

V(A). Planned Program (Summary)

Program # 4

1. Name of the Planned Program

Sustainable Energy

Reporting on this Program

V(B). Program Knowledge Area(s)

1. Program Knowledge Areas and Percentage

KA Code	Knowledge Area	%1862 Extension	%1890 Extension	%1862 Research	%1890 Research
201	Plant Genome, Genetics, and Genetic Mechanisms	0%		40%	
402	Engineering Systems and Equipment	20%		0%	
601	Economics of Agricultural Production and Farm Management	80%		30%	
605	Natural Resource and Environmental Economics	0%		30%	
	Total	100%		100%	

V(C). Planned Program (Inputs)

1. Actual amount of FTE/SYs expended this Program

Year: 2014	Extension		Research	
	1862	1890	1862	1890
Plan	0.5	0.0	0.7	0.0
Actual Paid	0.0	0.0	0.3	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
15830	0	50211	0
1862 Matching	1890 Matching	1862 Matching	1890 Matching
26620	0	67090	0
1862 All Other	1890 All Other	1862 All Other	1890 All Other
50740	0	0	0

V(D). Planned Program (Activity)

1. Brief description of the Activity

On farm Energy Crop Research Projects and renewable energy workshops on plant variety, planting dates, pest control, harvesting and processing of oilseed.

Vermont is a leading state in converting cow manure into electricity. This research is to see if it is economically feasible for farmers.

2. Brief description of the target audience

Agriculture: Crop Producers
 Agriculture: Farmers
 Scientific Community
 Undergraduate students

3. How was eXtension used?

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V(E). Planned Program (Outputs)

1. Standard output measures

2014	Direct Contacts Adults	Indirect Contacts Adults	Direct Contacts Youth	Indirect Contacts Youth
Actual	70	0	0	0

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

Patent Applications Submitted

Year: 2014
 Actual: 0

Patents listed

3. Publications (Standard General Output Measure)

Number of Peer Reviewed Publications

2014	Extension	Research	Total
Actual	0	2	2

V(F). State Defined Outputs

Output Target

Output #1

Output Measure

- Research Projects

Year	Actual
2014	28

Output #2

Output Measure

- Workshop - single session

Year	Actual
2014	3

Output #3

Output Measure

- Radio

Year	Actual
2014	1

V(G). State Defined Outcomes

V. State Defined Outcomes Table of Content

O. No.	OUTCOME NAME
1	Number of individuals who implement recommended practice(s) beginning energy crop production or increasing yield and/or quality of existing crops contributing to a sustainable, cost effective energy source
2	Number of farmers who implement a new practice to begin production or to improve current oilseed production yield and quality
3	Number of research findings for genes important in the structure of the plant cell wall during growth that will aid in the usage of using cell walls as a source of biofuels.

Outcome #1

1. Outcome Measures

Number of individuals who implement recommended practice(s) beginning energy crop production or increasing yield and/or quality of existing crops contributing to a sustainable, cost effective energy source

2. Associated Institution Types

- 1862 Extension
- 1862 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2014	12

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

Oilseed-type sunflower is a relatively new crop for the state of Vermont, with the potential to add value to farms. Unfortunately, bird and insect pests have limited the overall yield potential with seed and oil yields traditionally lower than national averages. Birds have decimated up to 80% of sunflower fields, migrating through and quickly decreasing yields. Insect pests like the Banded Sunflower Moth have proven devastating to seed yields and quality by feeding on the meal inside seeds.

What has been done

To address issues of pest predation, UVM Extension initiated on-farm research trials evaluating sunflower planting dates ranging from mid-May to late June. Later planting dates resulted in higher seed and oil yields and, often, greater test weights, indicating better seed quality. UVM Extension began recommending to some growers that selecting a shorter-season variety and planting in June, as opposed to earlier in the spring, may help to mitigate pest pressures.

Results

Calculated seed yields increased each year despite sometimes challenging weather conditions, from 931 lbs per acre in 2011 to 1296 lbs in 2012, and 1725 lbs in 2013. In addition, the discrepancy between total and harvestable population has lessened since 2011 enabling growers to get a greater percentage of their crop to the seed bin. This 85% increase in average seed yield in Vermont can be attributed in part to UVM Extension's continued work on IPM in sunflower. With the resources to conduct meaningful and applied research and perform outreach to growers, UVM Extension has been able to develop and implement strategies for reducing pest damage.

This has increased yields and quality of sunflower, enabling the crop to be considered a viable option for farmers in the region.

4. Associated Knowledge Areas

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

Outcome #2

1. Outcome Measures

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

Not Reporting on this Outcome Measure

Outcome #3

1. Outcome Measures

Number of research findings for genes important in the structure of the plant cell wall during growth that will aid in the usage of using cell walls as a source of biofuels.

2. Associated Institution Types

- 1862 Research

3a. Outcome Type:

Change in Knowledge Outcome Measure

3b. Quantitative Outcome

Year	Actual
2014	1

3c. Qualitative Outcome or Impact Statement

Issue (Who cares and Why)

Plant cell walls represent a renewable source of carbon for the development of biofuels and other plant based energy products. Cell walls are structures whose composition changes in response to changes in the environment. It is important to understand what these changes do to plant cell walls.

What has been done

Experiments have been done to investigate cell wall assembly.

Results

During past year, scientists found that SNARE VT113 plays a unique role in trafficking pathways essential for cell wall organization.

4. Associated Knowledge Areas

KA Code	Knowledge Area
201	Plant Genome, Genetics, and Genetic Mechanisms

V(H). Planned Program (External Factors)

External factors which affected outcomes

- Natural Disasters (drought, weather extremes, etc.)
- Economy
- Government Regulations

Brief Explanation

V(I). Planned Program (Evaluation Studies)

Evaluation Results

Oilseed producers were surveyed at the annual oilseed producer meeting and online to identify if information generated and delivered by the UVM oilseed program has improved yield and quality of the crop. Results included:

33% indicated that UVM Extension work helped improve their oilseed yields

75% indicated that our work help improve weed control, insects, and disease

100% indicated that our work helped them reduce harvest losses through fine-tuned harvest and drying practices.

Key Items of Evaluation