

## **2014 Final Report for University of Delaware**

### **Project Title: Enhancing Sustainable Practices for Agronomic and Processing Vegetable Crops**

#### **Report Summary**

This project was intended to address sustainability concerns with larger farms that operate on an agronomic scale. These farms include agronomic grain farms and farms that grow vegetables for processing on large acreage; farms growing processing vegetables regularly include agronomic crops. The intended beneficiary audience is university extension personnel, university support staff, federal and state agency personnel, crop consultants and advisors, and interested producers. This project will increase the understanding of sustainable practices for a diverse farm audience. Through this educational programming, agricultural service providers who serve the agronomic and processing vegetable farm community will receive training to help address topics of sustainability. The audience will differ according to the specific programs, but twenty to thirty members will gain a greater appreciation and understanding that can be ultimately extended to a wider audience of growers.

Multiple trainings were held during this grant period, including a field day highlighting UD Sustainable Agriculture and Soil Health Projects in 2012 attended by eight farmers, four workshops on Basic and Advanced Weed Management attended by over 140 participants. The weed management workshops increased participants' understanding of weed identification, weed control, and herbicide mode of action.

#### **1. Performance Target(s)**

- Five agricultural service providers will incorporate recommended techniques and practices for improved nutrient management and soil health or integrated weed management into educational programs they deliver to a total of twenty farmers.
- Ten interested growers will incorporate new recommended sustainable practices into their farming operation.

#### **2. Report on 2013-2014 Milestone Accomplishments**

This project will provide training for individuals from USDA and State agencies, Delaware Cooperative Extension, University farm staff, private consultants and the farming community in sustainable production practices. Participants will learn about a number of techniques for improved nutrient management, soil health, and weed management that are realistic for agronomic and processing vegetable farms.

- **Nutrient management training** will address nitrogen management in irrigated cropping systems. Participants will become familiar with adaptive nitrogen management, pre-sidedress nitrogen testing (PSNT), and nutrient use efficiency  
 As part of a broader irrigation professional development training, nutrient management was discussed by Drs. Amy Shober, Richard Taylor, and Cory Whaley. Nutrient management practices for overhead and sub-surface irrigation was included in the discussion
- Agricultural providers increased their understanding of **integrated weed management**. Incorporating more intensive use of cover crops provides unique opportunities and challenges for weed management. As herbicide-resistant biotypes increase in Delaware, the opportunity to include cover crops, improved row crop cultivation equipment, and other non-chemical approaches to weed management will be explored. Participants will become more familiar with herbicide families and mode of action and how this relates to herbicide resistance management.  
 Two one-day trainings were held in Delaware, one in Kent County and the other in Sussex County. Total attendance was 35 people; including 7 crop consultants who worked with more than fifty farmers each, and nine farmers (including 5 farmers with less than 50 acres to 4 farmers with more than 1,000 acres each. All participants rated this program either very good (11 out of 35) or excellent (24 out of 35).
- The agricultural providers will develop a better understanding of **cover crop use for soil health**. Currently, nutrient management programs in the region provide cost share funding for cover crop programs to reduce nutrient leaching. As a result, most service providers use this as a reference point for cover crops. Typically, a rye cover crop planted under these conditions will only produce about one-half to one ton of biomass; an amount that is not sufficient to impact soil health. Participants will learn about various cover crop species and their attributes. They will learn why and how to best manage a cover crop to obtain the amount of biomass that will be beneficial. They will also understand strategies for incorporating cover crops into processing vegetable production systems.  
 This milestone was to be addressed during a fall meeting of the USDA-NRCS cover crop advisory board. Demonstrations were established and photos taken for use at future extension meetings. However, due to changes in personnel in the NRCS office, this meeting was not held.

### 3. 3-Year Summary of Activities, Participants, Learning Outcomes and Products

Table 1 –Activities.

Type of Educational Activity Conducted by Project	Number of Each Activity Conducted
Workshop/Field Day	5
On-farm Demonstration	4
Tour	
Webinar/Talk/Presentation	5
Other on-line training	
Individual Consultations (an estimate is acceptable)	4
Other (specify)	

**Table 2 – Participants.**

Type of Agricultural Service Provider	Number Who Participated
Extension	15
NRCS/ Federal/State Agency	38
Other, AgChem, Fertilizer, Seed Sales	23
Farmers	23
<b>Total</b>	<b>131</b>

**Table 3 - Learning Outcomes.**

	Total Number of Agricultural Service Providers	Total Number of Farmers	Total number of acres or animals the farmers manage, if known
Verified an increase in knowledge, skills, confidence	19	17	6,000
Verified intention to use knowledge and/or skills learned			
*Bulleted list of only the key knowledge and skill areas for which you verified an increase in knowledge and skills.			
<p><b>As a result of the 2013 Weed School,:</b></p> <ul style="list-style-type: none"> <li>• 57 out of 68 participants said they felt more comfortable addressing Weed Identification as a result of the training;</li> <li>• 47 out of 68 said they felt more comfortable with Integrated Weed Management;</li> <li>• 44 out of 68 said they were more comfortable reading Herbicide Labels; and</li> <li>• 32 out of 68 said they were more comfortable with Herbicide Mode of Action</li> </ul> <p><b>As a result of the 2014 Weed School</b></p> <ul style="list-style-type: none"> <li>• 32 out of 35 participants said they felt more comfortable training others or talking</li> </ul>			

about Weed Identification;

- 20 out of 35 said they were more comfortable about Integrated Weed Management;
- 18 out of 35 felt more comfortable about Herbicide Resistance;
- 15 out of 35 were more comfortable with the interaction of Herbicides and Soils; and
- 13 out of 35 were more comfortable with Herbicide Mode of Action

**Table 4 – Products.**

Type of Information Product Produced	Number of Each Type Produced
Fact sheet/Guidance document	2
Decision tool	
Website/web content	
Article (newsletter, press)	1
Curricula	2
Video	
Other (specify)	

#### 4. Performance Target Outcomes and Additional, Unanticipated Outcomes

##### a. Summarized Outcome Data

**Table 5 – Numbers of agricultural service providers taking action**

*No reliable data is available to address this question*

The <b>total number of agricultural service providers</b> who incorporated information and/or used skills learned through the state program training activities in their educational activities, services and/or information products for farmers.	
The <b>total number of farmers</b> these agricultural service providers reached through their efforts.	

**Table 6 – Actions taken by the agricultural service providers**

Place an X next to all that apply	Types of Educational Activities Ag Service Providers incorporated information they learned into	Number of Each Activity Type, if known
	Workshop/Field Day	
	On-farm Demonstration	
XX	Webinar/Talk/Presentation	
	Other on-line training	
XX	Individual Consultation (an estimate is acceptable)	
XX	Fact sheet/Guidance document	
XX	Article (newsletter, press)	

	Web content	
	Other (specify)	

**Outcome Narrative and Performance Target Outcomes**

This project reached a large number of agronomic and processing vegetable acres through crop consulting companies and ag-chem industry personnel. The awareness of emerging weed problems in the region was highlighted through the weed identification training. A number of phone calls and conversations with state and federal agency personnel and farmers have focused on these problematic species and the awareness has been heightened as result of this project.

A session of integrated weed management at the weed school has led to numerous discussions on non-chemical approaches and optimizing herbicide usage to manage herbicide-resistant weed species, and manage hard to control species. While it is difficult to develop prescription strategies for consistently successful integrated weed management, service providers and farmers are understanding the interrelationship of these practices for their specific situations and are feeling more comfortable with incorporating these practices.

Farmers who are utilizing cover crops for nutrient management are beginning to discuss how to address soil health and weed management issues. While cover crops have been widely discussed by service providers, the discussions have seldom been done in a coherent message that addresses the outcome expected from the cover crop, management of the cover crop to achieve the outcomes, and limitations of using the various cover crop approaches. Some farmers are beginning to address a more comprehensive approach to cover crop management and are looking for research and data-supported recommendations.

**Other Results, Unanticipated Outcomes and Interesting Finding**

Demonstrations and discussions on expanding cover crops for soil quality has led to additional work done by UD Weed Science Program on utilizing cover crops for weed management. Two Soybean Board projects have been submitted for use of rye for weed management in no-tillage soybeans. Two Crop Protection and Pest Management Competitive Grants (USDA NIFA) have also been received for weed management in snap beans and the other for herbicide-resistant weed management in field corn and soybeans. The NE-SARE projects have served as a catalyst for discussion of incorporating more non-chemical strategies for managing weeds in agronomic and processing vegetables.

**2013-2014 SARE Outreach Activities**

Event/Activity	Number of Contacts <i>(please enter your best estimate)</i>	
	Farmers	Ag. Professionals
LEAD Delaware Program	2	5

Weed School	6	25
Ag Week	150	50
Sussex County Breakfast Meeting	20	3
Kent County Crop Master Meeting	45	5
New Castle County Meeting	20	3
DE Soybean Board Diagnostic Field Day	15	3
UD Weed Science Field Day	5	35