

**V(A). Planned Program (Summary)**

**Program # 6**

**1. Name of the Planned Program**

Economic and Community Development

Reporting on this Program

**V(B). Program Knowledge Area(s)**

1. Program Knowledge Areas and Percentage

<b>KA Code</b>	<b>Knowledge Area</b>	<b>%1862 Extension</b>	<b>%1890 Extension</b>	<b>%1862 Research</b>	<b>%1890 Research</b>
134	Outdoor Recreation	5%		0%	
206	Basic Plant Biology	0%		5%	
401	Structures, Facilities, and General Purpose Farm Supplies	5%		5%	
512	Quality Maintenance in Storing and Marketing Non-Food Products	5%		2%	
601	Economics of Agricultural Production and Farm Management	10%		1%	
602	Business Management, Finance, and Taxation	10%		3%	
603	Market Economics	5%		8%	
604	Marketing and Distribution Practices	5%		12%	
608	Community Resource Planning and Development	5%		4%	
609	Economic Theory and Methods	5%		2%	
712	Protect Food from Contamination by Pathogenic Microorganisms, Parasites, and Naturally Occurring Toxins	0%		5%	
801	Individual and Family Resource Management	10%		7%	
803	Sociological and Technological Change Affecting Individuals, Families, and Communities	5%		13%	
804	Human Environmental Issues Concerning Apparel, Textiles, and Residential and Commercial Structures	5%		0%	
805	Community Institutions, Health, and Social Services	5%		4%	
806	Youth Development	10%		7%	
901	Program and Project Design, and Statistics	5%		7%	
903	Communication, Education, and Information Delivery	5%		15%	
	<b>Total</b>	100%		100%	

**V(C). Planned Program (Inputs)**

1. Actual amount of FTE/SYs expended this Program

<b>Year: 2013</b>	<b>Extension</b>		<b>Research</b>	
	<b>1862</b>	<b>1890</b>	<b>1862</b>	<b>1890</b>

Plan	44.8	0.0	40.5	0.0
Actual Paid Professional	68.0	0.0	23.5	0.0
Actual Volunteer	31.9	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
2133686	0	443659	0
1862 Matching	1890 Matching	1862 Matching	1890 Matching
5260905	0	1403516	0
1862 All Other	1890 All Other	1862 All Other	1890 All Other
4647799	0	979019	0

**V(D). Planned Program (Activity)**

**1. Brief description of the Activity**

Strong communities are built upon a foundation of resilient individuals and families. These foundations, however, are being stressed by globalization of our economy, resulting in a displaced workforce, and by the changing demographics of our citizens. Shifting workforce needs require opportunities to help train or retrain workers for new job opportunities.

Penn State demonstrates commitment to the citizens of the Commonwealth through a diverse array of research and extension programs that address long-standing and emerging issues, such as the Marcellus shale gas drilling and regional food systems. Many of our research efforts in this planned program address civic engagement and effective community institutions to provide residents and businesses with the proper tools to address local problems that affect their community.

This research is delivered via extension programming in a variety of forms, including work with local governments and nongovernmental organizations, advice to businesses new and old, and facilitation of community strategic planning and visioning. Experiences gained during our first 150 years now must be adapted to apply to a changed and continually changing environment.

In the early days of our research and extension programs, we focused primarily on a rural audience, and Pennsylvania, although still highly rural in nature, is now a much more tightly woven patchwork of communities. The success of our traditional rural audience is becoming more and more dependent on the interconnections between our rural, suburban, and urban centers. Many regions that are key agricultural production zones are also now preferred residential locales. This mix creates a variety of tensions that can be resolved only through creative translation of the latest social science and agricultural research into programs that help to provide solutions for previously unknown problems. A current example of rural-urban interface tensions is the definition of "customary agricultural practices." Such definitions were unnecessary in the recent past, but now are important to crafting sensible solutions to conflicting pressures on land use.

In addition to these pressures, the drilling of the Marcellus and Utica shales is stressing Pennsylvania communities in many ways. Communities are faced with impacts on infrastructure (roads, school systems,

etc.), social services, housing, etc.

Although there are many challenges facing our communities, there are many opportunities that research and extension can help. Our contributions to these and other community-based conflicts are central for ensuring a high quality of life for Pennsylvania residents.

## **2. Brief description of the target audience**

- Agricultural Producers/Farmers/Landowners
- Agriculture Services/Businesses
- Nonprofit Associations/Organizations
- Business and Industry
- Community Groups
- Education
- General Public
- Government Personnel
- Human Service Providers
- Military
- Special Populations (at-risk and underserved audiences)
- Students/Youth
- Volunteers/Extension Leaders

## **3. How was eXtension used?**

The PA 4-H Science Group uses eXtension as a reference resource. This ensures that the scientific information included in curriculum components is accurate and up to date. eXtension has also been a source of potential curriculum ideas for program development.

Several faculty and staff gathered resources from eXtension. One individual published a paper on eXtension.

Several team members are topic experts for eXtension.org, and a few have answered questions from participants in the ask the expert program.

We have cited eXtension as a resource for audiences and used it as a resource when developing new curricula.

## **V(E). Planned Program (Outputs)**

### **1. Standard output measures**

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

#### **Patent Applications Submitted**

Year:	2013
Actual:	0

**Patents listed**

**3. Publications (Standard General Output Measure)**

**Number of Peer Reviewed Publications**

<b>2013</b>	<b>Extension</b>	<b>Research</b>	<b>Total</b>
<b>Actual</b>	36	0	0

**V(F). State Defined Outputs**

**Output Target**

**Output #1**

**Output Measure**

- Number of college-initiated technology disclosures.

<b>Year</b>	<b>Actual</b>
2013	0

**Output #2**

**Output Measure**

- Number of participants in extension education classes and workshops.

<b>Year</b>	<b>Actual</b>
2013	181603

**V(G). State Defined Outcomes**

**V. State Defined Outcomes Table of Content**

O. No.	OUTCOME NAME
1	Percentage of extension class/workshop participants who expect to implement/adopt practices. (This is a short-term outcome measure.)
2	Percentage of extension class/workshop participants who respond to a follow-up survey with a self-report that they have implemented/adopted practices. (This is a medium-term outcome measure.)
3	New mathematical model to determine optimal locations for wholesale food distribution centers.
4	Number of additional extension educators trained to deliver extension workshops -- Food for Profit and Managing Risk for Food Businesses -- in PA, MD, WV, and TN.
5	New automated system for fruit thinning.
6	Young people participating in Young Growers Alliance.
7	Potential dollar increase in farm revenues with the adoption of high tunnel technology by 5% of PA's vegetable and small fruit growers.
8	Application of genetic knowledge to Easter lilies to enhance their marketability.

### **Outcome #1**

#### **1. Outcome Measures**

Percentage of extension class/workshop participants who expect to implement/adopt practices. (This is a short-term outcome measure.)

Not Reporting on this Outcome Measure

### **Outcome #2**

#### **1. Outcome Measures**

Percentage of extension class/workshop participants who respond to a follow-up survey with a self-report that they have implemented/adopted practices. (This is a medium-term outcome measure.)

Not Reporting on this Outcome Measure

### **Outcome #3**

#### **1. Outcome Measures**

New mathematical model to determine optimal locations for wholesale food distribution centers.

#### **2. Associated Institution Types**

- 1862 Research

#### **3a. Outcome Type:**

Change in Condition Outcome Measure

#### **3b. Quantitative Outcome**

<b>Year</b>	<b>Actual</b>
2013	1

#### **3c. Qualitative Outcome or Impact Statement**

##### **Issue (Who cares and Why)**

The location of wholesale food distributors has a big impact on the efficiency of a food system. Most products are trucked from processing facilities to wholesale distributors, and then on to retail stores. If we sited distribution centers in optimal locations, we could minimize transportation costs, which improves profitability and reduces environmental impacts, and maximize the number of producers and retailers they serve.

##### **What has been done**

Penn State researchers developed a new mathematical model to help business owners and policy makers determine the optimal locations for wholesale food distribution centers. The model considers transportation and distributor-construction costs. The constraints in the model clarify how certain changes, including distributor size and capacity, road conditions, and gas prices, might affect the optimal locations of wholesale hubs.

### Results

The model will be useful to private-sector firm owners, who can use this information to plan new distribution businesses or to change the locations of their existing distribution centers to maximize their profits and to help lower producers' costs through aggregation. The research team applied the model to the meat supply chain in the Northeast. They identified counties containing slaughtering or meat-processing facilities and counties containing retail meat markets. Inserting these data into their mathematical model, they conducted several simulations to determine the optimal locations for wholesale hubs connecting these slaughter and processing facilities with retail markets. They will also apply the model to fresh fruits and vegetables.

## 4. Associated Knowledge Areas

KA Code	Knowledge Area
604	Marketing and Distribution Practices

### Outcome #4

#### 1. Outcome Measures

Number of additional extension educators trained to deliver extension workshops -- Food for Profit and Managing Risk for Food Businesses -- in PA, MD, WV, and TN.

#### 2. Associated Institution Types

- 1862 Extension

#### 3a. Outcome Type:

Change in Condition Outcome Measure

#### 3b. Quantitative Outcome

Year	Actual
2013	22

#### 3c. Qualitative Outcome or Impact Statement

##### Issue (Who cares and Why)

Since 1992, Penn State Extension has offered the workshop Food for Profit (FFP), targeting farmers and local food entrepreneurs. The session covers many aspects of food business start-up and development, so participants can make an informed decision about whether to start and operate a food venture. In 2011, the Food Safety Modernization Act (FSMA) raised the bar for all food business owners. FSMA now affects small-scale food producers as well as large, often at great expense in time and money.

### **What has been done**

As a result, a second Penn State workshop, Managing Risk for Food Businesses (MRFB), was designed to build on FFP, as a more comprehensive training about the unique risks of food businesses and specific strategies for mitigating these risks.

Since 2010, demand for FFP and MRFB has continued to rise in PA, MD, and WV, with classes filled to capacity (30-45) and wait lists. Until 2012, only 5 extension educators were qualified to teach sessions and offer post-workshop individualized support.

### **Results**

To respond to this demand, a Northeast SARE project was launched to provide professional development training to 22 extension personnel and agricultural professionals in PA, MD, WV, and TN. The project team used 7 webinars and 14 field trips to empower the trainees to plan and deliver standardized FFP and MRFB workshops in their regions, as well as to provide customized follow-on support. Once trainees received this base of education, they apprenticed with seasoned project team members to offer 8 FFP workshops in October and November, 2013, enabling 151 farmers and food entrepreneurs to determine whether their situation and interests would support a food venture. The project team is now collecting information under the SARE grant to determine if a 'graduate' of the class started a business, what kind of net revenue was realized in the first year.

## **4. Associated Knowledge Areas**

<b>KA Code</b>	<b>Knowledge Area</b>
602	Business Management, Finance, and Taxation
604	Marketing and Distribution Practices
801	Individual and Family Resource Management

## **Outcome #5**

### **1. Outcome Measures**

New automated system for fruit thinning.

### **2. Associated Institution Types**

- 1862 Extension

### **3a. Outcome Type:**

Change in Condition Outcome Measure

### **3b. Quantitative Outcome**

<b>Year</b>	<b>Actual</b>
2013	1

### 3c. Qualitative Outcome or Impact Statement

#### Issue (Who cares and Why)

It takes only 10% of a tree's fruit to produce a profitable crop. If too much fruit is left on a tree, all of that season's fruit turns out extremely small and next year the tree will not produce enough fruit to turn a profit. The only reliable current strategy for removing excess fruit in peaches is hand-thinning. This practice can require as much as 100 laborer hours per acre, or 10 people who each work for 10 hours on each acre of orchard. Depending on the region, this can cost \$750 to \$1,120 per acre.

#### What has been done

An integrated team led by Penn State developed an automated system for fruit thinning that can reduce the labor requirement by 50 percent. For peach crops, these tractor-mounted or handheld thinners also resulted in better fruit quality and yield to an average net economic output of \$694 per acre. Nationally, the annual economic benefit to peach growers is \$82.5 million and a labor reduction of 5.9 million hours, which could increase the revenue of rural economies by \$181.5 million per year.

#### Results

The project is expanding from peaches into other crops (apple, cherry, and plum) with similar results. If adoption is widespread across all potential crops, growers can realize increased economic output of over \$440 million per year, which will translate to a positive economic impact on rural economies of almost \$1 billion per year.

### 4. Associated Knowledge Areas

KA Code	Knowledge Area
601	Economics of Agricultural Production and Farm Management

#### Outcome #6

##### 1. Outcome Measures

Young people participating in Young Growers Alliance.

##### 2. Associated Institution Types

- 1862 Extension

##### 3a. Outcome Type:

Change in Condition Outcome Measure

##### 3b. Quantitative Outcome

Year	Actual
2013	250

### 3c. Qualitative Outcome or Impact Statement

#### Issue (Who cares and Why)

Many older farmers wonder who will take over their farm when they retire. At the same time, many young people want to get started in farming, but the costs and knowledge gap can seem prohibitive.

#### What has been done

Penn State's Young Grower Alliance (YGA), with additional support from the State Horticultural Association of PA, supports more than 250 young people as they transition into a career as a specialty crop grower. YGA offers education, support, and networking to young people interested in or just beginning their horticultural career. YGA fulfills their desire to learn, meet peers who have chosen a similar lifestyle, take on leadership opportunities in the industry, and give back through service.

#### Results

One of the most overlooked aspects of farming is what happens to the farm when the person who currently makes the major decisions decides to retire or passes away. Effective transitional planning can help to alleviate the obstacles that successors will face, while ensuring the continued financial health of the family and business. Preservation of farmland and its associated ecosystem services are other benefits to successful farm transition planning.

### 4. Associated Knowledge Areas

KA Code	Knowledge Area
602	Business Management, Finance, and Taxation
801	Individual and Family Resource Management
806	Youth Development

### Outcome #7

#### 1. Outcome Measures

Potential dollar increase in farm revenues with the adoption of high tunnel technology by 5% of PA's vegetable and small fruit growers.

#### 2. Associated Institution Types

- 1862 Extension
- 1862 Research

#### 3a. Outcome Type:

Change in Condition Outcome Measure

#### 3b. Quantitative Outcome

Year	Actual
------	--------

2013 1400000

### 3c. Qualitative Outcome or Impact Statement

#### Issue (Who cares and Why)

High tunnels offer plants protection from wet, saturated soils and low temperatures in the spring and fall, thereby extending the growing season. High tunnels are nonpermanent structures generally constructed of a metal frame covered with a single layer of greenhouse-grade plastic. High tunnels differ from greenhouses in that plants typically are grown directly in the ground instead of in pots, and high tunnels do not have permanent heating or automated ventilation systems.

#### What has been done

Pennsylvania growers are using high tunnels to extend the season and grow more food year round for consumers' tables. Penn State Extension hosted 9 high tunnel twilight sessions and intensive schools to help more growers adopt this new technology and improve their high tunnel production. Two hundred eighty growers participated. Eighty-two percent planned to put this new knowledge to practice on their farms, representing 231 acres of vegetables and small fruit.

#### Results

In general, the crops grown in high tunnels at Penn State's experimental farm have had higher yields and better quality than those grown outdoors. Few pests occur in high tunnels, which can mean less pesticide compared to crops grown outdoors. High tunnels are lower priced than greenhouses at a cost of about \$2.38 per square foot compared to \$20-\$37 per square foot for a greenhouse.

New high tunnel owners typically generate \$6000-11,000 in gross revenues from a 30' x 96' tunnel--about \$3-5 per square foot. This translates into a conservative net income increase for farmers of 6-8%. There are about 3,400 growers of vegetables and small fruit in PA. If we assume that just 5% of them install a high tunnel, and that they each earn average revenues, this translates into \$1.4 million.

Raising farm profits increases the likelihood that farm operations continue and farmland is preserved, along with the tremendous ecosystem services it provides.

### 4. Associated Knowledge Areas

KA Code	Knowledge Area
401	Structures, Facilities, and General Purpose Farm Supplies
601	Economics of Agricultural Production and Farm Management

## **Outcome #8**

### **1. Outcome Measures**

Application of genetic knowledge to Easter lilies to enhance their marketability.

### **2. Associated Institution Types**

- 1862 Research

### **3a. Outcome Type:**

Change in Knowledge Outcome Measure

### **3b. Quantitative Outcome**

<b>Year</b>	<b>Actual</b>
2013	1

### **3c. Qualitative Outcome or Impact Statement**

#### **Issue (Who cares and Why)**

Easter lilies had a wholesale value of \$37.4 million in 1995 (USDA), making them the 4th largest crop in wholesale value of US potted plants. Pennsylvania is 3rd in the country for producing Easter lilies. Of the 4 top crops, Easter lily has the narrowest holiday sales window, only about 2 weeks. The time it takes a plant to switch from vegetative to reproductive phase profoundly affects the market value of lilies, which should have their first flower open 2 weeks prior to Easter for best sales.

#### **What has been done**

This research is examining how flowering is controlled in Easter lilies. Plants need to gauge when both internal and external cues are optimal before they start flowering. Penn State researchers are applying new information on flowering time genes in Arabidopsis to Easter lily with the ultimate goal of triggering flowering by expressing specific flowering time genes. They are evaluating growth parameters of Easter lilies for the complete growth cycle and analyzing genes regulating flowering time.

#### **Results**

Basic knowledge obtained with Arabidopsis can now be applied to solve many practical problems in the horticulture industry. Flowers have special meanings to people and they are in high demand on specific days. This high demand makes it vital for specific flower types to be available in a narrow window of time. This research with Easter lilies builds on our previous research with Arabidopsis to provide a clearer understanding of how flowering is controlled by environmental conditions and developmental regulation. Knowledge gained will help Easter lily growers maximize profitability by helping the plants to flower at the desired time.

### **4. Associated Knowledge Areas**

**KA Code**    **Knowledge Area**  
206            Basic Plant Biology

### **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
- Other (Extramural Funding)

#### **Brief Explanation**

##### **Natural Disasters (drought, weather extremes, etc.)**

· Weather extremes with too wet or too dry conditions had major implications for somatic cell count and feed quality and quantity. This can have huge impacts on a producer's income, due to decreased milk production and milk premium earned, and increased feed costs.

##### **Economy**

- Stagnant growth in the economy has had mixed effects. It may be a factor in decreased attendance for some offerings. It may also drive people to explore entrepreneurship, thus increasing attendance at courses such as Food for Profit.
- The volatility of the grain and milk markets has forced dairy producers to be more involved in how to use risk management to cover their margin and produce an increased amount of high quality milk.
- Banks are requiring a cash flow plan before any consideration is given to making loans. To use risk management properly, producers need to know their breakeven income over feed cost and milk margin so they can make smart decisions.
- The new "Financial Considerations" workshops were added to assist landowners receiving or planning to receive bonus and/or lease payments for shale gas drilling.
- We are offering more programs in conjunction with external expertise on business development related to the emerging shale gas exploration and development industrial sector.

##### **Appropriations changes**

· Appropriation Changes affected both the research and extension functions of the College of Agricultural Sciences and resulted in fewer faculty and staff across all areas of the college.

##### **Public Policy changes**

· Changes in public policy and regulations are steady and provide opportunities to incorporate the changes and their implications into programming.

### **Government Regulations**

- The Food Safety Modernization Act trickled down to smaller businesses, so more people came to workshops to learn what they must do.
- There is also a growing awareness with a widening array of stakeholders as to the importance of Marcellus shale development to many aspects of their communities, businesses, educational institutions, and organizations. Communities are becoming more engaged in decision making and the consideration of ordinances. Considerable discussion is taking place on the local level as municipal officials discuss their options for some local regulation.

### **Competing Public priorities**

- Competing Public Priorities force us to continually align our program priorities with budget realities.

### **Competing Programmatic Challenges**

- The College of Agricultural Sciences' restructuring process allowed for continued focus on cost-effective program deliverables and strategic elimination of programs.
- Some other groups are providing competitive educational programming. But others, such as Ag Choice Farm Credit, are more actively connecting with extension to reach their audiences.
- Loss of farm management educators with no replacement meant that educators were redirected to SET projects, and could not do as much entrepreneurship programming.

### **Other - Extramural Funding**

- The PA 4-H Science Team was successful in obtaining funding totaling \$241,278 to support new curriculum initiatives and staff development.
- The USDA RMA grant we had in 2012 was not re-awarded to us in 2013. We had to search for alternative sources of funding for travel and program resources.

## **V(I). Planned Program (Evaluation Studies)**

### **Evaluation Results**

The generation of outcomes from existing programs and the development of new programs require improved evaluation that identifies pre- and post- responses to information and monitoring for long-term behavioral changes that result in improved environmental outcomes. The evaluations conducted thus far provide initial measures of implementation, but long-term monitoring is needed to ensure that the practices are successfully managed over time. We are attempting to incorporate more economic valuations of the results of our research and extension work.

### **Key Items of Evaluation**

See highlights of state-defined outcomes in this planned program.