2011 University of Vermont Combined Research and Extension Annual Report of Accomplishments and Results

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I. Report Overview

1. Executive Summary

Each year, different programs complete evaluations that point to the impact of their efforts. Each year, another sector of the economy, a new community or new member of 4-H benefit from participating in Extension educational programs that help people make better decisions based upon the research of Land Grant Universities. The 150th year of LGU's combined with nearly the same number of years of outreach, before and after the Cooperative Extension System was created in 1914, has had a profound impact on both the economic and social fabric of this nation. Whether it is improving agricultural production that is noted in this report during 2011, or for helping increase agricultural production to unprecedented levels over the past several decades, the AES and the CES have joined forces to aid the development of America. The research and the outreach results described in this report are but a short list of the work on-going each day that has impact on this nation. From the development of new leaders from 4-H programming, to helping adults become leaders in their communities, to becoming volunteers with knowledge imparted by the Master Gardener program, the research and outreach of the Land Grant Universities, including UVM, make continuing contributions to the strength of our individual state economies and communities.

Though our efforts, that of VT-AES and Extension, are divided in planned programs our efforts are integrated to best serve our citizens. Multidiciplinary work and integration of our research and outreach sometimes falls in different planned programs. For example in the planned program AES Food Safety research results are taken by Extension to producers, reported to planned program Global Food, to enhance their business viability protecting the agriculture base.

Each year we also report our accomplishments to our state legislature and that annual report can be found on line at: http://www.uvm.edu/extension/annualreport

Total Actual Amount of professional FTEs/SYs for this State

Year: 2011	Extension		Research	
	1862	1890	1862	1890
Plan	53.0	0.0	15.6	0.0
Actual	62.0	0.0	11.2	0.0

II. Merit Review Process

1. The Merit Review Process that was Employed for this year

- External University Panel
- Expert Peer Review

2. Brief Explanation

There is a cooperative agreement with the four states Vermont, Maine, New Hampshire, and Massachusetts to rotate a merit review process. Vermont is due in 2014.

III. Stakeholder Input

1. Actions taken to seek stakeholder input that encouraged their participation

- Use of media to announce public meetings and listening sessions
- Targeted invitation to traditional stakeholder groups
- Targeted invitation to traditional stakeholder individuals
- Targeted invitation to selected individuals from general public
- Survey of the general public
- Other (see narrative for details)

Brief explanation.

Nearly all program efforts ask participants if the programming meets their expectations and asks them for input to be considered for future programming. Program structure and focus as well as delivery methods are considered for future programming including future research. Collaborations are initiatied based on clients identified needs such as the Migrant Education program client workers who are challenged with recieving appropriate health care now have the UVM School of Medicine NOTCH program. Challenges with accessing food and food choices due to a lack of transportation identified a need so one county began a garden project for workers and their families to grow their own produce. In nutrition programming schools expressed a need for nutrition programs in schools so two Americorp were brought in to meet that need.

Partnerships with communities, public and private organizations and busesses are important partners in reaching and serving clients with appropriate programming. These relationships remain a critical part of identifying needs and gaps for programming.

2(A). A brief statement of the process that was used by the recipient institution to identify individuals and groups stakeholders and to collect input from them

1. Method to identify individuals and groups

- Use Advisory Committees
- Use Internal Focus Groups
- Use External Focus Groups
- Use Surveys

Brief explanation.

Vermont has a population of under 600,000 adults. A statistically viable sample of the public is done most years asking questions of importance. The over 1000 events each year provide opportunity for feedback on evaluations. Some programs also use specific focus groups and advisors.

2(B). A brief statement of the process that was used by the recipient institution to identify individuals and groups who are stakeholders and to collect input from them

1. Methods for collecting Stakeholder Input

- Meeting with traditional Stakeholder groups
- Survey of traditional Stakeholder groups
- Meeting with traditional Stakeholder individuals
- Survey of traditional Stakeholder individuals
- Survey of the general public
- Meeting specifically with non-traditional groups
- Survey specifically with non-traditional groups
- Meeting specifically with non-traditional individuals
- Survey specifically with non-traditional individuals
- Meeting with invited selected individuals from the general public
- Survey of selected individuals from the general public

Brief explanation.

Vermont has a population of under 600,000 adults. A statistically viable sample of the public is done most years asking questions of importance. The over 1000 events each year provide opportunity for feedback on evaluations. Some programs also use specific focus groups and advisors.

3. A statement of how the input will be considered

- In the Budget Process
- To Identify Emerging Issues
- Redirect Extension Programs
- Redirect Research Programs
- In the Staff Hiring Process
- In the Action Plans
- To Set Priorities

Brief explanation.

As a small state close to its citizens at all levels, collected data is used to refine, remove or create new educational programs that will serve the needs of the state.

Brief Explanation of what you learned from your Stakeholders

Increase support for local food systems research and extension.

Importance of formula funds in supporting infrastructure to support communities in disasters.

IV. Expenditure Summary

1. Total Actual Formula dollars Allocated (prepopulated from C-REEMS)			
Extension		Research	
Smith-Lever 3b & 3c	1890 Extension	Hatch	Evans-Allen
1789094	0	1825801	0

2. Totaled Actual dollars from Planned Programs Inputs				
	Extension		Research	
	Smith-Lever 3b & 3c	1890 Extension	Hatch	Evans-Allen
Actual Formula	2501998	0	1438373	0
Actual Matching	4304488	0	2118997	0
Actual All Other	2122187	0	250667	0
Total Actual Expended	8928673	0	3808037	0

3. Amount of Above Actual Formula Dollars Expended which comes from Carryover funds from previous				
Carryover	0	0	0	0

V. Planned Program Table of Content

V(A). Planned Program (Summary)

Program # 1

1. Name of the Planned Program

Childhood Obesity

V(B). Program Knowledge Area(s)

1. Program Knowledge Areas and Percentage

KA Code	Knowledge Area	%1862 Extension	%1890 Extension	%1862 Research	%1890 Research
501	New and Improved Food Processing Technologies	0%		6%	
607	Consumer Economics	0%		4%	
609	Economic Theory and Methods	0%		3%	
701	Nutrient Composition of Food	0%		6%	
703	Nutrition Education and Behavior	90%		20%	
704	Nutrition and Hunger in the Population	10%		4%	
724	Healthy Lifestyle	0%		57%	
	Total	100%		100%	

V(C). Planned Program (Inputs)

1. Actual amount of FTE/SYs expended this Program

Year: 2011	Extension		Research	
	1862	1890	1862	1890
Plan	2.2	0.0	0.9	0.0
Actual Paid Professional	1.4	0.0	4.1	0.0
Actual Volunteer	0.1	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**
66762	0	103220	0
1862 Matching	**1890 Matching**	**1862 Matching**	**1890 Matching**
114858	0	224425	0
1862 All Other	**1890 All Other**	**1862 All Other**	**1890 All Other**
7168	0	31477	0

V(D). Planned Program (Activity)

1. Brief description of the Activity

Diabetes Education: Workshop series, single session workshops, fact sheets, newsletter

Food, Culture, and Reading - a 1-3 hour train-the-trainer session for volunteers/teachers to implement the 6 lesson curriculum for pre-kindergarten through grade 2.

Healthy Eating: - Nutrition classes designed for a wide range of people, with an emphasis on national dietary guidance. Participants learn the latest information about how to choose a healthy diet, practice food safety and to incorporate physical activity into their day. Classes range from one to six sessions, with the topics tailored for the group requesting the program.

2. Brief description of the target audience

- Adults
- Age 25 - 60 Adult
- Age: 1 - 5 Pre-School
- Communities: Local Officials/Leaders
- Extension: Faculty/Staff
- Public: 6-12 (Children)
- Public: College Students
- Public: Families
- Public: General

3. How was eXtension used?

Our nutrition and food specialist has visited the Families, Food, and Fitness Community of Practice many times searching for research-based, peer-reviewed nutrition information to help clients and also when developing lesson plans for Healthy Eating workshops. They have used articles and quick and healthy recipes from the site.

V(E). Planned Program (Outputs)

1. Standard output measures

2011	Direct Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
Actual	645	3100	440	0

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

Patent Applications Submitted

Year: 2011

Actual: 0

Patents listed

3. Publications (Standard General Output Measure)

Number of Peer Reviewed Publications

2011	Extension	Research	Total
Actual	0	6	6

V(F). State Defined Outputs

Output Target

Output #1

Output Measure

- Conference

Not reporting on this Output for this Annual Report

Output #2

Output Measure

- Consultation

Year	Actual
2011	90

Output #3

Output Measure

- Consumer Publication

Year	Actual
2011	2

Output #4

Output Measure

- Curriculum

Not reporting on this Output for this Annual Report

Output #5

Output Measure

- Fact Sheets

Year	Actual
2011	1

Output #6

Output Measure

- Publication - Newprint

Year	Actual
2011	42

Output #7

Output Measure

- Train the trainer program
  Not reporting on this Output for this Annual Report

Output #8

Output Measure

- Workshop Series

Year	Actual
2011	30

Output #9

Output Measure

- Workshop - single session
  Not reporting on this Output for this Annual Report

Output #10

Output Measure

- TV segment/Across the Fence Program

Year	Actual
2011	3

Output #11

Output Measure

- Videos produced

Year	Actual
2011	9

V(G). State Defined Outcomes

V. State Defined Outcomes Table of Content

O. No.	OUTCOME NAME
1	Number of people who develop a plan to improve dietary practices
2	Number of people who expand or change their preferences for or attitudes about healthy foods
3	Number of people who have an increased preference for at least one fruit or vegetable.
4	Number of youth or adults who self report an increase in mastery of the life skills Healthy Lifestyle Choices and Decision Making.
5	Number the people that show an improvement in healthful eating practices
6	Evaluating the acceptance of reformulated of reformulated flavored milk in schools
7	Burn and earn: Incentivizing physical activity in college freshman
8	Prebiotics and probiotics can be used as bioactive components for developing functional foods due to their health promoting functions.

Outcome #1

1. **Outcome Measures**

Number of people who develop a plan to improve dietary practices

Not Reporting on this Outcome Measure

Outcome #2

1. **Outcome Measures**

Number of people who expand or change their preferences for or attitudes about healthy foods

Not Reporting on this Outcome Measure

Outcome #3

1. **Outcome Measures**

Number of people who have an increased preference for at least one fruit or vegetable.

Not Reporting on this Outcome Measure

Outcome #4

1. **Outcome Measures**

Number of youth or adults who self report an increase in mastery of the life skills Healthy Lifestyle Choices and Decision Making.

2. **Associated Institution Types**

- 1862 Extension

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2011	67

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

What has been done

Results

4. Associated Knowledge Areas

KA Code	Knowledge Area
703	Nutrition Education and Behavior

Outcome #5

1. Outcome Measures

Number the people that show an improvement in healthful eating practices

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2011	6304

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Obesity rates are rising. Vermont youth and older adults, especially lower income, do not meet dietary guidelines related to consumption of fruits and vegetables thus increasing their risks for chronic disease. Those with chronic health conditions such as diabetes must balance diet, activity and medications to maintain health.

What has been done
Specific programming was targeted, delivered, and evaluated for each audience. Almost 1000 low income seniors and disabled adults were provided fresh produce and recipe cards for an average of 9 weeks. Preschool to grade 2 youth, over 6000, participated in a national nutrition curriculum Food, Culture and Reading (FCR) and the educators using FCR participated in a post program survey. Diabetes education was delivered via 11 Vermont interactive Television sites and expanded to caregivers.

Results
At the end-of-season 68% of the participating seniors indicated that the program helped them to eat the recommended amounts of fruits and vegetables and 72% said it helped them stay healthy. The FCR survey showed that 99% of the youth would try new foods and 88% would select a

healthy food if given the choice. At the 6 month post Diabetes education classes, 19 of the 19 indicators showed significant positive change. Adopting healthier lifestyles reduces health care costs. Every $1 invested in outpatient education can cut health care costs by up to $8.76.

4. Associated Knowledge Areas

KA Code	Knowledge Area
703	Nutrition Education and Behavior
704	Nutrition and Hunger in the Population

Outcome #6

1. Outcome Measures

Evaluating the acceptance of reformulated of reformulated flavored milk in schools

2. Associated Institution Types

- 1862 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2011	25

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
The project evaluates how children accept flavored milk reformulated to meet the Alliance for a Healthier Generation (AHG) standard of no more than 150 calories per serving.

What has been done
Used milk sales as a proxy for milk consumption and National School Lunch Program (NSLP) participation rates as a proxy measure for school children's acceptance of the schools' meal programs, a sample of Northeastern and Southeastern schools offering reformulated lower calorie flavored milk are identified along with the milk processors supplying those schools.

Results
The plate waste portion of the study found no significant differences in consumption, however the flavored milks meeting the AHG standards, did not meet the current USDA proposed rule. Additionally, while there was a decline in NSLP participation rates when lower calorie milks were introduced, there was significant recovery over time. These findings have led to an additional project to follow a number of school districts in the northeast and southern regions of the country, representing a racially diverse group of students, as well as the two pilot schools in Vermont, as they come into compliance with the USDA proposed rule and IOM competitive beverage

recommendations.

4. Associated Knowledge Areas

KA Code	Knowledge Area
703	Nutrition Education and Behavior

Outcome #7

1. Outcome Measures

Burn and earn: Incentivizing physical activity in college freshman

2. Associated Institution Types

- 1862 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2011	100

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Physical activity has been identified as an important behavior to help prevent the development of overweight/obesity and associated conditions including diabetes, cardiovascular disease, and metabolic syndrome.

What has been done
One hundred and seventeen students are randomized to one of three groups: continued-incentives, discontinued-incentives, or control. For 12 weeks during the fall semester the continued-incentive and discontinued-incentive groups received weekly incentives for using the university fitness center.

Results

4. Associated Knowledge Areas

KA Code	Knowledge Area
724	Healthy Lifestyle

Outcome #8

1. Outcome Measures

Prebiotics and probiotics can be used as bioactive components for developing functional foods due to their health promoting functions.

2. Associated Institution Types

- 1862 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2011	1000

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Lactic acid bacteria (LAB) are the most common type of microbes used as probiotics. They have been used in the food industry for many years. However, these beneficial organisms often encounter many harsh conditions such as acid, alkali, heat and salt stresses during food processing.

What has been done
This project developed a new practical technology using polymerized whey protein based microcapsulation to improve survivability of probiotic lactobacilli in food systems.

Results
The results showed that this whey protein based microencapsulation technology is an effective and economical method compared with polysacchride based method to improve the quality of fermented dairy foods. Because of whey is a by product of cheese making, this new technology may be further to benefit the well being of consumers, the dairy industry, and protect the environment of the state of Vermont and beyond.

4. Associated Knowledge Areas

KA Code	Knowledge Area
501	New and Improved Food Processing Technologies
701	Nutrient Composition of Food

V(H). Planned Program (External Factors)

External factors which affected outcomes

- Economy

Brief Explanation

V(I). Planned Program (Evaluation Studies)

Evaluation Results

Food, Culture, and Reading (FCR)

After administering a national survey to educators who purchased **Food, Culture, and Reading (FCR)**, a preschool through grade 2 nutrition education program, the following results occurred: over 6000 children have participated in the program, 90% read the featured storybook, 100% completed the MyPyramid nutrition activity, 80% made a snack, 60% used the student activity worksheet, and 88% sent home the parent newsletters. 89% of youth were more willing to eat fruits and vegetables, 99% were willing to try new foods, and 88% could select a healthy food if given a choice. Objectives of the program were met. Children can recognize a variety of healthful foods within each food group, taste new foods from other cultures, and explore the similarities of foods from cultures different form their own**.** One educator stated, "Each year for the past four years of teaching FCR, we assess the effectiveness of FCR through conducting pre/post tests. Our post test has shown significant signs of improved knowledge from our students and many success stories have been written and teacher observations regarding positive behavior changes." Another respondent stated, "First and second grade classes chose to incorporate healthy foods that they had taste testing during their FCR nutrition lessons in their classroom holiday celebrations. They requested to make fruit kebobs, rice cake faces, bananas-in-a-blanket, and vegetables and low-fat cheese fun-do dip as party snacks eschewing the previous requests for sweets such as doughnuts, cookies, cupcakes, and soda."

In a future evaluation, a parent survey should be administered to see if children who participated in the program and brought home the Food, Culture, and Reading Parent newsletters, showed a change in trying new foods, requested foods from other cultures, and created recipes that were included or made during class presentations. A challenge would be collecting the information from the parents.

Senior Farm Share

Of the 448 participants who responded to our end-of-season survey, 32% indicated that the program helped them to manage a chronic condition, 66% said the program helped them to manage their food budget, 68% indicated that the program helped them to eat the recommended amount of fruits and vegetables, and 72% said that the program helped them to stay healthy. Given that the primary goal of this program is to increase consumption of fruits and vegetables, these results indicate that the program was successful in achieving this goal for many participants. However, given the way the question was framed ("As a result of Senior Farm Share, are you better able to eat the recommended amount of fruits

and/or vegetables?"), it is unclear whether older adults actually achieved the fruit and vegetable consumption goals as recommended in the Dietary Guidelines for Americans, or were more able to make progress towards meeting the goals.

These results were obtained through an end-of-season written survey that was distributed to all Senior Farm Share participants after the program was over. Approximately 50% of program participants returned the survey. On the survey, participants were asked to check all of the ways that they believed Senior Farm Share had been of benefit to them. Each of the categories listed above was provided as an option. In prior years, program participants were given a pre and post survey to assess food security and dietary change. Housing site coordinators have indicated that completing this paperwork is quite burdensome for older adults. Consequently, we decided to limit the survey to a post survey since we had data from previous years showing changes. Our response rate was much higher during the 2010 season indicating that this method of using just one survey was likely preferable to older adults.

Farm to School

A written survey was conducted with 632 school children aged 9-13 in 12 Vermont schools that have **Farm to School program**s to better understand the relationship between various environmental, personal and behavioral factors and the student's reported consumption of fruits and vegetables. The purpose of this work was to identify what factors showed the strongest correlation to adequate consumption of fruits and vegetables so that future Farm to School efforts could successfully target these factors.

It is our hope that the results of this research will provide Farm to School practitioners with better ideas about how to improve fruit and vegetable consumption in school children. For example, the research suggests that encouraging children to try new fruits and vegetables and building their confidence about their ability to do so could improve children's chance of meeting the Dietary Guidelines for Americans in relation to produce consumption. Parental modeling and positive facilitation of their children's eating behaviors related to fruits and vegetables also appears to be relevant.

Key Items of Evaluation

After administering a national survey to educators who purchased **Food, Culture, and Reading (FCR)**, a preschool through grade 2 nutrition education program, the following results occurred: over 6000 children have participated in the program,

- 89% of youth were more willing to eat fruits and vegetables,
- 99% were willing to try new foods, and
- 88% could select a healthy food if given a choice

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V(A). Planned Program (Summary)

Program # 2

1. Name of the Planned Program

Community Development and the Personal and Intellectual Development of Youth and Adults

V(B). Program Knowledge Area(s)

1. Program Knowledge Areas and Percentage

KA Code	Knowledge Area	%1862 Extension	%1890 Extension	%1862 Research	%1890 Research
124	Urban Forestry	4%		0%	
608	Community Resource Planning and Development	17%		0%	
723	Hazards to Human Health and Safety	7%		0%	
802	Human Development and Family Well-Being	10%		0%	
805	Community Institutions, Health, and Social Services	18%		0%	
806	Youth Development	44%		0%	
	Total	100%		0%	

V(C). Planned Program (Inputs)

1. Actual amount of FTE/SYs expended this Program

Year: 2011	Extension		Research	
	1862	1890	1862	1890
Plan	26.3	0.0	0.0	0.0
Actual Paid Professional	28.4	0.0	0.0	0.0
Actual Volunteer	1.1	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
841673	0	0	0
1862 Matching	**1890 Matching**	**1862 Matching**	**1890 Matching**
1448031	0	0	0
1862 All Other	**1890 All Other**	**1862 All Other**	**1890 All Other**
599355	0	0	0

V(D). Planned Program (Activity)

1. Brief description of the Activity

•4-H Positive Youth Development Program: Help youth acquire Life Skills in the following areas: Decision Making; Critical Thinking; Problem-Solving; Communication; Goal-Setting; and Skills for Everyday Living to succeed as adults. Delivery Methods: 6-8 sequential learning hours using experiential learning techniques for in- school, afterschool, or out-of-school settings.

Operation Military Kids (OMK) exists to educate Vermont communities on the unique experiences and challenges of military life and its impact on families, while providing positive opportunities for youth. Ready, Set, Go! Operation: Military Kids Vermont OMK-VT aims to establish community partnerships that will connect and educate people by: Creating community support, delivering opportunities to youth and families, supporting military kids, collaborating with community partners, educating the public, including the education community, and incorporating military families into existing community resources.

•S.E.T. Activities: 4-H SET will begin to show how science and engineering issues affect youths' lives and prepare a future generation of scientists and engineers. The 4-H SET program will present 4-H with a new opportunity to connect to the LGU's SET research community and integrate with current youth workforce development initiatives.

•Market Analysis, needs Assessment and Strategic Planning: This program provides the community with analytical techniques that can be put to work immediately in economic revitalization efforts. The process requires input from local residents so that recommendations reflect both market conditions as well as the preferences of the community. Delivery Methods: Group meetings and discussion groups in community.

•Community Leadership: Assessing, addressing and expanding community capacity through leadership and public policy education efforts including building--and education members and clientele of--coalitions and collaboratives.

•Coping with Separation and Divorce (COPE): Parent education for parents of minor children who have filed for separation, divorce, dissolving of a civil union, parentage, changes in rights and responsibilities concerning their children. This is a court mandated program.

•Migrant Education Recruitment Program (MEP): To ensure that children of migrant farm workers, and qualifying youth under age 22, are aware of the educational support services available to them. ESL services have been added to the delivery of the program. Delivery Methods: Outreach to schools, agricultural employers, and social service agencies throughout the state.

•Vermont AgrAbility Project: To make recommendations that can be used by farmers with disabilities to maintain employment, through development of accommodations. Delivery Methods: Process involves recruitment of eligible individuals through referrals. Intake information is recorded on farms provided by the National AgrAbility Project. Site visits are the primary means of contact.

•Rural and Agricultural VocRehab Program: To assist individuals with disabilities living in rural areas and those in agricultural professions or self-employmed by providing them with a variety of services tailored to their needs in order to maintain or obtain their selected employment outcome. Delivery Methods: Process involves recruitment of eligible individuals through referrals, assessment, writing up a plan of action, and providing services for eligible individuals. Printed materials and individual technical assistance are offered to strengthen the capacity of individuals to maintain or to prepare for meaningful work.

•Take Charge (TC/RC): Helping community adult members to gain the skills necesary to be confident enough to take part in town government by ultimately competing for town government leadership positions. Delivery Methods: Meetings, discussion groups.

•Town Officers Education Conference & Municipal Officers Management (TOEC/MOMS): Local town officers, decisionmakes and officials receive education and tools to improve job performance and mangement, addressing topics from new legislation to handling difficult customers. Delivery methods: Each one-day conference is held annually, at multiple sites.

•Vermont Urban and Community Forestry program :A joint initiative between the University of Vermont Extension and the Department of Forests, Parks and Recreation. The mission of the program is to promote the stewardship of the urban and rural landscapes to enhance the quality of life in Vermont communities. The program provides educational, technical and financial assistance in the management of trees and forests, in and around the built landscape. Delivery Methods: Classes, meetings, various media, community volunteer projects.

2. Brief description of the target audience

- 4-H: Adult Volunteers
- 4-H: Camp Counselors
- 4-H: Youth
- 4-H: Youth Volunteers
- Adults
- Age 1 - 5 Pre-School
- Age 13 - 18 Youth
- Age 19 - 24 Young Adult
- Age 25 - 45 Adult
- Age 25 - 60 Adult
- Age 46 - 65 Adult
- Age 6 - 12 School Age
- Age 60 - Senior
- Age 8 - 18 Youth
- Agriculture: Apple Growers
- Agriculture: Beef Producers
- Agriculture: Crop Producers
- Agriculture: Dairy Producers
- Agriculture: Equine Producers/Owners
- Agriculture: Farm Employees
- Agriculture: Farm Families
- Agriculture: Farm Managers
- Agriculture: Farmers
- Agriculture: Farmers w/disabilities
- Agriculture: Goat & Sheep Producers
- Agriculture: Industry Professionals
- Agriculture: Livestock producers
- Agriculture: Maple Industry
- Agriculture: Maple Sugar Producers
- Agriculture: Non-Dairy Producers
- Agriculture: Nursery operators

- Agriculture: Produce Growers
- Agriculture: Service Providers
- Agriculture: Small Fruit & Vegetable Growers
- Agriculture:Dairy Goat, Meat Goat and Dairy Sheep Producers
- Agriculture:Government Agency Personnel
- Communities: Cities and Towns
- Communities: Community Action Agencies
- Communities: Educators
- Communities: Local Officials/Leaders
- Communities: Non-Governmental Organizations
- Communities: Schools
- Community leaders and citizens
- DHIA supervisors
- Extension: Advisors
- Extension: Faculty/Staff
- Forestry: Landscape Industry
- Forestry: Loggers
- Forestry: Wood Processors
- Migrant In School Youth
- Migrant Out of School Youth
- Military families
- Military youth
- Policy Makers: Legislators
- Public: Adult Caregivers
- Public: Age 1-5 (Preschoolers)
- Public: Age 55+
- Public: College Students
- Public: Families
- Public: Families with Limited Resources
- Public: General
- Public: Homeowners
- Public: Nonprofit Organizations
- Public: Parents
- Public: People with Limited Resources
- Public: Small Business Owners/Entreprenuers
- Public: Volunteers
- Public: VT SOUL Tree Stewards
- School Grade: K-8
- Train-the-Trainer recipients:adults
- Youth

3. How was eXtension used?

- I have "liked" the facebook of the military network of families - great articles and research and have linked it to the OMK page and 4-H page
- I attempted to use eXtension approximately half a dozen times in the past year, looking to locate resources relating to workforce development, agricultural career education, and school gardening. In every case I gave up and went back to googling because I was unable to locate appropriate resources -- not sure if that was because they weren't on eXt, or because the interface is so poorly designed. Caveat: I consider myself very web-literate and tech-friendly, and have some experience with using the wiki format.

• I used eXtension this year when editing the National Identification and Recruitment Manual for the federal Migrant Education Program. I cited the website as a resource for migrant field recruiters nationwide. I put this resource in the manual as a tool to assist recruiters with their work on locating migrant workers and understanding their local agricultural industries. I also mentioned the site as a place for MEP recruiters to find quality research.

Manual Excerpt - "Each state has a land grant college or university that addresses agricultural issues and supports a statewide system of Cooperative Extension offices. Extension agents and outreach professionals for each Cooperative Extension office often have in-depth knowledge of local farms and crops and have many contacts in the farming community. Cooperative Extension offices may also offer annual statewide activities, such as farm shows or agricultural days that are good places to meet employers. In addition to local Cooperative Extension offices, recruiters may find the national online eXtension site (http://www.extension.org) of value. eXtension is an interactive learning environment delivering researched information from landgrant university minds across America. The recruiter can enhance their knowledge of agricultural crops and industries to better understand and communicate with the farm community in their recruitment regions. Furthermore, the recruiter can find useful research and articles specifically on migrant farmworkers by typing "migrant" into the search engine. "

• I use eXtension for the family caregiver articles. Most of them are about caregiving for elders, but some of them are for kin caregivers of youth. I also use it in my personal life for the equine news.

• I serve as the evaluation contact for our new CoP, Enhancing Rural Capacity. I attended the training offered in KY late June where our CoP meet to begin our work. We had a second working session tagged onto the What Works Conference in Philadelphia Sept 2011. The team is busy creating the 150 FAQs needed to achieve full CoP status. I was unaware of the breadth and depth of information through eXtension.

I used eXtension by finding a way to share my expertise through this resource with a larger audience. I participate regularly in webinars offered as professional development opportunities, perhaps as many as 8 during the time period of your request. eXtension tech staff are at the ready to answer questions and to find answers to my questions/problems. Outstanding resource for me as a professional.

• We used eXtension resources to deliver 10 1-hour webinars related to entrepreneurship (456 participants). We also used the eXtension Moodle platform to support two national trainings in Community and Economic Development -- those trainings were **Understanding Communities and Their Dynamics** and **Sustainable Communities**.

Several of us also benefited from eXtension's CoP training in June 2011.

V(E). Planned Program (Outputs)

1. Standard output measures

2011	Direct Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
Actual	10000	10470	5360	7220

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

Patent Applications Submitted

Year: 2011

Actual: 0

Patents listed

3. Publications (Standard General Output Measure)

Number of Peer Reviewed Publications

2011	Extension	Research	Total
Actual	0	0	0

V(F). State Defined Outputs

Output Target

Output #1

Output Measure

- 4-H Afterschool

Year	Actual
2011	21

Output #2

Output Measure

- 4-H Club

Year	Actual
2011	132

Output #3

Output Measure

- 4-H Day Camp

Year	Actual
2011	16

Output #4

Output Measure

- 4-H Overnight camp

Year	Actual
2011	6

Output #5

Output Measure

- 4-H School enrichment

Year	Actual
2011	106

Output #6

Output Measure

- 4-H Short-term/special interest

Year	Actual
2011	105

Output #7

Output Measure

- Class/course

Not reporting on this Output for this Annual Report

Output #8

Output Measure

- Conference

Year	Actual
2011	3

Output #9

Output Measure

- Consultations

Year	Actual
2011	847

Output #10

Output Measure

- Discussion group

Year	Actual
2011	82

Output #11

Output Measure

- Field site visit

Year	Actual
2011	1242

Output #12

Output Measure

- Funding request

Year	Actual
2011	1

Output #13

Output Measure

- Presentations

Year	Actual
2011	79

Output #14

Output Measure

- Publication - fact sheet

Year	Actual
2011	7

Output #15

Output Measure

- Publication - newsletter

Year	Actual
2011	65

Output #16

Output Measure

- Publication - newsprint article
  Not reporting on this Output for this Annual Report

Output #17

Output Measure

- Radio Spots/program (educational

Not reporting on this Output for this Annual Report

Output #18

Output Measure

- TV segment/ATF

Year	Actual
2011	10

Output #19

Output Measure

- Train the Trainer sessions

Year	Actual
2011	9

Output #20

Output Measure

- Web Page

Not reporting on this Output for this Annual Report

Output #21

Output Measure

- Workshop - series

Not reporting on this Output for this Annual Report

Output #22

Output Measure

- Workshop - single session

Year	Actual
2011	63

Output #23

Output Measure

- Trainee delivered programming

Year	Actual

2011	113

Output #24

Output Measure

- Display or exhibit

Year	Actual
2011	57

Output #25

Output Measure

- Curriculum

Year	Actual
2011	4

V(G). State Defined Outcomes

V. State Defined Outcomes Table of Content

O. No.	OUTCOME NAME
1	Increase number of communities establishing or expanding community tree program
2	increase in number of farm and rural residents with disabilities successfully served (ie case is closed) which is defined as having increased satisfaction with actual or potential employment and maintained or increased income
3	Increase number of 4-H staff self-reporting an increase in their ability to work with youth and adults to implement 4-H lifeskill development opportunities
4	Number of Migrant Education eligible students enrolled
5	Increase the number of program participants serving as leaders on Committees
6	Increase the number of volunteers self reporting an increase in their ability to implement a 4-H lifeskill development for youth
7	Increase the number of youth who set and reach goals identified at the beginning of the 4-H year
8	Increase the number of clubs doing at least 6 hours of community service
9	increase in number of youth reached with positive youth development programming self reporting an increase in mastery for targeted life skills, including: Decision making; wise use of resources; communication; accepting differences; leadership; useful/marketable skills; healthy lifestyle choices; and/or self-responsibility
10	Increase in number of youths involved in Urban Community Forestry
11	Number of individuals (youth and volunteers) increasing knowledge and/or skills in content and careers (across subject areas ranging from animal science to environmental science to technology)
12	Increase the number of participants who plan and implement a program evaluation.
13	Increase the number of participants who report the results of their program evaluation.
14	increasing number of elected/appointed village, town or city officials that use information gained at TOEC in leadership and decision making
15	Increase the number of parents understanding family transition through parentage, divorce or separation who understand the impact of these changes on their children.
16	Number of participants report using skills learned in community setting
17	Number of farmers with disabilities maintaining employment

18	increase in number of youth reached with positive youth development programming demonstrate mastery for targeted life skills, including: Decision making; wise use of resources; communication; accepting differences; leadership; useful/marketable skills; healthy lifestyle choices; and/or self-responsibility
19	Number of volunteers demonstrating new techniques/activities in clubs and programs learned through 4-H training and developmemnt
20	Number of participants who are English language learners will increase their level of English proficiency

Outcome #1

1. Outcome Measures

Increase number of communities establishing or expanding community tree program

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2011	3

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Vermont's urban and community forests provide ecological services that benefit the environmental, economic, and social health of the state.

What has been done
Since 1996, through partnering with VT Department of Forests, Parks and Recreation, an eight-week course prepares participants to become stewards of their community tree resources. A 20 hour internship is completed for certification. In the Winter of 2011 a survey of all participants from 1996 to present in the Stewardship of the Urban Landscape course(SOUL)had 138 respondents.

Results
As a result of SOUL in 2011, 3 communities established or expanded community tree programs. 2011 survey respondents indicated 25 had begun community tree programs and 46 had expanded existing programs reporting and contributing 2,729 hours in local urban and community forestry related efforts. They reported since 1996 1,270 trees have been planted. These trees will absorb 1,765,300 gallons of rainwater, reducing stormwater communities must treat. They will have an economic benefit totaling $63,500. That value doubles when trees reach 8" diameter.

1,027 trees have been planted in riparian areas, improving water quality and soil stabilization along Vermont's waterways. 717 hazardous trees have been identified and/or removed. The supported green infrastructure is a vital component to sustainable livable communities in Vermont.

4. Associated Knowledge Areas

KA Code	Knowledge Area
124	Urban Forestry

Outcome #2

1. Outcome Measures

increase in number of farm and rural residents with disabilities successfully served (ie case is closed) which is defined as having increased satisfaction with actual or potential employment and maintained or increased income

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2011	94

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Rural and Agricultural VocRehab (RAVR) has more than 40 years of collaboration between the University of Vermont Extension and VocRehab Vermont. This innovative program was the first of its kind in the nation to offer VR services specifically to farmers and rural families living and working with disabilities.

What has been done
RAVR has provided professional evaluation, counseling and assistance to hundreds of farmers and rural Vermonters. They are working with Vermont AgrAbility, working with about 50 farmers each year and Vermont Farm Health Task Force to promote a sustainable and healthy farm workforce.

Results
This year RAVR received 175 referrals for those seeking services, opened 95 new cases, closed 88 successfully, and invested $115,000 with rural Vermont farmers, living and working with chronic illness, on agricultural business and employment strategies. The AgrAbility project helped 62 farmers maintain employment. Each individual has a story. One 93 year-old farmer became

severely depressed after injuring himself and almost his 91 year-old wife, trying to climb on the tractor to help his son. He received steps and handrail on his tractor. At 96 he was proud to report he did 95% of the chopping on the farm this season. His outlook and attitude are greatly improved and he was a huge help to his son. Many supported individuals gained their livelihood and pride.

4. Associated Knowledge Areas

KA Code	Knowledge Area
723	Hazards to Human Health and Safety
805	Community Institutions, Health, and Social Services

Outcome #3

1. Outcome Measures

Increase number of 4-H staff self-reporting an increase in their ability to work with youth and adults to implement 4-H lifeskill development opportunities

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2011	11

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

What has been done

Results

4. Associated Knowledge Areas

KA Code	Knowledge Area
806	Youth Development

Outcome #4

1. Outcome Measures

Number of Migrant Education eligible students enrolled

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2011	203

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

What has been done

Results

4. Associated Knowledge Areas

KA Code	Knowledge Area
805	Community Institutions, Health, and Social Services

Outcome #5

1. Outcome Measures

Increase the number of program participants serving as leaders on Committees

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2011	5

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

What has been done

Results

4. Associated Knowledge Areas

KA Code	Knowledge Area
608	Community Resource Planning and Development

Outcome #6

1. Outcome Measures

Increase the number of volunteers self reporting an increase in their ability to implement a 4-H lifeskill development for youth

Not Reporting on this Outcome Measure

Outcome #7

1. Outcome Measures

Increase the number of youth who set and reach goals identified at the beginning of the 4-H year

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2011	493

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

What has been done

Results

4. Associated Knowledge Areas

KA Code	Knowledge Area
806	Youth Development

Outcome #8

1. Outcome Measures

Increase the number of clubs doing at least 6 hours of community service

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2011	43

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

What has been done

Results

4. Associated Knowledge Areas

KA Code	Knowledge Area
806	Youth Development

Outcome #9

1. **Outcome Measures**

increase in number of youth reached with positive youth development programming self reporting an increase in mastery for targeted life skills, including: Decision making; wise use of resources; communication; accepting differences; leadership; useful/marketable skills; healthy lifestyle choices; and/or self-responsibility

Not Reporting on this Outcome Measure

Outcome #10

1. **Outcome Measures**

Increase in number of youths involved in Urban Community Forestry

Not Reporting on this Outcome Measure

Outcome #11

1. **Outcome Measures**

Number of individuals (youth and volunteers) increasing knowledge and/or skills in content and careers (across subject areas ranging from animal science to environmental science to technology)

2. **Associated Institution Types**

- 1862 Extension

3a. **Outcome Type:**

Change in Knowledge Outcome Measure

3b. **Quantitative Outcome**

Year	Actual
2011	786

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

Issue (Who cares and Why)

What has been done

Results

4. **Associated Knowledge Areas**

KA Code	Knowledge Area
806	Youth Development

Outcome #12

1. **Outcome Measures**

Increase the number of participants who plan and implement a program evaluation.

Not Reporting on this Outcome Measure

Outcome #13

1. **Outcome Measures**

Increase the number of participants who report the results of their program evaluation.

Not Reporting on this Outcome Measure

Outcome #14

1. **Outcome Measures**

increasing number of elected/appointed village, town or city officials that use information gained at TOEC in leadership and decision making

Not Reporting on this Outcome Measure

Outcome #15

1. **Outcome Measures**

Increase the number of parents understanding family transition through parentage, divorce or separation who understand the impact of these changes on their children.

Not Reporting on this Outcome Measure

Outcome #16

1. **Outcome Measures**

Number of participants report using skills learned in community setting

2. **Associated Institution Types**

- 1862 Extension

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2011	219

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Youth and adults need opportunities to develop a set of skills to effectively engage in their community to address issues. It is just this development of Human Capital that Extension addresses with targeted programming.

What has been done
Programming reached community members with leadership skill training and committee work to complete community focused projects, informed community members on military family needs and supports mobilizing them to reach out to others; held annual energy conferences encouraging long term changes that benefit communities, and programming focused on establishing or expanding community green and infrastructure needed in communities.

Results
As a result of these efforts 72 individuals assisted in the management of the green infrastructure which is recognized as a valuable component of sustainable communities. An additional 354 military children were reached by community members empowered by their new awareness of the needs of military families, motivating them to reach out to others in their communities. At the 2nd Annual Energy Conference more attendees, 11 communities this year, made long term changes by installing alternative energy systems, performing energy audits and community wide campaigns. Other communities working with local committees accomplished local projects: a community garden, programs on food issues, and event planning and implementation. In all 219 community members took actions in their community after participating in Extension programs.

4. Associated Knowledge Areas

KA Code	Knowledge Area
124	Urban Forestry
608	Community Resource Planning and Development
805	Community Institutions, Health, and Social Services

Outcome #17

1. Outcome Measures

Number of farmers with disabilities maintaining employment

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2011	62

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

What has been done

Results

4. Associated Knowledge Areas

KA Code	Knowledge Area
723	Hazards to Human Health and Safety
802	Human Development and Family Well-Being
805	Community Institutions, Health, and Social Services

Outcome #18

1. Outcome Measures

increase in number of youth reached with positive youth development programming demonstrate mastery for targeted life skills, including: Decision making; wise use of resources; communication; accepting differences; leadership; useful/marketable skills; healthy lifestyle choices; and/or self-responsibility

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2011	993

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
According to the National Association of Colleges and Employers, six out of the seven skills desired by employers from new graduates were related to leadership. A recent study by the Girl Scout Research Institute (2008) has confirmed that opportunities to develop leadership skills are scarce.

What has been done
UVM Extension 4-H program teamed with a school supervisory union to create 4-H Leadership Clubs in its afterschool programs focusing on grades 5-6. The program is based on the 4-H youth development model, and has a service learning component. Intentional efforts were made to include diverse students of socio-economic status, gender and academic performance. The clubs were invited to participate in two leadership conferences.

Results
At the end of the year leaders completed a survey and reported: 80% have increased the ability to communicate effectively; 60% are able to work better with others; 80% have more opportunities to be a leader; 80% have increased self confidence; 100% have planned and organized a task; 100% have had to make and accept a group decision; 60% are more comfortable speaking out in a group or in public. The more experience youth have with leadership roles and extra-curricular activities, the more likely they are to aspire to leadership (Girl Scout Research Council, 2008). Participants are offered the opportunity to develop critical life skills and 21st century employment skills.

4. Associated Knowledge Areas

KA Code	Knowledge Area
806	Youth Development

Outcome #19

1. Outcome Measures

Number of volunteers demonstrating new techniques/activities in clubs and programs learned through 4-H training and developmemnt

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2011	133

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
The United States is falling dangerously behind other nations in developing its future workforce of scientists, engineers, and technology experts and faces a crisis in its ability to keep up with increasing demand for professionals trained in these fields. In Vermont, standardized test scores in science grow increasingly worse as students age. Over 70% of intermediary and secondary students rank partially proficient or below proficient, on the 2009 NECAP test.

What has been done
UVM 4-H has embarked upon a 5 year plan of action to enhance professional development opportunities for educators. After two years, we have conducted workshops, training over 100 educators plus our own volunteers representing public schools, after school programs, home school educators, etc., on how to deliver quality, non-formal science programming with a positive youth development framework. We have developed 10 learning kits and in collaboration with others, implemented over 250 after school, school enrichment, and special interest programs.

Results
Through workshop evaluation and online surveys 4 months later, over 80% of responding participants indicated using the training in a variety of ways. Educators now understand and are implementing their programming using an experiential approach coupled with inquiry based learning. Youth are benefitting, too. Over 87% of youth in 4-H SET programming are observed using new technology or methods practiced during science focused activities. Over 400 youth, through observation or as demonstrated through final projects, are increasing knowledge and/or skills in science content and careers.

4. Associated Knowledge Areas

KA Code	Knowledge Area

806 Youth Development

Outcome #20

1. Outcome Measures

Number of participants who are English language learners will increase their level of English proficiency

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2011	36

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

What has been done

Results

4. Associated Knowledge Areas

KA Code	Knowledge Area
806	Youth Development

V(H). Planned Program (External Factors)

External factors which affected outcomes

- Economy
- Appropriations changes
- Public Policy changes
- Government Regulations
- Competing Public priorities

Brief Explanation

V(I). Planned Program (Evaluation Studies)

Evaluation Results

300 Stewardship of the Urban Landscape (SOUL) participants from 1996 to present were surveyed to learn the impact of the program. Preliminary results have been gathered from 138 respondents. Data will be further analyzed. Results show:

- 116 respondents had shared their greater awareness that urban and community forests are planned and designed as part of the green infrastructure and are valuable components of sustainable communities with a member of their communities
- 76 had participated in an educational program around awareness
- 72 assisted in the management of trees in their community
- 2,729 hours have been completed
- 1,270 trees were planted
- 1027 trees have been planted in riparian areas
- 717 hazardous trees have been identified and removed

Preliminary analysis has shown that as a result of additional trees planted 1,765,300 gallons of rainwater water will be aborbed reducing stormwater that communities must treat. Trees planted in riparian areas will improve water quality and stabilize soil along Vemont's waterways and hazards are reduced by over 700 hazardous trees being identifed and removed.

The efforts within 4-H programming with youth and volunteers has focused on demonstration of mastery of skills through review of record keeping and observation verses reporting knowledge level measures. Information is used in determining effectiveness of programming with volunteers and youth.

Key Items of Evaluation

V(A). Planned Program (Summary)

Program # 3

1. Name of the Planned Program

Food Safety

V(B). Program Knowledge Area(s)

1. Program Knowledge Areas and Percentage

KA Code	Knowledge Area	%1862 Extension	%1890 Extension	%1862 Research	%1890 Research
305	Animal Physiological Processes	0%		16%	
501	New and Improved Food Processing Technologies	0%		6%	
502	New and Improved Food Products	0%		2%	
503	Quality Maintenance in Storing and Marketing Food Products	0%		4%	
601	Economics of Agricultural Production and Farm Management	0%		13%	
604	Marketing and Distribution Practices	0%		11%	
607	Consumer Economics	0%		1%	
701	Nutrient Composition of Food	0%		6%	
711	Ensure Food Products Free of Harmful Chemicals, Including Residues from Agricultural and Other Sources	30%		0%	
712	Protect Food from Contamination by Pathogenic Microorganisms, Parasites, and Naturally Occurring Toxins	70%		41%	
	Total	100%		100%	

V(C). Planned Program (Inputs)

1. Actual amount of FTE/SYs expended this Program

Year: 2011	Extension		Research	
	1862	1890	1862	1890
Plan	0.8	0.0	3.8	0.0
Actual Paid Professional	0.4	0.0	1.7	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**
18435	0	304891	0
1862 Matching	**1890 Matching**	**1862 Matching**	**1890 Matching**
31717	0	525836	0
1862 All Other	**1890 All Other**	**1862 All Other**	**1890 All Other**
0	0	66101	0

V(D). Planned Program (Activity)

1. Brief description of the Activity

Research - rapid detection of food-borne pathogens. Rapid determination of molecular identity in trace-back studies.

Food Preservation, Safety and Sanitation - A food preservation and safety program on home food preservation adn safety through newprint, radio and tv as well as consultations and single session workshops.

2. Brief description of the target audience

- Adults
- Public: General

3. How was eXtension used?

Was not referred to in reporting.

V(E). Planned Program (Outputs)

1. Standard output measures

2011	Direct Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
Actual	225	2000	0	0

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

Patent Applications Submitted

Year: 2011
Actual: 0

Patents listed
Booster Spout
Dual Spout
Method of improving maple sap yields in tubing systems

3. Publications (Standard General Output Measure)

Number of Peer Reviewed Publications

2011	Extension	Research	Total
Actual	0	6	6

V(F). State Defined Outputs

Output Target

Output #1

Output Measure

- Consultations

Year	Actual
2011	123

Output #2

Output Measure

- Field day/Fair
  Not reporting on this Output for this Annual Report

Output #3

Output Measure

- Newsprint Article

Year	Actual
2011	12

Output #4

Output Measure

- Workshop Series
  Not reporting on this Output for this Annual Report

Output #5

Output Measure

- Workshop - single session

Year	Actual
2011	5

Output #6

Output Measure

- TV segment/Across the Fence program

Year	Actual
2011	2

Output #7

Output Measure

- Radio Spots

Year	Actual
2011	6

Output #8

Output Measure

- Fact Sheets

Year	Actual
2011	3

V(G). State Defined Outcomes

V. State Defined Outcomes Table of Content

O. No.	OUTCOME NAME
1	Increase and maintain collaboration on events with agency and industry personnel to address farm safety and emergency preparedness
2	Increase in number of fair, field days or event attendees who demonstrate an increased understanding of the health risks associated with the failure to wash hands
3	Number of people who show improvement in food safety and preservation practices
4	Beneficial and adverse effects of natural, bioactive dietary chemicals on human health and food safety
5	Listeria monocytogenes: enrichment, sampling and novel surveillance.
6	Imaging methods to characterize calcium lactate crystallization in cheddar cheese

Outcome #1

1. Outcome Measures

Increase and maintain collaboration on events with agency and industry personnel to address farm safety and emergency preparedness

Not Reporting on this Outcome Measure

Outcome #2

1. Outcome Measures

Increase in number of fair, field days or event attendees who demonstrate an increased understanding of the health risks associated with the failure to wash hands

Not Reporting on this Outcome Measure

Outcome #3

1. Outcome Measures

Number of people who show improvement in food safety and preservation practices

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2011	8

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Food preservation and safety is critical to the health of families. Families are often unsure of proper techniques and therefore hesitant to prepare and process their own food. Farmers markets and home gardeners benefit from people processing their own food and families report eating a greater variety of fruits and vegetables, a healthier diet when they are able to safely prepare foods.

What has been done
Single session workshops, one which was evaluated via a survey monkey post survey; over 200

consultations, newsprint articles, radio and TV were done on home food safety and preservation techniques with a .3 faculty FTE. Consultations often resulted from consumers reading newsprint articles.

Results
All of the survey respondents (8 of 10)reported they used the information gained in the workshop. Seven indicated they preserved additional items providing a larger store of healthy foods for their families. Consultations and single session hands-on workshops are very effective at transferring good food preservation practices and skills likely resulting in over 150 families eating safely prepared healthy foods.

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 #4

1. Outcome Measures

Beneficial and adverse effects of natural, bioactive dietary chemicals on human health and food safety

2. Associated Institution Types

- 1862 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2011	0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Consumption of food-borne bioactive compounds can protect against human diseases such as cancer, inflammation, birth defects, and microbial infection. We will determine the mechanisms by which selected compounds exert their protective action.

What has been done
The microencapsulated cultures of Lactobacillus acidophilus NCFM by polymerized whey proteins (PWP) and/or sodium alginate (SA), and free culture were subject to artificial digestions to

determine the survival rate. The entrapment yield for the PWP method was significantly higher than the control samples. Viable counts of the culture after digestion processes were higher compared with other two groups. This microencapsulation is an effective way in protection of L. acidophilus in yogurt. The results showed that this whey protein based microencapsulation technology is an effective and economical method compared with polysacchride based method to improve the quality of fermented dairy foods.

Results
The results showed that oats can be exploited for developing symbiotic functional foods to deliver both prebiotics and probiotics. This new product will provide another healthy food choice for health conscious consumers. Consumption of this functional foods may reduce the risk of heart attack and other health problems.

4. Associated Knowledge Areas

KA Code	Knowledge Area
501	New and Improved Food Processing Technologies
701	Nutrient Composition of Food

Outcome #5

1. Outcome Measures

Listeria monocytogenes: enrichment, sampling and novel surveillance.

2. Associated Institution Types

- 1862 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2011	20

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Recalls of food products contaminated by the pathogenic bacterium Listeria monocytogenes are on the increase.

What has been done
The overall goal of this proposal is to develop improved strategies for the detection of L. monocytogenes. Research study evaluates the abilities of the 3M Petrifilm Environmental Listeria (EL) Plates and the commonly used methods to detect and recover L. monocytogenes cells from

environmental surfaces and processing environments.

Results
The work determined if differences between isolates of L. monocytogenes epidemic clones (EC III and IV) [strain numbers: J1-101, J1-129, J1-220 and R2-499] could be discerned using FTIR spectromicroscopy and multivariate analysis. The Mahalanobis maximum within group distances for strains J1-101, J1-129, J1-220 and R2-499 were 1.20 x 106, 1.79 x 107, 1.45 x 107 and 1.15 x 107, respectively. The minimum across group distances obtained by comparing the different epidemic clones generated different numbers and there was 100% success in the differentiation analysis. This finding indicates FTIR is a rapid technique that can point out slight biochemical differences in variants of a particular strain.

4. Associated Knowledge Areas

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

Outcome #6

1. Outcome Measures

Imaging methods to characterize calcium lactate crystallization in cheddar cheese

2. Associated Institution Types

- 1862 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2011	15

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Calcium lactate (CL) crystal formation is a widespread and costly problem for Cheddar cheesemakers in Vermont and throughout the US because institutional buyers and consumers reject cheeses that contain the white surface deposits.

What has been done
For each of three experimental replications, retail cuts of smoked Cheddar of specified age, exhibiting no crystals, and produced from a single vat, is used to simultaneously evaluate all four post-manufacture factors. Samples are randomly assigned to treatments and then stored for 25 weeks. Digital photographs are taken weekly for 25 weeks and the number of crystal sites and

percentage of total surface area occupied crystals are measured using image analysis to determine the onset of crystallization and rate of crystal growth.

Results

The major finding of this work is that post-manufacture factors such as low storage temperature and loose packaging that elevate the risk of calcium lactate crystal defects on Cheddar cheese do not affect the rate at which crystals grow but do affect the number of crystals that form on the surface over time. This is an important breakthrough because the number of crystals that may form on a cheese surface is limited by the number of physical sites at the surface that have the potential to serve as nucleation sites. This means that the risk of crystal defects can likely be reduced significantly by minimizing the possible sites for nucleation at the cheese surface. Our research indicates that possible sites for nucleation can be reduced significantly by optimizing the cut-and-wrap operation and storage and distribution conditions.

4. Associated Knowledge Areas

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

V(H). Planned Program (External Factors)

External factors which affected outcomes

- Economy
- Appropriations changes

Brief Explanation

Food safety resources at this time are limited to .3 faculty FTE.

V(I). Planned Program (Evaluation Studies)

Evaluation Results

A survery monkey post workshop evaluation was completed with 80% response rate. All respondents reported they used the information gained in the workshop to preserve food, with 70% reporting they preserved additional food including tomatoes, beets, pickles and other vegetables.

Key Items of Evaluation

V(A). Planned Program (Summary)

Program # 4

1. Name of the Planned Program

Global Food Security and Hunger

V(B). Program Knowledge Area(s)

1. Program Knowledge Areas and Percentage

KA Code	Knowledge Area	%1862 Extension	%1890 Extension	%1862 Research	%1890 Research
112	Watershed Protection and Management	0%		6%	
123	Management and Sustainability of Forest Resources	2%		2%	
133	Pollution Prevention and Mitigation	8%		3%	
203	Plant Biological Efficiency and Abiotic Stresses Affecting Plants	0%		7%	
205	Plant Management Systems	9%		5%	
206	Basic Plant Biology	0%		4%	
211	Insects, Mites, and Other Arthropods Affecting Plants	0%		3%	
212	Pathogens and Nematodes Affecting Plants	0%		6%	
216	Integrated Pest Management Systems	9%		4%	
302	Nutrient Utilization in Animals	0%		6%	
305	Animal Physiological Processes	0%		8%	
311	Animal Diseases	0%		12%	
601	Economics of Agricultural Production and Farm Management	41%		11%	
602	Business Management, Finance, and Taxation	8%		5%	
604	Marketing and Distribution Practices	4%		4%	
605	Natural Resource and Environmental Economics	10%		2%	
609	Economic Theory and Methods	0%		4%	
702	Requirements and Function of Nutrients and Other Food Components	0%		5%	
723	Hazards to Human Health and Safety	9%		0%	
724	Healthy Lifestyle	0%		3%	
	Total	100%		100%	

V(C). Planned Program (Inputs)

1. Actual amount of FTE/SYs expended this Program

Year: 2011	Extension		Research	
	1862	1890	1862	1890
Plan	25.0	0.0	5.2	0.0
Actual Paid Professional	30.0	0.0	3.9	0.0
Actual Volunteer	0.6	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
1475304	0	424703	0
1862 Matching	**1890 Matching**	**1862 Matching**	**1890 Matching**
2538142	0	723775	0
1862 All Other	**1890 All Other**	**1862 All Other**	**1890 All Other**
1411265	0	90530	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
- **Apples and Grapes**, consultations, research and field visits.
- **Non-dairy livestock** Conferences, workshops, discussion groups, individual consultations, articles, web site.
- **Community Preparedness.** Workshops, discussion group
- **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.
- **Forage and Pasture Management Education.** Conference, farm visits, 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) training.
- **Sheep program.** Hands-on workshop, applied research, newsletter.
- **Private/Commercial Landowner and Industry Professional Education**: Tour and conference
- **Senior Farm Share Nutrition Programs -** single or multi-session nutrition workshop for low-income
- **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.
- **Master Gardener.** Course, train the trainer
- **Women's Agricultural Network.** Newsletters, website, classes, workshops, individual and small group consultations.
- **Sustainable Forests.** Workshops, newsletter, consultations

AES efforts.

- **Animal Manure Treatment Systems**
- **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**
- **Biofuels from coconuts and other energy sources**
- **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 change on forest species diversity**
- **Genetic diversity among new world ferns and geographic distribution**
- **Cold hardiness of horticultural perennials**

2. Brief description of the target audience

4-H: Adult Volunteers
4-H: Youth
Adults
Age 6 - 12 School Age
Agriculture: Apple Growers
Agriculture: CCA & Crop Consultants
Agriculture: Crop Producers
Agriculture: Dairy Producers
Agriculture: Equine Producers/Owners
Agriculture: Farm Families
Agriculture: Farm Managers
Agriculture: Farmers
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: Produce Buyers
Agriculture: Produce Growers
Agriculture: Service Providers
Agriculture: Small Fruit & Vegetable Growers
Agriculture: Veterinarians
Agriculture:Government Agency Personnel
Communities: Cities and Towns
Communities: Community Action Agencies
Communities: Local Officials/Leaders
Communities: Schools
Community leaders and citizens
Environmental Professionals: Environmental Managers
Extension: Advisors
Extension: Faculty/Staff
Food Industry: Handlers
Food Industry: Processors
Food Industry: Producers
Forestry: Landscape Industry
Forestry: Wood Processors

Forestry: Wood Products Industry Organizations
Forestry: Woodland Owners
Funders
Policy Makers: Legislators
Public: College Students
Public: General
Public: Homeowners
Public: Master Gardeners
Public: Media Outlets
Public: Nonprofit Organizations
Public: Small Business Owners/Entreprenuers
Public: Volunteers
USDA personnel
Youth

3. How was eXtension used?

• 2 eXtension webinars in 2011
• I use eXtension to deliver content for my eOrganic dairy project. The content includes articles, webinars, and video.
• I use eOrganic on eXtension approximately weekly to find production information, pest management and other organic crop information to advise growers and inform publications I write. Ditto for the Farm Energy eXtension web site, which I contribute to as part of the CoP.
• 1-- To learn about Drupal as a platform for conducting online outreach/information sharing.
2-- Referred farmers and other service providers to eOrganic resources.
3-- Used eXtension to find some examples of farm business planning templates.
• I use eXension in my undergraduate classes. For example, I teach a course in Weed Ecology and Management and I have the student review some of the articles and video clips that Vern Grubinger produced on mechanical control of weeds.
• Professional development : I participated in eXtension virtual conference (10/10).

I provide staffing for an eXtension Community of Practice and during the reporting time period, published articles and instructional videos, organized webinars, responded to Ask an Expert questions, and provided outreach about / promoted eXtension.

• I have only used it in 2 main ways: (1) to help me understand what is looks like on the public side as I develop content and (2) to gather some goat nutrition information for a training and project proposal

V(E). Planned Program (Outputs)

1. Standard output measures

2011	Direct Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
Actual	51275	440000	570	0

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

Patent Applications Submitted

Year: 2011
Actual: 0

Patents listed

3. Publications (Standard General Output Measure)

Number of Peer Reviewed Publications

2011	Extension	Research	Total
Actual	7	3	10

V(F). State Defined Outputs

Output Target

Output #1

Output Measure

- Class/course

Year	Actual
2011	9

Output #2

Output Measure

- Conference

Year	Actual
2011	4

Output #3

Output Measure

- Consultation

Year	Actual
2011	1525

Output #4

Output Measure

- Consumer Publication

Year	Actual

2011	40

Output #5

Output Measure

- Demonstration

Year	Actual
2011	63

Output #6

Output Measure

- Discussion group

Year	Actual
2011	32

Output #7

Output Measure

- Educational/evaluation instrument

Year	Actual
2011	2

Output #8

Output Measure

- Electronic Communication/phone

Year	Actual
2011	723

Output #9

Output Measure

- Field day/fair

Year	Actual
2011	7

Output #10

Output Measure

- Field site visit

Year	Actual
2011	113

Output #11

Output Measure

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

Output #12

Output Measure

- Presentation

Year	Actual
2011	131

Output #13

Output Measure

- Publication - Peer Reviewed

Year	Actual
2011	5

Output #14

Output Measure

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

Output #15

Output Measure

- Publication - fact sheet

Year	Actual
2011	16

Output #16

Output Measure

- Publication - magazine article

Year	Actual
2011	17

Output #17

Output Measure

- Publication - manual

Year	Actual
2011	1

Output #18

Output Measure

- Publication - newsletter

Year	Actual
2011	66

Output #19

Output Measure

- Publication - newsprint article

Year	Actual
2011	70

Output #20

Output Measure

- Research project

Year	Actual
2011	5

Output #21

Output Measure

- TV segment/ATF

Year	Actual
2011	18

Output #22

Output Measure

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

Output #23

Output Measure

- Tour(s)

Year	Actual
2011	2

Output #24

Output Measure

- Train the Trainer trainings

Year	Actual
2011	8

Output #25

Output Measure

- Website development and updates

Year	Actual
2011	9

Output #26

Output Measure

- Workshop - series

Year	Actual
2011	13

Output #27

Output Measure

- Workshop - single session

Year	Actual
2011	91

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 the number of forest owners who plan for woodlands in their estates
3	Increase in collaboration with agency and industry personnel to address farm safety and emergency preparedness
4	Increase in number of program participants who make informed decisions about crop insurance
5	Increase in number of tax school participants stating improved accuracy of tax reporting for their clients
6	Increase in number of tax schools participants understanding federal and state tax laws and requirements
7	Increase in number of farmers that develop a nutrient management plan for their farm
8	Increase the number of farmers who implement at least one change in nutrient management plan practices
9	Increase the number of legislators and key decision makers who increase understanding of current local agricultural issues
10	Increased delivery of organic dairy information to dairy farmers across the nation that is accessible, reliable, credible and up-to-date.
11	Increase in number of Master Gardener participants earning certification
12	increase in the number of farmers who improve pasture management practices
13	Increase in number of forest owners, managers and users who make better decisions about forests using stumpage data
14	Increase in the number of forest owners saving money through use of written contracts for timber sales
15	Number of enterprises (already using recommended practices)that use Extension consultation to assess/inform business decisions
16	Number of clientele who have adopted one or more IPM practices that increase environmental sustainability
17	Number of enterprises that adopt a recommended practice resulting in increased revenues and/or reduced costs

18	Participants will have gained knowledge on how to grow organic crops (e.g. apples, grains)
19	A greater variety of produce available at home.
20	Number of farms that plan for and incorporate biosecurity, safety and preventative measures
21	Farmers will implement safety measures, i.e., ROPS on tractors
22	Farmers who implement a new practice to begin production of or improve current oilseed production yield and quality
23	Growers adopting new varieties
24	Number of individuals who change their gardening practices to reduce gardening inputs
25	Number of participants who go on to start a business within 18 months of course completion
26	Number of participants who make an informed decision to not start a business after completing the course
27	Number of farmers who will grow and market soybeans for local feed, oil production or export market to increase farm income
28	Number of farmers who will grow and produce energy crops and transform into energy products
29	Number of participants passing the required applicators licensing test
30	Number of farmers who implement a new practice to begin production or to improve current organic crop production yield and quality
31	Number of apple growers interested in the feasibility of organic production.
32	Enhancement of agricultural production with reduced chemical use.
33	Enhance the sustainability of the US food system and rural communities by fostering sustainable agri- food enterprises.
34	Effects of variation in pathogen detection and signaling pathways on resistance to bovine mastitis.
35	Development of technical training and support for Agricultural Service Providers and Farmers in Certified Organic Dairy Production Systems through
36	Effects of sap preconcentration by reverse osmosis on maple syrup chemical composition and flavor.
37	Benefits of on farm ecosystem service conservation and assessment of water quality BMPS and innovative practices on small and medium sizes farms.

38	Strategies to limit reductions in maple sap yield in vacuum installations.
39	Detect and evaluate genetic differences between animals in genes involved in response to infection.
40	Improve economic and environment in sustainability in tree fruit production through changes in root stock use.
41	Evaluating VT Grass-Based Livestock farms and agricultural policy implications.
42	Farm to institutions; opportunities for Vermont vegetable farmers.
43	New Approach towards maximizing maple sap yields.
44	Networks improve the effectiveness of promotion for Vermont Wine Producers
45	Characterization of the role of the medicago truncatula giraffe gene in oxidative stress.
46	Biological Control of the Asian Longhorned Beetle: Drawing From Indigenous Sources

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
2011	12

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

What has been done

Results

4. Associated Knowledge Areas

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

Outcome #2

1. Outcome Measures

Increase the number of forest owners who plan for woodlands in their estates

Not Reporting on this Outcome Measure

Outcome #3

1. Outcome Measures

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

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2011	103

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
602	Business Management, Finance, and Taxation

Outcome #4

1. Outcome Measures

Increase in number of program participants who make informed decisions about crop insurance

Not Reporting on this Outcome Measure

Outcome #5

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 #6

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 Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2011	345

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

What has been done

Results

4. Associated Knowledge Areas

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

Outcome #7

1. Outcome Measures

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

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2011	23

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

What has been done

Results

4. Associated Knowledge Areas

KA Code	Knowledge Area
133	Pollution Prevention and Mitigation

Outcome #8

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
2011	22

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Nutrient Management Plans are developed by farmers. They provide a strategy for farmers that protects environment and looks at best practices for meeting crop nutrient needs. If nutrient management is properly employed on a farm it can reduce overall farm production costs, improving farm viability. Fertilizer prices are a major expense on most conventional farms. Soil testing and adopting manure mangement techniques can help minimize fertilzer purchases.

What has been done
A farmer nutrient management course has been developed by UVM Extension. The course teaches farmers the principles and applications of nutrient management. Farms take the course and develop a NMP that meets state and federal requirements. Each year the farms in the nutrient management program work to update their plans.

Results
Successful implementation of one or more elements of the plan can provide improved crop yields and savings on inputs such as fertilizer. One real farm example: the farm went from averaging 19 to 24 tons of corn silage per acre by applying less fertilizer; they stopped using commercial fertilizer on their hay fields using timely manure nitrogen, and they take regular soil tests. The farm has expanded his herd by 80 head without having to add more land to harvest more feed. They estimate they are saving between $25,000 and $50,000 per year on fertilizer alone. This farm is substantially more viable, is protecting soil and water and keeping acres of agricultural land in tact. 22 farms have implemented NMPs this year. This program will continue for Vermont farmers.

4. Associated Knowledge Areas

KA Code	Knowledge Area

133 Pollution Prevention and Mitigation

Outcome #9

1. Outcome Measures

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

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2011	10

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

Outcome #10

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 #11

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
2011	104

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Due to easy access to over the counter products and advertizing, homeowners often use insecticides and herbicides on their lawns without thought to principles of integrated pest managment (IPM).

What has been done
To make homeowners aware of the issues around pesticide usage as well as cultural practices that can reduce the need or reliance on pesticides, the Master Gardener program has placed much emphasis on using practical methods of IPM for home garden and grounds. They also learn about scouting and appropriate pest management action.

Results
Based on a post-presentation survey of Master Gardeners class attendees, 97 percent indicated they learned something new about sustainable lawn care. Although the term IPM has been around for over 30 years, 40% had not heard of the term until this presentation. The Master Gardener volunteers staff the Garden helpline to provide Vermonters with information on gardening and IPM strategies. In 2011 a random survey of former callers showed that 978 of the 1248 callers made a change in gardening practices as a result of learning about IPM best practices.

4. Associated Knowledge Areas

KA Code	Knowledge Area
216	Integrated Pest Management Systems

Outcome #12

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
2011	290

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Farmers must be profitable to stay in business. Grazing management can provide a key to profitability, reducing feed costs and improving herd health. Management efforts affect environmental health and can improve water and soil quality.

What has been done
In Vermont the Annual Grazing Conference attracts over 300 attendees. Repeat attendees are asked if they implemented changes as a result of what they learned at a previous conference. Pasture Walks and consultations are conducted across the state for all types of farms. Work with other states like the 3 year SARE funded train-the-trainer effort with New York and Pennsylvania takes trainees into the field each working with 2-3 farms. A trilogy publication for horse owners was done in partnership with Univ. of Minnesota and the UVM Animal Science Dept.

Results
As a result of efforts from various programs in Vermont this year 290 farmers and horse owners improved pasture management. Through external funding and effort with other states and UVM University departments grazing and pasture management is enabling results like one 7th generation farmer who was able to double his herd by bringing land back into livestock production. Another farmer expects to be financially viable in a few months as a result of transitioning to selling organic milk in part due to changing grazing livestock management. Women, beginning and small farms are being brought this information with many being able to increase the amount of product like goat cheese, being sold.

4. Associated Knowledge Areas

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

Outcome #13

1. **Outcome Measures**

Increase in number of forest owners, managers and users who make better decisions about forests using stumpage data

Not Reporting on this Outcome Measure

Outcome #14

1. **Outcome Measures**

Increase in the number of forest owners saving money through use of written contracts for timber sales

Not Reporting on this Outcome Measure

Outcome #15

1. **Outcome Measures**

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

2. **Associated Institution Types**

- 1862 Extension

3a. **Outcome Type:**

Change in Action Outcome Measure

3b. **Quantitative Outcome**

Year	Actual
2011	17

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
602	Business Management, Finance, and Taxation

Outcome #16

1. Outcome Measures

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

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2011	1443

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
With the growing concern of pesticide safety commercial horticulture businesses, public institutions like schools, as well as home owners need a greater awareness and understanding of management practices that help reduce the need for chemical control to protect the environment, personal and public safety.

What has been done
Industry professionals, in a tri-state effort, have held the 2nd annual all day workshop on issues facing the horticulture industry. Attendees represent all segments of the industry. Master Gardeners (MG) are trained in IPM strategies and share that with homeowners and gardeners. Commercial pesticide applicator training has been going for 20 years. The attendees provide services to 90% of the dairy and field crop producers. Greenhouse growers through biennial regional meetings, annual events and consultations receive the latest on IPM strategies.

Results
Survey results of the Commercial Pesticide Applicators 2011 meeting indicated since the 2009 meeting, 78% increased use of IPM. MG took over 1200 calls sharing IPM strategies with homeowners and gardeners, who surveyed, overwhelmingly follow MG advice. The 54th VT school Custodian and Maintenance Conference focused on IPM and turf cultural practices with 94% stating they intended and felt prepared to implement IPM and turf best strategies. The New England Nursery Assoc. 2009 survey of a 6-state region of the horticulture industry reports sales of 2.3 billion. Representative survey results from a biennial multistate event show 32% of the repeat attendees had adopted IPM. In summary 1443 individuals, businesses and commercial

applicators increased or began using IPM, positively impacting the environment and human exposure to chemicals.

4. Associated Knowledge Areas

KA Code	Knowledge Area
123	Management and Sustainability of Forest Resources
211	Insects, Mites, and Other Arthropods Affecting Plants
216	Integrated Pest Management Systems

Outcome #17

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
2011	301

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Along with the natural resource base, Vermont's Agricultural system depends on the people to keep the land in Agriculture. Maple production, agro-tourism and farming are tough businesses with narrow profit margins and many variables beyond control of the farm operator. Technology and best practices change improving the ability to enhance viability of the business and protect its impact on the environment.

What has been done
The largest percent of Extension's effort is focused on education and research in support of the agricultural community. Efforts include business management, diversification strategies, marketing, planning, environmental issues, livestock management, local food access and markets, new crops and production best practices. Programming strives to meet the needs of young, old, women, beginning and multi-generation farmers, and hispanic workers and their ability to meet their needs.

Results
Business viability, even if that means being able to maintain agricultural land is a core value of

many Vermonters. Examples of the success this year for a few agriculture related businesses: a $50/acre savings using no-till corn seeding; a $26,000 increase in produce sales by 6 farms organized in a Food Network; a $4,800 increase in annual production earnings per 24'x 100' high tunnel; a $6.18/acre savings planting corn using Precision Ag technology. For one farmer after offsetting his equipment cost, this meant a $8,000 savings over 5 years. Over 300 individuals, influenced by UVM Extension programming have experienced an increase in business viability by adopting one or more best management strategies.

4. Associated Knowledge Areas

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

Outcome #18

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 #19

1. Outcome Measures

A greater variety of produce available at home.

Not Reporting on this Outcome Measure

Outcome #20

1. Outcome Measures

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

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2011	73

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

What has been done

Results

4. Associated Knowledge Areas

KA Code	Knowledge Area
723	Hazards to Human Health and Safety

Outcome #21

1. Outcome Measures

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

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2011	68

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

National statistics show that farmers are at great risk of death and injury due to tractor accidents. Tractor overturns are the leading cause of these farmer deaths and injuries. Seven of ten farms where a fatal overturn occurs are out of business within a year. Yet when farmers retrofit their older tractors with roll-over protective structures (ROPS) they are 99% protected. Recent studies suggest that 25% of Vermont farms have no protected tractors on their farms.

What has been done

A social marketing campaign and 70% rebate to farmers for the purchase of ROPS is critical to farmers retrofitting their tractors. Fund raising is critical to the campaign to provide the rebate to farmers and efforts are on-going. 74 media messages have been completed in an effort to reach farmers and potential contributors.

Results
Between September 2010 and June 2011 198 farmers registered with the Vermont Rebates for Roll Bars program to gain access to the 705 rebate. 68 farmers have ordered/installed ROPS on tractors and over $62,000 from private sources has been raised. If just one life is saved by his new ROPS, the potential savings to society is $910,000.

4. Associated Knowledge Areas

KA Code	Knowledge Area
601	Economics of Agricultural Production and Farm Management
723	Hazards to Human Health and Safety

Outcome #22

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 #23

1. Outcome Measures

Growers adopting new varieties

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2011	97

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

Home gardeners look for new varieties that will enhance their gardens, yet be hardy. They want new garden practices that are less resource intensive and better for the environment. Appropriate choice of varieties and proper culture will result in more sustainable landscapes with less need for inputs of fertilizers and pesticides, resulting less environmental impact and greater economic savings. Grower retailers need to be updated on the new plant varieties and strategies for pest and weed management to maintain or increase business viability.

What has been done
Over 1200 homeowner's questions are handled yearly by Master Gardeners. Tours to historic and diversified gardens include educational programs. The Annual Vermont Flower show had 9,800 attendees. Last year 650 unique individuals attended 1-3 educational seminars. Grower retailers meet biennially in a multistate effort, 6 states were represented with sales totaling over $2.3 billion. Topics are new plant varieties, IPM, and sustainable and environmentally friendly garden strategies. Websites and the Across the Fence TV program continue.

Results
Master Gardener (MG) helpline survey results indicate 978 home gardeners made a change in gardening practices as a result of MG advice. The Vermont Flower show survey results from previous attendees, indicated 60% (209) changed gardening practices and 54% stated they purchased new plant varieties. Bus tours average 43% repeat attendees. The most recent survey indicated all but 2 had changed gardening practices or grown new varieties based on what they had learned and spent an average of $472 per person on new plants. Combined results show over 1200 home gardeners changed practices benefiting the environment. The New England Nursery Assoc. meeting vendors surveyed in 2008 indicated 40% of the previously attending vendors grew new varieties based on what they learned. 2010 projected event sales totaled $993,000.

4. Associated Knowledge Areas

KA Code	Knowledge Area
601	Economics of Agricultural Production and Farm Management
604	Marketing and Distribution Practices

Outcome #24

1. Outcome Measures

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

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual

2011 0

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

What has been done

Results

4. Associated Knowledge Areas

KA Code	Knowledge Area
216	Integrated Pest Management Systems

Outcome #25

1. Outcome Measures

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

Not Reporting on this Outcome Measure

Outcome #26

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 #27

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 #28

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 #29

1. Outcome Measures

Number of participants passing the required applicators licensing test

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2011	50

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

What has been done

Results

4. Associated Knowledge Areas

KA Code	Knowledge Area
216	Integrated Pest Management Systems

Outcome #30

1. Outcome Measures

Number of farmers who implement a new practice to begin production or to improve current organic crop production yield and quality

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2011	128

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

Outcome #31

1. Outcome Measures

Number of apple growers interested in the feasibility of organic production.

2. Associated Institution Types

- 1862 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2011	6

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Recent shifts in consumer preference for newer cultivars, growers are planting differently. Growers want to know what the potential is for sustainable and profitable organic production.

What has been done
The project examines the opportunities and challenges of organic production. Continued research in two certified organic orchards in Vermont and ground cover management research in Maine. planting a new organic research orchard to address identified challenges; further development of the OrganicA website (http://www.uvm.edu/organica/); an Organic Orchard Tour; presentations at state/regional apple grower and research/extension meetings, answering grower questions on organic apple production; and publishing 12 issues of Orchard Observations which is a web log of orchard observations disseminated to over 100 subscribers via email and posted on the OrganicA website.

Results
All participants (100%) who responded to an evaluation of the tour of the research organic apple orchards this past year agreed that the event increased their awareness and knowledge of organic apple production and 94% rated the OrganicA Project as very/extremely important to increasing information and insights into organic apple production. Ninety-five percent (95%) of participants planned on using the information presented at the tour. In an on-line evaluation of the project, 100% of respondents said the OrganicA Project has increased their knowledge and understanding of organic apple production; 83% stated that they have used the information in decision-making.

4. Associated Knowledge Areas

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

Outcome #32

1. Outcome Measures

Enhancement of agricultural production with reduced chemical use.

Not Reporting on this Outcome Measure

Outcome #33

1. Outcome Measures

Enhance the sustainability of the US food system and rural communities by fostering sustainable agri- food enterprises.

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2011	10

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
As food becomes more scare with population increase, community is looking for sustainable agriculture.

What has been done
Setup semi-structured interviews of 15-20 sustainable agri-food entrepreneurs in Vermont. Utilize network of non-profit, UVM Extension and State government stakeholders to identify potential interviewees, particularly the Community Advisory team.

Results
No tangible results at this time.

4. Associated Knowledge Areas

KA Code	Knowledge Area
604	Marketing and Distribution Practices

Outcome #34

1. Outcome Measures

Effects of variation in pathogen detection and signaling pathways on resistance to bovine mastitis.

2. Associated Institution Types

- 1862 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2011	15

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

Scientific research community studying bacterial pathogenesis and intracellular signaling pathways contribute to differences between cows in their innate resistance to mastitis.

What has been done
Fibroblast cultures have been established from 15 calves sampled at approximately 5 and 11, and 16 months of age.

Results
Responses of the fibroblasts to LPS reveal substantial between-animal variation in IL-8 production. This molecule is key to recruiting immune cells to the site of infection. The cows were ranked from highest to lowest and were subsequently challenged with an intravenous infusion of LPS. The in vivo results are consistent with the in vitro predictions in that serum levels of IL-8 and TNF-alfa were higher in the high responder calves. Results who that the somatic immune cells in milk remained elevated for a longer period of time in the high responding cows. Thus, high responding animals may not be ideal in terms of rapid return to the production of high quality milk following a course of E. coli mastitis.

4. Associated Knowledge Areas

KA Code	Knowledge Area
311	Animal Diseases

Outcome #35

1. Outcome Measures

Development of technical training and support for Agricultural Service Providers and Farmers in Certified Organic Dairy Production Systems through

2. Associated Institution Types

- 1862 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2011	94

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Farmers who are interested in selling organic food.

What has been done

Assist organic dairy farmers in developing practices based on fluctuating pay price, low cost production and full utilization of their own forages.

Results
The project developed an innovative educational strategy to increase the number of knowledgeable service providers. During the reporting period, end-of-session evaluations were administered to the webinar participants. The project piloted a regional learning hub at the Vermont Organic Dairy Producer Conference where a guest speaker provided a presentation to a live audience of approximately 94 dairy producers. End-of-session evaluations were administered to the webinar participants. As a result, on average, 80% of respondents said they had a better understanding of the topic addressed based on what they learned during the webinars, and 65% said they will make changes to their farm practices or how they advise farmers based on what they have learned. 78% of respondents said they better understand the inter-relationships between pasture management, feeding, and animal behavior as a result of the webinar; 88% learned how to avoid problems in their grazing system; 44% will change the way they feed concentrates to their cows during the non-grazing season; and 85% said they will add grains to their livestock operation.

4. Associated Knowledge Areas

KA Code	Knowledge Area
205	Plant Management Systems

Outcome #36

1. Outcome Measures

Effects of sap preconcentration by reverse osmosis on maple syrup chemical composition and flavor.

2. Associated Institution Types

- 1862 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2011	5

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Maple producers have expressed concern that producing syrup from maple sap concentrated by RO might yield negative impacts on the flavor and quality of maple syrup.

What has been done

Experiments will be conducted in which maple syrup is produced simultaneously with unconcentrated ('raw') maple sap and the same sap that has been concentrated to 8% sugar by reverse osmosis (RO). Syrup experiments produced simultaneously with a third treatment: a portion of the sap concentrated by RO to 8% diluted with water back to raw sap sugar concentration (~2%). The experiments conducted at the University of Vermont Proctor Maple Research Center and is repeated five times during the 2011 maple production season.

Results
The results from the experiments conducted indicate that maple syrup produced with unconcentrated sap was significantly darker in color than syrup produced from the same sap concentrated to 8% by RO.

4. Associated Knowledge Areas

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

Outcome #37

1. Outcome Measures

Benefits of on farm ecosystem service conservation and assessment of water quality BMPS and innovative practices on small and medium sizes farms.

Not Reporting on this Outcome Measure

Outcome #38

1. Outcome Measures

Strategies to limit reductions in maple sap yield in vacuum installations.

2. Associated Institution Types

- 1862 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2011	15

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

Maple sap yields typically decline each year after a mainline and tubing system is installed. The causes for this decline are unclear, however the difference between yield in the first season and yield after 5-10 years of operation can amount to 50% or more. This project seeks to devise strategies whereby maple producers can maintain high system yields over a longer period of time, and to determine the economic lifetime of a mainline/tubing system.

What has been done
The scientists compared annual sap yield (quantity and quality) from a system installed in fall 2005, with different management strategies to determine which shows the largest effect on maintaining high yield. There are two "controls" built into the experimental design. One is a new system installed in 2005 and simply maintained. Yearly review indicates a progressive decrease (after standardization for annual differences) from this low control sytem, which will represent the typical maple installation.

Results
Tubing systems show gradual and continuing reductions in sap yield as they age. By the time they are five years old, they have lost up to one third of their total sap yield potential. Using annually-replaceable spout adapters or replacing drops (spouts, dropline and tees) can partially, but not completely offset these losses.

4. Associated Knowledge Areas

KA Code	Knowledge Area
123	Management and Sustainability of Forest Resources

Outcome #39

1. Outcome Measures

Detect and evaluate genetic differences between animals in genes involved in response to infection.

2. Associated Institution Types

- 1862 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2011	5

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Our major target audience is the scientific research community studying bacterial pathogenesis.

What has been done
Experiments are being conducted to evaluate genetic differences between dairy animals in their innate response to infection. In experiment one, a dermal fibroblast model is being used to investigate genetic differences in responses between cows with or without chronic mastitis. These animals are being selected from a local commercial herd on the basis of monthly milk somatic cell counts and bacteriological evaluation. These animals were selected based on high or low genomic estimation of their productive life.

Results
Preliminary results from four animals per group have not revealed between-cow differences in the ability of their fibroblasts to respond to components of bacterial cell wall (LPS; Gram-positive, Pam2CSK4; Gram-positive. In experiment two, skin samples were obtained from a local farm. The genomic estimates were based on a 50K SNP chip and performed in conjunction with USDA-ARS. Preliminary results from six animals per group have not revealed between-cow differences in the ability of their fibroblasts to respond to components of bacterial cell wall (LPS or Pam2CSK4).

4. Associated Knowledge Areas

KA Code	Knowledge Area
311	Animal Diseases

Outcome #40

1. Outcome Measures

Improve economic and environment in sustainability in tree fruit production through changes in root stock use.

Not Reporting on this Outcome Measure

Outcome #41

1. Outcome Measures

Evaluating VT Grass-Based Livestock farms and agricultural policy implications.

2. Associated Institution Types

- 1862 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual

2011	15

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
At the request of the VT House Agriculture Committee, VT USDA-NRCS (NRCS), and the VT Agency of Agriculture, Food and Markets (VAAFM), the PI will join with the UVM Center for Sustainable Agriculture (CSA) to utilize historical and contemporary data to examine and evaluate the socio-economic and environmental impacts of grass-based livestock farming in Vermont.

What has been done
Identify the macro-environmental impacts of Vermont and NRCS programs in Vermont. Qualitative interviews will be conducted with technical experts who will be asked to identify specific improvements to water quality, reasons, scientific measurements, and program attributed to the environmental improvements. Information will be gleaned on the perceived environmental benefits, suggested measurement methods, and farm related benefits from grass farming and other environmentally-friendly farming methods. Identify the trend in grass-based farming in Vermont over the past 15 years.

Results
Properly-managed grass-based livestock farms have been shown to have beneficial environmental impacts through carbon sequestration, soil retention, improved water quality, and reduced use of animal hormones or antibiotics, as compared to confinement animal agriculture.

4. Associated Knowledge Areas

KA Code	Knowledge Area
601	Economics of Agricultural Production and Farm Management
605	Natural Resource and Environmental Economics

Outcome #42

1. Outcome Measures

Farm to institutions; opportunities for Vermont vegetable farmers.

2. Associated Institution Types

- 1862 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2011	12

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Farmers, distributors, processors and institutional buyers engaged in local produce procurement efforts.

What has been done
Specifically, we will interview an array of supply chain actors. This project will utilize key informant interviews and roundtable discussions to identify, vet and test key mechanisms for fostering these opportunities.

Results
Conduct a series of approximately 12 key informant interviews with farmers, buyers and intermediaries engaged in farm to institution sales to identify logistical requirements for market participation and appropriate conditions for value chain-type partnerships. Interviewees and research questions will be selected in conjunction with community partners. We will find key themes and findings from interviews subsequent interviews, then develop recommendations for logistical arrangements, "rules for entry", communication methods, and potential mechanisms to govern relationships. Monitor implementation of suggested mechanisms by supply chains actors via subsequent interviews and discussions, in order to develop best practices and lessons learned. Work with Vermont stakeholders to develop outreach materials.

4. Associated Knowledge Areas

KA Code	Knowledge Area
604	Marketing and Distribution Practices

Outcome #43

1. Outcome Measures

New Approach towards maximizing maple sap yields.

2. Associated Institution Types

- 1862 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2011	25

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Maple producers utilizing vacuum in their tubing operations.

What has been done
Four treatments, including a control treatment of currently promulgated best management practices, will be evaluated. All treatments will consist of three replicated plot of trees. Each plot will consist of 50-75 maple taps supplied via their own mainline connected to individual calibrated vacuum releasers. All plots are serviced by a common vacuum pump pulling approximately 27-28" Hg. Total sap will be measured for each sap run during the 2011, 2012, and 2013 seasons and totalled for each season. Sap yields (gallons of sap/tap) will be compared via analysis of variance.

Results
Maple producers can use these results to determine the best strategies to improve sap yields.

4. Associated Knowledge Areas

KA Code	Knowledge Area
206	Basic Plant Biology

Outcome #44

1. Outcome Measures

Networks improve the effectiveness of promotion for Vermont Wine Producers

Not Reporting on this Outcome Measure

Outcome #45

1. Outcome Measures

Characterization of the role of the medicago truncatula giraffe gene in oxidative stress.

Not Reporting on this Outcome Measure

Outcome #46

1. Outcome Measures

Biological Control of the Asian Longhorned Beetle: Drawing From Indigenous Sources

2. Associated Institution Types

- 1862 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2011	100

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Forest Pest Specialists, Forest Pest Management Policy Makers who are interested in pest management.

What has been done
Samples from the malaise traps from 2007 and 2008 have been sorted to determine the number and species of Cerambycidae and parasitoids. To date, over 400 Coleoptera and 4500 Hymenoptera have been collected and identified to family. Of these, 85 were wood-borers from the families Cerambycidae (75) and Buprestidae (10). This research is critical to future studies on longhorned beetles. Because these pests spend much of their time within logs, and occur in fairly small numbers compared to other insect species, studying them is particularly challenging. It is critical that effective methods of survey and detection are devised. It is also important to begin to establish baseline information on the biodiversity of this potentially damaging group of wood-boring beetles and their associated parasitoids

Results
It was hypothesized that longhorned beetles can detect volatiles from wounded maple logs. The volume of logs may differentially attract beetles and their parasites

4. Associated Knowledge Areas

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

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

The **Master Gardener (MG) program** conducted a random phone survey with a sample of the individuals who had contaced the MG hotline. They received 1248 emails and calls. Sample data showed that 978 of these contacts made a change in their gardening practices as a result of learning about IPM best practices.

78% of the participants at the **Commercial Pesticide Applicators 2011 meeting** indicated they increased their use of IPM methods and practices for specific pests and weeds since the 2009 meeting. Examples included resistance management, scouting, timely application for weed control and resistance management.

Data was collected at the 2011 meeting asking if they are a past participant did they implement any IPM practices as a result of something they learned at the 2009 conference? If so what?

A survey of commercial pesticide applicators rated the program to be of moderate to high value for helping them improve their safety practices for handling and applying pesticides. 83% increased their use of IPM methods and practices as a result of attending the program; 62% indicatoed this program helped them save money in their business. The commercial pesticide applicator training for field and forages has been an on-going program for 20 years.

At the Vermont **Vegetable and Berry Growers Association annual meeting** 120 farmers and 30 industry personnel/service providers attended. Seventy-three people filled out a post-meeting evaluation, of which 60 were farmers (about a 50% response rate for both farmers and others). Of the respondents, 86% said that the information provided would help them improve farm profitability; 90% said it would help them improve farm management; 99% said they found out about a new practice, product or service, and 86% said they would do something different in the coming growing season as a result.

Twenty nine people said that they had done something different in the past year as a

result of information gained at the 2010 annual meeting, including 15 farmers that put up a new high tunnel and/or got a grant from NRCS to assist with their high tunnel construction. Well-managed leafy greens, tomatoes and other crops in high tunnels have been shown to net $1 to $3 per square foot annually, or more. (See: the Cornell High Tunnel site, http://www.hort.cornell.edu/hightunnel/, and the Northeast High Tunnel Manual, http://www.uvm.edu/sustainableagriculture/hightunnels.html.). So assuming an average annual net return of $2 per square foot and a typical tunnel size of 24' x 100', the annual net per farm would be $4,800 with an annual net of $72,000 for the 15 farms with new tunnels. Over a twenty year period these tunnels will provide $1.4 million in additional profit to these commercial farms.

Two workshops were held on **food safety and risk management for agritourism and culinary tourism**.

An evaluation immediately following the workshops indicated that 100% of survey respondents increased their knowledge of food safety risks and 92% reported that the workshop helped them understand how a food safety plan can be used to manage risk on their farm. Regarding intentions for the coming year, 91% of respondents reported that they were planning to implement changes based on information provided at the workshop and 38% indicated that they intended to create a new plan or change an existing plan to accommodate the changes being implemented. Food safety technical support resources were introduced at the workshop, and we are planning to follow-up with workshop participants to find out how many farms implement changes to reduce food safety risks.

The **Focusing on Beginning Farmers Projec**t is working to 1) educate agricultural professionals about the challenges that beginning farmers face; 2) stimulate changes in service delivery to make it more responsive to beginning farmers' needs; and 3) develop a corps of service providers better skilled at assessing stakeholder needs and using that information to develop programs.

The project held four fishbowl-style focus groups in 2009 and early 2010, and will be conducting a related survey in early 2011 to better understand needs of beginning farmers in the region. In each focus group, farmers served as educators as they discussed the kinds of services they have found helpful while service providers form an audience and listen. At the end of each session, all participants discussed the ideas that emerged, with an eye toward service delivery modifications that those in the room could implement in the future. Fifty farmers and 52 service providers participated.

Following the focus groups, service provider participants participated in debriefing conference calls approximately two weeks after the focus group. These calls provided an opportunity to share reflections on what was discussed at the focus group, and for the service providers to begin considering ways to better serve beginning farmers. All service providers were eligible to apply for mini-grants of up to $1000 to develop new approaches or adapt service delivery to beginning farmers. We awarded 13 mini grants to service provider participants. Some mini-grant projects have been completed, but most are still in process with reports due between March and May 2011. Of the six completed mini-grants, five reported positive impacts on farmers and/or the agricultural professionals who work with beginning farmers. These projects that have reported conducting beginning farmer education, technical assistance or stakeholder assessments with 329 individuals, and reported positive impacts/behavior change with 96 individuals.

The **2010 Women in Sustainable Agriculture Conference** drew over 250

participants. As of this reporting 153 of the 250 participants have filled out a follow-up evaluation survey, a 60 percent response rate. The following summary statements reflect responses to questions asking to identify areas in which the conference provided useful information or skill-building (respondents could select more than one category):

- 99 people said the conference improved their understanding of effective farm marketing techniques;
- 57 said they gained skills in farm business management;
- 55 said they increased understanding and gained skills in human resources management;
- 82 increased knowledge of production methods.

Nearly all participants indicate that they made connections or learned about resources they can use in the future.

- 97 percent (143 people) made new connections with farmers;
- 89 percent (133 people) made new connections with agricultural educators or service providers

91 percent (137 people) expanded their understand and awareness of resources that are available to help women and beginning farmers

Extension educators and farmers in Northeastern states collaborated to develop **agritourism training** modules. With partial funding from a SARE grant and additional resources, we held 19 workshops between January 2009 and March 2010 in 10 states in the Northeast, and 763 farmers attended. The workshops were followed by technical assistance available to farmers. Evaluation was conducted 1 year post program participation. We conducted a web survey one year after the workshops and heard from 98 farmers. Results indicated that 80 percent of farmers had assessed their business to determine where improvements or new ventures were needed and 60 percent had implemented improvements or new ventures. To assess contributions to farm viability, we measured increases in profitability as well as increases in quality of life. Of farmers responding to the survey, 60% (59/98) reported a positive impact on profitability from information received through workshops and technical assistance and 52% (51/98) reported increases in quality of life. Without double counting, 72 farmers reported improved farm viability, defined as increased profitability and/or quality of life.

As a result of the **pasture walk/event season** a Survey Monkey online survey 64% of respondees indicated that they have made changes or changed their thinking as a result of attending pasture sessions in the past.

Key Items of Evaluation

V(A). Planned Program (Summary)

Program # 5

1. Name of the Planned Program

Sustainable Energy

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	0%		18%	
102	Soil, Plant, Water, Nutrient Relationships	0%		18%	
203	Plant Biological Efficiency and Abiotic Stresses Affecting Plants	0%		19%	
204	Plant Product Quality and Utility (Preharvest)	0%		3%	
205	Plant Management Systems	0%		4%	
212	Pathogens and Nematodes Affecting Plants	0%		1%	
402	Engineering Systems and Equipment	20%		0%	
601	Economics of Agricultural Production and Farm Management	80%		19%	
605	Natural Resource and Environmental Economics	0%		9%	
609	Economic Theory and Methods	0%		9%	
	Total	100%		100%	

V(C). Planned Program (Inputs)

1. Actual amount of FTE/SYs expended this Program

Year: 2011	Extension		Research	
	1862	1890	1862	1890
Plan	0.9	0.0	0.8	0.0
Actual Paid Professional	0.7	0.0	0.4	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**
34310	0	45017	0
1862 Matching	**1890 Matching**	**1862 Matching**	**1890 Matching**
59028	0	54905	0
1862 All Other	**1890 All Other**	**1862 All Other**	**1890 All Other**
32929	0	1755	0

V(D). Planned Program (Activity)

1. Brief description of the Activity

Energy Crop Research Projects

Renewable energy workshops

2. Brief description of the target audience

- Adults
- Agriculture: Crop Producers
- Agriculture: CCA & Crop Consultants
- Agricutlure: Dairy Producers

3. How was eXtension used?

Faculty and program staff are working on the eXtention COP in this aea.

V(E). Planned Program (Outputs)

1. Standard output measures

2011	Direct Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
Actual	440	0	0	0

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

Patent Applications Submitted

Year: 2011

Actual: 0

Patents listed

3. Publications (Standard General Output Measure)

Number of Peer Reviewed Publications

2011	Extension	Research	Total
Actual	0	1	2

V(F). State Defined Outputs

Output Target

Output #1

Output Measure

- Research Projects

Year	Actual
2011	13

Output #2

Output Measure

- Workshop - single session

Year	Actual
2011	7

V(G). State Defined Outcomes

V. State Defined Outcomes Table of Content

O. No.	OUTCOME NAME
1	Number of farmers who implement a new practice to begin production or to improve current oilseed production yield and quality
2	Economic feasibility and market potentials for oilseed and farm-scale biodiesel production in Vermont

Outcome #1

1. Outcome Measures

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

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2011	44

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Major fluctuations in the global energy markets have caused increased fuel prices. Fuel is a necessary input, making up a significant portion of energy usage and input costs of farms in Vermont. Increased production costs lead to less viable farms and potential increases in food costs for the public. Farmers are interested in adopting the necessary technologies and production practices that will give them greater independence from volatile global energy markets.

What has been done
The goal is to increase the production of oilseed crops and biodiesel on farms, and to expand the knowledge base for growing, harvesting, and storing oilseeds. To meet these goals, we have worked on three fronts: 1) agronomic trials; 2) enterprise analyses; and 3) outreach of all information to farmers. In 2011, 15 agronomic trials were conducted in 5 counties. An oilseed crop enterprise analysis tool was developed and used by 6 farmers to determine profitability. Three outreach meetings were held to deliver oilseed production information to 300 stakeholders.

Results
Since the start of the project in 2004 the number of farms producing oilseeds has increased from 0 to 26. The infrastructure required has also increased and now farms have the capacity to produce 2.6 million gallons of biodiesel per year. Based on costs of production and market pricing, all end products are profitable at current market prices. Both 5-year and 10-year payback periods are achievable with pricing below market pricing. Based on data collected from 6 oilseed farms, the cost of producing biodiesel averages $1.35 gallon with the market price of diesel at $3.64 gallon, a potential profit of $2.29 gallon. This may lead to more profitable farms. These improvements in production were a result of them implementing new practices researched by UVM Extension including seeding rates, varieties, and planting dates.

4. Associated Knowledge Areas

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

Outcome #2

1. Outcome Measures

Economic feasibility and market potentials for oilseed and farm-scale biodiesel production in Vermont

2. Associated Institution Types

- 1862 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2011	3

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Recently there has been a rapidly growing interest in biofuels in Vermont and across the United States. The potentials of biodiesel for providing renewable energy and improving farm profitability in Vermont and the need for information on the economic feasibility for Vermont farmers to grow oilseed crops and produce biodiesel.

What has been done
The project analyzes the economic feasibility and market potentials for farm-scale oilseed and biodiesel production in Vermont with a focus on the demand factors and provide information and recommendations to farmers, entrepreneurs, policymakers and communities.

Results
We have focused on the analysis of the CVPS Cow Power program in which dairy farmers use cow manure to generate electricity and sell the electricity to participating CVPS customers at a premium price. Our study suggests that it is technically feasible to convert cow manure to electricity on farms, but the economic returns depend highly on the base electricity price, the premium paid for converted energy, financial supports from government and other agencies, and the ability to sell byproducts of the methane generation.

4. Associated Knowledge Areas

KA Code	Knowledge Area
205	Plant Management Systems
212	Pathogens and Nematodes Affecting Plants

V(H). Planned Program (External Factors)

External factors which affected outcomes

- Economy
- Government Regulations

Brief Explanation

V(I). Planned Program (Evaluation Studies)

Evaluation Results

Survey done at annual oilseed producers meeting asking repeat attendees how past conference attendance has helped. 80% reported improved economics; 60% improved weed control; 80% improved soil health; and 40% improved yields and quality.

In 2011, 15 agronomic trials were conducted in 5 counties. An oilseed crop enterprise analysis tool was developed and used by 6 farmers to determine profitability. Three outreach meetings were held in 3 counties to deliver oilseed production information to 300 stakeholders.

Since the start of the project in 2004 the number of farms producing oilseeds has increased from 0 to 26. The infrastructure required has also increased and now farms have the capacity to produce 2.6 million gallons of biodiesel per year. Based on costs of production and market pricing, all end products are profitable at current market prices. Both 5-year and 10-year payback periods are achievable with pricing below market pricing. Based on data collected from 6 oilseed farms, the cost of producing biodiesel averages $1.35 gallon with the market price of diesel at $3.64 gallon this is a potential profit of $2.29 gallon.

Key Items of Evaluation

In 2011, 15 agronomic trials were conducted in 5 counties. An oilseed crop enterprise analysis tool was developed and used by 6 farmers to determine profitability. Three outreach meetings were held in 3 counties to deliver oilseed production information to 300 stakeholders.

Since the start of the project in 2004 the number of farms producing oilseeds has increased from 0 to 26. The infrastructure required has also increased and now farms have the capacity to produce 2.6 million gallons of biodiesel per year. Based on costs of production and market pricing, all end products are profitable at current market prices. Both 5-year and 10-year payback periods are achievable with pricing below market pricing. Based on data collected from 6 oilseed farms, the cost of producing biodiesel averages $1.35 gallon with the market price of diesel at $3.64 gallon this is a potential profit of $2.29 gallon.

V(A). Planned Program (Summary)

Program # 6

1. Name of the Planned Program

Urban Non Point Source Pollution

V(B). Program Knowledge Area(s)

1. Program Knowledge Areas and Percentage

KA Code	Knowledge Area	%1862 Extension	%1890 Extension	%1862 Research	%1890 Research
112	Watershed Protection and Management	100%		0%	
121	Management of Range Resources	0%		2%	
123	Management and Sustainability of Forest Resources	0%		15%	
124	Urban Forestry	0%		15%	
125	Agroforestry	0%		20%	
131	Alternative Uses of Land	0%		3%	
211	Insects, Mites, and Other Arthropods Affecting Plants	0%		15%	
216	Integrated Pest Management Systems	0%		15%	
605	Natural Resource and Environmental Economics	0%		7%	
609	Economic Theory and Methods	0%		8%	
	Total	100%		100%	

V(C). Planned Program (Inputs)

1. Actual amount of FTE/SYs expended this Program

Year: 2011	Extension		Research	
	1862	1890	1862	1890
Plan	3.0	0.0	0.2	0.0
Actual Paid Professional	1.0	0.0	0.6	0.0
Actual Volunteer	0.1	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**
65514	0	20755	0
1862 Matching	**1890 Matching**	**1862 Matching**	**1890 Matching**
112712	0	98857	0
1862 All Other	**1890 All Other**	**1862 All Other**	**1890 All Other**
71470	0	0	0

V(D). Planned Program (Activity)

1. Brief description of the Activity

Healthy Coastal Ecosystems: work with towns, municipalities, community organizations with consultations, demonstrations, workshops, newsprint, presentation, youth camps
Watershed & Water Quality Education: Watershed education for educators and students, and community members with consultation, train the trainer, demonstration, field site visits
Design, testing and implementation of materials and technologies for the removal of phosphorus from agricultural run-off and suburban wastewater non-point sources.

2. Brief description of the target audience

- Adults

- Age 13-18
  - Age 19 - 24 Young Adult
  - Age 25 - 60 Adult
  - Agriculture: Service Providers
  - Communities: Cities and Towns
  - Communities: Educators
  - Communities: Local Officials/Leaders
  - Communities: Schools
  - Community leaders and citizens
  - Environmental Professionals: Environmental Managers
  - Public: College Students
  - Public: General
  - Public: Homeowners
  - Public: Master Gardeners
  - Public: Small Business Owners/Entreprenuer
  - Train-the-Trainer recipients:youth

3. How was eXtension used?

Do not have data to complete this section

V(E). Planned Program (Outputs)

1. Standard output measures

2011	Direct Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
Actual	740	25000	1640	0

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

Patent Applications Submitted

Year: 2011

Actual: 0

Patents listed

3. Publications (Standard General Output Measure)

Number of Peer Reviewed Publications

2011	Extension	Research	Total
Actual	0	1	1

V(F). State Defined Outputs

Output Target

Output #1

Output Measure

- Consultation

Year	Actual
2011	11

Output #2

Output Measure

- Demonstration

Year	Actual
2011	4

Output #3

Output Measure

- Field day/Fair

Year	Actual
2011	1

Output #4

Output Measure

- Presentation

Year	Actual
2011	18

Output #5

Output Measure

- Fact Sheet

Not reporting on this Output for this Annual Report

Output #6

Output Measure

- Tour

Not reporting on this Output for this Annual Report

Output #7

Output Measure

- Train the Trainer

Year	Actual
2011	8

Output #8

Output Measure

- Web page updating

Year	Actual
2011	4

Output #9

Output Measure

- Workshop series

Year	Actual
2011	43

Output #10

Output Measure

- Workshop - single session

Year	Actual
2011	24

V(G). State Defined Outcomes

V. State Defined Outcomes Table of Content

O. No.	OUTCOME NAME
1	Decrease in number of households using lawn care inputs in designated no-input buffer zones
2	Number of commercial lawn care firms using low input/ no phosphorous lawn care practices
3	Number of educators increasing knowledge of watersheds and new teaching tools and techniques
4	Number of lakeshore residential properties planting buffer strips or maintaining native vegetation as a buffer to decrease erosion and sedimentation
5	Number of lakeshore residents changing residential practices to reduce impact on water quality
6	Number of middle and high school youth demonstrating an increase in knowledge of watersheds and their role as watershed stewards
7	Number of municipal officials have an increased understanding of and need for natural resource based planning and stormwater management at the municipal level
8	Number of municipalities integrating natural resource protection and Low Impact Development strategies in town plans and ordinances
9	Number of non-residential properties (business, institutional residential commons) under one or more low input/ no phosphorous lawn care practices
10	Number of participant hours restoring riparian habitat through stewardship activities.
11	Number of residencial households adopting low input/no phosphorous lawn care practices
12	Number of retail lawn and garden centers providing information on low input/no phosphorous lawn care options to customers
13	Number of schools that demonstrate an increase in, or institutionalization of, integrated watershed education into returning educators curriculum
14	Number of service learning high school or undergraduate college students conducting or participating in watershed stewardship projects
15	Number of sites where Low Impact Development practices are being used to decrease stormwater runoff
16	Number of towns/municipalities and watershed organizations conducting outreach activities and participating in outcome oriented water quality education
17	Number of towns/municipalities using one or more bioengineering methods for shoreline stabilization to decrease erosion and sedimentation

18	Number of undergraduate students in the development, planning, and implementation of middle and high school watershed education programs
19	Number of requests for information or technical assistance for educational watershed stewardship projects or implementation of water quality improvement projects
20	Develop economic institutions that reward the provision of ecosystem services.
21	Facilitating the Development of Stakeholder-driven, Performance-based, Performance-based Policies for Agricultural Nonpoint Source Polution Control.

Outcome #1

1. **Outcome Measures**

Decrease in number of households using lawn care inputs in designated no-input buffer zones

Not Reporting on this Outcome Measure

Outcome #2

1. **Outcome Measures**

Number of commercial lawn care firms using low input/ no phosphorous lawn care practices

Not Reporting on this Outcome Measure

Outcome #3

1. **Outcome Measures**

Number of educators increasing knowledge of watersheds and new teaching tools and techniques

2. **Associated Institution Types**

- 1862 Extension

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2011	24

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

What has been done

Results

4. Associated Knowledge Areas

KA Code	Knowledge Area
112	Watershed Protection and Management

Outcome #4

1. Outcome Measures

Number of lakeshore residential properties planting buffer strips or maintaining native vegetation as a buffer to decrease erosion and sedimentation

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2011	12

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

What has been done

Results

4. Associated Knowledge Areas

KA Code	Knowledge Area
112	Watershed Protection and Management

Outcome #5

1. Outcome Measures

Number of lakeshore residents changing residential practices to reduce impact on water quality

Not Reporting on this Outcome Measure

Outcome #6

1. Outcome Measures

Number of middle and high school youth demonstrating an increase in knowledge of watersheds and their role as watershed stewards

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2011	533

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Knowledge about the condition of our environment including water resources is constantly changing, as are the landscapes in which we live. One result of this trend is the variability of relevant water resource education in Vermont that can create informed citizens prepared to make decisions that benefit watersheds and water quality. Moreover, many science educators do not have the current knowledge, resources or support to integrate appropriate watershed education into their curricula for middle and high school youth.

What has been done
The University of Vermont Watershed Alliance (WA) supports environmental education by making hands-on, up-to-date, inquiry-based, scientific watershed and water quality education available to Vermonters including educators, students, adults and families. UVM WA provides equipment, curricula, technical support and human resources for those participating in our programs.

Results
Efforts this year reached 533 middle and high school youth who demonstrated their understanding of watersheds and their role as stewards. The program trained 24 educators who increased their knowledge of watersheds, new teaching tools and techniques. Programs took

place in public and home school programs as well as programs for struggling youth. In addition 36 undergrads from Vermont colleges participated in the program. One returning teacher wrote, "I believe that applied field experiences are the best way for students to learn about the environment and environmental science. Without programs such as UVM WA it is difficult to affordably access the materials and resources necessary to conduct these experiences.... it is invaluable for students to interact with scientists and college undergraduates..."

4. Associated Knowledge Areas

KA Code	Knowledge Area
112	Watershed Protection and Management

Outcome #7

1. Outcome Measures

Number of municipal officials have an increased understanding of and need for natural resource based planning and stormwater management at the municipal level

Not Reporting on this Outcome Measure

Outcome #8

1. Outcome Measures

Number of municipalities integrating natural resource protection and Low Impact Development strategies in town plans and ordinances

Not Reporting on this Outcome Measure

Outcome #9

1. Outcome Measures

Number of non-residential properties (business, institutional residential commons) under one or more low input/ no phosphorous lawn care practices

Not Reporting on this Outcome Measure

Outcome #10

1. Outcome Measures

Number of participant hours restoring riparian habitat through stewardship activities.

Not Reporting on this Outcome Measure

Outcome #11

1. Outcome Measures

Number of residencial households adopting low input/no phosphorous lawn care practices

Not Reporting on this Outcome Measure

Outcome #12

1. Outcome Measures

Number of retail lawn and garden centers providing information on low input/no phosphorous lawn care options to customers

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2011	7

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

What has been done

Results

4. Associated Knowledge Areas

KA Code	Knowledge Area
112	Watershed Protection and Management

Outcome #13

1. Outcome Measures

Number of schools that demonstrate an increase in, or institutionalization of, integrated watershed education into returning educators curriculum

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2011	13

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

What has been done

Results

4. Associated Knowledge Areas

KA Code	Knowledge Area
112	Watershed Protection and Management

Outcome #14

1. Outcome Measures

Number of service learning high school or undergraduate college students conducting or participating in watershed stewardship projects

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2011	36

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

What has been done

Results

4. Associated Knowledge Areas

KA Code	Knowledge Area
112	Watershed Protection and Management

Outcome #15

1. Outcome Measures

Number of sites where Low Impact Development practices are being used to decrease stormwater runoff

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2011	12

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

What has been done

Results

4. Associated Knowledge Areas

KA Code	Knowledge Area
112	Watershed Protection and Management

Outcome #16

1. Outcome Measures

Number of towns/municipalities and watershed organizations conducting outreach activities and participating in outcome oriented water quality education

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2011	3

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

What has been done

Results

4. Associated Knowledge Areas

KA Code	Knowledge Area
112	Watershed Protection and Management

Outcome #17

1. Outcome Measures

Number of towns/municipalities using one or more bioengineering methods for shoreline stabilization to decrease erosion and sedimentation

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2011	2

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

What has been done

Results

4. Associated Knowledge Areas

KA Code	Knowledge Area
112	Watershed Protection and Management

Outcome #18

1. Outcome Measures

Number of undergraduate students in the development, planning, and implementation of middle and high school watershed education programs

Not Reporting on this Outcome Measure

Outcome #19

1. Outcome Measures

Number of requests for information or technical assistance for educational watershed stewardship projects or implementation of water quality improvement projects

2. Associated Institution Types

- 1862 Extension

3a. Outcome Type:

Change in Action Outcome Measure

3b. Quantitative Outcome

Year	Actual
2011	16

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Advances have been made in methods of treating stormwater pollution, it still remains the fastest growing threat to Vermont's water quality. Rain and snowmelt from rooftops, parking lots, streets, and driveways, picks up sediment, phosphorous, toxins, pathogens, and other pollutants that can impair surface waters. There are 15 lakes and ponds and 98 state stream and river waters that do not meet Vermont Water Quality Standards (the 2008 303 (d) list). Rain Gardens and buffer strips provide one simple solution for property owners to manage runoff onsite.

What has been done
Requests for technical assistance created opportunities to work with homeowners, homeowners associations, public schools and watershed groups. In addition a training was done with Master Gardeners on building rain gardens. Master Gardeners can answer the most common questions about how a rain garden works, how to calculate the size and knowing what plants to use.

Results
197 master gardeners attended the Rain Garden training which has resulted in multiple requests for additional information, Rain Garden manuals as well as increased interest in the Rain Garden contest. One Rain Garden project alone redirected 1200 gallons per 1/2" rain event and involved 35 college students in hands on experiential learning. As part of a joint project with the Poultney Mettowee NRCD 12 new buffer planting were completed along Lake St Catherine. See a picture and article by following this link
http://lmprs.net/linkedFiles/IND8758THE%5FLAKE%5FMATTERS%5FJULY%5F2010%5FFINAL%5FCOPY%2Epdf

4. Associated Knowledge Areas

KA Code	Knowledge Area
112	Watershed Protection and Management

Outcome #20

1. Outcome Measures

Develop economic institutions that reward the provision of ecosystem services.

Not Reporting on this Outcome Measure

Outcome #21

1. Outcome Measures

Facilitating the Development of Stakeholder-driven, Performance-based, Performance-based Policies for Agricultural Nonpoint Source Polution Control.

2. Associated Institution Types

- 1862 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2011	25

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Current conservation approaches do not focus on environmental outcomes and do not provide farmer flexibility sufficient to induce innovation or seek least-cost solutions.

What has been done
Developed educational and outreach materials on the theory and practice of performance-based approaches for control of agricultural; Developed a PEPA Website as a Clearinghouse for Information; Enhanced and Document Stakeholder-Scientific Policy Development ess., Conducted education and outreach activities throughout the U.S., Demonstrated the PEPA approach at the watershed-level through CSREES Regional Water Quality Projects; Conducted a National PEPA Workshop, and Compiled lessons learned and create policy recommnedations for the use of performance-based incentives.

Results
Our project identified and emailed 64 watershed coordinators with information about the concept

of performance-based incentives and the services that our project has to offer. Numerous inquiries for further information resulted from this outreach. The packets contained the project's booklet describing the process of developing stakeholder-driven, watershed-level recommendations for the use of performance-based incentives for agricultural pollution control, as well as previously published papers on the topic.

4. Associated Knowledge Areas

KA Code	Knowledge Area
123	Management and Sustainability of Forest Resources
124	Urban Forestry
125	Agroforestry
211	Insects, Mites, and Other Arthropods Affecting Plants
216	Integrated Pest Management Systems

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

Brief Explanation

{No Data Entered}

V(I). Planned Program (Evaluation Studies)

Evaluation Results

{No Data Entered}

Key Items of Evaluation

{No Data Entered}

V(A). Planned Program (Summary)

Program # 7

1. Name of the Planned Program

Climate Change

V(B). Program Knowledge Area(s)

1. Program Knowledge Areas and Percentage

KA Code	Knowledge Area	%1862 Extension	%1890 Extension	%1862 Research	%1890 Research
103	Management of Saline and Sodic Soils and Salinity	0%		4%	
112	Watershed Protection and Management	0%		1%	
123	Management and Sustainability of Forest Resources	0%		24%	
125	Agroforestry	0%		6%	
131	Alternative Uses of Land	0%		4%	
133	Pollution Prevention and Mitigation	0%		1%	
136	Conservation of Biological Diversity	0%		17%	
202	Plant Genetic Resources	0%		4%	
205	Plant Management Systems	0%		1%	
206	Basic Plant Biology	0%		9%	
211	Insects, Mites, and Other Arthropods Affecting Plants	0%		12%	
213	Weeds Affecting Plants	0%		2%	
501	New and Improved Food Processing Technologies	0%		6%	
601	Economics of Agricultural Production and Farm Management	0%		1%	
604	Marketing and Distribution Practices	0%		3%	
605	Natural Resource and Environmental Economics	0%		3%	
609	Economic Theory and Methods	0%		2%	
	Total	0%		100%	

V(C). Planned Program (Inputs)

1. Actual amount of FTE/SYs expended this Program

Year: 2011	Extension		Research	
	1862	1890	1862	1890
Plan	0.0	0.0	4.7	0.0

Actual Paid Professional	0.0	0.0	3.7	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**
0	0	539787	0
1862 Matching	**1890 Matching**	**1862 Matching**	**1890 Matching**
0	0	491199	0
1862 All Other	**1890 All Other**	**1862 All Other**	**1890 All Other**
0	0	60804	0

V(D). Planned Program (Activity)

1. Brief description of the Activity

Invasive Pests - Monitoring of the Asian Long Horned Beetle & Hemlock Woolly Adelgid; interception and prevention if possible, mitigation through work with bioactive fungi and natural enemy species; work with the US forest service, US-ARS, and the maple industry.

Maple Production - research and extension efforts at the Proctor Maple Center are directed at extending the sugaring season, maximizing yield, and minimizing disease to trees.

Monitoring of the Eastern Forests - Species change and demarkcation levels are being observed, documented and modeled for northern forests through remote sensing and on-the-ground observations.

Invasive Plants - research will continue on the genetic and physiological basis for "invasiveness" of problem plant species and introductions.

Greenhouse Gas Emissions - research has been initiated to evaluate microbial population dynamics in ruminant farm animals in an effort to control/minimize the production of methane and other greenhouse gases. Parallel efforts are underway to understand soil processes that affect the carbon cycle, and that may sequester carbon in soil sinks.

Extension has no program FTEs in this planned program.

2. Brief description of the target audience

Researchers, Extension Faculty and Staff
Maple producers
Agriculture - Farmers

3. How was eXtension used?

Extension was not used in this program.

V(E). Planned Program (Outputs)

1. Standard output measures

2011	Direct Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
Actual	0	0	0	0

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

Patent Applications Submitted

Year: 2011

Actual: 0

Patents listed

3. Publications (Standard General Output Measure)

Number of Peer Reviewed Publications

2011	Extension	Research	Total
Actual	0	4	4

V(F). State Defined Outputs

Output Target

Output #1

Output Measure

- Scientific Journals

Year	Actual
2011	3

V(G). State Defined Outcomes

V. State Defined Outcomes Table of Content

O. No.	OUTCOME NAME
1	Potential disruption of the normal physiological processes of development in sugar maples.
2	Predicting invasiveness of introduced species into communities
3	Trait variation across species range: explaining invasive differences
4	Projecting climate change impacts on Vermont forests using dynamic vegetation models
5	Climate Range Expansion during colonization of a major crop pest, Colorado potato beetle

Outcome #1

1. Outcome Measures

Potential disruption of the normal physiological processes of development in sugar maples.

2. Associated Institution Types

- 1862 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2011	150

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Increased temperatures and longer growing seasons associated with global warming have the potential to disrupt the normal physiological processes of autumn color development in maple and to potentially decrease the intensity of fall coloration. This will affect the Vermont tourist season. The annual display of autumn coloration in Vermont is highly prized, economically andculturally important event.

What has been done
This project involves conducting a series of experiments on red and sugar maple seedlings. In general, the experiments will involve exposing seedlings to various temperature treatments and monitoring subsequent color development and leaf physiological parameters. Leaf color development will be quantified nondestructively with both anthocyanin and chlorophyll content meters (ACM, CCM), which are hand-held spectrophotometric devices that measure light transmitted through leaves and yield a pigment content index value.

Results
Experiments were focused on determining if cold temperatures promote the development of autumn coloration. In these experiments, red and sugar maple seedlings were subjected to various temperature treatments for one week prior to the onset of fall coloration, and their subsequent color development were monitored with nondestructive pigment content meters and digital photography. The subsequent set of experiments focused on determining the physiological mechanisms through which cold temperatures promote autumn coloration. In these experiments, leaf petioles or portions of leaves were cooled at night and during the day, and color development subsequently monitored throughout the fall. The results obtained will provide scientific data to help understand the potential effects of climate change on autumn coloration.

4. Associated Knowledge Areas

KA Code	Knowledge Area
206	Basic Plant Biology

Outcome #2

1. **Outcome Measures**

Predicting invasiveness of introduced species into communities

Not Reporting on this Outcome Measure

Outcome #3

1. **Outcome Measures**

Trait variation across species range: explaining invasive differences

Not Reporting on this Outcome Measure

Outcome #4

1. **Outcome Measures**

Projecting climate change impacts on Vermont forests using dynamic vegetation models

2. **Associated Institution Types**

- 1862 Research

3a. **Outcome Type:**

Change in Knowledge Outcome Measure

3b. **Quantitative Outcome**

Year	Actual
2011	5

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

Issue (Who cares and Why)
Global climate is in the midst of rapid change associated with increasing concentration of atmospheric greenhouse gases. Forests across New England are expected to respond to climate change. Foresters and agricultural farmers would be concerned regarding changes.

What has been done

Objective is to improve the efficacy of m odel projections of vegetation distributional shifts in response to expected climate change. Assessed the influence of spatial reultution of model projects.

Results
Used vegetation models to project the responses of forests across New England and projecxted that the climate of New England will continue to warm rapidly over the current century. Forests will respond with a general shift to higher elevations and more northerly latitudes.

4. Associated Knowledge Areas

KA Code	Knowledge Area
123	Management and Sustainability of Forest Resources
202	Plant Genetic Resources

Outcome #5

1. Outcome Measures

Climate Range Expansion during colonization of a major crop pest, Colorado potato beetle

2. Associated Institution Types

- 1862 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2011	10

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)
Colorado potato beetle is a notoriously difficult insect to control. While there are conventional and organic pesticides that control the betetle, some beetle populations have already developed resistance to these insecticides. Combniation of warmer winters and pesticide resitance have created problems. Agricultural farmers are concerned.

What has been done
We examined how climatic and biotic factors have influenced CPB geographic range expansion and forecase how climate change may influence the abundance and distribution of beetle populations in the future.

Results

Our findings whow that geographic variation among beetle populations means that beetles may have undergone significant evolutionary changes in order to adapt to northern climatic conditions.

4. Associated Knowledge Areas

KA Code	Knowledge Area
205	Plant Management Systems
211	Insects, Mites, and Other Arthropods Affecting Plants

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

Brief Explanation

{No Data Entered}

V(I). Planned Program (Evaluation Studies)

Evaluation Results

{No Data Entered}

Key Items of Evaluation

{No Data Entered}