

2009 Purdue University Combined Research and Extension Annual Report of Accomplishments and Results

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I. Report Overview

1. Executive Summary

At Purdue University, professors, scientists, staff and students work daily to unlock both new knowledge and new methods for transferring that knowledge to the global community. The following overview highlights a portion of our efforts in integrated programs, combining achievements in science with service to students and society. These efforts are the result of diverse collaborations among many individuals and organizations from academia, government, industry and community stakeholders. From our University and College Strategic Plans, we:

- Launch tomorrow's leaders by enhancing student success with careers in a dynamic global society, as well as foster intellectual, professional and personal development for lifelong learning.
- Promote discovery with delivery by conducting field-defining research with breakthrough outcomes and catalyze research-based economic development and entrepreneurship.
- Meet global challenges by enhancing Purdue's presence and impact in addressing grand challenges of humanity.

GLOBAL FOOD SECURITY AND HUNGER: *Boost U.S. agricultural production, improve global capacity, and foster innovation in fighting hunger*

The tremendous need for increased food production requires plant animal and production systems to become much more efficient; more outputs, fewer inputs, smaller land base, changing global environment. These challenges demand a comprehensive food production enterprise from the molecular to the marketplace.

Heat and drought stress (biotic and abiotic) and competition with weeds are the most important factors affecting crop production with as much as one-third of the corn production and nearly all of the sorghum production in the United States experiencing yield-reducing stress conditions at some point during the growing season. An array of corn genotypes with diverse forms of early-, mid-, and late-season drought tolerance were identified, and studies continue to understand the genetic and physiological bases for these stress tolerance traits. Weed management is one of the most important considerations impacting sorghum grain production, so herbicide tolerance traits are used as tools for development of new weed management strategies for sorghum in the U.S. and in Africa

Although CAFOs (Confined Animal Feeding Operations) are already a common fixture in the rural landscape, offering production efficiency, cheaper and higher quality meat products, and employment opportunities plus organic nutrients returned to the soil. However, the effects of such high-intensity production lots on the neighboring human landscape are still being identified. Over 230 local decision makers such as area planning commissioners, highway engineers and county councils were accurately informed of these issues through presentations about CAFO operators, and tax and environmental data. Informed decisions are necessary for the counties examining comprehensive land use plan and zoning ordinances.

The food versus fuel debate has sparked wide-scale debate, with the Midwest farm producers caught in the middle. One new ethanol production process under development, extracts corn proteins and oils for food and industrial applications before the carbohydrates subjected to fermentation. This process may circumvent the debate by producing both food and fuel from the same grain.

CLIMATE CHANGE: *Develop an agriculture system that maintains high productivity in the face of climate changes*

Characterizing the potential impacts of global environmental changes is critical both for informing decisions that have consequences for the rate of environmental change and for preparing society for that future. Changes in the abundance of, and competition between plant species, composition of plant ecosystems, or changes in land use impact those ecological communities, the neighboring human communities and the global community as well.

The effect of global warming on grassland systems is modeled through an outdoor environmental simulation laboratory, manipulating field plot temperature and precipitation inputs via heat lamps and irrigation controls. The adjacent public display area informs high school teachers and student visitors about the carbon cycle, climate change and grassland ecology. The amount of CO₂ sequestered in north-central Indiana forestlands in the second half of the 20th Century is analyzed through remote sensing data. The changing land use patterns in Indiana, reduction of agricultural areas and increase in urban sprawl,

is representative of changing land use patterns across the globe. Adopting improved soil and crop management practices may increase the soil organic carbon sequestration rate by 50%.

While land use changes have their most visible impact on above-ground plant communities, the hydrologic cycle of the region is increasingly impacted. Understanding the changes in seasonal precipitation, soil temperatures and snow cover affect agriculture, wildlife, water quality and ultimately the human quality of life in the region. This Purdue research and outreach effort helps the City of Chicago plan for climate change in this century. The study of agricultural inputs, management practices, soil moisture, streamflow dynamics, land use and human impacts, collectively the "Agroecology", is another primary focus for many faculty members, working to bring new focus to the Grand Challenges of agriculture throughout the Midwest in a changing world.

SUSTAINABLE ENERGY: Develop biomass used for biofuels, design optimum forestry and crops for bioenergy production, and produce value-added bio-based industrial products

Purdue University has established a depth and breadth of programs in bioenergy production and policy by creating programs with local relevance and international reach. Our bioenergy research encompasses the entire bioenergy supply chain of disciplines; from feedstock processing through information processing.

Evaluation of agronomic inputs and biomass outputs determines appropriate crops and cropping systems to yield both high quality biomass feedstock and long-term environmental benefits in the Midwest. These efforts link research and development efforts in agroecology production and conservation with biomass processing and conversion. Feedstock from agronomic crops and forest products are converted to ethanol more efficiently through the development of cellulosic pre-treatment processes, adding value to agricultural products and decreasing costs to bioenergy producers. This work enables testing of designs for large scale pretreatment and bioprocessing of cellulosic materials to ethanol and has the potential to expand markets of agriculturally sustainable sources of renewable cellulosic feedstocks for biofuels production.

Such collaborative efforts across disciplines and our three-part mission result in technology transfer from research experience to real enterprise. The utilization of biodiesel is made commercially viable in cold climates by developing unique processing techniques to mimic the characteristics of petroleum diesel. This "adductive crystallization process" produces 100% biodiesel fuels with gellation temperatures below -50 degrees C, and is currently being pilot tested in industry. Similarly, one solution to the dual issues of waste generation and fuel supply for electricity generators at US Army forward operating bases is the Tactical Garbage to Energy Refinery (TGER) which can process about 1 ton per day of food, paper and plastic waste into biofuels to power a 60 kW generator. With industry collaborators, Purdue engineered and created two TGER prototypes which successfully underwent actual in-field testing by the U.S. Army at Victory Base Camp in Iraq.

The myriad streams of bioenergy-related data must be transformed into concise information analysis for the policy and regulatory community. Energy volumes and emissions data were added to the Global Trade Analysis Project, a globally consistent database containing regional data on international production, trade and household income distribution. GTAP is the only database of its kind in the world and is used extensively by academic researchers and policy makers to examine the economic impacts of trade and environmental issues. Research and engagement activities contribute to a better understanding of the consequences of biofuels policy alternatives, encompassing the Renewable Fuel Standard, crude oil prices, cellulosic biofuels, the ethanol import tariff, the ethanol blend wall, and critically, a better understanding of the link between biofuels and food prices.

CHILDHOOD OBESITY: Ensure that nutritious foods are affordable and available and provide guidance so that individuals and families are able to make informed, science-based decisions about their health and well-being

In 2008, Indiana ranked eleventh in obesity, with approximately 26 percent of the population categorized as obese according to CDC's Behavioral Risk Factor Surveillance System. Since obesity is certainly the result of a large number of physiological, sociological and economic factors, the long-term solution will similarly include a range of scientific and behavioral factors.

Consumption of Omega 3 fatty acid is associated with decreased risks for obesity, diabetes and cardiovascular diseases. Though Omega 3 is most commonly associated with fish, soybean plants also may be developed to derive these products as a cheap and nutritionally adequate alternative to fish. Dietary components such as curcumin (from curry), selenium (a trace mineral from a variety of foods) and piceatannol (a bioactive component in red wine) are being evaluated to determine their physiological function at the cellular level for a reduction in obesity. Increased fiber consumption also is a critical need in the fight against obesity, yet is not particularly palatable for youths. Fiber extrusion processing improvements yield increased quality and nutritional composition of corn by-products specifically for inclusion in breakfast cereals.

Extension educators in multiple disciplines deliver a wide variety of new knowledge and proven programs at the community level. The USDA MyPyramid guidelines were the focus for 19 "RECIPE for Growing Healthy Children" workshops targeting staff that provide food service in childcare settings. Childcare providers were empowered to set goals to improve both the foodservice environment and menus. This included knowledge of dietary regulations and teaching children to monitor their own eating habits. "Exploring MyPyramid with Professor Popcorn" was taught to over 20,000 kids in grades 1 to 6, to help establish lifelong food, nutrition and physical activity habits.

From the cellular level to the classroom level, *Purdue Extension*, the *College of Agriculture*, and the *College of Consumer and Family Sciences* discover new knowledge and deliver new programs to youths and adults to help develop healthier humans with healthier habits.

FOOD SAFETY: *Reduce the incidence of food-borne illness and provide a safer food supply*

Within the past decade, the number of foodborne outbreaks and illnesses associated with produce has doubled (www.cfsan.fda.gov). Recent notable outbreaks include raw and cut spinach contaminated with *E. coli* O157:H7 and tomatoes and peppers contaminated with *Salmonella Saintpaul*. Combined, these incidents lead to over 1500 illnesses, 5 deaths, and over 300 hospitalizations. The estimated economic impact of just these two outbreaks exceeds \$250 million.

The Purdue University research, education and Extension portfolio encompasses a continuum of disciplinary expertise, from basic microbiology to public sector technology transfer directed at the Food Safety community of producers, distributors and consumers. A bacterial anti-Salmonella intervention was developed to eliminate foodborne pathogens in swine and poultry. The role of a single gene in a bacterium provides new insight on the ability of pathogenic microbes to withstand food preservatives and microbial poisons. Rapid spectroscopy technologies are developed to detect *Salmonella* and *E. coli* pathogens in meat and produce, or even to detect melanine adulteration in infant formula in bare minutes. Professors, researchers and educators bring food safety and processing technologies directly to the producers and consumers through Extension programs as well as a collaboration of universities, trade and professional organizations and regulatory agencies via the Retail Food Safety Consortium national website www.retailfoodsafety.org.

From a nanoscale anti-pathogen delivery system to a retail foods information delivery system, Purdue University scientists deliver the fundamental knowledge, technological solutions and practical programs to provide a safer food supply across the country and around the globe.

Total Actual Amount of professional FTEs/SYs for this State

Year: 2009	Extension		Research	
	1862	1890	1862	1890
Plan	130.9	0.0	238.5	0.0
Actual	124.7	0.0	397.6	0.0

II. Merit Review Process

1. The Merit Review Process that was Employed for this year

- Internal University Panel
- External Non-University Panel
- Combined External and Internal University External Non-University Panel

2. Brief Explanation

Teams working on planned programs provide continual review of progress toward goals and outcomes, including assessing whether additional topics should be added because of changing needs. County Extension Boards continue to review planned programs on an annual basis to ensure programs address critical local needs. The Purdue Council on Agricultural Research, Extension, and Teaching (PCARET) meets semi-annually with county, district, and state administrators to discuss needs and how Extension and research are addressing or could address needs. An annual PCARET conference also provides an opportunity for the state PCARET to

review progress on planned programs and provide input on expectations of future needs and programs.

Hatch research projects are peer reviewed prior to submission to USDA-NIFA. Review panels consist of at least three scientists that include faculty from at least two disciplines. Faculty members are strongly encouraged to collaborate across departments, schools, and universities. Multi-state projects are reviewed by regional department head associations and the Multi-State Review Committee composed of agricultural experiment station directors. Reviewers look for relevance, feasibility, building on previous research, approach and methods, scientific and technical merit.

Academic departments are reviewed every 5 years by an external NIFA team. The research, extension and teaching components of each department are examined during these reviews. These reviews provide an additional opportunity for merit review of research and extension programming.

III. Stakeholder Input

1. Actions taken to seek stakeholder input that encouraged their participation

- Use of media to announce public meetings and listening sessions
- Targeted invitation to traditional stakeholder groups
- Targeted invitation to non-traditional stakeholder groups
- Targeted invitation to traditional stakeholder individuals
- Targeted invitation to non-traditional stakeholder individuals
- Targeted invitation to selected individuals from general public

Brief explanation.

{NO DATA ENTERED}

2(A). A brief statement of the process that was used by the recipient institution to identify individuals and groups stakeholders and to collect input from them

1. Method to identify individuals and groups

- Use Advisory Committees
- Use Internal Focus Groups
- Open Listening Sessions
- Needs Assessments

Brief explanation.

{NO DATA ENTERED}

2(B). A brief statement of the process that was used by the recipient institution to identify individuals and groups who are stakeholders and to collect input from them

1. Methods for collecting Stakeholder Input

- Meeting with traditional Stakeholder groups
- Survey of traditional Stakeholder groups
- Meeting with traditional Stakeholder individuals
- Survey of traditional Stakeholder individuals
- Meeting with the general public (open meeting advertised to all)
- Meeting specifically with non-traditional groups
- Survey specifically with non-traditional groups
- Meeting specifically with non-traditional individuals
- Survey specifically with non-traditional individuals
- Meeting with invited selected individuals from the general public

Brief explanation.

{NO DATA ENTERED}

3. A statement of how the input will be considered

- To Identify Emerging Issues
- Redirect Extension Programs
- Redirect Research Programs
- In the Action Plans
- To Set Priorities

Brief explanation.

{NO DATA ENTERED}

Brief Explanation of what you learned from your Stakeholders

Stakeholders continue to recognize Purdue as a trusted source of information to strengthen agriculture, families, youth and communities. They ask us to continue efforts in each of these areas. Research and Extension programs described in this plan of work reflect key concerns of stakeholders. Stakeholders encourage focusing efforts on relevant issues to maximize resources.

IV. Expenditure Summary

1. Total Actual Formula dollars Allocated (prepopulated from C-REEMS)			
Extension		Research	
Smith-Lever 3b & 3c	1890 Extension	Hatch	Evans-Allen
8456771	0	5486146	0

2. Totaled Actual dollars from Planned Programs Inputs				
Extension			Research	
	Smith-Lever 3b & 3c	1890 Extension	Hatch	Evans-Allen
Actual Formula	7386867	0	5412278	0
Actual Matching	13561544	0	22674636	0
Actual All Other	2170884	0	9010383	0
Total Actual Expended	23119295	0	37097297	0

3. Amount of Above Actual Formula Dollars Expended which comes from Carryover funds from				
Carryover	2380740	0	1604166	0

V. Planned Program Table of Content

S. No.	PROGRAM NAME
1	Youth Development
2	Economics, Markets, and Policy
3	Agricultural, Natural Resources, and Biological Engineering
4	Food and Non-Food Products: Development, Processing, Quality, and Delivery
5	Family Well-Being
6	Human Nutrition, Food Safety and Human Health and Well-Being
7	Natural Resources and Environment
8	Plants and Their Systems
9	Animals and Their Systems
10	Economic and Community Development

V(A). Planned Program (Summary)

Program # 1

1. Name of the Planned Program

Youth Development

V(B). Program Knowledge Area(s)

1. Program Knowledge Areas and Percentage

KA Code	Knowledge Area	%1862 Extension	%1890 Extension	%1862 Research	%1890 Research
806	Youth Development	100%		100%	
	Total	100%		100%	

V(C). Planned Program (Inputs)

1. Actual amount of professional FTE/SYs expended this Program

Year: 2009	Extension		Research	
	1862	1890	1862	1890
Plan	10.0	0.0	0.0	0.0
Actual	18.7	0.0	0.1	0.0

2. Actual dollars expended in this Program (includes Carryover Funds from previous years)

Extension		Research	
Smith-Lever 3b & 3c	1890 Extension	Hatch	Evans-Allen
1030984	0	18457	0
1862 Matching	1890 Matching	1862 Matching	1890 Matching
1223046	0	200404	0
1862 All Other	1890 All Other	1862 All Other	1890 All Other
819951	0	158455	0

V(D). Planned Program (Activity)

1. Brief description of the Activity

- Develop curriculum educational workshops
- Conduct evaluation/research
- Participate in collaborations that have a youth focus
- Conduct website development
- Provide youth and volunteer training and development

2. Brief description of the target audience

- Youth --- Grades K-12
- Volunteers
- Public/Private School Teachers

V(E). Planned Program (Outputs)

1. Standard output measures

2009	Direct Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
Plan	15000	250000	250000	150000
Actual	118312	1588455	427012	502940

2. Number of Patent Applications Submitted (Standard Research Output)

Patent Applications Submitted

Year: 2009

Plan: 0

Actual: 0

Patents listed

3. Publications (Standard General Output Measure)

Number of Peer Reviewed Publications

2009	Extension	Research	Total
Plan	5	0	
Actual	7	0	0

V(F). State Defined Outputs

Output Target

Output #1

Output Measure

- Number of new/revised curriculum topics

Year	Target	Actual
2009	5	9

Output #2

Output Measure

- Number of evaluations conducted of 4-H Youth Development programs, events and activities

Year	Target	Actual
2009	25	46

Output #3

Output Measure

- Number involved in youth focused community collaborations

Year	Target	Actual
2009	2500	17679

Output #4**Output Measure**

- Number of quality, educational workshops for youth audiences

Year	Target	Actual
2009	150	4063

Output #5**Output Measure**

- Number of volunteer development opportunities

Year	Target	Actual
2009	100	4070

Output #6**Output Measure**

- Number of camp counselors trained

Year	Target	Actual
2009	10	1597

Output #7**Output Measure**

- Number of volunteers participating in volunteer development opportunities

Year	Target	Actual
2009	50	619

Output #8**Output Measure**

- Number of youth participating in Career Development Events

Year	Target	Actual
2009	10	17708

Output #9**Output Measure**

- Number of youth participating in educational workshops

Year	Target	Actual
2009	100	93630

V(G). State Defined Outcomes**V. State Defined Outcomes Table of Content**

O. No.	OUTCOME NAME
1	Number of volunteers reporting management of safe environments in which 4-H youth have the opportunity to learn.
2	Number of youth who increased knowledge of good character traits, goal setting, team work, communication techniques, decision making, and handling conflict
3	Number of 4-H youth who indicate they possess the skills to practice good character, to plan and organize community service activities, and have the skills to be actively engaged in local, state, and national issues
4	Number of youth at the culmination of their 4-H career who report life skills developed through the program, know how to set goals, work cooperatively in a team, communicate effectively, make decisions based on data and the opinions of others, honor individual differences and handle conflict.
5	Number of youth involved in community service activities
6	Number of counties that have established goals for increasing the types of geographic settings in which programs are offered and increasing the opportunity for youth to be engaged in 4-H club work with a likely result in an increase in the number of youth in 4-H Youth Development Programs.
7	Number of counties that experience growth and diversity in 4-H Youth Development Program opportunities and resources for youth.
8	Number of plans developed for volunteer development focused on educating volunteers to increase their understanding of life skill development, experiential learning, risk management, and group management.
9	Number of volunteers and Extension staff who report improved knowledge and skills in supporting, delivering, and/or managing quality positive youth development experiences and program planning for youth.

Outcome #1

1. Outcome Measures

Number of volunteers reporting management of safe environments in which 4-H youth have the opportunity to learn.

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2009	2000	2836

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

Appropriate and safe environments in which young people can learn are fundamental to the success of the 4-H youth development program.

What has been done

Three new resources for volunteers were developed and presented in electronic format allowing volunteers the opportunity to participate in real-time or at their convenience.

Results

2836 volunteers participated in volunteer development focused in these sessions and 92% reported new ideas being implemented in 4-H club meetings.

4. Associated Knowledge Areas

KA Code	Knowledge Area
806	Youth Development

Outcome #2

1. Outcome Measures

Number of youth who increased knowledge of good character traits, goal setting, team work, communication techniques, decision making, and handling conflict

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2009	0	5114

3c. Qualitative Outcome or Impact Statement**Issue (Who cares and Why)**

During the pre teen/early teen years, youth face many issues including peer pressure, assuming responsibility for one's own actions and assuming leadership roles.

What has been done

Programs have been developed to offer youth the opportunity to explore relationships with others and develop skills to assume leadership roles in club and organizational settings. 4 H Jr. Leader Programs that have as a primary target those youth enrolled in grades 8 to 12 have been designed to specifically target this age group and offer programs and experiences to build important interpersonal skills.

Results

5114 Indiana youth enrolled and participated in their local Jr. Leader program and activities. 29,470 youth indicated when surveyed that after concluding participation in specific 4 H educational programs they had increased their knowledge of good character traits, goal setting, teamwork, communication techniques, decision making, and handling conflict.

4. Associated Knowledge Areas

KA Code	Knowledge Area
806	Youth Development

Outcome #3**1. Outcome Measures**

Number of 4-H youth who indicate they possess the skills to practice good character, to plan and organize community service activities, and have the skills to be actively engaged in local, state, and national issues

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2009	0	7680

3c. Qualitative Outcome or Impact Statement**Issue (Who cares and Why)**

Youth who develop decision making skills and positive personal character are more likely to cooperate and work well with others. Learning through team building skills allows youth to begin to recognize and identify needs, concerns and interests of others resulting in success when dealing with others.

What has been done

Programs were conducted in fifth grade classrooms to help students develop skills that prevent antisocial and high risk behaviors. Students are provided with experiences that help them to clarify their roles as citizens, develop decision making skills, interact with positive role models and explore ideas on issues that are relevant to their lives.

Results

7,680 participant evaluations using the Scale of Juvenile Legal Attitudes (pre and 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, classroom teachers report a positive change in general student attitude after completion.

4. Associated Knowledge Areas

KA Code	Knowledge Area
806	Youth Development

Outcome #4

1. Outcome Measures

Number of youth at the culmination of their 4-H career who report life skills developed through the program, know how to set goals, work cooperatively in a team, communicate effectively, make decisions based on data and the opinions of others, honor individual differences and handle conflict.

Not Reporting on this Outcome Measure

Outcome #5

1. Outcome Measures

Number of youth involved in community service activities

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2009	3000	16844

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

Learning how to contribute to society to make life better for oneself and others is a valuable life skill. Youth who volunteer are 50% less likely to abuse drugs, alcohol, cigarettes, or engage in destructive behavior (Search Institute, 1995). Youth who volunteer are also more likely to do well in school, graduate, vote, and be philanthropic (UCLA/Higher Education Research Institute, 1991).

What has been done

Indiana 4 H Youth are encouraged to become involved in the community by learning to give back to others through community service activities. Activities range from supporting the Operation Military Kids Program by assembling and distributing Hero packs to the children of recently deployed National Guard and Army Reserve units, to conducting events in health care facilities, collecting canned goods for food pantries, providing assistance to community shelters, community beautification and recycling.

Results

Participating teens' presence and involvement in their local communities provides both service and encouragement to individuals who sometimes have difficulty fulfilling basic needs. Teens reported an increased awareness of the level of need in the local community as well as options for serving others. They also indicated they are able to "put a face on poverty" and developed a sense of pride in giving to others. 16,844 youth were directly involved in community service activities.

4. Associated Knowledge Areas

KA Code	Knowledge Area
806	Youth Development

Outcome #6

1. Outcome Measures

Number of counties that have established goals for increasing the types of geographic settings in which programs are offered and increasing the opportunity for youth to be engaged in 4-H club work with a likely result in an increase in the number of youth in 4-H Youth Development Programs.

Not Reporting on this Outcome Measure

Outcome #7

1. Outcome Measures

Number of counties that experience growth and diversity in 4-H Youth Development Program opportunities and resources for youth.

Not Reporting on this Outcome Measure

Outcome #8

1. Outcome Measures

Number of plans developed for volunteer development focused on educating volunteers to increase their understanding of life skill development, experiential learning, risk management, and group management.

Not Reporting on this Outcome Measure

Outcome #9

1. Outcome Measures

Number of volunteers and Extension staff who report improved knowledge and skills in supporting, delivering, and/or managing quality positive youth development experiences and program planning for youth.

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2009	2000	3858

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

4-H Community Club programming success is dependent upon capable and competent extension staff and volunteers. A needs assessment conducted in 2008 indicated that both staff and volunteers felt they needed to retool in the fundamentals of successful 4-H club experiences.

What has been done

Staff and volunteer development materials were created and disseminated via web seminars for the following topics: 4-H 101, 4-H IN Toolbox for Success and What Every 4-H Leader Should Know. These sessions focus on everything from descriptions of welcoming environments to sample agendas for meetings, lesson plans to teach from, tips for involving parents, to evaluating effectiveness of meetings.

Results

3858 volunteers and Extension staff completed evaluations reporting that information presented was relevant, practical, and easy to implement. Over 900 follow up evaluations indicate volunteers increased their confidence and knowledge of 4-H program guidelines, policies and how to better work with people leading to more effective interactions with youth and parents engaged in programming.

4. Associated Knowledge Areas

KA Code	Knowledge Area
806	Youth Development

V(H). Planned Program (External Factors)

External factors which affected outcomes

- Natural Disasters (drought, weather extremes, etc.)
- Economy
- Appropriations changes
- Public Policy changes
- Government Regulations
- Competing Public priorities
- Competing Programmatic Challenges
- Populations changes (immigration, new cultural groupings, etc.)

Brief Explanation

{No Data Entered}

V(I). Planned Program (Evaluation Studies and Data Collection)

1. Evaluation Studies Planned

- After Only (post program)
- Retrospective (post program)
- Before-After (before and after program)
- Time series (multiple points before and after program)
- Case Study
- Other (ongoing needs assessment)

Evaluation Results

{No Data Entered}

Key Items of Evaluation

{No Data Entered}

V(A). Planned Program (Summary)**Program # 2****1. Name of the Planned Program**

Economics, Markets, and Policy

V(B). Program Knowledge Area(s)**1. Program Knowledge Areas and Percentage**

KA Code	Knowledge Area	%1862 Extension	%1890 Extension	%1862 Research	%1890 Research
601	Economics of Agricultural Production and Farm Management	15%		15%	
602	Business Management, Finance, and Taxation	8%		8%	
603	Market Economics	13%		13%	
604	Marketing and Distribution Practices	27%		27%	
605	Natural Resource and Environmental Economics	11%		11%	
606	International Trade and Development	11%		11%	
607	Consumer Economics	7%		7%	
609	Economic Theory and Methods	3%		3%	
610	Domestic Policy Analysis	4%		4%	
611	Foreign Policy and Programs	1%		1%	
	Total	100%		100%	

V(C). Planned Program (Inputs)**1. Actual amount of professional FTE/SYs expended this Program**

Year: 2009	Extension		Research	
	1862	1890	1862	1890
Plan	22.0	0.0	18.0	0.0
Actual	14.9	0.0	22.3	0.0

2. Actual dollars expended in this Program (includes Carryover Funds from previous years)

Extension		Research	
Smith-Lever 3b & 3c	1890 Extension	Hatch	Evans-Allen
910594	0	111140	0
1862 Matching	1890 Matching	1862 Matching	1890 Matching
1569349	0	1990012	0
1862 All Other	1890 All Other	1862 All Other	1890 All Other
124957	0	363251	0

V(D). Planned Program (Activity)

1. Brief description of the Activity

- The Center for Trade Policy Analysis conducted workshops with stakeholders on the expected economic impacts of trade and domestic agricultural policy.
- The New Ventures Team and staff in the Agricultural Innovation and Commercialization Center offered workshops throughout the state on entrepreneurship and starting new value-added businesses.
- Agricultural policy workshops were conducted with farm groups such as the Indiana Farm Bureau and the Farm Policy Study Group.
- Websites such as the Agricultural Economic Reports provided timely analysis on marketing, management, and policy issues.
- Econometric and simulation models were specified and validated to determine the socioeconomic impacts of proposed international trade and domestic agricultural policy proposals.
- Tax schools and workshops on farm management , commodity marketing, risk management, credit analysis and management, and estate planning were held.

2. Brief description of the target audience

•Indiana farmers •State and Federal government policy makers, especially the Indiana State Department of Agriculture and the Office of the Secretary of Agriculture •Indiana general farm and commodity organizations such as Indiana Farm Bureau, Indiana Pork Producers, Indiana Soybean Alliance •Agricultural input supply industry managers such as Monsanto, DuPont-Pioneer, John Deere, Beck Hybrids, Dow-AgroSciences •Agricultural marketing firms such as Tate & Lyle, ADM, Countrymark, Cargill •International trade organizations and officials including the Office of the U.S. Special Trade Representative and WTO in Geneva

V(E). Planned Program (Outputs)

1. Standard output measures

2009	Direct Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
Plan	10000	25000	250	2000
Actual	27810	115668	758	6365

2. Number of Patent Applications Submitted (Standard Research Output)

Patent Applications Submitted

Year: 2009

Plan: 0

Actual: 0

Patents listed

3. Publications (Standard General Output Measure)

Number of Peer Reviewed Publications

2009	Extension	Research	Total
Plan	15	25	
Actual	0	73	0

V(F). State Defined Outputs

Output Target**Output #1****Output Measure**

- Number of programs with state and federal government officials on trade and farm policy development and impact assessment

Year	Target	Actual
2009	10	15

Output #2**Output Measure**

- Number of programs offered to food and agri-business leaders by the Center for Food and Agricultural Business

Year	Target	Actual
2009	15	38

Output #3**Output Measure**

- Number and quality of peer reviewed research publications in professional journals on economics, management, markets, new and small business development, and policy

Year	Target	Actual
2009	25	73

Output #4**Output Measure**

- Number of programs with Indiana farmers on farm management and commodity marketing such as the annual Top Crop Farmer Workshop, Farm Management Tour, and the Outlook Campaign

Year	Target	Actual
2009	50	98

Output #5**Output Measure**

- Number of programs offered to tax professionals, attorneys, lenders and other professionals advising farmers and small business owners

Year	Target	Actual
2009	20	119

Output #6**Output Measure**

- Number of programs offered to entrepreneurs and small business owners as part of the Agricultural Innovation and Commercialization Center/New Ventures

Year	Target	Actual
2009	25	13

Output #7

Output Measure

- Number of programs on the economics of biofuels

Year	Target	Actual
2009	10	32

Output #8

Output Measure

- Number of estate planning programs offered to farm and family business owners

Year	Target	Actual
2009	5	29

Output #9

Output Measure

- Number of risk management education programs

Year	Target	Actual
2009	5	88

V(G). State Defined Outcomes**V. State Defined Outcomes Table of Content**

O. No.	OUTCOME NAME
1	Number of participants who increase their knowledge of commodity markets and marketing contracts
2	Number of Indiana farmers who increase the use of commodity markets and marketing contracts to reduce price risk and increase profitability
3	Number of Indiana farms that increase productivity and profitability
4	Number of farm and commodity organization members who increase their knowledge of the potential economic impacts of alternative farm commodity program provisions such as implications for exports, domestic utilization and price, farm income, and government farm program expenditures
5	Number of research-based studies, publications, and reports for policy organization members and legislators on the consequences of their international trade and farm commodity program choices in Farm Bill and related federal legislation
6	Number of research-based analyses of trade liberalization and market-oriented policies to guide government policy-makers as they draft appropriate legislation to increase the competitiveness of U.S. agriculture in a global market
7	Number of food and agribusiness firms, private investors, commodity organization leaders, and government officials who increase their knowledge of the economic potential to increase the number and size of new and current value-added agricultural industries such as grain and livestock processing.
8	Number of new value-added agricultural associated small businesses in Indiana
9	Number of farmers generating additional farm income from additional market opportunities for grain, livestock, and specialty crops
10	Number of participants who increase their knowledge of tax and legal issues affecting farmers and small businesses
11	Number of food and agribusiness managers who increase their knowledge of marketing and sales strategies, general business management, and making decisions under highly uncertain situations
12	Number of entrepreneurs and small businesses that improve efficiency and increase profitability
13	Number of potential entrepreneurs who avoid making bad investment decisions following analysis they did with assistance from AICC/New Ventures programs and resources
14	Number of farmers and agricultural industry employees who increase their knowledge of opportunities and challenges for agriculture under carbon dioxide emissions policies to address climate change.

Outcome #1

1. Outcome Measures

Number of participants who increase their knowledge of commodity markets and marketing contracts

Not Reporting on this Outcome Measure

Outcome #2

1. Outcome Measures

Number of Indiana farmers who increase the use of commodity markets and marketing contracts to reduce price risk and increase profitability

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2009	30	425

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

Managing margin risk has become incredibly important for producers given commodity price volatility and input cost increases. Producers must simultaneously manage price risk and input cost risk to maintain profitable margins.

What has been done

The Purdue Risk Management Team developed and conducted a five-week workshop series to provide producers with the tools to determine their breakeven prices, marketing goals, marketing plans, crop insurance decisions, and leasing options with the end goal of being able to lock-in profitable margins. This state-wide series was delivered via IP video at 28 locations and attended by 200 producers and agribusiness professionals.

Results

End of session evaluations showed the program had direct impacts on attitudes and modified risk management behavior. Over 95 percent of respondents said the workshops increased their comfort level in using risk management tools covered in the program. When asked if they would change the way they manager their farm as a result of the program, 44% said they would definitely change and an additional 51% said they may change the way they manage their farm.

4. Associated Knowledge Areas

KA Code	Knowledge Area
604	Marketing and Distribution Practices

Outcome #3

1. Outcome Measures

Number of Indiana farms that increase productivity and profitability

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Condition Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2009	5000	641

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

What has been done

Results

4. Associated Knowledge Areas

KA Code	Knowledge Area
601	Economics of Agricultural Production and Farm Management
604	Marketing and Distribution Practices

Outcome #4

1. Outcome Measures

Number of farm and commodity organization members who increase their knowledge of the potential economic impacts of alternative farm commodity program provisions such as implications for exports, domestic utilization and price, farm income, and government farm program expenditures

Not Reporting on this Outcome Measure

Outcome #5

1. Outcome Measures

Number of research-based studies, publications, and reports for policy organization members and legislators on the consequences of their international trade and farm commodity program choices in Farm Bill and related federal legislation

2. Associated Institution Types

- 1862 Research

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2009	10	23

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

Developing countries play an increasingly important role in world agricultural markets. While the Doha round of WTO negotiations founders, it continues to play a role disciplining trade relations. An important role has also been played in policy setting by structural adjustment programs of the IMF and World Bank. Policies of these institutions meant countries were ill prepared for the extremes of international commodity markets in 2007 and 2008.

What has been done

Purdue researchers have examined institutional arrangements critical to agricultural trade policy reform. Key topics include causes and consequences of high agricultural commodity prices; impacts of commodity price spikes, recession and financial crisis, particularly on developing countries. Work continues on structural adjustment reform of cotton and cocoa sectors in West Africa, food security and trade liberalization, Fair Trade, preferential trade arrangements, cereals market reform in Morocco, and imperfectly competitive international supply chains.

Results

This research continues to influence trade negotiations. The work on consequences of high commodity prices has gained attention in the debate on revitalizing foreign assistance to agriculture. A broader goal has been to influence agricultural and trade policy in those developing countries regardless of the outcomes of trade negotiations. Work with the OECD resulted in collaborations with researchers there as well as at the World Bank, FAO, IFAD, WFP and other international institutions.

4. Associated Knowledge Areas

KA Code	Knowledge Area
606	International Trade and Development
610	Domestic Policy Analysis

Outcome #6

1. Outcome Measures

Number of research-based analyses of trade liberalization and market-oriented policies to guide government policy-makers as they draft appropriate legislation to increase the competitiveness of U.S. agriculture in a global market

2. Associated Institution Types

- 1862 Research

3a. Outcome Type:

Change in Condition Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2009	5	0

3c. Qualitative Outcome or Impact Statement**Issue (Who cares and Why)**

In order for the biomass industry to develop, there will need to be major investments in cellulosic ethanol plants and farmers interested in producing biomass for the plants. Miscanthus is a perennial grass that produces for 10 years or more. Farmers will not make the initial investments without some assurance of a market for the crop. Plant investors will not invest without assurance of raw material supply. So from both the perspective of the biofuel plant and the farmer, long term contracts will be needed.

What has been done

This research focuses on how optimal contracts can be designed to minimize supply chain costs. Researchers are completing the economic modeling of optimal long term contracts for a dedicated energy crop. A spreadsheet that can be used to evaluate the costs and returns from implementing different biomass contracts has been developed and economic experiments for evaluating different contract designs have been designed.

Results

The anticipated impact is that the optimal contract design will minimize supply chain costs for bioenergy plants while at the same time provide benefits to farmers so that farmers are willing to adopt the contracts. This will facilitate the development of economically viable lignocellulosic ethanol plants.

4. Associated Knowledge Areas

KA Code	Knowledge Area
601	Economics of Agricultural Production and Farm Management
604	Marketing and Distribution Practices
606	International Trade and Development

Outcome #7**1. Outcome Measures**

Number of food and agribusiness firms, private investors, commodity organization leaders, and government officials who increase their knowledge of the economic potential to increase the number and size of new and current value-added agricultural industries such as grain and livestock processing.

Not Reporting on this Outcome Measure

Outcome #8**1. Outcome Measures**

Number of new value-added agricultural associated small businesses in Indiana

Not Reporting on this Outcome Measure

Outcome #9

1. Outcome Measures

Number of farmers generating additional farm income from additional market opportunities for grain, livestock, and specialty crops

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Condition Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2009	50	1160

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

What has been done

Results

4. Associated Knowledge Areas

KA Code	Knowledge Area
601	Economics of Agricultural Production and Farm Management
604	Marketing and Distribution Practices

Outcome #10

1. Outcome Measures

Number of participants who increase their knowledge of tax and legal issues affecting farmers and small businesses

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
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2009

50

1685

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

What has been done

Results

4. Associated Knowledge Areas

KA Code	Knowledge Area
602	Business Management, Finance, and Taxation

Outcome #11

1. Outcome Measures

Number of food and agribusiness managers who increase their knowledge of marketing and sales strategies, general business management, and making decisions under highly uncertain situations

Not Reporting on this Outcome Measure

Outcome #12

1. Outcome Measures

Number of entrepreneurs and small businesses that improve efficiency and increase profitability

Not Reporting on this Outcome Measure

Outcome #13

1. Outcome Measures

Number of potential entrepreneurs who avoid making bad investment decisions following analysis they did with assistance from AICC/New Ventures programs and resources

Not Reporting on this Outcome Measure

Outcome #14

1. Outcome Measures

Number of farmers and agricultural industry employees who increase their knowledge of opportunities and challenges for agriculture under carbon dioxide emissions policies to address climate change.

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2009	{No Data Entered}	50

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

What has been done

Results

4. Associated Knowledge Areas

KA Code	Knowledge Area
605	Natural Resource and Environmental Economics

V(H). Planned Program (External Factors)

External factors which affected outcomes

- Natural Disasters (drought, weather extremes, etc.)
- Economy
- Public Policy changes
- Government Regulations
- Competing Public priorities
- Competing Programmatic Challenges
- Other (Diffusion of new technology)

Brief Explanation

V(I). Planned Program (Evaluation Studies and Data Collection)

1. Evaluation Studies Planned

- After Only (post program)
- Retrospective (post program)
- Before-After (before and after program)
- During (during program)
- Time series (multiple points before and after program)
- Case Study
- Comparisons between program participants (individuals, group, organizations) and non-participants
- Comparisons between different groups of individuals or program participants experiencing different levels of program intensity.

- Comparison between locales where the program operates and sites without program intervention
- Other (periodic assessment of policy)

Evaluation Results

Key Items of Evaluation

V(A). Planned Program (Summary)**Program # 3****1. Name of the Planned Program**

Agricultural, Natural Resources, and Biological Engineering

V(B). Program Knowledge Area(s)

1. Program Knowledge Areas and Percentage

KA Code	Knowledge Area	%1862 Extension	%1890 Extension	%1862 Research	%1890 Research
401	Structures, Facilities, and General Purpose Farm Supplies	19%		19%	
402	Engineering Systems and Equipment	27%		27%	
403	Waste Disposal, Recycling, and Reuse	38%		38%	
404	Instrumentation and Control Systems	9%		9%	
405	Drainage and Irrigation Systems and Facilities	7%		7%	
	Total	100%		100%	

V(C). Planned Program (Inputs)**1. Actual amount of professional FTE/SYs expended this Program**

Year: 2009	Extension		Research	
	1862	1890	1862	1890
Plan	5.9	0.0	15.5	0.0
Actual	7.6	0.0	26.1	0.0

2. Actual dollars expended in this Program (includes Carryover Funds from previous years)

Extension		Research	
Smith-Lever 3b & 3c	1890 Extension	Hatch	Evans-Allen
483987	0	367762	0
1862 Matching	1890 Matching	1862 Matching	1890 Matching
1269198	0	1662365	0
1862 All Other	1890 All Other	1862 All Other	1890 All Other
85022	0	385454	0

V(D). Planned Program (Activity)**1. Brief description of the Activity**

•Energy workshops and educational programs were conducted throughout the state and involved key research scientists ranging from chemical engineers to logistics experts to economists •A team of scientists including experts in animal nutrition, soil fertility, and farm management conduct research and work with farmers to reduce water pollution, especially phosphorus

•Food safety experts, along with microbiologists and nanotechnology experts, develop sensors that will enhance food safety and risks from bioterrorism •Livestock facilities were designed and analyzed to determine optimal nutrient management systems from an environmental and cropping systems perspective •Electro-hydraulic sensors and off-road

machine operation systems were designed and tested. •Scientists monitor air quality of selected concentrated livestock systems on farms in multiple states to facilitate the determination of science-based EPA regulatory standards.

2. Brief description of the target audience

•Indiana livestock producers, especially those managing confined feeding operations •Crop farmers interested in applying animal wastes to enhance yields and reduce water pollution •Stakeholders in the bio-energy industry including Country Mark Cooperative, Indiana State Department of Agriculture, Indiana Soybean Alliance, Indiana Corn Growers, grain processors such as ADM, Cargill, and Tate & Lyle •Officials with federal (EPA) and state (IDEM) regulatory agencies •Off-road farm and industrial equipment manufacturers will be contacted and offered patent licensing opportunities as sensors for machine operation and maintenance are developed and tested

V(E). Planned Program (Outputs)

1. Standard output measures

2009	Direct Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
Plan	5000	40000	2500	5000
Actual	51786	197288	25602	17546

2. Number of Patent Applications Submitted (Standard Research Output)

Patent Applications Submitted

Year: 2009
 Plan: 3
 Actual: 3

Patents listed

Heat Recovery from a Biomass Heat Source, 7,566,383
 Cell Concentration and Pathogen Recovery, 7,547,526 B2
 Hydraulic Hose with Integral Life-Sensing Capability and Method, 7,555,936

3. Publications (Standard General Output Measure)

Number of Peer Reviewed Publications

2009	Extension	Research	Total
Plan	5	20	
Actual	5	20	0

V(F). State Defined Outputs

Output Target

Output #1

Output Measure

- Number of educational workshops and seminars on nutrient management and air quality

Year	Target	Actual
2009	15	50

Output #2**Output Measure**

- Number of research-based educational programs on bio-fuel production, distribution, and policy

Year	Target	Actual
2009	25	18

Output #3**Output Measure**

- Number of websites and publications developed

Year	Target	Actual
2009	20	39

Output #4**Output Measure**

- Number of patents applied for and licensing arrangements entered into with off-road farm and industrial equipment manufacturers

Year	Target	Actual
2009	5	0

V(G). State Defined Outcomes**V. State Defined Outcomes Table of Content**

O. No.	OUTCOME NAME
1	Number of producers who increase awareness and knowledge concerning science-based methods to manage animal wastes so as to minimize potential soil and air pollution
2	Number of environmental pollution incidents caused by inappropriate application of animal wastes to soils or emission of animal odors from production facilities
3	Number of farmers who enhance soil fertility and reduce soil pollution through less reliance on commercial fertilizer and increased reliance on properly applied animal waste
4	Number of energy producers, farmers, and consumers who increase their knowledge of the technical and economic implications of increased use of Indiana produced corn and soybeans in bio-fuels
5	Number of technologies developed and disseminated that will increase the efficiency of bio-fuel production
6	Number of bushels of Indiana produced corn and soybeans used in bio-fuels
7	Number of farmers who increase their knowledge of livestock building designs that are energy efficient as well as more animal welfare friendly
8	Number of farmers who optimize livestock welfare through the design of efficient and animal sensitive farm structures.
9	Number of farmers who increase total livestock production and profitability through the adoption of building designs that are energy efficient as well as more animal welfare friendly
10	Number of livestock facilities designed to minimize odor emissions and potential air pollution
11	Number of students with increased awareness and knowledge of energy and water conservation and food safety
12	Number of turfgrass specialists with increased knowledge of nutrient and soil management
13	Number of Amish farmers with increased awareness of farm safety and health

Outcome #1

1. Outcome Measures

Number of producers who increase awareness and knowledge concerning science-based methods to manage animal wastes so as to minimize potential soil and air pollution

Not Reporting on this Outcome Measure

Outcome #2

1. Outcome Measures

Number of environmental pollution incidents caused by inappropriate application of animal wastes to soils or emission of animal odors from production facilities

Not Reporting on this Outcome Measure

Outcome #3

1. Outcome Measures

Number of farmers who enhance soil fertility and reduce soil pollution through less reliance on commercial fertilizer and increased reliance on properly applied animal waste

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Condition Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2009	10	465

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

What has been done

Results

4. Associated Knowledge Areas

KA Code	Knowledge Area
403	Waste Disposal, Recycling, and Reuse

Outcome #4**1. Outcome Measures**

Number of energy producers, farmers, and consumers who increase their knowledge of the technical and economic implications of increased use of Indiana produced corn and soybeans in bio-fuels

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2009	200	1186

3c. Qualitative Outcome or Impact Statement**Issue (Who cares and Why)**

There is a significant need for finding alternative renewable sources for liquid transportation fuels and other forms of energy derived from petrochemical sources. This project addresses the conversion of agricultural/cellulosic residues, certain types of wood, and other cellulosic materials into fermentable sugars and ethanol. The research addresses the bio-processing technologies that are required to provide fuel ethanol and other types of biofuels from cellulosic materials in a cost-effective manner.

What has been done

Researchers have examined the basis for enhancing pretreatment of cellulosic biomass, including corn stover, wood, and wet cake for the purpose of reducing the amount of enzyme required to transform the cellulosic fractions of these materials into fermentable sugars and ethanol. The work has identified release of inhibitors from these materials during pretreatment and hydrolysis. Methods for their quantification are enabling development of strategies that may minimize or eliminate their effect. This is an important development because the single major cost of cellulose conversion is the cost of the enzyme. This work is focused on reducing this cost by making the substrate more accessible and susceptible to cellulose conversion and minimizing or moderating inhibitors of the enzymes that are released from the cellulosic materials due to pretreatment, hydrolysis, or other processing conditions.

Results

The impact of this effort in cellulosic biofuels is to develop processes capable of cost-effectively utilizing cellulosic, agricultural residues for the purpose of production of ethanol. The work in process is enabling designs and testing of designs for large scale pretreatment and bioprocessing of cellulosic materials to ethanol. This will make a significant contribution to the energy security of the U.S. as well as providing products for other agricultural commodities in the state, Midwest, and the U. S. The impact of this research will be technologies that enable transformation. This research also has the potential to expand markets of agriculturally sustainable sources of renewable cellulosic feedstocks for biofuels production.

4. Associated Knowledge Areas

KA Code	Knowledge Area
402	Engineering Systems and Equipment

Outcome #5**1. Outcome Measures**

Number of technologies developed and disseminated that will increase the efficiency of bio-fuel production

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2009	1	1

3c. Qualitative Outcome or Impact Statement**Issue (Who cares and Why)**

Currently the use of distiller's grains as an animal feed is not widely accepted by feed nutritionists because of its inconsistent nutrient composition and questionable overall value as a feed component. Also, higher corn prices caused by increased ethanol production have increased the need by livestock producers to seek alternative replacements for corn in livestock diets.

What has been done

An integrated research, education and extension effort was conducted which investigated the (1) effect of process variables on the physical and chemical properties of distillers grains, (2) the impact of DDGS product from various processes on animal performance and carcass quality, (3) environmental impact of DDGS ration inclusions, and (4) the economic ramifications of using DDGS as a livestock feed and the economics of new technologies on ethanol profitability.

Results

DDGS product inconsistency is a major issue affecting the acceptability of the product as a livestock feed. The results of the research conclusively found the causes of product variability during production and a strategy to eliminate product inconsistency. The logistics of transporting DDGS is a major issue, especially the caking of the product during transportation. The results also identified factors causing DDGS to cake during transport and ways to mitigate caking. The storability of DDGS was also investigated to determine safe storage moisture for DDGS, which was found to be higher than what is currently used, indicating opportunities for cost saving in drying without incurring rapid deterioration.

4. Associated Knowledge Areas

KA Code	Knowledge Area
402	Engineering Systems and Equipment

Outcome #6

1. Outcome Measures

Number of bushels of Indiana produced corn and soybeans used in bio-fuels

Not Reporting on this Outcome Measure

Outcome #7

1. Outcome Measures

Number of farmers who increase their knowledge of livestock building designs that are energy efficient as well as more animal welfare friendly

Not Reporting on this Outcome Measure

Outcome #8

1. Outcome Measures

Number of farmers who optimize livestock welfare through the design of efficient and animal sensitive farm structures.

Not Reporting on this Outcome Measure

Outcome #9

1. Outcome Measures

Number of farmers who increase total livestock production and profitability through the adoption of building designs that are energy efficient as well as more animal welfare friendly

Not Reporting on this Outcome Measure

Outcome #10

1. Outcome Measures

Number of livestock facilities designed to minimize odor emissions and potential air pollution

Not Reporting on this Outcome Measure

Outcome #11

1. Outcome Measures

Number of students with increased awareness and knowlege of energy and water conservation and food safety

Not Reporting on this Outcome Measure

Outcome #12

1. Outcome Measures

Number of turfgrass specialists with increased knowledge of nutrient and soil management

Not Reporting on this Outcome Measure

Outcome #13

1. Outcome Measures

Number of Amish farmers with increased awareness of farm safety and health

Not Reporting on this Outcome Measure

V(H). Planned Program (External Factors)

External factors which affected outcomes

- Natural Disasters (drought, weather extremes, etc.)
- Economy
- Appropriations changes
- Public Policy changes
- Government Regulations
- Competing Public priorities
- Competing Programmatic Challenges

Brief Explanation

{No Data Entered}

V(I). Planned Program (Evaluation Studies and Data Collection)

1. Evaluation Studies Planned

- After Only (post program)
- Retrospective (post program)
- Before-After (before and after program)
- During (during program)
- Time series (multiple points before and after program)
- Case Study
- Comparisons between program participants (individuals, group, organizations) and non-participants
- Comparison between locales where the program operates and sites without program intervention
- Other (hits and use of web site)

Evaluation Results

{No Data Entered}

Key Items of Evaluation

{No Data Entered}

V(A). Planned Program (Summary)**Program # 4****1. Name of the Planned Program**

Food and Non-Food Products: Development, Processing, Quality, and Delivery

V(B). Program Knowledge Area(s)

1. Program Knowledge Areas and Percentage

KA Code	Knowledge Area	%1862 Extension	%1890 Extension	%1862 Research	%1890 Research
501	New and Improved Food Processing Technologies	31%		31%	
502	New and Improved Food Products	22%		22%	
503	Quality Maintenance in Storing and Marketing Food Products	18%		18%	
504	Home and Commercial Food Service	2%		2%	
511	New and Improved Non-Food Products and Processes	25%		25%	
512	Quality Maintenance in Storing and Marketing Non-Food Products	2%		2%	
Total		100%		100%	

V(C). Planned Program (Inputs)

1. Actual amount of professional FTE/SYs expended this Program

Year: 2009	Extension		Research	
	1862	1890	1862	1890
Plan	3.5	0.0	14.5	0.0
Actual	3.2	0.0	20.1	0.0

2. Actual dollars expended in this Program (includes Carryover Funds from previous years)

Extension		Research	
Smith-Lever 3b & 3c	1890 Extension	Hatch	Evans-Allen
355493	0	297785	0
1862 Matching	1890 Matching	1862 Matching	1890 Matching
1052543	0	1186164	0
1862 All Other	1890 All Other	1862 All Other	1890 All Other
90962	0	620785	0

V(D). Planned Program (Activity)

1. Brief description of the Activity

- Conducted research
- Developed educational programs and workshops

- Developed Extension curricula
- Provided outreach teaching programs
- Established distance education programs and web-based programs
- Coordinated meetings with important stakeholders (researchers, industry, farmers, regulatory, etc)
- Worked with media

2. Brief description of the target audience

There are a wide variety of intended audiences including:

•Farmers •Animal production personnel •Plant production personnel •Biofuels processing industry personnel •Food manufacturing and processing plant personnel •Non-food manufacturing plant personnel •Professional engineers •State and county health departments •Federal regulatory officials •State industry associations

V(E). Planned Program (Outputs)

1. Standard output measures

2009	Direct Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
Plan	1000	10000	100	1000
Actual	3534	788	4742	133

2. Number of Patent Applications Submitted (Standard Research Output)

Patent Applications Submitted

Year: 2009

Plan: 1

Actual: 0

Patents listed

3. Publications (Standard General Output Measure)

Number of Peer Reviewed Publications

2009	Extension	Research	Total
Plan	5	10	
Actual	4	1	0

V(F). State Defined Outputs

Output Target

Output #1

Output Measure

- Number of programs offered to farmers or production agriculture specialists
- Not reporting on this Output for this Annual Report

Output #2

Output Measure

- Number of programs offered to the food industry

Year	Target	Actual
2009	10	8

Output #3**Output Measure**

- Number of programs offered to the non-food industry

Year	Target	Actual
2009	5	6

Output #4**Output Measure**

- Number of research projects on bioprocessing

Year	Target	Actual
2009	5	1

Output #5**Output Measure**

- Number of research projects on air quality

Year	Target	Actual
2009	1	1

Output #6**Output Measure**

- Number of research projects on grain storage and processing
Not reporting on this Output for this Annual Report

Output #7**Output Measure**

- Number of research projects related to dairy products
Not reporting on this Output for this Annual Report

Output #8**Output Measure**

- Number of research projects related to aquaculture products

Year	Target	Actual
2009	3	1

Output #9**Output Measure**

- Number of research projects related to enology and viticulture

Year	Target	Actual
2009	10	5

Output #10**Output Measure**

- Number of research project related to food processing

Year	Target	Actual
2009	10	16

Output #11**Output Measure**

- Number of research projects related to food quality

Year	Target	Actual
2009	5	8

Output #12**Output Measure**

- Number of workshops offered to the general public

Year	Target	Actual
2009	1	12

V(G). State Defined Outcomes**V. State Defined Outcomes Table of Content**

O. No.	OUTCOME NAME
1	Number of persons gaining knowledge in bioprocessing
2	Number of products produced using new bioprocessing technologies
3	Number of new products produced by new bioprocessing, bioenergy, and biotechnology
4	Number of new bioprocessing techniques used to increase efficiency
5	Number of persons gaining knowledge in food processing and food processing automation
6	Numbers of persons or companies adopting new food automation technologies
7	Number of food and non-food automation technologies used
8	Number of persons gaining knowledge in air quality control systems
9	Numbers of animal production facilities adopting better air quality practices
10	Number of production facilities with improved air quality
11	Number of persons gaining knowledge in grain processing
12	Numbers of persons and companies adopting better grain processing practices
13	Number of persons gaining knowledge in enology and viticulture
14	Number of persons gaining knowledge of government programs
15	Number of persons gaining knowledge of marketing trends
16	Number of persons gaining knowledge of food packaging applications
17	Number of small food processors adopting better food safety practices

Outcome #1

1. Outcome Measures

Number of persons gaining knowledge in bioprocessing

Not Reporting on this Outcome Measure

Outcome #2

1. Outcome Measures

Number of products produced using new bioprocessing technologies

Not Reporting on this Outcome Measure

Outcome #3

1. Outcome Measures

Number of new products produced by new bioprocessing, bioenergy, and biotechnology

Not Reporting on this Outcome Measure

Outcome #4

1. Outcome Measures

Number of new bioprocessing techniques used to increase efficiency

2. Associated Institution Types

- 1862 Research

3a. Outcome Type:

Change in Condition Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2009	3	1

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

Broadening sensor application to simultaneous detection of multiple pathogens and toxins using a single sensor platform is becoming a priority. This approach would not only allow total microbiological assessment of a product for the presence of foodborne pathogens but also make the microbiological testing less expensive.

What has been done

Researchers have optimized several biosensor tools such as fiber optic based immunosensor, mammalian cell based sensor, and light scattering sensors for their ability to detect multiple pathogens including Salmonella, E. coli, Listeria, and Vibrio and various toxins in food products.

Results

Researchers have demonstrated that the biosensor tools are able to detect various foodborne pathogens from inoculated food samples with a sensitivity of 1 CFU/g of sample in less than 24 h. These multipathogen detection tools would cut down assay steps to facilitate improved and specific detection of foodborne pathogens including Listeria monocytogenes, Eshcerichia coli 0157:H7, Vibrio vulnificus, V. parahaemolyticus and Salmonella serovars in a cost-effective manner.

4. Associated Knowledge Areas

KA Code	Knowledge Area
501	New and Improved Food Processing Technologies
511	New and Improved Non-Food Products and Processes

Outcome #5

1. Outcome Measures

Number of persons gaining knowledge in food processing and food processing automation

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2009	0	941

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

What has been done

Results

4. Associated Knowledge Areas

KA Code	Knowledge Area
501	New and Improved Food Processing Technologies

Outcome #6

1. Outcome Measures

Numbers of persons or companies adopting new food automation technologies

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2009	0	1

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

What has been done

Results

4. Associated Knowledge Areas

KA Code	Knowledge Area
501	New and Improved Food Processing Technologies
504	Home and Commercial Food Service

Outcome #7

1. Outcome Measures

Number of food and non-food automation technologies used

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Condition Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2009	5	4

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

What has been done

Results

4. Associated Knowledge Areas

KA Code	Knowledge Area
501	New and Improved Food Processing Technologies
511	New and Improved Non-Food Products and Processes

Outcome #8

1. Outcome Measures

Number of persons gaining knowledge in air quality control systems

Not Reporting on this Outcome Measure

Outcome #9

1. Outcome Measures

Numbers of animal production facilities adopting better air quality practices

Not Reporting on this Outcome Measure

Outcome #10

1. Outcome Measures

Number of production facilities with improved air quality

Not Reporting on this Outcome Measure

Outcome #11

1. Outcome Measures

Number of persons gaining knowledge in grain processing

Not Reporting on this Outcome Measure

Outcome #12

1. Outcome Measures

Numbers of persons and companies adopting better grain processing practices

Not Reporting on this Outcome Measure

Outcome #13

1. Outcome Measures

Number of persons gaining knowledge in enology and viticulture

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2009	100	1000

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

As wine grape production has increased in Indiana, growers and vintners demand up-to-date information on new grape cultivars, sustainability and pest management, winemaking techniques, and marketing strategies.

What has been done

The team started a successful campaign to create and promote an inaugural Indiana signature wine style. This campaign incorporates the team's winegrowing, winemaking, and wine marketing expertise. It uses the novel grape varietal Traminette to showcase growers and vintner's ability to produce unique, nationally recognizable and globally competitive wines. The team also hosted a wine festival and competition.

Results

Wine production surpassed 800,000 gallons (4 million bottles) a year in 2009, a 1700% increase since the Purdue Wine Grape Team began its efforts in 1990. Indiana wine sales have grown by more than 15% every year. Wine has emerged as a prime example of high-valued agricultural commodity made in Indiana.

4. Associated Knowledge Areas

KA Code	Knowledge Area
502	New and Improved Food Products

Outcome #14

1. Outcome Measures

Number of persons gaining knowledge of government programs

Not Reporting on this Outcome Measure

Outcome #15

1. Outcome Measures

Number of persons gaining knowledge of marketing trends

Not Reporting on this Outcome Measure

Outcome #16

1. Outcome Measures

Number of persons gaining knowledge of food packaging applications

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2009	150	100

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

What has been done

Results

4. Associated Knowledge Areas

KA Code	Knowledge Area
501	New and Improved Food Processing Technologies

Outcome #17**1. Outcome Measures**

Number of small food processors adopting better food safety practices

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2009	{No Data Entered}	325

3c. Qualitative Outcome or Impact Statement**Issue (Who cares and Why)**

Food entrepreneurs lack technical knowledge of food processing requirements, food safety regulations, marketing strategies, and business plan development.

What has been done

The Food Entrepreneur Assistance Response (FEAR) Team delivers annual workshops and direct technical assistance to approximately 125 food entrepreneurs annually. The team also reviews business plans and product testing to ensure safety and regulatory compliance. The team has produced a series of 16 extension publications that highlight food business activities including: food regulations, food marketing, food technology, food safety, food sanitation.

Results

Over 125 food entrepreneurs are assisted annually in these efforts resulting in five to ten new food entrepreneurs being established in Indiana each year. The cumulative economic impact over the last five years from these efforts is over \$1,000,000 annually contributed in state revenue and 40 persons employed.

4. Associated Knowledge Areas

KA Code	Knowledge Area
503	Quality Maintenance in Storing and Marketing Food Products
511	New and Improved Non-Food Products and Processes

V(H). Planned Program (External Factors)

External factors which affected outcomes

- Natural Disasters (drought, weather extremes, etc.)
- Economy
- Appropriations changes
- Public Policy changes
- Government Regulations
- Competing Public priorities
- Competing Programmatic Challenges
- Populations changes (immigration, new cultural groupings, etc.)
- Other (State & National Priorities)

Brief Explanation

{No Data Entered}

V(I). Planned Program (Evaluation Studies and Data Collection)

1. Evaluation Studies Planned

- After Only (post program)
- Retrospective (post program)
- Before-After (before and after program)
- During (during program)
- Comparison between locales where the program operates and sites without program intervention

Evaluation Results

{No Data Entered}

Key Items of Evaluation

{No Data Entered}

V(A). Planned Program (Summary)**Program # 5****1. Name of the Planned Program**

Family Well-Being

V(B). Program Knowledge Area(s)**1. Program Knowledge Areas and Percentage**

KA Code	Knowledge Area	%1862 Extension	%1890 Extension	%1862 Research	%1890 Research
801	Individual and Family Resource Management	26%		26%	
802	Human Development and Family Well-Being	74%		74%	
	Total	100%		100%	

V(C). Planned Program (Inputs)**1. Actual amount of professional FTE/SYs expended this Program**

Year: 2009	Extension		Research	
	1862	1890	1862	1890
Plan	4.0	0.0	4.0	0.0
Actual	9.5	0.0	17.9	0.0

2. Actual dollars expended in this Program (includes Carryover Funds from previous years)

Extension		Research	
Smith-Lever 3b & 3c	1890 Extension	Hatch	Evans-Allen
481286	0	112973	0
1862 Matching	1890 Matching	1862 Matching	1890 Matching
1334641	0	1504606	0
1862 All Other	1890 All Other	1862 All Other	1890 All Other
111303	0	198106	0

V(D). Planned Program (Activity)**1. Brief description of the Activity**

- Conducted workshops and educational programs on personal finance, childcare, relationships, parenting
- Provided staff development
- Worked with media
- Created displays
- Collaborated with other agencies
- Conducted research
- Developed web-based and distance educational materials

2. Brief description of the target audience

- immigrants
- welfare-to-work individuals
- job loss individuals
- youth
- adults
- limited resource families
- farm families
- families in divorce
- child care professionals
- trainers of child care professionals
- policy makers
- parents
- volunteers that work with parents
- elder caregivers
- adult children
- retirement associations
- community leaders
- planners

V(E). Planned Program (Outputs)

1. Standard output measures

2009	Direct Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
Plan	40250	160500	19750	73250
Actual	40637	2228069	9445	25249

2. Number of Patent Applications Submitted (Standard Research Output)

Patent Applications Submitted

Year: 2009
 Plan: 0
 Actual: 0

Patents listed

3. Publications (Standard General Output Measure)

Number of Peer Reviewed Publications

2009	Extension	Research	Total
Plan	2	0	
Actual	2	0	11

V(F). State Defined Outputs

Output Target

Output #1

Output Measure

- Number of staff development opportunities for Extension Educators

Year	Target	Actual
2009	8	20

Output #2

Output Measure

- Number of programs offered to parents, childcare providers, youth, adults, low-wealth households and consumers

Year	Target	Actual
2009	200	899

Output #3

Output Measure

- Number of research projects

Year	Target	Actual
2009	3	7

Output #4

Output Measure

- Number of publications

Year	Target	Actual
2009	2	11

Output #5

Output Measure

- Number of web sites developed
Not reporting on this Output for this Annual Report

Output #6

Output Measure

- Number of new partnerships, coalitions, advisory boards created.
Not reporting on this Output for this Annual Report

V(G). State Defined Outcomes**V. State Defined Outcomes Table of Content**

O. No.	OUTCOME NAME
1	Number of participants who increased their knowledge of debt management
2	Number of participants who adopted one or more practices to reduce debt
3	Number of participants reporting decreased debt
4	Number of participants who increased their knowledge of the benefits of saving on a regular basis
5	Number of participants who increased the amount of money they save regularly
6	Number of participants who save regularly as a result of educational programming
7	Number of participants who increased their knowledge of basic personal financial management
8	Number of participants who have established financial goals to guide financial decisions
9	Number of participants who develop a plan for achieving financial security
10	Number of participants who report increased financial security
11	Number of participants who increased their knowledge of child care and how to manage care giving roles and responsibilities
12	Number of participants who increased their knowledge of decision making skills necessary to make quality of life decisions for caregivers and receivers
13	Number of child care professionals who are working toward, who have obtained, or who have renewed the Child Development Associate Credential.
14	Number of participants who increased their knowledge of basic parenting skills
15	Number of participants reporting improved parent-child communication
16	Number of participants reporting significant improvement in satisfaction and quality of parent-child relationships
17	Number of participants who report they will take one or more recommended actions to avoid identity theft
18	Number of participants who developed knowledge of safety and security procedures in an emergency

19	Number of individuals who increased their knowledge about establishing and maintaining health indoor air quality
20	Number of adults who have experienced changed attitudes or behaviors in valuing and appreciating differences in others
21	Number of adults who have increased their understanding of human relationships, communications, and leadership styles.
22	Number of adults who have increased their understanding of themselves and others
23	Participants increased saving by \$_____
24	Participants reduced debt by \$_____
25	Number of participants who report knowing the steps to take if they are a victim of identity theft

Outcome #1**1. Outcome Measures**

Number of participants who increased their knowledge of debt management

Not Reporting on this Outcome Measure

Outcome #2**1. Outcome Measures**

Number of participants who adopted one or more practices to reduce debt

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2009	0	650

3c. Qualitative Outcome or Impact Statement**Issue (Who cares and Why)**

Financial issues are important to women of all ages and backgrounds. Many women do not have the knowledge or background in money management and lack confidence to make informed financial decisions. The majority of women will have to manage their finances at some point in their lives.

What has been done

Purdue Extension provided the six week series, Focus on Financial Management, to help women establish sound financial management practices to become financially secure. This series focused on providing information to help participants get organized, determine net worth, calculate insurance and savings needs, set financial goals, and determine future income needs. There were 17 participants who completed both pre and post assessments.

Results

At the beginning of the series 59 percent of the participants felt they did not have the knowledge, skills or ability to affect their financial position positively. At the end, 90 percent felt they had the knowledge, skills, and ability to affect their financial position positively. Participants reported they were working on establishing goals, setting up record keeping systems, preparing household inventories, developing spending plans, starting to save or increasing savings, and determining future income needs. Forty-one percent were reducing balances on credit accounts.

4. Associated Knowledge Areas

KA Code	Knowledge Area
801	Individual and Family Resource Management

Outcome #3

1. Outcome Measures

Number of participants reporting decreased debt

Not Reporting on this Outcome Measure

Outcome #4

1. Outcome Measures

Number of participants who increased their knowledge of the benefits of saving on a regular basis

Not Reporting on this Outcome Measure

Outcome #5

1. Outcome Measures

Number of participants who increased the amount of money they save regularly

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2009	0	256

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

What has been done

Results

4. Associated Knowledge Areas

KA Code	Knowledge Area
801	Individual and Family Resource Management

Outcome #6

1. Outcome Measures

Number of participants who save regularly as a result of educational programming

Not Reporting on this Outcome Measure

Outcome #7

1. Outcome Measures

Number of participants who increased their knowledge of basic personal financial management

Not Reporting on this Outcome Measure

Outcome #8

1. Outcome Measures

Number of participants who have established financial goals to guide financial decisions

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2009	0	1233

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

What has been done

Results

4. Associated Knowledge Areas

KA Code	Knowledge Area
801	Individual and Family Resource Management

Outcome #9

1. Outcome Measures

Number of participants who develop a plan for achieving financial security

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2009	0	262

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

What has been done

Results

4. Associated Knowledge Areas

KA Code	Knowledge Area
801	Individual and Family Resource Management

Outcome #10

1. Outcome Measures

Number of participants who report increased financial security

Not Reporting on this Outcome Measure

Outcome #11

1. Outcome Measures

Number of participants who increased their knowledge of child care and how to manage care giving roles and responsibilities

Not Reporting on this Outcome Measure

Outcome #12

1. Outcome Measures

Number of participants who increased their knowledge of decision making skills necessary to make quality of life decisions for caregivers and receivers

Not Reporting on this Outcome Measure

Outcome #13

1. Outcome Measures

Number of child care professionals who are working toward, who have obtained, or who have renewed the Child Development Associate Credential.

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2009	20	133

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

Child care providers in Indiana are required to obtain the nationally recognized Child Development Associate (CDA) Credential or its equivalent to meet state child care licensing regulations. Because child care providers work long hours, time available for formal classes is limited.

What has been done

Purdue Extension offered 120 class hours of CDA instruction to 5 separate classes of child care providers in 4 locations in the state. Instruction was provided through four 30-hour class sessions to the 118 child care providers enrolled.

Results

Evaluation data indicated that child care providers attending the classes reported positive attitude changes, increased knowledge and skills in child development, changes in their child care environment, changes in interactions or behaviors with young children, and increased confidence as child care professionals.

4. Associated Knowledge Areas

KA Code	Knowledge Area
802	Human Development and Family Well-Being

Outcome #14

1. Outcome Measures

Number of participants who increased their knowledge of basic parenting skills

Not Reporting on this Outcome Measure

Outcome #15

1. Outcome Measures

Number of participants reporting improved parent-child communication

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2009	500	1066

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

What has been done

Results

4. Associated Knowledge Areas

KA Code	Knowledge Area
802	Human Development and Family Well-Being

Outcome #16**1. Outcome Measures**

Number of participants reporting significant improvement in satisfaction and quality of parent-child relationships

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Condition Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2009	500	946

3c. Qualitative Outcome or Impact Statement**Issue (Who cares and Why)**

In an era of high divorce rates and increasing longevity, the parent/offspring tie is one of the longest lasting and most important relationships in our lives. The majority of research concerning parents and children focuses on the period before children leave home. A lack of formal government support programs means parents and grown children serve key support functions for material, psychological, and physical well-being.

What has been done

Researchers focused particular attention on the period of midlife and relationships between middle-aged parents and their grown children. The researchers interviewed 633 middle-aged adults about relationships with their grown children and aging parents.

Results

The researchers found that middle-aged adults typically provide more support to grown children than to aging parents. The flow of support reversed when parents incurred disabilities of later life. In these families, middle-aged adults expanded efforts to provide greater support to their parents while still supporting grown children.

4. Associated Knowledge Areas

KA Code	Knowledge Area
802	Human Development and Family Well-Being

Outcome #17**1. Outcome Measures**

Number of participants who report they will take one or more recommended actions to avoid identity theft

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2009	0	295

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

What has been done

Results

4. Associated Knowledge Areas

KA Code	Knowledge Area
801	Individual and Family Resource Management

Outcome #18

1. Outcome Measures

Number of participants who developed knowledge of safety and security procedures in an emergency

Not Reporting on this Outcome Measure

Outcome #19

1. Outcome Measures

Number of individuals who increased their knowledge about establishing and maintaining health indoor air quality

Not Reporting on this Outcome Measure

Outcome #20

1. Outcome Measures

Number of adults who have experienced changed attitudes or behaviors in valuing and appreciating differences in others

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2009	100	2130

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

What has been done

Results

4. Associated Knowledge Areas

KA Code	Knowledge Area
802	Human Development and Family Well-Being

Outcome #21

1. Outcome Measures

Number of adults who have increased their understanding of human relationships, communications, and leadership styles.

Not Reporting on this Outcome Measure

Outcome #22

1. Outcome Measures

Number of adults who have increased their understanding of themselves and others

Not Reporting on this Outcome Measure

Outcome #23

1. Outcome Measures

Participants increased saving by \$_____

Not Reporting on this Outcome Measure

Outcome #24

1. Outcome Measures

Participants reduced debt by \$_____

Not Reporting on this Outcome Measure

Outcome #25

1. Outcome Measures

Number of participants who report knowing the steps to take if they are a victim of identity theft

Not Reporting on this Outcome Measure

V(H). Planned Program (External Factors)

External factors which affected outcomes

- Natural Disasters (drought, weather extremes, etc.)
- Economy
- Appropriations changes
- Public Policy changes
- Government Regulations
- Competing Public priorities
- Competing Programmatic Challenges
- Populations changes (immigration, new cultural groupings, etc.)

Brief Explanation

{No Data Entered}

V(I). Planned Program (Evaluation Studies and Data Collection)

1. Evaluation Studies Planned

- After Only (post program)
- Before-After (before and after program)

Evaluation Results

{No Data Entered}

Key Items of Evaluation

{No Data Entered}

V(A). Planned Program (Summary)**Program # 6****1. Name of the Planned Program**

Human Nutrition, Food Safety and Human Health and Well-Being

V(B). Program Knowledge Area(s)**1. Program Knowledge Areas and Percentage**

KA Code	Knowledge Area	%1862 Extension	%1890 Extension	%1862 Research	%1890 Research
701	Nutrient Composition of Food	1%		1%	
702	Requirements and Function of Nutrients and Other Food Components	30%		30%	
703	Nutrition Education and Behavior	11%		11%	
711	Ensure Food Products Free of Harmful Chemicals, Including Residues from Agricultural and Other Sources	7%		7%	
712	Protect Food from Contamination by Pathogenic Microorganisms, Parasites, and Naturally Occurring Toxins	28%		28%	
721	Insects and Other Pests Affecting Humans	7%		7%	
723	Hazards to Human Health and Safety	16%		16%	
	Total	100%		100%	

V(C). Planned Program (Inputs)**1. Actual amount of professional FTE/SYs expended this Program**

Year: 2009	Extension		Research	
	1862	1890	1862	1890
Plan	15.5	0.0	53.5	0.0
Actual	3.5	0.0	21.0	0.0

2. Actual dollars expended in this Program (includes Carryover Funds from previous years)

Extension		Research	
Smith-Lever 3b & 3c	1890 Extension	Hatch	Evans-Allen
560126	0	567522	0
1862 Matching	1890 Matching	1862 Matching	1890 Matching
1056975	0	1344197	0
1862 All Other	1890 All Other	1862 All Other	1890 All Other
91912	0	446216	0

V(D). Planned Program (Activity)**1. Brief description of the Activity**

• Research-based programs focused on conducting research experiments and programs emphasizing our key interest areas including:

- detection and control of foodborne pathogens,
- effects of diet and nutrition on human health,
- beneficial effects of nutrition, functional foods and biomedical research, and
- nutritional impact on chronic diseases including diabetes, heart disease, and obesity

A wide variety of programs were delivered to our targeted audiences. Our output efforts included:

- partnering with important stakeholders
- development of workshop materials and curricula
- conducting workshops
- development of web-based and distance education materials
- working with the media

We increased our distance education and/or web-based materials. Most programs involved some type of collaboration or partnerships with our stakeholders, with industry, with consumers, or with regulatory agencies.

2. Brief description of the target audience

There are a wide variety of intended audiences including:

- Animal production personnel
- Plant production personnel
- Food manufacturing and processing personnel
- The transportation industry
- Foodservice and food retail workers
- Consumers
- Healthcare
- Day Care
- Nursing homes
- Youth
- State and county health departments
- Federal regulatory officials
- State industry associations
- First Responders

V(E). Planned Program (Outputs)

1. Standard output measures

2009	Direct Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
Plan	3000	20000	300	2000
Actual	137619	3229698	127828	55458

2. Number of Patent Applications Submitted (Standard Research Output)

Patent Applications Submitted

Year: 2009

Plan: 2

Actual: 1

Patents listed

Apparatus and Method for Reducing Microorganisms on Produce Using Chlorine Dioxide Gas, 7,571,676

3. Publications (Standard General Output Measure)

Number of Peer Reviewed Publications

2009	Extension	Research	Total
Plan	0	15	
Actual	0	34	0

V(F). State Defined Outputs**Output Target****Output #1****Output Measure**

- Number of nutrition related programs offered to consumers

Year	Target	Actual
2009	100	5371

Output #2**Output Measure**

- Number of programs offered to the food industry

Year	Target	Actual
2009	100	23

Output #3**Output Measure**

- Number of research programs on food safety, human nutrition, and health

Year	Target	Actual
2009	10	51

Output #4**Output Measure**

- Number of nutrition related research publications

Year	Target	Actual
2009	4	32

Output #5**Output Measure**

- Number of research publications related to detection of foodborne pathogens
Not reporting on this Output for this Annual Report

Output #6**Output Measure**

- Number of research publications related to control of foodborne hazards

Year	Target	Actual
2009	4	10

Output #7

Output Measure

- Number of research publications related to food defense and protection

Year	Target	Actual
2009	2	19

Output #8

Output Measure

- Number of nutrition programs offered to foodservice staff

Year	Target	Actual
2009	25	35

Output #9

Output Measure

- Number of community health coalition events

Year	Target	Actual
2009	25	201

Output #10

Output Measure

- Number of newsletters, brochures, or publications distributed to consumers

Year	Target	Actual
2009	100	58666

Output #11

Output Measure

- Number of food safety programs offered to consumers

Year	Target	Actual
2009	50	690

V(G). State Defined Outcomes**V. State Defined Outcomes Table of Content**

O. No.	OUTCOME NAME
1	Number of persons who increased their knowledge of proper hand washing
2	Number of persons who increased their knowledge of cooking foods adequately
3	Number of persons who increased their knowledge of avoiding cross-contamination
4	Number of persons who increased their knowledge of keeping food at a safe temperature
5	Number of persons who increased their knowledge of storing foods properly
6	Number of participants passing food handler certificate
7	Number of incidents of food borne illness associated with unsafe food handling practices
8	Number of persons who increased their knowledge of the connection between food choices and risk of chronic disease.
9	Number of persons who increased their knowledge of selection and preparation of foods with reduced fat and/or calories
10	Number of persons who increased knowledge of USDA serving sizes
11	Number of participants consuming appropriate USDA serving sizes
12	Number of participants demonstrating ability to choose or prepare foods with reduced fat and/or calories
13	Number of participants with decreased risk factors for chronic disease (including diabetes, heart disease, obesity)
14	Number of participants with decreased chronic disease complications (including diabetes, heart disease, obesity)
15	Number of persons who increase knowledge of the relationship between nutrition and health
16	Number of persons who increased their knowledge of physical activity recommendations
17	Number of persons who adopt one or more practices to improve food choices and activity levels
18	Number of participants that report reduced medical costs because of changes in food choices and activity levels

19	Number of parents who have increased their understanding of how to raise healthy eaters
20	Number of participants adopting practices to increase their compliance with food safety requirements

Outcome #1**1. Outcome Measures**

Number of persons who increased their knowledge of proper hand washing

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2009	0	1611

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

What has been done

Results

4. Associated Knowledge Areas

KA Code	Knowledge Area
712	Protect Food from Contamination by Pathogenic Microorganisms, Parasites, and Naturally Occurring Toxins

Outcome #2**1. Outcome Measures**

Number of persons who increased their knowledge of cooking foods adequately

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2009	100	1439

3c. Qualitative Outcome or Impact Statement**Issue (Who cares and Why)****What has been done****Results****4. Associated Knowledge Areas**

KA Code	Knowledge Area
703	Nutrition Education and Behavior
712	Protect Food from Contamination by Pathogenic Microorganisms, Parasites, and Naturally Occurring Toxins

Outcome #3**1. Outcome Measures**

Number of persons who increased their knowledge of avoiding cross-contamination

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2009	100	545

3c. Qualitative Outcome or Impact Statement**Issue (Who cares and Why)**

Recent recalls involving pet food and milk products contaminated with melamine have created a widespread food safety scare. Melamine contamination has been reported in products such as milk, infant formula, frozen yogurt, pet food, biscuits, candy and coffee drinks. There is a need for a rapid, high-throughput, widely-available, cost-effective method for detecting melamine in infant formula. There is also a need for rapid detection methods for pathogens in foods.

What has been done

Research evaluated spectroscopy methods for detection and quantification of melamine in infant formula powder. FTIR methods were also evaluated for the detection of foodborne pathogens (e.coli 0157:H7 and Salmonella) in ground beef, chicken, and produce. Food samples were inoculated with known pathogens, and FTIR Methods were used to quantify the pathogens in the foods.

Results

Rapid spectroscopy methods for the presence of melamine in infant formula powder and pathogens in foods (E. coli 0157:H7 in ground beef and produce, Salmonella in chicken) were developed. These methods could be adopted by industry to improve food safety efforts to avoid distribution of hazardous foods to consumers.

4. Associated Knowledge Areas

KA Code	Knowledge Area
712	Protect Food from Contamination by Pathogenic Microorganisms, Parasites, and Naturally Occurring Toxins

Outcome #4

1. Outcome Measures

Number of persons who increased their knowledge of keeping food at a safe temperature

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2009	100	1501

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

What has been done

Results

4. Associated Knowledge Areas

KA Code	Knowledge Area
712	Protect Food from Contamination by Pathogenic Microorganisms, Parasites, and Naturally Occurring Toxins

Outcome #5

1. Outcome Measures

Number of persons who increased their knowledge of storing foods properly

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2009	100	1493

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

The retail food safety community is very complex. While there is a great deal of useful information available, a one-stop source for information does not exist.

What has been done

The Retail Food Safety Consortium (RFSC) is a collaboration among five land grant universities and three science-based associations that involve retail food safety stakeholders. The group created a new web site to provide information and training materials relative to food safety and safe food handling for retail food establishments. There are links to more than 1000 different resources important to retail food safety stakeholders.

Results

This new web-based resource is a tremendously valuable tool for the retail food safety professional. Since June 2009, the web site has had more than 11,000 hits.

4. Associated Knowledge Areas

KA Code	Knowledge Area
712	Protect Food from Contamination by Pathogenic Microorganisms, Parasites, and Naturally Occurring Toxins
721	Insects and Other Pests Affecting Humans

Outcome #6

1. Outcome Measures

Number of participants passing food handler certificate

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2009	100	617

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

What has been done

Results

4. Associated Knowledge Areas

KA Code	Knowledge Area
712	Protect Food from Contamination by Pathogenic Microorganisms, Parasites, and Naturally Occurring Toxins

Outcome #7

1. Outcome Measures

Number of incidents of food borne illness associated with unsafe food handling practices

Not Reporting on this Outcome Measure

Outcome #8

1. Outcome Measures

Number of persons who increased their knowledge of the connection between food choices and risk of chronic disease.

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2009	500	1000

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

What has been done

Results

4. Associated Knowledge Areas

KA Code	Knowledge Area
702	Requirements and Function of Nutrients and Other Food Components

Outcome #9

1. Outcome Measures

Number of persons who increased their knowledge of selection and preparation of foods with reduced fat and/or calories

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2009	500	1000

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

What has been done

Results

4. Associated Knowledge Areas

KA Code	Knowledge Area
702	Requirements and Function of Nutrients and Other Food Components

Outcome #10

1. Outcome Measures

Number of persons who increased knowledge of USDA serving sizes

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2009	1000	1000

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

What has been done

Results

4. Associated Knowledge Areas

KA Code	Knowledge Area
703	Nutrition Education and Behavior

Outcome #11

1. Outcome Measures

Number of participants consuming appropriate USDA serving sizes

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2009	500	100

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

What has been done

Results

4. Associated Knowledge Areas

KA Code	Knowledge Area
703	Nutrition Education and Behavior

Outcome #12

1. Outcome Measures

Number of participants demonstrating ability to choose or prepare foods with reduced fat and/or calories

Not Reporting on this Outcome Measure

Outcome #13

1. Outcome Measures

Number of participants with decreased risk factors for chronic disease (including diabetes, heart disease, obesity)

Not Reporting on this Outcome Measure

Outcome #14

1. Outcome Measures

Number of participants with decreased chronic disease complications (including diabetes, heart disease, obesity)

Not Reporting on this Outcome Measure

Outcome #15

1. Outcome Measures

Number of persons who increase knowledge of the relationship between nutrition and health

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2009	1000	1445

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

Obesity is a global health problem with an association of the risk of the development of chronic diseases, such as type 2 diabetes, coronary heart disease, and aging. Little is known about the dietary strategy in preventing the development of obesity and its related diseases.

What has been done

Researchers established experimental techniques needed to culture mammalian cells and perform biochemical/molecular analyses. The goal of this research is to identify and characterize anti-obese dietary components and their underlying molecular mechanisms in adipose tissue development, which is one of the key features of obesity.

Results

Outcomes include investigation of the anti-adipogenic function of curcumin, a dietary phytochemical found in curry; obtaining preliminary data of a potential anti-adipogenic function of piceatannol, a bioactive component found in red wine, and selenium, a micronutrient, which could regulate the generation of new adipose tissue; characterization of a potential pro-adipogenic function of Advanced Glycation End-Products, secondary food components generated during food processes such as frying and grilling, in adipocyte differentiation in vitro. Continuous studies on determining the mode of action and the physiological functions of these components in vitro and in vivo should provide new insights into dietary strategies for the prevention of obesity.

4. Associated Knowledge Areas

KA Code	Knowledge Area
702	Requirements and Function of Nutrients and Other Food Components

Outcome #16

1. Outcome Measures

Number of persons who increased their knowledge of physical activity recommendations

Not Reporting on this Outcome Measure

Outcome #17

1. Outcome Measures

Number of persons who adopt one or more practices to improve food choices and activity levels

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2009	1000	275

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

What has been done

Results

4. Associated Knowledge Areas

KA Code	Knowledge Area
703	Nutrition Education and Behavior

Outcome #18

1. Outcome Measures

Number of participants that report reduced medical costs because of changes in food choices and activity levels

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Condition Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2009	100	146

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

What has been done

Results

4. Associated Knowledge Areas

KA Code	Knowledge Area
703	Nutrition Education and Behavior

Outcome #19

1. Outcome Measures

Number of parents who have increased their understanding of how to raise healthy eaters

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2009	0	4247

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

A review of Child and Adult Care Food Program (CACFP) menus documented a need for an increase in the variety of: fruits and vegetables; whole-grain products; and lean meat or meat alternatives. Child care foodservice staff must have the necessary knowledge and skills for planning and preparing healthy and appealing meals and snacks.

What has been done

Resource materials and video-based training sessions were created for use in 19 workshops. Staff were motivated and inspired to create a total environment that recognized the role of quality nutrition education and positive adult role modeling for children to build lifelong health beliefs and behaviors. Ideas were presented for encouraging children to consume more fruits and vegetables, whole-grain products, fat-free or low-fat milk and milk products, and lean meat and lean meat alternatives.

Results

More than 470 childcare providers attended the workshops to enhance their knowledge and skills in the areas of child nutrition, menu planning, recipes, food preparation, and food safety. Completed assessments showed significant improvement in knowledge of dietary regulations for whole grains, allowing children to monitor their own eating by serving themselves, understanding that preschool aged children should serve themselves, and an increase in knowledge of the benefits of family meals.

4. Associated Knowledge Areas

KA Code	Knowledge Area
703	Nutrition Education and Behavior

Outcome #20

1. Outcome Measures

Number of participants adopting practices to increase their compliance with food safety requirements

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Condition Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2009	{No Data Entered}	0

3c. Qualitative Outcome or Impact Statement**Issue (Who cares and Why)**

Small meat and poultry processors struggle with compliance of USDA-FSIS and state food safety requirements.

What has been done

A series of workshops was presented to 379 meat processors, government regulators, state regulators and Extension personnel on Selecting Scientific Documentation to Support an Establishments HACCP program.

Results

Evaluations conducted showed that 89% of participants strongly agreed or agreed that the seminar provided them with a better understanding of the subject matter. Because of this seminar, 78 percent of plant participants plan to make at least one change in their day-to-day operations.

4. Associated Knowledge Areas

KA Code	Knowledge Area
712	Protect Food from Contamination by Pathogenic Microorganisms, Parasites, and Naturally Occurring Toxins

V(H). Planned Program (External Factors)**External factors which affected outcomes**

- Natural Disasters (drought, weather extremes, etc.)
- Economy
- Appropriations changes
- Public Policy changes
- Government Regulations
- Competing Public priorities
- Competing Programmatic Challenges
- Populations changes (immigration, new cultural groupings, etc.)
- Other (State and National priorities)

Brief Explanation

{No Data Entered}

V(I). Planned Program (Evaluation Studies and Data Collection)

1. Evaluation Studies Planned

- After Only (post program)
- Retrospective (post program)
- Before-After (before and after program)
- During (during program)

- Comparisons between different groups of individuals or program participants experiencing different levels of program intensity.
- Other (Success/pass rate on regulatory)

Evaluation Results

{No Data Entered}

Key Items of Evaluation

{No Data Entered}

V(A). Planned Program (Summary)**Program # 7****1. Name of the Planned Program**

Natural Resources and Environment

V(B). Program Knowledge Area(s)**1. Program Knowledge Areas and Percentage**

KA Code	Knowledge Area	%1862 Extension	%1890 Extension	%1862 Research	%1890 Research
101	Appraisal of Soil Resources	1%		1%	
102	Soil, Plant, Water, Nutrient Relationships	18%		18%	
104	Protect Soil from Harmful Effects of Natural Elements	5%		5%	
111	Conservation and Efficient Use of Water	2%		2%	
112	Watershed Protection and Management	6%		6%	
121	Management of Range Resources	1%		1%	
123	Management and Sustainability of Forest Resources	18%		18%	
125	Agroforestry	1%		1%	
131	Alternative Uses of Land	10%		10%	
132	Weather and Climate	4%		4%	
133	Pollution Prevention and Mitigation	24%		24%	
135	Aquatic and Terrestrial Wildlife	10%		10%	
	Total	100%		100%	

V(C). Planned Program (Inputs)**1. Actual amount of professional FTE/SYs expended this Program**

Year: 2009	Extension		Research	
	1862	1890	1862	1890
Plan	12.0	0.0	32.0	0.0
Actual	14.5	0.0	27.8	0.0

2. Actual dollars expended in this Program (includes Carryover Funds from previous years)

Extension		Research	
Smith-Lever 3b & 3c	1890 Extension	Hatch	Evans-Allen
687111	0	430997	0
1862 Matching	1890 Matching	1862 Matching	1890 Matching
1612720	0	2037075	0
1862 All Other	1890 All Other	1862 All Other	1890 All Other
110141	0	341888	0

V(D). Planned Program (Activity)**1. Brief description of the Activity**

•Workshops •Extension publications •Public service announcements •Research •Web site development •Home and farm visits •Displays •IP video programs •Demonstrations and field days •One-on-one consultations
•Collaboration with sister agencies

2. Brief description of the target audience

•Agricultural producers •Rural and urban residents •Elected officials and other decision-makers •Owners of private and public forestlands and wildlands •Natural resource professionals •Technical service providers •Tree care providers
•Right of way managers •Urban planners •Youth

V(E). Planned Program (Outputs)**1. Standard output measures**

2009	Direct Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
Plan	23000	125000	6000	35000
Actual	64888	127866	18127	7010

2. Number of Patent Applications Submitted (Standard Research Output)**Patent Applications Submitted**

Year: 2009

Plan: 2

Actual: 0

Patents listed**3. Publications (Standard General Output Measure)****Number of Peer Reviewed Publications**

2009	Extension	Research	Total
Plan	25	75	
Actual	0	0	166

V(F). State Defined Outputs**Output Target****Output #1****Output Measure**

- Number of programs offered to producers, land owners, and land managers.

Year	Target	Actual
2009	100	223

Output #2**Output Measure**

- Number of research projects

Year	Target	Actual
2009	25	140

Output #3**Output Measure**

- Number of demonstrations and field days

Year	Target	Actual
2009	10	288

Output #4**Output Measure**

- Number of Extension publications written, new & revised
Not reporting on this Output for this Annual Report

Output #5**Output Measure**

- Number of publications, media interactions, and presentations related to Indiana and regional weather and climate

Year	Target	Actual
2009	20	89

Output #6**Output Measure**

- Number of K-12 Classroom visits

Year	Target	Actual
2009	20	49

Output #7**Output Measure**

- Number of one-on-one consultations

Year	Target	Actual
2009	25	2235

Output #8**Output Measure**

- Number of newsletter or magazine articles written

Year	Target	Actual
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2009	5	53
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Output #9

Output Measure

- Number of volunteers trained

Year	Target	Actual
2009	40	569

Output #10

Output Measure

- Number of Plan Commission meetings
Not reporting on this Output for this Annual Report

Output #11

Output Measure

- Number of Extension publications distributed

Year	Target	Actual
2009	100	35272

V(G). State Defined Outcomes**V. State Defined Outcomes Table of Content**

O. No.	OUTCOME NAME
1	Number of participants who increase knowledge of practices to protect water resources
2	Number of participants who improve decision making for use of water resources
3	Number of participants who increase knowledge of proper application of fertilizer, manure and waste products to soil and potential for environmental consequences of misapplication
4	Number of participants who increased adoption of proper application of fertilizer, manure and waste products to soil
5	Number of participants who increase knowledge of best management practices for optimal manure nutrient utilization with on- and off-site agricultural lands
6	Number of participants who adopt best management practices for optimal manure nutrient utilization with on- and off-site agricultural lands
7	Number of participants who increase knowledge of the value of ponds in landscapes and methods for installing and managing ponds
8	Number of participants who increase value of landscapes through better installation and management of ponds
9	Number of participants who increase knowledge of on-site wastewater treatment siting and maintenance needs
10	Number of participants who make more informed decisions for on-site wastewater treatment siting and maintenance
11	Number of water quality violations related to animal production and land application in the state of Indiana
12	Number of tree care providers in Indiana who become certified arborists.
13	Number of professional natural resource advisors who have the skills necessary to assess the health of the wildlands
14	Number of wildlands owners who have a relationship with knowledgeable professional natural resource advisors and have developed and implemented a management plan
15	Number of natural resource professionals and wildland owners who have worked with landowners to develop and implement management plans
16	Number of owners of wildlands who will have assessed the health of their lands and developed and implemented management plans
17	Number of observers participating in weather and climate monitoring efforts
18	Number of certified arborists maintaining their certification

19	Number of landowners with knowledge of proper tree planting and management techniques
20	Number of participants who increased their knowledge of natural resource management
21	Number of participants who increased their knowledge of proper application of pesticides
22	Number of participants who increased their knowledge of topsoil importance
23	Number of participants who increased their knowledge of Indiana's diverse wildlife
24	Number of woodlot owners who improved their management skills

Outcome #1

1. Outcome Measures

Number of participants who increase knowledge of practices to protect water resources

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2009	0	3891

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

What has been done

Results

4. Associated Knowledge Areas

KA Code	Knowledge Area
102	Soil, Plant, Water, Nutrient Relationships
111	Conservation and Efficient Use of Water
112	Watershed Protection and Management
133	Pollution Prevention and Mitigation

Outcome #2**1. Outcome Measures**

Number of participants who improve decision making for use of water resources

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2009	0	282

3c. Qualitative Outcome or Impact Statement**Issue (Who cares and Why)**

The Indiana Water Shortage Task Force was convened to develop a revised water shortage plan. The Task Force needed guidance on how to assess droughts in Indiana and what would be needed to be done to develop that guideline.

What has been done

Researchers at Purdue and the Indiana Division of Water Resources developed a climatological assessment of the droughts in Indiana as well as a review of different indices that could be used for detecting droughts.

Results

As a result of the interaction, the Indiana Water Shortage Task Force revised the drought estimation from the older hydrological index to a newer rainfall based index.

4. Associated Knowledge Areas

KA Code	Knowledge Area
102	Soil, Plant, Water, Nutrient Relationships
111	Conservation and Efficient Use of Water
112	Watershed Protection and Management
133	Pollution Prevention and Mitigation

Outcome #3**1. Outcome Measures**

Number of participants who increase knowledge of proper application of fertilizer, manure and waste products to soil and potential for environmental consequences of misapplication

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2009	0	1258

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

What has been done

Results

4. Associated Knowledge Areas

KA Code	Knowledge Area
102	Soil, Plant, Water, Nutrient Relationships
112	Watershed Protection and Management
133	Pollution Prevention and Mitigation

Outcome #4

1. Outcome Measures

Number of participants who increased adoption of proper application of fertilizer, manure and waste products to soil

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2009	0	1268

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

The turfgrass industry needs constant educating on advances in turfgrass science in order to remain economically viable, reduce inputs, and become more sustainable.

What has been done

Purdue faculty and staff maintain constant outreach through Turf Tips, six educational programs sponsored by Purdue and the Midwest Regional Turf Foundation, pesticide licensing training, and conducting site visits and educational programs throughout the state.

Results

Post event evaluations have shown that 76 percent of respondents felt better able to manage turf in a more environmentally conscious manner. Forty-nine percent felt able to save money for their company or organization. Forty-nine percent consciously reduced the amount of pesticides, fertilizer or water inputs to maintain turf over the last growing season. 84% felt equipped to do their job more effectively and efficiently.

4. Associated Knowledge Areas

KA Code	Knowledge Area
102	Soil, Plant, Water, Nutrient Relationships
112	Watershed Protection and Management
133	Pollution Prevention and Mitigation

Outcome #5

1. Outcome Measures

Number of participants who increase knowledge of best management practices for optimal manure nutrient utilization with on- and off-site agricultural lands

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2009	0	1257

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

What has been done

Results

4. Associated Knowledge Areas

KA Code	Knowledge Area
102	Soil, Plant, Water, Nutrient Relationships
112	Watershed Protection and Management
133	Pollution Prevention and Mitigation

Outcome #6

1. Outcome Measures

Number of participants who adopt best management practices for optimal manure nutrient utilization with on- and off-site agricultural lands

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2009	0	100

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

What has been done

Results

4. Associated Knowledge Areas

KA Code	Knowledge Area
102	Soil, Plant, Water, Nutrient Relationships
112	Watershed Protection and Management
133	Pollution Prevention and Mitigation

Outcome #7

1. Outcome Measures

Number of participants who increase knowledge of the value of ponds in landscapes and methods for installing and managing ponds

Not Reporting on this Outcome Measure

Outcome #8

1. Outcome Measures

Number of participants who increase value of landscapes through better installation and management of ponds

Not Reporting on this Outcome Measure

Outcome #9

1. Outcome Measures

Number of participants who increase knowledge of on-site wastewater treatment siting and maintenance needs

Not Reporting on this Outcome Measure

Outcome #10

1. Outcome Measures

Number of participants who make more informed decisions for on-site wastewater treatment siting and maintenance

Not Reporting on this Outcome Measure

Outcome #11

1. Outcome Measures

Number of water quality violations related to animal production and land application in the state of Indiana

Not Reporting on this Outcome Measure

Outcome #12

1. Outcome Measures

Number of tree care providers in Indiana who become certified arborists.

Not Reporting on this Outcome Measure

Outcome #13

1. Outcome Measures

Number of professional natural resource advisors who have the skills necessary to assess the health of the wildlands

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2009	0	521

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

What has been done

Results

4. Associated Knowledge Areas

KA Code	Knowledge Area
121	Management of Range Resources
123	Management and Sustainability of Forest Resources
135	Aquatic and Terrestrial Wildlife

Outcome #14

1. Outcome Measures

Number of wildlands owners who have a relationship with knowledgeable professional natural resource advisors and have developed and implemented a management plan

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2009	0	180

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

What has been done

Results

4. Associated Knowledge Areas

KA Code	Knowledge Area
121	Management of Range Resources
123	Management and Sustainability of Forest Resources
135	Aquatic and Terrestrial Wildlife

Outcome #15

1. Outcome Measures

Number of natural resource professionals and wildland owners who have worked with landowners to develop and implement management plans

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2009	0	1526

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

What has been done

Results

4. Associated Knowledge Areas

KA Code	Knowledge Area
121	Management of Range Resources
123	Management and Sustainability of Forest Resources
135	Aquatic and Terrestrial Wildlife

Outcome #16

1. Outcome Measures

Number of owners of wildlands who will have assessed the health of their lands and developed and implemented management plans

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Condition Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
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2009

20

230

3c. Qualitative Outcome or Impact Statement**Issue (Who cares and Why)****What has been done****Results****4. Associated Knowledge Areas**

KA Code	Knowledge Area
121	Management of Range Resources
123	Management and Sustainability of Forest Resources
135	Aquatic and Terrestrial Wildlife

Outcome #17**1. Outcome Measures**

Number of observers participating in weather and climate monitoring efforts

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2009	20	1003

3c. Qualitative Outcome or Impact Statement**Issue (Who cares and Why)**

Global environmental changes such as climate change pose threats to natural ecosystems and to human welfare. Characterizing the potential impacts of these changes is important, both for informing decisions that have consequences for the rate of environmental changes, and for preparing society for the future.

What has been done

To better understand ecological responses to climate change, Purdue researchers and colleagues conduct the Boston-Area Climate Experiment (BACE). In the BACE, experimental infrastructure subjects grassland plots to twelve different climatic regimes: four temperature treatments in each of three precipitation regimes. Seedlings of four tree species have been planted in each plot. Plots are warmed with the use of heater elements suspended above the plots and precipitation is manipulated through the use of rainout shelters and sprinklers. This project is being used to determine the shape of the response curve of species, communities, and ecosystem processes to warming under different precipitation regimes. There is a public display area that serves as a focal point for educational efforts.

Results

Through this project, the researchers are able to provide a public display of the effects of climate change on ecosystems. Results have been shared with decision-makers as well as students and the public.

4. Associated Knowledge Areas

KA Code	Knowledge Area
132	Weather and Climate

Outcome #18

1. Outcome Measures

Number of certified arborists maintaining their certification

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2009	50	250

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

What has been done

Results

4. Associated Knowledge Areas

KA Code	Knowledge Area
123	Management and Sustainability of Forest Resources
125	Agroforestry

Outcome #19

1. Outcome Measures

Number of landowners with knowledge of proper tree planting and management techniques

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2009	100	950

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

What has been done

Results

4. Associated Knowledge Areas

KA Code	Knowledge Area
123	Management and Sustainability of Forest Resources
125	Agroforestry

Outcome #20

1. Outcome Measures

Number of participants who increased their knowledge of natural resource management

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2009	10	5085

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

What has been done

Results

4. Associated Knowledge Areas

KA Code	Knowledge Area
112	Watershed Protection and Management
121	Management of Range Resources
123	Management and Sustainability of Forest Resources

Outcome #21

1. Outcome Measures

Number of participants who increased their knowledge of proper application of pesticides

Not Reporting on this Outcome Measure

Outcome #22

1. Outcome Measures

Number of participants who increased their knowledge of topsoil importance

Not Reporting on this Outcome Measure

Outcome #23

1. Outcome Measures

Number of participants who increased their knowledge of Indiana's diverse wildlife

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2009	100	2556

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

What has been done

Results

4. Associated Knowledge Areas

KA Code **Knowledge Area**
 135 Aquatic and Terrestrial Wildlife

Outcome #24

1. Outcome Measures

Number of woodlot owners who improved their management skills

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2009	20	775

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

What has been done

Results

4. Associated Knowledge Areas

KA Code **Knowledge Area**
 123 Management and Sustainability of Forest Resources
 125 Agroforestry

V(H). Planned Program (External Factors)

External factors which affected outcomes

- Natural Disasters (drought, weather extremes, etc.)
- Economy
- Appropriations changes
- Public Policy changes
- Government Regulations
- Competing Public priorities
- Competing Programmatic Challenges
- Populations changes (immigration, new cultural groupings, etc.)

Brief Explanation

{No Data Entered}

V(I). Planned Program (Evaluation Studies and Data Collection)

1. Evaluation Studies Planned

- After Only (post program)
- Retrospective (post program)
- Before-After (before and after program)
- Time series (multiple points before and after program)
- Case Study
- Comparisons between program participants (individuals, group, organizations) and non-participants

Evaluation Results

{No Data Entered}

Key Items of Evaluation

{No Data Entered}

V(A). Planned Program (Summary)**Program # 8****1. Name of the Planned Program**

Plants and Their Systems

V(B). Program Knowledge Area(s)**1. Program Knowledge Areas and Percentage**

KA Code	Knowledge Area	%1862 Extension	%1890 Extension	%1862 Research	%1890 Research
201	Plant Genome, Genetics, and Genetic Mechanisms	12%		12%	
202	Plant Genetic Resources	3%		3%	
203	Plant Biological Efficiency and Abiotic Stresses Affecting Plants	8%		8%	
204	Plant Product Quality and Utility (Preharvest)	1%		1%	
205	Plant Management Systems	15%		15%	
206	Basic Plant Biology	11%		11%	
211	Insects, Mites, and Other Arthropods Affecting Plants	14%		14%	
212	Pathogens and Nematodes Affecting Plants	14%		14%	
213	Weeds Affecting Plants	9%		9%	
214	Vertebrates, Mollusks, and Other Pests Affecting Plants	1%		1%	
215	Biological Control of Pests Affecting Plants	3%		3%	
216	Integrated Pest Management Systems	9%		9%	
	Total	100%		100%	

V(C). Planned Program (Inputs)**1. Actual amount of professional FTE/SYs expended this Program**

Year: 2009	Extension		Research	
	1862	1890	1862	1890
Plan	34.0	0.0	49.0	0.0
Actual	36.2	0.0	102.1	0.0

2. Actual dollars expended in this Program (includes Carryover Funds from previous years)

Extension		Research	
Smith-Lever 3b & 3c 1763778	1890 Extension 0	Hatch 1973788	Evans-Allen 0
1862 Matching 1882191	1890 Matching 0	1862 Matching 6478976	1890 Matching 0
1862 All Other 386166	1890 All Other 0	1862 All Other 1206112	1890 All Other 0

V(D). Planned Program (Activity)**1. Brief description of the Activity**

•Conducted meetings, conferences, and workshops •Published newsletters and Extension publications •Established web sites
 •Organized Field days •Developed Demonstration plots •Used Telephone consultations •Applied research
 •Worked with Mass media •Conducted Short courses

2. Brief description of the target audience

•Agricultural crop producers •Crop consultants •Agribusinesses •Landowners •Horticultural producers
 •Professionals involved with golf courses, lawn care, sod production, athletic turf, and grounds •Individuals and families interested in small farms or alternative enterprises •Homeowners •Youth

V(E). Planned Program (Outputs)**1. Standard output measures**

2009	Direct Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
Plan	175000	400000	20000	500000
Actual	151875	5486726	23744	14047

2. Number of Patent Applications Submitted (Standard Research Output)**Patent Applications Submitted**

Year: 2009

Plan: 1

Actual: 0

Patents listed**3. Publications (Standard General Output Measure)****Number of Peer Reviewed Publications**

2009	Extension	Research	Total
Plan	50	100	
Actual	61	139	0

V(F). State Defined Outputs

Output Target**Output #1****Output Measure**

- Number of programs offered to producers, horticultural enterprises, Master Gardeners, etc.

Year	Target	Actual
2009	500	888

Output #2**Output Measure**

- Number of research projects.

Year	Target	Actual
2009	50	172

Output #3**Output Measure**

- Number of research publications.

Year	Target	Actual
2009	100	139

Output #4**Output Measure**

- Number of volunteers trained to assist with information and programs.

Year	Target	Actual
2009	500	3616

Output #5**Output Measure**

- Number of Extension publications written, new or revised; web sites developed

Year	Target	Actual
2009	50	61

Output #6**Output Measure**

- Number of Extension publications distributed
Not reporting on this Output for this Annual Report

Output #7**Output Measure**

- Number of newsletter or magazine articles written

Year	Target	Actual
2009	10	232

Output #8

Output Measure

- Number of consultations

Year	Target	Actual
2009	50	5652

Output #9

Output Measure

- Number of K-12 classroom visits

Year	Target	Actual
2009	10	148

V(G). State Defined Outcomes**V. State Defined Outcomes Table of Content**

O. No.	OUTCOME NAME
1	Number of horticultural enterprises who increase knowledge of new and appropriate technologies and effective cropping practices to produce high quality products while protecting, preserving and sustaining their land and the regional environment
2	Number of horticultural enterprises who adopt new and appropriate technologies and effective cropping practices to produce high quality products while protecting, preserving and sustaining their land and the regional environment
3	Number of Indiana citizens who increase knowledge of proper landscape and garden management.
4	Number of volunteers who increase knowledge of consumer horticulture to serve as first detectors for symptoms of invasive species.
5	Number of professional turf managers who increase knowledge of pesticides, nutrients, and water inputs for maintaining high quality turf.
6	Number of professional turf managers who reduce pesticide, nutrient, and water inputs while maintaining high quality turf.
7	Number of high quality turf acres maintained with reduced pesticides, nutrient and water inputs.
8	Number of crop producers who increase knowledge of integrated pest management practices
9	Number of acres of field crops (corn, soybeans, forage, small grains) in which pests are managed using an integrated pest management system.
10	Number of crop producers who increase knowledge of best management practices in crop, nutrients, and related soil/water decisions.
11	Number of producers who adopt best management practices in crop, nutrient, and related soil/water decisions.
12	analysis of how crop plants respond to heat and drought stress and competition with weeds

Outcome #1**1. Outcome Measures**

Number of horticultural enterprises who increase knowledge of new and appropriate technologies and effective cropping practices to produce high quality products while protecting, preserving and sustaining their land and the regional environment

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2009	0	3035

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

What has been done

Results

4. Associated Knowledge Areas

KA Code	Knowledge Area
205	Plant Management Systems
211	Insects, Mites, and Other Arthropods Affecting Plants
212	Pathogens and Nematodes Affecting Plants
213	Weeds Affecting Plants
214	Vertebrates, Mollusks, and Other Pests Affecting Plants
215	Biological Control of Pests Affecting Plants
216	Integrated Pest Management Systems

Outcome #2**1. Outcome Measures**

Number of horticultural enterprises who adopt new and appropriate technologies and effective cropping practices to produce high quality products while protecting, preserving and sustaining their land and the regional environment

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2009	30	220

3c. Qualitative Outcome or Impact Statement**Issue (Who cares and Why)**

The survival and growth of the U.S. floriculture industry is threatened by rising energy and input costs, increasing environmental regulations, droughts, immigration and labor issues. Growers are seeking information on how to successfully finish poinsettias at cooler temperatures.

What has been done

Researchers have quantified how a range of temperatures and daily light integral impact poinsettia and Tecoma, a new floriculture crop, growth and development. For ten poinsettia cultivars, researchers are determining if 1 or 2 weeks of additional growth are required prior to short days to achieve marketable height and quality.

Results

These studies have generated information that is enabling greenhouse growers across the U.S. to optimize poinsettia cold finishing, consume less energy, and produce a poinsettia crop with the fewest possible inputs leading to increased profitability and sustainability. The holiday poinsettia is the most valuable potted flowering crop sold in the U.S. Based on the preliminary data of these studies, poinsettia producers across the U.S. could save between 25 to 50 percent by growing their poinsettia crop more efficiently by consuming less energy for heating. As a result, the U.S. floriculture industry could reduce its energy and input consumption and successfully market environmentally friendly and sustainable poinsettias at a premium price. Researchers are providing growers with information on how to produce and schedule new floriculture crops.

4. Associated Knowledge Areas

KA Code	Knowledge Area
205	Plant Management Systems
211	Insects, Mites, and Other Arthropods Affecting Plants
212	Pathogens and Nematodes Affecting Plants
213	Weeds Affecting Plants
214	Vertebrates, Mollusks, and Other Pests Affecting Plants
215	Biological Control of Pests Affecting Plants
216	Integrated Pest Management Systems

Outcome #3**1. Outcome Measures**

Number of Indiana citizens who increase knowledge of proper landscape and garden management.

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2009	0	3157

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

What has been done

Results

4. Associated Knowledge Areas

KA Code	Knowledge Area
204	Plant Product Quality and Utility (Preharvest)
205	Plant Management Systems
211	Insects, Mites, and Other Arthropods Affecting Plants
212	Pathogens and Nematodes Affecting Plants
213	Weeds Affecting Plants
214	Vertebrates, Mollusks, and Other Pests Affecting Plants
215	Biological Control of Pests Affecting Plants
216	Integrated Pest Management Systems

Outcome #4**1. Outcome Measures**

Number of volunteers who increase knowledge of consumer horticulture to serve as first detectors for symptoms of invasive species.

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2009	0	500

3c. Qualitative Outcome or Impact Statement**Issue (Who cares and Why)**

There are over 16,000 insect species in Indiana. Most are native, but a few have been intentionally or accidentally introduced from other parts of the world. Many of these invasive species are destructive. Without natural enemies or control intervention they can spread rapidly causing devastating damage to crops and forests. Quick, accurate identification of these pest and understanding their distribution in the state is important in preparing and executing appropriate control measures.

What has been done

During the summer, reserached conducted insect surveys throughout the state. Over 30000 specimen were processed. All invasive species were reported to the Cooperative Pest Survey director and entered inot a national database. Over 7000 specimen representative of these species were placed in the Purdue Entomological Research Collection as vocher specimen for future study.

Results

Information about invasive species, such as the Emerald Ash Borer, the Banded Elm Bark Beetle, the Granulated Ambrosia Beetle and others, will help entomologists develop strategies for controllign these pests. The database information linked with current and future data will provide an historical picture of the distribution of various insect species in the state and their changing distributional patterns over time due to such factors as habitat modification and climate change.

4. Associated Knowledge Areas

KA Code	Knowledge Area
211	Insects, Mites, and Other Arthropods Affecting Plants
212	Pathogens and Nematodes Affecting Plants
213	Weeds Affecting Plants
214	Vertebrates, Mollusks, and Other Pests Affecting Plants

Outcome #5**1. Outcome Measures**

Number of professional turf managers who increase knowledge of pesticides, nutrients, and water inputs for maintaining high quality turf.

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2009	0	271

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

What has been done

Results

4. Associated Knowledge Areas

KA Code	Knowledge Area
203	Plant Biological Efficiency and Abiotic Stresses Affecting Plants
205	Plant Management Systems
211	Insects, Mites, and Other Arthropods Affecting Plants
212	Pathogens and Nematodes Affecting Plants
213	Weeds Affecting Plants
214	Vertebrates, Mollusks, and Other Pests Affecting Plants
215	Biological Control of Pests Affecting Plants
216	Integrated Pest Management Systems

Outcome #6

1. Outcome Measures

Number of professional turf managers who reduce pesticide, nutrient, and water inputs while maintaining high quality turf.

Not Reporting on this Outcome Measure

Outcome #7

1. Outcome Measures

Number of high quality turf acres maintained with reduced pesticides, nutrient and water inputs.

Not Reporting on this Outcome Measure

Outcome #8**1. Outcome Measures**

Number of crop producers who increase knowledge of integrated pest management practices

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2009	0	6963

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

What has been done

Results

4. Associated Knowledge Areas

KA Code	Knowledge Area
216	Integrated Pest Management Systems

Outcome #9**1. Outcome Measures**

Number of acres of field crops (corn, soybeans, forage, small grains) in which pests are managed using an integrated pest management system.

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2009	3000000	5500000

3c. Qualitative Outcome or Impact Statement**Issue (Who cares and Why)**

Agribusiness personnel including producers, fertilizer and chemical dealers, county Extension Educators, company agronomists, and crop consultants want and need to be kept abreast of pest (insect, nematodes, weeds, vertebrates, and plant diseases) development and problems, and agronomic situations and issues on Indiana's field crops. 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 personnel are, the greater their ability to guide producers toward economically and environmentally sound pest management decisions.

What has been done

The Purdue Pest Management program coordinates an interdisciplinary team to produce and publish the weekly Pest & Crop newsletter. This newsletter gives forecasted and up-to-date information on pests and their damage throughout the state. Graphics and videos to aid in pest identification, scouting procedures, management guidelines, and control techniques and materials are presented. Pest surveys, including pheromone and black light pest collection data, are included. This information assists producers and agribusiness personnel in making real time economic risk assessments for pests and other agronomic issues, as well as assessments for the subsequent year.

Results

The newsletter is available on the internet and a weekly e-mail publication notice is sent to over 1300 pest managers. Through an on-line evaluation, 99 percent of respondents indicated that the newsletter helped them improve their pest management decision making ability. 72 percent said it saved or made them money. Fifty percent considered the newsletter their main source of pest information. One respondent said "this publication helps me stay on top of potential problems".

4. Associated Knowledge Areas

KA Code	Knowledge Area
216	Integrated Pest Management Systems

Outcome #10**1. Outcome Measures**

Number of crop producers who increase knowledge of best management practices in crop, nutrients, and related soil/water decisions.

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2009	0	7823

3c. Qualitative Outcome or Impact Statement**Issue (Who cares and Why)**

Soybean cyst nematode (SCN) is the most yield limiting disease of soybean in the United States. Research has shown that the most common source of resistance, PI88788, is no longer effective but it continues to be used in management of SCN. Recent surveys and correspondence with growers and commercial agriculture professionals revealed that the growers are not managing this pest properly.

What has been done

Long-plot field trials were established in the North Central states. In Indiana two locations were chosen based on the degree of infestation and known history of these fields. Four soybean cultivars were planted, three with various sources of resistance. Yield and SCN data were collected and genetic characterization of SCN populations will be determined. A small-plot version of these plots was established at the Diagnostic Training Center demonstration plots and showcased during educational sessions on the management of soybean cyst nematode.

Results

Soybean cyst nematode continues to be a perennial pest of soybean in most soybean growing areas of the United States. This project will directly benefit all soybean producers by increasing awareness of this problem and encouraging the proper management. The project also targets sustainability of soybean production in SCN infested fields by managing the problem over time. Establishment of on-site long plots should demonstrate the effectiveness of various sources of resistance on SCN and provide a valuable tool for Extension specialists. It is a known fact that PI88788 is not as effective in managing SCN and new sources of resistance need to be incorporated into soybean cultivars. Results from these plots have effectively demonstrated the correlation between sources of resistance and soybean yield.

4. Associated Knowledge Areas

KA Code	Knowledge Area
205	Plant Management Systems

Outcome #11

1. Outcome Measures

Number of producers who adopt best management practices in crop, nutrient, and related soil/water decisions.

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2009	300	6171

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

With the rising costs of inputs such as fuel, fertilizer, and labor, the profit margins for all areas of production agriculture become smaller. In order for ruminant livestock producers to remain profitable or become profitable once again they need to be time efficient and make the most of their resources. Implementing management-intensive grazing offers this opportunity by reducing labor requirements and eliminating waste.

What has been done

Missouri, Illinois, Ohio, Kentucky and Indiana hosted the 8th annual Heart of America Grazing Conference. Working with input from NRCS staff and livestock producers, the program was designed to provide information on more traditional aspects of rational grazing as well as programming and raising and marketing ones own lamb or beef directly through Farmers' Markets.

Results

Conference evaluations showed that two-thirds of the respondents planned to impleoment information they learned at the conference such as breaking up larger pastures and implementing basic rotational grazing, breaking up current paddocks to implement hihg-density mob type grazing to more efficiently use forage resources. Ninety percent of those attending the locally grown, marketing portion of the program said they planned to direct market or help others they knew direct market their farm produced products.

4. Associated Knowledge Areas

KA Code	Knowledge Area
205	Plant Management Systems

Outcome #12**1. Outcome Measures**

analysis of how crop plants respond to heat and drought stress and competition with weeds

2. Associated Institution Types

- 1862 Research

3a. Outcome Type:

Change in Condition Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2009	{No Data Entered}	0

3c. Qualitative Outcome or Impact Statement**Issue (Who cares and Why)**

Heat and drought stress and competition with weeds are the most important factors affecting crop production in the world. In the United States, as much as one-third of the corn production and nearly all of the sorghum production experiences yield-reducing stress conditions at some point during the growing season. There is a tremendous need and opportunity for researchers to identify how crop plants respond to these stresses and can be developed to better withstand these conditions.

What has been done

Researchers initiated a multipronged program to develop corn and sorghum traits and germplasm with improved performance in stress environments. In corn, the research activities have focused on identification of genes for improved stress tolerance. An array of genotypes with diverse forms of early-, mid-, and late-season drought tolerance have been identified. In sorghum, the researchers are developing sorghum genotypes with various herbicide tolerance traits as tools for ue in development of new weed management strategies for sorghum in the U.S. and Africa.

Results

In sorghum, researchers developed and released 31 elite sorghum lines with combinations of ALS and ACCase herbicide resistance (PU-KS1 to PU-KS31). These lines were released to all sectors of the commercial U.S. sorghum seed sector and will provide the germplasm for development of new herbicide tolerant sorghum hybrids in the U.S. Studies of the drought tolerance traits of maize have focused on outstanding germplasm sources of these traits. Individual genes or components of these traits are being incorporated into elite U.S. parent lines for development of more drought tolerant maize hybrids. Gene tagging studies with the Mutator transposable element have identified multiple alleles of two different genes associated with staygreen/senescence. These mutants will be used to clone and characterize these genes.

4. Associated Knowledge Areas

KA Code	Knowledge Area
201	Plant Genome, Genetics, and Genetic Mechanisms
202	Plant Genetic Resources

V(H). Planned Program (External Factors)

External factors which affected outcomes

- Natural Disasters (drought, weather extremes, etc.)
- Economy
- Appropriations changes
- Public Policy changes
- Government Regulations
- Competing Public priorities
- Competing Programmatic Challenges
- Populations changes (immigration, new cultural groupings, etc.)

Brief Explanation

{No Data Entered}

V(I). Planned Program (Evaluation Studies and Data Collection)

1. Evaluation Studies Planned

- After Only (post program)
- Before-After (before and after program)
- Time series (multiple points before and after program)
- Case Study
- Comparisons between program participants (individuals, group, organizations) and non-participants
- Comparison between locales where the program operates and sites without program intervention

Evaluation Results

{No Data Entered}

Key Items of Evaluation

{No Data Entered}

V(A). Planned Program (Summary)**Program # 9****1. Name of the Planned Program**

Animals and Their Systems

V(B). Program Knowledge Area(s)

1. Program Knowledge Areas and Percentage

KA Code	Knowledge Area	%1862 Extension	%1890 Extension	%1862 Research	%1890 Research
301	Reproductive Performance of Animals	6%		6%	
302	Nutrient Utilization in Animals	30%		30%	
303	Genetic Improvement of Animals	7%		7%	
304	Animal Genome	13%		13%	
305	Animal Physiological Processes	3%		3%	
306	Environmental Stress in Animals	3%		3%	
307	Animal Management Systems	9%		9%	
308	Improved Animal Products (Before Harvest)	8%		8%	
311	Animal Diseases	10%		10%	
312	External Parasites and Pests of Animals	1%		1%	
313	Internal Parasites in Animals	1%		1%	
314	Toxic Chemicals, Poisonous Plants, Naturally Occurring Toxins, and Other Hazards Affecting Animals	1%		1%	
315	Animal Welfare/Well-Being and Protection	8%		8%	
	Total	100%		100%	

V(C). Planned Program (Inputs)

1. Actual amount of professional FTE/SYs expended this Program

Year: 2009	Extension		Research	
	1862	1890	1862	1890
Plan	20.0	0.0	50.0	0.0
Actual	13.2	0.0	154.5	0.0

2. Actual dollars expended in this Program (includes Carryover Funds from previous years)

Extension		Research	
Smith-Lever 3b & 3c 642619	1890 Extension 0	Hatch 1512389	Evans-Allen 0
1862 Matching 1548464	1890 Matching 0	1862 Matching 5622876	1890 Matching 0
1862 All Other 270516	1890 All Other 0	1862 All Other 5067911	1890 All Other 0

V(D). Planned Program (Activity)**1. Brief description of the Activity**

- Fostered leadership and economic development and facilitated strong partnerships and participation in state, regional, national, and international agencies, organizations, and groups.
- Developed collaborative, multidisciplinary approaches that responded to short- and long- term educational needs and issues.
- Developed publications, workshops, consultations, seminars, certification programs, distance education modules, field days and other opportunities.
- Increased number of participants in life-long learning programs.
- Encouraged participation by faculty in taskforces, review committees, advisory boards, editorial boards, commodity committees/boards, common interest groups and professional societies.
- Completed needs assessments for each species

2. Brief description of the target audience

- Poultry and livestock producers
- Farm employees
- Nutritionists and consultants
- Veterinarians
- Small flock/herd owners
- Youth
- Consumers
- County officials
- Government officials

V(E). Planned Program (Outputs)**1. Standard output measures**

2009	Direct Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
Plan	40000	200000	10000	50000
Actual	102574	76590	50041	7049

2. Number of Patent Applications Submitted (Standard Research Output)**Patent Applications Submitted**

Year: 2009
Plan: 1
Actual: 0

Patents listed**3. Publications (Standard General Output Measure)****Number of Peer Reviewed Publications**

2009	Extension	Research	Total
Plan	25	50	
Actual	18	3	0

V(F). State Defined Outputs**Output Target****Output #1****Output Measure**

- Number of educational workshops and seminars offered to poultry and livestock producers

Year	Target	Actual
2009	50	125

Output #2**Output Measure**

- Number of research projects

Year	Target	Actual
2009	50	81

Output #3**Output Measure**

- Number of consultations

Year	Target	Actual
2009	25	1106

Output #4**Output Measure**

- Number of Extension publications written, new or revised; websites developed

Year	Target	Actual
2009	50	18

Output #5**Output Measure**

- Number of K-12 classroom visits

Year	Target	Actual

2009

20

10

Output #6

Output Measure

- Number of Extension publications distributed

Year

Target

Actual

2009

100

13997

V(G). State Defined Outcomes**V. State Defined Outcomes Table of Content**

O. No.	OUTCOME NAME
1	Number of poultry and livestock producers and professionals who increase their knowledge of up-to-date information and technologies, management practices, and value-added opportunities
2	Number of poultry and livestock producers and professionals who adopt up-to-date information and technologies.
3	Number of livestock producers adopting practices to enhance sustainability of their operations.
4	Number of livestock producers expanding their operations.
5	Number of poultry and livestock producers utilizing animal welfare assessments to enhance their management systems.
6	Number of poultry and livestock producers and professionals who increased their knowledge of environmental stewardship practices and environmental regulations.
7	Number of poultry and livestock producers adopting management practices that maximize environmental stewardship.
8	Number of poultry and livestock producers and professionals developing comprehensive nutrient management plans.
9	Number of poultry and livestock producers who enhance soil fertility and reduce soil pollution through properly applied animal waste
10	Number of 4-H member Youth Quality Assurance certified
11	Number of adults Quality Assurance certified
12	Number of livestock tested for reproductive soundness
13	Number of livestock producers who increased their knowledge about alternative feedstuffs
14	Number of youth who gained knowledge about the livestock industry, animal feeding, and/or production

Outcome #1**1. Outcome Measures**

Number of poultry and livestock producers and professionals who increase their knowledge of up-to-date information and technologies, management practices, and value-added opportunities

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2009	0	1576

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

What has been done

Results

4. Associated Knowledge Areas

KA Code	Knowledge Area
301	Reproductive Performance of Animals
302	Nutrient Utilization in Animals
305	Animal Physiological Processes
306	Environmental Stress in Animals
307	Animal Management Systems
308	Improved Animal Products (Before Harvest)
311	Animal Diseases
312	External Parasites and Pests of Animals
313	Internal Parasites in Animals
314	Toxic Chemicals, Poisonous Plants, Naturally Occurring Toxins, and Other Hazards Affecting Animals

Outcome #2**1. Outcome Measures**

Number of poultry and livestock producers and professionals who adopt up-to-date information and technologies.

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2009	0	942

3c. Qualitative Outcome or Impact Statement**Issue (Who cares and Why)**

Researchers hypothesize that ethanol co-products and estrus synchronization technologies can be used to reduce cow herd input costs and increase cow herd productivity. When used in excess, ethanol co-products can have a negative effect on cow herd reproductive performance.

What has been done

Researchers evaluated the effect of ethanol co-products in developing replacement heifer and cow diets. Data from these studies have been disseminated to producers through educational sessions and printed materials.

Results

Producers are using ethanol co-products as a protein source and not a primary source of energy. This recommendation eliminates the negative effects of excess nitrogen, sulfur and fat in the diet. Adding wet distiller's grains to silage at the time of ensiling or re-ensiling corn silage with wet distiller's grains allows small producers an opportunity to minimize storage losses, extend shelf life, and capitalize on cost effectiveness of semi-load quantities.

4. Associated Knowledge Areas

KA Code	Knowledge Area
301	Reproductive Performance of Animals
302	Nutrient Utilization in Animals
305	Animal Physiological Processes
306	Environmental Stress in Animals
307	Animal Management Systems
308	Improved Animal Products (Before Harvest)
311	Animal Diseases
312	External Parasites and Pests of Animals
313	Internal Parasites in Animals
314	Toxic Chemicals, Poisonous Plants, Naturally Occurring Toxins, and Other Hazards Affecting

Animals

Outcome #3**1. Outcome Measures**

Number of livestock producers adopting practices to enhance sustainability of their operations.

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Condition Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2009	20	646

3c. Qualitative Outcome or Impact Statement**Issue (Who cares and Why)**

Variation in pig growth increases the cost of pork production by decreasing the efficiency in which the grow finish facilities are utilized. Selection for increased litter size has resulted in larger litters with greater number of light weight pigs. These pigs tend to grow more slowly to market increasing the number of lightweight pigs that are sold with substantial discounts, ranging from 10 to 30 dollars per pig. Producers will feed dried distillers grains and solubles as a high percentage of the current and future corn production will be used for ethanol production. If DDGS are available the use of 20-25% in the finishing diets can reduce feed costs from 4 to 8 dollars per head. The feeding of DDGS at higher concentrations results in decreased carcass weight growth by both decreasing bodyweight growth and decreasing dressing percentage.

What has been done

Alternative methods to model farm-genetic population specific growth parameters including variation in pig bodyweight and compositional growth are being refined. Large data sets were used to develop a stochastic pig growth model that relates early pig growth including birth, weaning, and nursery weight on pig compositional growth to market weight. The model has been updated to include the survival of pigs from each stage of growth, birth, preweaning, nursery and grow-finish relative to litter size, birth weight and sow parity. The model includes a parity one effect that reduces pig growth and increase mortality. Research has been conducted to refine the pig compositional model to take into account the changes in fatty acid profiles of pigs fed dried distillers grains, dietary fats, and ractopamine to increased market weights.

Results

Pork producers have increased their use of Paylean and are increasing the feeding of dried distillers grains. More producers are either decreasing the concentration of dried distillers grains or removing dried distillers grains just prior to marketing.

4. Associated Knowledge Areas

KA Code	Knowledge Area
301	Reproductive Performance of Animals
302	Nutrient Utilization in Animals

- 305 Animal Physiological Processes
- 306 Environmental Stress in Animals
- 307 Animal Management Systems
- 308 Improved Animal Products (Before Harvest)
- 311 Animal Diseases
- 312 External Parasites and Pests of Animals
- 313 Internal Parasites in Animals
- 314 Toxic Chemicals, Poisonous Plants, Naturally Occurring Toxins, and Other Hazards Affecting Animals

Outcome #4

1. Outcome Measures

Number of livestock producers expanding their operations.

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Condition Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2009	20	51

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

What has been done

Results

4. Associated Knowledge Areas

KA Code	Knowledge Area
307	Animal Management Systems

Outcome #5

1. Outcome Measures

Number of poultry and livestock producers utilizing animal welfare assessments to enhance their management systems.

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Condition Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2009	5	145

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

What has been done

Results

4. Associated Knowledge Areas

KA Code	Knowledge Area
315	Animal Welfare/Well-Being and Protection

Outcome #6

1. Outcome Measures

Number of poultry and livestock producers and professionals who increased their knowledge of environmental stewardship practices and environmental regulations.

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2009	0	110

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

What has been done

Results

4. Associated Knowledge Areas

KA Code	Knowledge Area
302	Nutrient Utilization in Animals
307	Animal Management Systems

Outcome #7

1. Outcome Measures

Number of poultry and livestock producers adopting management practices that maximize environmental stewardship.

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2009	0	248

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

What has been done

Results

4. Associated Knowledge Areas

KA Code	Knowledge Area
302	Nutrient Utilization in Animals
307	Animal Management Systems

Outcome #8

1. Outcome Measures

Number of poultry and livestock producers and professionals developing comprehensive nutrient management plans.

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2009	0	7

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

Nutrient management record keeping is important for all sizes of livestock operations. Nutrient management records are required to be kept and maintained by all permitted livestock operations in Indiana, including Confined Feeding Operations (CFO) and Concentrated Animal Feeding Operations (CAFO). Improper record keeping is often cited by the Indiana Department of Environmental Management during inspections of livestock operations. Systems that make record keeping easier will encourage producers to keep the appropriate records for their operations.

What has been done

A nutrient management record keeping calendar was developed for livestock producers. The calendar is designed to serve as a reminder of the records that need to be kept by livestock operations and as a tool for recording and keeping the records. The calendar provides places to keep daily, weekly, monthly, and annual records related to nutrient management. Over 3000 calendars were distributed in Indiana.

Results

The nutrient management record keeping calendars were distributed to over 3000 producers in Indiana. Both environmental consultants and the Indiana Department of Environmental Management worked with livestock producers that were using the calendars for keeping their records. The record keeping calendars provide livestock producers with a simple method for keeping their nutrient management records.

4. Associated Knowledge Areas

KA Code	Knowledge Area
302	Nutrient Utilization in Animals
307	Animal Management Systems

Outcome #9

1. Outcome Measures

Number of poultry and livestock producers who enhance soil fertility and reduce soil pollution through properly applied animal waste

Not Reporting on this Outcome Measure

Outcome #10

1. Outcome Measures

Number of 4-H member Youth Quality Assurance certified

Not Reporting on this Outcome Measure

Outcome #11

1. Outcome Measures

Number of adults Quality Assurance certified

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2009	25	362

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

What has been done

Results

4. Associated Knowledge Areas

KA Code	Knowledge Area
307	Animal Management Systems

Outcome #12

1. Outcome Measures

Number of livestock tested for reproductive soundness

Not Reporting on this Outcome Measure

Outcome #13

1. Outcome Measures

Number of livestock producers who increased their knowledge about alternative feedstuffs

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2009	50	1304

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

What has been done

Results

4. Associated Knowledge Areas

KA Code	Knowledge Area
302	Nutrient Utilization in Animals

Outcome #14

1. Outcome Measures

Number of youth who gained knowledge about the livestock industry, animal feeding, and/or production

Not Reporting on this Outcome Measure

V(H). Planned Program (External Factors)

External factors which affected outcomes

- Natural Disasters (drought, weather extremes, etc.)
- Economy
- Appropriations changes
- Public Policy changes
- Government Regulations
- Competing Public priorities
- Competing Programmatic Challenges
- Populations changes (immigration, new cultural groupings, etc.)

Brief Explanation

{No Data Entered}

V(I). Planned Program (Evaluation Studies and Data Collection)

1. Evaluation Studies Planned

- After Only (post program)
- Retrospective (post program)
- Before-After (before and after program)
- During (during program)
- Case Study
- Comparisons between program participants (individuals, group, organizations) and non-participants

Evaluation Results

{No Data Entered}

Key Items of Evaluation

{No Data Entered}

V(A). Planned Program (Summary)**Program # 10****1. Name of the Planned Program**

Economic and Community Development

V(B). Program Knowledge Area(s)**1. Program Knowledge Areas and Percentage**

KA Code	Knowledge Area	%1862 Extension	%1890 Extension	%1862 Research	%1890 Research
608	Community Resource Planning and Development	80%		80%	
803	Sociological and Technological Change Affecting Individuals, Families, and Communities	3%		3%	
805	Community Institutions, Health, and Social Services	17%		17%	
Total		100%		100%	

V(C). Planned Program (Inputs)**1. Actual amount of professional FTE/SYs expended this Program**

Year: 2009	Extension		Research	
	1862	1890	1862	1890
Plan	4.0	0.0	2.0	0.0
Actual	3.5	0.0	5.7	0.0

2. Actual dollars expended in this Program (includes Carryover Funds from previous years)

Extension		Research	
Smith-Lever 3b & 3c	1890 Extension	Hatch	Evans-Allen
470889	0	19465	0
1862 Matching	1890 Matching	1862 Matching	1890 Matching
1012417	0	647961	0
1862 All Other	1890 All Other	1862 All Other	1890 All Other
79954	0	222205	0

V(D). Planned Program (Activity)**1. Brief description of the Activity**

•Workshops •Extension publications •Research •Website Development •IP Video Programs •One-on-One Consultation •Collaboration with other agencies

2. Brief description of the target audience

- Local elected officials
- Staff and volunteers of nonprofits/NGOs
- General Citizens

V(E). Planned Program (Outputs)

1. Standard output measures

2009	Direct Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
Plan	11000	60000	6000	35000
Actual	73720	615978	9816	72788

2. Number of Patent Applications Submitted (Standard Research Output)

Patent Applications Submitted

Year: 2009
 Plan: 0
 Actual: 0

Patents listed

3. Publications (Standard General Output Measure)

Number of Peer Reviewed Publications

2009	Extension	Research	Total
Plan	6	0	
Actual	0	0	51

V(F). State Defined Outputs

Output Target

Output #1

Output Measure

- number of workshops conducted

Year	Target	Actual
2009	12	734

Output #2

Output Measure

- number of research projects

Year	Target	Actual
2009	3	3

Output #3**Output Measure**

- number of publications

Year	Target	Actual
2009	6	51

Output #4**Output Measure**

- number of collaborations with other agencies

Year	Target	Actual
2009	20	28

Output #5**Output Measure**

- number of IP-video programs

Year	Target	Actual
2009	4	145

Output #6**Output Measure**

- number of one-on-one consultations

Year	Target	Actual
2009	36	238

Output #7**Output Measure**

- number of web sites developed

Year	Target	Actual
2009	3	4

V(G). State Defined Outcomes**V. State Defined Outcomes Table of Content**

O. No.	OUTCOME NAME
1	Number of communities that increase knowledge of how to identify and address critical issues for citizens
2	Number of communities engaged in issue identification and action planning
3	Number of communities who improve their capacity to identify and address critical issues that impact the lives of its citizens
4	Number of communities increasing knowledge related to creating sustainable and competitive local economic development systems
5	Number of communities creating more sustainable and competitive local economic development systems.
6	number of participants who are building their community leadership skills and becoming more active in community problem-solving.
7	number of participants becoming more active in community problem-solving efforts
8	Dollar value of grants obtained as a result of participation in grant writing program

Outcome #1**1. Outcome Measures**

Number of communities that increase knowledge of how to identify and address critical issues for citizens

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2009	0	138

3c. Qualitative Outcome or Impact Statement**Issue (Who cares and Why)**

Most communities lack the "civic space" in which to frame issues and identify ways to address them. Extension provides that civic space acting as a neutral convener, providing the facilitation needed to engage stakeholders, and serving as an impartial source of research-based information to assist the community in making better-informed decisions.

What has been done

Extension has been involved in 240 communities helping them build their capacity to identify and address critical issues. Responding to the need for programming related to local government finance, three state-wide sessions were delivered on the topic. Over 500 local government officials attended these programs.

Results

The following are some of the impacts and results from the programming related to this issue. In the local government finance program 100% of participants indicated that the information from the session helped them identify important community issues related to local government finance and 90% indicated that their new knowledge would have an impact on the fiscal well-being of their community.

4. Associated Knowledge Areas

KA Code	Knowledge Area
608	Community Resource Planning and Development
803	Sociological and Technological Change Affecting Individuals, Families, and Communities
805	Community Institutions, Health, and Social Services

Outcome #2

1. Outcome Measures

Number of communities engaged in issue identification and action planning

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2009	0	162

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

What has been done

Results

4. Associated Knowledge Areas

KA Code	Knowledge Area
608	Community Resource Planning and Development
803	Sociological and Technological Change Affecting Individuals, Families, and Communities
805	Community Institutions, Health, and Social Services

Outcome #3

1. Outcome Measures

Number of communities who improve their capacity to identify and address critical issues that impact the lives of its citizens

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Condition Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2009	15	240

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

What has been done

Results

4. Associated Knowledge Areas

KA Code	Knowledge Area
608	Community Resource Planning and Development
803	Sociological and Technological Change Affecting Individuals, Families, and Communities
805	Community Institutions, Health, and Social Services

Outcome #4

1. Outcome Measures

Number of communities increasing knowledge related to creating sustainable and competitive local economic development systems

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2009	0	60

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

What has been done

Results

4. Associated Knowledge Areas

KA Code	Knowledge Area
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608	Community Resource Planning and Development
803	Sociological and Technological Change Affecting Individuals, Families, and Communities
805	Community Institutions, Health, and Social Services

Outcome #5

1. Outcome Measures

Number of communities creating more sustainable and competitive local economic development systems.

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2009	15	76

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

What has been done

Results

4. Associated Knowledge Areas

KA Code	Knowledge Area
608	Community Resource Planning and Development
803	Sociological and Technological Change Affecting Individuals, Families, and Communities
805	Community Institutions, Health, and Social Services

Outcome #6

1. Outcome Measures

number of participants who are building their community leadership skills and becoming more active in community problem-solving.

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2009	0	5757

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

What has been done

Results

4. Associated Knowledge Areas

KA Code	Knowledge Area
608	Community Resource Planning and Development
803	Sociological and Technological Change Affecting Individuals, Families, and Communities
805	Community Institutions, Health, and Social Services

Outcome #7

1. Outcome Measures

number of participants becoming more active in community problem-solving efforts

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2009	2400	6455

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

What has been done

Results

4. Associated Knowledge Areas

KA Code	Knowledge Area
608	Community Resource Planning and Development
803	Sociological and Technological Change Affecting Individuals, Families, and Communities
805	Community Institutions, Health, and Social Services

Outcome #8

1. Outcome Measures

Dollar value of grants obtained as a result of participation in grant writing program

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Condition Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2009	{No Data Entered}	1555432

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

Small nonprofits are the backbone of many local communities and most lack the capacity to be effective in writing grants for much-needed resources to support their important work in their communities.

What has been done

This statewide program pairs campus-based specialists with county-based Extension professionals to offer the 16-hour program. Several professional organizations are able to use the program for Continuing Education Credits.

Results

In the 2008-2009 programming year, participants developed grant proposals that resulted in over \$1.5 million in grant dollars that went directly to their local communities to support programmatic and capital needs.

4. Associated Knowledge Areas

KA Code	Knowledge Area
608	Community Resource Planning and Development

V(H). Planned Program (External Factors)

External factors which affected outcomes

- Natural Disasters (drought, weather extremes, etc.)
- Economy
- Appropriations changes
- Public Policy changes
- Government Regulations
- Competing Public priorities
- Competing Programmatic Challenges
- Populations changes (immigration, new cultural groupings, etc.)

Brief Explanation

{No Data Entered}

V(I). Planned Program (Evaluation Studies and Data Collection)

1. Evaluation Studies Planned

- After Only (post program)
- Retrospective (post program)
- Before-After (before and after program)
- Case Study

Evaluation Results

{No Data Entered}

Key Items of Evaluation

{No Data Entered}