

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

**Program # 6**

**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
101	Appraisal of Soil Resources	10%	100%	100%	0%
205	Plant Management Systems	10%	0%	0%	50%
404	Instrumentation and Control Systems	10%	0%	0%	0%
501	New and Improved Food Processing Technologies	20%	0%	0%	0%
502	New and Improved Food Products	20%	0%	0%	0%
711	Ensure Food Products Free of Harmful Chemicals, Including Residues from Agricultural and Other Sources	10%	0%	0%	25%
712	Protect Food from Contamination by Pathogenic Microorganisms, Parasites, and Naturally Occurring Toxins	20%	0%	0%	25%
	<b>Total</b>	100%	100%	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>	9.0	1.5	5.0	4.0
<b>Actual Paid</b>	8.0	0.0	1.5	6.7
<b>Actual Volunteer</b>	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
341273	135656	937159	326647
1862 Matching	1890 Matching	1862 Matching	1890 Matching
341273	135656	937159	420445
1862 All Other	1890 All Other	1862 All Other	1890 All Other
292204	0	53970	0

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

**1. Brief description of the Activity**

- Develop technical assistance programs for UME
- Develop and/or adapt food safety materials and resources for UME Educators
- Collaborate with local, regional, and national partners
- Develop safe food educational materials/ resources and disseminate USDA food safety materials to consumers and producers
  - Conduct trainings and workshops, including train-the-trainer workshops
  - Conduct evaluations
  - Promote and support Maryland Farm to School and other agricultural literacy programs
  - Conduct data analysis, needs assessments, environmental scans, and asset mapping
  - Network internally and externally with collaborators, partners, and affiliates
  - Raise community and stakeholder awareness of local food issues
  - Develop online food safety modules
  - Conduct social marketing awareness education focusing on food safety
  - Conduct basic and applied research to inform program development regarding food-borne illnesses and beneficial and safe compounds in the food.

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

- Consumers: Youth, adults, older adults
- Commercial: Fruit and vegetable producers
- Food service workers, childcare workers, community-based organizations
- Service agencies related to food production, promotion, consumption, protection, education

**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>	2500	4751	0	101

**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>	5	5	0

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

**Output Target**

**Output #1**

**Output Measure**

- 1. Food Safety Practices: # training sessions; # trained; # courses developed; # publications; # Mass Media

Year	Actual
2014	2505

**Output #2**

**Output Measure**

- 2. Good Agricultural Practices (GAP): # of fruit and vegetable farmers implementing Good Agricultural Practices; # of fruit and vegetable producers attending GAP training; # of GAP workshops, seminars, consultations.

Year	Actual
2014	58

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

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

O. No.	OUTCOME NAME
1	1. Food Safety Practices: Participants will gain basic food safety knowledge and skills, resulting in an intent to adopt the following: Follow the key safe food handling recommendations (clean; separate; cook; chill) -Wash hands before working with food -Clean food preparation utensils and surfaces -Wash fruits and vegetables before eating and preparing - Keep raw food/meat separate from ready to eat foods -Cook and chill food to safe temperature using a food thermometer -Store foods at a safe temperature using an appliance thermometer
2	2. Good Agricultural Practices (GAP): Maryland's fruit and vegetable producers implement Good Agricultural Practices in their operations to prevent contamination and ensure a safe food supply.

## **Outcome #1**

### **1. Outcome Measures**

1. Food Safety Practices: Participants will gain basic food safety knowledge and skills, resulting in an intent to adopt the following: Follow the key safe food handling recommendations (clean; separate; cook; chill) -Wash hands before working with food -Clean food preparation utensils and surfaces -Wash fruits and vegetables before eating and preparing - Keep raw food/meat separate from ready to eat foods -Cook and chill food to safe temperature using a food thermometer -Store foods at a safe temperature using an appliance thermometer

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

- 1862 Extension
- 1890 Extension
- 1862 Research
- 1890 Research

### **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)**

Maryland Crabmeat Quality Assurance and Inspection Program (MCQAP) is a unique voluntary quality management program in which Maryland crab processors have the opportunity to join and undergo evaluations and assistance beyond the regular inspections performed by FDA and state health regulators. The program has conducted sanitation audits and process verification studies in crabmeat processing plants, and microbiological analysis for crabmeat and environmental swab samples.

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

A total of 1322 samples were collected from participating companies. The microbiological tests were performed at the UMES Center for Food Science and Technology. At the end of this year's crab season, 167 industry reports, representing approximately 5219 test procedures, were prepared and mailed to participating processors detailing the microbiological status of their operations, implications, and recommendations.

#### **Results**

One major value of this program was to help 100% of the participating industry totally eliminate the dangerous human pathogens E. coli from their crabmeat and processing environments (0%

positive for E. coli in crabmeat, food and non-food contact surfaces). Another program results was to help the industry identify and control Listeria monocytogenes in both crabmeat and environmental swab samples. In 2014, the rate of occurrence of Listeria monocytogenes in the crabmeat and environmental swab samples was 0.76 % (1/131) and 0 % (0/595), respectively.

#### 4. Associated Knowledge Areas

KA Code	Knowledge Area
205	Plant Management Systems
501	New and Improved Food Processing Technologies
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

2. Good Agricultural Practices (GAP): Maryland's fruit and vegetable producers implement Good Agricultural Practices in their operations to prevent contamination and ensure a safe food supply.

##### 2. Associated Institution Types

- 1862 Extension
- 1862 Research
- 1890 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)**

Several outbreaks of foodborne illness have been traced to contaminated fruits and vegetables that were either grown domestically or imported. Presently, the U.S. Food and Drug Administration (FDA) is reviewing regulations that govern the produce industry and early drafts indicate that fruits and vegetables from all size farm operations will need to comply with proposed regulations. Therefore, it is evident that producers need to be more aware of GAPs and the changing regulatory environment which includes an emphasis on water quality.

### **What has been done**

Vegetable grower sites were selected to represent Maryland's various geographic areas including the Eastern Shore, Southern, Central and Western regions. Monthly samples were taken from 27 water sources (including ponds, wells and springs). The project was started in 2013 and repeated in 2014 using many of the same farms as in the 2013 study; however, the water samples were tested for E.coli, total coliform bacteria, pH, nitrates and turbidity (the nitrate test replaced the electrical conductivity test).

### **Results**

At grower meetings in early 2014, 2013 summary data was used to illustrate the vast range of water pH (3.9 to 9.7) and how E.Coli (an indicator for contamination) counts can vary widely due to water sources and month. Where water quality was compromised by potentially hazardous levels of bacterial contamination, growers became aware of their individual situations and made plans to install mitigation measures to reduce or eliminate contamination.

## **4. Associated Knowledge Areas**

<b>KA Code</b>	<b>Knowledge Area</b>
101	Appraisal of Soil Resources
205	Plant Management Systems
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
- Public Policy changes
- Government Regulations
- Competing Public priorities

### **Brief Explanation**

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

### **Evaluation Results**

Maryland Crabmeat Quality Assurance and Inspection Program (MCQAP) is a unique voluntary quality management program with partial funding from the industry, in which Maryland crab processors have the opportunity to join and undergo evaluations and assistance beyond the regular inspections performed by FDA and state health regulators. The program has conducted sanitation audits and process verification studies in crabmeat processing plants, and microbiological analysis for crabmeat and environmental swab

samples. Almost two thirds of Maryland crabmeat processors belong to the program. Routine microbiological inspections conducted through MCQAP ensure compliance with state regulations and the guidelines of the Chesapeake Bay Seafood Industries Association. Reports of the inspection and lab test results are mailed to each participating processing plant, and may include recommendations if findings warrant changes in sanitation procedures. This year, 13 Maryland crab processors, including one company located in Smith Island, have joined this unique voluntary program. A total of 1322 samples were collected from participating companies during this year (between April and November). The microbiological tests were performed at the UMES Center for Food Science and Technology. At the end of this year's crab season, 167 industry reports, representing approximately 5219 test procedures, were prepared and mailed to participating processors detailing the microbiological status of their operations, implications, and recommendations. One major value of this program in 2014 was to help 100% of the participating industry totally eliminated the dangerous human pathogens *E. coli* from their crabmeat and processing environments (0% positive for *E. coli* in crabmeat, food and non-food contact surfaces). Another value of the program was to help the industry identify and control *Listeria monocytogenes* in both crabmeat and environmental swab samples. Federal and state health regulators do not accept this pathogenic bacterium at any level in ready-to-eat seafood. In 2014, the rate of occurrence of *Listeria monocytogenes* in the crabmeat and environmental swab samples was 0.76 % (1/131) and 0 % (0/595), respectively. During 2014, three Seafood HACCP Training Workshops (Seafood HACCP Segment 2 Course and HACCP Course for Shellfish Shippers) were rotated in Maryland and Delaware. The Seafood HACCP Segment 2 Course was a one-day practical course that must be provided by certified trainers in accordance with the established protocol recognized by the Association of Food and Drug Officials (AFDO) and the U.S. Food and Drug Administration (FDA). This was a must for individuals who needed to demonstrate compliance with the training requirements of the FDA, state health departments and regulatory agencies. During this course, participants reviewed HACCP principles, the FDA regulations, and the FDA Hazards Guide. Participants also worked in groups to conduct a Hazard Analysis and developed a HACCP plan for a model seafood business assigned by the instructors. In 2014, a total of 57 individuals from seafood handling, processing, packing, storing, transportation and distribution, and shellfish growers and shippers registered for the Seafood HACCP Segment 2 Course and the HACCP Course for Shellfish Shippers. By completing these courses, 22 participants received a certificate of course completion from AFDO that met the FDA Seafood HACCP Regulation training requirements (21 CFR 123.10) and additional 33 attendees were qualified for shellfish operation.

### **Key Items of Evaluation**

Presently, the U.S. Food and Drug Administration (FDA) is reviewing regulations that govern the produce industry and early drafts indicate that fruits and vegetables from all size farm operations will need to comply with proposed regulations. Therefore, it is evident that producers need to be more aware of GAPs and the changing regulatory environment which includes an emphasis on water quality. GAP survey work conducted in 2010 and 2013 revealed that many growers did not have water quality data about their water sources on their farms. This study was conducted to develop baseline information by analyzing microbial water quality during the vegetable production months and by major water sources utilized in Maryland vegetable operations. This baseline data will be used for program development in the years ahead.