V(A). Planned Program (Summary)

Program # 1

1. Name of the Planned Program

Global Food Security and Hunger

☑ 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
102	Soil, Plant, Water, Nutrient Relationships	11%		3%	
202	Plant Genetic Resources	0%		3%	
203	Plant Biological Efficiency and Abiotic Stresses Affecting Plants	0%		4%	
204	Plant Product Quality and Utility (Preharvest)	6%		0%	
205	Plant Management Systems	15%		8%	
206	Basic Plant Biology	0%		8%	
211	Insects, Mites, and Other Arthropods Affecting Plants	16%		5%	
212	Diseases and Nematodes Affecting Plants	16%		14%	
216	Integrated Pest Management Systems	26%		2%	
301	Reproductive Performance of Animals	0%		18%	
304	Animal Genome	0%		1%	
307	Animal Management Systems	5%		0%	
311	Animal Diseases	0%		10%	
314	Toxic Chemicals, Poisonous Plants, Naturally Occurring Toxins, and Other Hazards Affecting Animals	0%		3%	
503	Quality Maintenance in Storing and Marketing Food Products	0%		4%	
504	Home and Commercial Food Service	0%		2%	
601	Economics of Agricultural Production and Farm Management	0%		5%	
604	Marketing and Distribution Practices	5%		0%	
711	Ensure Food Products Free of Harmful Chemicals, Including Residues from Agricultural and Other Sources	0%		9%	
712	Protect Food from Contamination by Pathogenic Microorganisms, Parasites, and Naturally Occurring Toxins	0%		1%	
	Total	100%		100%	

V(C). Planned Program (Inputs)

1. Actual amount of FTE/SYs expended this Program

Year: 2014	Extension		Research	
	1862	1890	1862	1890
Plan	14.0	0.0	12.0	0.0
Actual Paid	2.9	0.0	14.8	0.0
Actual Volunteer	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**
346407	0	610472	0
1862 Matching	**1890 Matching**	**1862 Matching**	**1890 Matching**
453443	0	1945566	0
1862 All Other	**1890 All Other**	**1862 All Other**	**1890 All Other**
302690	0	5571642	0

V(D). Planned Program (Activity)

1. Brief description of the Activity

Demonstrations
Diagnostic Services
Facilitated Group Meetings and Conferences
Individual Consultations and Site Visits
Presentation/Poster (Academic)
Printed Materials
Published Article (Academic)
Research Project (Applied Research)
Single day workshop, presentation or event
Websites or Other Computer-based Delivery
Workshop series or educational course

2. Brief description of the target audience

The primary audience for this plan are Massachusetts growers and food production-related businesses. This includes established producers as well as new, immigrant, part-time, conventional and organic growers. Others audiences include government agencies, non-profit and community-based organizations, including food banks and pantries that serve low-income families. The broader scientific community involved in basic and applied research related to all aspects of food production is another key audience.

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
Actual	13490	330938	70	0

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
Actual	30	48	78

V(F). State Defined Outputs

Output Target

Output #1

Output Measure

- Demonstrations

Year	Actual
2014	24

Output #2

Output Measure

- Diagnostic Services

  Not reporting on this Output for this Annual Report

Output #3

Output Measure

- Facilitated Group Meetings and Conferences

Year	Actual
2014	6

Output #4

Output Measure

- Individual Consultations and Site Visits

Year	Actual
2014	1080

Output #5

Output Measure

- Printed Materials

Year	Actual
2014	24

Output #6

Output Measure

- Single day workshop, presentation or event

Year	Actual
2014	108

Output #7

Output Measure

- Websites or other computer-based delivery

Year	Actual
2014	208

Output #8

Output Measure

- Workshop series or educational course

Year	Actual
2014	6

Output #9

Output Measure

- Peer review publications

Year	Actual
2014	78

Output #10

Output Measure

- Applied Research Projects

Year	Actual
2014	25

Output #11

Output Measure

- Displays and Exhibits

Year	Actual
2014	5

Output #12

Output Measure

- Academic poster or presentation

Year	Actual
2014	6

Output #13

Output Measure

- Research, Grant or Policy Report

Year	Actual
2014	2

Output #14

Output Measure

- Survey, Needs Assessment or Other Data Collection

Year	Actual
2014	1

Output #15

Output Measure

- Published News, Professional or Trade Article

Year	Actual
2014	1

V(G). State Defined Outcomes

V. State Defined Outcomes Table of Content

O. No.	OUTCOME NAME
1	Participants acquire knowledge and skills for practices that ensure economically viable food production.
2	Participants adopt practices that ensure economically viable food production
3	Participants acquire knowledge and skills for practices that ensure the environmentally sustainable food production
4	Participants adopt practices that ensure environmentally sustainable food production
5	Creation and synthesis of knowledge related to Global Food Security and Hunger
6	Food production enterprises in Massachusetts are more robust, diverse and economically viable

Outcome #1

1. Outcome Measures

Participants acquire knowledge and skills for practices that ensure economically viable food production.

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2014	600

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Cranberry Growers in Massachusetts struggle to remain economically competitive and environmentally sustainable. The additional pressure of marketing fruit for export (foreign) markets that mandate restrictive thresholds for pesticide residues present yet another challenge. Growers must understand the biology of cranberry pests to properly utilize new management tactics. Additionally, they must contend with increasing urban pressure on the farm's margin as many parties compete for resources.

What has been done
257 growers attended the Annual Management Update meeting as well as a separate meeting on pesticide safety attended by 83 people. We published 8 issues of the Cranberry Station newsletter, which was distributed to 284 recipients. We continued our research work on phosphorus use in cranberry systems and its impact on water quality into scientific presentations and papers. Work continues on the use of automated irrigation for frost protection and irrigation. We published 4 refereed papers, 7 fact sheets and 11 abstracts.

Results
Our 2014 meetings allowed 278 attendees to obtain 1046 contact hours towards pesticide re-certification. Based on survey data obtained at our 2014 Update Management meeting growers got new information and/or got information they will likely use on their farm in the following areas: phosphorus loss management during harvest, targeting herbicide applications, poison ivy and moss management, fruit rot, adjuvant technology, nutrient management, frost cycling, cranberry fruitworm management and pollination. The relevant topics for the responses are in parenthesis.

4. Associated Knowledge Areas

KA Code	Knowledge Area
205	Plant Management Systems
216	Integrated Pest Management Systems
601	Economics of Agricultural Production and Farm Management

Outcome #2

1. Outcome Measures

Participants adopt practices that ensure economically viable food production

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2014	600

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Fruit farms and vineyards provide open space and scenic vistas while the lands surrounding agricultural production provide buffer zones for native species of plants and animals and corridors for their movement or expansion. To remain a vital part of the Massachusetts economy, both new and established growers must learn to produce crops sustainably and to adapt production systems to market opportunities. Research on pest ecology and management informs approaches that optimize control and reduce chemical use.

What has been done
Thirty Research and Demonstration projects were carried out at the UMass Cold Spring Orchard and another three projects were conducted at a combined 25 cooperating grower sites. Outreach/Education activities included hosting and maintaining websites, producing publications (print and online), organizing and conducting day-long and multi-day conferences, delivering educational presentations and trainings, and one-on-one consultations with growers (by email, phone and in person).

Results

Fruit Growers adopted new methods, practices and technology to improve production efficiency and reduce preventable crop loss. These included high density planting, native pollinator conservation, soil health assessment, season extension, value-added production. Fruit Growers diversified their operations with new crops or products so as to guard against crop or market failures. These included Asian pears, wine or table grapes, frozen/processed products and wine.

4. Associated Knowledge Areas

KA Code	Knowledge Area
205	Plant Management Systems
216	Integrated Pest Management Systems
601	Economics of Agricultural Production and Farm Management

Outcome #3

1. Outcome Measures

Participants acquire knowledge and skills for practices that ensure the environmentally sustainable food production

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2014	3845

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

What has been done

Results

4. Associated Knowledge Areas

KA Code	Knowledge Area
205	Plant Management Systems
216	Integrated Pest Management Systems

Outcome #4

1. Outcome Measures

Participants adopt practices that ensure environmentally sustainable food production

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2014	3005

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Vegetable farming in Massachusetts and New England has remained vital in recent decades through constant and creative change: more direct marketing, diversification, selection of high value crops, and adoption of new technologies. The twenty thousand Massachusetts acres used to produce vegetables are a resource for food, open space, environmental quality, economic vitality, and quality of life. Vegetable farmers are essential to our national leadership role in wholesale local food distribution systems.

What has been done
We completed research trials for cucurbits and brassicas, generating reduced-risk management alternatives for growers. We continued our collaboration with NRCS regarding methods used to generate EQUIP contracts and IPM plans. We also continued our Commonwealth Quality program which now certifies fifty vegetable and fruit farms, and provides recognition and market access for products that are grown, harvested, and processed in Massachusetts, using practices that are safe, sustainable and don't harm the environment.

Results
Detailed records were kept for our collaborating partner farmers where we made hundreds of recommendations related to the implementation of environmentally sound management practices. About 80% of our recommended actions were taken by growers, either as recommended, or with some modification. About 81% of the recommendations that were implemented were judged by growers to have been ?moderately? or ?largely? successful. In addition surveys of growers revealed that 80% were able to reduce, limit, or change pesticide use; 75% were able to reduce or limit the damage or loss from diseases and pests; 71% were able to improve crop quality and

51% were able to improve crop yield.

4. Associated Knowledge Areas

KA Code	Knowledge Area
205	Plant Management Systems
216	Integrated Pest Management Systems

Outcome #5

1. Outcome Measures

Creation and synthesis of knowledge related to Global Food Security and Hunger

Not Reporting on this Outcome Measure

Outcome #6

1. Outcome Measures

Food production enterprises in Massachusetts are more robust, diverse and economically viable

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Condition Outcome Measure

3b. Quantitative Outcome

Year	Actual
2014	78

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

What has been done

Results

4. Associated Knowledge Areas

KA Code	Knowledge Area
102	Soil, Plant, Water, Nutrient Relationships
205	Plant Management Systems
211	Insects, Mites, and Other Arthropods Affecting Plants
212	Diseases and Nematodes Affecting Plants
216	Integrated Pest Management Systems
601	Economics of Agricultural Production and Farm Management

V(H). Planned Program (External Factors)

External factors which affected outcomes

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

Brief Explanation

V(I). Planned Program (Evaluation Studies)

Evaluation Results

Fruit Growers adopted new methods, practices and technology to improve production efficiency and reduce preventable crop loss. These included high density planting, native pollinator conservation, soil health assessment, season extension, value-added production. Fruit Growers diversified their operations with new crops or products so as to guard against crop or market failures. These included Asian pears, wine or table grapes, frozen/processed products and wine.
Our 2014 Cranberry outreach meetings allowed 278 attendees to obtain 1046 contact hours towards pesticide re-certification. Based on survey data obtained at our 2014 Update Management meeting growers got new information and/or got information they will likely use on their farm in the following areas: phosphorus loss management during harvest, targeting herbicide applications, poison ivy and moss management, fruit rot, adjuvant technology, nutrient management, frost cycling, cranberry fruitworm management and pollination. The relevant topics for the responses are in parenthesis. Detailed records were kept for our collaborating partner farmers where we made hundreds of recommendations related to the implementation of environmentally sound management practices. About 80% of our recommended actions were taken by growers, either as recommended, or with some modification. About 81% of the recommendations that were implemented were judged by growers to have been ?moderately? or ?largely? successful. In

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Key Items of Evaluation