2010 Pennsylvania State University Combined Research and Extension Annual Report of Accomplishments and Results

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I. Report Overview

1. Executive Summary

Penn State's Agricultural Experiment Station and Cooperative Extension Service operate in concert within the College of Agricultural Sciences to address present and future needs in agriculture at local, national, and international scales. The College operates on the basis of shared decision-making regarding investment of AES and CES resources. During 2010, the College continues to engage in developing implementation strategies for our current strategic plan to move forward an agenda around our five strategic initiatives: entrepreneurship, energy, water, pest prediction and response, and food, diet, and health. We have also engaged in a planning process, not yet completed in this reporting period, to define key strategic imperatives for future research and extension efforts.

Research and extension are integrated largely through joint appointments in the College of Agricultural Sciences. Of 697 administrators, faculty and staff at University Park, 245 have a combination of research and extension funds supporting their positions. During the past year, we have completed a reframing exercise within PA CES that has identified 19 overarching issues and created work groups to focus on each of these issues. The work groups serve to unite faculty and county-based educators in a common goal of generating new knowledge, offering high quality, focused extension education programs on stakeholder-identified subjects, and identifying and addressing science gaps on the basis of feedback from these educational programs. We connect in research with resources across campus through the Penn State Institute system (Life Sciences, Materials, Social Science, Environment and Energy), and the CES work groups provide a mechanism to connect with and leverage research expertise outside the AES purview from across campus.

Our programs continue to focus on high profile problems that, in addition to their impact in Pennsylvania, frequently also represent regional and national priorities. Information in this report on our work in the Chesapeake Bay and nutrient management is a regional issue of great interest to the US government, and this work is quite possibly setting benchmarks by which other US watersheds will be approached. Our continued efforts in Marcellus Shale natural gas, now much more focused on extraction and related environmental and community problems, also demonstrates how we are addressing issues in energy and the environment. We are building predictive models that allow more targeted pest management, examining how best to preserve pollinators in support of the food supply, and studying the impact of invasive species on Pennsylvania and US agriculture. PA AES and CES must be responsive to new societal needs, investing our federal funds in a manner that furthers national agricultural goals but also addressing the local implications of those national priorities.

A few explanatory notes are necessary regarding the report that follows. First, PA CES captures data on contacts (direct and indirect) and participants. We consider participants to be the number of individuals who attend our programs that we offer. Our contact numbers are derived from the number of people each of our extension educators and/or faculty have contacted. Direct contact numbers are only those from face-to-face meetings; indirect contacts are through email, telephone conversations, and Adobe Connect sessions, etc.

Total Actual Amount of professional FTEs/SYs for this State

Year: 2010	Extension		Research	
	1862	1890	1862	1890
Plan	274.6	0.0	298.5	0.0
Actual	390.0	0.0	264.3	0.0

II. Merit Review Process

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

- Internal University Panel
- External University Panel
- External Non-University Panel
- Combined External and Internal University Panel
- Combined External and Internal University External Non-University Panel
- Expert Peer Review

2. Brief Explanation

Both cooperative extension and agricultural experiment station programs undergo very thorough and comprehensive review processes.

As discussed in the "Stakeholder Input Process" section, all cooperative extension state planning efforts are thoroughly grounded in the needs identified during our statewide needs assessment process. After the needs assessment and program identification process was completed, each of the identified programmatic issues was assigned to an integrated, multidisciplinary Natural Work Group (NWG) made up of field based extension educators and faculty with split appointments in both extension and research efforts. Team members from the field were chosen to broadly represent all parts of the Commonwealth and faculty members were chosen to represent the research and extension perspectives of all relevant disciplines. Extension State Program Leaders provide overall leadership to the NWG with Regional and state administrators and academic unit leaders serve in liaison roles to each team. All of the programs have been reviewed by research and/or extension administrators. Additionally, logic models were developed by each NWG to guide the programming efforts of field based educators and faculty members with extension appointments, and they contribute to applied research priorities.

Pennsylvania Agricultural Experiment Station projects, which partially comprise our planned programs, are reviewed by qualified and knowledgeable scientists. Non multistate projects are reviewed internally, while multistate projects are reviewed by external reviewers.

As new Penn State extension programmatic issues or agricultural experiment station projects are implemented, stakeholder groups and/or program advisory groups will provide ongoing review of the educational and research programs to ensure that programs are focusing on priority needs as identified by key advisory groups in the college. All reviewers' critiques and comments provide us with mechanisms for

enriching and improving our educational and research programs. Ag Council and Penn State Cooperative Extension Council are being considered to serve in an advisory capacity for extension teams.

Through the evaluation process that is part of the logic model, feedback from stakeholders provides areas that applied research needs to address. In addition, after resources have been identified to direct extension program areas where limited knowledge occurs, fundamental and applied research are identified to be carried out during the period of the program. Fundamental research is largely driven by availability of extramural funding sources and the peer review process associated with that funding.

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
- Survey of traditional stakeholder groups
- Survey of traditional stakeholder individuals
- Survey specifically with non-traditional groups
- Survey specifically with non-traditional individuals

Brief explanation.

Stakeholder input is actively sought to help set the course for CES and AES programs. Our primary stakeholder input is received through cooperative extension. CE engages in periodic statewide needs assessments, and the results of these assessments were incorporated into our Extension Program SharePoint site and our Extension Program Activity System (EPAS). These tools, which are built on components of the logic model, are used to prepare the annual cooperative extension programs. Thus, stakeholder input is a key attribute of extension programming. This, in turn, provides input into our research agenda, especially through faculty who are jointly appointed on extension and research funding. In addition, extension county based personnel confer with their program advisory groups as they determine the local focus of their educational programs. College administration and faculty advisory groups confer regularly with key stakeholder groups. The Penn State Agricultural Council (http://agcouncil.cas.psu.edu) provides us with direct contact to nearly 100 member organizations and groups representing the agricultural industry across Pennsylvania. Also part of the Ag Council membership are such organizations as the Chesapeake Bay Foundation and the County Commissioners Association of Pennsylvania--we seek input for all sectors representing the interest of Pennsylvania citizens. In addition, we meet multiple times per year with stakeholder groups including, but not limited to, the Pennsylvania Farm Bureau, PennAg Industries, State Horticultural Association of Pennsylvania, Pennsylvania Agronomic Education Society, Pennsylvania Association for Sustainable Agriculture, Penn State Cooperative Extension Council, the Pennsylvania Christmas Tree Growers Association, and the Pennsylvania Floral Industry Association. Through direct faculty and extension educator contacts, we have regular contact with the private sector to assess their specific needs. For example the following groups provide valuable feedback--Pennsylvania Nutrition Education Network, the Intergenerational Initiatives Advisory Group, the StrongWomen program leaders, the PROSPER program collaborators, and the PA Office of Financial Education. Penn State has a well-developed organizational structure for interacting with industry; our Industrial Research Office serves as a

liaison to specific industrial partners. Also in our stakeholder base are state and federal partners; we have regularly scheduled meetings with agencies such as the Pennsylvania Department of Agriculture, the Pennsylvania Department of Environmental Protection, the Pennsylvania Department of Health, and the US Department of Agriculture's Agricultural Research Service and Animal and Plant Health Inspection Service. These stakeholder meetings provide feedback on programming for Hatch, McIntire-Stennis, Smith Lever, and Animal Health funds.

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
- Use External Focus Groups
- Open Listening Sessions
- Needs Assessments

Brief explanation.

County, multi-county, and state program advisory committees continue their role in providing valuable information on extension programming needs. Program advisory committee members are selected to represent program areas, emerging issues, geographic areas, and population diversity. These groups help extension educators with program design and implementation, which may include identifying resources to support the programs, tailoring the content to specific audience needs, and marketing the programs to targeted audiences and communities.

In the establishment of program advisory committees, our policy is that these committees need to represent the demographics of the commodity, community, or workforce. Extension boards and program advisory committees are representative of demographics of the county and where appropriate Hispanics, African American, Asian or other minorities serve on these groups and provide input to extension programs. Annual reports from counties document these efforts. The same is true in the establishment of internal and external focus groups. Penn State Agricultural Council meetings are publicly announced and our broad representation is constantly reassessed to ensure that new and traditionally underserved audiences are included.

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 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

- Other (Focus Groups)

Brief explanation.

To collect stakeholder input, educators or faculty met with program advisory committees or individuals or solicited input at educational meetings. During and after extension educational programs, program participants request additional programs, updates, or make suggestions on new topics where an educational program would be helpful to them.

This input may be verbal only or collected in meeting survey instruments. To collect more detailed information from traditional and non-traditional stakeholders, sophisticated survey instruments or focus group meetings are implemented and the data collected were summarized. The request of information from county extension offices through telephone calls is also a measure regarding needs of clientele. If similar information is requested repeatedly, that is a sign that an issue is of concern to the public.

3. A statement of how the input will be considered

- In the Budget Process
- To Identify Emerging Issues
- Redirect Extension Programs
- Redirect Research Programs
- In the Staff Hiring Process
- In the Action Plans
- To Set Priorities

Brief explanation.

Information collected from stakeholders was used to adjust issue areas that determined Cooperative Extension programming. These stakeholder priorities also directly influenced applied research activity through local decisions about research priorities, availability of funding from certain extramural funding sources including stakeholder groups such as industry associations, and hiring decisions for faculty and extension educators. Stakeholder input not only informs planning, but also influences resource allocations. Stakeholder feedback also indicates where volunteers and donors would be interested in assisting with the program.

As part of the implementation plan for our current strategic plan, we have engaged representatives of the Penn State Agricultural Council as key team members on our internal implementation teams. This serves to inform our programs on the real-world demands for new information and programs.

Both Ag Council and Penn State Cooperative Extension Council are looking to serve in an advisory capacity to the NWGs structure implemented in CES; advisory committees for NWGs will seek membership from a large stakeholder base.

Brief Explanation of what you learned from your Stakeholders

Stakeholders provide grassroots view of what is important. Marcellus Shale public meetings continue to have high attendance; many meetings extended to other issues related to this emerging issue such as water resources and forest management. Stakeholders statewide are concerned

about water quality and quantity and the long range effect the natural gas drilling will have on PA natural resources. Extension aided many county governments to form County Marcellus Task Forces; these efforts were through extension work at the state organization of County Commissioner's Association of Pennsylvania (CCAP).

Most popular programs continue to be in 4-H youth development and horticulture and green industry; both programs engage volunteers in their delivery, therefore larger participant numbers. Other programs with high participation are agronomic production, agricultural profitability, animal production, strengthen and supporting families and diet nutrition and health. Programs that are growing are related to renewable resources, agricultural profitability and diet, nutrition and health. Stakeholders in agricultural programs continued to be focused on the safe production of food and profitability of such enterprises; new Good Agricultural Practices (GAP) regulations in edible horticulture production is key for producers' profitability; diet, nutrition and health programs are focused on childhood obesity, diabetes and older women's health, all key public health issues. Extension continues to strategically work with diverse audiences in many programs. Minorities serve on extension boards and advisory committees and are key to helping market extension programs in their communities.

IV. Expenditure Summary

1. Total Actual Formula dollars Allocated (prepopulated from C-REEMS)			
Extension		Research	
Smith-Lever 3b & 3c	1890 Extension	Hatch	Evans-Allen
10199303	0	6861024	0

2. Totaled Actual dollars from Planned Programs Inputs				
	Extension		Research	
	Smith-Lever 3b & 3c	1890 Extension	Hatch	Evans-Allen
Actual Formula	9734325	0	6782194	0
Actual Matching	24818352	0	31524165	0
Actual All Other	17436615	0	27552789	0
Total Actual Expended	51989292	0	65859148	0

3. Amount of Above Actual Formula Dollars Expended which comes from Carryover funds from previous				
Carryover	1035013	0	3184156	0

V. Planned Program Table of Content

V(A). Planned Program (Summary)

Program # 1

1. Name of the Planned Program

Agricultural and Food Biosecurity

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	100%		100%	
	Total	100%		100%	

V(C). Planned Program (Inputs)

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

Year: 2010	Extension		Research	
	1862	1890	1862	1890
Plan	14.0	0.0	68.0	0.0
Actual	0.0	0.0	0.0	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
0	0	0	0
1862 Matching	1890 Matching	1862 Matching	1890 Matching
0	0	0	0
1862 All Other	1890 All Other	1862 All Other	1890 All Other
0	0	0	0

V(D). Planned Program (Activity)

1. Brief description of the Activity

NOT REPORTING ON THIS PLANNED PROGRAM

2. Brief description of the target audience

V(E). Planned Program (Outputs)

1. Standard output measures

2010	Direct Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
Actual	0	0	0	0

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

Patent Applications Submitted

Year: 2010

Actual: 0

Patents listed

3. Publications (Standard General Output Measure)

Number of Peer Reviewed Publications

2010	Extension	Research	Total
Actual	0	0	0

V(F). State Defined Outputs

Output Target

Output #1

Output Measure

- Number of invention disclosures

Year	Actual
2010	0

Output #2

Output Measure

- Number of people enrolled or registered in programs related to agricultural and food biosecurity

Year	Actual
2010	0

V(G). State Defined Outcomes

V. State Defined Outcomes Table of Content

O. No.	OUTCOME NAME
1	Number of participants who were evaluated and demonstrated increased knowledge and skills related to agricultural and food biosecurity
2	Number of participants who were evaluated in a follow up and who implement/adopt practices related to agricultural and food biosecurity
3	Number of decision support tools adopted based upon predictive modeling research
4	Number of diagnostic tools implemented or adopted for threat identification
5	Number of volunteers that helped with program leadership or program delivery

Outcome #1

1. Outcome Measures

Number of participants who were evaluated and demonstrated increased knowledge and skills related to agricultural and food biosecurity

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2010	5000	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
{No Data Entered}

What has been done
{No Data Entered}

Results
{No Data Entered}

4. Associated Knowledge Areas

KA Code	Knowledge Area
{No Data}	null

Outcome #2

1. Outcome Measures

Number of participants who were evaluated in a follow up and who implement/adopt practices related to agricultural and food biosecurity

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2010	350	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
{No Data Entered}

What has been done
{No Data Entered}

Results
{No Data Entered}

4. Associated Knowledge Areas

KA Code	Knowledge Area
{No Data}	null

Outcome #3

1. Outcome Measures

Number of decision support tools adopted based upon predictive modeling research

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2010	0	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
{No Data Entered}

What has been done
{No Data Entered}

Results
{No Data Entered}

4. Associated Knowledge Areas

KA Code	Knowledge Area
{No Data}	null

Outcome #4

1. Outcome Measures

Number of diagnostic tools implemented or adopted for threat identification

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2010	1	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

{No Data Entered}

What has been done
{No Data Entered}

Results
{No Data Entered}

4. Associated Knowledge Areas

KA Code	Knowledge Area
{No Data}	null

Outcome #5

1. Outcome Measures

Number of volunteers that helped with program leadership or program delivery

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Condition Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2010	439	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
{No Data Entered}

What has been done
{No Data Entered}

Results
{No Data Entered}

4. Associated Knowledge Areas

KA Code	Knowledge Area
{No Data}	null

V(H). Planned Program (External Factors)

External factors which affected outcomes

- Economy
- Appropriations changes
- Public Policy changes
- Government Regulations
- Competing Public priorities
- Competing Programmatic Challenges
- Other (Extramural Funding)

Brief Explanation

{No Data Entered}

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

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

Agricultural 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	9%		9%	
204	Plant Product Quality and Utility (Preharvest)	5%		5%	
205	Plant Management Systems	9%		8%	
206	Basic Plant Biology	3%		8%	
301	Reproductive Performance of Animals	9%		5%	
302	Nutrient Utilization in Animals	7%		5%	
303	Genetic Improvement of Animals	5%		3%	
304	Animal Genome	4%		4%	
305	Animal Physiological Processes	3%		7%	
307	Animal Management Systems	9%		3%	
308	Improved Animal Products (Before Harvest)	3%		1%	
314	Toxic Chemicals, Poisonous Plants, Naturally Occurring Toxins, and Other Hazards Affecting Animals	6%		2%	
402	Engineering Systems and Equipment	3%		3%	
501	New and Improved Food Processing Technologies	6%		6%	
502	New and Improved Food Products	3%		7%	
601	Economics of Agricultural Production and Farm Management	3%		6%	
602	Business Management, Finance, and Taxation	6%		5%	
603	Market Economics	3%		3%	
604	Marketing and Distribution Practices	2%		7%	
610	Domestic Policy Analysis	2%		3%	
	Total	100%		100%	

V(C). Planned Program (Inputs)

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

Year: 2010	Extension		Research	
	1862	1890	1862	1890
Plan	67.9	0.0	92.9	0.0
Actual	103.1	0.0	93.9	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
3629309	0	3154394	0
1862 Matching	1890 Matching	1862 Matching	1890 Matching
9049877	0	13372287	0
1862 All Other	1890 All Other	1862 All Other	1890 All Other
4008087	0	9807675	0

V(D). Planned Program (Activity)

1. Brief description of the Activity

Long-term sustainability of farms is dependent upon the ability to plan for the future and to implement and adjust those plans. Agriculture is facing mounting public pressure. Consumer concerns about the well-being of livestock and production methods are spawning new policies and legislation. In addition, environmental laws, regulations, and less formal challenges are increasing. As a result of these pressures, producers may deal with legal/regulatory issues related to maintaining, growing or changing their operation. Producers face many sources of risk that can impact cash flow, profitability and long-term sustainability. Tools such as crop insurance, forward contracting, futures and options, etc. can help to mitigate risk and stabilize farm finances. An increasing number of farmers are exploring value-added enterprises to increase profits. Programs on integrated planning focused on financial management, marketing, production, business succession, environmental, community and organizational changes. Extension Faculty and Educators have developed a researched-based curriculum that addresses the Good Production Practices (GPP) for quality management as it relates to developing a hazard analysis critical control points (HACCP) of producing animal products. Plant pathologists, entomologists, nematologists, virologists, weed scientists, and pomologists provided research-based education programs to producers on the availability and feasibility of new pest management programs for better insect pest, disease, nematode, weed, and vertebrate control. The recommended methods utilized multi-prong approaches incorporating the best available technologies including bio-rational, biological pest control, cultural control, and organic tools as well as the most efficacious, environmentally friendly conventional products. Insect and disease phenological developmental models will be utilized for the best timing of recommended practices. Programs are based on research by an inter-disciplinary team and delivered by multiple venues (meetings, newsletters, and farm visits) as well as increased use of web (VTC, Adobe Connect). These programs are designed to provide producers, their employees, and advisors the skills and strategies they need to meet these challenges to sustaining the agriculture industry in Pennsylvania.

2. Brief description of the target audience

Target audiences in the agricultural systems area include: youth enrolled in Animal Science and

Crop projects, volunteer leaders, parents, commodity groups, farm managers, farm workers, and farm owners, farm consultants, agribusiness, ag professionals, agency representatives, and decision and policy makers.

V(E). Planned Program (Outputs)

1. Standard output measures

2010	Direct Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
Actual	103986	3419663	3289	14871

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

Patent Applications Submitted

Year: 2010

Actual: 4

Patents listed

Serial No.: 61/298,424; Filed: 1/26/10; Title: Root Cortical Aerenchyma as a Selection Trait for Drought Tolerance in Plants

Serial No.: 61/342,429; Filed: 4/14/10; Title: Strategies for the Transgenic Manipulation of Filamentous Fungi

Serial No.: 61/351,162; Filed: 6/3/10; Title: Plant-derived Feed Supplement for Reducing Methane Production from Ruminant Species

Serial No.: 61/353,513; Filed: 6/10/10; Title: Root Cortical Aerenchyma as a Selection Trait for Abiotic Stress Tolerance in Plants

3. Publications (Standard General Output Measure)

Number of Peer Reviewed Publications

2010	Extension	Research	Total
Actual	0	0	540

V(F). State Defined Outputs

Output Target

Output #1

Output Measure

- Number of invention disclosures

Year	Actual
2010	3

Output #2

Output Measure

- Number of people enrolled or registered in programs related to agricultural systems

Year	Actual
2010	117633

Output #3

Output Measure

- Number of research projects completed

Year	Actual
2010	23

V(G). State Defined Outcomes

V. State Defined Outcomes Table of Content

O. No.	OUTCOME NAME
1	Number of participants who were evaluated and demonstrated increased knowledge and skills related to agricultural systems
2	Number of participants who were evaluated in a follow up and who implement/adopt practices related to agricultural systems
3	Number of volunteers that helped with program leadership and program delivery

Outcome #1

1. Outcome Measures

Number of participants who were evaluated and demonstrated increased knowledge and skills related to agricultural systems

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2010	4000	20652

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Agriculture is the largest industry in Pennsylvania. Combined with the food system, every citizen is affected along the farm to fork continuum. To sustain the contribution of production agriculture, participants must become knowledgeable, and develop skills to ensure a profitable business to contribute to the food system locally and internationally. Research and education through applied outreach programs strive to sharpen the competitive nature of production agriculture and agribusiness in Pennsylvania for continuity of operations.

What has been done
Research and Extension efforts focus on providing answers to individual and societal issues for the food and agriculture sector. Through one-on-one visits, workshops, focus groups, webinars, on-line training, field days, conferences, and other interactive educational interventions, program participants learn best management practices to ensure profitability and sustainability in an environmentally acceptable manner. Feedback helps identify research and educational needs.

Results
Participants can identify quality indicators in animal and plant production techniques as a result of participation in experiential learning regarding current research on profitability and cost effective business management practices, environmental and regulatory issues, and quality assurance including food safety. Programs emphasize reducing costs and maximizing income through value added and improved yields and quality products. Youth participants receive training in Good Production Practices (GPPs) that mirror the adult expectations. Pest prediction and integrated response minimizes the impact and costs of pests. Programs focused on BMPs to reduce nutrient and sediment pollution and promote animal and plant health and productivity.

4. Associated Knowledge Areas

KA Code	Knowledge Area
201	Plant Genome, Genetics, and Genetic Mechanisms
205	Plant Management Systems
301	Reproductive Performance of Animals
302	Nutrient Utilization in Animals
304	Animal Genome
305	Animal Physiological Processes
307	Animal Management Systems
502	New and Improved Food Products
601	Economics of Agricultural Production and Farm Management
602	Business Management, Finance, and Taxation
604	Marketing and Distribution Practices

Outcome #2

1. Outcome Measures

Number of participants who were evaluated in a follow up and who implement/adopt practices related to agricultural systems

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2010	1500	3903

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Adoption of research based solutions to issues results in enhanced profitability, reduced costs, improved quality, continuity of operations, improved sustainability, and economic stability for agricultural producers and agricultural businesses.

What has been done
Through a variety of educational intervention strategies, food and agriculture program participants adopt BMP's specific to their operation. Practices implemented include, pest and disease monitoring, economic analysis, certification, cash flow planning, improved variety selection, balancing nutrient needs, production records kept, and plant and animal health monitoring.

Results
Participants who implemented practices improved animal and plant productivity and yields, improved plant and animal health and welfare, reduced costs, improved quality, reduced negative environmental impact, improved sustainability and profitability, increased product quality and marketability, and minimized or managed risks.

4. Associated Knowledge Areas

KA Code	Knowledge Area
201	Plant Genome, Genetics, and Genetic Mechanisms
205	Plant Management Systems
301	Reproductive Performance of Animals
302	Nutrient Utilization in Animals
305	Animal Physiological Processes
307	Animal Management Systems
501	New and Improved Food Processing Technologies
502	New and Improved Food Products
601	Economics of Agricultural Production and Farm Management
602	Business Management, Finance, and Taxation
604	Marketing and Distribution Practices

Outcome #3

1. Outcome Measures

Number of volunteers that helped with program leadership and program delivery

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Condition Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2010	2362	303

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Stakeholder involvement with issues needs assessment, prioritization, program development, marketing and promotion, program delivery, evaluation, and advocacy is critical to the partnership

of stakeholders. Volunteers support the research and educational effort for agricultural systems in numerous ways.

What has been done
Expertise from Ag business and industry assist in research trials and in support and delivery of Extension programs. Advisory and Advocacy groups have stepped forward to assist Penn State in providing science driven solutions to the ag sector.

Results
Advisory groups help identify research needs and extension educational programs. Advocacy groups assist with marketing and promotion of programs, as well as documenting the need for support for research and outreach programs for the agriculture sector.

4. Associated Knowledge Areas

KA Code	Knowledge Area
201	Plant Genome, Genetics, and Genetic Mechanisms
205	Plant Management Systems
301	Reproductive Performance of Animals
302	Nutrient Utilization in Animals
307	Animal Management Systems
502	New and Improved Food Products
601	Economics of Agricultural Production and Farm Management
602	Business Management, Finance, and Taxation
604	Marketing and Distribution Practices

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
- Other (Extramural Funding)

Brief Explanation

There is probably no industry more affected by adverse factors more than production agriculture. Weather extremes and anomalies dramatically affect plant health and productivity. Adverse weather can also affect productivity for animal agriculture. Not only are effects of adverse weather recognized directly by Pennsylvania producers on their crops and herds, but weather affecting crop and animal production in distant parts of the world affect market prices for products and commodities produced and/or utilized by Pennsylvania agriculture producers. Market fluctuations are affected not only by weather events, but also political factors, consumer demand, societal influence on environmental and production methods. Governmental and other political regulations locally, nationally,

and internationally affect market share for Pennsylvania producers. Understanding the global influence for markets of commodities produced and utilized by Pennsylvania producers can help reduce risk, and ultimately improve profitability for producers. Financial support from public sources -- local, state, and nationally -- are under increasing scrutiny. Support levels are stagnant, reducing, or in rare occasions, increasing slightly. As a result, research and outreach programming is being reviewed to adjust as necessary to balance with available support. Current trends indicate lower funding and increasing costs which can only be accommodated by fewer programs and fewer people.

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

Evaluation Results

Through a variety of evaluation tools, participants were invited to provide feedback on the research-based educational outreach activities delivered through Extension. A sampling of the results follows. 43% of (N=44, n=19) educators responded that they will utilize the kits provided or add to a kit they already have by the Quality Management of Youth Animal Sciences team to provide educational programs in their local communities. 32% (N=44, n=14) intend to train all or some of their volunteers to deliver this program in local clubs. 97% (N=44, n=43) feel comfortable accessing information for QMYAS curriculum on the SharePoint intranet site. 79.5% (N=44, n=35) correctly identified the number of GPPs that youth will be required to complete training in annually. 63% (N=44, n=27) felt the hands-on activities were beneficial to reinforcing the expected curriculum outcomes. 37% (N=44, n=16) felt the hands-on activities were of some value to reinforcing the expected curriculum outcomes. 87% (N=44, n=34) will utilize the state-wide training for all volunteers or key volunteers. Economic impact data were collected with surveys or estimated from detailed financial analysis from 716 clientele that attended Farm Business Management programs. These data showed an average impact of $6,993 per farm, for a total impact of $5,007,165. Research documented that producers could save an average of $16/acre on seed costs with reduced seeding rates. Dairy Discussion Group results of follow-up phone surveys held 2-3 months after the final session: of 37 respondents (57% of participants) - 72% reported change in knowledge; 43% reported change in behavior; 27% reported change in attitude. Friday Facilitator Forum survey results immediately following program: 56% change in knowledge on 2-3 topics; 43% change in knowledge on 1 topic; 43% change in attitude about 3 concepts; 52% change in attitude about 1-2 concepts; 52% anticipated change in 3 behaviors; 47% anticipated change in 1-2 behaviors. N=21. 30 dairy nutritionists and veterinarians attended the Feed Management Planner Certification program with 15 nutritionists taking the American Registry of Professional Animal Scientists (ARPAS) feed management exam and passing. 40 consultants and certified feed management planners attended the plan writing workshops with 11 completing their 2 plan requirement to become a technical service provider through Natural Resource and Conservation Service (NRCS). Income over Feed Cost Tool implemented on 22 dairies. Cash flow planning and Income Over Feed Costs (IOFC) implemented on 14 dairies. Cash flow planning implemented on 29 dairies. Team 1 reduced Somatic Cell Count (SCC) from 225,000 to 90,000 (gaining them a .20/cwt bonus 3 consecutive months, gaining them $1425 increase over the 3 months). Also increased milk production from 66 lbs/cow/day to 75 lbs/cow/day while maintaining average days in milk (an average increase of 1.5 lbs/cow/day each month, or 5,000 lbs/month ($754 @ $15/cwt). Team 2 increased milk production from 64 lbs/cow/day to 68 (1140 lbs/mo, $171 @ $15/cwt), and increased pregnancy rate from 19% to 23% (4% change, saving the farm $3500 in replacement costs.

Key Items of Evaluation

Plans to include and train more volunteers, adoption of Good Production Practices for Youth programs, collection, interpretation and decisions for ag producers based on detailed financial analysis of farm business, training resulted in certification for ag planners and consultants, increase in knowledge, indication of intent to adopt Best Management Guidelines, increase in production and yield, reduction in costs, increased profitability, improvement in animal health and longevity. 100 % of the participants stated that they had a moderately large to large increase in: forage identification and selection and weed identification and management. 74% planned to add additional paddocks and/or stress lots to reduce grazing pressure. 72% planned to generate a forage inventory for their farm. 74% planned to generate a weed and toxic plant inventory. 72% planned to renovate the pastures to introduce new varieties and thicken the stand. 80% planned to begin to conduct fecal egg counts to identify horses that routinely shed parasite eggs. 73% planned to reduce the use of deworming agents when environmental conditions pose a reduced risk. 66% planned to adopt pasture management strategies designed to reduce exposure to parasites. 66% already had or planned to have a nutrient management plan developed for their farm. 86% planned or already apply nutrients based on soil test results. 66 % planned or already had a proper manure storage facility. 80% already contact or planned to contact Cooperative Extension for assistance.

V(A). Planned Program (Summary)

Program # 3

1. Name of the Planned Program

Families, Youth, and Communities

V(B). Program Knowledge Area(s)

1. Program Knowledge Areas and Percentage

KA Code	Knowledge Area	%1862 Extension	%1890 Extension	%1862 Research	%1890 Research
134	Outdoor Recreation	1%		3%	
503	Quality Maintenance in Storing and Marketing Food Products	1%		5%	
504	Home and Commercial Food Service	5%		1%	
512	Quality Maintenance in Storing and Marketing Non-Food Products	1%		0%	
607	Consumer Economics	3%		8%	
608	Community Resource Planning and Development	10%		20%	
701	Nutrient Composition of Food	2%		1%	
702	Requirements and Function of Nutrients and Other Food Components	4%		4%	
704	Nutrition and Hunger in the Population	10%		0%	
721	Insects and Other Pests Affecting Humans	6%		5%	
723	Hazards to Human Health and Safety	5%		15%	
801	Individual and Family Resource Management	3%		1%	
803	Sociological and Technological Change Affecting Individuals, Families, and Communities	1%		16%	
804	Human Environmental Issues Concerning Apparel, Textiles, and Residential and Commercial Structures	0%		1%	
805	Community Institutions, Health, and Social Services	0%		9%	
806	Youth Development	47%		5%	
903	Communication, Education, and Information Delivery	1%		6%	
	Total	100%		100%	

V(C). Planned Program (Inputs)

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

Extension	Research

Year: 2010	1862	1890	1862	1890
Plan	149.0	0.0	27.6	0.0
Actual	167.6	0.0	32.8	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**
2945063	0	642955	0
1862 Matching	**1890 Matching**	**1862 Matching**	**1890 Matching**
7421496	0	3151035	0
1862 All Other	**1890 All Other**	**1862 All Other**	**1890 All Other**
8895544	0	3155967	0

V(D). Planned Program (Activity)

1. Brief description of the Activity

Better Kid Care provides professional development and technical assistance to early learning and care practitioners. PROSPER is a special-interest short-term program where youth attend with parents during out-of-school hours over 7 weeks of evening sessions. Parent sessions consist of role plays, group discussions, and skill-building activities. Youth sessions involved group discussions, group skill practice, and social bonding activities. Family sessions use specially designed games and projects to increase family bonding, build positive communication skills, and facilitate learning to solve problems together. Parent Education programs are face-to-face presentations, newsletters, and train the trainer. Relatives as Parents: The four program components are: kinship care "simulation" workshops (these educational seminars are designed to raise professionals' awareness of issues faced by families with relative caregivers and the resources that are available to help them), educational workshops for kinship care family members (usually delivered as part of kinship family support group meetings), an online, interactive database consisting of information on services and resources that support kinship care families in Pennsylvania, and kinship family retreats (designed to provide kinship families with social support and information about ways to strengthen their families). The 4-H Youth Development Program focused efforts on science, citizenship, and healthy living education. To support these education areas, materials on volunteer management and development, positive youth development, cultural competencies, and leadership were developed and used in educational settings. Pennsylvania has over 10,000 residents serving on 1,700 municipal planning commissions. These individuals are the foundation of planning in Pennsylvania and educating them is a key to preparing them to effectively carry out the planning and land use regulations in their communities. Courses in land use planning were taught by PA Municipal Planning Education Institute (PMPEI) certified instructors seventeen (17) times in 2009-2010. Over 410 planning and zoning officials attended PMPEI courses throughout the state. In order to make both rural and urban areas of the state economically vibrant, residents need the skills contained in the Learning Today Leading Tomorrow curriculum. Participants in this program increased their skills in a number of leadership areas including valuing diversity, understanding leadership styles, how to run productive meetings with appropriate decision-making tools, dealing with change, managing conflict, and using the tools of active community leadership. Using these skills, communities discover that they make better decisions that are

not questioned after implementation, that the level of conflict has been reduced thereby improving community satisfaction, and that more residents, feeling confident in their leadership skills, step up to help guide their communities to changes that will help to improve the local economy.

2. Brief description of the target audience

Better Kid Care: Child care providers. PROSPER: Parents, middle school youth. Parent Education: Parents with young children. Relatives as Parents: Non-profit organizations, older adults raising grandchildren, youth. 4-H: youth. Economic & Community Development: local government officials, business owners, residents.

V(E). Planned Program (Outputs)

1. Standard output measures

2010	Direct Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
Actual	243023	3558868	283400	110742

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

Patent Applications Submitted

Year: 2010

Actual: 0

Patents listed

3. Publications (Standard General Output Measure)

Number of Peer Reviewed Publications

2010	Extension	Research	Total
Actual	0	0	224

V(F). State Defined Outputs

Output Target

Output #1

Output Measure

- Number of people enrolled or registered in programs related to families, youth, and communities

Year	Actual
2010	242072

Output #2

Output Measure

- Number of invention disclosures

Year	Actual
2010	0

Output #3

Output Measure

- Number of research projects completed

Year	Actual
2010	10

V(G). State Defined Outcomes

V. State Defined Outcomes Table of Content

O. No.	OUTCOME NAME
1	Number of participants who were evaluated and demonstrated increased knowledge and skills related to families, youth, and communities
2	Number of participants who were evaluated in a follow up and who implement/adopt practices related to families, youth, and communities
3	Number of volunteers that helped with program leadership and program delivery

Outcome #1

1. Outcome Measures

Number of participants who were evaluated and demonstrated increased knowledge and skills related to families, youth, and communities

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2010	27200	34945

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Better Kid Care: The need for high quality early care and after-school care continues to grow. Parents cannot work productively unless care for their children is available. Quality early learning experiences prepare children for success in school and to become contributing members of their community. Early education practitioners are required to obtain professional development to be able to meet state certification and Keystone Stars requirements.

What has been done
The Better Kid Care Program was offered in 41 counties by extension. Workshops for child care workers addressed a variety of child care issues and skills to help them be more effective working with children in their care.

Results
Better Kid Care: 5,982 (75%) participants could list a specific idea they learned; 4,812 (60%) could list a specific planned change in behavior; 6,945 (87%) participants indicated 1-200 children would benefit from the program; 6,134 (79%) shared information with 1-30 others.

4. Associated Knowledge Areas

KA Code	Knowledge Area
607	Consumer Economics
608	Community Resource Planning and Development
801	Individual and Family Resource Management
803	Sociological and Technological Change Affecting Individuals, Families, and Communities

805	Community Institutions, Health, and Social Services
806	Youth Development
903	Communication, Education, and Information Delivery

Outcome #2

1. Outcome Measures

Number of participants who were evaluated in a follow up and who implement/adopt practices related to families, youth, and communities

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2010	15500	8973

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Quality, stable early care and education impacts current and future workforces. The United States trails in developing its future workforce of scientists, engineers, and technology experts. The key is to interest youth in science opportunities. Future employers, including the Marcellus Shale industry in Pennsylvania, are relying on a prepared workforce of young adults who are responsible, can make decisions, know how to set goals, and have a strong work ethic.

What has been done
The Better Kid Care program provides training to early education professionals with a variety of delivery methods, making it convenient to all circumstances and cost efficient to early education businesses. Over 50,000 4-H youth complete projects in the 4-H science area including robotics, electricity, small engines, and animal and plant sciences.

Results
Results of the Life Skills Survey for Everyday Living indicate that participation within the 4-H Youth Development program is associated with a positive change in life skill development and practice. Pennsylvania 4-H youth showed significant increase in their skills to make decisions, think critically, communicate, set goals, and solve problems.

4. Associated Knowledge Areas

KA Code	Knowledge Area

607	Consumer Economics
608	Community Resource Planning and Development
801	Individual and Family Resource Management
803	Sociological and Technological Change Affecting Individuals, Families, and Communities
805	Community Institutions, Health, and Social Services
806	Youth Development
903	Communication, Education, and Information Delivery

Outcome #3

1. Outcome Measures

Number of volunteers that helped with program leadership and program delivery

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Condition Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2010	15278	7270

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Volunteers are helpful to the Better Kid Care program because they help advertise the local training meetings and encourage child care providers to attend. Volunteers are a key component to delivery of the 4-H Youth Development program. Research shows that interaction between a youth and a caring, competent adult is the greatest determinant for positive outcomes for youth.

What has been done
Volunteers provide assistance during the training meetings and also serve as guest speakers. Since Pennsylvania does not have a volunteer specialist, a program team oversees volunteer management and development. During the past year, this team has focused on professional development of extension educators to increase their skills in recruiting and retaining high quality volunteers.

Results
210 volunteers supported the Better Kid Care program by volunteering 1470 hours. About 30% of 4-H extension educators have participated in the national online learning program, Everyone Ready. 518 new volunteers were recruited for the program over the last year.

4. Associated Knowledge Areas

KA Code	Knowledge Area
607	Consumer Economics
608	Community Resource Planning and Development
801	Individual and Family Resource Management
803	Sociological and Technological Change Affecting Individuals, Families, and Communities
805	Community Institutions, Health, and Social Services
806	Youth Development
903	Communication, Education, and Information Delivery

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 (Extramural Funding)

Brief Explanation

Limited staff across the state limited the overall outreach. In volatile economic times, it is difficult to maintain a full staffing level and some educator positions may be open for several months or not filled. Vacancies limit the time available to recruit and train volunteers and ensure they are able to deliver a quality program. In some cases, programming in school competes with out-of school time education. A boost to programming has been the ability to obtain external funding for some project areas.

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

Evaluation Results

Better Kid Care: More than 12,000 early learning and care professionals attended a face-to-face Better Kid Care professional development session. An additional 41,010 caregivers completed online learning modules for a total of 144,127 online training hours. 7,972 of the 12,326 participants who attended county-based workshops completed a post-program evaluation. 97% indicated that they learned a little to a great deal and 92% indicated that they will use a little to a great deal of what they learned directly with the children or families in their care. Indeed, 60% listed a specific change they plan to make as a result of the session (e.g. strategies to deal with different temperaments, offer more milk or water, schedule more active play). PROSPER: Youth in the program report that their parents are using more consistent and less harsh discipline and that their time together as

a family has improved (warmth and cohesion). They also have increased their family time activities.155 youth out of 228 indicated a positive behavior change in that they know one step to take to reach one of their goals. 158 youth out of 228 indicated a positive behavior change for knowing how do things to help them feel better when they are under stress. 141 youth out of 228 indicated a positive behavior change for listening to their parent(s) or caregiver(s) point of view. 223 adults out of 228 indicated a positive behavior change for waiting to deal with problems with their child until they have cooled down. 206 of adults out of 228 indicated a positive behavior change for the indicator: they follow through with consequences each time their child breaks a rule.187 of adults out of 228 (total number who completed survey) indicated a positive behavior change for the indicator: they give compliments and rewards when their child does chores at home or learns to follow rules. Parent Education: Parents increased their confidence and intention to change parenting skills on the following topics: 1) having more developmentally appropriate expectations of their children; 2) modifying their parenting style or discipline techniques to increase effectiveness; 3) increasing positive communication with their children; 4) applying appropriate parenting techniques; and 5) becoming aware of community resources to support their family. Relatives as Parents: Elements of the program have been evaluated and have received positive results. An evaluation of four of the kinship care family "simulation" workshops provides evidence of a growing program capacity to provide leadership and technical assistance for organizations serving relative caregiver families in the state. These workshops, as well as the expanded online resource database maintained by Extension, serve to introduce human service professionals to a variety of kinship care models and promote the idea of collaboration and resource sharing between community agencies in support of kinship care families. Results of the Life Skills Survey for Everyday Living indicate that participation within the 4-H Youth Development program is associated with a positive change in life skill development and practice.

Key Items of Evaluation

Programs across the life cycle that build family strengths are important for helping families increase their quality of life and improve family functioning and relationships. Professionals who work with children and families improve their care giving and ability to provide guidance and direction with the youth and families they are interacting with in their agency.

V(A). Planned Program (Summary)

Program # 4

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	10%		7%	
102	Soil, Plant, Water, Nutrient Relationships	15%		18%	
104	Protect Soil from Harmful Effects of Natural Elements	8%		1%	
112	Watershed Protection and Management	10%		17%	
121	Management of Range Resources	5%		0%	
122	Management and Control of Forest and Range Fires	8%		2%	
123	Management and Sustainability of Forest Resources	15%		17%	
124	Urban Forestry	10%		3%	
135	Aquatic and Terrestrial Wildlife	3%		10%	
136	Conservation of Biological Diversity	4%		9%	
141	Air Resource Protection and Management	5%		2%	
403	Waste Disposal, Recycling, and Reuse	5%		6%	
511	New and Improved Non-Food Products and Processes	2%		8%	
	Total	100%		100%	

V(C). Planned Program (Inputs)

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

Year: 2010	Extension		Research	
	1862	1890	1862	1890
Plan	20.8	0.0	59.9	0.0
Actual	28.1	0.0	30.5	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**
930134	0	496584	0
1862 Matching	**1890 Matching**	**1862 Matching**	**1890 Matching**
2678766	0	3648421	0
1862 All Other	**1890 All Other**	**1862 All Other**	**1890 All Other**
1256020	0	2968160	0

V(D). Planned Program (Activity)

1. Brief description of the Activity

Collectively, research and extension seeks to restore, improve, and sustain the health and well-being of water, land, air, flora, and fauna for the essential use by and enjoyment of present and future generations. CES natural resource programs integrate research with innovations in outreach to address the state's major pollution generating or natural resource threatening activities including agricultural and industrial production, energy exploration and production, and urbanization. Growing pressures from land conversion activities within the Marcellus shale region of the state exacerbate the need for meeting the needs of rural audiences who are positioned to make the land use decisions and trade-offs within this natural gas production region along with balancing demands with the needs to protect the layers of natural resources lying above the Marcellus shale including ground- and surface water, and forests supporting vast, and biologically diverse wildlife. CES natural resources programs focus on addressing critical knowledge gaps. With a focus on pollution prevention and adaptive management by communicating research informed management choices, participants in natural resource programs collectively move the State towards it's desired outcome of healthy waters, lands, forests, and wildlife In many cases, natural resource extension targets the individual for whom choices relative to protecting one's private water supply, forest lands, residential on-lot wastewater system, household level storm water runoff, water and energy demands, intrinsic ecosystems such as vulnerable headwater streams, riparian buffers, and privately held green infrastructure, is made at the household, farm, or forest landowner level. Educating and supporting the decision maker at the level for which the decision maker holds a unique sphere of influence is essential to ensuring sound and scientifically guided stewardship of natural resources. Penn State Forest Resources researchers have identified that nearly 70% of Pennsylvania's forests are privately owned, managed by independent decision makers and their trusted agents. Likewise, individual landowners manage the lands from which the state's majority of headwater streams emanate, critical sources of the state's water for drinking water supplies, sustaining critical baseline flows for aquatic habitat, as well as serving as the source of water that provides outstanding recreation and aesthetic value for Pennsylvanians.

2. Brief description of the target audience

Decision makers at multiple levels and scales comprise the target audiences for natural resource extension programs, ranging from individuals who manage farms, private forestlands, and households to organizations and institutions that manage natural resources or influence their management such as businesses and industry, municipalities, commercial agriculture and forestry, county, regional, state and federal agencies, non-governmental organizations including woodlot and watershed associations, civic groups, and the professionals who serve each of these scales in support of individual and institutional decision making related to natural resources. Geographically, critical audiences exist in all reaches of the state. In rural Pennsylvania, citizens and municipalities within the Marcellus shale region seek clarity on

water and land protection in light of the rapid change to the landscape that natural gas exploration has imposed. Other rural areas of the state are confronted with heightened scrutiny and enforcement related to the management of nonpoint source from various landscapes (agricultural and non-agricultural). Likewise, suburban and urban audiences seek improved mechanisms for defining, protecting, and adopting essential green infrastructure for the purposes of stormwater management. These audiences have unique and varied, but meaningful spheres of influence in respect to managing and stewarding natural resources that can benefit their property, family, community, and region.

V(E). Planned Program (Outputs)

1. Standard output measures

2010	Direct Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
Actual	20199	569189	5864	200

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

Patent Applications Submitted

Year: 2010

Actual: 2

Patents listed

Serial No.: 61/250,989; Filed: 10/13/09; Title: Composites Containing Polypeptides Attached to Polysaccharides and Molecules

Serial No.: 61/349,506; Filed: 5/28/10; Title: Composites Containing Polypeptides Attached to Polysaccharides and Molecules

3. Publications (Standard General Output Measure)

Number of Peer Reviewed Publications

2010	Extension	Research	Total
Actual	0	0	290

V(F). State Defined Outputs

Output Target

Output #1

Output Measure

- Number of invention disclosures

Year	Actual
2010	1

Output #2

Output Measure

- Number of people enrolled or registered in programs related to natural resources and environment

Year	Actual
2010	30135

Output #3

Output Measure

- Number of research projects completed

Year	Actual
2010	9

V(G). State Defined Outcomes

V. State Defined Outcomes Table of Content

O. No.	OUTCOME NAME
1	Number of participants who were evaluated and demonstrated increased knowledge and skills related to natural resources and environment
2	Number of participants who were evaluated in a follow up and who implement/adopt practices related to natural resources and environment
3	Number of volunteers that helped with program leadership and program delivery

Outcome #1

1. Outcome Measures

Number of participants who were evaluated and demonstrated increased knowledge and skills related to natural resources and environment

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2010	3100	6821

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Nonpoint source runoff from industrial operations (mining, impervious surfaces), ag- and forestlands, homes and yards, roads, and commercial and municipal properties has impaired local surface- and ground water quality, exacerbated stormwater volume and energy, and collectively diminished the quality of significant ecosystems (e.g. Chesapeake Bay and lower Mississippi River-Gulf of Mexico). Human health (drinking water quality) and environmental health (aquatic life, biodiversity) are compromised by nonpoint source pollution with significant social, economic, and environmental costs to Pennsylvanians and their communities.

What has been done
Targeting the household, farm and forest owner level and the practitioners that serve these levels, workshops, e-classrooms, conferences, field-trainings, seminars, webinars, face-to-face consultations, and peer-to-peer exchanges made possible through train-the-trainer programs have provided these decision makers working at local and regional scales with suites of science informed actions and tools to protect their drinking water source, reduce pollutant runoff from their properties, improve (and retain) forests, and improve retention of stormwater for improved filtration and aquifer recharge. Trainings for on-lot septic system management, safe drinking water, forest stewardship, agricultural and stormwater best management practices (BMPs), and pond and lake management have been provided to critical audiences who simultaneously have the greatest opportunity for managing risks while being the most vulnerable to these risks.

Results
Ninety-three percent of participants in on-lot septic system management training demonstrated an increase in knowledge or skill. Of that, 88% indicated that they would be taking a specific course of action to improve their system operation. Ninety-three percent of those participating in the best management practice training for agricultural lands indicated an improved understanding of

innovative and applied approaches for decreasing nutrients emitted from ag operations. Another 94% of participants in groundwater protection education indicated that they would be willing to take at least one action to protect groundwater. The pond and lake management participants indicated they would take a recommended action to improve the quality of the system they manage. Nearly 2,100 private water supply owners received direct services advising them on how to ensure their drinking water supply was safe. Ninety-five percent of private water supply owners indicated they gained knowledge and 84% planned to take action to better manage their supply. One hundred percent of responders to the survey of training related to water and energy conservation indicated gained knowledge and 62% planned action to install water conservation devices, water meters, or reduce overall water use. In forest landowner conferences, 81% indicated moderate to considerable new knowledge from the training, 73% indicated considerable skill improvement and 70% identified a desire to implement a sustainable forestry practice. Eighty-nine percent agreed that they intended to sustainably manage their woodland and 80% indicated a willingness to share with their peers the information they learned. An additional 35 people have obtained the necessary credentials to write forest stewardship plans in Pennsylvania. Of influence in respect to managing and stewarding natural resources that can benefit their property, family, community, and region.

4. Associated Knowledge Areas

KA Code	Knowledge Area
101	Appraisal of Soil Resources
102	Soil, Plant, Water, Nutrient Relationships
112	Watershed Protection and Management
123	Management and Sustainability of Forest Resources
135	Aquatic and Terrestrial Wildlife
403	Waste Disposal, Recycling, and Reuse
511	New and Improved Non-Food Products and Processes

Outcome #2

1. Outcome Measures

Number of participants who were evaluated in a follow up and who implement/adopt practices related to natural resources and environment

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual

2010	2660	3858

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

The implementation of the knowledge gained from natural resources training and education results in the actual environmental outcomes sought - reduction of pollution emissions that cause deleterious impacts to local water quality and quantity sources with the potential to harm human health, aquatic health, biodiversity, or downstream resources. All actions undertaken by natural resource program participants result in direct pollution prevention, reduce the potential risk for harm to human health and the environment with value to property and the well-being of the local community as well as those living downstream.

What has been done

Delivery mechanisms delineated in previous section.

Results

Eighty-two percent of pond and lake program participants took specific action to improve their system including managing a nuisance plant or algae, testing the water quality, installing buffer strips, or reducing use of fertilizer near the water. All of these actions address water quality and have a direct influence on emissions of nutrients and other pollutants to waters of the Commonwealth. It is particularly important to note that Pennsylvania's ponds and lakes represent significant nutrient sinks on across the landscape and serve as essential traps to diminish the transport of nutrients and sediments to downstream ecosystems where hypoxia has catastrophic consequences - environmentally and economically. Pond owners also indicated that they had tested their water quality (89%), measured their pond size (67%), checked for lead (67%) and managed their ponds wildlife (33%). Private water supply owners indicated that they would take a specific action to manage and protect their drinking water (81%) including test the water quality (36%), shock chlorinate their water supply (21%), install water treatment (11%), reduce land-based polluting activities in the wellhead vicinity (8%), or improve construction of their well (10%). A pilot pharmaceutical return program resulted in 25 pounds of unwanted medications being turned in at a McKean County site, and growth of this pilot to at least five other areas of the state has begun based on these results. Water conservation measures implemented in response to participation include 63% of participants indicated that they checked for water leaks, 56% installed water saving appliances, 75% installed rain gardens or rain barrels, and 69% reduced the volume of water they used.

4. Associated Knowledge Areas

KA Code	Knowledge Area
101	Appraisal of Soil Resources
102	Soil, Plant, Water, Nutrient Relationships
112	Watershed Protection and Management
123	Management and Sustainability of Forest Resources
135	Aquatic and Terrestrial Wildlife
403	Waste Disposal, Recycling, and Reuse
511	New and Improved Non-Food Products and Processes

Outcome #3

1. Outcome Measures

Number of volunteers that helped with program leadership and program delivery

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Condition Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2010	1342	893

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Social scientists have identified that the peer-to-peer exchange of information is the single most effective delivery mechanism for modifying behaviors and improving management of natural resources at the landowner level. To improve environmental outcomes at the landowner level (farm, forest, household) both water and renewable natural resource programs have developed extensive, efficient, and high performing peer-to-peer networks in the form of volunteer programs like the Master Well Owner Network (MWON), the Pennsylvania Forest Stewards (PFS) program, the NatureStart youth education program, and even the "dairy discussion groups" utilized within the Pennsylvania Discovery Watershed program in coordination with the Dairy Alliance, within which precision feeding is encouraged on a farmer-to-farmer basis and through enhanced dialogue and sharing networks. By nature, Pennsylvanians are influenced by their neighbors, social networks, and community members. Peer-to-peer and volunteer networks are gaining in their value and prominence in effecting land management changes that have enormous environmental consequences.

What has been done
Networks of volunteers have been developed, fostered, trained, and empowered to deliver science based information in their communities and across their social networks resulting in significantly enhancing the number, frequency, and follow-up of contacts statewide and improving dissemination of research, practices, and approaches for improved natural resource management with the goal of increasing and improving natural resource sustainability across Pennsylvania. The MWON, albeit faced with flat external funding, has continued to train volunteers who agree to extend extension's outreach efforts.

Results
MWON volunteers reached 4,687 private water supply owners who indicated that they had increased their knowledge level about how to protect their private water supply (92%). Eighty-two

percent of these took some action to protect their drinking water supply from potential contamination. The MWON program also continued to garner external support from the PA Department of Environmental Protection and the Pennsylvania Groundwater Association. PFS volunteers, of which 522 have been trained since the program inception, with 27 new volunteers joining their ranks in this reporting cycle. Seventy-two PFS participated in the statewide training for best practices in Woodland Owners Associations and collectively, PFSs reached over 16,500 people and provided the equivalent of 23 FTEs in outreach time.

4. Associated Knowledge Areas

KA Code	Knowledge Area
101	Appraisal of Soil Resources
102	Soil, Plant, Water, Nutrient Relationships
112	Watershed Protection and Management
123	Management and Sustainability of Forest Resources
135	Aquatic and Terrestrial Wildlife
403	Waste Disposal, Recycling, and Reuse
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
- Populations changes (immigration, new cultural groupings, etc.)
- Other (Extramural Funding)

Brief Explanation

There is extensive policy and regulatory shifts underway that influence natural resource protection and management options related to Marcellus shale exploration and development (water quantity, withdrawals, wastewater disposal options, and local ordinances). Likewise, the Total Maximum Daily Load (TMDL) imposed for the waters of the Chesapeake Bay, and the State's Watershed Implementation Plan (WIP) that guides how Pennsylvania will allocate the TMDL across key sectors including agriculture, urban storm water, and the waste water discharges from municipal and industrial sources provide new policy and regulatory landscapes for citizens and the source sectors. For some sectors, these shifts have resulted in a "wait and see what will be enforced" philosophy that is counter to improving adoption of practices that are essential for reducing nonpoint source pollution and diminishing deleterious water quality impacts. The WIP has been backstopped by the USEPA for the storm water loads, and there is much confusion and concern about how local municipalities will meet their anticipated loads, what the actual expectations are, and the questions of "who pays" for meeting these loads. Extension programs have focused on providing the practices and approaches that are known, innovative, or emerging. It is anticipated that the regulatory climate related to agricultural

and storm water based loads will only become more stringent. Extension programs have focused historically on supporting the voluntary aspects of practice implementation, with an understanding that decision makers can better protect their own families health (as is the case with the safe drinking water program focus) and make improve economic and environmental outcomes through practice adoption. Extreme weather events - ranging from drought to flood conditions - also influence willingness to adopt, or even interest in, conservation-based programs based on the audience perception of water availability.

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

Evaluation Results

The evaluation results indicate that natural resource-based Extension has influenced behavioral changes in respect to either adaptive management, implementation of a specific practice, or a reduction in resource use that improves environmental outcomes. While individual adoption and implementation of these practices may not appear to have wide impact, it is clear that the aggregate impact of multiple small changes at the local landscape level -- to protect drinking water, improve buffers of aquatic systems, increase forest stewardship practices, reduce volume of water use, removal of potential emerging contaminants (i.e. pharmaceuticals) from waste streams, and engaged citizenry on information exchange (from peer-to-peer, neighbor-to-neighbor) -- have enormous impact on the net quality of water, land, forests, and consequent health and biodiversity of plants and animals.

Key Items of Evaluation

The consistently high percentage (80 to 100%) of participants who indicated a specific practice, approach, or management choice they made to improve protection of water quality, quantity, forestlands, and flora and fauna on lands or water bodies that they personally steward is a powerful indication of incremental change in behaviors that will collectively aggregate for measurable environmental improvements.

V(A). Planned Program (Summary)

Program # 5

1. Name of the Planned Program

Pest Management

V(B). Program Knowledge Area(s)

1. Program Knowledge Areas and Percentage

KA Code	Knowledge Area	%1862 Extension	%1890 Extension	%1862 Research	%1890 Research
211	Insects, Mites, and Other Arthropods Affecting Plants	8%		23%	
212	Pathogens and Nematodes Affecting Plants	13%		21%	
213	Weeds Affecting Plants	7%		7%	
214	Vertebrates, Mollusks, and Other Pests Affecting Plants	7%		0%	
215	Biological Control of Pests Affecting Plants	12%		7%	
216	Integrated Pest Management Systems	28%		20%	
311	Animal Diseases	8%		16%	
404	Instrumentation and Control Systems	2%		2%	
901	Program and Project Design, and Statistics	8%		2%	
902	Administration of Projects and Programs	7%		2%	
	Total	100%		100%	

V(C). Planned Program (Inputs)

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

Year: 2010	Extension		Research	
	1862	1890	1862	1890
Plan	19.4	0.0	50.2	0.0
Actual	35.9	0.0	69.4	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**
857449	0	1319027	0
1862 Matching	**1890 Matching**	**1862 Matching**	**1890 Matching**
1952296	0	6775882	0
1862 All Other	**1890 All Other**	**1862 All Other**	**1890 All Other**
1326472	0	8619320	0

V(D). Planned Program (Activity)

1. Brief description of the Activity

Several Extension Program Teams provided educational programming on pest management to a wide variety of audiences. Master Gardener educators and volunteers provide research-based recommendations to homeowners as well as local community members. Commercial horticulture business owners have benefited from programs such as Advanced Integrated Pest Management, with unique trainings for tree fruit and grape growers. Educators and faculty also focused on technology adoption and innovation this year, providing educational programming in partnership with model orchards and vineyards. These serve as laboratories and classrooms, ultimately to educate growers. The Pesticide Safety Education Program provides initial and ongoing training for pesticide applicators. This training is required by law. In total, these Cooperative Extension educational programs reflect a commitment to identifying pests and controlling them with effective and efficient tools. These programs use face-to-face delivery methods supplemented by printed materials such as production guides and fact sheets which are also disseminated through electronic means, including websites and blogs. AES-sponsored research underlies the many web-based pest monitoring tools that are available to growers. Work on slugs, herbicide-resistant weeds, invasive insect pests, and emerging diseases is the lynchpin of science-based educational programs and ability of stakeholders to successfully manage their pest problems. Work on brown marmorated stink bug was the emergent issue of this reporting period, responding to an unprecedented population increase in Pennsylvania and neighboring states on a wide diversity of crops. Necessity of insecticide-based management of this stink bug could reverse 30 years of successful pesticide-reduction in Pennsylvania orchards.

2. Brief description of the target audience

The target audience included agricultural producers, homeowners, private and commercial pesticide applicators, state and federal agency personnel, and agribusiness professionals.

V(E). Planned Program (Outputs)

1. Standard output measures

2010	Direct Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
Actual	246227	141705	15774	182

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

Patent Applications Submitted

Year: 2010

Actual: 3

Patents listed

Serial No.: 61/304,113; Filed: 2/12/10; Title: Compositions, Methods and Kits for Detecting and Treating Abnormal Metabolic and Cardiovascular Diseases

Serial No.: 61/342,429; Filed: 4/14/10; Title: Strategies for the Transgenic Manipulation of Filamentous Fungi

Serial No.: PCT/US2010/04562; Filed: 8/16/10; Title: Compositions, Methods, and Kits for Detecting and Treating Abnormal Metabolic and Cardiovascular Diseases

3. Publications (Standard General Output Measure)

Number of Peer Reviewed Publications

2010	Extension	Research	Total
Actual	0	0	441

V(F). State Defined Outputs

Output Target

Output #1

Output Measure

- Number of invention disclosures

Year	Actual
2010	1

Output #2

Output Measure

- Number of people enrolled or registered in programs related to pest management

Year	Actual
2010	49459

Output #3

Output Measure

- Number of research projects completed

Year	Actual

2010	18

V(G). State Defined Outcomes

V. State Defined Outcomes Table of Content

O. No.	OUTCOME NAME
1	Number of participants who were evaluated and demonstrated increased knowledge and skills related to pest management
2	Number of participants who were evaluated in a follow up and who implement/adopt practices related to pest management
3	Number of decision support tools adopted based upon predictive modeling research
4	Number of diagnostic tools implemented or adopted for pest identification
5	Number of volunteers that helped with program leadership and program delivery

Outcome #1

1. Outcome Measures

Number of participants who were evaluated and demonstrated increased knowledge and skills related to pest management

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2010	1300	1187

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Plant pests are responsible for significant product losses each year. This translates into major potential financial losses for commercial growers, including fruit and vegetable growers, grape growers, homeowners, and members of the green industry. Those with better knowledge and skills are better able to manage pests in an economic way.

What has been done
Pest management and pesticide applicator trainings have continued to use various delivery methods and have been supplemented by statewide pest monitoring and prediction models. Extension personnel have partnered with industry, private consultants, and state and Federal agencies.

Results
Advanced Integrated Pest Management workshops were held in 18 fruit and grape growing regions of the state. Evaluations of these programs showed that 98% of participants had increased knowledge of pest management and cultural recommendations as a result of the programs. Also, 47% plan to use Penn State pest monitoring Web tools. Programs for the green industry, which are delivered in various ways from short, targeted presentations to multi-day workshops, have led to significant improvements in pest management. For example, 71% of respondents indicated that they had increased their skill and ability to accurately diagnose pest problems.

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
215	Biological Control of Pests Affecting Plants
216	Integrated Pest Management Systems

Outcome #2

1. Outcome Measures

Number of participants who were evaluated in a follow up and who implement/adopt practices related to pest management

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2010	370	1808

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Pesticide applicators have an important impact on the environment as well as the economic viability of commercial agricultural businesses. The practices they use evolve from year to year. These practices include products selection, handling, storage as well as recordkeeping.

What has been done
Pesticide applicators have been targeted through presentations at meetings sponsored by various commodity groups as well as Cooperative Extension. Staff members also used webinars to provide training. Both of these were supplemented by materials developed at Penn State.

Results
Evaluations indicated that many pesticide applicators have adopted new practices including new product selection, handling, storage, and recordkeeping.

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

215	Biological Control of Pests Affecting Plants
216	Integrated Pest Management Systems

Outcome #3

1. Outcome Measures

Number of decision support tools adopted based upon predictive modeling research

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2010	0	1

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Accurate predictive modeling is essential to provide growers with the tools they need to manage risk in pest management. Pest models that incorporate climatological and biological data on a spatial scale are of greatest utility in supporting local decision making.

What has been done
A module to incorporate the recent appearance of western bean cutworm in Pennsylvania corn fields was introduced as part of the cutworm module into the Pennsylvania Pest Information Platform for Extension and Education (PA-PIPE) (http://pa-pipe.zedxinc.com/). This tool provides additional data to extension educators, crop advisors, and farmers on proper timing of any pest management decisions.

Results
Western bean cutworm emerged as a Pennsylvania pest in 2009, and in 2010 it had spread to 24 counties. Extensive trapping information and a grower network developed in support of this decision management tool has helped refine the utility of the tool. Combined with all of the other crop, weather, and pest data available on PA-PIPE, we are providing more and more comprehensive predictive decision support to Pennsylvania growers.

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
215	Biological Control of Pests Affecting Plants
216	Integrated Pest Management Systems
404	Instrumentation and Control Systems

Outcome #4

1. Outcome Measures

Number of diagnostic tools implemented or adopted for pest identification

Not Reporting on this Outcome Measure

Outcome #5

1. Outcome Measures

Number of volunteers that helped with program leadership and program delivery

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Condition Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2010	53	2596

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Caring for a garden is an important concern for homeowners and other gardeners. These constituents need help controlling pests in their gardens so that they can protect the food or flowers they are raising. The volume of requests (made through phone, email, or in-person visits) is substantial.

What has been done
The Master Gardener program takes advantage of many volunteers to meet these needs. A Master Gardener is certified after 40 hours of instruction, successful completion of an exam, and 50 hours of volunteer work. Master gardeners provide training through workshops, hands-on opportunities, web-based trainings, and other venues.

Results

A total of 2,311 volunteers provided 143,712 hours of volunteer service to the Master Gardener program in the program year. The program trained 572 new Master Gardeners this year. The program supported Garden Hotlines in 44 counties, providing insect identification and control services. The gardens used for teaching and demonstration provided 13,804 pounds of fresh produce to local food banks around the state.

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
215	Biological Control of Pests Affecting Plants
216	Integrated Pest Management Systems

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
- Populations changes (immigration, new cultural groupings, etc.)
- Other (Extramural Funding)

Brief Explanation

Economic conditions led to reduced client ability to attend meetings and conferences. Similarly, government employees, spending policy, competing public priorities, and government regulations influenced attendance and the ability of the clientele to change methods being employed to manage plant health. Weather factors also influence client participation in winter meetings because many have snow and ice-removal enterprises in their businesses.

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

Evaluation Results

We have provided the most germane elements of the evaluation results in the results sections above related to participant knowledge or adoption of new practices/methods.

Key Items of Evaluation

The evaluations show that Penn State research and extension are having an impact on pest identification and management within the state. This is critical for plant, animal, and human health as well as the economic sustainability of farm businesses in the state. Continued monitoring of invasive species and promotion of Integrated Pest Management tactics are very important issues for Pennsylvania.

V(A). Planned Program (Summary)

Program # 6

1. Name of the Planned Program

Global Food Security and Hunger

V(B). Program Knowledge Area(s)

1. Program Knowledge Areas and Percentage

KA Code	Knowledge Area	%1862 Extension	%1890 Extension	%1862 Research	%1890 Research
606	International Trade and Development	35%		36%	
611	Foreign Policy and Programs	25%		46%	
722	Zoonotic Diseases and Parasites Affecting Humans	40%		18%	
	Total	100%		100%	

V(C). Planned Program (Inputs)

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

Year: 2010	Extension		Research	
	1862	1890	1862	1890
Actual	1.9	0.0	10.1	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
126227	0	184016	0
1862 Matching	**1890 Matching**	**1862 Matching**	**1890 Matching**
309869	0	1093480	0
1862 All Other	**1890 All Other**	**1862 All Other**	**1890 All Other**
399148	0	1009792	0

V(D). Planned Program (Activity)

1. Brief description of the Activity

US food security depends upon global food security. A variety of AES projects address global food security head on, and many of our extension programs focus on food security and hunger issues, albeit

primarily in the US as one component of the world situation. We have initiated a program called Ag2Africa (http://agsci.psu.edu/international/programs/ag2africa), which not only complements a Penn State-wide effort in Africa but also reinforces the objectives of the US government's Feed the Future initiative. We have continued work on stress tolerance in corn and beans in southern Africa, with a focus on work in South Africa, Mozambique, and Malawi (http://roots.psu.edu/ukulima). Tools for high-throughput phenotypic screening are being combined with participatory breeding in local communities. Biological sciences and plant breeding are coupled with social sciences and adoption of new technology. Our scientists were engaged with mapping of the cacao genome; this knowledge is being put to use in identifying improved tree varieties, particularly trees with disease resistance traits that will minimize pesticide requirements. Cocoa production is generally a cash crop, but a reliable income source clearly reduces food insecurity in those communities. Furthermore, we have continued to collaborate on cropping system diversity within cacao plantations, which addresses food security issues for the families and communities involved. We hosted the first International Conference on Pollinator Biology, Health and Policy, which attracted experts in pollination from 14 countries. Pollinator preservation and pollinator biodiversity are key issues for sustainability of food supplies in developing economies just as they are in developed countries. Research results led to changes in the OECD/FAO AGLINK-COSIMO economic model of global agricultural markets, which is used by OECD and FAO to estimate the impacts of agricultural policy reforms and to make projections for global agricultural markets. At a more local level, CES educational programs on Hunger Gardens, community food systems, Harvest 4-Health, economical nutrition, and food security focused programs will contribute to this federal initiative. We will continue to focus resources on CES programs that complement the global initiatives of our research agenda.

2. Brief description of the target audience

The food and agriculture sector audience is very diverse and complex and includes a wide range from producers to consumers. Targeted audiences include farmers who raise small fruit, tree fruit, vegetables, or agronomic crops used for human food, agronomic crops used for animal feed, dairy producers, livestock producers, poultry producers, aquaculture producers, and other specialty crop and unique food product producers; commodity organizations that represent the various crop and animal food products and the distribution of these products; companies that process and manufacture food from the raw materials; and local, state, and federal agencies who have interest or responsibility for the safety and security of food products. Within the food service area, restaurant, institutional food preparation, grocery stores, and food serving entities are a targeted audience specifically for safe food handling and preparation education from Extension. The consuming public, every person, is also a target audience; including resource limited individuals and families. Educational programs teach individuals about diet, nutrition, healthy eating, food budgeting, and food safety. Global populations, developing and stressed nations, and the agriculture commodity producers and consumers world-wide represent a new audience that is benefiting from our research and outreach. We also work with plant breeders in the public and private sectors to drive traits deriving from our research into the marketplace. Multinational agricultural organizations take advantage of our work in refining their modeling capabilities for policy and market implications.

V(E). Planned Program (Outputs)

1. Standard output measures

2010	Direct Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
Actual	3727	12468	9	0

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

Patent Applications Submitted

Year: 2010

Actual: 0

Patents listed

3. Publications (Standard General Output Measure)

Number of Peer Reviewed Publications

2010	Extension	Research	Total
Actual	0	0	45

V(F). State Defined Outputs

Output Target

Output #1

Output Measure

- Number of invention disclosures

Year	Actual
2010	0

Output #2

Output Measure

- Number of people enrolled and/or registered in programs

Year	Actual
2010	4761

Output #3

Output Measure

- Number of research projects completed

Year	Actual
2010	0

V(G). State Defined Outcomes

V. State Defined Outcomes Table of Content

O. No.	OUTCOME NAME
1	Number of participants who were evaluated and demonstrated increased knowledge and skills
2	Number of participants who were evaluated in a follow up and who implement/adopt practices
3	Number of volunteers that helped with program leadership or program delivery

Outcome #1

1. Outcome Measures

Number of participants who were evaluated and demonstrated increased knowledge and skills

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2010	{No Data Entered}	1655

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
There is no one who is not affected by the availability of food. For developed countries, the issue is the cost of food relative to spendable income. In developing countries, food availability may mean the difference between life and death. Hunger is present in many nations, in many geographic locations, and as the result of many factors. Research and Extension provide information to help individuals feed their families. Varietal modification and selections based on local environmental conditions including moisture, nutrients, and pests can be modified through research. Everyone should have access, at all times, to enough food to ensure a healthy population.

What has been done
A variety of research projects in plant and animal production minimizes the effects of pests, moisture, and nutrients on sustainable yields. Preparedness education assures the short-term health and sustainability of individuals affected by disastrous events.

Results
Emergency preparedness training, utilizing more than 300 local human service providers, delivered training to over 1,200 special populations in rural PA.

4. Associated Knowledge Areas

KA Code	Knowledge Area
606	International Trade and Development
611	Foreign Policy and Programs

Outcome #2

1. Outcome Measures

Number of participants who were evaluated in a follow up and who implement/adopt practices

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2010	{No Data Entered}	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Local Human Service Providers support the training of special populations to become better prepared for adverse events.

What has been done
Train-the-trainer by extension to over 200 Human Service providers. These agency representatives, in turn, present the training to their clientele.

Results
Participant Evaluations -- n = 948 99% indicated that the information presented will help them become better prepared for an emergency; 26% of the participants indicated that they would implement all six actions as the result of this program; 66% of the participants indicated that they would implement 3 or more actions as the result of this program. Agency Evaluations -- n = 300. 314 representatives from 111 agencies participated in one of the 26 different agency training presentations; 94% of the agency representatives indicated the importance of the ability of special populations in their community to be better prepared for disaster or a pandemic as moderately (17%) or very important (77%).

4. Associated Knowledge Areas

KA Code	Knowledge Area
606	International Trade and Development
611	Foreign Policy and Programs

Outcome #3

1. Outcome Measures

Number of volunteers that helped with program leadership or program delivery

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2010	{No Data Entered}	350

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
227 agencies have stepped forward and agreed to have their staff trained by Extension Educators and then present this preparedness information directly to their clientele or invite Extension Educators to present the material to their clientele.

What has been done
Over 2,500 special population clientele have received this training.

Results
94% of the agency representatives indicated the importance of the ability of special populations in their community to be better prepared for disaster or a pandemic as moderately (17%) or very important (77%). 93% of the agency representatives (279) indicated that they believe that their agency can help special populations in their community become better prepared for disasters or a pandemic event. Only 3% (9) representatives did not believe that their agency can help special populations in their community become better prepared for disasters or a pandemic event.

4. Associated Knowledge Areas

KA Code	Knowledge Area
606	International Trade and Development
611	Foreign Policy and Programs

V(H). Planned Program (External Factors)

External factors which affected outcomes

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

Brief Explanation

Resources allocated to support research and extension are stressed in a changing economy. Genetic and biometric advances in breeding and varieties have a direct correlation to yield and sustainability. Climate change and changing weather patterns, which results in local to national environmental variations, result in immediate changes in yield and longer term challenges for sustainability. Weather anomalies such as extreme drought, severe cold, ice, hurricanes, tornadoes, hail, early and late frost, flooding, earthquakes, etc., will all have a local to regional impact on productivity and yield. Political conditions affect local to national populations negatively as food shortages lead to hunger. Invasive and new pests and diseases typically have a negative effect on production and sustainability. The world economy, national economies, and the vitality of local communities can have a negative effect on the ability of individuals and families to afford adequate, safe, and nutritious food. Increased emphasis on environmental impact may affect current and future production practices. The economy and availability of energy sources will have a direct effect on productivity, processing, distribution, and availability of food for everyone. Economically challenged populations will be more dramatically affected and may need to be addressed uniquely.

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

Evaluation Results

Participant Evaluations -- n = 948 . 99% indicated that the information presented will help them become better prepared for an emergency. 26% of the participants indicated that they would implement all six actions as the result of this program. 66% of the participants indicated that they would implement 3 or more actions as the result of this program. 46% said they would Create a Support Network. 46% said they would Make a List of Personal Limitations. 58% said they would Create a Communication Plan. 76% said they would Build a Disaster Kit. 59% said they would Complete a Medical Information Form. 69% said they would Encourage Someone Else to Become Better Prepared. Agency Evaluations -- n = 300. 314 representatives from 111 agencies participated in one of the 26 different agency training presentations. 94% of the agency representatives indicated the importance of the ability of special populations in their community to be better prepared for disaster or a pandemic as moderately (17%) or very important (77%). 93% of the agency representatives (279) indicated that they believe that their agency can help special populations in their community become better prepared for disasters or a pandemic event. Only 3% (9) representatives did not believe that their agency can help special populations in their community become better prepared for disasters or a pandemic event. The level of

awareness about what to do about preparing for a disaster or pandemic increased from 46% of those who knew what to do or already had a kit and a plan, to 88% after the agency presentation. 92% of the agency representative indicated that the PowerPoint presentation made sense or was clearly presented and explained. 90% of the agency representative indicated that the training material was appropriate for their clientele. 85% of the agency representative indicated that they felt comfortable or very comfortable using this material to present to their clientele. 68% of the agency representatives indicated that they will probably (31%) or will (37%) present the material in the very near future. 83% indicated that they will work with Cooperative Extension again in the future, probably (32%) or will definitely look for opportunities (51%).

Key Items of Evaluation

Implementation of the US Government Feed the Future initiative should be a key goal in the coming year. US Land-Grant and agricultural universities possess extraordinary capacity that must be incorporated into a successful program.

V(A). Planned Program (Summary)

Program # 7

1. Name of the Planned Program

Climate Change

V(B). Program Knowledge Area(s)

1. Program Knowledge Areas and Percentage

KA Code	Knowledge Area	%1862 Extension	%1890 Extension	%1862 Research	%1890 Research
103	Management of Saline and Sodic Soils and Salinity	15%		2%	
111	Conservation and Efficient Use of Water	15%		6%	
132	Weather and Climate	13%		6%	
133	Pollution Prevention and Mitigation	15%		33%	
203	Plant Biological Efficiency and Abiotic Stresses Affecting Plants	15%		25%	
306	Environmental Stress in Animals	15%		6%	
605	Natural Resource and Environmental Economics	12%		22%	
	Total	100%		100%	

V(C). Planned Program (Inputs)

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

Year: 2010	Extension		Research	
	1862	1890	1862	1890
Actual	2.7	0.0	14.9	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
72670	0	645679	0
1862 Matching	1890 Matching	1862 Matching	1890 Matching
163019	0	1963292	0
1862 All Other	1890 All Other	1862 All Other	1890 All Other
100714	0	1036802	0

V(D). Planned Program (Activity)

1. Brief description of the Activity

The Pennsylvania Climate Impact Assessment conducted by AES, in partnership with the Pennsylvania Department of Environmental Protection, inventoried the potential impacts of global climate change on Pennsylvania's climate, human health, the economy, and management of economic risks, forests, wildlife, fisheries, recreation, energy, agriculture, and tourism. In response, Extension has focused on heightening the integration of climate change and greenhouse gas management and mitigation across multiple programmatic offerings, particularly in the natural resource, energy, and agricultural production programs. The emphasis for Extension-led climate change research and education has centered on the trade-offs and outcomes of various management approaches for waste, energy, land, soil, and forest. CES integration of climate change research and outreach into programs will prepare Pennsylvanians and those responsible for localized generation of energy, stewardship of water, lands, forests, energy consumers, and agricultural producers to better consider the impacts of their practices on the emissions of greenhouse gases and the broader issue of climatic change. The "Managing Community and Urban Natural Resources" program weighs in prominently in this section. Trees and other natural resources provide communities with a wealth of environmental, social, and economic values and these ecosystem services have historically been undervalued and not well understood. In addition to providing critical "green infrastructure," community and urban forests also create healthy, livable, and sustainable communities. Mounting research conducted by various universities (Penn State, University of Washington, University of Massachusetts) and organizations (USDA Forest Service, International Society of Arboriculture, American Planning Association, Society of American Foresters) continues to illustrate the important role that trees, forests, and natural resources in regulating ecosystem services that support healthy people and places, especially carbon sequestration as an offset/sink for potential greenhouse gases).

2. Brief description of the target audience

The audiences served include municipalities, planning agencies, citizens groups and associations, farm and forest managers, conservation practitioners, agriculture and forest industry, regional, state, and federal agencies, local municipalities, and energy consumers.

V(E). Planned Program (Outputs)

1. Standard output measures

2010	Direct Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
Actual	34984	329006	96	0

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

Patent Applications Submitted

Year: 2010

Actual: 3

Patents listed
Serial No.: 61/298,424; Filed: 1/26/10; Title: Root Cortical Aerenchyma as a Selection Trait for Drought Tolerance in Plants

Serial No.: 61/342,429; Filed 4/14/10; Title: Strategies for the Transgenic Manipulation of Filamentous Fungi

Serial No.: 61/353,513; Filed: 6/10/10; Title: Root Cortical Aerenchyma as a Selection Trait for Abiotic Stress Tolerance in Plants

3. Publications (Standard General Output Measure)

Number of Peer Reviewed Publications

2010	Extension	Research	Total
Actual	0	0	207

V(F). State Defined Outputs

Output Target

Output #1

Output Measure

- Number of invention disclosures

Year	Actual
2010	1

Output #2

Output Measure

- Number of people enrolled and/or registered in programs

Year	Actual
2010	46103

Output #3

Output Measure

- Number of research projects completed

Year	Actual
2010	14

V(G). State Defined Outcomes

V. State Defined Outcomes Table of Content

O. No.	OUTCOME NAME
1	Number of participants who were evaluated and demonstrated increased knowledge and skills
2	Number of participants who were evaluated in a follow up and who implement/adopt practices
3	Number of volunteers that helped with program leadership or program delivery

Outcome #1

1. Outcome Measures

Number of participants who were evaluated and demonstrated increased knowledge and skills

Not Reporting on this Outcome Measure

Outcome #2

1. Outcome Measures

Number of participants who were evaluated in a follow up and who implement/adopt practices

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2010	{No Data Entered}	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Climate change forecasts accompanied by debate about the timeline, impacts, as well as rulemaking on the inclusion of carbon emissions under the Clean Air Act can obscure the specific actions that Pennsylvanians can take to diminish emissions of greenhouse gases from their day-to-day activities and the operations that they manage. Tree plantings, manure-to-energy (digesters), cover crop for growing biomass, no-till, and even household energy conservation along with a number of other strategies in forest, farm, community, and household level that can offset and/or mitigate emissions of carbon and other greenhouse gases. At the heart of climate change education is a growing interest across different groups for specific information that individuals can employ to reduce greenhouse gas emissions and potentially be better positioned for future participation in carbon trading markets.

What has been done
In partnership with the USDA Forest Service, Pennsylvania DCNR Bureau of Forestry, Pennsylvania Horticultural Society, county planning offices, municipal staff, and others, the program uses a number of delivery methods. 1) Face-to-face technical assist (consulting) for municipal staff, elected officials, nonprofits, and agency staff. This includes site visits as well as

consultation over the phone and internet (e.g., Altoona Planning Department). 2) Workshops in different regions of the state as well as at University Park (e.g., Annual Community Forest Conference and Tree Tenders Workshops). 3) Talks at workshops and events hosted by others (e.g., presentation to Pittsburgh City Council, talk for PennDot Roadside Managers Meeting). 4) Webinars hosted by School of Forest Resources or others including PA Boroughs Association and USDA Forest Service. 5) Provision of extension materials developed by the program (e.g., Managing Natural Resources: A Guide for Municipal Officials). 6) Provision of materials developed by others. 7) Provision of materials through newsletters, list serves, press release, and other methods. Please note that this program is a partner in the DCNR TreeVitalize Initiative and is partnering with nonprofits in the Philadelphia and Pittsburgh areas in education and outreach. The program is solely responsible, in partnership with the Bureau of Forestry, for education and outreach for the other 12 metropolitan areas in Pennsylvania (e.g., Altoona/Johnstown, State College, Erie). Through this program we offer full-day TreeTender workshops and two day Community Tree Institutes. "Linking Livestock and Renewable Energy" and the "Follow the Nutrients On-farm and Regional Digesters", both in the Manure du jour webinar series (Pennsylvania's Best Practices for Animal Agriculture, Air, and Water Quality Protection), reached 100 conservation practitioners including conservation districts, NRCS, watershed associations, state agency personnel, and municipal officials; provided training relative to greenhouse gas emissions and management from animal operations in Pennsylvania and mechanisms for manure-to-energy initiatives that have net reduction of methane emissions. Approximately 400 additional viewings of these recordings have taken place since their spring 2010 release. Fact sheets summarizing the benefits and trade-offs of on-farm and regional systems were developed and released at the National Manure Expo (July 2010) and Ag Progress Days.

Results

One hundred and sixty-five participants (79%) in the Community and Urban Natural Resources program indicated an increase in knowledge and skills that would be applied. 80% of participants in the Manure du jour sessions indicated an increased knowledge and willingness to recommend or adopt the use of digesters as a part of an on-farm system. 70% indicated that manure-to-energy integrated systems, such as the "COW POWER" program featured would have value to Pennsylvanians and farms for contributing energy to the grid and reducing reliance on fossil fuel generated energy.

4. Associated Knowledge Areas

KA Code	Knowledge Area
111	Conservation and Efficient Use of Water
132	Weather and Climate
133	Pollution Prevention and Mitigation
203	Plant Biological Efficiency and Abiotic Stresses Affecting Plants
306	Environmental Stress in Animals
605	Natural Resource and Environmental Economics

Outcome #3

1. Outcome Measures

Number of volunteers that helped with program leadership or program delivery

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2010	{No Data Entered}	1850

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
With nearly 70% of Pennsylvania's forest under private ownership, increasing the network of volunteers who can reach owners -- in urban and rural settings -- is critical. The Managing Community and Urban Natural Resources program has trained, in partnership with DCNR, 7,250 TreeTender community volunteers and 1,775 currently serve on tree commissions, municipal committees, parks and recreation planning, and support the growth and sustenance of community and urban forests. Although not yet measured in the long-term, we believe the program has impact on the ability of Pennsylvania residents and municipalities to understand and enact environmental ordinance and other public policy.

What has been done
Through the training provided, the 1,775 volunteers have helped lead and provide programs; nearly 45,000 hours of service have been recorded in support of urban and community forestry initiatives and increased tree plantings in critical areas.

Results
Volunteer capacity for the leadership of community-based programs has resulted in increasing contacts by a factor of 10.

4. Associated Knowledge Areas

KA Code	Knowledge Area
111	Conservation and Efficient Use of Water
132	Weather and Climate
133	Pollution Prevention and Mitigation

203	Plant Biological Efficiency and Abiotic Stresses Affecting Plants
306	Environmental Stress in Animals
605	Natural Resource and Environmental Economics

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 (Extramural Funding)

Brief Explanation

Progress on implementation of programs in contingent upon continued availability of extramural funding from a variety of public and private sources.

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

Evaluation Results

As an emerging area, the integration of climate change into existing programs and the development of new programs will require improved evaluation that will identify pre- and post responses to information, and monitoring for long term behavioral changes that result in improved environmental outcomes.

Key Items of Evaluation

In Pennsylvania, the vernacular for climate change, its causes, and mitigating actions that individuals and institutions can undertake is evolving. Two years ago, programming was limited. Programming for this reporting year has increased and continued increases are expected.

V(A). Planned Program (Summary)

Program # 8

1. Name of the Planned Program

Sustainable Energy

V(B). Program Knowledge Area(s)

1. Program Knowledge Areas and Percentage

KA Code	Knowledge Area	%1862 Extension	%1890 Extension	%1862 Research	%1890 Research
125	Agroforestry	40%		19%	
131	Alternative Uses of Land	20%		62%	
202	Plant Genetic Resources	40%		19%	
	Total	100%		100%	

V(C). Planned Program (Inputs)

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

Year: 2010	Extension		Research	
	1862	1890	1862	1890
Actual	14.3	0.0	4.6	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**
611453	0	136538	0
1862 Matching	**1890 Matching**	**1862 Matching**	**1890 Matching**
1701800	0	388269	0
1862 All Other	**1890 All Other**	**1862 All Other**	**1890 All Other**
445261	0	543085	0

V(D). Planned Program (Activity)

1. Brief description of the Activity

The development of Marcellus Shale natural gas reserves in Pennsylvania has resulted in a large opportunity to develop a domestic energy resource in the state. In response, we have initiated a comprehensive outreach program to understand the potential community, economic, and environmental

issues associated with the development of the Marcellus Shale resource in the state. This has included the development of webinars, meeting conferences, newsletters, tours, and factsheets on understanding the potential of the resource, gas leasing considerations, and other topics related to the development of the resource. Engagement with county commissioners, state government, and the industry is a critical part of the outreach effort. Renewable energy development that has minimal environmental impacts and limited effects on food and feed prices presents new opportunities and challenges for our clientele. The development of alternative energy strategies is also a function of federal, state, and local policies that either subsidize or restrict development. The AES strives to identify regionally adapted renewable energy solutions and develop the supporting research and outreach programs to help foster the appropriate development of these technologies. We have continued to develop an outreach program to address the potential of various alternative feedstocks for energy. One focus in our region is the development of biomass heating projects using woody biomass to displace heating oil and propane. Our clientele need an understanding of the feedstock production and availability, sustainable harvest strategies and cost, feedstock logistics, and the optimum methods of utilizing the resource most efficiently. Outreach education on these topics must be developed and shared with the public, communities, and potential project developers. Case studies of successful projects and on line monitoring systems of new projects are being developed. Research initiatives have included evaluations of cropping systems on dairy farms, development of novel bioenergy crops such as jatropha, canola and camelina, development of sustainability criteria for harvesting crop residues, and evaluations of cost and logistic issues associated with the harvest of woody biomass for energy. Faculty and extension staff are also helping clientele understand emerging markets for ecosystem service credits that are often generated in conjunction with renewable energy project developments and are key components of the business plan. These include renewable energy credits, carbon credits, and nutrient trading credits.

2. Brief description of the target audience

This audience is broad and encompasses much of the general public, but focuses on landowners, energy project developers, state and federal agency personnel, extension educators, and state and local community leaders.

V(E). Planned Program (Outputs)

1. Standard output measures

2010	Direct Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
Actual	49943	524684	31	333

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

Patent Applications Submitted

Year: 2010

Actual: 0

Patents listed

3. Publications (Standard General Output Measure)

Number of Peer Reviewed Publications

2010	Extension	Research	Total
Actual	0	0	118

V(F). State Defined Outputs

Output Target

Output #1

Output Measure

- Number of invention disclosures

Year	Actual
2010	0

Output #2

Output Measure

- Number of people enrolled and/or registered in programs

Year	Actual
2010	85886

Output #3

Output Measure

- Number of research projects completed

Year	Actual
2010	3

V(G). State Defined Outcomes

V. State Defined Outcomes Table of Content

O. No.	OUTCOME NAME
1	Number of participants who were evaluated and demonstrated increased knowledge and skills
2	Number of participants who were evaluated in a follow up and who implement/adopt practices
3	Number of volunteers that helped with program leadership or program delivery

Outcome #1

1. Outcome Measures

Number of participants who were evaluated and demonstrated increased knowledge and skills

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2010	{No Data Entered}	1538

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
The development of Marcellus Shale natural gas reserves in Pennsylvania has resulted in a large opportunity to develop a domestic energy resource in the state. However, there are a multitude of potential community, economic, and environmental issues associated with the development of the Marcellus Shale that must be resolved. Renewable energy development that has minimal environmental impacts and limited effects on food and feed prices presents new opportunities and challenges for our clientele.

What has been done
Our extension teams have conducted webinars, meeting conferences, newsletters, tours, and factsheets on understanding the potential of the natural gas resource, gas leasing considerations, and other topics related to the development of the resource. They have conducted similar programs on renewable energy issues in the state. Engagement with county commissioners, state government agencies and officials, and the industry has been a critical part of the outreach effort.

Results
The Cooperative Extension Marcellus Shale Education Program has had widespread impacts on improving the skills of landowners in coping with this issue. For example, the program has improved participants confidence in the ability to make sound decisions pertaining to the leasing of oil and gas rights and understanding of the need to consult an oil and gas attorney before signing an oil and gas lease. Local government officials have also gained knowledge about the potential impact of the resource and how other communities have addressed gas related issues. Landowners have received personal advice on their own situations as a result of interactions with extension staff. In the renewable energy arena, project developers have interacted with Penn State researchers and extension staff at various programs to understand regulatory and technical

issues with feedstock procurement and processing.

4. Associated Knowledge Areas

KA Code	Knowledge Area
125	Agroforestry
131	Alternative Uses of Land

Outcome #2

1. Outcome Measures

Number of participants who were evaluated in a follow up and who implement/adopt practices

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2010	{No Data Entered}	37

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
The development of Marcellus Shale natural gas reserves in Pennsylvania has resulted in a large opportunity to develop a domestic energy resource in the state. However, there are a multitude of potential community, economic, and environmental issues associated with the development of the Marcellus Shale that must be resolved.

What has been done
Twelve webinars were developed, delivered, and evaluated via Adobe Connect software by a team made up of faculty and educators. These online seminars were held monthly from October 2009 through September 2010. Penn State speakers included: K. Brasier, T. Kelsey, T. Murphy, R. Pifer, G. Sheppard, B. Swistock, and D. Yoxtheimer. External speakers were from the following organizations: Carnegie Mellon U.; City of Fort Worth, TX; Bradford, Lycoming, Potter, and Somerset (PA) counties; PA Dept. of Cons. & Nat. Resources; Susquehanna River Basin Commission; and US Environmental Protection Agency.

Results
1220 individuals participated directly (live) in the webinars the day of the webinars. In addition, nearly 20,000 individuals viewed the recorded webinars. 373 of 377 (98.9%) people who

participated in a webinar in Fall 2009 or Spring 2010 answered once or multiple times that as a result of participating in today's webinar, within the next 6 months they intend to either: view recorded webinars, visit the Penn State Natural Gas site (http://extension.psu.edu/naturalgas), or become involved in their community around Marcellus Shale development.

4. Associated Knowledge Areas

KA Code	Knowledge Area
125	Agroforestry
131	Alternative Uses of Land

Outcome #3

1. Outcome Measures

Number of volunteers that helped with program leadership or program delivery

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.)
- Other ()

Brief Explanation

Public interest in either Marcellus Shale natural gas or renewable energy strategies is tied closely to the economy and public policy. Increases in economic activity and energy prices could greatly increase the interest in the development of these resources and the potential for secondary issues to develop. Both of these industries are also closely tied to public policy and development is a function of tax, subsidy, and environmental policy. Changes in any policy often require subsequent interpretation and education and create additional opportunities for engagement through extension. These changes also create opportunities for public policy research on energy policy, which is also a strength of the AES.

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

Evaluation Results

Our evaluation results have demonstrated the quality and potential impact of our

programs in these often complex and technical subject matter areas. For example, four the Fall 2009/Winter 2010 webinar series, 98.2% of those who responded to the on-line survey (N=165) rated the webinars as having met their expectations, including those who rated them as "good"(40%), "very good"(45.5%) or "excellent" (12.7%)." For the Spring/Summer 2010 series 95.6% of those who responded to the on-line survey (N=230) rated the webinars as having met their expectations, including those who rated the webinars as "acceptable" (17.8%), "good"(53%), or excellent" (24.8%). A broad measure of the webinars' quality and potential impact is participants' responses to the question of whether the webinar provided them with information that was useful to their needs. For the Fall 2009/Winter 2010 series, 97.6% of those who responded to the on-line survey (N=165) rated the webinars as having provided them with information that was useful to their needs. For the Spring/Summer 2010 series, 92.2% of those who responded to the on-line survey (N=230) rated the webinars as having provided them with information that was useful to their needs, including those who rated the webinars as "acceptable" (17.0%), "good"(50%), or "excellent" (25.2%).

Key Items of Evaluation

Extension educators in the field in both the Marcellus and the Renewable Energy programs have the potential to engage the clientele in many new and innovative ways to facilitate energy development and address local development issues. Frequently these impacts are overlooked at the Federal level in terms of providing funding opportunities for county or regional field staff. A recently published paper on these new roles of faculty and field staff (http://openjournals.libs.uga.edu/index.php/jheoe/article/view/273/252) describes some of the potential methods of engagement that could be creatively included or encouraged in future NIFA project RFPs.

V(A). Planned Program (Summary)

Program # 9

1. Name of the Planned Program

Childhood Obesity

V(B). Program Knowledge Area(s)

1. Program Knowledge Areas and Percentage

KA Code	Knowledge Area	%1862 Extension	%1890 Extension	%1862 Research	%1890 Research
703	Nutrition Education and Behavior	85%		53%	
724	Healthy Lifestyle	10%		7%	
802	Human Development and Family Well-Being	5%		40%	
	Total	100%		100%	

V(C). Planned Program (Inputs)

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

Year: 2010	Extension		Research	
	1862	1890	1862	1890
Actual	18.8	0.0	3.2	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
82387	0	15070	0
1862 Matching	**1890 Matching**	**1862 Matching**	**1890 Matching**
273728	0	378916	0
1862 All Other	**1890 All Other**	**1862 All Other**	**1890 All Other**
613662	0	133930	0

V(D). Planned Program (Activity)

1. Brief description of the Activity

Family Fitness was delivered to children ages 8-12; the classes meet for 1.5 hours for 9 sessions either weekly or bi-weekly and parents/families meet for 5 sessions, 3 jointly. A four-part learn at home

newsletter series for families to work on together is offered. The Up for the Challenge curriculum is offered through teacher workshops and child care providers. The curriculum is used in after-school programs and camps. Teacher workshops were offered in Westmoreland, Fayette, Monroe, and Erie Counties.

2. Brief description of the target audience

Target audiences included teachers, child care providers, youth organizations, and a partnership with a Private Industry Council.

V(E). Planned Program (Outputs)

1. Standard output measures

2010	Direct Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
Actual	874	64445	2000	4265

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

Patent Applications Submitted

Year: 2010

Actual: 0

Patents listed

3. Publications (Standard General Output Measure)

Number of Peer Reviewed Publications

2010	Extension	Research	Total
Actual	0	0	27

V(F). State Defined Outputs

Output Target

Output #1

Output Measure

- Number of invention disclosures

Year	Actual
2010	0

Output #2

Output Measure

- Number of people enrolled and/or registered in programs

Year	Actual
2010	7861

Output #3

Output Measure

- Number of research projects completed

Year	Actual
2010	4

V(G). State Defined Outcomes

V. State Defined Outcomes Table of Content

O. No.	OUTCOME NAME
1	Number of participants who were evaluated and demonstrated increased knowledge and skills
2	Number of participants who were evaluated in a follow up and who implement/adopt practices
3	Number of volunteers that helped with program leadership or program delivery

Outcome #1

1. Outcome Measures

Number of participants who were evaluated and demonstrated increased knowledge and skills

Not Reporting on this Outcome Measure

Outcome #2

1. Outcome Measures

Number of participants who were evaluated in a follow up and who implement/adopt practices

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2010	{No Data Entered}	207

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
The percentage of children overweight and obesity has quadrupled in the past thirty years for children ages 6-11, so the need for successful research-based interventions is urgent. Childhood overweight has been documented to increase the risk for cardiac disease and its risk factors -- hypertension, type II diabetes, and high cholesterol for children, adolescents, and adults. Overweight and obesity and their associated health problems have a significant economic impact on the U.S. health care system.

What has been done
The Family Fitness Program for grades 3-5 and their families was conducted at 10 sites in 11 counties. The program offers the help all children ages 8-12 and their families need to choose healthier food and improve fitness behaviors. Children attended 9 weekly sessions to practice making healthy food choices and increase physical activity. Parents participate to receive information, skills, and motivational guidance leading to improved food choices and increased physical activity. The Better Kid Care programs reached 116 childcare providers who will be in contact with over 2000 children.

Results
Healthy Eating: 88% of youth increased eating 2 or 3 or more fruits or vegetables daily, 29% of youth increased eating 3 or more dairy foods, 38% of youth increased eating whole grains, 42% of youth decreased high sugar foods or drinks. Family Communication: 53% increased planning meals together, 85% of families increased family meal preparation and eating meals together. Physical Activity: 62% of families increased walking, 35% of children decreased minutes of TV, 60% of youth increased physical activity intensity (heartbeat fast, breathe hard 20+ minutes over past week vs. pre-program). Physical measurements: One site reported BMI results at 6 months post: 60% had not increased BMI (N=9) which is the desired result.

4. Associated Knowledge Areas

KA Code	Knowledge Area
703	Nutrition Education and Behavior
724	Healthy Lifestyle
802	Human Development and Family Well-Being

Outcome #3

1. Outcome Measures

Number of volunteers that helped with program leadership or program delivery

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2010	{No Data Entered}	111

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
To successfully teach the physical activity programs, volunteers are needed to supplement program resources. They are the multiplier that extension educators need to deliver the program and make the most efficient use of their time.

What has been done
Volunteers helped teach or assist with a class, offered program supplies, program space, helped with registration, child measurements, and recruiting program participants.

Results

With the assistance of volunteers, the program is able to capture the physical measurement changes in the children that are used for the evaluation. More program participants enroll in the program because of the encouragement, enthusiasm, and support from a volunteer or teacher.

4. Associated Knowledge Areas

KA Code	Knowledge Area
703	Nutrition Education and Behavior
724	Healthy Lifestyle
802	Human Development and Family Well-Being

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 (Extramural Funding)

Brief Explanation

With fewer Extension Educators on our staff, we have competing programmatic challenges to cover more counties with less staff. In addition, we do not have sufficient grant dollars or income generated by this program to hire program assistants to conduct the program in more than a few counties. The families most at risk for overweight are low-income, so they do not have expendable income to cover program costs. Also, during winter in PA schools may close, which disrupts the schedule for extension classes held in the schools. Schools typically will not allow programs to be held in their schools until their required state mandated tests have been completed, which means that extension programs are offered later in the school year. Schools have tight budgets and are becoming more limited in their ability to pay for the program so there is great need for grants and sponsorships to support the programs that are offered by extension and other organizations.

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

Evaluation Results

Family Fitness Impact: For the 14 programs sites with 105 parents and186 children for a total of 291 participants, they improved their Healthy Eating patterns due to increased knowledge, use of Nutrition Facts labels, and trying new fruits and vegetables. Youth increased eating more dairy as well as more whole grains. They decreased high sugar foods or drinks. About half of the youth increased knowledge of foods high in calcium,

increased knowledge in number of minutes for healthy physical activity and increased knowledge of bone-building activities. A little more than half of the families increased planning meals together and increased family meal preparation. About one-third increased eating meals together and improved agreement about eating healthy foods. Over half of the families improved agreement about physical activity. •44% of youth increased enjoyment of physical activity •57% of families increased enjoyment of physical activity •55% of children were willing to try new physical activities •62% of families increased walking •76% increased other physical activity •35% of children decreased minutes of TV •27% decreased computer game time •60% of youth increased physical activity intensity (heartbeat fast, breathe hard 20+ minutes over past week vs. pre-program). In the Up for the Challenge Program •42 youth ages 10-18 increased knowledge for increased physical activity •42 youth ages 10-18 increased knowledge of the correct portion size for their age and life style •28 students completed a post program survey. 1) 77% had learned a lot about fitness. 2) 62% would use at least 3 fitness lessons at home •Participants were able to successfully complete activities including identifying sugar content of beverages, categorizing foods to food groups, rating the calories of snacks •The Food and Culture program results: 1) 88% of youth strongly agree that they learned the importance of eating healthy meals and snacks; 2) 87% of youth strongly agreed that they want to learn more about healthy eating; 3) 91% of youth strongly agreed that the food they eat may affect their future health •Of the 19 teachers attending the training, 15 completed evaluations. Findings included: 1) 90% felt that the training increased their skills in teaching fitness lessons; 2) 80% became aware of impact technology can have on physical fitness; 3) 100% learned new fitness activities and play; 4) 70% indicated their attitudes and opinions were changed about body-image and self-awareness in the lives of their students; 5) 90% of teachers indicated more confidence in teaching fitness than before the training. Participants were able to successfully complete activities including identifying sugar content in beverages, categorizing foods to food groups, rating the calories of snacks.

Key Items of Evaluation

When we can stimulate improved healthy eating practices among children, improve family communication when families are preparing and eating meals together, and increase physical activity among youth and their families including increased walking, we believe we are helping families make important changes. Teachers are also a source of information that can incorporate physical activity into their classroom. After the extension training for teachers, they indicated more confidence in teaching about fitness and improving consumption of healthy beverages and snacks.

V(A). Planned Program (Summary)

Program # 10

1. Name of the Planned Program

Food Safety

V(B). Program Knowledge Area(s)

1. Program Knowledge Areas and Percentage

KA Code	Knowledge Area	%1862 Extension	%1890 Extension	%1862 Research	%1890 Research
711	Ensure Food Products Free of Harmful Chemicals, Including Residues from Agricultural and Other Sources	40%		8%	
712	Protect Food from Contamination by Pathogenic Microorganisms, Parasites, and Naturally Occurring Toxins	60%		92%	
	Total	100%		100%	

V(C). Planned Program (Inputs)

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

Year: 2010	Extension		Research	
	1862	1890	1862	1890
Actual	17.6	0.0	4.9	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
479633	0	187931	0
1862 Matching	**1890 Matching**	**1862 Matching**	**1890 Matching**
1267501	0	752583	0
1862 All Other	**1890 All Other**	**1862 All Other**	**1890 All Other**
391707	0	278058	0

V(D). Planned Program (Activity)

1. Brief description of the Activity

COOKING FOR CROWDS: Workshops of 3 to 4 hours are offered using power point visuals, handouts, hands-on demonstration and videos. Dependent on the recipients needs, participants receive the CFC manual, posters, and thermometers. FOOD PRESERVATION: Extension educators are committed to providing consumers with up-to-date research-based information on home food preservation. Many delivery methods were used to disseminate food preservation information and included hands-on and lecture/demonstrations. Considerable time was spent answering individual questions mostly by phone but also through face-to-face contacts, email, and written letter. Exhibits at Farmer's Markets, health fairs, and county fairs allowed consumers to ask questions and receive up-to-date printed information. Testing of pressure canner dial gauges also provided opportunity to answer questions as well as help insure that consumers were canning low-acid foods safely. A variety of multiple media methods were used. Consumers were encouraged to use reliable internet sources such as Penn State Home Food Preservation and the National Center for Home Food Preservation sites. USDA and other University Extension publications/curriculum were used. SERVSAFE®: The program is delivered in a face-to-face format. A minimum of 7.5 hours of classroom instruction (for recertification) and instruction and/or home study activities to total 15 hours (for initial certification) of instruction is provided. The exam is optional for recertification and mandatory for initial certification. TAP ONLINE TRAINING: Since this is a self-paced learning program, the educators serve as a resource to individuals registered for the program. The educator enrolls the student in the program for either initial certification or recertification through the TAP website. Educators determine the testing schedule for their participants who are certifying for the first time. Educators administering the exam must be a Certified ServSafe® Instructor and Registered ServSafe® Proctor. FARM FOOD SAFETY PROGRAM: Good Agricultural Practices (GAPs) are ways that produce growers can prevent on-farm contamination of fruits and vegetables. County meetings, farm workshops, twilight mock audit presentation, conference and educational information on a website were used to reach growers. Applied research, funded by USDA NE SARE and the USDA Specialty Crops Block grant program is underway. The Department of Food Science is studying the microbial quality of irrigation water used on fresh produce crops. The Departments of Food Science and Agricultural and Extension Education have joint projects to assess local and international perceptions toward GAP implementation among growers and retailers. GOOD PRODUCTION PRACTICES: Addresses quality management for youth animal sciences as it relates to developing a hazard analysis critical control points (HACCP) of producing an animal product for sale to consumers in the United States.

2. Brief description of the target audience

COOKING FOR CROWDS: Nonprofit Associations/Organizations, Community Groups, General Public, Human Service Providers. FOOD PRESERVATION: General Public, Community Groups, Students/Youth, Ag Producers/Farmers/Landowners, Nonprofit Associations/Organizations and Educators. SERVSAFE®: Nonprofit Associations/Organizations, Business and Industry - Owners and operators of food establishments and educators. FOOD SAFETY PROGRAM: produce growers. GOOD PRODUCTION PRACTICES: Animal Producers. YOUTH QUALITY ASSURANCE PROGRAMS: Youth.

V(E). Planned Program (Outputs)

1. Standard output measures

2010	Direct Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
Actual	6348	3110720	41	0

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

Patent Applications Submitted

Year: 2010
Actual: 0

Patents listed

3. Publications (Standard General Output Measure)

Number of Peer Reviewed Publications

2010	Extension	Research	Total
Actual	0	0	37

V(F). State Defined Outputs

Output Target

Output #1

Output Measure

- Number of invention disclosures

Year	Actual
2010	0

Output #2

Output Measure

- Number of people enrolled and/or registered in programs

Year	Actual
2010	8140

Output #3

Output Measure

- Number of research projects completed

Year	Actual
2010	4

V(G). State Defined Outcomes

V. State Defined Outcomes Table of Content

O. No.	OUTCOME NAME
1	Number of participants who were evaluated and demonstrated increased knowledge and skills
2	Number of participants who were evaluated in a follow up and who implement/adopt practices
3	Number of volunteers that helped with program leadership or program delivery

Outcome #1

1. Outcome Measures

Number of participants who were evaluated and demonstrated increased knowledge and skills

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2010	{No Data Entered}	2595

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
In 1999, Pennsylvania passed the Food Employee Certification Act, which requires one supervisory employee from for-profit facilities that carry a Pennsylvania Department of Agriculture license to attend an approved food safety course and pass an approved exam. Best management practices employed with food animal production are extremely critical to assure that the food supply is safe. The public is very aware of the need for food safety practices during the production and preparation of food.

What has been done
SERVSAFE®: 155 ServSafe® classes were taught by 24 ServSafe® instructors reaching 2,135 students. 1,657 individuals enrolled in the class for initial certification. 1,385 ServSafe® participants passed the certification exam. 478 individuals enrolled in the class for recertification. By offering food safety training, Extension has helped 2,237 individuals maintain their establishment's license. COOKING FOR CROWDS: 56 Cooking for Crowds presentations for 1,111 individuals from 152 organizations were given. GOOD PRODUCTION PRACTICES: Sixteen county educators/specialists delivered 109 presentations in 20 different counties.

Results
SERVSAFE®: 83.4% (1,147 of 1,361) plan to implement one or more food safety practices such as using sanitizer test strips (58.5%); log cooking, holding and cooling temperatures (56.3%); checking food temperatures with a food thermometer (54.6%); cooling foods quickly (53.1%). COOKING FOR CROWDS PROGRAM: 63% (508 of 813) plan to implement and/or increase 4 or more practices such as checking food temperatures with a calibrated thermometer; cooking foods to the proper temperature; washing hands for 20 seconds; limiting the time food spends in the danger zone; cooling foods quickly; separating raw from ready-to-eat foods. FOOD PRESERVATION: 27 classes with 450 participants (90%) reported new knowledge. 271 pressure

canner dial gauges tested in which half needed adjustment or replacement. FARM FOOD SAFETY: Confidence in conducting a self-inspection increased from 0% to 73%.

4. Associated Knowledge Areas

KA Code	Knowledge Area
711	Ensure Food Products Free of Harmful Chemicals, Including Residues from Agricultural and Other Sources
712	Protect Food from Contamination by Pathogenic Microorganisms, Parasites, and Naturally Occurring Toxins

Outcome #2

1. Outcome Measures

Number of participants who were evaluated in a follow up and who implement/adopt practices

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2010	{No Data Entered}	176

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Follow-up evaluations help the Food Safety team know whether the educational information they have presented is being used by the institution that is preparing the food. It assures the educators that the training and educational information is being retained and understood.

What has been done
Delivery mechanisms delineated in previous section.

Results
SERVSAFE®: 79 students completed follow-up evaluations. They serve over 12,700 people each day and trained over 375 individuals in food safety. 3 to 6 months after: 69.6% (55 of 79) implemented one or more practices such as checked food with a thermometer (67.3%); limited the time food spends in the danger zone (65.8%); cooled foods quickly (63.3%); used sanitizer test strips (59.5%); used gloves for ready-to-eat foods (58.2%). COOKING FOR CROWDS: Within 3 to 6 months, 76% (55 of 66) increased the frequency of one practice such as checking

food with a calibrated thermometer; cooked foods to the proper temperature; limited food in the danger zone; cooled foods quickly; separated raw from ready-to-eat foods, and used sanitizer test strips. FOOD PRESERVATION: Replaced old directions, (76%), Had canner dial gauge tested (31%).

4. Associated Knowledge Areas

KA Code	Knowledge Area
711	Ensure Food Products Free of Harmful Chemicals, Including Residues from Agricultural and Other Sources
712	Protect Food from Contamination by Pathogenic Microorganisms, Parasites, and Naturally Occurring Toxins

Outcome #3

1. Outcome Measures

Number of volunteers that helped with program leadership or program delivery

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Quantitative Target	Actual
2010	{No Data Entered}	129

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
The volunteers are important because they have access to locations and people that extension staff does not. They extend extension's reach. They also lend credibility to extension's training. Having another person recommend and endorse our program has greater impact than marketing it ourselves.

What has been done
SERVSAFE®: Health inspectors from county health departments and the Pennsylvania Department of Agriculture help to market the program and act as guest speakers. Others help to identify training sites and assist in setting up the site. PA Board of Probation and Parole staff has helped enroll and monitor the students. COOKING FOR CROWDS: Volunteers help with site identification, marketing, and help on the day of the training. Some volunteers serve as sponsors to offset the cost of Cooking for Crowds manuals, supplies, and instructor travel.

Results

As a result of volunteer involvement, there is increased enrollment in the training, increased access to training sites, and the opportunity to include the perspective of the regulators in our class. This last item also helps to improve the relationship between the food service operation and the regulators by allowing them to interact in a neutral setting. Ultimately, we reach more individuals, organizations, and communities who need our educational program.

4. Associated Knowledge Areas

KA Code	Knowledge Area
711	Ensure Food Products Free of Harmful Chemicals, Including Residues from Agricultural and Other Sources
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
- Populations changes (immigration, new cultural groupings, etc.)

Brief Explanation

Pennsylvania law now prevents the state from taking action against groups that sell commonly prepared baked goods to raise funds for non-profit organizations. The attention drawn to this change in legislation caused an increased demand for non-profit food safety education. Cooking for Crowds offers community groups the opportunity to learn safe procedures for preparing food sold for fundraising. In addition to the impact of legislation passing into state law there has also been an increased demand for food safety education because of difficult economic conditions in the state. Many food banks and pantries have experienced decreases in sources of revenue and increased food costs. This has resulted in decreased budgets for food safety training. The Cooking for Crowds program offers food banks researched based food safety education relevant to the needs of their volunteers at a reasonable cost. Food Preservation: Home gardening and purchasing from farmer's markets have increased. Possible reasons include the slow economy, buy fresh buy local interests, and consumer desire to grow their own for health, economy, and to control what is in their food. Extreme weather conditions, such as drought, plant diseases, and insect infestations, also affected food quality and availability for preserving. GAP's Program: U.S. Congressional and state regulatory actions. Wholesale buyer requirements to mandate verification of farm food safety practices as a condition of purchase. Interest in supporting Penn State farm food safety remains strong within the Pennsylvania Department of Agriculture although there are uncertainties with upcoming budget shortfalls and a change in administration. There are no indications that wholesale buyers will not continue to phase in GAP documentation and perhaps third party audit requirements for all growers, regardless of size. These requirements may well be more stringent than government regulations.

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

Evaluation Results

Food safety is a high priority issue in Pennsylvania and Penn State Extension is a key player in conducting educational programs to audiences who serve the public on a regular basis. Evaluation results indicate that the practices of checking food temperatures with a calibrated thermometer; limiting the time food spends in the temperature danger zone; cooling foods quickly; using sanitizer test strips to measure the strength of the sanitizer; using gloves to handle ready-to-eat foods; and washing hands for 20 seconds are key points that the participants practice in their work when preparing and serving food. These practices are important for prevention of food-borne illness and outbreaks. Testing pressure canner gauges and processing food at the correct temperature are also critical practices when preserving food. Commercial growers of small fruits and vegetables in Pennsylvania are using research-based information to improve their farm food safety practices and evaluation results indicate that there was a great increase in knowledge. Good Agricultural Practices: Youth increased their ability to make ethical decisions about 4-H animal science projects as a result of participation in Quality Assurance Management in Youth Animal Science programming. Youth can identify quality indicators in animal husbandry techniques as a result of participation in experiential learning regarding quality assurance and ethics.

Key Items of Evaluation

ServSafe® participants reported that they serve 183,580 customers per day. These customers will be impacted by the food safety training provided. The mass media plays a huge role in educating the public about food safety. For example, when teaching about food preservation, over 2,880,000 Pennsylvania households received educational information through the mass media. For the Good Agriculture Practices program, of those completing evaluations, they indicated they managed a total of over 16,000 head of livestock. Extrapolated for all participants, nearly 115,000 head of livestock were represented at these programs. Quality assurance programs are designed for certification in best management practices employed with food animal production. There were 270 producers certified among the 44 training opportunities for beef, sheep, goats, and pork.