

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
133	Pollution Prevention and Mitigation	20%		0%	
202	Plant Genetic Resources	0%		7%	
203	Plant Biological Efficiency and Abiotic Stresses Affecting Plants	0%		8%	
205	Plant Management Systems	6%		11%	
206	Basic Plant Biology	0%		6%	
211	Insects, Mites, and Other Arthropods Affecting Plants	0%		7%	
216	Integrated Pest Management Systems	9%		5%	
311	Animal Diseases	0%		13%	
402	Engineering Systems and Equipment	4%		0%	
501	New and Improved Food Processing Technologies	0%		5%	
601	Economics of Agricultural Production and Farm Management	29%		10%	
602	Business Management, Finance, and Taxation	14%		0%	
604	Marketing and Distribution Practices	3%		9%	
605	Natural Resource and Environmental Economics	3%		5%	
607	Consumer Economics	0%		9%	
711	Ensure Food Products Free of Harmful Chemicals, Including Residues from Agricultural and Other Sources	2%		0%	
712	Protect Food from Contamination by Pathogenic Microorganisms, Parasites, and Naturally Occurring Toxins	2%		0%	
723	Hazards to Human Health and Safety	8%		0%	
803	Sociological and Technological Change Affecting Individuals, Families, and Communities	0%		5%	
	Total	100%		100%	

V(C). Planned Program (Inputs)

1. Actual amount of FTE/SYs expended this Program

Year: 2012	Extension		Research	
	1862	1890	1862	1890
Plan	25.0	0.0	5.7	0.0

Actual Paid Professional	28.5	0.0	3.7	0.0
Actual Volunteer	8.1	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
903653	0	458542	0
1862 Matching	1890 Matching	1862 Matching	1890 Matching
1865939	0	700236	0
1862 All Other	1890 All Other	1862 All Other	1890 All Other
1971241	0	39471	0

V(D). Planned Program (Activity)

1. Brief description of the Activity

Project listed in bold followed by delivery methods:

- **Beginning Farmers.** Focus groups, learning circles, workshops, mini-courses and publications
- **Ag Business Management.** Conferences, courses, consultations and farm visits.
- **Agricultural safety.** Courses, consultations and farm visits
- **Engineering for food production, harvest, and storage.** Consultations, research and field visits.
- **Community Preparedness.** Workshops, discussion group
- **Dairy Management:** Consultation
- **Equine program.** Annual equine event, publications, workshops.
- **Farm and Forest Transfers.** Workshops, consultations, farm visits
- **Farm Viability.** Farm visits, consultations
- **Farming Alternatives.** Workshops, consultations, farm visits.
- **Farming Across Cultures:** Farm site visits
- **Food Production in Business:** Workshops, consultations, site visits
- **Forage and Pasture Management Education.** Conference, farm visits, consultations
- **GAP Good Agricultural Practices:** Presentations, consultations
- **Maple Program.** Conference, workshops, newsletter.
- **Nutrient Management Program.** Farm visits, consultations
- **Organic Grain Project.** Demonstrations, data gathering.
- **Pest Management Education.** IPM and Pesticide Education and Safety Program (PESP)
- **Private/Commercial Landowner and Industry Professional Education:** Tour and conference
- **Soil Health:** Demonstration, consultation
- **Sustainable Transportation Project:** certification, presentations, consultations
- **UVM Tax School.** conference, tax book
- **Vegetable and Berry Growers.** Consultations, farm visits, meetings, various media, presentations, website.
 - **Vermont New Farmer Network.** Conference, networking, consultations
 - **Vermont Pasture Network.** Pasture walks, demonstrations and trials, conference, consultations, various media.

- **Vermont Tourism and Recreation.** Research, conference.
- **Extension Master Gardener.** Course, train the trainer
- **Women's Agricultural Network.** Newsletters, website, classes, workshops, individual and small group consultations.

AES efforts.

- **Animal Manure Treatment Systems**
- **Evaluation sustainability of soil health through management of plant-parasitic nematodes; field trials, experiments being done**
 - **Study of consumer preference drivers for Vermont Artisan Cheese**
 - **Storm and Wastewater Management Systems**
 - **Perturbation of soil ecosystems by anthropomorphic interventions**
 - **Soil nutrient effect on forest ecosystem productivity and lake water quality**
 - **Soil fertility/chemistry/physical problems associated with waste disposal and bioremod faction**
 - **Economics of organic dairy, crop management and alternative energy**
 - **Heifer nutrition, rearing and management**
 - **Dairy nutritional immunology**
 - **Small ruminant production and management systems**
 - **Development of strategies to address applied equine issues**
 - **identification of genetic traits that make species invasive**
 - **Surveillance and prevention of spread of Asian Longhorned Beetle**
 - **Management of thrips pests in forests and greenhouses**
 - **Identification/control of fungal propagation**
 - **Fungal biological plant protection, collection and management**
 - **Explore microbial pesticides and fungal components as IPM strategies**
 - **Innate immunity, DNA-based vaccines and mastitis prevention**
 - **Hormonal regulation of glucose synthesis and milk production**
 - **Functional genomics and photoperiod effects on hormonal cycles/milk production**
 - **Explore ruminant lipid metabolism**
 - **Impact of global climate**
 - **Threat posed by foreign or exotic diseases on livestock in this country**
 - **Advance current techniques of producing lifesaving medicine with much reduced costs**
 - **Help to create new ways for sustainable agriculture**
 - **Identify a maple crop management system which optimizes productivity and that will enable maple producers to increase profitability of maple production operations**
 - **Develop indicators of food systems engagement and measure their impact on dietary choices.**

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E

2. Brief description of the target audience

- 4-H: Camp Counselors
- Adults
- Age 25 - Senior
- Agriculture/Natural Resources: Watershed Based Organizations
- Agriculture: Apple Growers
- Agriculture: Beef Producers
- Agriculture: CCA & Crop Consultants
- Agriculture: Crop Producers
- Agriculture: Dairy Producers
- Agriculture: Equine Producers/Owners
- Agriculture: Farm Employees
- Agriculture: Farm Families
- Agriculture: Farm Managers
- Agriculture: Farmers
- Agriculture: Goat & Sheep Producers
- Agriculture: Greenhouse Ornamental Growers
- Agriculture: Home Gardeners
- Agriculture: Industry Professionals
- Agriculture: Livestock producers
- Agriculture: Maple Industry
- Agriculture: Maple Sugar Producers
- Agriculture: Non-Dairy Producers
- Agriculture: Nursery operators
- Agriculture: Ornamentals Industry Professionals
- Agriculture: Service Providers
- Agriculture: Small Fruit & Vegetable Growers
- Agriculture: Veterinarians
- Agriculture: Dairy Goat, Meat Goat and Dairy Sheep Producers

3. How was eXtension used?

Leadership and expertise in CoPs.

V(E). Planned Program (Outputs)

1. Standard output measures

2012	Direct Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
Actual	24162	440000	260	0

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

Patent Applications Submitted

Year: 2012

Actual: 1

Patents listed

Plantation Maple Sap Collection

3. Publications (Standard General Output Measure)

Number of Peer Reviewed Publications

2012	Extension	Research	Total
Actual	6	16	22

V(F). State Defined Outputs

Output Target

Output #1

Output Measure

- Class/course

Year	Actual
2012	8

Output #2

Output Measure

- Conference

Year	Actual
2012	10

Output #3

Output Measure

- Consultation

Year	Actual
2012	2944

Output #4

Output Measure

- Consumer Publication

Year	Actual
2012	60

Output #5

Output Measure

- Demonstration

Year	Actual
2012	57

Output #6

Output Measure

- Discussion group

Year	Actual
2012	69

Output #7

Output Measure

- Educational/evaluation instrument
Not reporting on this Output for this Annual Report

Output #8

Output Measure

- Electronic Communication/phone

Year	Actual
2012	1068

Output #9

Output Measure

- Field day/fair

Year	Actual
2012	6

Output #10

Output Measure

- Field site visit

Year	Actual
2012	88

Output #11

Output Measure

- Funding request
Not reporting on this Output for this Annual Report

Output #12

Output Measure

- Presentation

Year	Actual
2012	162

Output #13

Output Measure

- Publication - Peer Reviewed

Year	Actual
2012	6

Output #14

Output Measure

- Publication - curriculum

Year	Actual
2012	1

Output #15

Output Measure

- Publication - fact sheet

Year	Actual
2012	34

Output #16

Output Measure

- Publication - magazine article

Year	Actual
2012	5

Output #17

Output Measure

- Publication - manual

Year	Actual
2012	3

Output #18

Output Measure

- Publication - newsletter

Year	Actual
2012	66

Output #19

Output Measure

- Publication - newsprint article

Year	Actual
2012	88

Output #20

Output Measure

- Research project

Year	Actual
2012	10

Output #21

Output Measure

- TV segment/ATF

Year	Actual
2012	23

Output #22

Output Measure

- Technical Publication
Not reporting on this Output for this Annual Report

Output #23

Output Measure

- Tour(s)

Year	Actual
2012	2

Output #24

Output Measure

- Train the Trainer trainings
Not reporting on this Output for this Annual Report

Output #25

Output Measure

- Website development and updates

Year	Actual
2012	178

Output #26

Output Measure

- Workshop - series

Year	Actual
2012	19

Output #27

Output Measure

- Workshop - single session

Year	Actual
2012	222

Output #28

Output Measure

- Scientific meetings
Not reporting on this Output for this Annual Report

Output #29

Output Measure

- Trainee Delivered programs

Year	Actual
2012	92

Output #30

Output Measure

- Survey instruments

Year	Actual
2012	3

V(G). State Defined Outcomes

V. State Defined Outcomes Table of Content

O. No.	OUTCOME NAME
1	Increase the number of farmers who implement at least one cropping practice to improve crop and soil productivity and water quality
2	Increase in collaboration with agency and industry personnel to address farm safety and emergency preparedness
3	Increase in number of tax school participants stating improved accuracy of tax reporting for their clients
4	Increase in number of tax schools participants understanding federal and state tax laws and requirements
5	Increase in number of farmers that develop a nutrient management plan for their farm
6	Increase the number of farmers who implement at least one change in nutrient management plan practices
7	Increase the number of legislators and key decision makers who increase understanding of current local agricultural issues
8	Increased delivery of organic dairy information to dairy farmers across the nation that is accessible, reliable, credible and up-to-date.
9	Increase in number of Master Gardener participants earning certification
10	increase in the number of farmers who improve pasture management practices
11	Number of enterprises (already using recommended practices)that use Extension consultation to assess/inform business decisions
12	Number of clientele who have adopted one or more IPM practices that increase environmental sustainability
13	Number of enterprises that adopt a recommended practice resulting in increased revenues and/or reduced costs
14	Participants will have gained knowledge on how to grow organic crops (e.g. apples, grains)
15	A greater variety of produce available at home.
16	Number of farms that plan for and incorporate biosecurity, safety and preventative measures
17	Farmers will implement safety measures, i.e., ROPS on tractors

18	Farmers who implement a new practice to begin production of or improve current oilseed production yield and quality
19	Growers adopting new varieties
20	Number of individuals who change their gardening practices to reduce gardening inputs
21	Number of participants who go on to start a business within 18 months of course completion
22	Number of participants who make an informed decision to not start a business after completing the course
23	Number of farmers who will grow and market soybeans for local feed, oil production or export market to increase farm income
24	Number of farmers who will grow and produce energy crops and transform into energy products
25	Number simulation models developed to protect the economic viability of livestock and tourism.
26	Number of research trials to manage insects in greenhouse ornamentals (plants).
27	Number of legislative actions taken based on research study data.
28	Number of maple producers who use a maple crop management system that optimizes productivity and increases profitability.
29	Number of food system indicators that measure impact on dietary choices
30	Number of research results which increase the understanding of a plants response to their environment.
31	Number passing the USDA GAPs audit to gain or maintain a market for their locally grown crop(s)
32	Number of growers growing organic crops increase revenues improving business sustainability

Outcome #1

1. Outcome Measures

Increase the number of farmers who implement at least one cropping practice to improve crop and soil productivity and water quality

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2012	51

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

The agriculture industry is critical to Vermont's economy but dairy farms are struggling because of high input costs and low and volatile milk prices. Regulations and farmers interest in protecting the environment push farmers to look for solutions that do not threaten business viability. A major expense for farmers is crop production.

What has been done

One Extension educational effort this year has focused on pre-sidedress nitrate tests (PSNT). Outreach has included newsletters, consultations, workshops and meetings in 9 counties reaching 328 farmers and industry professionals. Data is then collected to understand if the information is being used and the resulting impact on the business and the environment.

Results

One farm, used as a case study at four winter meetings in Vermont and New Hampshire, called Extension after reading an article about PSNT. He then tested 13 fields, followed the recommendations resulting in increased corn silage yield and savings on fertilizer costs. He estimates a savings of over \$30,000 and the environmental benefits are noteworthy. Over 300 farmers accessed information on PSNT with data collected to date showing 25 farmers are using PSNT. Effort will continue to understand the economic and environmental impact as the program matures.

4. Associated Knowledge Areas

KA Code	Knowledge Area
133	Pollution Prevention and Mitigation
601	Economics of Agricultural Production and Farm Management

Outcome #2

1. Outcome Measures

Increase in collaboration with agency and industry personnel to address farm safety and emergency preparedness

Not Reporting on this Outcome Measure

Outcome #3

1. Outcome Measures

Increase in number of tax school participants stating improved accuracy of tax reporting for their clients

Not Reporting on this Outcome Measure

Outcome #4

1. Outcome Measures

Increase in number of tax schools participants understanding federal and state tax laws and requirements

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2012	326

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

Tax laws change each year and can be very complex. Tax practitioners who are not enrolled agents or CPAs must pass the new IRS Registered Tax Practitioners (RTP) test. Anyone who sees a tax preparer needs to feel confident that they are being given the expertise necessary and having a certified tax practitioner is assuring.

What has been done

388 CPAs, attorneys, and tax practitioners attended the annual UVM Tax School this year. Highest rated topics are legislation, retirement and foreign taxation. Besides bringing in tax

experts as speakers, participants are given tools and materials to aid them in preparing tax forms. Certificates are given to those who pass the IRS RTP test, which the school prepares them for.

Results

Participants selected strongly agree or agree (94%) indicating the Tax School will improve accuracy when preparing tax forms. Participants were asked, how many hours in a tax season they estimated were saved by having the tools/book provided and the knowledge they gained at the tax school. Given hour ranges 50% chose <20 hours, 38% 20-40 hours, and 4% >70 hours. On average, tax practitioners charge \$75-100/hour. Training is saving time and money while providing an important, valued service to clients/citizens.

4. Associated Knowledge Areas

KA Code	Knowledge Area
602	Business Management, Finance, and Taxation

Outcome #5

1. Outcome Measures

Increase in number of farmers that develop a nutrient management plan for their farm

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2012	17

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

Many waters of the state are impaired from agricultural loss of nutrients and sediments. Impaired water reduces the quality for drinking, recreation, wildlife, and livestock. The reduced quality can impair human and ecosystem health. Impairment from agricultural runoff can be reduced through implementation of reduced tillage practices on farm fields.

What has been done

UVM Extension implemented a reduced tillage project in 2010 in 4 counties. This program allows farmers to use UVM owned equipment to "try" the practice at a low cost or the farmer can modify their own planter to be reduced tillage ready. Lastly, outreach and education is provided training farmers on how to use the equipment so they can try reduced tillage on their farm.

Results

The project has seen reduced tillage on 4500 acres. Based on current tillage costs this can translate into a cost savings of roughly \$44 per acre or \$200,000. It has significant impact on erosion rates with average reductions of 2 tons of soil loss per acre or 9000 tons of soil and its accompanying nutrients and sediments prevented from further impairing our waters. This program continues for farmers for corn, soybeans, and new seedings of perennial forage and cover crops.

4. Associated Knowledge Areas

KA Code	Knowledge Area
133	Pollution Prevention and Mitigation
601	Economics of Agricultural Production and Farm Management

Outcome #6

1. Outcome Measures

Increase the number of farmers who implement at least one change in nutrient management plan practices

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2012	130

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

Agricultural nutrient management planning (NMP) and implementation of the plan prevents water pollution, but some farmers have not adopted this process. Cost, time and lack of knowledge about a new practice can be barriers. Educational outreach, including working directly with farmers is very effective in helping farms implement NMPs.

What has been done

One faculty member has increased outreach programming, hired a team, with funding from USDA NRCS, VT Agency of Natural Resources and VT Agency of Agriculture as well as additional funding for Livestock Fencing and No-Till planting of crops to promote conservation practices with farmers. The team is working with farmers one-on-one, in classroom settings and via printed news releases and electronic mailings. Over 150 farmers attended workshops to update their farm nutrient plans or develop pasture and crop management plans for this year.

Results

The team worked with 130 farms in 2012 implementing conservation practices on 23,000 acres. Accomplishments include five miles of fence to exclude livestock from streams and \$96,000 of incentive payments resulting in 830 tons of soil saved. 11,000 acres have reduced phosphorous loss by as much as 30% by using aerator machines in manure application. 1200 acres were planted with cover crops conserving approximately 36,000 lbs of Nitrogen, 12,000 lbs of Phosphorous, and 60,000 lbs of Potassium as well as preventing almost 1,000 tons of soil erosion. With a skilled, energetic team of Extension professionals to support farmers, farmers continue to contribute to a vibrant Vermont economy while being good land stewards and protecting our water.

4. Associated Knowledge Areas

KA Code	Knowledge Area
133	Pollution Prevention and Mitigation
601	Economics of Agricultural Production and Farm Management

Outcome #7

1. Outcome Measures

Increase the number of legislators and key decision makers who increase understanding of current local agricultural issues

Not Reporting on this Outcome Measure

Outcome #8

1. Outcome Measures

Increased delivery of organic dairy information to dairy farmers across the nation that is accessible, reliable, credible and up-to-date.

Not Reporting on this Outcome Measure

Outcome #9

1. Outcome Measures

Increase in number of Master Gardener participants earning certification

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2012	248

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

Outcome #10

1. Outcome Measures

increase in the number of farmers who improve pasture management practices

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2012	6

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
601	Economics of Agricultural Production and Farm Management

Outcome #11

1. Outcome Measures

Number of enterprises (already using recommended practices) that use Extension consultation to assess/inform business decisions

Not Reporting on this Outcome Measure

Outcome #12

1. Outcome Measures

Number of clientele who have adopted one or more IPM practices that increase environmental sustainability

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2012	144

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

This program depends on a trained volunteer base to educate other Vermont gardeners in the value of Integrated Pest Management (IPM) practices. The intent of this course is to educate gardening enthusiasts about the importance of IPM practices to reduce or eliminate chemical usage from their gardening habits.

What has been done

The 2012 course trained 187 Vermonters in the basics of plant and soil science and best practices for applying the IPM method to their home and community gardens. Master Gardeners

man a Garden Helpline and complete volunteer hours for certification.

Results

Results from a yearly phone survey of a sampling of Vermonters who received gardening advice from the MG Garden Helpline regularly demonstrates that over 90% have implemented one or more IPM practices based on MG advice. Additionally, all MG project leaders reported that their projects had focused on IPM education and demonstration. These projects engaged 390 volunteers in education outreach to citizens statewide and accounted for over 13,000 volunteer hours devoted to the promotion of best IPM practices for home and community gardeners in Vermont.

4. Associated Knowledge Areas

KA Code	Knowledge Area
216	Integrated Pest Management Systems

Outcome #13

1. Outcome Measures

Number of enterprises that adopt a recommended practice resulting in increased revenues and/or reduced costs

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2012	708

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

Vermont's major industries are agriculture and tourism. Maple production, agro-tourism, and farming have narrow profit margins and many variables beyond control of the farm/business operator. A complicating factor for these industries is their potential for negatively impacting the water, air and soil. Staying informed of new and/or tested best practices that protect the environment while not threatening the business viability is critical to their and Vermont's economic health.

What has been done

2.7 Extension FTEs reported education and research activities focused on "individuals and business owners taking actions that improve their economic sustainability while minimizing their

impact on the environment." Efforts from base/grant funded faculty and staff have expanded the capacity and flexibility of UVM Extension to conduct programs that inform, demonstrate and evaluate best practices. Post event data was collected through survey, observation or interview.

Results

Staff reported 708 business owners adopting a recommended practice resulting in increased revenues and/or reduced costs. The range of Extension education, clients, and practices adopted is extensive. Reporting return on investment (ROI) can be challenging due to clients record keeping and comfort in reporting economic information. One faculty member evaluated ROI by using data from one client who is in the upper range of his time commitment. Using his salary, hours worked with the client, the clients reported financial benefit resulting from following his recommendations a returned an ROI of \$60 for each \$1 Extension invested. While every client does not experience this gain or Extension investment, even half, a \$30 ROI for each \$1 is significant. Efforts will continue to assist with best practices and evaluate for ROI.

4. Associated Knowledge Areas

KA Code	Knowledge Area
601	Economics of Agricultural Production and Farm Management
602	Business Management, Finance, and Taxation

Outcome #14

1. Outcome Measures

Participants will have gained knowledge on how to grow organic crops (e.g. apples, grains)

Not Reporting on this Outcome Measure

Outcome #15

1. Outcome Measures

A greater variety of produce available at home.

Not Reporting on this Outcome Measure

Outcome #16

1. Outcome Measures

Number of farms that plan for and incorporate biosecurity, safety and preventative measures

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2012	56

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

Farmers are eight times more likely to die on the job than the average worker. The leading cause of their death is the tractor roll over. Seven of 10 farms where a fatal tractor roll over occurs are out of business within a year. Roll-Over Protective Structures (ROPS=Roll bar and seat belt kit) provide 99% protection to tractor drivers in the event of a tractor rollover, but studies show that farmers are reluctant to install ROPS due to money and the time it takes to find roll bars for their tractor. It is estimated that half of Vermont tractors do not have rollover protective structures.

What has been done

The Vermont ROPS Program launched a campaign in September 2010 to provide rebates and an informational hotline to Vermont tractor owners wishing to protect themselves by installing ROPS on their tractors. To fund rebates to tractor owners for ROPS, the Vermont ROPS Program raised cash from 24 separate corporate and non-profit donors and with additional financial commitment supported installation of roll over protective structures on tractors for fifty-six Vermont tractor owners in FY 2012. A total of 105 tractors have now been retrofitted in the first two years of the program.

Results

Studies show that one fatal rollover costs the family and society \$910,000. In NY, 10 out of 400 farmers surveyed, who installed ROPS in the past 6 years subsequently had rollovers that would have been fatal. Using the same ratio in Vermont, the 105 tractor owners who installed ROPS in VT prevented two tragic deaths and saved nearly two million dollars. An investment of \$660 UVM Extension's Vermont Rebates for Roll Bars Program per ROPS prevents a tremendous amount of suffering and loss, financial and other.

4. Associated Knowledge Areas

KA Code	Knowledge Area
602	Business Management, Finance, and Taxation

Outcome #17

1. Outcome Measures

Farmers will implement safety measures, i.e., ROPS on tractors

Not Reporting on this Outcome Measure

Outcome #18

1. Outcome Measures

Farmers who implement a new practice to begin production of or improve current oilseed production yield and quality

Not Reporting on this Outcome Measure

Outcome #19

1. Outcome Measures

Growers adopting new varieties

Not Reporting on this Outcome Measure

Outcome #20

1. Outcome Measures

Number of individuals who change their gardening practices to reduce gardening inputs

Not Reporting on this Outcome Measure

Outcome #21

1. Outcome Measures

Number of participants who go on to start a business within 18 months of course completion

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2012	160

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

Vermont is enjoying a resurgence of interest in farming and we have strong consumer support for locally produced farm goods. Despite the resurgence, research has documented serious obstacles for new farmers and Vermont's farming population is "graying." Success of new farmers is imperative for growing the agricultural sector. Agriculture and tourism are critical to the state's economic health.

What has been done

UVM Extension in collaboration with other nonprofit organizations, state and federal agencies is working to provide a new farmer training and education that accelerates new farm establishment, improves decision-making skills related to scope and scale of the farm business, and helps post-startup new farmers increase farm profitability and farm family income. Growing Places is an 18-hour class designed to assist aspiring and start-up farmers determine if agriculture is a feasible option for them.

Results

Almost 400 individuals have completed the class since 1995, and follow-up evaluations indicate that approximately 40% of graduates start a farm business within 24 months. According to the 2007 Census of Agriculture the average farm sales in Vermont is over \$96,000. Using this data, this program is securing over \$850,000 annually adding to the state's economy, providing access to local food, preserving a way of life, and a landscape that is important to tourists and Vermonters.

4. Associated Knowledge Areas

KA Code	Knowledge Area
601	Economics of Agricultural Production and Farm Management
602	Business Management, Finance, and Taxation

Outcome #22

1. Outcome Measures

Number of participants who make an informed decision to not start a business after completing the course

Not Reporting on this Outcome Measure

Outcome #23

1. Outcome Measures

Number of farmers who will grow and market soybeans for local feed, oil production or export market to increase farm income

Not Reporting on this Outcome Measure

Outcome #24

1. Outcome Measures

Number of farmers who will grow and produce energy crops and transform into energy products

Not Reporting on this Outcome Measure

Outcome #25

1. Outcome Measures

Number simulation models developed to protect the economic viability of livestock and tourism.

2. Associated Institution Types

- 1862 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2012	1

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

Milk price fluctuations pose an obvious threat to the sustainability of the dairy industry in Vermont and nationwide; less obvious is the threat posed by foreign or exotic diseases that persist in other parts of the world and could accidentally or intentionally infect livestock in this country, resulting in the devastation of agricultural communities. Knowledge of baseline Vermont-specific contact rates among farms and how these might change in the face of a highly contagious disease epidemic can inform more accurate modeling of the potential spread of disease and effectiveness of control measures.

What has been done

Rates from this model are being utilized in a simulation of disease spread in New England using the North American Animal Disease Spread Models. A survey instrument to characterize the rate of direct and indirect contacts among dairy farms was developed and distributed to Vermont dairy farmers. From this model a manuscript is in preparation. Data has been presented in a poster at the American Association of Bovine Practitioners and to the New England States Agricultural Animal Security Alliance.

Results

As a result of this project, a study is being utilized in a simulation of disease spread in New England using the North American Animal Disease Spread Model. Simulations can support preparedness activities by state animal health authorities and industry stakeholders.

4. Associated Knowledge Areas

KA Code	Knowledge Area
311	Animal Diseases

Outcome #26

1. Outcome Measures

Number of research trials to manage insects in greenhouse ornamentals (plants).

2. Associated Institution Types

- 1862 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2012	1

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

The greenhouse industry is a vital and dynamic component of New England's changing agricultural economy. Pest control strategies are heavily reliant on chemical pesticides, a situation that is neither sustainable nor desirable, and novel approaches that increase opportunities to utilize biological controls are badly needed. This project seeks to generate information and novel technologies that will provide growers with the tools they need to increase their use of natural enemies, and enhance the activity of biological and reduced-risk pesticides.

What has been done

Marigolds are highly attractive to thrips and can be used for early detection and because they produce pollen can serve as habitat for mites by providing an alternative food source. Six treatments were tested in caged trials. The goal of the experiment was to see what plants attract mites and thrips. As a result of this project, a publication on plant protection was written.

Results

The results were found that at all locations, there was more damage on the marigolds than on the crops. On many occasions, marigolds had ratings exceeding 50 percent foliar damage whereas nearby crop plants had less than 10 percent damage. When averaged over the entire experimental period, in general more thrips were found on marigolds with no mites or fungal treatment than on those treated with mites and/or fungi. Two of the five sites had very low overall numbers of thrips making it difficult to make conclusions on treatment efficacy. Thrips numbers increased rapidly on some of the marigolds without the fungal or mite treatments and had to be removed 2-4 wks before the end of the experiment to avoid reinfesting the crop. On these plants foliar damage of over 75 percent was observed. No significant differences in the number of thrips on marigolds with or without the lures.

4. Associated Knowledge Areas

KA Code	Knowledge Area
211	Insects, Mites, and Other Arthropods Affecting Plants

Outcome #27

1. Outcome Measures

Number of legislative actions taken based on research study data.

2. Associated Institution Types

- 1862 Research

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2012	1

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

In the past decade Hispanic workers have arrived in Vermont and become a significant portion of the Vermont dairy labor force. Concerns about the health of migrant workers in Vermont entered the public consciousness in 2009 when a Mexican worker was killed on a dairy farm. Concerns about how Vermont's Hispanic migrants have been faring have been brought to the attention of farmer's and Vermont legislators.

What has been done

Existing data and key informant interviews with health care providers was collected and analyzed to better understand the trends and issues faced by health care providers in their efforts to service the Hispanic farmworker. Interview questions were designed from the scientist's research. The make-up of participants includes farmers, farmworkers, migrant service agencies and advocacy organizations. The scientist provided testimony to the Vermont House Agricultural results were reported. As a result, Vermont state legislators approved a bill establishing a study committee on migrant labor.

Results

Statewide survey found support for migrant dairy labor remains strong and awareness is high. In 2012 65% of respondents said they had personally spoke with a farmer or family member and 86% said they agreed that undocumented workers help Vermont farms stay in business. 72% said they favored the adoption of bias free policies in Vermont. 83% favored development of a 3-year guest worker program.

4. Associated Knowledge Areas

KA Code	Knowledge Area
803	Sociological and Technological Change Affecting Individuals, Families, and Communities

Outcome #28

1. Outcome Measures

Number of maple producers who use a maple crop management system that optimizes productivity and increases profitability.

Not Reporting on this Outcome Measure

Outcome #29

1. Outcome Measures

Number of food system indicators that measure impact on dietary choices

Not Reporting on this Outcome Measure

Outcome #30

1. Outcome Measures

Number of research results which increase the understanding of a plants response to their environment.

2. Associated Institution Types

- 1862 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2012	1

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

Plants are rooted to one spot for their entire life. In order to survive, plants must sense even the smallest environmental change, and respond rapidly, changing their physiology and modifying further development. Cold, drought, high light, UV, high salt, wounding, pathogen attack and heavy metals are all environmental stresses. Understanding what triggers plants development would benefit farmers, plant biologists, and consumers.

What has been done

The scientist studied the production of reactive oxygen species (ROS) in response to environmental stresses. The project focuses on the role of the heme oxygenase enzyme and the hormone abscisic acid in the production of ROS and the response to ROS signals during root growth. Scientists have presented this work at scientific meetings.

Results

The scientists have found that the heme oxygenase gene alters the expression of certain enzymes that are required for oxidative stress signaling. This research helps to extend the understanding of how reactive oxygen molecules signal during normal development.

4. Associated Knowledge Areas

KA Code	Knowledge Area
203	Plant Biological Efficiency and Abiotic Stresses Affecting Plants
206	Basic Plant Biology

Outcome #31

1. Outcome Measures

Number passing the USDA GAPs audit to gain or maintain a market for their locally grown crop(s)

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2012	19

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

What has been done

Results

4. Associated Knowledge Areas

KA Code	Knowledge Area
604	Marketing and Distribution Practices
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 #32

1. Outcome Measures

Number of growers growing organic crops increase revenues improving business sustainability

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2012	66

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

What has been done

Results

4. Associated Knowledge Areas

KA Code	Knowledge Area
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

Brief Explanation

V(I). Planned Program (Evaluation Studies)

Evaluation Results

Outcome measures in this report outline mid-level changes occurring due to the latest research and education in the field. Staff are employing varying techniques to gather data post-event to determine changes made and the impact of those changes on the business viability, value and goals of the individuals.

Narratives with the outcome measures highlight some of those results and explain the value of those changes.

Stakeholder input continues to inform program efforts direction and content, format and accessibility.

Key Items of Evaluation