Paylean™ feeding; and (d) the use of new animal sorting technology. The research results have been discussed with Elanco technical representatives and a small number of producers. The results indicate that (1) the profitability of pork production can be increased by the joint optimization of Paylean™ use, nutrition and marketing strategy, and (2) the new animal sorting technology can assist in the development, continued refinement, and implementation of the optimal strategies. Extension articles have been written and refined with input from industry representatives. Future plans are to discuss the new results with Elanco, the manufacturer of Paylean™ and the manufacturers of animal sorting technology. The model determines the most profitable series of diets in terms of live weight growth, carcass composition, and feed conversion for Paylean-fed pigs for different carcass-value-based marketing systems. The model can be used to establish specifications for a series of diets which maximize profitability for pigs fed Paylean. The model has been refined to include the increased duration and magnitude of response when increasing concentrations of Paylean are fed. Data from four research trials, (three Purdue trials and one North Carolina State University trial) were used in which either constant or increasing dietary concentrations of Paylean were fed. The results indicate that step-up programs such as feeding 5 ppm Paylean for 18 days followed by 10 ppm for 17 days will result in increased profits of \$1.10 to \$1.24 per pig, depending on the marketing system.

**Impact:** Purdue Animal Sciences and Agricultural Economics Departments have developed a stochastic swine growth model that can optimize pork production. This is the first swine compositional growth model that has been developed, parameterized, and tied to a multi-variable decision making program. The program demonstrates that marketing strategies can be improved

to increase producer profitability. The feeding of Paylean™ can substantially increase the efficiency of swine growth and profitability. However, the benefits of Paylean feeding can only be fully achieved with improved feeding and marketing management. Initial research results indicate that the collection of serial live weight and compositional data as well as develop and implementation of the optimal marketing system via animal sorting technology can result in a \$7,000 to \$10,000 increase in profitability per 1000 head finishing facility. The optimal use of Paylean™ increased profitability almost an additional \$9,000 per year for the 1000 head finisher.

Source of Funds: Smith-Lever, Hatch, State

Scope of Impact: Nationwide

### **Determining Non-Laying Hens**

On average, nearly 28% of all layer hens fail to lay. This additional housing and feed cost poultry producers millions of dollars annually. A method has been established to selected identify non-laying or low producing hens.

Impact: Through this selection procedure, Purdue can assist poultry producers in the selection of non-laying or low producing hens. This method of selection can effectively reduce 1 to 5% of the non-layers in a flock, which in turn increases the overall profitability of a layer operation.

Source of Funds: Smith-Lever, State

Scope of Impact: Nationwide

### **Key Theme: Biotechnology**

#### **Genomic Analogy Model for Educators: Effectiveness of LEGO(R) model in teaching gene sequencing and biotechnology with high school students**

Research in biotechnology is rapidly advancing; everyday new and exciting discoveries are made, but new technology also brings with it many safety and ethical questions as well as the need for education. Many people feel that alternative teaching methods will help to increase students understanding of difficult concepts in all aspects of schooling including math, science, genetics, and biotechnology. The Genomic Analogy Model for Educators (GAME) is a teaching tool currently under development, made up of three different pieces: (i) a CD ROM, (ii) a website and (iii) laboratory exercises. The GAME model uses simple analogies of easily understandable concepts to explain the technical and scientific aspects of modern genomics; the first module is the Lego© lesson which focuses on DNA sequencing using the Sanger method and electrophoresis. The purpose of this study was to evaluate, through pre/post survey, the effectiveness of the GAME model on high school students at seven high schools, as well as evaluating the effect of the GAME model on high school students' attitudes about biotechnology. Effectiveness of the GAME model can be defined as a measurable gain in genetic and

biotechnology knowledge. The Lego© lesson was presented along with the accompanying laboratory exercise and was followed with the use of the CD-Rom to reinforce that same lesson.

**Impact:** The results in this study indicated that students participating in the Lego® lesson learned the biotechnology and genetics information presented to them. The students did approximately three points better on the post-test than they did on the pre-test, demonstrating that there was an overall gain in genomics and biotechnology knowledge. Most students were able to understand the Lego® lesson and develop a better understanding of gene sequencing. Knowledge gain in genetics and biotechnology would allow students to understand basic genetic and biotechnology principles. This can translate to a better understanding of the scientific and technologic advancements made in these fields. Once students are able to understand these issues, they are more likely to be able to make concrete arguments, which can lead to more productive and informed decisions. Results showed a positive change in students' post-test scores after participating in the GAME model which indicates the effectiveness of this new tool for biotechnology education. The teachers in the participating classrooms expressed that the Lego® lesson corresponded to the curricula in their classrooms, was easy to use, and was appropriate for high school students. In addition, teachers expressed that the Lego® lesson gave their students a clearer understanding of the different concepts involved in genetics, as well as the impact of biotechnology in their daily lives.

Source of Funds: Smith-Lever, Hatch, State

Scope of Impact: Nationwide

### **Survey Efforts Improve Indiana Producers Decision Making on Use of Bt Corn Technology**

Corn hybrids that have been genetically engineered to provide protection against corn borer are referred to as “Bt corn.” Bt corn, first commercially available in 1996, contain a gene derived from a naturally occurring bacterium, *Bacillus thuringiensis*, which produces a protein that is toxic to corn borers. Scientists consider this technology an excellent pest management tool, as it is extremely effective against these potentially destructive insects. Unfortunately, producers must purchase and plant Bt corn seed before corn borer problems are known. Because premiums are charged for Bt corn seed, financial benefits from this technology are only realized when producers correctly anticipate corn borer infestations causing significant yield loss. Resistance management plans are to be implemented by producers growing Bt corn to preserve this technology.

The Purdue Pest Management Program annually surveys corn borer populations in the fall throughout Indiana. The corn borer, over-wintering in the damaged stalks, serves as the basis for the next year's infestation. This information, by area of the state, enables us to better inform producers of their risk of future corn borer attacks and the need for planting Bt corn. This information is distributed via the web-based Pest & Crop newsletter and presentations at winter meetings and workshops. Continual discussion about implementing resistance management plans and outlining the refuge requirements is included with corn borer publications/presentations.

**Impact:** Producers strive to reduce pest populations in a cost effective manner with minimum disruption to the environment. Bt corn, genetically resists attack from corn borers, protects yield and eliminates the need for insecticide applications when significant damaging numbers exist. Statewide surveys coupled with knowledge of pest biology enable Purdue Extension Entomologists to advise producers when and where economic returns will likely be realized when implementing this technology on a yearly basis. Since the commercial availability of Bt corn (1996), Indiana's national corn production ranking remains constant, while the percent of Bt corn planted remains one of the lowest in the corn belt (National Agricultural Statistics Service data). The Purdue Pest Management Program desires that producers make wise, informed pest control decisions.

Since 1997, statewide corn borer populations have been low as shown by our annual survey. This information has allowed Indiana producers to use this technology only when and where it was needed while avoiding unnecessary expenses for the premium Bt corn seed. According to a NASS July, 2003 report ("Corn and Biotechnology Special Analysis") Indiana planted one of the lowest percentages of Bt corn in 2002 compared with ten other corn producing states, yet its production ranking has remained constant. In 2002, Indiana producers saved over \$3.2 million in Bt corn premiums compared with the neighboring state of Illinois. Indiana also had the highest percent compliance with EPA's resistance management strategy (range 44 to 87%, mean of 74%).

Source of Funds: Smith-Lever, State

Scope of Impact: State Specific

## **Key Theme: Bioterrorism**

### **Homeland Security - Animal Agri-Terrorism**

Animal agri-terrorism is a concern for the Indiana Board of Animal Health, and many others in the agricultural community. A major concern is what action to take in the event of an emergency animal disease outbreak in a community. With assistance from the Board of Animal Health, the Carroll County Purdue Extension ANR Educator mapped the entire county as to where the animal operations were located. A global positioning system (GPS) unit was used to mark the location with Arc-view software to display the findings. The data collected were: type of operation (swine, beef, sheep, dairy, equine, goats, or llamas); name, address, and phone number of owner; township, and GPS location. Other facilities identified were: veterinary clinics, medical centers, chemical and fertilizer dealers, schools, and churches. Churches often serve as gathering and meeting places for people in times of disaster. At the conclusion of the GPS mapping, a special Emergency Management Team was formed to help in the event of an agricultural tragedy. The team was comprised of Emergency Management personnel, volunteer fire chiefs, veterinarians, local law enforcement people, school officials, and local agricultural producers. A meeting was held to show them the collected data and discussed topics of concern to the group. A resource list of available equipment in the county was compiled. Letters were sent to all farmers and contractors listing those who had such items as back hoes, bulldozers, livestock trailers, portable gates and corrals, etc. This data can be extremely beneficial in the

event of a tragedy because time is of such importance. Purdue Extension, Carroll County, served as the pilot county for this project that hopefully will become statewide. Clinton, Cass, and Tippecanoe Counties are all planning to duplicate the effort in their respective counties.

**Impact:** Purdue Extension, in cooperation with other Carroll County agencies and agricultural producers, assisted in the creation of a special Emergency Preparedness Team to deal with potential agricultural terrorism. The true impact of this project will be known only if a community emergency happens. By compiling a through database of the animal locations in our county we are more prepared to isolate and quarantine the potentially affected operations that could be affected by an outbreak of any kind. With all the uncertainty in our world today, we can never be too prepared to face the future and this project is just one way to help plan for those uncertainties that lie ahead.

Source of Funds: Smith-Lever, State

Scope of Impact: State Specific

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

### **Nx Level Ag - Tilling the Soil of Opportunity Produces Business Plans**

The business of farming and the broader world of agriculture are changing. New businesses in agriculture are being launched by farmers who grew up believing they would carry on their families long-held farming traditions, growing and raising food the way their fathers and grandfathers had. The national trend toward consolidation and concentration of farm enterprises, and a similar boom in mergers and acquisitions of agribusinesses, has created a whole new, stiffly competitive marketplace for food and fiber, and forced once-traditional farmers to rethink everything. Nx Level Ag - Tilling the Soil of Opportunity training was provided for CES educators in May, 2002, to certify them to become instructors for the program. This program encourages current and potential agricultural entrepreneurs to develop a business plan for their enterprise. A planning meeting was held in June, 2002, for those CES educators interested in offering the series to develop a coordinated marketing program for the state of Indiana. The Small Business Development Centers became collaborative partners. Allen, LaGrange, and Kosciusko counties provided the 10 session series, January to March, 2003, for \$175.00 per participant. Additional individuals from the same enterprise could attend for \$100.00 to cover expenses beyond the notebook. Allen County had 8 individuals enroll which represented 6 enterprises. LaGrange County had 8 participants representing 7 enterprises, also. Kosciusko County had 9 participants representing 7 enterprises. Each session featured basic business plan principles taught by the Extension Educator which was then supplemented by presentations from community professionals or business owners on the topic, and work time for their personal business plans. Allen County had each business plan reviewed by a lender and shared the comments with the participants. Each participant received a certificate of completion and recognition at the graduation ceremony.

Impact: Nx Level Ag - Tilling the Soil of Opportunity curriculum was taught in Allen, LaGrange, and Kosciusko Counties, January-March, 2003. The 10 session series had 25 participants which represented 19 enterprises. Each session featured basic business plan principles taught by the Extension Educator, presentations by community professionals or business owners, and work time for their personal business plans. Business plans were completed by 15 (60%) of the participants. Each participant received a certificate of completion and recognition at the graduation ceremony. Additional series are scheduled in Allen County and Huntington County in 2004. Each session of the series encouraged participants to complete one more section of their business plan. Allen County had a business plan completed by all 6 enterprises. One enterprise also participated in an Agricultural Management contest at Notre Dame and was required to prepare a business plan and make a presentation during the duration of the course. They found the textbook and workbook valuable resources to assist with their business plan development. They were selected as the winner from the four finalists and received a cash award for their enterprise. LaGrange County had a business plan completed by 7 individuals. Kosciusko County has had no business plans submitted at this time. Allen County has scheduled another series for December 11, 2003-February 26, 2004. Huntington County has scheduled a series for January 15, 2003-April 1, 2004, with the educators from Allen, LaGrange, and Kosciusko counties presenting the sessions. Participant comments: "I liked the net working with others and the step by step to write the plan of operation." - Allen County couple "I liked the course layout. It took a major undertaking like a business plan and broke it down to manageable sections." - Allen County participant "As a result of this course, we are doing more planning and have realized that 'Failing to Plan is Planning to Fail.'" - Allen County participant

Source of Funds: Smith-Lever, State  
Scope of Impact: Northeast IN

### **Creating Business Development in Greene County**

A private individual approached Extension with the opportunity to create a new business venture by adding value to agriculture commodities and selling them thru a marketing network. A vacant building was renovated and a complex business plan was developed with the help of the food science department, and the newly created statewide value added person. Hazard Analysis and Critical Control Points were identified and were followed under the direction of the appropriate state and federal agencies. Monies were acquired along with partners that solved distribution and order taking. Vendors were positioned to supply quality products and the product began the steps of monitoring and record product verification to the buyer's doorsteps. Cash flow is beginning to filter into the profit cycle and is beginning to erase debt.

Impact: A local businessman and a neighboring marketing person created a business that is successfully producing and marketing pizzas. This business has a projected workforce of thirty to forty workers. Food safety training and a HAACP trained person on staff will keep the factory safe and growing. This single enterprise has already spawned two similar business plans revolving around value-added agriculture products and could further help Greene County economic development. An otherwise vacant building is now generating taxes and revenues.

Vendors are profiting from this venture along with a town that has visions of further economic development. The original business now employs 15 fulltime production and management people. The economic impact on Greene County is substantial. This business accounts for 2% of the 760 jobs gained in Greene County from January to August 2003.

Source of Funds: Smith-Lever, State  
Scope of Impact: Greene County IN

### **New Ventures Team**

The New Ventures Team, established in the spring/summer of 2002 as an official team of Purdue Cooperative Extension, is a resource serving the educational and facilitation needs of individuals and groups throughout Indiana in the development of new business ventures that produce food and agricultural based products. The structure of the 25 person New Ventures Team was deliberately set up to include both Purdue Extension Educators and Specialists, balanced with respect to geographic representation and subject expertise. The Educators, located in counties in all regions of Indiana, are in the unique position to hear the problems and ideas that producers around the state have. In addition, they have the facilitation skills in to work with individuals and groups at the kitchen table, in town hall meetings and in larger assemblies as they work through the process of taking their dream to the reality of a profitable business entity. The Specialists, located on the Purdue Campus, take the lead in developing educational materials and programs for delivery throughout the state with the Educators. Over the past year, the New Ventures Team has very efficiently and effectively set up the infrastructure to the point where it is a highly functional team ready to work with and facilitate groups as they work through the process of developing a new value added business or deliver educational programming in areas of business management as well as technical analysis. This infrastructure development has been extremely important given that much of the work of the New Ventures Team is new to the team members. Team members have been involved in over 100 person days of training during the past year. The New Ventures Team at Purdue University is well known among Cooperative Extension personnel in all 92 counties of Indiana. The team has already established an identity with a logo, a standard template for publications, PowerPoint presentations and other marketing materials. Members of the New Ventures Team have established vital networks with the Value Added Committee of the Indiana Farm Bureau, the Value Added and Business Development division of the Office of the Indiana Commissioner of Agriculture and the Small Business Development Centers.

Impact: Purdue University has made important investment in the New Ventures Team so that team members are able to effectively assist groups in developing new value added business ventures. The New Ventures Team has also had an active start-up year with respect to educational programming and facilitation of producer groups. The Team responded to over 40 requests for assistance in evaluating business investment alternatives throughout the state. Educational programming over the past year has included 8 educational presentations, the evening program of the Indiana Farm Management Tour, two two-day workshops on milk/food processing, and two ten-session NxLevel (business planning) training programs. Projects that

team members have worked with include working with Amish farmers to acquire “certified organic” status for their vegetable production to working with groups of corn producers exploring the viability of multi-million dollar investments in corn processing plants. In the case of the Amish farmers the work of the New Ventures Team member was successful in providing the necessary education program so 7 farms received organic certification (the first time) with 6 of these organizing and Pleasant Ridge Organic Farms selling produce to a Chicago organic food distributor. In another case the New Ventures Team member worked with a group of farmers to develop a produce auction. This highly successful project has experienced growth in gross sales of \$420,000 in 2002 to a projected \$800,000 in 2003. Two other team members worked with groups of corn producers evaluating potential for corn processing plants. In both of these cases the projects reached the stage of stock offerings this past year.

Source of Funds: Smith-Lever, State  
Scope of Impact: State Specific

## **Key Theme: Home Lawn and Gardening**

### **Landscape and Turf Seminars**

Commercial Landscape and Turf personnel need up-to- date research-based information to apply pesticides safely and correctly as a part of their business operations. In addition commercial applications need to attend pesticide training as a part of maintaining their pesticide licenses. Northeast (NE) Indiana Landscape and Turf seminars were organized by the Allen County Horticulture Educator with the help of the Fort Wayne Arborist Association. University specialists offer programs on pesticide use and selection, and pest and disease identification and control. 115 owners and employees of landscape and turf commercial enterprises attended the NE Indiana Landscape and Turf meeting at the Allen County Extension Office on November 8, 2003. Attendees attended seminars taught by specialists and experts on pesticide use, pest identification and control, and Extension programs (website and e-mail) and services. They also received CCH’s (continuing certification credits) to maintain their commercial pesticide licenses. Post surveys were given at the end of the program.

Impact: 100 % of attendees reported that they learned something new about pest control and identification that would save them time and money in the operation of their commercial enterprises. 85% of the attendees reported they learned something new that would help them apply pesticides or fertilizer in a more environmentally- responsible manner. Finally 65% of the attendees reported they had become more aware of extension programs and services as a result of attending the program.

Source of Funds: Smith-Lever, State  
Scope of Impact: Northeast IN

## **Master Gardeners Assist the People of Madison County with Horticulture Education**

Madison County is a growing urban community with many existing and new neighborhoods and homes. The people of Madison County need information concerning gardening, landscape management, and lawn care. The Purdue Extension Office is not equipped to handle the demand for educational programs and horticultural information requested for adults and youth living in the county. This Educator organized and held the Master Gardener Intern Training January 23 - April 10, Thursday evenings in Anderson. This Educator organized the training and taught 3 of the sessions (Soils and Plant Nutrition, Insect ID and Control, and Lawn Care). This Educator has held similar Master Gardener Intern Trainings every year since 1997 to train Master Gardener volunteers. Master Gardeners in Madison County teach horticulture programs for local clubs, organizations, and agencies. They hold the Saturday Gardening Series, a two-hour gardening program, once a month, a garden tour in June, and the Youth Gardening Day Camp in June, 2003.

**Impact:** Master Gardeners in Madison County have made a significant contribution to horticulture education for adults as well as youth, and in 2003 contributed 895 volunteer hours worth \$14,364.75 (based on \$16.05/hr). The total hours contributed by Master Gardeners since 1997 total 4,364 hours, a worth of \$70,050. Sixteen youth, ages 8-12, participated in the Youth Gardening Day Camp on June 26, 2003. According to a follow-up survey, 90% of the respondents indicated they would likely have a garden of their own in the future and 100% of the respondents indicated they learn something new that made them a better gardener. Fifty percent of respondents indicated they learned something that made them more interested in the environment, 20% learned more about working with others, 50% responded that they were more thankful for food produced from plants, and 80% indicated they were more interested in gardening as a hobby because of the program.

**Source of Funds:** Smith-Lever, State

**Scope of Impact:** State Specific

### **Purdue Master Gardener Program: Helping Others Grow**

The demand for gardening information by the general public far exceeds available staff time. Participants are recruited from the general public and participate in a local Master Gardener Training Program organized by CES ANR Educator with support from the State Coordinator. Participants undergo several weeks of training covering a range of topics including plant science and nutrition, soil science, pesticide safety, plant problem diagnosis, gardening and landscape maintenance techniques and yard waste management. Participants are required to pass a final comprehensive exam in order to remain active as Master Gardener Interns. Upon completion of required volunteer service, Interns become certified Purdue Master Gardeners, volunteers of Purdue University.

**Impact:** In the past year, nearly 230 Master Gardeners and Interns staffed the Master Gardener informational booths at the Indiana Flower and Patio Show and the Indiana State Fair. The total

volunteer service from these participants during these two events is estimated to be 690 hours, which is equivalent to \$11,412 at \$16.54 per hour. An estimated 4,825 yard and garden questions were addressed. The monetary value of Master Gardener volunteers is only for these two state events. This value does not account for the vast number of hours that Master Gardeners volunteers give locally within their counties. Training of volunteers allows for the extension of research-based information to more people. This "ripple effect" is a beneficial way for Purdue University to meet some of the demands by the general public for yard and garden information.

Source of Funds: Smith-Lever, State  
Scope of Impact: State Specific

## **Key Theme: Organic Agriculture**

### **Organic Agricultural Production**

Farm profitability has been declining, and farmers are looking for alternative agricultural enterprises and/or production practices to improve their profitability. One practice being examined closely by many small farmers is certified organic production and marketing. As a result of local requests, the Extension Educator set up two meetings to provide educational information about organic certification. The first one was held on March 6, 2003 and over 85 people from Indiana, Michigan, and Ohio attended. Representatives from CROPP Cooperatives, headquartered in Wisconsin, gave a 4-hour presentation on organic dairy and milk production. As a result of the high level of interest at this meeting, a second meeting was scheduled on April 11 with Indiana Certified Organic and an organic certifier who is a member of the national organic standards board. Letters were sent to the participants of the March 6 meeting and to the local vegetable growers. This half-day workshop provided participants with information on how to become certified.

Impact: As a result of these meetings, Indiana Certified Organic reports that a farmer from southern Indiana and 6 farmers in LaGrange County have become certified organic pending final receipt of documents and records. The Lagrange County farmers have organized into a group which calls itself Pleasant Ridge Organic Farms and have begun marketing produce through Whole Foods, an organic food distributor in Chicago. A secondary result of the meeting is that this growers group of Amish farmers has the most complete paperwork of the three Amish grower groups that Indiana Certified organic has works with – one in Indiana and two in Missouri. Extension collaboration has helped develop skills in communicating with Amish clients. As a direct result of the April meeting in LaGrange workshop participants are filing more complete and accurate documents for certification

Source of Funds: Smith-Lever, State  
Scope of Impact: IN, OH, MI

## **Key Theme: Ornamental/Green Agriculture**

### **Rebuild Linton School Football Field**

Linton school football field had very little top soil and was a hazard to play on, as it was extremely muddy and slick when wet and very hard when dry. It had become a safety and liability issue for the school. The athletic director asked for assistance on how the school should proceed to build a new field on the same location with very little money. The Extension Educator Contacted the Purdue Turf Program for advise and help with this project. A Turf Specialist visited the field twice, met with the school administration, and spoke at a public meeting on the need for the project. The Purdue Turf Program also used the field for research purposes. A Group of interested people visited six schools with Bermuda grass (2 with the A.D., a maintenance worker and a volunteer), and discussed with theses schools their experience with a type of grass that has been used very little in Indiana. They then talked to three private contractors that had worked on Bermuda grass fields and had two of them look at the Linton field. The Educator led and assisted with public meetings for community input and agreed to serve as resource person on a committee to rebuild the Linton field. The Extension Educator assisted the A.D. and the committee in formulating a plan of action. The Educator then secured a donation of 450 cubic yards of top soil from local coal company, and visited the field 2 or 3 times per week in June through August to make sure the maintenance plan was being followed.

Impact: A new football field that will cut down on injuries and that the coaches and players enjoy was built in less that one year. Volunteer work and donations toward this project totaled \$30,058 of donated time, labor and materials, documented as: 450 cubic yards of top soil at an estimated savings of \$8000; 7 trucks X 6 hours X \$50.00 per hour donated by local trucking company at an estimated savings of \$2100; \$10,000 donated by township trustee to purchase Bermuda grass and do dirt work; \$500 donated by booster club; 6 volunteers x 48 hours x \$16.00 per hour equaling \$4,8086, and \$4,650 donated by private contractor for site preparation.

Source of Funds: Smith-Lever, State  
Scope of Impact: Greene County IN

### **Trees for Community Beautification and Improvement**

With little community development due to a lack of a county master plan and poor economic development, urban and rural beautification shall be approached as a means to develop community pride. Extension distributed 1600 tree seedlings in March and April of 2003 to 285 people. 30 per cent replied to a survey as to how the trees should improve the value of the home.

Impact: The need for low cost beautification measures was ascertained through tree planting measures. Through the efforts of Master Gardener volunteers, 1,600 tree seedlings were distributed to rural and urban homeowners. Nearly a quarter of a million dollars improvement of real estate values as well as beautification of home-sites were estimated. Nearly all of the respondents replied that the tree seedlings will improve the landscaping, will improve the

beautification of the community, and benefit the songbirds of the area. Of those responding as to how the tree seedlings will improve the dollar value of the home site: 14 responded Less than \$10, 34 responded \$10 to \$500, 19 responded \$500 to \$1,000, 10 responded \$1,000to \$5,000, 6 responded over \$5,000. No less than \$233,460 was estimated to be the likely improved real estate values due to the plantings.

Source of Funds: Smith-Lever, State  
Scope of Impact: Southwest IN

## **Key Theme: Plant Health**

### **Purdue's Plant and Pest Diagnostic Laboratory**

Purdue's Plant and Pest Diagnostic Laboratory (P&PDL) fulfills the Land Grant University's responsibility to provide the citizens of Indiana with un-biased, accurate and timely diagnosis of plant disease and insect problems. Many stakeholders have benefited from the diagnoses provided by the P&PDL and have voiced that the services provided are too valuable to be neglected. Accurate and timely diagnosis of plant disease and insect problems as well as the provision of feasible management strategies for plant disease problems and insect pests is a necessity for commercial growers, landscapers, private consultants, regulatory inspectors, county extension educators, homeowners and other clientele groups throughout Indiana. Multi-disciplinary diagnosis of samples and prescription management recommendations provided citizens of Indiana the optimum in plant health care information.

Impact: In 2003, the P&PDL provided diagnoses for a total of 1672 physical and digital samples. Trees and shrubs comprised the largest group of samples (30%) followed by flowers (27%) and agronomic crops (22%). The P&PDL also serves as the state regulatory plant diagnostic lab. Any plant samples requiring diagnoses pertaining to a regulatory nature are forwarded by Indiana Department of Natural Resources (IDNR) plant inspectors to the P&PDL for diagnosis. This year the IDNR Division of Entomology and Plant Pathology submitted 163 geranium samples to be tested for the presence of *Ralstonia solanacearum*, a plant pathogen listed on the select agent list of the Agricultural Bioterrorism Protection Act of 2002. The P&PDL also diagnosed foliar plant diseases on 180 corn and soybean samples submitted for State Phytosanitary Certification. The P&PDL web site has had 1,575,474 successful requests over a 12-month period. The website is up-dated on a weekly basis with timely information and images provided by P&PDL Diagnosticians and Extension Specialists. The picture of the week, "hot topics", invasive species updates and links to important information are available on the website. The P&PDL UPDATE is made available to all who wish to subscribe, allowing those who subscribe to receive links to the most recent information posted on the website. The following selected comments from the various clientele illustrate our impact: "When it comes to crop plants, the economic downside to plant disease and injury is tremendous, we especially appreciate having P&PDL to back up our other resource agronomists when our very livelihood is on the line." "I have used the lab on several occasions, most recently dropping off 4 tree samples for diagnosis. In the course of my travels around Indiana, I've been the courier for a number of samples from clients around the

state to the lab. I have always received courteous service, as well as a prompt response with an extensive analysis.” “My husband and I have used the lab for home horticulture and for crop disease issues, and we agree that the lab is an invaluable resource. Last year alone, I had an iris fungal disease diagnosed by P&PDL and as a result I was spared having to replace established plants that would cost me 7 or 8 times the price of the lab test.” "Thank you for your information. I wish everyone at Purdue realized how important quick responses are as you do. Little favors for little people can mean more to how Extension is viewed than some people realize.”

Source of Funds: Smith-Lever, State

Scope of Impact: State Specific

### **Safeguarding Indiana Agriculture - The 2003 Ralstonia Outbreak**

*Ralstonia solanacearum* Race 3 Biovar 2 (RsR3B2), the pathogen that causes southern bacterial wilt in potatoes and other solanaceous crops, is not currently found in the US and is one of the pathogens on the Select Agents and Toxins List, part of the USDA Agricultural Bioterrorism Act of 2002. In January, 2003, the pathogen was unintentionally introduced to numerous greenhouses in the US during the routine and normal importation of geranium cuttings from Kenya by a US company. This introduction initiated a regulatory response by USDA-APHIS-PPQ to detect and eradicate the pathogen from US greenhouses. This project was initiated when an Extension Horticulturist was sent a wilted geranium by an Indiana grower in January 2003. He brought the plant to the Purdue Plant and Pest Diagnostic Laboratory (PPDL), and the diagnosis of southern bacterial wilt caused by *Ralstonia solanacearum* was made. The PPDL was the first university diagnostic clinic in the US to detect *Ralstonia solanacearum* in geraniums in this outbreak. Purdue provided samples to USDA-APHIS for biovar and race determination. Purdue worked closely with Indiana Dept. of Natural Resources (IDNR) in organizing the regulatory response to the outbreak. Indiana growers were notified of the outbreak via a faxed bulletin and information about the disease was posed on his Commercial Floriculture website. Purdue provided information to the IDNR on symptoms and etiology of the disease to aid the field inspectors in their collection of potentially infected plants. The Diagnostic Lab provided initial testing of more than 160 samples collected by nursery inspectors, and forwarded samples positive for *Ralstonia solanacearum* in initial tests to USDA-APHIS for race and biovar determination. Four Indiana greenhouses were found to have infected plants, and members of this team worked together in the quarantine and sanitation efforts in those greenhouses. We also collaborated in formal meetings to assess the Indiana response to the *Ralstonia* outbreak, and advised growers on how to manage this disease.

**Impact:** The 2003 outbreak of *Ralstonia solanacearum* race 3 biovar 2 demonstrated the benefits of the IDNR and the Purdue Plant and Pest Diagnostic Laboratory working together to safeguard Indiana agriculture. The unintentional introduction of this quarantine pathogen to US greenhouses during the routine importation of geranium cuttings from Kenya was first detected in Indiana. The Purdue Plant and Pest Diagnostic Laboratory was the first university diagnostic clinic to provide samples to USDA-APHIS for biovar and race determination. Due to the cooperation between the IDNR, Purdue plant diagnosticians and the extension floriculture specialist, Indiana was among the first states to organize a regulatory response to the *Ralstonia*

outbreak. This enabled Indiana greenhouse growers to minimize losses due to stop-sale and quarantine actions that were mandated by USDA-APHIS. Four Indiana greenhouses were found to have infected plants, and the activities of our Purdue Ralstonia team enabled these businesses to comply with sanitation regulations as efficiently as possible. There was no recurrence of the disease in Indiana greenhouses, indicating the success of the eradication efforts.

Indiana was among the first states in the nation to organize a regulatory response to the Ralstonia outbreak. We provided information to USDA-APHIS staff which contributed to the national regulatory response to the outbreak. Due to the fast action and cooperation between members of this team and USDA-APHIS-PPQ officials, Indiana growers were able to accurately follow protocols mandated by the federal Ralstonia Action plan, minimizing the losses due to these quarantine actions. Greenhouses that received infected plants were detected quickly, and eradication and sanitation procedures were conducted in an efficient manner. The contaminated Indiana greenhouses were able to resume business in time for the spring growing season.

Source of Funds: Smith-Lever, State

Scope of Impact: State Specific

## **Key Theme: Precision Agriculture**

### **GPS Guidance Reduces Pesticide/Fertilizer Application Costs**

In the 1990's, farmers questioned the economic profitability of GPS guidance systems. The economic benefits and costs of using GPS guidance and foam markers were estimated. Budgets showed the benefits of reducing application skip and overlap often pays for the technology. Additional benefits include reduced operator fatigue and improved ability to operate at night and/or in dusty conditions, Depending on farm size and whether the GPS unit is used for yield monitoring or other activities, the benefit of reduced skip and overlap is in the range of 50 cents to \$2.00 per acre.

Impact: For custom applicators, use of GPS guidance grew from about 5% in 1999 to over 50% in 2003, with similar growth by farmers. If 50% of Indiana cropland has pesticides and fertilizer applied using GPS guidance by custom applicators or farm operators, the total annual benefit to Indiana farmers would be approximately \$6 million annually.

Source of Funds: Smith-Lever, Hatch, State

Scope of Impact: State Specific

### **Precision pH Management a Direct Result of Purdue Efforts**

Previous research has shown that soil pH varies within a single field more than can be adequately described by the current practice of manual grid sampling using 2.5 acre grids. However, the cost to reduce the size of the grids in order to capture the actual pH variation is too expensive. Automated soil sensors for mapping soil pH can potentially reduce the cost and effective grid size to improve soil pH management. Researchers designed and demonstrated a soil pH sensor

implement that could be pulled behind a tractor and map pH variation. The pH mapping system consisted of a rugged pH electrode, a soil sampling mechanism, GPS receiver, and electronics to control the machine and record pH data. Field evaluation of the system demonstrated the feasibility of mapping soil pH on-the-go.

Impact: On-the-go soil pH sensing is now possible using a concept originally developed by Purdue researchers. The Veris pH Manager is a new farm implement that can be used to map soil pH variation and manage lime application. The yet unproven economic potential lies in improved yield, reduced environmental impact, and reduced lime costs.

The soil pH mapping concept resulted in a patent (6,356,830) which was licensed by a company (Veris Technologies, Salina KS). Over the next 2 years, commercial development continued by Veris with the help of Purdue and Nebraska researchers. The result was a commercial system called the Veris pH Manager. Now commercially available, the pH Manager can generate up to 25 times as many pH measurements as a 2.5 acre grid map. Better pH information turns into better decisions in lime application potentially saving several dollars per acre in lime costs and unknown costs due to yield losses due to poor lime management.

Source of Funds: Smith-Lever, Hatch, State

Scope of Impact: State Specific

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

### **Conserving Resources through Modern Horse Pasture Management**

A recent survey showed that there are 160,000 horses and other members of the equine family in Indiana. These horses provide countless hours of recreation and companionship to the family members who provide for these animals. Pastures play a very important role in the health and nutrition of animals. If managed well, pastures will be an economical source of high-quality feed as well as a healthy place for horses to exercise. If managed poorly or ignored, pastures can soon become nothing more than an overgrazed weed patch or eroded hillside that not only has little nutritional value, but may even contribute to horse health problems, damage the environment and sacrifice valuable resources. The management of a horse pasture is an ongoing process that takes time, equipment, knowledge, and dollars. The suburban horse owner has a limited understanding of the mechanics and techniques involved in general pasture management and modern intensive rotational grazing. They wish to improve their understanding of efficient pasture management, horse health maintenance and the role of forages in a good horse ration. The Floyd County Extension office in conjunction with a variety of valued partners, hosted a four part horse pasture management educational series which was designed and conducted in the summer and fall of 2002 with a follow up in-field workshop in the summer of 2003 to address the specific needs of the suburban horse owner. The purpose of this educational series was to help horse owners get the most out of the time, effort, and money they put into permanent pasture management and animal health while reducing the potential for negative impact on the environment. Over 270 participants, who control 528 acres of pasture and 258 acres of hay land and own 104 horses, attended a 4 workshops which were offered in both classroom and on farm settings. Presenters

with broad and diverse backgrounds in various facets of the subject matter provided practical information to the participants in a manner which should facilitate rapid adoption and implementation.

**Impact:** Within one year, participants had substantially increased knowledge of pasture management. After the first sessions 86% of participants indicated plans to both test soil for pH and nutrient levels and apply nutrients and lime based on those recommendations. After one year 64% of those responding indicated that they were using some form of rotational grazing and 81% indicated that they now routinely survey their pastures for poisonous plants and treat for them as appropriate. Forty five percent indicated that they have altered their fencing system/arrangement of fences to more appropriately/efficiently manage pasture for their horses.

Source of Funds: Smith-Lever, State  
Scope of Impact: State Specific

## **Key Theme: Small Farm Viability**

### **Farmstead Milk Processing Workshop**

Dairy farmers have been struggling with profitability as a result of low commodity milk prices. Many are exploring on-farm processing of their milk into cheeses and other dairy products. A two-day workshop was planned and held in LaGrange on January 3 and 10, 2003 to provide producers with information about on-farm milk processing. Successful entrepreneurs were brought in to share their experiences. A presentation on regulations was made to make participants more aware of the breadth of regulations they may possibly need to comply with. The technologies of various milk processing enterprises were discussed and equipment sources were presented.

**Impact:** There were 82 paid participants at this workshop – 26 turned in the voluntary evaluation. There were two primary outcomes from this workshop; both were achieved, at least preliminarily. Respondents were asked to indicate if they were more or less interested in on-farm milk processing as a result of the workshop. Twenty indicated they were more interested for the following reasons: 15 – to improve my farm's profitability; 7 – to bring other family members into the operation; 7 – to diversify my operation; 3 – to quit an off-farm job; 9 – on-farm milk processing appeals to me. Six indicated that they were less interested for the following reasons: 5 – the start-up investment is too great; 3 – there are too many regulations to comply with; 2 – operating an on-farm milk processing plant will be too costly; 5 – operating an on-farm milk processing plant will be too time consuming; 1 – I do not have an interest. Also, 7 of the surveys indicated they wanted to explore the possibility of developing a farmer alliance to pursue opportunities in farmstead milk processing. The 26 surveys represented a total of over 1200 dairy cows and over 10 goats. Two different outcomes, both positive, were sought: - 20 of 26 were more interested in pursuing an on-farm milk processing enterprise - 6 of 26 were less interested. Some of the respondents were looking into purchasing equipment.

Source of Funds: Smith-Lever, State  
Scope of Impact: State Specific

## **Kosciusko County Farm Fresh Directory - In Progress**

An increasing number of agriculture producers are seeking for opportunities and alternative enterprises to keep their farms viable. Once a new venture is started on the farm, the biggest hurdle to overcome is marketing of the product. One way to introduce consumers in Kosciusko County to locate locally raised products was to create a directory for the county. This directory will assist in marketing the farm products to a variety of consumers both in the county and surrounding sites. The Extension Educator met with the Kosciusko County Visitors Bureau in October 2002 to discuss the idea of a Farm Fresh Directory. They would assist in displaying the final brochure. A committee was developed from a group who had attended prior meetings on alternative agriculture. This committee met to discuss the specific requirements of such a directory. A news article was written for the local newspapers to seek people interested in being in the first Farm Fresh Directory. Information was mailed to participants of past alternative agriculture meetings. 21 producers in Kosciusko County supplied information for the directory ranging from certified organic to conventional farming methods. Two different forms of the brochure were developed: a short color, four fold brochure and a more detailed booklet. The directory was shared for the 1st time at the Taste of Ag where over 250 copies were distributed. A news paper article and a radio spot were also developed to promote the availability of the brochure. Since April, over 1,000 brochures have been distributed in the county and at the Indiana State Fair. The Visitors Bureau helped to distribute over 200 copies. A short survey about farm fresh products was also used in promotion of the directory at the Taste of Ag where 56 surveys were completed.

**Impact:** Results of the survey showed that when buying food, it is important to make purchases that support local family farms and to buy produce that is locally grown or produced. Consumers preferred to buy farm fresh grown food from a farmer's market or direct from a farmer. When purchasing produce, the most important characteristics that consumers looked for were freshness, taste, and quality. Farmer's Markets are the preferred choice for purchasing fruit, vegetables, and cheese. Beef, pork, and eggs were purchased more often directly from a farmer. An evaluation will be sent to the producers in the farm fresh directory in the fall of 2003 to determine if they received more contacts or sales increased as a result of their involvement. The first ever Kosciusko County Farm Fresh Directory was developed with 21 producers in the county. Over 1,000 copies of the directory have been distributed in the county and surrounding counties. An evaluation in the fall of 2003 is yet to be completed to determine if the directory increased sales for the producers.

**Source of Funds:** Smith-Lever, State

**Scope of Impact:** State Specific

## **Key Theme: Urban Gardening**

### **Spring Garden Clinic**

There are over 278,000 households in Marion County that participate in one or more gardening activities. Gardeners need to gain and update their gardening knowledge to help them be successful gardeners, beautify their surroundings and understand food production. Purdue Extension's Urban Garden Program provided a daylong Spring Garden Clinic. Community gardeners and volunteers received a discounted registration fee of \$3.00 while the general public was charged a \$7.50 registration fee (lunch included). The speakers were Extension Educators. The topics presented were Fresh from the Garden, Out of the Ordinary Annuals, Garden Weeds, Garden Myths Revealed, 2003 All-America Selections, Fragrance in the Garden, and Gardening on the Internet. Everyone attending received a folder of handouts for all the presentations.

Impact: As a result of the Spring Garden Clinic 86 % of attendees will change a gardening practice and 100 percent said they would be a better gardener. Clinic attendance totaled 53 (attendance was restricted due to space limitations). Participants indicated they would do the following differently as a result of the clinic: do a better job of controlling weeds in my garden, Japanese beetle control, care of plants, pruning, more careful with chemicals, start a small vegetable plot this year, knowing combinations to plant, not spread garden myths, check Internet more often for garden information, pay attention to plant smells and where fragrant flowers are planted, plant in a pot with drainage holes, plant more scented plants, try several new plants, plant more annuals, start seeds earlier, do not use salt on asparagus, stop putting a gravel layer in the bottom of pots, use fertilizer, make raised beds and the use of pesticides. According to evaluations, 100 % said: 1) they would attend again, 2) the handouts were of high quality and appropriate to sessions, and 3) they will be better gardeners as a result of attending the clinic.

Source of Funds: Smith-Lever, State

Scope of Impact: Marion County IN

### **Urban Garden - City Gardener Program**

At the suggestion of the Marion County Extension Board a survey was generated and distributed to gauge interest in a basic gardening program. The City Gardener Program was developed when 47% of survey respondents indicated they were "very interested" and an additional 47% indicated they were "somewhat interested" in a beginning gardening class. Extension Educators developed the City Gardener Program for beginning gardeners focusing on gardening in urban areas. The Program consisted of 6 two-hour educational presentations and a 3-hour volunteer day at the White River Gardens that allowed them to apply what was learned in class. The educational and demonstration topics were: Soil, Fertilizer and Compost; Insect & Plant Disease Management; Tools, Vegetables and Weed Control; Trees & Shrubs; Flowers; Lawn Care & Animal Damage Management. A reference notebook containing outlines of each presentation and supporting publications was given to each participant.

Impact: Fifteen people successfully completed the City Gardener Program and took a pre-test and post-test. They also completed surveys at the end of the program. The average increase from pre-test to post-test score was 33 % while 100 % of respondents said yes to “Do you think you will be a better gardener as a result of attending this program?” One hundred percent of respondents also said yes to, “Is there a practice you will change because of this program. Practices respondents intend to change include: "Take time to prepare areas before planting. Fertilize at proper times," "Pay careful attention to lawn fertilization. Pay careful attention to timing on disease and pest control. Oh yes- test my soil!" General comments about the program included: "I thought it was very informative. I'm glad we received good references for future use and in case I decide to try something different each year," "Best bargain for an amateur gardener in town." "Well organized and presented."

Source of Funds: Smith-Lever, State  
Scope of Impact: Marion County IN

**Goal Two. A safe and secure food and fiber system.** To ensure an adequate food and fiber supply and food safety through improved science-based detection, surveillance, prevention, and education.

## Overview

Food safety education provided by Purdue Extension continues to focus on all stages of the food handling system—production, processing, distribution, preparation, and consumption. Consumers expect a safe and wholesome food supply. The maintenance of that safe and wholesome food supply requires constant education of those that produce food, those that process and distribute it, those who prepare food and, ultimately, all consumers. The emphasis that Purdue Extension puts on this important issue is reflected by the 4,123 days of effort reported on this topic by campus and field staff, and the 25,444 direct contacts made with educational programming. Of those 25,444 contacts, 11,382 were youth.

Specific programmatic focus relates to the food service industry and to general consumers. Programs emphasized in the FY 2003 program year focused on food service-related industry. Programs include *Food Safety Day* and the National Restaurant Association program *ServSafe*. These programs teach food safety sanitation to food service workers and provide the certification examination. Twenty-three counties reported conducting the *ServSafe* program in 2003.

Purdue Extension food safety programs reach general consumers with research-based food safety basics. Curricula used encourage discussion, questions, participation, and involvement of the general public to help them learn basic concepts that can decrease the incidence of food-borne illness in this country. Food safety education is emphasized in both the Expanded Food and Nutrition Education Program and the Food Stamp Nutrition Education Program targeting low-income families. Other programs conducted in FY 2003 were *Safe Food and You: Food Safety during Pregnancy*, a food safety program targeted to pregnant women, and programs for children, *Professor Popcorn: Hooked on Health* and *The Mystery of the Poisoned Panther Picnic* that teach basic food safety concepts with games, music, and videotapes.

Fish is the primary source of nutritionally important omega-3 fatty acids in the human diet; however, fish can contain contaminants like mercury and PCBs. To protect anglers and their families, fish consumption advisories are issued. Purdue Extension staff have developed a website to convey fish advisory information. It is called *Angling Indiana* (<http://fn.cfs.purdue.edu/anglingindiana/>). A training program of the same name is currently being delivered to limited-resource families through the Family Nutrition Program and the Expanded Food and Nutrition Education Program. Evaluation data collected on this program is in the form of a pre- and post-test. Before the program, only 19% of the audience reached consulted the Indiana Fish Consumption Advisory. After the program, 67% of the audience indicated they would consult the Advisory in advance of eating recreationally caught fish. The food safety program for consumers launched in FY 2001, *Food Biotechnology: Dreams from the Fields*, continues to be a popular and important program for Indiana in FY 2003. This

program, taught both directly to consumers and to professionals (high school teachers, dietitians, nurses, physicians, and staff of the departments of health), has been effective in raising awareness and increasing knowledge of this important topic.

Safe food handling is important for preventing food-borne illness outbreaks, especially for infants and young children particularly at high risk. Purdue Extension is reaching out to child care providers with a program that stresses the basics of safe food handling—cleanliness, cooking temperatures, cooling appropriately, and preventing cross contamination.

### **Resources**

Approximately \$ 1,884,739.60 and 23 FTEs have been invested in Goal 2. This is a best estimate and these are not presented as auditable numbers

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

#### **ServSafe**

Description: Three programs are offered in Indiana to address retail food safety. *The Essentials of Food Safety and Sanitation* and *SuperSafeMark* programs were each developed as nationally recognized curriculums and certification programs for retail food handlers. *The Essentials of Food Safety and Sanitation* program is intended mainly for supermarkets and foodservice, and the *SuperSafeMark* program has been customized for supermarket and convenience store operations. Each program is designed as an 8-hour or 16-hour program for retail food managers and is linked with a retail food certification exam developed with the National Registry of Food Safety Professionals. The targeted audience included retail food managers and retail food workers. The program is also offered to corporate trainers and academic trainers that serve the retail food industry. The National Restaurant's *ServSafe* program that is targeted for restaurants is conducted in Indiana for growing audiences.

Impact: Within Indiana, the program is offered through the Retail Food Grocers Association, the Indiana Restaurant and Hospitality Association, and Purdue University. The Food Marketing Institute has endorsed *SuperSafeMark* as the food safety training program for the supermarket industry. The three leading U.S. supermarket chains (Kroger, Albertson's, and Safeway) have adopted the program to train and certify their employees. Indiana's largest supermarket chain, March Supermarkets, has also adopted this program. Within Indiana, over 3,500 people are certified each year using one of these three programs. These figures are expected to rise significantly prior to January 2005 when the mandatory certification rule comes into effect. Nationally, *The Essentials of Food Safety and Sanitation* program ranks as the second most popular retail food safety program, and the *SuperSafeMark* program is the number-one ranked retail food safety program for supermarkets.

Source of Funds: Smith-Lever, Registration fees

Scope of Impact: State

## **Delivering *Angling Indiana*<sup>™</sup> to EFNEP Families**

Description: The *Angling Indiana*<sup>™</sup> training program is intended to help pregnant and nursing women to make informed decisions regarding fish consumption. Four hundred fifty-eight women, of which 36% were pregnant and 6% were nursing, between the ages of 10 and 49, were surveyed and then provided a short face-to-face presentation on fish safety by EFNEP staff. Following training, participants were again asked to complete a short survey. From survey responses, participants were divided into four groups based upon fish consumption habits. Three percent reported eating only recreationally caught fish in the past year. Forty-five percent reported eating only commercial fish in the past year. Seven percent reported eating both recreational and commercial fish in the past year. Forty-five percent reported that they had not eaten fish in the past year. Slightly more than 2% had taken a fish oil supplement in the past month. Sixteen percent ate fish that is moderately high in mercury (i.e. tuna steaks, shark, swordfish, mackerel).

Impact: Prior to training, only 48% felt that pregnant or nursing women and children should eat fish, 18% indicated that omega-3 fatty acids in fish are nutritious for the unborn child or nursing infant, 48% knew that there are commercial fish species that should be avoided by sensitive populations, and 19% consulted the Indiana Fish Consumption Advisory before eating recreationally caught fish. Following training, 58% felt that pregnant or nursing women and children should eat fish, 66% indicated that omega-3 fatty acids in fish are nutritious for the unborn child or nursing infant, 58% knew that there are commercial fish species that should be avoided by sensitive populations, and 67% intend to consult the Indiana Fish Consumption Advisory before eating recreationally caught fish.

Source of Funds: Smith-Lever

Scope of Impact: State, National

## **Key Theme: Food Handling**

### **Child Care Food Safety Training**

Description: Safe food handling is important for preventing food-borne illness outbreaks and for infants and young children who are at-risk populations because of immature immune systems. *Child Care Food Safety* is a training program which emphasizes the basic principles of safe food handling—cleanliness, cook to proper temperatures, chill rapidly, and prevent cross contamination—for child care providers. A Purdue University Extension educator presented two sessions of *Child Care Food Safety*. The first program was at the Indiana Association for the Education of Young Children Conference in Indianapolis. The second session was for Nutrition, Inc., a Child and Adult Food Program provider of child care during their mandatory training. A total of 39 women participated in the two sessions and 36 participants completed both pre- and post-test evaluations of the program.

Impact: Knowledge gained of safe food handling practices was measured by pre- and post-test. The average pre-test score was 51% for 36 participants, with an average post-test score of 79%. There was a 28% increase in knowledge gained by attending the *Child Care Food Safety* trainings for child care providers and early childhood education teachers.

Source of Funds: Smith-Lever

Scope of Impact: State

**Goal Three. A healthy, well-nourished population.** Through research and education on nutrition and development of more nutritious foods, enable people to make health-promoting choices.

## Overview

The association between many chronic diseases and nutrition is becoming clearer. Careful nutritional choices can lead to decreased risks of certain cancers, coronary artery disease, diabetes, obesity, and osteoporosis. Nutrition education for adults and youth is essential to help form healthful dietary practices to support longer, healthier, and happier lives. Early educational interventions are critical, as it is easier to prevent the development of unhealthy eating and exercise habits than to change established habits. By increasing the knowledge base, especially of those who are educationally and economically at risk, healthy nutrition habits in children can be established early for a higher quality of life. Purdue Extension emphasizes nutrition education across the state, devoting 8,832 days to nutrition education programming and making direct contact with 83,196 individuals. Of the 83,196 contacts, 34,463 were youth in FY 2003.

The Dietary Guidelines for Americans continues to be the backbone of nutrition education in Indiana. Coupled with the Food Guide Pyramid and the Food Label, consumers can make informed dietary choices using basic nutrition information. Specific programs and settings vary throughout the state, but the Dietary Guidelines for Americans are included in all nutrition education programming.

Nutrition education for youth audiences focuses on building better food habits and maintaining healthy weight. The *Exploring the Food Pyramid with Professor Popcorn and Hooked on Health* curriculum reaches elementary school children across Indiana in school classrooms and in after-school programs. The program helps children learn about nutrition in a fun and innovative way to help them make wise food choices.

The Expanded Food and Nutrition Education Program (EFNEP) and the Family Nutrition Program (FNP) are two nutrition education programs specifically targeted at limited-resource families. Indiana has both these programs in counties across the state as indicated by need and program budget. Both programs address wise nutrition choices, careful meal planning, and sound food budgeting information for Food Stamp-eligible clients. This information assists limited-resource families to stretch their food resources, while still maintaining high-quality nutrition and balanced diet.

Chronic disease is not the only health parameter affected by sound nutrition. Pregnancy outcome is affected by nutrition and lifestyle choices. The *Have a Healthy Baby* program continues to reach at-risk pregnant women across the state with information on adequate weight-gain expectations, lifestyle habits for best pregnancy outcome, and good nutrition information. In FY 2003, 1,127 at-risk pregnant women were reached with the *Have a Healthy Baby* program.

Results of this program continue to show lower rates of low birth-weight infants in women participating in the program compared to state averages.

### **Resources**

Approximately \$ 3,769,479.30 and 46 FTEs have been invested in Goal 3. This is a best estimate and these are not presented as auditable numbers

## **Key Theme: Human Nutrition**

### **EFNEP Improves Quality of Life for Participants**

Description: Limited-resource families in both rural and urban settings require practical knowledge and skills to start them on the path to self-sufficiency. Changed food and nutrition related skills are often the first step on this path. Collaborations and partnerships with local agencies strengthen this community effort.

The Expanded Food and Nutrition Education Program (EFNEP) utilizes Family Nutrition Advisors (trained paraprofessionals known as FNAs) to teach a series of food and nutrition topics that lead to behavior change to limited-resource families in their homes or community sites in 15 Indiana counties. Topics include food safety, meal planning, food resource management, selection and purchase of nutritious foods, and nutrition for pregnancy, lactation, and early childhood. Lessons often include a food preparation activity to reinforce the principles taught. EFNEP works closely with agencies that serve this audience, including WIC, Food Stamps, Step Ahead, Healthy Families, Healthy Start, Maternal and Child Health, and other local agencies. 2003 EFNEP Initiatives: Bilingual paraprofessionals in Lake and Marion counties, as well as other FNAs, are reaching the Hispanic/Latino population. Indiana's EFNEP program has conducted follow-up evaluation research to determine sustainability of behavior change. The program for pregnant adolescents and limited-resource mothers-to-be, *Have a Healthy Baby*, continues to show healthier babies as result of participation. *Safe Food and You*, food safety during pregnancy, especially habits to reduce risk if listeriosis, is included. *Angling Indiana*, fish safety during pregnancy, was added in 2003. With funding from March of Dimes, *Have a Healthy Baby* video lessons were released. The audience is participants in physicians' offices and clinics. Spanish version in development. *Exploring the Food Pyramid with Professor Popcorn*, recently revised, was distributed nationally. In Indiana, 5,826 youth in 30 counties participated. Improvement was reported related to food selection food safety practices. Collaboration with March of Dimes to facilitate Indiana Folic Acid Council. Host for statewide conference, Folic Acid through the Life Cycle in March 2003 sent via IHETS throughout the state. Dr. Godfrey Oakley was the keynote speaker.

Impact: 2,178 families, including 3,537 children (over 7,229 persons), participated in EFNEP in 2003-2003; over 13,500 lessons taught as part of a series. Ninety percent improved their intake of nutritious foods. Eighty-eight percent improved other nutrition practices such as reading nutrition labels, and planning meals. Eighty-one percent improve their food resource management skills such as using a shopping list. Fifty-five percent improve their food safety

skills. Eleven percent improved handwashing. Thirty-five percent improved use of thermometers to measure doneness of meat. Thirty-one percent increased their physical activity. Six hundred twenty-eight youth (628), ages 6-14, participated. Three hundred sixty (360) volunteers assisted in youth and adult program. Collaborations involved 33 WIC clinics. Two thousand nine hundred eighty-five dollars (\$2,985) was contributed to EFNEP efforts by local agencies. A graduate stated that because of EFNEP, she has decided to go to college to become a “nutrition teacher.” “My mom recently put me in charge of the grocery shopping. Because of the great shopping tips I have learned, we have come in under budget every week!” A pregnant diabetic stated, “I will continue to try to eat healthy for myself and my baby so as not to hurt myself.” “I quit smoking this week after smoking a pack a day for a very long time. I know I will be healthier and my baby will have time to get more oxygen before I deliver.” “I have learned the importance of how to prepare, store, and save food correctly and save money when shopping for groceries.” A male participant stated, “I never paid attention to how to prepare meat during cooking and now I am more careful, especially with ground meat.”

Source of Funds: Smith-Lever 3(d)

Scope of Impact: State

### **Helping Indiana Families Eat Better for Less**

Description: According to Indiana Family and Social Services Administration, the number of Indiana Food Stamp recipients in June 2003 was 487,197. The USDA Food Stamp program strives to end hunger and improve nutrition and health. Food Stamp benefits, in addition to nutrition education, is a means for individuals and families to put their limited resources to optimal use as a powerful weapon in the fight against hunger.

USDA and Indiana Family and Social Services awarded a grant to the Family Nutrition Program (FNP) for \$1,337,189, with Purdue Cooperative Extension Service matching the funds with local and state dollars. As a result, during the 2002-2003 fiscal year, FNP assistants reached out to 65,244 limited-resource individuals in 53 counties to help them to better utilize their food dollars and stamps and to provide a safe meal environment. These individuals were provided educational programs that focus on developing knowledge and skill related to nutrition and meal planning, food purchasing, preparation, and safety; and resource management.

Impact: FNP assistants made direct contact with 65,244 individuals through home and group visits. There was a 25.2% percent increase of participants who regularly stayed within a budget by planning menus and shopping skillfully; a 23.7% increase in participants who saved money on food purchases for the month rather than running out of food and/or money. There was a 33.7% increase of participants knowing how to use the Food Guide Pyramid to plan meals; a 36.6% increase in the number of participants that knew proper serving sizes; and an 18.5% increase in participants’ money management skills. Additionally, FNP assistants made indirect contact with 196,640 individuals through the use of informational brochures, newsletters, telephone calls, and recruitment efforts. Two program participants offered personal testimonies of applying the skills they learned. One reported, “I have learned to stay within my food budget

by planning meals ahead, reading unit pricing, using coupons, and purchasing less junk food. I now save \$20-\$30 a month on my grocery bill.” Another said, “We are eating more fruits and vegetables, eating the proper serving sizes, and cutting back on fried foods. We are eating 500% better than before the FNP lessons.”

Source of Funds: USDA State contract

Scope of Impact: State

### **Exploring the Food Pyramid with Professor Popcorn: Youth improve food selection and safety practices**

Description: *Exploring the Food Pyramid with Professor Popcorn (Professor Popcorn)* is a curriculum for youth in grades 1-6. Originally written in 1993, it was extensively rewritten in 2002. Major concepts included in the curriculum have been linked to Indiana’s health and science education standards. Topics include: the Food Guide Pyramid, including servings and serving sizes; the Dietary Guidelines for Americans; the *Fight Bac!* concepts of clean, separate, cook, and chill; and, finally, the importance of physical activity to health. Extension staff were trained both in person and via distance education in 2002 and began teaching following that training. In some counties, teachers have been trained by Extension staff and together teach the program. Credit was obtained from the Indiana Professional Standards Board for teachers.

Impact: Extension staff taught and provided evaluation data for the *Professor Popcorn* program in 30 Indiana counties. Eight counties taught the program to grades 1-2; 16 counties taught the program to grades 3-6; and six counties taught to grades 1-6. Five thousand eight hundred twenty-six (5,826) youth in 170 groups were taught the program; 3,669 youth in 101 groups in grades 3-6; and 2,157 youth in 69 groups in grades 1-2. Youth in grades 3-6 reported the following related to behavior change: 90% reported that they sometimes or almost always practiced one or more healthy food selection habits, an 8% improvement; 96% reported that they sometimes or almost always practiced one or more food safety habits, a 9% improvement; 96% reported that they sometimes or almost always practiced healthy physical activity habits, a 2% improvement. Youth in grades 3-6 reported the following related to knowledge: 95% reported knowledge of healthy food choices and food preparation, an increase of 2%; 92% reported knowledge of safe food handling, an increase of 21%; 98% reported knowledge of the relationship of physical activity to health, an increase of 2%. Youth in grades 1-2 reported the following related to knowledge: 96% reported knowledge of one or more nutrition, food choices, and/or food preparation facts, an increase of 12%; 90% reported knowledge of safe food handling. Lower increases in topic areas may be related to increased awareness of actual behavior.

Source of Funds: Smith-Lever

Scope of Impact: State

## Dealing with Diabetes

Description: The number of people with Type 2 diabetes has been steadily rising for over 25 years. This is due to an aging population and a large increase in overweight and obesity. As importantly, while Type 2 diabetes used to occur only in people over 40, it is now appearing more and more in teens and even preteens. Because diabetes cannot be cured, only controlled, the earlier a person gets diabetes, the longer they have to live with the restrictions it places on their life and the long-term health problems, including damage to the eyes, hands, feet, and heart. With good food choices and an active lifestyle, people can prevent diabetes from occurring or can delay the onset of complications. The cost to the healthcare system of treating the complications of diabetes and providing services for those keeping diabetes in control is in the tens of billions of dollars each year. And this will continue to rise unless something is done to change the eating and exercise habits of many Americans.

A program was created to educate the public on the concerns about diabetes. It focuses on what happens with diabetes, how to tell if you are diabetic, and what you can do to prevent the onset of diabetes or delay the complications.

Impact: The program was introduced in early 2003 and given nine times in eight counties (Adams, Dearborn, DeKalb, Hancock, Howard, Johnson, Switzerland, and Whitley) by four county Extension educators. A total of 198 people attended the programs and 161 completed the pre-/post-questionnaire. Of the 161, 61 did not have diabetes, 20 did not have diabetes but were cooking for someone who did, and 80 had diabetes. There was a statistically significant, although slight, gain in knowledge from the pre- to post-questionnaire, with participants getting 10 out of 14 points on the pre- and 11 out of 14 points on the post-questionnaire. On the “anticipated behavior change” questions, 85% of the participants listed at least one behavior they would change in order to help control or prevent diabetes. The percentage of people who responded to each behavior was: for those who did not have diabetes—52% (84) plan to “encourage more physical activity with the person who has diabetes”; 47% (76) plan to “prepare more low-fat meals that are higher in fruits and vegetables and whole grains”; 56% (90) plan to “encourage more regular medical doctor check-ups to monitor for signs of complications.” For those who had diabetes—58% plan to “become more physically active most days”; 49% plan to “increase the number of servings of fruits and vegetables and whole grains in my diet”; 55% plan to “focus more on getting my weight within range that is healthy for me”; 43% plan to “more carefully check my blood glucose level as often as my medical doctor or diabetes educator recommends”; 47% plan to “work harder on maintaining normal blood glucose”; 45% plan to “check myself more often and ask my medical doctor to check for signs of complications from diabetes.”

Source of Funds: Smith-Lever

Scope of Impact: State

## **Key Theme: Birth Weight**

### **Have a Healthy Baby: Healthy decisions make healthier babies**

Description: Low birth weight is the number-one contributor to infant mortality in Indiana, and preterm birth is the number-one contributor to the low birth weight rate. In Indiana, 7.6% of babies in 2001 were born at low birth weight. For mothers age 10-17, 9.7% of babies are born at low birth weight. Twelve and nine-tenths percent of African-American infants were born at low birth weight. Eleven percent of low birth weight babies are associated with maternal smoking. Unfortunately, 20% of Indiana mothers smoke during pregnancies. Low birth weight babies are 64% more likely to attend special-education classes than normal birth weight babies. Babies of low birth weight account for 10% of all health care cost for children, and lifetime medical costs for low birth weight babies are projected at least \$500,000 per case. More than 60% of private-sector preterm births and low birth weight cases are preventable.

Purdue University Extension staff developed a prenatal nutrition education program called *Have a Healthy Baby* for pregnant adolescents and adults. Trained, caring professionals have taught this research-based program throughout the state of Indiana in more than 239 middle schools, high schools, community agencies, and other sites. Also, 35 other states have purchased the curriculum. Video lessons, including DVD, video, and handouts were produced in 2003 for use in clinics and physicians' offices with a grant from March of Dimes. The topics include adequate weight gain and healthy nutritional choices; consequences of smoking, drinking, and drugs; importance of early and continuous prenatal care; infant feeding choices like breast-feeding and bottle-feeding; and the impact of mothers-to-be decisions on herself and her baby. Participants this year included nearly 900 pregnant adolescents and at-risk adults.

Impact: In 2002-03: 32 counties provided the program; 878 pregnant adolescents and at-risk adults were taught; data was obtained on 523 live births; 67% of smokers report decreased tobacco use; 50% achieved appropriate weight gain; 50% of participants initiated breast-feeding; decreased neonatal mortality—two deaths reported; decreased days of hospitalization with subsequent savings; decreased long-term care costs due to healthier babies; significant increase in both nutrition knowledge and improvement of intake of healthy foods. Since program initiation: over 12,350 pregnant adolescents and at-risk adults taught; fewer low birth weight infants; decreased neonatal mortality and decreased days of neonatal hospitalization; significant increase in both nutrition knowledge and improvement in intake of healthy foods; significant increase in WIC participation after birth. Participant comments about changes made: “I changed my mind about breast-feeding and made a lot of good decisions”—16-year-old in eastern Indiana. “I heated luncheon meats, exercised by walking more”—14-year-old in southern Indiana. “I want to breast-feed my baby, stay in school, eat healthy foods so that my baby can be healthy”—15-year-old in northeast Indiana. “I’ve stopped smoking, started eating right, and drink plenty of fluids”—18-year-old in southern Indiana. “I drink more milk; still love to drink it!”—17-year-old in western Indiana. “I started eating more healthy. I stopped buying so many hot dogs and bologna, and started buying turkey and ham”—20-year-old in eastern Indiana. “I no

longer drink 32-oz. pops, I walk more to try to stay in shape, and I stopped smoking”—18-year-old in eastern Indiana.

Source of Funds: Smith-Lever, March of Dimes

Scope of Impact: State

## **Goal Four. Greater harmony between agriculture and the**

**environment.** Enhance the quality of the environment through better understanding of and building on agriculture and forestry's complex links with soil, water, air, and biotic resources.

### **Overview**

Purdue Extension provides education and outreach programs that allow the public to reach sound judgments regarding the use of natural resources. The quality of air, soil, and water resources is critical to the overall well being of the entire ecosystem of the state. Farmers, homeowners, public officials, and all citizens need to be aware that many of their decisions and activities affect the quality of the environment and the natural resources they use. Purdue Extension provides education and outreach programs that allow the public to reach sound judgments regarding the use of natural resources. Purdue Extension is developing and delivering educational information that provides all Indiana citizens the opportunity to analyze and adopt useful emerging technologies, which will maintain family farms, protect the waters of the state, and provide an acceptable wildlife habitat for future generations. A large part of Purdue Extension's efforts is to make farmers and the general public aware of the issues and consequences, from lack of action, to the land and the environment. During FY 2003, Purdue Extension devoted to environmental stewardship issues 4,468 contact days and made 117,345 direct contacts.

Purdue Extension County Educators have worked with county officials to address land use issues when planning the growth and development of Indiana counties. These efforts not only involve training county officials in planning and zoning for residential and industrial growth, but also involved training them on how this growth impacts the natural resources of the area and region. Planning with POWER (Protecting Our Water and Environmental Resources) is a program that introduces county officials to the need for protecting critical natural resources from encroachment by development pressures, and teams the planning and zoning officials with conservation agencies that provide technical support on natural resource planning and strategies to protect these resources from being destroyed by development of the lands. In FY 2003, Purdue Extension spent 1,122 contact days on Land Use issues, making 18,413 direct contacts.

While manure management and soil erosion, with their related water quality issues, are of primary concern to the agriculture and forest producers, residential waste and water pollution are the issues that most affect the non-farming population of Indiana. Purdue Extension has focused its research and educational outreach resources to address the issues that affect both the farming and non-farming citizens of Indiana. The outcomes of these efforts have resulted in an increased awareness of these environmental issues, and through a combination of extension and research, significant progress is being made with educational programs.

Purdue Extension is in the forefront of environmental educational needs to address the issues facing the agricultural community of the state. While we have initiated several new programs and experienced some short-term impacts of knowledge gained and human behavioral change, we have also accomplished some long-term goals and are noticing medium and long-term

impacts of implementing new environmentally sound practices that will lead to a cleaner environment. Several examples of the results of these efforts are given below in the key themes section.

### **Resources**

Approximately \$ 1,556,958.80 and 19 FTEs have been invested in Goal 4. This is a best estimate and these are not presented as auditable numbers

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

### **Laying It On Too Thick 2003: Maximizing the value of applied manure through use of pre-sidedress soil nitrate tests (PSNT)**

Despite tremendous advances in agricultural production, a significant number of producers still do not take into consideration the contribution of manure and organic matter residues to the overall fertility in crop production. A significant obstacle to optimizing nitrogen is the variable breakdown of manure and other residue in soil over time. The best way to optimize nitrogen levels at critical periods in corn growth and development is through soil testing at those periods. An inexpensive and proven effective soil testing method is the pre-sidedress soil nitrate test (PSNT). Through a combination of a public meeting, newspaper and newsletter features, area producers have been informed about the benefits of the PSNT. Area producers have each been offered a free trial of the PSNT on all manured corn acreage. Extension personnel have monitored participants' corn fields and sampled the soil at the appropriate growth stage. Results were then conveyed to the producers for use in sidedress application decision-making.

**Impact:** Many producers still do not take into consideration the contribution of manure to the overall fertility in crop production. Through meetings, news articles and outreach, producers were able to try the PSNT for free. Through use of the PSNT, surface water loading of nitrates was reduced by 62 tons in 2003, and unnecessary fertilizer applied to area fields has been reduced by more than 62 tons of actual nitrogen. This translates to 221 tons of 28% UAN not applied. Participating area producers have saved over \$38,000 this season.

Source of Funds: Smith-Lever, State

Scope of Impact: State Specific

### **Implications of Manure Management Policies on Pork Producers**

New regulations may soon require farmers to spread manure at lower rates. Past regulations were based on the Nitrogen uptake of crops and new regulations will eventually require application at the phosphorus rate of crop uptake. For swine on most crops in the Midwest this would require about three times as much land for manure application. Some farms would not have sufficient land and others would face higher costs of manure disposal due to covering more acres. A mathematical model of a typical Indiana hog and crop farm was developed to analyze the

economic impacts of new regulations requiring a phosphorus application rate for manure. The model allows for alternative feeds that would reduce phosphorus excretion, hiring a custom manure hauler, and changing the mix of crops as methods to mitigate the cost of compliance.

Impact: Purdue research showed the degree to which farms will bear an economic burden, or must offset economic burdens that result from certain manure management requirements. The research demonstrated that the phosphorus regulation would not increase costs substantially for farms that have options to feed alternative feed and have sufficient land for application or a place to haul manure off the farm for no cost above that of the custom hauler. The estimated compliance cost for these farms was approximately 60 cents per pig space per year. For farms that are land constrained, the cost of compliance is prohibitive and would result in a shut down or partial shut down of production. The estimated compliance cost for these farms ranged from \$11 to \$22 per pig space per year.

Source of Funds: Smith-Lever, Hatch, State

Scope of Impact: Nationwide

### **Revision of ASAE Manure Characteristics Standard**

The ASAE standard for manure characteristics largely had been not updated since 1988. With dramatic changes in genetics and nutritional programs, an accurate reflection of up-to-date practices were needed for this standard, as this is a primary resource for regulatory and governmental cost-sharing programs. As part of this national effort, the Extension Specialist chaired the poultry section revisions.

Impact: An updated version of the ASAE D384.1 Manure characteristics standard will provide state and federal regulatory and governmental assistance agencies necessary information for cost-sharing programs (EQIP) and regulatory activities. A joint effort of individuals from the American Society of Agricultural Engineers (ASAE) and Federation of Animal Science Societies (FASS) updated the ASAE D384.1 Manure characteristics standard. This publication is the primary reference for environmental regulation for state, federal, and non-U.S. entities when determining nutrient excretion volumes, developing environmental impact models, and developing comprehensive nutrient management plans (CNMP).

Source of Funds: Smith-Lever, State

Scope of Impact: Nationwide

### **Key Theme: Forestry Resource Management**

#### **Indiana Coverts Project**

Forests are important to many wildlife species, but are also vital to Indiana's economy. In order to effectively manage our forests for wildlife, timber, and other natural resources we must engage non-industrial private landowners in the state which as a group own 76% of the

forestland in Indiana. However, research has shown that 9 out of 10 timber harvests on these properties are conducted without any long-term management goals in mind. We initiated the Indiana Coverts Project in 2001. Up to now, 80 forest landowners, educators, and other environmentally interested people have attended a training seminar. At each seminar, we teach them important wildlife and forest management concepts and practices, show them successful examples in the field, and give them the tools and knowledge to practice what they have learned on their own property and share that with others. We then ask participants to consult professionals and develop a forest management plan for their property and be willing to share what they have learned with others.

**Impact:** The Indiana Coverts Project is a long-term program that will continue to teach citizens of Indiana about our forests and the wildlife that depend upon them. A direct result of this program is improved management of our forest resources, which ultimately will add to Indiana's economy and improve the quality of life for all of its citizens.

Twenty nine (29) people, who owned 925 acres of forestland, attended the 2003 Coverts training seminar. Since 2001, eighty (80) participants have gone through the program and own, or manage, over 11,000 acres of forestland in the state. After attending the 2003 training seminar, 6 of 8 attendees who have not worked with a professional forester in the past indicated they would do so, 13 of 14 attendees who have not worked with a professional wildlife biologist in the past indicated they would do so, 79% agreed that Coverts has changed the way they view forest management, and 96% thought that the information they learned would help them manage wildlife on their property. Comments from some of the 2003 participants include: "...it was great to see what is actually happening with landowners rather than just reading and talking about case studies..." "[Coverts] has led me to the decision to purchase [more forestland] as soon as possible." "[Coverts was] the best seminar I have attended." In 2003, the Coverts Grants Program was started to increase the relationships between past Coverts participants and their local natural resources professionals. Money was made available to them for forestry/wildlife field days. Six grants were awarded in 2003 totaling \$4053.90.

Source of Funds: Smith-Lever, State

Scope of Impact: Nationwide

## **Key Theme: Hazardous Materials**

### **Hancock County Tox-Away Day**

Improper residential and agricultural chemical disposal leads to the contamination of the soil, water and air of a community. The Hancock County Tox Away Day, a chemical collection program, allows county residents to dispose of chemicals in an environmentally conscience manner. County residents are encouraged to participate since all chemical wastes generated by a household are technically exempt from the disposal requirements placed on commercial, educational and government entities. Participation in such events eliminates the threat of diverted chemical wastes causing chemical spills or fires while being transferred to a landfill or during the internment process. Each participant received a comprehensive chemical disposal and recycling

guide to supplement their experience at the event. This guide included contact information and technical guidance in the areas of: Landfill Operation, Composting, Mulching, Recycling, Chemical Disposal, Chemical Identification, Chemical Storage, Chemical Alternatives and Automotive Chemical Management. Hazardous materials collections, conducted by a certified contractor, ensure that chemicals do not contaminate the environment by their disposal.

Impact: The threat of air, soil and water contamination caused by improper chemical disposal by homeowners was greatly reduced. 555 households have access to environmental stewardship projects and local contacts in the areas of soil and water conservation, recycling and chemical disposal. As reported by the single day event vendor, 47,648 pounds of hazardous household waste and agricultural chemicals were collected from 555 households in the Hancock County area. The reported disposal weight is 150% greater than the weight calculated for the year 2002 event. Specific material diversion quantities include: 11,290 pounds of flammable liquids, 700 pounds of dried flammable liquids, 310 pounds of oil filters, 700 pounds of miscellaneous solids, 9,234 pounds of used oil, 500 pounds of antifreeze, 250 pounds of flammable aerosols, 295 pounds of poisonous aerosols, 4,620 pounds of pesticides, 47 pounds of reactive, 124 pounds of mercury bearing light bulbs, 247 pounds of dry cell batteries, 800 pounds of PCB bearing ballasts, 45 pounds of elemental mercury, 5,400 pounds of lead acid batteries, 1656 pounds of compressed gas cylinders, 2,325 pounds of CFC bearing appliances, 5,260 pounds of lead bearing computer monitors and 6,425 pounds of scrap bearing appliances. Tox Away Day provides homeowners with an opportunity to remove toxic materials from their homes and ensure their proper disposal through a county wide chemical disposal event.

Source of Funds: Smith-Lever, State

Scope of Impact: Hancock County IN

### **Anhydrous Ammonia & Methamphetamine Emergencies Workshop**

Data reported in the National Household survey on Drug Abuse indicate that an estimated 9.6 million U.S. residents age 12 and older used methamphetamine at least once in their lifetime. In Henry County, there have been several Methamphetamine drug busts in recent years that gained a lot of media attention. Farmers occasionally get caught-up in this issue, as anhydrous ammonia (NH<sub>3</sub>), a common fertilizer, is a highly sought after ingredient necessary for methamphetamine production. Anhydrous tanks and storage facilities are routinely vandalized, posing a serious environmental and public health concern to many in rural communities. In 2003, the Henry County Extension Office hosted an Anhydrous Ammonia & Methamphetamine Emergencies workshop for farmers and local emergency personnel. Seventeen local fire personnel and farmers attended the 4-hour long program, and heard speakers discuss the physical properties of NH<sub>3</sub>, law enforcement concerns, legal and liability issues for farmers, and general safety and security measures. As part of the program, participants were able to examine a NH<sub>3</sub> tank that had been converted into a training unit.

Impact: When participants were surveyed, one-hundred percent indicated that they better understood the security issues surrounding NH<sub>3</sub> storage and methamphetamine labs, better

understood law enforcement concerns, and knew how to better secure their NH<sub>3</sub> tanks. In addition, eighty-six percent of respondents indicated they better understand the hazards of working with ammonia, and increased their knowledge of how to secure intentional releases of NH<sub>3</sub>. When asked to rate the different presentations (1 being poor and 5 being excellent), respondents rated the “Physical Properties” as a 4.6, “Law Enforcement concerns” as a 4.4, “Liability & Legal Issues” as a 4.4, and “Safety and Security” as a 4.3. Overall, the workshop received a 4.4 rating.

Source of Funds: Smith-Lever, State  
Scope of Impact: State specific

## **Key Theme: Land Use**

### **Septic System Failures in Indiana**

The accounting practices of our local regulatory agencies regarding the septic system permitting records are inadequate. As a result many local health departments merely have a best guess at the number of septic system failures and what caused the failure. Purdue Extension Specialists compiled and analyzed the septic system permit records for two counties and geo-referenced their locations relative to soils information. Septic system performance was measured spatially and temporally.

Impact: The Specialists demonstrated the effectiveness of accurate accounting practices and the information that can be gleaned from a spatial accounting system. They also quantified septic system repairs based on documented systems. Results indicated that septic system repair rates were less than 3% for two northern Indiana counties. It was documented that alternative mound septic systems lasted longer in problematic soils than conventional septic systems in non-problematic soils. This spatial information has been used by the Legislative Services Agency of the State of Indiana in estimating the economic impact of the promulgated rule 410 IAC 6-8.2 that regulates residential septic systems.

Source of Funds: Smith-Lever, Hatch, State  
Scope of Impact: State Specific

### **Update of Ripley County’s Comprehensive Plan and Zoning Ordinances**

Ripley County’s Comprehensive Plan and Zoning Ordinances were 30 years old and needed to be updated to address current development pressures. The Extension Educator facilitated the development of a steering committee to gain support and move the project forward. The Educator co-chaired the steering committee responsible for hiring and oversight of the consultant; represented the steering committee at public input meetings; wrote the two grants that helped fund the project; reviewed all drafts of the plan; and conducted town board meetings for planning map input.

Impact: Ripley County's Planning and Zoning Ordinances were updated with help from Purdue Extension. The project increased the knowledge and understanding of local plan commission members, officials, and county leaders about potential problems of operating with outdated comprehensive plan and ordinances. Plan commission members, local officials and county leaders also gained an understanding of the importance of their involvement in land use planning on the future development of the county. The project was funded by grants for \$100,000 from Ripley County Community Foundation and \$50,000 from Rising Sun Foundation written by the Extension Educator. The county council provided an additional \$25,000, for a total project funding of \$175,000. A technical plat review committee was formed to streamline area plan commission meetings. New ordinances, subdivision controls, and new enforcement procedures for violations were adopted, and a comprehensive plan was adopted in 2002. Zoning and Subdivision Control Ordinances are in final drafts.

Source of Funds: Smith-Lever, State  
Scope of Impact: Ripley County IN

### **Denver Siekman Environmental Park in Ohio County**

Ohio County has a deficit in recreational green space. With 67 acres of donated land we have developed 3 trails (5K, 4K, and 3K, wetlands, classroom facilities and a parking lot. The 116 Denver Siekman Environmental Park volunteers are working toward providing additional outdoor educational and recreational facilities for the residents of Ohio and surrounding counties. The Environmental Park has increased available outdoor educational and recreational space in Ohio County. As a direct result of Extension's commitment to not only expanding recreational space but also creating quality enhancements to that space, the Environmental Park will provide a unique hands-on learning environment to teach conservation, natural science and other academic areas. The project is geared toward providing a location for existing youth and community groups and the school system to implement their own projects. Teachers will be encouraged through various workshops, seminars, etc. to develop lesson plans that include regular on-site visits to the facilities we hope to develop at the park.

Impact: Boys Scout and Girl Scouts are constructing bird houses, planting trees and identifying flora and fauna, all parts of the Boy Scout educational curricula. They will have further access to other opportunities for outdoor skills as the park continues to expand. Three trails have been completed for general use as a hiking trail, bird watching trail and a trail for the local cross-country track team. Artists are using vantages from around the park that overlooks the Ohio River Valley. Senior citizens are using the park for walking, fishing, etc. The development and usage of this environmental park will create a strong identification with Extension Services in many facets: education, research, teaching, recreation, community development and youth development. Through many contacts within the community, the Extension Educator brought together 116 volunteers who formed 12 standing committees to pursue the best interests of Extension and the community. Each member, through committees formed of like-minded individuals, have their own interests and concerns and have agreed to act in unity to see that the park will serve multiple recreational and educational purposes. To date, the Educator has written

and received six grants to 1) restore an existing structure, 2) construct a classroom facility in an existing structure, 3) purchase maintenance equipment, 4) purchase educational classroom resource materials, 5) develop wetlands area, and 6) develop trails. Utilizing Purdue University resources, the committee has not only written a master plan for the facility but a blueprint for its future use. The result has been an increase of recreational space in the county by over 110%.

Source of Funds: Smith-Lever, State  
Scope of Impact: Southeast IN

## **Key Theme: Natural Resources Management**

### **Henry County Pond Clinic**

More homeowners are constructing ponds for recreational use, or purchasing property that contains an existing pond. The owners of these ponds usually have dreams of fun-filled days spent fishing or swimming in their pond, but the reality often turns out to be a nightmare of weed-choked water and fish populations that consist primarily of two-inch bluegill. Many pond owners attempt to manage their ponds using ill-advised techniques, and often end up wasting money and time on improper or unnecessary chemicals. Many also stock their ponds with the wrong kind or wrong-sized fish. The result of all of this is that each year, local Extension offices are swamped with calls from frustrated pond owners looking for help with their ponds. In June 2003, the Henry County Extension Office conducted a pond clinic for area pond owners and others who were thinking about building a pond. A Purdue aquatic plant specialist began the program with a presentation on weed identification and management, during which participants were able to have samples of weeds from their ponds identified, and control options discussed. Pond construction considerations were addressed by a staff member from the local Natural Resources Conservation Service office. An assistant fisheries biologist with the Indiana Department of Natural Resources finished the evening by discussing pond stocking and management, then taking the electro-shocking boat into the pond and demonstrating fish sampling techniques.

Impact: Henry County sponsored a pond clinic for local pond owners. Sixty percent of those attending indicated they planned to change the way they managed their pond as a result of the program. All attending said they would enjoy their pond more after attending the pond clinic. Twenty-two participants from Henry and surrounding counties attended the pond clinic. One hundred percent of respondents to a clinic evaluation indicated they learned how to identify and manage some weeds in their pond, learned how to improve the fish balance in their pond, and discovered some new resources available to help them manage their pond. In addition, 60 % of respondents indicated they planned to change the way they managed their pond as a result of the program, and 100 % responded they would enjoy their pond more after attending the pond clinic.

Source of Funds: Smith-Lever, State  
Scope of Impact: State Specific

## **Key Theme: Nutrient Management**

### **Improving Our Understanding and Interpretation of Soil K Test Results**

Without moldboard plowing, K becomes stratified in the root zone. Concentrations are greatest in the surface soil (top 2 to 4 inches), but this K may be relatively less plant-available, especially during dry periods, than it would be if it were deeper in the soil profile. To date, studies have not addressed whether this stratification requires a change in K management recommendations. Furthermore, current laboratory analyses index exchangeable K only and do not address fundamental differences in soil physiochemical properties are not well correlated among all major agronomic soils. A NaBPh<sub>4</sub> extraction has shown promise in greenhouse research for indexing K availability among soils but field correlation/calibration work has not been done. This project is using soil and crop data and archived samples (currently being analyzed) from a 6 yr, 5-location K-rate experiment established in 1997 at 5 regional Purdue Agriculture Centers. Field sites were established in 1997 at locations representative of different major agronomic soils of the humid region of the Eastern Corn belt. Treatments included crop species, rotational corn and soybean (both crops present each year), and K fertility level (rate and timing of application). Data from intensive soil and plant sampling regimes are being used to construct a K balance for six crop cycles (3 full rotations). Soil nutrient absorptive strength, soil buffering power, and soil quantity/intensity relationships are being evaluated with depth in the soil profile for their effect on plant-availability of K. Data are being analyzed for soil test critical levels needed in surface soils to attain optimal yields and grain quality.

**Impact:** Potassium fertilizer is a multi-billion dollar investment for US farmers and, in Indiana over 70% of the agricultural soils are inherently K deficient. The Soil testing remains the cornerstone of K fertility recommendations for production agriculture, but current laboratory analyses are not well correlated on all agronomic soils in Indiana. Furthermore, large within-field variability in soil K supply typically exists, and soil sampling strategies that accurately characterize this spatial variability can be a major investment. Accurate soil K test information and efficient collection strategies are essential to optimizing returns on fertilizer investment. This research is creating the database needed to improve K management recommendations for corn soybean rotations in the eastern Corn Belt and to optimize farmer investment in precision technologies, soil testing and K fertilizer. This research will permit the complete revision of the university K recommendations to include soil- and crop-specific interpretation of soil test results and guidance on how to manage K fertility to maximize yields in both low and high yielding environments. Project results will also provide a foundation for future research on fertilizer placement and genetic differences in plant K uptake and use.

Source of Funds: Smith-Lever, Hatch, State

Scope of Impact: Nationwide

## **Use of Aerator Non-beneficial to Tall Fescue Production**

The cool-season grass tall fescue occupies over 30 million acres in the United States. Most of the acreage is in the transitional zone between cool, temperate climates and subtropical climates. Southern Indiana is the north central region of the zone that is commonly referred to as the Tall Fescue Belt. Much of the forage acreage in this region is acidic and/or deficient in nutrients for satisfactory establishment and production of many forages. With perennial forage crops it is difficult to incorporate needed nutrients into the soil profile as fertilizers are typically surface-broadcast applied. Aerators, implements developed to improve soil physical properties, have not been evaluated in regards to incorporating surface-applied fertilizer deeper into the soil profile. Field research was conducted on tall fescue hay and pasture sites at the Southern Indiana Purdue Agricultural Center in 2001 and 2002. The objectives of the research were to determine if the Aerway aerator 1) incorporated broadcast-applied phosphorus (P) and potassium (K) fertilizers, 2) improved forage yield and/or 3) improved forage quality.

**Impact:** Investment in the Aerway aerator for the purpose of incorporating P and K fertilizers, and improvement in tall fescue forage yield and quality is not justified. Aeration did not improve soil nutrient distribution at deeper depths in the soil profile. Greater than 50 percent total soil P and total soil K remained in the upper 2 inches and 4 inches, respectively, in the 8-inch sampling zone. Aeration had no consistent positive effect on dry matter yield or forage quality. In most cases, aeration reduced yield.

Source of Funds: Smith-Lever, Hatch, State  
Scope of Impact: IN, IL, KY, MO, OH, TN

## **Key Theme: Pesticide Application**

### **Improving Agribusiness Drift Response**

A drift complaint was filed with the Indiana State Chemist against a Commercial applicator. After talking at length with the landowner receiving drift, it was clear the complaint might have been prevented with better employee supervision. Two educational programs were developed highlighting good and bad ways to handle a drift complaint as well as a number of ways farmers can effectively manage liability issues with regards to drift. A newspaper article and newsletter article were written on the subject.

**Impact:** Twelve participants reported needing to make changes in employee supervision, a topic presented in both of the programs. Between the two programs, 43% (72 participants) of all eligible private applicators and 39% (7 participants) of all Commercial applicators attended both programs. Seventy five participants completed evaluations at the conclusion of the programs. Twelve participants reported needing to make changes in employee supervision, a topic presented in both of the programs.

Source of Funds: Smith-Lever, State  
Scope of Impact: State Specific

## **Private Pesticide Applicators Updated on Change in Supervision Regulation**

A private pesticide applicator's permit allows a producer to purchase and apply restricted-use pesticides to land that they own or operate. It also allows a private applicator to supervise the use of a restricted-use pesticide by a non-certified applicator. The regulation regarding supervision was revised by the Office of the Indiana State Chemist (OISC) in 2002. The revised policy was enforced during the 2003 growing season. In addition to the certified applicator being on site with the non-certified applicator, the revised regulation states that other conditions be met. The certified supervisor must: examine the application site with the non-certified applicator prior to the pesticide application; remain within 30 miles of the application site; and be in continuous voice contact—by telephone, cell phone, 2-way radio or walkie-talkie with the non-certified applicator. Private applicators were informed of the revised supervision regulation at pesticide recertification programs. In order to maintain their certification, private applicators must attend three recertification programs within the five years of their permit. The supervision regulation was selected as the annual regulatory topic presented at all the recertification programs in 2003. Extension educators were given a PowerPoint program and fact sheet from which to inform private applicators of the revised regulation. The supervision regulation topic was presented at five recertification programs from January to July 2003 by the Extension Educator in Posey County. Following each program, private applicators voluntarily completed evaluations to measure their understanding of the supervision change and its implementation on their operation.

Impact: The Private Applicator Recertification Program (PARP) is helping private pesticide applicators become more aware of their responsibilities when applying or supervising restricted use pesticides. Of 136 private applicators completing the evaluation, 27 percent supervise non-certified applicators. More than 90 percent recognize the legal limits of their private applicator certification (purchase of restricted-use pesticides, supervision, not for-hire). After the training, 93 percent correctly identified the acceptable form of voice communication with non-certified applicators. Of the private applicators that supervise employees, 82 percent were meeting the requirements for direct supervision. From the 18 percent that needed to make a change to comply with the regulation, the most frequent change listed was that they, the certified private applicator, would handle the restricted-use pesticides. Private applicators noted their appreciation of utilizing the recertification programs to inform them of regulatory changes. A Vanderburgh County program participant wrote "Speakers were aware and prepared for teaching this course." Another private applicator from a Gibson County program wrote: "Good refresher to help us be conscientious applicators."

Source of Funds: Smith-Lever, State

Scope of Impact: State Specific

## **Key Theme: Recycling**

### **Agricultural Waste Recycling and Disposal**

Producers need assistance with recycling and proper disposal of empty pesticide containers, used farm oil, and obsolete or unused pesticides. Without viable alternatives for proper disposal, agricultural waste products represent a potential environmental problem. Dubois County Extension Service worked with the Dubois County Solid Waste District and the Indiana State Chemist to provide an "Ag Waste Recycling and Disposal Day." The program was offered at no charge to the participants. This event was publicized in local media and with direct contacts with local commercial applicators and 35 producers, commercial applicators, small businesses and private citizens participated in recycling and environmentally sound disposal.

Impact: More than 2500 gallons of used motor oil, 1200 empty pesticide containers and 10,055 pounds of packaged obsolete and unused pesticides were collected. The used motor oil was removed by an oil recycling firm. The empty containers were transported to a plastic recycling facility. The pesticides were turned over to a waste disposal firm. The local water supply was protected from potential contamination from oil and improperly handled pesticides.

Source of Funds: Smith-Lever, State

Scope of Impact: State Specific

## **Key Theme: Soil Erosion**

### **Strip Tillage: An increasingly acceptable alternative for corn producers**

Adoption of the no-till system for corn reached a peak of about 25% of the acreage in 1995, and has plateaued at about 20% in the period since. Corn farmer concerns for possible delayed planting and poor plant establishment due to the cooler and moister soils associated with no-tillage, relative to conventional tillage systems has been the main impediment to further adoption of no-till for corn. Even though farmers have widely accepted no-till for soybean (at about 60% of the acreage each year), the same conservation practice has not occurred for corn production. This has resulted in continued high costs and increased erosion potential. Purdue research and Extension efforts have widely promoted fall strip tillage as an acceptable compromise alternative between no-till and full-width conventional tillage systems.

Impact: Purdue research and Extension efforts on strip tillage are another essential part of the growing confidence in strip tillage as a new conservation planting system for corn in Indiana and surrounding states in the Corn Belt. Furthermore, the research efforts on multiple strip-tillage equipment depths and fertility placement are providing much needed support information on how to achieve best possible results with this relatively new system. Fall strip tillage is now the fastest growing tillage system (in terms of estimated percentage increase) in the last 3 to 5 years. It has been adopted by farmers on both end of the tillage spectrum; no-till farmers have

converted to it in place of continuous no-till, and conventional-till farmers have converted to it to save input costs and reduce soil erosion. Because the only tillage with strip tillage is in the intended row areas for corn (usually planted on 30" centers), strip tillage has combined the best of both tillage alternatives. It preserves from two-thirds to three-quarters of the surface residue cover of no-till, and it permits soil drying and warming in spring to be as fast as it is after fall conventional tillage operations. Thus more corn farmers are being reassured that planting dates need not be delayed (as it might be for no-till on poorly drained soils in some springs), and that early corn growth rates and final yields are comparable to those with conventional tillage. Furthermore, the soil savings with strip tillage preserves long-term productivity.

Source of Funds: Smith-Lever, Hatch, State  
Scope of Impact: North Central Region

## **Key Theme: Water Quality**

### **Lawns vs. Lakes - Striking a Balance**

The land area of Porter County lies across two major watersheds, the Calumet and Kankakee. The amount of housing and other urban development in these areas has led to increasing concerns over non-point pollution, particularly fertilizer and pesticide runoff from turf. Areas of Porter County are currently the focus of environmental studies by the Army Corps of Engineers, Indiana Department of Natural Resources, and several independent environmental groups. One pound of phosphorus fertilizer finding its way into a body of water can result in one-hundred pounds of algae growth, thus a ring of houses around a lake can result in serious impacts on water quality. The Extension Educator was asked to speak to the Lakes of the Four Seasons Lakes Conservancy Group about steps homeowners could take to help reduce impacts on lakes and streams in their areas. The "Lawns vs. Lakes" presentation outlines seven simple lawn management practices anyone can do to help reduce surface water contamination. Enthusiasm about this topic resulted in invitations to speak to a Valparaiso Chain of Lakes Watershed Group meeting and their annual Living with Lakes Seminar.

Impact: The educator presented a talk entitled "Laws vs. Lakes: Striking a Balance" to four audiences comprising 138 people. In the 38 follow-up conversations to date, the educator has advised homeowners on how to reduce the environmental impact. This presentation has been given four times, covered in four newspaper feature articles, and continues to generate interest. The educator has worked one-on-one with clients to develop personalized management practices for their situations. While the goal was to reduce pollution by modifying lawn care practices, these recommendations usually saved clients money by eliminating unnecessary applications of chemicals, improving mowing practices, and encouraging the use of low maintenance plants. The follow-up conversations resulted in about 80% of the homeowners changing management practices. As a result, fertilizer applications were reduced by as much as 100 pounds per year with cost savings of from \$100-200 per client per year. Additionally, the Valparaiso Chain of

Lakes Watershed Group has adapted parts of the educator's materials for their own promotional and educational materials furthering the reach and impact of these presentations.

Source of Funds: Smith-Lever, State

Scope of Impact: State Specific

### **Reducing Nitrate Leaching into Subsurface Tile Drains**

Subsurface tile drainage is a common water management practice in much of Indiana and the Midwest. Although subsurface drainage has many benefits (greater infiltration, lower surface runoff, improved crop growth and yield), it also may increase nitrate-N losses through the root-zone and out to surface waters. An appropriate balance between increasing drainage intensity (narrower spacing) to improve drainage and decreasing drainage intensity to reduce nitrate-N losses needs to be found for different climatic and soil regions. Purdue researchers have measured nitrate leaching into tile drains of three different spacing (drainage intensities) at a long-term research site in southeastern Indiana. Over the 16-yr period management practices have sequentially changed in order to try to reduce nitrate leaching from the root-zone. Nitrate concentrations (ppm) and total losses (lbs/acre) in the tile drain have decreased significantly as a result of reducing fertilizer N rates and including a winter cover crop after corn, to “trap” some of the soil nitrogen in late fall through early spring, when much of the water drainage occurs.

Impact: A 16-yr experiment on nitrate leaching into tile drains found a significant reduction in nitrate leaching from a combination of lower fertilizer N rates and winter cover crops. Results show that at least on the low organic matter, silt loam soils similar to the Clermont silt loam, concentrations of nitrate-N in tile drainage can be reduced to below the drinking water standard of 10 ppm, by a combination of lower fertilizer N rates and a winter cover crop after corn in a corn-soybean rotation. From this experiment we cannot distinguish how much of the benefit comes from the cover crop vs. the lower fertilizer rate. The results are promising for concerns about nitrate contributions to surface waters in the Mississippi River basin and their potential impact on hypoxia in the Gulf of Mexico. It is important to note, however, that these results may not be achievable on the higher organic matter soils (“prairie soils”) of much of the Midwest, due to higher natural release of N from soil organic matter and the limited time for cover crop growth in the colder regions of the Midwest.

Source of Funds: Smith-Lever, Hatch, State

Scope of Impact: North Central Region

### **Adopt- A-River Streambank Cleanup Program**

Litter and other materials classified as solid waste are finding their way into Indiana’s streams and rivers by the ton. Visual pollution is a problem to which far too many people relate and which often leads to a poor community image of a body of water. This negative perception often leads to further abuse of a resource, which could possibly lead to more serious forms of pollution. The Adopt-A-River Program was coordinated as a statewide stream bank clean up

program. Adopt-A-River allows volunteer groups of two or more people adopt and clean up at least a ½ mile segment of river or stream. Groups accepted into the program agree to hold cleanups at least twice per year (with at least four months between each) for at least two years. Cleanups involve removing litter from the stream banks and bed if possible. Active groups are recognized for their efforts through the installation of a large, colorful Adopt-A-River DNR sign and a nameplate sign erected along a highway nearest the "adopted" site. Volunteers were required to submit clean up reports after each clean up event quantifying the number of participants and the nature and amount of debris collected.

Impact: Since the Adopt-A-River Program's inception in 1998, approximately 4,166 participants from 65 Adopt-A-River groups have removed 256,450 pounds of debris from 135 miles of Indiana's streams and rivers!

Source of Funds: Smith-Lever, State

Scope of Impact: State Specific

## **Key Theme: Wildlife Management**

### **Illinois-Indiana Sea Grant College Program –Aquatic Nuisance Species (ANS) Programming**

Over 160 ANS have been introduced in the Great Lakes region. Once introduced, these species can spread and have a devastating impact on our lakes and rivers, and on the native fish and wildlife that inhabit them. They are costly not only to our environment but also to our economy. The sea lamprey and zebra mussels continue to cause ecological damage including reducing food availability for native mussel and fish populations. Control costs associated with zebra mussels in the Great Lakes Basin are estimated at \$250 million. The introduction and spread of ANS can occur through a variety of pathways and vectors including recreational water users, backyard water gardeners, aquarium hobbyists, the baitfish industry and commercial shippers. Illinois-Indiana Sea Grant is working to close this conduit of ANS dispersal. We are engaged in preventing the introduction of new species and limiting the spread of those already established by changing the behavior of people involved in each pathway of spread. From 1997 through 2003, 15 research projects were funded within the biological resources thematic area. Objectives for research supported by the program include: determining the present and future effect of infestations of exotic species on the food chain and biodiversity, identify likely new invading species, develop protocols for prevention of new invasions and spread of existing ones, and search for likely control mechanisms.

Boat-landing signs have been posted for recreational water users at Lake Michigan access sites, which remind boaters to clean their equipment to avoid carrying unwanted exotic hitchhikers inland. We have conducted workshops, developed a CD-ROM, produced a fact sheet and have written newsletter articles specifically for lake associations. Indiana also mentioned ANS in the Spring issue of the Fishing and Hunting guide. Interactive displays for use at conferences (e.g., Indiana Lake Management Society) and outdoor shows (e.g., Chicagoland Outdoors Show) have been created and used to reach a large number of recreational water users. A new Web site is

being developed to make curricular activities accessible to larger numbers of educators and students in a highly interactive format. The site, “Nab the Aquatic Invader! Be a Sea Grant Super Sleuth,” resides on the Sea Grant Nonindigenous Species (SGNIS) Web site. It uses a detective theme to engage youth in grades 4-10 as they explore biology, spread, impacts, and control of numerous aquatic invaders in U.S. waterbodies. Also, researchers and other users can conduct a literature search on this Web site or they can download entire documents or products on demand. This moves the transfer of scientific knowledge one step further and Sea Grant can be proud to be a leader in this trend.

**Impact:** As a result of the testimony for the City of Chicago City Council, snakehead fish and sales of live Asian carp were banned within the City of Chicago. At the state level in Illinois, an emergency administrative rule was passed prohibiting possession of all snakehead fish within the state. This legislation is the first step in the state’s ability to develop an easily amended, prohibited species list. Extension also helped developed a ballast water brochure for the Great Lakes shipping community, which is being distributed to each ship captain entering an Illinois port. In 2000, we surveyed anglers fishing the Illinois waters of Lake Michigan on their attitudes regarding ANS. Sixty-nine percent of those anglers took at least some sort of action. As part of an Illinois DNR Lake Michigan creel survey, we asked the same question in 2003. That survey revealed that 84% now take action specifically to prevent the spread of ANS—a 15% increase. An electrical dispersal barrier has been installed in the Chicago waterways, and a second barrier is slated for installation early in 2004. Public support for the barrier has been crucial in securing long-term funding and ensuring against human-assisted transfer of species across the barrier. A rapid response plan for Asian carp in the Chicago Waterways was developed by a Task Force of federal, state and local agency representatives including Illinois-Indiana Sea Grant. This plan was adopted by the state after public hearings we co-organized allayed public fears and opposition to the plan. A rapid response plan relies on timely sightings of an invader; timely sightings of Asian carp in the Chicago waterways, in part, are advanced by our outreach products and web-based sighting reporting system. Over 4,200 students in Illinois, Indiana, Wisconsin, New York, Louisiana, and Washington developed an environmental stewardship ethic based on their study of exotic species. Fifteen community stewardship projects created by participating students have linked these young people to members of their communities by providing innovative delivery methods for sharing information about why invasive species have become a serious problem and on what steps people can take to reduce further impacts created by these species. Projects ranged from creating T shirts and booklets with educational messages distributed at local businesses, to posters displayed at city hall, to personal distribution of information to bass tournament fisherman. The SGNIS web site contains high-quality science and has been the web presence for the National Sea Grant College Program on non-indigenous issues since 1996. Information on over 25 species, including zebra mussel and round goby, can be searched for as well as a range of related topics. Over 139,000 unique visitors from over 125 countries regularly access SGNIS (averaging 56,822 visits monthly) resulting in 3,060,000 hits in 2002-2003.

Source of Funding: Smith-Lever, Sea Grant, State

Scope of Impact: IN, IL

## **White-tailed Deer in Indiana State Parks**

White-tailed deer were protected within Indiana State Parks until 1993 when the first reduction was completed in Brown County State Park. Deer were causing damage to their habitat within parks and to cropland surrounding the parks. Deer-car accidents were also common on roads adjacent to parks. George Parker, Professor of Forest Ecology, was instrumental in development of a deer reduction program within state parks through research to examine deer impact on their habitat, written reports and public hearings.

**Impact:** Deer had increased within state parks to excessive numbers by 1990 and were causing damage to habitat and to properties outside parks. A research program was initiated to provide data on damage to park habitat in 1994. This research, along with written reports and public hearings, has resulted in a deer control program and a long-term policy to maintain deer number at a sustainable level within parks. This will also lead to a reduction in damage to surrounding properties by deer. Eighteen state parks have had one or more deer reductions since 1993. Five parks, with several years of deer reduction, now have deer populations at a level of maintenance where habitats can recover. This has resulted in reduced damage to crops and reduced car accidents outside the parks. The Department of Natural Resources adopted Parker's recommended policy for the long-term maintenance of deer numbers within parks in 2003. This policy will result in the long-term maintenance of deer populations that are sustainable.

**Source of Funding:** Smith-Lever, Hatch, State

**Scope of Impact:** State Specific

**Goal Five. Enhanced economic opportunity and quality of life for Americans.** Empower people and communities, through research-based information and education, to address economic and social challenges facing our youth, families and communities.

## **Overview**

### Youth Development

Purdue University, through its 4-H Youth Development Program, reached 303,875 youth throughout Indiana during FY03. We continue to focus on new audience development to reach youth beyond the club program in order to meet youth needs and build youth competencies relevant to enabling them to become successful adults. Much of our success is due to the outreach being done county by county in collaboration with other organizations. Extension staff in Indiana has reported 10,483 days of activity, with 598,771 direct contacts addressing issues related to youth development.

Examples of the success of 4-H Youth programs will be provided in the Key Theme section of Goal 5 accomplishments. Briefly, our programming is delivered by three different methods, which are club programming, school enrichment programming and community programming (usually in collaboration with other community groups and organizations). School enrichment programs continue to be our fastest growing reporting category. In Marion County, 4,563 youth from each of the 11 public school corporations, private and parochial schools and home-schooling families participated in *4-H in the Classroom* during the 2002-2003 academic year. To enhance the acceptance of this effort, all 4-H curricula utilized in these programs have been aligned with the state-mandated teaching standards. The alignment of curriculum with teaching standards is now standard procedure in all new curriculum produced and adopted for use in the Indiana 4-H Program.

### Parenting

Families are at the very heart of the strength and competitiveness of our nation. Indiana county-based needs assessments conducted in 1998 strongly indicated that increasing parenting skills was the topic of highest priority for Extension programming. Purdue Extension continues to respond to this high priority. The Strong, Resilient Families Plan of Work group offers a diversity of programming to strengthen families through the learning and use of positive personal development and relationship skills and teaching parents to know and use positive parenting practices. Over 90,696 direct contacts have been made with programming focused to strengthen families in FY 2003. These contacts represent 2,252 contact days of programming effort. The *It's My Child Too* program continues to reach non-custodial fathers with critical information on parenting. The website developed to respond to events of 9/11/01 has been maintained and related materials have been launched to address children and how to communicate with them about terrorism, violence and war. As a group, grandparents raising their own grandchildren is a growing number of people in our country. Programming specifically for grandparents serving as the sole parents of grandchildren has been developed.

### Financial Management

Financial management programming in Indiana encompasses many different aspects of both personal and business financial management. Specialists and educators reached 19,587 individuals with financial management programming. These contacts represented 2,066 programming days. Of these 19,587 individual contacts made, 5,513 were youth. How important it is to teach youth important aspects of personal finance at an early age! Programming efforts in family resource development range from the *High School Financial Planning* program to help develop financial literacy in youth, to *Focus on Financial Management*, a Purdue University-developed program in five parts to encourage participants to establish financial practices to enhance financial security and reduce risk of financial problems. Continued use of the web-based educational tool *Planning for a Secure Retirement* has been high. The instructional effort combined the expertise of an Extension specialist and research/teaching faculty. A team of Purdue Extension staff who attended the national conference on Planning for a Secure Retirement are planning a statewide rollout of the programming effort for Indiana.

### Leadership, Community, and Workforce Development

Healthy communities, committed and effective local leaders, human capital development and strong local economies are integrally related. Extension contributes to these interrelated dynamics through a variety of programs. Leadership development programs range from those associated with youth and 4-H to signature adult programs such as i-LEaD and Leadership 20/20. Many of our leadership efforts go beyond focusing on the individual and include the broader community focus. Extension's Leadership Team has been an important organizing nexus for many of these programs. Communities, much like individuals and organizations, need to have a vision and plan for the future and Extension is often involved in helping to facilitate community-wide visioning and planning processes. Special attention has been placed on the community dynamics and challenges associated with the recent arrival of new residents from other countries and cultures. Often, the focus of community visioning and planning is on economic and business development. Extension is making a significant commitment to entrepreneurship, whether it be youth-based entrepreneurship or the work of the New Ventures Team which tends to focus on new types of agriculturally based business opportunities. An important community development activity has been supporting and nurturing community-based learning centers. While the educational programs offered through these learning centers are broad and varied, there has been considerable emphasis placed on workforce development needs and opportunities. Workforce development is a critical part of Indiana's overall economic development strategy and Extension—especially through its learning centers—is becoming much better positioned to meet workforce development needs.

### **Resources**

Approximately \$ 9,095,917.60 and 111 FTEs have been invested in Goal 5. This is a best estimate and these are not presented as auditable numbers.

## **Key Theme: Character/ Ethics Education**

Description: The 2002 Report Card on the Ethics of American Youth (Josephson Institute of Ethics) reports a survey of 12,000 high school students found that from 1992 to 2002: The number of high school students who admit that they cheated on an exam in the past year increased from 61% to 74%. The number of high school students who admit that they stole something from a store in the past 12 months increased from 33% to 38%. The number of high school students who admit stealing from a parent or relative increased from 24% to 28%. The number of high school students who admit lying to their parents in the past year increased from 83% to 93%. The number of high school students who admit lying to a teacher in the past year increased from 69% to 83%.

Character education is at the core of the 4-H Youth Development Program. Several counties have identified the issue as a priority with coalitions involving other organizations such as Boys & Girls Clubs, Girls Inc., YMCA, and local school corporations. Lesson plans have been developed to assist 4-H volunteers or classroom teachers with instructions, activity ideas and rewards systems to teach the 6 pillars of character.

Impact: In Johnson County, when asked to rate their 4-H club members following instruction on the 6 pillars, 55% of 4-H leaders said that their club members frequently exhibit the character traits at club meetings; 47% of leaders frequently saw a difference in members' behavior at club meetings and another 29% saw a difference at least half of the time; 50% of the leaders frequently saw a greater respect for each other at club meetings; and 53% frequently saw examples of integrity by club members; 47% of leaders frequently saw more member participation at club meetings; and 41% of leaders frequently saw a greater level of initiative at their meetings. In Carroll County, the teachers and administrators were surveyed at the end of 6 months to evaluate the effectiveness of the program. Their response was: 100 percent felt the students were more respectful of school property; 94 percent felt students offered to help other students; 83 percent felt the students had better manners; 77 percent felt the students were more responsible and remembered their homework; 77 percent felt the students were more likely to consider the consequences of their actions. 72 percent felt the students argued and fought less; 72 percent felt the students cooperated better with each other on the playground; and 72 percent said that students were more willing to admit their mistakes.

Source of Funds: Smith-Lever, local school corporations

Scope of Impact: Carroll, Clark, Johnson, Ripley

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

### **Project LEAD: Legal Education to Arrest Delinquency**

Description: Many Indiana counties participate in the 4-H *Project LEAD* program in school settings in order to help students develop an understanding of the legal systems and to develop

skills that help them communicate, handle conflict and make sound decisions so that they can avoid situations that may lead to undesirable behavior. Sessions are conducted in fifth-grade classrooms in partnerships with schools. This prevention program teaches about laws, law enforcement, the judicial system, decision-making, and consequences of actions. Many local professionals and elected officials volunteer their time to teach different portions of the program and host tours of the county facilities, including courtrooms and jails.

Impact: 2,575 participant evaluations using the Scale of Juvenile Legal Attitudes (pre-post-test) show that after the program, youth have a better attitude toward laws, law enforcement, the judicial system, and the idea that they must take personal responsibility to abide by laws and report unlawful acts. Additionally, teachers in the classroom report a positive change in attitude after completion.

Source of Funds: Smith Lever  
Scope of Impact: State specific

## **Key Theme: Community Development**

### **Hispanic/Latino Initiative**

Description: The Latino population is the fastest growing component of Indiana's population. Much of this increase is due to immigration from other countries, particularly Mexico. While many of our new residents locate in the larger cities, many smaller towns are also seeing an increase in the Latino population. Although our new residents enrich us with their culture and talents, challenges also emerge—both for the new and existing residents. Education and cultural understanding are critical elements in addressing both the challenges and opportunities, and Extension has much to offer in this regard. Extension has responded in a number of important ways:

- \*Extension is working to strengthen Hispanic community based organizations (CBOs) in Marion County.

- \*A Cultural Sensitivity Program has been created to bring knowledge and cultural experiences to communities and organizations throughout Indiana. The program consists of a presentation of facts about Latino immigration, and information on the cultural characteristics of immigrants, reasons for immigration, and the positive impacts immigrants have on the economy and culture.

- \*Extension has organized a statewide Hispanic/Latino Summit. The theme of the 2003 summit was *Building Leadership and Cultural Sensitivity*.

- \*Extension's community-based Learning Centers have taken the lead in offering conversational Spanish classes to local residents in Whitley, Jasper, Newton, Hendricks, Tipton, and Clinton counties.

Impact: \*Fiesta Indianapolis, Inc. is a CBO that has been established with technical and administrative support from the Marion County Extension office. This organization is now

building bridges between the Hispanic community and the overall community, has hired an Executive Director and is nearing financial self-sufficiency.

\*Nearly 150 people have participated in the Cultural Sensitivity Program. Evaluation data show participants are more likely to see new immigrants in a positive light and as an enrichment to the culture of their communities; and many participants made one or more of the following commitments: to become more caring and understanding of new immigrants, to learn Spanish, and to encourage their respective churches to increase their outreach efforts.

\*Over 250 people attended the 2003 Hispanic/Latino Summit. All of those returning evaluation forms indicated another Summit should be held in 2004. The summit provided a forum where Hispanic/Latino leaders made valuable contacts with community leaders and the financial community. As a result, Hispanic/Latino leaders said they better understand federal and local administrative services.

\*In Clinton County, 141 students have enrolled in either the beginning, intermediate or advanced conversational Spanish classes. This includes 26 health care professionals at two hospitals (St. Joseph and St. Vincent) whose customized training focused on medical terminology, intake information and inter-cultural differences and sensitivities that are important when working with the Latino population. Similarly, a customized training was put together for 10 employees of the local court system. All participants showed improvement and also said they felt more comfortable in interacting with Spanish speaking people. All of the 42 participants in Newton County rank their ability to understand spoken Spanish and their comfort-level around others who are speaking Spanish as much improved. A police officer in Newton County proudly recounted his ability to instruct a Hispanic woman in the proper installation of car seats at a car seat safety workshop. In Tipton County, 77 adults are now better able to communicate with the Spanish-speaking population in that county. In Hendricks County, 25 workers have improved their value to current employers because they can now do a better job in of serving the growing Hispanic population.

Source of Funds: Smith-Lever and local sponsors and partners

Scope of Impact: Statewide

## **Public Entrepreneurship**

Description: With local and state governments facing revenue shortfalls and fiscal stress, many community organizations, associations and groups have become increasingly reliant on grants to initiate new programs and help sustain existing programs. Purdue Extension specialists have developed a manual and training workshop on successful grant writing skills, including how to develop an idea into a fundable proposal and matching projects with potential funding sources. From 2001-2003, 85 participants throughout Indiana have completed the training program, and the demand for additional offerings of the program continue to increase.

Impact: Participants have shown improved knowledge and skill development as measured by submitted project proposals and a pre/post evaluation assessing basic grant writing knowledge and basic skills. A follow-up survey of participants (with a 41% response rate) reports \$678,782 in funds awarded through funded grants. These grants have been put to a variety of uses,

including developing a youth fitness and nutrition program and purchasing bulletproof vests for a county sheriff's reserve personnel.

Source of Funds: Smith-Lever

Scope of Impact: Statewide

### **White County's Vision for the 21<sup>st</sup> Century**

Description: Like many rural counties, White County had important decisions to make about its future. Manufacturing firms were leaving the county, and the rising unemployment and losses to the tax base were affecting the school system. In addition, the county had a growing Hispanic population. Added to that mix were the opportunities posed by 1.2 million tourists annually. County leadership needed help deciding where to invest effort and tax dollars to solve county problems, meet county challenges, and take advantage of county opportunities.

White County leadership requested help from Extension. A campus specialist partnered with the White County's Extension Director to conduct a program titled *White County Strategic Plan: A Vision for the 21<sup>st</sup> Century*. Extension was responsible for developing the program, facilitating the process, providing technical and educational resources, and coordinating the meetings. The program brought together approximately 130 individuals representing all towns, most organizations, local businesses, and most major sectors of the community to develop a consensus on priority issues and a vision for the future. Nine high priority issues were identified and task forces were appointed to address each issue. A fund-raising workshop was held to teach each task force about grant writing.

Impact:

- \*The White County Commissioners invested \$15,000 to support development of the strategic plan.

- \*A \$7,500 grant was recently received more recently to help fund a part-time coordinator to continue the implementation process.

- \*A \$23,500 grant was received to initiate a Farmer's market that now generates weekly sales of \$1,000.

- \*The Education Task Force received a \$5,350 grant for developmental screening with day care providers. In conjunction with another task force and Step Ahead, a \$26,300 grant was received to develop curricula for childcare providers that affect 267 children.

- \*The Cultural Diversity Task Force meets monthly and has developed a Spanish version of a community resource manual. English classes for new immigrants are also being offered.

- \*The Economic Development Task Force conducted a survey to identify the specific needs of different industries, and also researched a Venture Capital Club and loan program to replace lost industries. This Task Force is also working with the Infrastructure Task Force on the expansion of a major road system.

- \*The Tourism Task Force collaborated with an adjacent county on a fall tourism activity and works to foster year-around tourism.

\*The Government and Small Towns Task Force is working on a common internet provider to coordinate county-level communication among the various towns and between the towns and county.

\*The Social Services and Health Care Task Force formed a respite service called “Helping Hands” and is currently working with the Education Task Force on a grant for other needed programs.

Source of Funds: Smith-Lever and local sponsors and partners

Scope of Impact: White County

## **Youth Entrepreneurship**

Description: Communities that are concerned about their economic future are moving away from the strategy of “recruiting” existing businesses to relocate from other communities to a strategy of “growing” new businesses locally. Communities need to create what Flora and Flora (*Rural Communities: Legacy and Change*, Westview Press, Boulder, Colorado, 2004.) refer to as a culture of ESI (entrepreneurial social infrastructure). Youth entrepreneurship is an important ingredient in ESI, but our historical underpinning of formal education has emphasized career development in which the only option is working *for someone else*. There is a need to move away from this monolith approach and develop programs and opportunities that can support and nurture the entrepreneurial spirit that exists in many of our youth.

In 2002, a Purdue Extension Specialist, in partnership with the Indiana Council for Economic Education, received a grant from the Ewing Marion Kauffman Foundation to bring the Mini Society program to Indiana. This Program is a national program designed to teach economics and entrepreneurship to youth. Students form a government system, conduct market analysis identifying the supply and demand for products and services, and over a five-week period build and maintain a mini society in the classroom. First year implementation focused on four counties. Facilitators collaborated with teachers and after-school directors to deliver 30-35 hours of Mini Society programming to more than 200 youth. A second year of funding has provided additional resources to enhance program delivery.

Impact: Pre/post program evaluation show improved post-evaluation test scores measuring knowledge and skill development in the areas of economics, government systems, and entrepreneurship. Additionally, youth successfully formed their own government and subsequently started businesses, either on their own or with one or more partners, based on the needs of their society.

Source of Funds: Smith-Lever, Indiana Council for Economic Education, and the Ewing Marion Kauffman Foundation

Scope of Impact: Adams, Bartholomew, Decatur and Porter counties

## **Key Theme: Family Resource Management**

### **Take the Road to Financial Security**

Description: Most people say they want to be financially secure in later life, yet research indicates that many are not preparing for their later life stage. Financial security rarely occurs without planning, yet many people are not aware of normal later life events or the steps involved in planning for later life. Many people are not aware of the steps they can take now to prepare for their later life.

Purdue Extension developed a program called *Take the Road to Financial Security in Later Life* to address the financial management gap in a growing aging population. The purposes of this curriculum are to increase knowledge of issues regarding later life financial security and to help consumers assess their preparedness for later life financial security and create a plan of action to meet their personal needs and goals. This curriculum introduces three critical mileposts on the road to later life financial security: Plan—for normal later life events; Act—do it now; and Evaluate—as changes are needed. The program has been presented in Indiana for a variety of audiences.

Impact: End-of-session evaluations completed by 117 participants showed that 83% identified specific action steps they could take to protect their later life financial security as a result of the program. Eighty-eight percent said the information on normal later life events would help them develop plans for their future. Follow-up evaluations completed by 44 participants showed that 75% knew where to find information to help them make decisions about later life as a result of the program. Seventy percent shared information about the program with other people. Almost all participants listed specific action they took as a result of the program. Fifty-seven percent said they organized financial records; 57% said they estimated their life expectancy; 61% reviewed their Social Security statements; 55% reviewed their savings and investment plans; 48% identified later life financial goals; 48% reviewed insurance coverage and property ownership. One participant said, “The program helped me finally tackle an issue bothering me for some time, but I did not know how to get started.” Another participant said, “I did convince my husband that our will needed to be updated, and it was less expensive than we thought.”

Source of Funds: Smith-Lever

Scope of Impact: State

### **Description: Professional Development for Service Providers**

Employees of social service agencies across Indiana seek professional development opportunities to develop necessary skills to assist their clients in making sound financial decisions.

At the request of the Indiana Commission for Women, Purdue Extension conducted financial planning seminars for service providers in 2002 and 2003. Topics covered during the seminars included: understanding individuals’ money personalities, making spending choices, systems that make our money work, the wise use of credit, and resources for managing cash. Future seminars are in the planning stages.

Impact: End-of-meeting evaluations (IRB # 02-735E) indicated that the majority of participants planned to use at least one idea gained from the workshops. Further, participants' expectations for attend the workshop were met. Follow-up evaluations were mailed two months after the 2002 workshop. Seven out of 13 follow-up evaluations were returned (response rate = 54%). All of the respondents indicated that they had used at least one idea from the workshop when working with clients. Each respondent also indicated that when working with clients they had done at least one thing differently as a result of attending the workshop. Examples of what had been done differently include: working with clients to plan for their spending despite having limited incomes, working with clients as they manage their consumer debt to help them focus on needs rather than wants, and being more understanding of the time it will take most clients to become self-sufficient. Follow-up evaluations of the 2003 seminar will be sent in early 2004.

Source of Funds: Smith-Lever  
Scope of Impact: State

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

### **Adult Leadership Development**

Description: Healthy organizations and communities require effective leaders. Purdue Extension has a long history of creating and providing educational programs and leadership development opportunities for Indiana residents. Examples include such signature programs as Leadership 20/20 and i-LEAD (Indiana Leadership Education and Development). Additionally, during 2003 a new effort was launched: The Natural Resources Leadership Development Institute. This program is targeted to those working in the natural resource and environmental areas. Location specific *examples* of Extension's leadership development programs follow:

\*Communities and organizations in rural LaGrange and Steuben counties were experiencing difficulty in finding skilled and willing leaders to fill leadership roles. Extension Educators offered the i-LEaD program, using experiential learning activities to supplement training from campus via distance education. Similar efforts, using i-LEaD as the core curriculum, were undertaken in several other counties. The use of satellite and IP Video (typically, nine, two-hour sessions) was especially helpful to emerging leaders who were unable to participate in previous daytime offerings.

\*Persons serving in leadership roles in agricultural organizations in Dubois County were having trouble finding replacements. Purdue Extension offered Leadership 20/20 which focused on leadership styles, communication, teamwork, conflict management, goal-setting, community power structures, and board and committee responsibilities. Fifteen participants completed the seven-session course.

\*A needs assessment in Warrick County identified leadership development as a priority need. Extension convened a planning committee of community leaders and Extension staff to launch Leadership Warrick County. Responsibilities of the committee are curriculum selection, program planning and promotion, and recruitment of participants. Fifteen participants completed the four sessions. Each session was eight hours in length and topics covered were team-building, Myers-Briggs personality assessment, communication, working with boards and

committees, consensus building, community visioning, and local power structure. A somewhat similar two-day session was offered in Jasper County.

**Impact:** Survey results (and other data sources) indicate these programs are having a positive impact. Examples of impact follow:

\*Statewide results of the i-LEaD program indicated 60 percent of the respondents are more likely to speak out on an issue, 53 percent said they were planning to chair a committee, and 40 percent planned to “join a community organization” or “take an office within an organization”. One participant said she could not speak in front of an audience before the program but is now a lay speaker at her church.

\*A quote from a LaGrange/Steuben County participant: “I have held public office for 15 years...I wish I had taken this program 15 years ago.”

\*Graduates of the Dubois program assumed the Presidencies of the Dubois County Pork Producers and the Dubois County Cattlemen.

\*All participants in the Warrick County program were motivated to become more involved in the community. One participant stated, “I learned more about leadership in the county, which inspired me to become more involved.”

\*Among the actions planned by Jasper County participants were joining a community organization, taking an office within an organization, chairing a committee, speaking out on issues, and running for political office.

**Source of Funds:** Smith-Lever, local sponsors and partners, and participant fees

**Scope of Impact:** Statewide

## **Teen Leadership Development**

**Description:** Purdue Extension’s history of delivering educational programs that help build healthy organizations and communities extends not only to adults, but also to youth audiences. A variety of Teen Leadership Academies have been planned by bringing together individuals from the local school corporations, youth serving agencies, service organizations and business leaders to develop and enhance leadership skills among local youth. The programs cover a variety of topics such as communication, public speaking, and listening skills; team building; personality styles and leadership; learning about city and county government; planning and organizational skills; board and group process; parliamentary procedure; consensus building; youth and adult perspectives and stereotypes; community visioning and philanthropy.

**Impact:** Teen participants exhibited and reported improved leadership skills in group activities. Additionally, the youth participants reported that they had gained confidence to speak out on issues of interest, gaining skills in communication and decision making, leadership knowledge and an increased ability to work with other people. Pre- post participation scores also indicated knowledge gains in regards to parliamentary procedure, group process and how boards function, community visioning and planning, personality and leadership styles, recognizing and understanding stereotypes, philanthropy, and trusteeship.

**Source of Funds:** Smith-Lever, local sponsors and partners, and participant fees

**Scope of Impact:** Statewide

## **Key Theme: Parenting**

### **Parenting Education for Moms—2003**

Description: For many parents, especially those in domestic violent situation, physical punishment or spanking is the only means known to them for disciplining their children. Research shows that a mother who has been hit by her husband is more likely to hit her child. Parents who were hit when they were teenagers are more likely to do the same thing to their children. The more a parent was hit as a teenager, the greater the chances that parent will physically abuse his or her own child. Corporal punishment does not produce a well-disciplined child but one that is aggressive, difficult to control, depressed, alienated, and lacks achievement.

Two Parenting Education Series were conducted at the YMCA for moms in the Domestic Violence and Drug Addition Programs. Forty-eight women participated in the six-week series. Topics covered included Parenting Styles, Physical Punishment, Setting Limits, Natural and Logical Consequences, Improving Listening Skills, and Dealing with Anger.

Impact: Prior to taking the series, nearly all of the parents participating believed physical punishment to be the most effective means of disciplining their children. They reported not knowing other techniques to use and did not understand the consequences to corporal punishment. As a result of participating in the classes, 97% reported increasing their knowledge of using other forms of discipline. Their largest knowledge gained was in the importance of cooling down before handling discipline situations with their child. They also reported understanding the negative effects of corporal punishment. One mom stated, “Instead of spanking her, I will take something she loves away from her for a while.” Another mom reported that she now knows to use distractions and redirecting activities.

Source of Funds: Smith-Lever

Scope of Impact: St. Joseph County

### **Grandparents Raising Grandchildren Support Group—2003**

Description: Increasing numbers of grandparents are raising their grandchildren both in the state of Indiana and Lawrence County. A special grandparents’ group which would meet to discuss the unique interests of grandparents raising grandchildren was needed in Lawrence County.

A panel of various professionals, as well as a grandparent currently raising a grandchild, presented a program in Lawrence County addressing the topic of grandparents raising grandchildren in the fall of 1998. As a result of this initial effort, the Lawrence County Grandparents Raising Grandchildren support group formed. Since that time, several educational programs as well as general discussions have been topics of the monthly meetings.

**Impact:** Group members have routinely given each other suggestions and shared stories for the past two years during regularly scheduled meetings. However, a new level of trust and caring among the participants has been evidenced during the past year. Members of the group have reported telephoning each other to get advice and support between meetings. One young grandmother, age 35, physically took an elderly grandmother, approximately 80 years old, to a county court, staying with her so that she could get information about a grandson who was in jail. The older woman had previously been intimidated about asking questions and wasn't quite sure where and how to get answers.

Source of Funds: Smith-Lever

Scope of Impact: Lawrence County, State

## **Key Theme: Workforce Preparation—Youth and Adults**

### **Community-Based Learning Centers**

**Description:** There is an increasing need for adult educational opportunities for (a) workers entering the job market (b) current workers who need to upgrade their skills (c) retired workers who need supplemental incomes and/or new skills to handle changing business transactions and communication systems. A significant portion of the workforce age population finds it very difficult to access the current educational system for a variety of reasons—despite the large number of higher education campuses in Indiana. In addition to distance and timing, many are apprehensive and unwilling to risk the possibility of failure. For many, their last experience with education was a long time ago and for some their last experience may not have been positive. Limited experience suggests that individuals are much more likely to try if the education is offered in an environment in which the adult feels comfortable. This means taking the education to their workplace or to some other location in their community where they are not intimidated by the institutional trappings of many higher educational settings. It also means finding a friendly and supportive environment where they feel someone cares and will provide the support they need to be successful. This is especially important to those special populations who already feel somewhat marginalized, such as newcomers and those living in small towns and rural areas. Finally, information technology is making it feasible to deliver education anywhere at any time, a just-in-time approach focused on the learner's needs.

In response to these needs and opportunities, Extension has provided local organizational and other types of support to the development of a number of “learning centers” in Indiana. In several cases, the center is formally associated with the local Extension office and an Extension employee serves as a center coordinator. Each center is organized and operates somewhat differently, reflecting variations in local needs and community context. Some of the programmatic offerings of the centers focus on personal enrichment, but workforce preparation and development are the drivers behind much of the effort and offerings. Campus support for the learning center initiative has expanded with a formal partnership now in place between Extension and Purdue's Division of Continuing Education.

Impact: *Examples* of the *selected* impact of those centers most closely affiliated with Extension follow:

\* Over 300 individuals have participated in courses through the Whitley County Learning Services. Over 60 companies and organizations had employees participate in courses. Participants indicate the courses completed helped them in their job and career paths. In some cases, the course enables participants to communicate with clients who did not speak Spanish. The Whitley County Community Foundation has provided \$37,000 in grant funding and the Whitley County Commissioners have designated \$30,000 to support the Learning Services activities.

\*350 people have obtained 1,486 hours of training in over 37 classes through the Pulaski County Learning Network. Fourteen people have received academic advising. Participants have commented about how they were able to save time and travel expenses by being able to obtain the training they had locally.

\*Approximately 120 students have received more than 1, 897 hours of instruction through the Lifelong Learning Network of Jasper and Newton Counties. Evaluations continue to indicate a high percentage of the participants gain knowledge and skills that they can apply in their work and personal lives.

\*Purdue Extension Service in Wells County is very active as a host site for distance education classes and training sessions. Twelve university classes were hosted in 2003, serving 28 students. It is estimated that each student saved over \$300 in travel and 20 hours of time by having these courses provided locally. Wells County Extension also served as coordinator and host for various professional training sessions, including those sponsored by the Indiana Department of Health and the Center for Disease Control. These local professionals also benefited from savings associated with travel and in time saved.

\*Since its first offering (September 2002), the Education Center of Tipton County has offered 29 K-12 classes/program and 135 life-long learning courses. The Education Center has become *the* location for the county to begin the process of GED and or adult literacy. It is a “bee-hive” of activity throughout the day with a variety of activities including class registration, committee meetings, instructional preparation and design by instructors, tutoring, and residents seeking educational information. The number of users since the opening of the center has steadily increased and during the last six months of 2003, as illustrated by the following:

- Over fifty non credit continuing education courses were offered consisting of more than 500 hours of direct instructor/learner contact.
- Sixteen educational activities were offered to youth to expand and enhance their knowledge and skills in various subject areas.
- The SAT Preparation course was offered twice. This consisted of an intensive eighteen hour instructor led course leading up to the SAT. One student reported an increase of 100 points on the SAT from before and after the preparation course.

- Adult Literacy and GED Preparation expanded as learners became more comfortable with the facility and direct instructor contact. (52 students, 196 instructor hours)
- Two summer college credit (instructor led) courses were offered enabling college students and graduating senior – college bound students to “get a jump” on their college credits.
- Tutoring hours has expanded from a total of 184 hours in the first 1 ½ years to over 400 hours in the past six months.

\*The Learning Network (LN) of Clinton County operates in partnership with Purdue University Cooperative Extension, the Clinton County Chamber of Commerce, and Clinton County government. During the past year, 237 workers from 35 individual businesses were trained in computer technology classes necessary to upgrade required skills for daily job performance. Nearly 400 local residents obtained over 2,300 hours of training in 102 lifelong learning classes. A grant from the Lumina Foundation helped fund the participation of 26 high school sophomores in the Learning to Lead Youth Leadership Series. Over 40 local teachers received college credits from six different state universities via IHETS satellite classes. Eight local teachers will complete their Masters in Educational Administration at the LN this year. None of these teachers had to travel to any of the campuses from which they received courses. Combining distance education classes from three universities, a local resident who was employed full-time completed his Associate Degree in General Arts, a degree he first started over 35 years ago. He tells everyone, “This place offers education for anybody. I took classes here, tests here, and faxed homework here. It’s so convenient and right here in our town.” A young woman is taking classes online to obtain her Dietary Management Career Certificate with exams proctored by the LN director. She works a full time job, and is unable to drive to college campus to take classes. The LN coordinated and hosted seven Indiana Department of Health seminars, in which local emergency management workers received Bio-terrorism and Public Health crisis training. The LN was designated as the only Indiana testing site for the International Computer Driving License, allowing local workers to obtain internationally-recognized Information Technology (IT) skills for current and prospective employers.

\* At the Hendricks College Network (HCN), over 800 students logged over 13,250 class hours in 2003. Funding support for these students and programs included: a \$25,000 grant from SBC Communications; \$13,000 from a partnership involving the Lincoln Bank Foundation and a local community foundation; class fees; community sponsorships and donations; and various types of support from Purdue, Ivy Tech, Ball State University, and Indiana State University. Fourteen universities offer classes in Hendricks County via face-to-face classes, IHETS satellite classes, internet classes and 2-way video classes. In addition, business trainings were provided to Department of Health employees, area restaurants and food handlers, the Hendricks County Bar Association, area teachers, banks, community organizations, distribution centers, the local women's shelter, Work One participants, and others. HCN has become a Microsoft Office Systems Certification test site and 23 students have prepared themselves by taking MOS Certification courses at HCN. Over 40 businesses benefited from HCN's offerings in 2003. Two examples of specific programmatic impacts follow:

1. HCN was able to bring an existing Masters in Educational Administration to the county to “homegrow” needed school administrators. More than 10 administrators and teachers will graduate with their Masters and get Principal’s Licenses in 2004. One future administrator noted, “I decided to go back to school to become an administrator when I found out about this program being offered here in Hendricks County...The ease and convenience of going to class makes it all worthwhile.”

2. Over 300 students have improved their computer proficiency and made themselves more marketable in the workforce or more effective in their current job. This number includes 32 Hendricks County employees. HCN has become a Microsoft Office Systems Certification Test site and 23 students have prepared themselves by taking MOS Certification courses at HCN.

Due to the success of HCN, Hendricks County government decided to fund the director's salary and some administrative costs for the next fiscal year to help the HCN achieve long-term sustainability.

Source of Funds: Smith-Lever; Lumina Foundation; SBC Communications; local businesses and other sponsors and partners; participant fees

Scope of Impact: Whitley, Jasper, Newton, Pulaski, Wells, Hendricks, Tipton, and Clinton

### **Key Theme: Youth Development --- 4-H**

Description: The 4-H component of Purdue Extension utilizes hands-on, research-based education that helps young people become competent, caring, confident, connected, and contributing citizens of character.

Impact: In 2003, 303,875 young people in Indiana (nearly 38% of the state’s youth ages 10-18) were involved in some way with 4-H. 66,469 participated with adult volunteers in 2,398 clubs, while 141,971 youth were involved in school enrichment programming and 95,435 participated in after-school and community programming. Additionally, 598,771 youth participated in educational workshops, events and activities or made an information request to a local Extension office or a state 4-H specialist. The 4-H program also involves 18,006 volunteers who contribute an estimated \$297,819.24 annually in time, mileage and out-of-pocket expenses.

Source of Funds: Smith-Lever

Scope of Impact: State specific

## **B. STAKEHOLDERS' INPUT PROCESS**

The initial development of the 1999-2004 Plan of Work had extensive input by a cross-section of the citizens of Indiana. Over 5,000 citizens representing the diversity of the Indiana community participated in a series of two meetings hosted by each county extension staff. The purpose of the first meeting was to discover what citizens believed were the important issues in their community. During the second meeting, the listing of issues was reaffirmed with the group establishing a priority ordering of those issues. The county extension staff then prepared county Plans of Work as well as reports that transmitted the findings of each county to the state Program Leaders. From the 92 reports, the Program Leaders classified the many issues into 16 priority issues that form the Indiana Plan of Work.

However, it is critical for stakeholders and all citizens to have a continued opportunity to provide input on identification of issues in their communities. Each of Indiana's 92 County Extension Boards is a broad representation of local citizens who provide identification and prioritization of the issues to be addressed by county extension programs.

In addition, local citizens in each county are selected to represent the connection to the statewide Council on Agricultural Research, Extension, and Teaching (CARET). CARET members represent the Extension Boards, elected officials, community leaders, staff from K-12 education, and business. The key criteria in their selection to CARET are their interest and their willingness to improve the quality of life in their communities through the programmatic functions of Purdue Extension.

Through their county connection, these citizens participate in twice-a-year multi-county meetings attended by County, District, and State Extension administrators as well as others such as the Dean of Agriculture and the Directors of Ag Research, Academic Programs and International Ag Programs. Most of the discussions during these Area CARET meetings focus on issues of concern to these local citizens.

Once each year, typically in November or early December, a State Conference is provided for the members of CARET and County Extension Directors. The format of the Conference is to provide an opportunity for obtaining input from the participants in a facilitated and structured manner. The Conference also provides an awareness of what Extension is providing to the citizens of Indiana and seeking their reaction to future educational needs and issues. The following educational presentations were presented and associated discussions occurred in November at the 2003 State Conference: Impact of State Budget and Implications for County Budgets; Rural Economic Development; Biomedical Engineering; Obesity: the Latest American Health Issue; Homeland Security and Agriculture; Are Indiana's High Graduates Ready for College?; and Communicating with the Public Regarding the Modernization of Agriculture.

Most of the School of Agriculture Administrators and Faculty serve as ex officio committee members for county and state agriculture associations and organizations, and receive stakeholder feedback through these interactions.

## **C. PROGRAM REVIEW PROCESS**

There have been no significant changes in the program review processes since Indiana's 5-Year Plan of Work was submitted.

## **D. EVALUATION OF THE SUCCESS OF MULTI AND JOINT ACTIVITIES**

Purdue Extension is proud of its achievement in effectively and efficiently responding to the needs and concerns articulated by Indiana citizens through various means of harvesting their input. To deliver relevant educational information to a spectrum of audiences, Purdue Extension is obligated to continually focus on three major tasks: 1) actively seek citizen input, 2) integrate research and extension outcomes into program planning, and 3) intensely scrutinize programs through effective reporting and evaluation systems. As evidenced by the reports provided for each Goal, Purdue Extension has accomplished these steps.

In the past four years, Purdue Extension has aggressively addressed the responsibility of delivering information to new audiences and new information to traditional audiences. Engaged audiences vary from traditional family, youth, community and agricultural groups to new populations such as Asian or Hispanic communities, and from targeted groups such as participants in funded nutrition education programs to under-served audiences such as families with small farms and Amish farmers. They also vary from traditional families planning retirement to single fathers, and from youth in 4-H projects to after-school children involved in enrichment programs. In the past four years, Purdue Extension has become much less tradition bound and more capable of reaching audiences in a variety of high touch and high technology manners.

The process of program evaluation is being improved through the on-going adoption of the LOGIC evaluation model. Extension staff associated with the 16 Plan of Work Oversight Issue teams completed several days of staff development regarding the utilization of this tool. All Extension (and research and teaching) staff participated in training in the past two years to

prepare them to effectively evaluate their educational programs using the LOGIC model. Additional professional development activities related to the LOGIC Model, effective program evaluation, and accountability are being planned. Two additional professional positions have been added to the staff in the office of the Director of Extension. Both will provide focus on staff support in the areas of program evaluation and accountability.

The System for Accountability and Management (SAM), based on the LOGIC evaluation model, allows Extension staff to report community needs, create an action plan for addressing those needs, and report against the plan. The system allows educators to identify programs that target underserved and underrepresented audiences. Having one system where they can plan, collect data, and prepare impact and other reports allows staff to be more efficient and effective in planning and reporting to stakeholders.

Goal 1: Agriculture remains a prominent industry in Indiana even though the demographics of Indiana's population are significantly changing as a result of rapid growth during the decade of the 1990's. Profitability resulting from a strong competitive position remains a key to the continued strength and integrity of Indiana's farm families. However, emphasis by Extension on diversification of agricultural enterprises and value-added production and marketing has increased so that farm families may evaluate more alternatives to increase their net farm income.

With the rapid growth of the state's non-farm population, Extension has increased emphasis on 1) urban gardening, 2) environmentally benign methods of pest management in lawn, turf, and garden, 3) Master Gardener programs, and 4) producer-to-consumer marketing and farmers' markets. While the proportion varies by county, as much as one-half of the extension resources devoted to "agriculture" may focus on the "green" industry associated with non-farm populations.

Goal 2: Food safety and quality education programs are included in many aspects of Purdue Extension. HACCP training is provided throughout agricultural production, processing, and marketing educational programming as well as at the point of contact with consumers. Much of the educational efforts of extension staff involved in agricultural production focus on the production of high quality and safe food products. An increasing proportion of food consumption occurs in restaurants or the food is provided for ready-to-eat, take-home consumption. Handlers of food in these businesses must understand that it is their responsibility to provide consumers with a safe food supply. Purdue Extension has reached out to a spectrum of audiences with its message of safe food handling.

Goal 3: A healthy and well-nourished population is essential to the establishment of a high quality of life in any family and community setting. Purdue Extension has reached out to audiences across a breadth of age groups and resource levels in its educational programming. Major thrusts during the last year have been obesity prevention and diabetes programming. Additionally, Extension staffs have continued to target low income audiences with nutrition education through the EFNEP and Family Nutrition Programs.

Goal 4: With knowledge provided by Purdue Extension, all citizens will potentially be better stewards of the environment and surrounding natural resources. Whether agricultural producers or homeowners, relevant information is effectively provided for all citizens to use in decisions that affect how they will impact their environment.

The industries associated with forest crops and products manufactured from timber are a significant segment of Indiana's economy. With Indiana's population growth, decisions regarding the use of land are becoming increasingly contentious. Seventy-two of the county extension staff are voting members of County or Area Plan Commissions. A team of staff, the Land Use Team, was developed in 1996 to provide a focused resource to assist communities in better understanding and participating in the process of arriving at public decisions. The team was selected for the prestigious Dean's Team Award in January 2002.

Goal 5: Relevant decision-making information is essential for citizens to address issues that affect their families, youth, communities, and businesses. The 4-H and Youth Development program has a long tradition of successful youth and adult participation. With the increasing complexity of issues faced by youth, traditional 4-H programs are being augmented with topics such as Character Counts, conflict resolution, and after-school enrichment activities, and through the establishment of community partnerships with other youth serving organizations. In addition to traditional youth audiences, Purdue Extension is also providing information to enable local youth organizations to better serve at-risk youth audiences and their parents.

The Purdue Leadership Team is composed of field educators and state specialists who develop and deliver educational programs in leadership development. The team assists local organizations and communities in developing the capacity for more effective leadership. The team serves both youth and adult organizations. Team members go to organizations and communities, upon request, to offer educational programs on ten different topics; assist communities in establishing a community youth and/or adult leadership program; and serve as instructors for several state-wide leadership programs. The topics taught by team members include ethics, the Myers Briggs Type Indicator, interpersonal communication, public speaking, the nature of leadership, board development, conflict management, teamwork, visioning and strategic planning and community leadership and power structures.

Purdue Extension is also focusing increased programming on workforce development and welfare to work programs. In addition, learning centers in rural communities are being developed by Extension collaborating with community partnerships that include private industry, community leaders, and other youth and adult educational entities. A variety of not-for-credit and for-credit educational opportunities are increasingly available to local citizens through these centers.

With the many changes that have taken place in the demographics of Indiana's population in the decade of the 1990's, community leaders and elected officials are seeking advice from Extension on methods to accommodate population growth and diversity.

## E. Multistate Extension Activities – chart

**U.S. Department of Agriculture**  
**Cooperative State Research, Education, and Extension Service**  
**Supplement to the Annual Report of Accomplishments and Results**  
**Multistate Extension Activities and Integrated Activities**  
**(Attach Brief Summaries)**

**Institute** Purdue University  
**State** Indiana  
**Check One:**  **Multistate Extension Activities**  
 **Integrated Activities (Hatch Act Funds)**  
 **Integrated Activities (Smith-Lever Act Funds)**

### Actual Expenditures

Title of Planned Program/Activity	FY2000	FY2001	FY2002	FY2003	FY2004
Strategic Business Planning for Commercial Producers				64,332.14	
Executive Institute for Commercial Producers				40,252.46	
Swine Growth Modeling Extension Project				42,488.15	
Midwest Swine Nutrition Conference				19,337.50	
Revision of ASAE Manure Characteristics Standard				45,330.49	
Illinois-Indiana Sea Grant College Program- Aquatic Nuisance Species Programming				17,735.25	
Soybean Aphid Ecology & Integrated Pest Management (IPM)				131,151.60	
Midwest Fruit Workers				51,725.42	
Stewardship Program for Biotechnology Corn				56,662.24	
<b>Total</b>				<b>469,015.25</b>	

**David C. Petritz** **March 1, 2004**  
**Director**  
**Form CSREES-REPT (2/00)**

## **E. MULTISTATE EXTENSION ACTIVITIES**

### **BRIEF SUMMARIES**

#### **Strategic Business Planning for Commercial Producers**

The Strategic Business Planning for Commercial Producers is a comprehensive resource for educators to use in teaching farmers to be highly effective managers. The resource has found wide and often deep applications to educate managers across the Midwest. Adoption efforts by educators have been dramatic and should continue to increase as awareness of the curriculum broadens. The web site ([www.agecon.purdue.edu/ext/farmplan](http://www.agecon.purdue.edu/ext/farmplan)) has proven a popular delivery method. The site began collecting user information in mid-April of 2003. The materials have been accessed by Extension Specialists from the Midwest and South and by Farm Credit executives. From these registrants the Center for Food and Agricultural Business (CAB) collects name, occupation and an email address to be used for updates. Additional statistics from mid-April to June show that there are about nine users per day and that each user has visited about 2.8 times and has spent an average of about 23 minutes viewing the content. Users that come from educational institutions (.edu) represent 74% of users, while commercial sites (.com) are 11% of the visitors. A small number have come from either Argentina or New Zealand or .net domains. Of the commercial site visitors there were a significant number of hits from googlebot.com, indicating that the material will be more widely available to users of the Google search engine. The site continues to be improved. Additional content on human resources and finance will be added. The response to the Strategic Business Planning materials has been enthusiastic. A number of states are drawing heavily from the program. Efforts in the four-state FCS region are summarized below. KENTUCKY - Extension Professor Steve Isaacs at the University of Kentucky reports that the materials have been a part of their Management First and Master Cattlemen programs – particularly the strategic management materials. Additional planned use will be by extension educators in western Kentucky with horticulture and vegetable co-ops. INDIANA - The materials continue to be used as part of the Extension program in Indiana. The financial materials have been used in staff development sessions. Material has also been used to develop two winter school offerings for producers during this year's Extension winter schools. The materials are also used in undergraduate classes in Farm Management and Agricultural Finance. Additionally, the Strategic Business Planning for Commercial Producers materials is being used as baselines to develop a program for top potato and vegetable growers across the US. The program will focus on the challenges and opportunities of extracting value from the food chain. The program will also focus on financial management as well as strategically positioning the farming operation. OHIO - Ohio State University has used the materials in both classroom and extension settings. Professor Warren Lee drew heavily from them for his Farm Business Management course (32 students). He reports that the materials will be used increasingly as he has made the entire extension system aware of the resource. He adds that he has found them to be an excellent resource. Extension Specialist Robert Fleming reported that they used part of the materials for a four-day financial management workshop for large grain farm managers who completed an earlier four-day training in management functions and

leadership. The program, Grain Excel, had 15 people from 10 farms complete the course. He adds that Ohio has shared information about Strategic Business Planning with their agricultural lenders (about 90 people), plus hotlinked to the materials on their web site. TENNESSEE Professor Clark Garland of the University of Tennessee reports that Strategic Business Planning for Commercial Producers materials were used in the Tennessee teaching sessions listed below.

Meeting Date/Location	Program Name	Audience	Participants
September 25, 2002 Manchester, TN	Planning Business Management Educational Programs for Commercial Producers	Extension agents from nursery production area	12 participants
September 26, 2002 Carthage, TN	Planning Educational Programs to Help Farmers Evaluate Alternatives	Extension agents and district program leaders	14 participants
October 2, 2002 Paris, TN	Business Strategies	Extension agents from major tobacco and row crop production areas of the state	13 participants
November 8, 2002 Greeneville, TN	Business Strategies Chamber of Commerce Agriculture Development Committee		21 participants
December 3, 2002 Franklin, TN	Business Planning and New Enterprises National Value Added Conference		36 participants
June 20, 2003 Murfreesboro, TN	Strategic Business Planning Area Farm Management Specialists		10 participants

Professor Garland adds, "We are impressed by the quality and effectiveness of the Strategic Business Planning materials. It is well organized and the information has been well received by various audiences. Thanks for sharing the teaching materials with us."

**USER TESTIMONIAL** The following testimonial is provided by an extension economist from Kansas State University. I am using many parts of the materials as I develop presentations and workshops on business planning. I have drawn from the materials as I put together presentations for our intensive distance-delivered farm management education program (29 participants last year), and I anticipate drawing on your materials as I update those sessions this year. I am in the process of developing several workshop presentations and sets of material that will draw on your excellent resources. In addition, I use your material for my senior level Farm Management Strategies class in the Fall. Last year I had 28 students. I found the material to be an excellent supplement for the class.

Rodney Jones Associate Professor, Extension Livestock Production Economics Kansas State University

**OTHER USERS**

- Positive contacts with organizations not in the North Central Farm Management Extension Committee region include Clemson and the Ontario Ministry of Agriculture where the curriculum will contribute significantly to their extension offerings.
- Rabobank, Australia is assessing the potential of using the curriculum as part of its producer benchmarking committees.
- In March the Northwest Farm Credit Services conducted a pilot "Best Management Practices Roundtable" with customers. This session drew particularly on materials from the succession planning area, among others.
- The University of Wisconsin used the finance materials in "Measuring Farm Profitability," a six week short course. They appreciated the quality and professionalism of the materials and have found the speaker notes very helpful in building effective teaching sessions. Additionally, the Wisconsin Farm Financial Management Extension team is developing a new case farm for use in the coming year's Extension programming. Apart from actually using the materials with extension and classroom audiences, a number of users have used them as background for development of extension and classroom teaching sessions.

IN, OH, CO

## **Executive Institute for Commercial Producers**

The current economic environment places significant demands on large commercial producers to position their business for success. With the number of successful commercial farms in the US shrinking, to be one of the successful farms in the future, farm business managers must take on the role of a general manager. They must look at the business as a whole and have a vision of where the business is going. The undirected growth typical of farms in the past will not be acceptable. To do this, managers must have a comprehensive set of finance, marketing and strategic tools. Farm Credit Services of Mid-America sponsored about 100 high-potential farmers through a series of seminars over the course of a year which teaches tools needed for management. Participants are drawn from leading agribusinesses in the four states (Indiana, Ohio, Kentucky and Tennessee) that Farm Credit Services of Mid-America serves. These seminars introduce and apply advanced business management concepts to the problems confronting the larger and more complex commercial farm and its management team. The classes consisted of intensive one-on-one strategic consultation, group work, case study analysis, and computer skill development. This multi-state effort will continue for the next year. The materials form a 465-page binder. This is comprised of 33 PowerPoint presentations with complete presenters' notes that aid educators in delivery, 36 reference articles (many written specifically for this program), hands-on exercises and various supporting documents. These materials have been presented at a meeting sponsored by Farm Credit Services to the North Central Farm Management Extension Committee, an organization of 12 state extension programs. Visit our website at [www.agecon.purdue.edu/ext/eicp](http://www.agecon.purdue.edu/ext/eicp)

This farm management program allows participants to meet a felt need: information on how to position themselves for a competitive future. By centering the curriculum on building a working business plan, this team has successfully implemented a progressive management training course. This program allowed commercial producers to take their business management skills to another level and think about their operation from a strategic standpoint. As markets continue to change, this management capacity is critical to the long-term success of today's farming operations. Since the conception of the project in early 2000 lecturers have seen a marked evolution in how farm managers view the strategic focus of their businesses. While gaining skills in the short-term financial control of their business, participants have developed a long-term view of the profitability of their business essential to success. Participants have also increased their computer skills and developed a network of peers. The first class (of three) of 23 operations believes the material presented to be highly useful in dealing with managing their business. On a scale of five the program has been rated a 4.56. One participant said "As we grow our business, there are a lot of challenges ahead for the future that we need to address. At these seminars, we've learned how to manage our assets, how to manage our resources, and how to manage our employees. Also, we've looked at how to think about growing the business. These are things for the young farmers and nurserymen of the future to be aware of - or we won't be in the business." Future impact of the program will include packaging of the material for extension educators in the four-state region.

IN, OH, CO

## **Swine Growth Modeling Extension Project**

Pork producers are striving to produce quality lean pork as efficiently as possible with minimal environmental impact. Feed represents approximately 60% of the costs of pork production. Feeding pigs the optimal levels of essential amino acids and phosphorus will reduce feed costs while reducing environmental impact. Recently a feed additive, Paylean™ has been approved to increase the rate and efficiency of lean growth. The use of Paylean™ must take into account the marketing system and product system economies.

A stochastic version of the pig compositional model has been developed. The model predicts a compositional growth live weight growth and feed intake curve for each pig in a 1000 head finisher. The program has been used to (a) evaluate the optimal marketing strategy with and without Paylean™; (b) the cost of fixed scheduling; (c) the impact of errors in the timing of the initiation of Paylean™ feeding; and (d) the use of new animal sorting technology. The research results have been discussed with Elanco technical representatives and a small number of producers. The results indicate that (1) the profitability of pork production can be increased by the joint optimization of Paylean™ use, nutrition and marketing strategy, and (2) the new animal sorting technology can assist in the development, continued refinement, and implementation of the optimal strategies. Extension articles have been written and refined with input from industry representatives. Future plans are to discuss the new results with Elanco, the manufacturer of Paylean™ and the manufacturers of animal sorting technology. The model determines the most profitable series of diets in terms of live weight growth, carcass composition, and feed conversion for Paylean-fed pigs for different carcass-value-based marketing systems. The model can be used to establish specifications for a series of diets which maximize profitability for pigs fed Paylean. The model has been refined to include the increased duration and magnitude of response when increasing concentrations of Paylean are fed. Data from four research trials, (three Purdue trials and one North Carolina State University trial) were used in which either constant or increasing dietary concentrations of Paylean were fed. The results indicate that step-up programs such as feeding 5 ppm Paylean for 18 days followed by 10 ppm for 17 days will result in increased profits of \$1.10 to \$1.24 per pig, depending on the marketing system. However, the benefits of Paylean feeding can only be fully achieved with improved feeding and marketing management. Initial research results indicate that the collection of serial live weight and compositional data as well as develop and implementation of the optimal marketing system via animal sorting technology can result in a \$7,000 to \$10,000 increase in profitability per 1000 head finishing facility. The optimal use of Paylean™ increased profitability almost an additional \$9,000 per year for the 1000 head finisher.

IN, KS

## **Midwest Swine Nutrition Conference**

Improving information available for Nutrition consultants, swine veterinarians, pork producers and academic nutritionists is highly needed in the swine industry. A multi-state conference was held on September 9, 2003 to update the various clienteles on the latest relevant research in the Swine Nutrition field. Approximately 80 participants from 7 states attended this conference.

This conference was the 3rd annual and the impact it is having is evidenced by the continual increase in attendance, with about 40 people in year one and double that number this year. An evaluation indicated that the conference was well received. Fifty-six of 60 people that completed evaluations indicated an overall satisfaction level of 4 or 5 based on a scale of 1 to 5 (5=best). Several comments were complimentary of the program and several also indicated where improvements could be made.

IN, KY, IL, OH, MI

### **Revision of ASAE Manure Characteristics Standard**

The ASAE standard for manure characteristics largely had been not updated since 1988. With dramatic changes in genetics and nutritional programs, an accurate reflection of up-to-date practices were needed for this standard, as this is a primary resource for regulatory and governmental cost-sharing programs. An updated version of the ASAE D384.1 Manure characteristics standard will provide state and federal regulatory and governmental assistance agencies necessary information for cost-sharing programs (EQIP) and regulatory activities. A joint effort of individuals from the American Society of Agricultural Engineers (ASAE) and Federation of Animal Science Societies (FASS) updated the ASAE D384.1 Manure characteristics standard. This publication is the primary reference for environmental regulation for state, federal, and non-U.S. entities when determining nutrient excretion volumes, developing environmental impact models, and developing comprehensive nutrient management plans (CNMP).

IN, NB, IA

### **Illinois-Indiana Sea Grant College Program –Aquatic Nuisance Species Programming**

The Great Lakes Basin encompasses the largest surface freshwater system in the world. Over 160 ANS have been introduced in the Great Lakes region. Once introduced, these species can spread and have a devastating impact on our lakes and rivers, and on the native fish and wildlife that inhabit them. They are costly not only to our environment but also to our economy. The sea lamprey drastically changed the food web of the Great Lakes and now costs more than \$12 million a year to control. Zebra mussels continue to cause ecological damage including reducing food availability for native mussel and fish populations. Control costs associated with zebra mussels in the Great Lakes Basin are estimated at \$250 million. One of the greatest risks to the health of surface freshwater systems is the invasion of non-native aquatic nuisance species (ANS). The introduction and spread of ANS can occur through a variety of pathways and vectors including recreational water users, backyard water gardeners, aquarium hobbyists, the baitfish industry and commercial shippers. Illinois-Indiana Sea Grant is working to close this conduit of ANS dispersal. Illinois-Indiana Sea Grant is engaged in preventing the introduction of new species and limiting the spread of those already established by changing the behavior of people involved in each pathway of spread. A new Web site is being developed to make curricular activities accessible to larger numbers of educators and students in a highly interactive format.

The site, “Nab the Aquatic Invader! Be a Sea Grant Super Sleuth,” resides on the Sea Grant Non-indigenous Species (SGNIS) Web site. It uses a detective theme to engage youth in grades 4-10 as they explore biology, spread, impacts, and control of numerous aquatic invaders in U.S. waterbodies. Also, researchers and other users can conduct a literature search on this Web site or they can download entire documents or products on demand. This moves the transfer of scientific knowledge one step further and Sea Grant can be proud to be a leader in this trend. As a result of the testimony for the City of Chicago City Council, snakehead fish and sales of live Asian carp were banned within the City of Chicago. At the state level in Illinois, an emergency administrative rule was passed prohibiting possession of all snakehead fish within the state. This legislation is the first step in the state’s ability to develop an easily amended, prohibited species list. Participation on a State committee examining the feasibility of regulating shippers entering Illinois waters of Lake Michigan resulted in the State’s willingness to work with the shipping industry through education rather than regulation. (Regulation of shippers on a regional level has been determined to be preferable to individual state regulations.) We then developed a ballast water brochure for the Great Lakes shipping community, which is being distributed to each ship captain entering an Illinois port. In 2000, we surveyed anglers fishing the Illinois waters of Lake Michigan on their attitudes regarding ANS. Sixty-nine percent of those anglers took at least some sort of action. As part of an Illinois DNR Lake Michigan creel survey, we asked the same question in 2003. That survey revealed that 84% now take action specifically to prevent the spread of ANS—a 15% increase. An electrical dispersal barrier has been installed in the Chicago waterways, and a second barrier is slated for installation early in 2004. Public support for the barrier has been crucial in securing long-term funding and ensuring against human-assisted transfer of species across the barrier. A rapid response plan for Asian carp in the Chicago Waterways was developed by a Task Force of federal, state and local agency representatives including Illinois-Indiana Sea Grant. This plan was adopted by the state after public hearings we co-organized allayed public fears and opposition to the plan. A rapid response plan relies on timely sightings of an invader; timely sightings of Asian carp in the Chicago waterways, in part, are advanced by our outreach products and web-based sighting reporting system. Over 4,200 students in Illinois, Indiana, Wisconsin, New York, Louisiana, and Washington developed an environmental stewardship ethic based on their study of exotic species. 15 Community stewardship projects created by participating students have linked these young people to members of their communities by providing innovative delivery methods for sharing information about why invasive species have become a serious problem and on what steps people can take to reduce further impacts created by these species. Projects ranged from creating T shirts and booklets with educational messages distributed at local businesses, to posters displayed at city hall, to personal distribution of information to bass tournament fisherman. The SGNIS web site contains high-quality science and has been the web presence for the National Sea Grant College Program on non-indigenous issues since 1996. Information on over 25 species, including zebra mussel and round goby, can be searched for as well as a range of related topics. Over 139,000 unique visitors from over 125 countries regularly access SGNIS (averaging 56,822 visits monthly) resulting in 3,060,000 hits in 2002-2003. IN, IL

## **Soybean Aphid Ecology & Integrated Pest Management (IPM)**

Prior to the invasion of the soybean aphid, soybeans in the US North Central Region typically did not suffer intense pressure from insect pests. The infestation of the aphid now extends over a 20 state area challenging pest managers to develop new approaches to managing this serious pest of soybean production. In collaboration with Purdue Extension, several Purdue departments and multi-state collaborations my lab is helping define sampling protocols, management thresholds, aphid-natural enemy ecology relationships, and primary-secondary hosts associations. The range of reported yield losses in Indiana and other mid-western states amounts to tens of millions of dollars, annually. Purdue research is providing pest managers key information on aphid-host relationships, the effects of soybean production practices on aphid densities and damage, and the importance of natural enemies on aphid dynamics and control. Our research will provide soybean producers effective and environmentally-sound methods of managing this devastating invasive pest by:

1. **Aphid-host relations:** Understanding which species can serve as hosts, and their relative distribution and abundance, allows pest managers to map out areas at higher risk, and mobilize scarce resources to manage the insect before it reaches pestiferous levels.
2. **Soybean production practices:** Determined that aphid population densities and growth rates were not affected by plant age (planting date). A statewide survey of aphid densities showed that the northern one-half of the state was heavily infested, and insecticides were commonly applied there. These findings will impact management decisions and identify areas of risk where management efforts can be focused.
3. **Endemic natural enemies:** The impact and ecology of endemic natural enemies has shown that predators present in the field before aphids arrive can have a significant effect on subsequent aphid densities, however this impact is influenced by the presence of alternative prey. These findings will impact early-season pesticide application decisions as well as form the basis for preventative pest management practice for soybean aphid IPM.

IN, MN, OH, MI, IL, WI

## **Title Midwest Fruit Workers**

The Midwest Fruit Workers consists of Extension personnel with responsibility for fruit from 11 Midwestern states; Arkansas, Illinois, Indiana, Iowa, Kansas, Kentucky, Missouri, Nebraska, Ohio, West Virginia and Wisconsin. This group meets annually at the Midwest Fruit Workers Conference in Indianapolis to work on cooperative publications. Each year, the Commercial Tree Fruit Spray Guide and Midwest Small Fruit and Grape Spray Guide are revised and updated to provide growers with the latest information regarding pest management alternatives. Other publications produced by this group include Midwest Tree Fruit Pest Management Handbook and Midwest Small Fruit Pest Management Handbook. Publications targeted at home fruit growers include Tree Fruits: Insect and Disease Management for Backyard Fruit Growers in the Midwest and Small Fruits: Insect and Disease Management for Backyard Fruit Growers in the Midwest. For each of these publications, the pooled knowledge of Extension specialists from all the cooperating states is merged to produce a single set of recommendations that are used throughout the region. In addition, 5 entomologists from Illinois, Indiana, Kentucky, Missouri,

and Ohio are working cooperatively to evaluate new, safer pesticides for control of codling moth, the primary insect pest of apples. They are also testing non-chemical control of codling moth with innovative methods of mating disruption using pheromones.

**Impact:** By combining the expertise of Extension specialists from a number of states, the publications produced are more comprehensive than those that could be produced by individual states. A single, consistent set of recommendations is used throughout the Midwest. These publications are the primary source of pest management information for commercial fruit growers in the cooperating states. For states that are unable to devote much Extension involvement in fruit production, such as Kansas, the Midwest Fruit Workers provide materials that can be used to meet the needs of their clientele. The result is that commercial and backyard fruit growers throughout the Midwest having the latest information regarding fruit production and pest management. In the area of pest management, the result is that fruit growers will use the correct pesticides for particular pests at the proper time, resulting in improved control, less overall pesticide use, and reduced pesticide residues on fruit crops.

IN, AK, IL, IA, KS, KY, MO, NB, OH, WV, WI

### **Stewardship Program for Biotechnology Corn**

In 2002 and 2003, the Purdue University Post-Harvest Education & Research Center joined the corn stewardship poster project initiated by the Iowa Grain Quality Initiative at Iowa State University in 2001. The project raises producer awareness that Market Choices<sup>SM</sup> corn products must be delivered to a facility that accepts them because they have not been approved in the European Union. Grain elevators received two posters of each size, 18 in. x 24 in. and 8.5 in. x 11 in. An accompanying letter requested that the facility place the posters in locations visible to producers. Additionally, we initiated a news release each year through the Purdue Agricultural Communication Service to make the media, elevators, and producers aware of this initiative. Resulting media coverage included print, radio and TV coverage throughout the Midwest.

In 2002, we helped to expand this project to Illinois and Indiana. This increased the poster distribution to 2,200 elevators. In 2003, the poster distribution was expanded to over 4,300 elevators in Illinois, Indiana, Iowa, Minnesota, Missouri, Nebraska, Ohio, South Dakota, and Wisconsin. The small poster was sent to 19,000 producers identified as planting Market Choices<sup>SM</sup> corn. Cooperators from the corn grower, elevator, and university extension organizations used communication channels in their states to promote the project. The poster was supported by media channels in all states and a Market Choices<sup>SM</sup> Web site that was linked to the American Seed Trade Association Grain Handler's Database and the National Corn Growers Association Know Where to Go Web site.

IN, IA

## F. Integrated Research & Extension Activities - Chart

U.S. Department of Agriculture  
 Cooperative State Research, Education, and Extension Service  
 Supplement to the Annual Report of Accomplishments and Results  
 Multistate Extension Activities and Integrated Activities  
 (Attach Brief Summaries)

Institute Purdue University  
 State Indiana  
 Check One:  Multistate Extension Activities  
                    Integrated Activities (Hatch Act Funds)  
                    Integrated Activities (Smith-Lever Act Funds)

Actual Expenditures					
Title of Planned Program/Activity	FY2000	FY2001	FY2002	FY2003	FY2004
Swine Growth Modeling Extension Project				42,488.15	
Potassium & Phosphorus Nutrition of Alfalfa				10,135.11	
Improving Our Understanding and Interpretation of Soil Potassium Test Results				48,595.42	
Use of Aerator Non-beneficial to Tall Fescue Production				18,895.28	
Strip Tillage: An Increasingly Acceptable Alternative for Corn Producers				39,932.23	
Midwest Fruit Workers				51,725.42	
Soybean Aphid Ecology & Integrated Pest Management (IPM)				131,151.60	
Fungicide Sensitivity Profiles for Indiana Golf Courses				30,916.31	
Food Biotechnology: Dreams from the Fields				26,677.32	
Plants Use Conserved Mechanisms to Regulate the Actin Cytoskeleton and Cell Shape				10,309.60	
Fruit Breeding				6,949.98	
Determining Non-Laying Hens				12,336.00	
<b>Total</b>				<b>430,112.42</b>	

David C. Petritz     March 1, 2004

Director

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## **F. INTEGRATED RESEARCH AND EXTENSION ACTIVITIES BREF SUMMARIES**

### **Swine Growth Modeling Extension Project**

Pork producers are striving to produce quality lean pork as efficiently as possible with minimal environmental impact. Feed represents approximately 60% of the costs of pork production. Feeding pigs the optimal levels of essential amino acids and phosphorus will reduce feed costs while reducing environmental impact. Recently a feed additive, Paylean™ has been approved to increase the rate and efficiency of lean growth. The use of Paylean™ must take into account the marking system and product system economies.

A stochastic version of the pig compositional model has been developed. The model predicts a compositional growth, live weight growth and feed intake curve for each pig in a 1000 head finisher operation.

Purdue Animal Sciences and Agricultural Economics Departments have developed a stochastic swine growth model that can optimize pork production. This is the first swine compositional growth model that has been developed, parameterized, and tied to a multi-variable decision making program. The program demonstrates that marketing strategies can be improved to increase producer profitability. The feeding of Paylean™ can substantially increase the efficiency of swine growth and profitability. However, the benefits of Paylean feeding can only be fully achieved with improved feeding and marketing management. Initial research results indicate that the collection of serial live weight and compositional data as well as develop and implementation of the optimal marketing system via animal sorting technology can result in a \$7,000 to \$10,000 increase in profitability per 1000 head finishing facility. The optimal use of Paylean™ increased profitability almost an additional \$9,000 per year for the 1000 head finisher producer.

### **Potassium and Phosphorus Nutrition of Alfalfa**

Farm profitability could be improved by understanding how best to manage P and K for alfalfa production. These two nutrient control alfalfa productivity and persistence, two factors that are important determinants of yield. A long-term experiment is presently examining the impact of P and K on alfalfa yield, yield components, soil test P and K values, plant persistence, root biochemistry, and gene expression is underway.

Purdue University researchers are developing improved phosphorus (P) and potassium (K) fertilizer guidelines for alfalfa in order to maximize long-term alfalfa productivity. Critical tissue and soil test P and K concentrations will be used to determine how much P and K are needed for good agronomic performance of alfalfa. Proper fertilization can double productivity of P- and K-stressed alfalfa. The alfalfa section of the Tri-State Fertilizer Extension Bulletin will be revised as a result of this research.

## **Improving Our Understanding and Interpretation of Soil K Test Results**

Without moldboard plowing, K becomes stratified in the root zone. Concentrations are greatest in the surface soil (top 2 to 4 inches), but this K may be relatively less plant-available, especially during dry periods, than it would be if it were deeper in the soil profile. To date, studies have not addressed whether this stratification requires a change in K management recommendations. Furthermore, current laboratory analyses index exchangeable K only and do not address fundamental differences in soil physiochemical properties are not well correlated among all major agronomic soils. A NaBPh<sub>4</sub> extraction has shown promise in greenhouse research for indexing K availability among soils but field correlation/calibration work has not been done. This project is using soil and crop data and archived samples (currently being analyzed) from a 6 yr, 5-location K-rate experiment established in 1997 at 5 regional Purdue Agriculture Centers. Field sites were established in 1997 at locations representative of different major agronomic soils of the humid region of the Eastern Corn belt. Treatments included crop species, rotational corn and soybean (both crops present each year), and K fertility level (rate and timing of application). Data from intensive soil and plant sampling regimes are being used to construct a K balance for six crop cycles (3 full rotations). Soil nutrient absorptive strength, soil buffering power, and soil quantity/intensity relationships are being evaluated with depth in the soil profile for their effect on plant-availability of K. Data are being analyzed for soil test critical levels needed in surface soils to attain optimal yields and grain quality.

Potassium fertilizer is a multi-billion dollar investment for US farmers and, in Indiana over 70% of agricultural soils are inherently K deficient. Soil testing remains the cornerstone of K fertility recommendations for production agriculture, but current laboratory analyses are not well correlated on all agronomic soils in Indiana. Furthermore, large within-field variability in soil K supply typically exists, and soil sampling strategies that accurately characterize this spatial variability can be a major investment. Accurate soil K test information and efficient collection strategies are essential to optimizing returns on fertilizer investment. This research is creating the database needed to improve K management recommendations for corn soybean rotations in the eastern Corn Belt and to optimize farmer investment in precision technologies, soil testing and K fertilizer. This research will permit the complete revision of the university K recommendations to include soil- and crop-specific interpretation of soil test results and guidance on how to manage K fertility to maximize yields in both low and high yielding environments. Project results will also provide a foundation for future research on fertilizer placement and genetic differences in plant K uptake and use.

## **Use of Aerator Non-beneficial to Tall Fescue Production**

The cool-season grass tall fescue occupies over 30 million acres in the United States. Most of the acreage is in the transitional zone between cool, temperate climates and subtropical climates. Southern Indiana is the north central region of the zone that is commonly referred to as the Tall Fescue Belt. Much of the forage acreage in this region is acidic and/or deficient in nutrients for satisfactory establishment and production of many forages. With perennial forage crops it is difficult to incorporate needed nutrients into the soil profile as fertilizers are typically surface-

broadcast applied. Aerators, implements that were developed to improve soil physical properties, have not been evaluated in regards to incorporating surface-applied fertilizer deeper into the soil profile.

Field research was conducted on tall fescue hay and pasture sites at the Southern Indiana Purdue Agricultural Center in 2001 and 2002. The objectives of the research were to determine if the Aerway aerator 1) incorporated broadcast-applied phosphorus (P) and potassium (K) fertilizers, 2) improved forage yield and/or 3) improved forage quality.

Investment in the Aerway aerator for the purpose of incorporating P and K fertilizers, and improvement in tall fescue forage yield and quality is not justified. Aeration did not improve soil nutrient distribution at deeper depths in the soil profile. Greater than 50 percent total soil P and total soil K remained in the upper 2 inches and 4 inches, respectively, in the 8-inch sampling zone. Aeration had no consistent positive effect on dry matter yield or forage quality. In most cases, aeration reduced yield.

### **Strip Tillage: An Increasingly Acceptable Alternative for Corn Producers**

Adoption of the no-till system for corn reached a peak of about 25% of the acreage in 1995, and has plateaued at about 20% in the period since. Corn farmer concerns for possible delayed planting and poor plant establishment due to the cooler and moister soils associated with no-till, relative to conventional tillage systems has been the main impediment to further adoption of no-till for corn. Even though farmers have widely accepted no-till for soybean (at about 60% of the acreage each year), the same conservation practice has not occurred for corn production. This has resulted in continued high costs and increased erosion potential. My research team and extension efforts have widely promoted fall strip tillage as an acceptable compromise alternative between no-till and full-width conventional tillage systems.

Our research and extension efforts on strip tillage are another essential part of the growing confidence in strip tillage as a new conservation planting system for corn in Indiana and surrounding states in the Corn Belt. Furthermore, our research efforts on multiple strip-till equipment depths and fertility placement are providing much needed support information on how to achieve best possible results with this relatively new system. Fall strip tillage is now the fastest growing tillage system (in terms of estimated percentage increase) in the last 3-5 years. It has been adopted by farmers on both end of the tillage spectrum; no-till farmers have converted to it in place of continuous no-till, and conventional-till farmers have converted to it to save input costs and reduce soil erosion. Because the only tillage with strip tillage is in the intended row areas for corn (usually planted on 30" centers), strip tillage has combined the best of both tillage alternatives. It preserves from two-thirds to three-quarters of the surface residue cover of no-till, and it permits soil drying and warming in spring to be as fast as it is after fall conventional tillage operations. Thus more corn farmers are being reassured that planting dates need not be delayed (as it might be for no-till on poorly drained soils in some springs), and that early corn growth rates and final yields are comparable to those with conventional tillage. Furthermore, the soil savings with strip tillage preserves long-term productivity.

## **Title Midwest Fruit Workers**

The Midwest Fruit Workers consists of Extension personnel with responsibility for fruit from 11 Midwestern states; Arkansas, Illinois, Indiana, Iowa, Kansas, Kentucky, Missouri, Nebraska, Ohio, West Virginia and Wisconsin. This group meets annually at the Midwest Fruit Workers Conference in Indianapolis to work on cooperative publications. Each year, the Commercial Tree Fruit Spray Guide and Midwest Small Fruit and Grape Spray Guide are revised and updated to provide growers with the latest information regarding pest management alternatives. Other publications produced by this group include Midwest Tree Fruit Pest Management Handbook and Midwest Small Fruit Pest Management Handbook. Publications targeted at home fruit growers include Tree Fruits: Insect and Disease Management for Backyard Fruit Growers in the Midwest and Small Fruits: Insect and Disease Management for Backyard Fruit Growers in the Midwest. For each of these publications, the pooled knowledge of Extension specialists from all the cooperating states is merged to produce a single set of recommendations that are used throughout the region. In addition, 5 entomologists from Illinois, Indiana, Kentucky, Missouri, and Ohio are working cooperatively to evaluate new, safer pesticides for control of codling moth, the primary insect pest of apples. They are also testing non-chemical control of codling moth with innovative methods of mating disruption using pheromones.

By combining the expertise of Extension specialists from a number of states, the publications produced are more comprehensive than those that could be produced by individual states. A single, consistent set of recommendations is used throughout the Midwest. These publications are the primary source of pest management information for commercial fruit growers in the cooperating states. For states that are unable to devote much Extension involvement in fruit production, such as Kansas, the Midwest Fruit Workers provide materials that can be used to meet the needs of their clientele. The result is that commercial and backyard fruit growers throughout the Midwest having the latest information regarding fruit production and pest management. In the area of pest management, the result is that fruit growers will use the correct pesticides for particular pests at the proper time, resulting in improved control, less overall pesticide use, and reduced pesticide residues on fruit crops.

## **Soybean Aphid Ecology & Integrated Pest Management (IPM)**

Prior to the invasion of the soybean aphid, soybeans in the US North Central Region typically did not suffer intense pressure from insect pests. The infestation of the aphid now extends over a 20 state area challenging pest managers to develop new approaches to managing this serious pest of soybean production. In collaboration with Purdue Extension, several Purdue departments and multi-state collaborations my lab is helping define sampling protocols, management thresholds, aphid-natural enemy ecology relationships, and primary-secondary hosts associations. The range of reported yield losses in Indiana and other mid-western states amounts to tens of millions of dollars, annually. Purdue research is providing pest managers key information on aphid-host relationships, the effects of soybean production practices on aphid densities and damage, and the importance of natural enemies on aphid dynamics and control. Our research will provide soybean producers effective and environmentally-sound methods of managing this devastating invasive

pest by: 1. Aphid-host relations: Understanding which species can serve as hosts, and their relative distribution and abundance, allows pest managers to map out areas at higher risk, and mobilize scarce resources to manage the insect before it reaches pestiferous levels. 2. Soybean production practices: Determined that aphid population densities and growth rates were not affected by plant age (planting date). A statewide survey of aphid densities showed that the northern one-half of the state was heavily infested, and insecticides were commonly applied there. These findings will impact management decisions and identify areas of risk where management efforts can be focused. 3. Endemic natural enemies: The impact and ecology of endemic natural enemies has shown that predators present in the field before aphids arrive can have a significant effect on subsequent aphid densities, however this impact is influenced by the presence of alternative prey. These findings will impact early-season pesticide application decisions as well as form the basis for preventative pest management practice for soybean aphid IPM.

### **Fungicide Sensitivity Profiles for Indiana Golf Courses**

Dollar spot is a problem on every golf course in the state (actually the entire NE quarter of the country). Although the disease does not kill the grass plants, it results in a poor appearance, reduces playability and predisposes turf to contamination by weeds. The disease is active from May through October, and is aggravated by more intensive turf management practices. Because nearly half of the pesticide budget is used for dollar spot control, superintendents are interested in the sensitivity of dollar spot strains on their golf courses to common fungicides for disease control. Our turf pathology group in the department of Botany and Plant Pathology conducts assays to determine the fungicide sensitivity of the dollar spot pathogen population on Indiana golf courses. The initial survey included isolates of the dollar spot fungus from seventeen courses. To date, more than 300 isolates have been collected representing 40 - 50 courses. Each participating golf course was provided a fungicide sensitivity profile which described expected disease control efficacies for three common fungicides.

With these fungicide sensitivity profiles, superintendents gain awareness of the dollar spot threat on their own golf courses and often change their management practices accordingly. As a result, they are likely to apply less fungicide while maintaining an attractive high quality playing surface. Benefits include reduced fungicide expenditures, less pesticide added to the environment, and a greater likelihood of applying the most appropriate fungicide to control disease. More than 75% of the respondents to a follow up survey indicated that the results of our work increased their awareness of fungicide resistance issues. More than half of the respondents indicated that they will change their management practices based on this new information. More than 80% indicated that the information will help them develop improved long term strategies for resistance management. Comments added to the survey included the following: "This is one of the most helpful pieces of information I have ever received." "Good program to continue. We are thankful for your work and hope it continues..." "This will be a very valuable practice tool for use by the golf course supt. I believe the research will help better organize chemical programs, save money and eliminate certain unneeded chemical applications." "As an environmentally conscious Superintendent managing a Certified Audubon Cooperative Sanctuary, I also

appreciate this research because of the beneficial impact it will have on the environment. Without this data, it's very possible that less effective fungicides would unnecessarily be applied more frequently and at higher rates."

### **Food Biotechnology: Dreams from the fields**

An August 2002 survey by the International Food Information Council (IFIC) found that only 35% of American consumers were aware that foods from biotech crops were sold in supermarkets. Current estimates are that 80% of all processed foods contain ingredients from genetically-modified plants. The lack of understanding by American consumers about this new technology may lead to the same lack of confidence in food systems that have been expressed by European consumers and grocers. Providing American consumers with science-based information will allow them to make informed decisions regarding the acceptability of these products. Department of Foods and Nutrition cooperative extension efforts have developed and delivered a training program to provide science-based information to physicians (3,800), registered dietitians and nutritionists (105), food technologists (323), k-12 science teachers (114), cooperative extension educators and specialists (184), producers and producer groups (597), college students (2,493), toxicologists (100), biotech industry personnel (29), miscellaneous professionals (40), food service workers (100) and consumers (1,103). Through a program entitled 'Food Biotechnology: Dreams from the fields', we have provided training to 8,988 in three countries (USA, Philippines, Mexico) with 1,353 participants completing an assessment survey including over 826 that completed pre- and post-training surveys to determine the outcome of training on participants knowledge and attitudes.

Following training, 98-99% correctly indicated that fruits and vegetables contain chromosomes and foods from biotech crops are currently sold in grocery stores. Prior to training, only 31% felt that these crops were properly regulated by federal agencies and only 25% were confident that bioengineering was unlikely to make an existing food allergenic. Following training, 83% felt that these crops were properly regulated and 63% believed that biotechnology was unlikely to add new allergens to our food supply. In addition, 90% of those trained would eat or serve genetically-modified foods to their family and 90% believed that they or their family would benefit from genetically-modified foods within the next 5-years. It is apparent from these results that when provided sound, science-based information, participants are more accepting of this technology and the regulatory process. Consumers are more accepting of food biotechnology when provided with balanced, science-based information.

### **Plants Use Conserved Mechanisms to Regulate the Actin Cytoskeleton and Cell Shape**

A better understanding of plant cell growth mechanisms is needed if future efforts to alter the physical and chemical properties of plant cells are to be widely successful. Data demonstrate the importance of the ARP2/3 complex in the generation of a normal actin cytoskeleton during cell growth. Molecular genetic and cell biological experiments using Arabidopsis will help to understand how signaling processes affect the actin cytoskeleton during growth and

development. Recent gene cloning experiments have shown that an evolutionarily conserved ARP2/3 complex is required for normal cell growth and development.

The actin cytoskeleton plays a central role in plant growth by providing both tracks for transport of new wall materials for growth, and perhaps a driving force for organelle transport. Understanding the mechanisms by which the actin cytoskeleton is reorganized will permit more rational engineering of plant cell and organ architecture.

### **Fruit Breeding**

Indiana horticulture requires new high quality, disease resistant cultivars of apples and pears. The apple breeding program is a cooperative effort with Purdue University, the University of Illinois and Rutgers, The State University of New Jersey.

Two high quality, disease-resistant apples have been released: Pixie Crunch, a red very crisp apple that should appeal to children, and Sundance, a yellow apple with resistance to many diseases including apple scab. A new pear with tolerance to the disease fire blight has also been released: Green Jade. These new cultivars of apple and pear should provide new options for Indiana fruit growers and Indiana home owners who grow fruit in their yards.

### **Determining Non-Laying Hens**

On average, nearly 28% of all layer hens fail to lay. This additional housing and feed cost poultry producers millions of dollars annually. A method has been established to selected identify non-laying or low producing hens. Through this selection procedure, Purdue can assist poultry producers in the selection of non-laying or low producing hens. This method of selection can effectively reduce 1 to5% of the non-layers in a flock, which in turn increases the overall profitability of a layer operation.