

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

**Program # 4**

**1. Name of the Planned Program**

Food Safety

- Reporting on this Program

**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	5%		5%	
204	Plant Product Quality and Utility (Preharvest)	5%		5%	
212	Diseases and Nematodes Affecting Plants	5%		5%	
216	Integrated Pest Management Systems	5%		5%	
308	Improved Animal Products (Before Harvest)	10%		10%	
501	New and Improved Food Processing Technologies	20%		20%	
503	Quality Maintenance in Storing and Marketing Food Products	10%		10%	
504	Home and Commercial Food Service	10%		10%	
607	Consumer Economics	5%		5%	
702	Requirements and Function of Nutrients and Other Food Components	5%		5%	
711	Ensure Food Products Free of Harmful Chemicals, Including Residues from Agricultural and Other Sources	5%		5%	
712	Protect Food from Contamination by Pathogenic Microorganisms, Parasites, and Naturally Occurring Toxins	15%		15%	
	<b>Total</b>	100%		100%	

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

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

Year: 2014	Extension		Research	
	1862	1890	1862	1890
<b>Plan</b>	4.5	0.0	7.0	0.0
<b>Actual Paid</b>	4.0	0.0	16.6	0.0

<b>Actual Volunteer</b>	0.0	0.0	0.0	0.0
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**2. Actual dollars expended in this Program (includes Carryover Funds from previous years)**

Extension		Research	
Smith-Lever 3b & 3c	1890 Extension	Hatch	Evans-Allen
974052	0	407815	0
1862 Matching	1890 Matching	1862 Matching	1890 Matching
2559900	0	3033583	0
1862 All Other	1890 All Other	1862 All Other	1890 All Other
323032	0	1297460	0

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

**1. Brief description of the Activity**

Research-based programs will focus on conducting research experiments and programs emphasizing our key interest areas including detection and control of foodborne pathogens.

A wide variety of programs will be delivered to our targeted audiences. Some programs will include a complete development of curriculum, while others will involve the use of readily available programs used in other states and/or available for purchase through different organizations. Our output effort will include:

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

We expect to increase our offerings through distance education and/or web-based materials. Most programs involve some type of collaboration or partnerships with our stakeholders, with industry, with consumers, or with regulatory agencies. Evaluation tools vary greatly depending on the intended audience and program type ranging from surveys, to pre-and post test, to national certification exams, and intensive follow up surveys to better assess knowledge gain.

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

- Animal production personnel
- Plant production personnel
- Food manufacturing and processing plant personnel
- Food service and food retail workers
- Consumers
- Youth
- State and county health departments
- Federal regulatory officials
- State industry associations

- First Responders

**3. How was eXtension used?**

eXtension was not used in this program

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

**1. Standard output measures**

2014	Direct Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
<b>Actual</b>	5782	339082	793	1719

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

**Patent Applications Submitted**

Year: 2014

Actual: 0

**Patents listed**

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

**Number of Peer Reviewed Publications**

2014	Extension	Research	Total
<b>Actual</b>	1	42	43

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

**Output Target**

**Output #1**

**Output Measure**

- Number of food safety programs offered to consumers

Year	Actual
2014	0

**Output #2**

**Output Measure**

- Number of programs offered to the food industry

<b>Year</b>	<b>Actual</b>
2014	0

**Output #3**

**Output Measure**

- Number of research projects on food safety

<b>Year</b>	<b>Actual</b>
2014	37

**Output #4**

**Output Measure**

- Number of research publications related to control of foodborne hazards

<b>Year</b>	<b>Actual</b>
2014	0

**Output #5**

**Output Measure**

- Number of research publications related to detection of foodborne pathogens

<b>Year</b>	<b>Actual</b>
2014	0

**Output #6**

**Output Measure**

- Number of research publications related to food defense and protection

<b>Year</b>	<b>Actual</b>
2014	0

**Output #7**

**Output Measure**

- Number of Extension publications related to food safety

<b>Year</b>	<b>Actual</b>
2014	37

**Output #8**

**Output Measure**

- Number of volunteers

<b>Year</b>	<b>Actual</b>
2014	161

**Output #9**

**Output Measure**

- Number of consultations

<b>Year</b>	<b>Actual</b>
2014	600

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

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

O. No.	OUTCOME NAME
1	Number of incidents (reduction is goal) of foodborne illness associated with unsafe food handling practices
2	Number of persons who increased their knowledge of cooking foods adequately
3	Number of persons who increased their knowledge of avoiding cross-contamination
4	Number of persons who increased their knowledge of keeping food at a safe temperature
5	Number of persons who increased their knowledge of storing foods properly
6	Number of persons who increased their knowledge of proper hand washing
7	Number of participants passing food handler certificate
8	Number of participants adopting best management practices related to food safety
9	An impact from new knowledge related to food quality and nutrient uptake.
10	Number of people with new knowledge related to hunting and meat processing.
11	An impact from new knowledge related to economics regarding food safety.
12	An impact on food safety from new knowledge related to technology
13	An impact on family and community capacity to grow local foods.

**Outcome #1**

**1. Outcome Measures**

Number of incidents (reduction is goal) of foodborne illness associated with unsafe food handling practices

Not Reporting on this Outcome Measure

**Outcome #2**

**1. Outcome Measures**

Number of persons who increased their knowledge of cooking foods adequately

Not Reporting on this Outcome Measure

**Outcome #3**

**1. Outcome Measures**

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

Not Reporting on this Outcome Measure

**Outcome #4**

**1. Outcome Measures**

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

Not Reporting on this Outcome Measure

**Outcome #5**

**1. Outcome Measures**

Number of persons who increased their knowledge of storing foods properly

**2. Associated Institution Types**

- 1862 Extension
- 1862 Research

**3a. Outcome Type:**

Change in Knowledge Outcome Measure

**3b. Quantitative Outcome**

<b>Year</b>	<b>Actual</b>
2014	2157

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

**Issue (Who cares and Why)**

Egg products are a growing market opportunity for U.S. egg producers. Over one-third of eggs are converted into pasteurized egg products such as dry whole egg, sugared white, salted yolk, and many others. Many of these products are used as natural food ingredients in cakes, cookies, pies, mayonnaise, and ice cream, for example.

**What has been done**

A consortium of egg industry, the American Egg Board and a number of egg product experts from multiple universities developed a four day hands-on workshop to train persons in egg product manufacturing. These courses are offered bi-annually in even years. The participants receive laboratory training in evaluating egg product functionality, quality, and safety along with a tour of egg product manufacturing, and chef demonstration of various egg products.

**Results**

Over forty persons were trained in egg product technology. These forty persons were from 20 U.S. egg product manufacturers and contribute over 50% of the egg product volume produced in the United States.

**4. Associated Knowledge Areas**

<b>KA Code</b>	<b>Knowledge Area</b>
504	Home and Commercial Food Service
712	Protect Food from Contamination by Pathogenic Microorganisms, Parasites, and Naturally Occurring Toxins

**Outcome #6**

**1. Outcome Measures**

Number of persons who increased their knowledge of proper hand washing

Not Reporting on this Outcome Measure

**Outcome #7**

**1. Outcome Measures**

Number of participants passing food handler certificate

**2. Associated Institution Types**

- 1862 Extension

**3a. Outcome Type:**

Change in Action Outcome Measure

**3b. Quantitative Outcome**

<b>Year</b>	<b>Actual</b>
2014	2512

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

**Issue (Who cares and Why)**

Indiana fresh fruit and vegetable producers play an important role in the state's agriculture, food systems and local economies. Growers must satisfy consumer, buyer, and government expectations for produce safety in order to remain competitive. Many will soon be required by law to follow specific on-farm food safety regulations. Recent foodborne illness outbreaks have heightened awareness of these issues in Indiana among a variety of audiences. New state guidelines require operations that sell fresh fruits and vegetables to wholesale accounts to document that they have received basic training in food safety practices. These facts combine to create a need for basic and continuing education for fruit and vegetable farmers about food safety.

**What has been done**

Since 2011, Purdue Extension offered Good Agricultural Practices from A to Z, and in 2014 that included 19 locations around the state (in person or via webinar), teaching people how to identify and reduce food safety risks on the farm. Topics in the program include worker health and hygiene, water quality, animals and manure, sanitation during production, harvest and postharvest, and documentation including food safety plans and traceability systems. We offered

food safety update workshops at the Indiana Horticultural Congress and in Odon, Indiana. We created an online version of the GAPs A to Z course. Team members delivered shorter presentations about good agricultural practices at other programs, including the Illiana Vegetable Growers School. We launched the Food Safety for Fruit and Vegetable Farms web site. We published an Extension bulletin introducing GAPs.

### Results

Educational programs in 2014 informed more than 340 fruit and vegetable producers about Good Agricultural Practices and on-farm food safety. Over 80% of the participants in the webinar version of the GAPs A to Z program reported they would change practices in a least one area of food safety, and at least 50% reported they would make a change in all areas discussed. Over 300 individuals were eligible to receive a certificate of attendance at a GAPs A to Z program.

### 4. Associated Knowledge Areas

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

### Outcome #8

#### 1. Outcome Measures

Number of participants adopting best management practices related to food safety

#### 2. Associated Institution Types

- 1862 Extension
- 1862 Research

#### 3a. Outcome Type:

Change in Action Outcome Measure

#### 3b. Quantitative Outcome

Year	Actual
2014	0

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

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

In 2012, an outbreak of Salmonella was traced to a cantaloupe grower's farm in Indiana. This followed a larger outbreak of foodborne illness linked to cantaloupe in Colorado during the 2011 growing season. During the 2013 season, the Indiana melon industry faced a decrease in cantaloupe acreage, FDA inspections of cantaloupe packinghouses, and the need to rebuild the industry's reputation. In 2014, growers faced the uncertainty of potential federal regulations, as

well as the challenges of continuing to rebuild the Indiana cantaloupe industry. Growers also faced the challenges of making sure that the entire industry produced and packed cantaloupe in a manner that reduced the risk of a foodborne illness outbreak.

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

Efforts were undertaken to support melon and produce industry in Southwestern Indiana. In 2014, a 60% time commitment was focused on this issue by Daviess County ANR. Mock audits were offered for those seeking a third-party food safety certification. Workshops were conducted for Indiana melon growers to prepare them for the 2014 harvest season and potential FDA inspections. Workshops updated growers on issues such as sanitizer use, inspection activity in the previous year, and general packinghouse sanitation. Audit services were provided for Indiana members of the Eastern Cantaloupe Growers Association. This group represents over 75% of the cantaloupe acres grown in Indiana.

#### **Results**

Of the 13 farms on which audits were offered in 2014, 12 of them obtained their third-party food safety certification. Workshops, held collaboratively with Food Science personnel and the Indiana Department of Health, helped to prepare growers for the upcoming harvest season. No farm had the opportunity to test their protocols with a formal FDA audit. After the workshops, one grower thanked us and commented that they were very impressed with the support and assistance that Purdue was willing to provide in the event of a federal inspection. Unannounced audits were performed on farms and packinghouse of Indiana Eastern Cantaloupe Growers Association (ECGA) members. Per ECGA protocol, all members submit to one unannounced audit during the growing season. All Indiana members passed the unannounced audit. This translates into no excess or unnecessary contamination risk being detected on a majority of the cantaloupe acres in the state.

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

<b>KA Code</b>	<b>Knowledge Area</b>
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 #9**

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

An impact from new knowledge related to food quality and nutrient uptake.

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

- 1862 Research

**3a. Outcome Type:**

Change in Knowledge Outcome Measure

**3b. Quantitative Outcome**

Year	Actual
2014	0

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

**Issue (Who cares and Why)**

Consumption of phytochemical-rich foods has been associated with prevention of chronic disease. This project explored the effects of food formulation and processing on absorption, metabolism and potential physiological activity of dietary phytochemicals from common fruits, vegetables and beverages.

**What has been done**

This past year, researchers studied factors influencing polyphenol stability and bioavailability from foods including an assessment of polyphenol-protein interactions and their relationship to stability and bioaccessibility. Results indicate that milk proteins can stabilize tea and cocoa flavonoids to thermal processing and oxidation. Further, non-covalent binding does not appear to limit bioaccessibility of tea phenolics suggesting that protein-based formulation strategies may be employed to enhance stability and delivery in novel foods. In this last year, studies were expanded related to bioavailability of carotenoids from human milk. Lutein was found equally bioaccessible but more readily absorbed by Caco-2 human intestinal cells in culture when derived from human milk compared to infant formula. This may suggest that yet-to-be-determined factors in human milk can be leveraged to enhance absorption of select bioactive compounds such as carotenoids.

**Results**

These efforts have provided key insights on how interactions in the food matrix (protein, lipid and carbohydrates) may influence stability and bioavailability/metabolism of polyphenols, carotenoids and other micronutrients. Specific knowledge of how macronutrient interactions can modulate absorption and metabolism of phenolics in vivo with additional results to be published in 2015. Combined, these results are helping to define biologically relevant phytochemical forms and factors impacting their absorption from food and distribution to target tissues. Overall, this will facilitate design and development of product formulations and dosing strategies favoring absorption of bioactive phytochemicals from foods.

**4. Associated Knowledge Areas**

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

## **Outcome #10**

### **1. Outcome Measures**

Number of people with new knowledge related to hunting and meat processing.

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

- 1862 Extension

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

Change in Knowledge Outcome Measure

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

<b>Year</b>	<b>Actual</b>
2014	0

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

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

Hunting is a way of life for many citizens of Indiana. In 2012, a record 136,248 deer were harvested across the state. While some of these deer end up at commercial meat processing facilities, many are butchered by hunters at home. Of those who choose to process their harvested animals themselves, very few have formal training about how to properly process a wild game animal and must rely on practices that have simply been passed down from relatives or learned from friends. In addition, commercial processors are often concerned by the dirty, spoiled deer carcasses that end up at their facilities.

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

Purdue Extension Educators in Ripley and Fayette Counties conducted a series of venison workshops in 3 Indiana counties: Wayne, Clark, and Marion. During each workshop, the educators discussed the proper techniques for field dressing and aging of deer; skinned and quartered the deer; discussed proper storage and preservation methods; cut up the meat and prepared it in a variety of ways for participants to taste. Educators also presented information about proper meat handling and safety, and provided an update about chronic wasting disease in Indiana. At the conclusion, participants had the opportunity to sample venison products prepared that evening as well as some donated from local deer processors.

#### **Results**

Over 350 participants from 17 Indiana counties attended the programs. Ninety-nine percent of respondents indicated they learned field-dressing tips that would help them keep the carcass clean and free of contamination. One hundred percent indicated they had learned something about food safety, and 99% responded they had learned how to make better use of the meat. Also, 97% of respondents indicated they planned to change how they handle their deer meat after attending this workshop, one hundred percent of the respondents indicated they would like to see

similar workshops in the future that focused on additional upland game and fish, and 73% indicated this was the first extension program they had ever attended. Nine returning participants were surveyed, and 85% indicated that they hunt and fish more as a result of attending the workshops, while 93% reported they also tend to keep and bring home more fish and game. When asked about the program, one participant said, "I have never processed a deer before and would have been intimidated to try. Now I feel comfortable enough to try it". Another added "the meat tasted much better than the meat I had processed last year at a high cost!" Finally, one individual who indicated he had never attended a Purdue Extension program before wrote "if this is how Purdue does outreach, then I am very impressed."

#### 4. Associated Knowledge Areas

KA Code	Knowledge Area
501	New and Improved Food Processing Technologies

#### Outcome #11

##### 1. Outcome Measures

An impact from new knowledge related to economics regarding food safety.

##### 2. Associated Institution Types

- 1862 Research

##### 3a. Outcome Type:

Change in Knowledge Outcome Measure

##### 3b. Quantitative Outcome

Year	Actual
2014	0

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

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

Creating value added products from underutilized by-products can not only enhance their commercial end-value, but also create a more sustainable industry. Over the years, animal and plant by-products have mainly been used as fertilizers and livestock feeds with little commercial value and/or few food applications. In an attempt to create a more sustainable food industry, byproducts can be exposed to proteolytic enzymes, leading to the hydrolysis of the proteins in the material. This process converts otherwise underutilized material into more marketable and functional products known as protein hydrolysates (PH). Protein hydrolysates can be used by the food industry as emulsifying, foaming and water-binding agents. In addition, recent interest in PH has shifted toward their potential bioactive properties not only to human health (anti-hypertensive), but also in stabilizing food products, such as preventing lipid oxidation and freeze-

induced damage in frozen foods. In food products, cryopreservatives (cryoprotectants) prevent protein denaturation during frozen storage. Commercial cryoprotectants currently used in fish products, such as surimi seafoods, require the use of high concentrations to impart satisfactory cryoprotection. These concentrations have a tendency to impart a sweet taste to the final product, which is not always the preferred case and would not be suitable for consumers suffering from diabetes. Therefore, alternative ingredients are desirable in the context of sensory attributes and issues related to health. Tilapia (*Oreochromis niloticus*) is a commercially important aquatic species. The volume of farmed tilapia produced in the Americas is believed to have doubled in the last 10 years, with the U.S. being the second biggest consumer (Fitzsimmons, 2000). When fish such as tilapia is processed, the yield recovery ranges only from 30 to 40% fillets with the remaining percentage accounting as by-products (Torres et al., 2007). Another example of underutilized resources is the case of Asian bighead carp (*Hypophthalmichthys nobilis*) and silver carp (*Hypophthalmichthys molitrix*). These fish, native to Asia, pose a significant risk to the U.S. Midwest rivers' and Great Lakes' ecosystems due to the competition with the native species for food resources. Currently, there is no established commercial fishing in the U.S. for these two invasive species (Schrank et al., 2003; Rogowski et al., 2009). In summary, this project will assist in creating value added products from Indiana's Agriculture derived by-products, to enhance their commercial value and create a more sustainable industry.

**What has been done**

The main objective of this project is to explore the potential of using protein hydrolysates, derived from animal and plant byproducts, as functional, bioactive and cryopreservative ingredients in food systems. The specific objectives include: 1)To establish processing conditions for production of protein hydrolysates (PH) 2)To characterize the functional, physicochemical and cryopreservative properties of the protein hydrolysates Will the protein hydrolysates have optimal functionality in terms of solubility, emulsifying and foaming capacity Are the protein hydrolysates able to act as cryopreservatives in a model system 3)To assess the potential antioxidant and antimicrobial activities from protein hydrolysates. The research will assist in the long-term objective, which is to increase the commercial value and use of by-products derived from agriculture production in Indiana.

**Results**

The research project has successfully developed a mechanism for creating several types of value-added products derived from under-utilized, invasive silver carp. As mentioned previously, silver carp species are now considered "Injurious wildlife" by the United States Fish and Wildlife Service. Recommendations by the Asian Carp Regional Control Committee (ACRCC) for control of Silver carp populations primarily relate to the harvest and use of these fish rather than piscicidal options such as chemical and electrochemical barriers. The research has caught the attention of John Goss (Asian carp Director for the White House Council on Environmental Quality), leading to conversations and networking ideas. The project has successfully developed a mechanism for creating several types of value-added products derived from under-utilized, invasive silver carp

**4. Associated Knowledge Areas**

<b>KA Code</b>	<b>Knowledge Area</b>
308	Improved Animal Products (Before Harvest)
702	Requirements and Function of Nutrients and Other Food Components

**Outcome #12**

**1. Outcome Measures**

An impact on food safety from new knowledge related to technology

**2. Associated Institution Types**

- 1862 Research

**3a. Outcome Type:**

Change in Knowledge Outcome Measure

**3b. Quantitative Outcome**

Year	Actual
2014	0

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

**Issue (Who cares and Why)**

Rapid and accurate detection of foodborne pathogen are crucial for improving food safety. We investigated whether laser light scattering sensors can detect Salmonella, Shigatoxin producing E. coli (STEC), and Bacillus spp. at low levels from naturally contaminated food and environmental samples in less than 24 hours.

**What has been done**

Test samples, after a period of enrichment in appropriate pathogen enrichment broths, were surface plated on selective agar plates and the millimeter sized colonies were screened using the laser light scattering sensor. The incident laser beam sequentially runs through each preselected colony and generated scatter signature which were matched to the image library for detection and identification.

**Results**

The sensor detected all test pathogens; Salmonella enterica, STEC and Bacillus spp. from varieties of inoculated or naturally contaminated samples within 16-24 hours, validating the sensor's potential application with real-world samples to benefit the food processing industry and regulatory agencies.

**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 #13**

**1. Outcome Measures**

An impact on family and community capacity to grow local foods.

**2. Associated Institution Types**

- 1862 Extension

**3a. Outcome Type:**

Change in Action Outcome Measure

**3b. Quantitative Outcome**

Year	Actual
2014	0

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

**Issue (Who cares and Why)**

Across Indiana, Purdue Extension provides training for volunteers to become Master Gardeners in a 35-hour program that covers such topics as plants, soils, gardening tools and techniques, fertilizers, plant problems, diseases, pests, weeds, and insecticides and fungicides. Those who complete the training, pass an exam with a score of 70% or more, and contribute at least 35 hours of volunteer service related to home gardening education become Certified Purdue Master Gardeners.

**What has been done**

In 2013, Indiana Master Gardeners provided over 160,000 volunteer hours of educational activities, provided food from Master Gardner educational demonstration gardens to Indiana food banks, and provided horticulture scholarships for local college students.

**Results**

Using the Independent Sector's Value of Volunteer Time of \$21.56/hour in Indiana, the value of these volunteer efforts was over \$3.5 million. Also, Indiana food banks received over 27 tons of produce created and maintained by Master Gardeners for educational demonstration gardens. And Local Master Gardener associations awarded over \$40,000 in scholarships for local college students studying horticulture or related fields.

**4. Associated Knowledge Areas**

KA Code	Knowledge Area
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204	Plant Product Quality and Utility (Preharvest)
212	Diseases and Nematodes Affecting Plants
216	Integrated Pest Management Systems
503	Quality Maintenance in Storing and Marketing Food Products
607	Consumer Economics
702	Requirements and Function of Nutrients and Other Food Components
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
- Competing Public priorities
- Competing Programmatic Challenges
- Populations changes (immigration, new cultural groupings, etc.)
- Other (state and national priorities)

##### **Brief Explanation**

{No Data Entered}

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

##### **Evaluation Results**

Outcome 5 - Training of staff working in egg processing  
Outcome 7 - Post survey of intentions for making changes in practices by participants  
Outcome 8 - FDA certification of farms producing fruit.  
Outcome 9 - Lab study  
Outcome 10 - Post survey and followup of knowledge gained and changes in activities  
Outcome 11 - Lab study  
Outcome 12 - Lab study  
Outcome 13 - Tracking of volunteer hours with Independent Sector Values for Indiana.

##### **Key Items of Evaluation**

Outcome 5 - 50% of egg product volume impacted by staff who were trained  
Outcome 7 - Over 80% would change practices in at least one area of food safety.  
Outcome 8 - 12 of 13 fruit farms obtained third-party food safety certification.  
Outcome 9 - Development of product formulations for absorption of phytochemicals from

foods.

Outcome 10 - 100% learned something new about food safety. On followup, many indicated they hunted and fished more, and brought home more fish and game as a result of the workshop.

Outcome 11 - Developed value-added food products from silver carp.

Outcome 12 - Sensor can now detect all pathogens - Salmonella, STEC, and Bacillus.

Outcome 13 - Over \$3.5 million Master Gardener volunteer hours for Indiana.