

Massachusetts Department of Agricultural Resources
Mary Jordan
USDA / AMS Agreement No. 12-25-B- 1074
Final Report

Promoting Massachusetts Maple (FINAL REPORT)

Project Summary

In an effort to support producers of Massachusetts maple products, the Massachusetts Maple Producers Association (MMPA) sought this grant for funding to do targeted advertising that would help our members increase direct farm-to-consumer sales of their products. By making a concerted effort to encourage consumers to look specifically for syrup, candy, cream and other products made by Massachusetts sugar makers, we hoped to reduce our members' dependence on selling their syrup in bulk by steering more customers to them, which will allow them to earn more money by selling their products retail.

Each year Massachusetts maple producers make outstanding maple products – syrup, candy, cream, and value added products. The relatively small size of the maple industry in the state, however, means that our producers are unable to meet the demands of the market, and many consumers consider other sources (such as Vermont or Canada) to be the only (and best) source of supply. If our own neighbors aren't aware of our products, this is an indication that we need to better educate the Commonwealth about Massachusetts maple products.

Many local maple producers are becoming quite skilled at direct to consumer sales, and are learning the value of interacting with customers. Direct sales of maple products are often a driving force behind sales of other locally produced agricultural products, and all of these sales boost the overall image, and economic strength of Massachusetts agriculture. The best method for increasing sales for local producers is better education of the consumer. The more we have the words "Massachusetts" and "Maple" in front of consumers, the greater chance they will recognize and purchase our products.

This marketing campaign to enhance the competitiveness of Massachusetts maple products was aimed at making the general public aware of our members' products and what is special about them, so that demand for these products would increase.

Project Approach

This grant allowed the Massachusetts Maple Producers Association, a professional trade association representing more than 250 farmers statewide, to place advertisements with three 'Buy Local' groups in the state, to pay for an underwriting contract with a local public radio station for one month, and to design and print a new brochure. (See Exhibit 1 and 2) Approximately 5,000 copies of the new brochure were distributed to travel and tourism offices around the state, where visitors would find them and learn about opportunities to visit sugarhouses and learn about how maple products are made.

Goals and Outcomes Achieved

These activities were intended to drive consumers to our website and encourage them to visit local sugarhouses and purchase maple products directly from our members. Our website traffic was approximately 40% higher in 2011 than it was in 2010. In response to an email query in May 2011, many of our members reported that their customers

mentioned the radio spots, print ads and new brochures to them when they placed their orders, demonstrating that the work was reaching its target.

Each year MMPA surveys our members about their season and sales, including asking about how much of their syrup they sell retail and how much wholesale. The survey is not scientific: it is sent to all members as they renew their annual memberships, and response is inconsistent. Of those who did respond in both 2010 and 2011, there was little or no difference in the amount of syrup they sold retail vs. wholesale.

These results can be attributed to a number of factors. First, the season itself was vastly different, with our members producing more than twice as much syrup in 2011 as in 2010, largely due to more favorable weather conditions. While more product is always a good thing, it does place additional stressors on maple producers in the form of upfront costs, particularly labor and fuel. The need for immediate cash flow necessitates immediate sales of finished product, and there are always opportunities to sell syrup in bulk on the wholesale market, whereas selling retail takes more time and resources.

Second, where our project succeeded, based on anecdotal evidence, in making more consumers aware of Massachusetts-made maple products, we learned that the dynamics of individual maple producers' businesses don't necessarily change based on a change demand from one year to the next. Only a handful of the state's 250+ maple producers call sugaring their full-time occupation – for the vast majority it is a side business that they fit into their lives among other jobs and commitments. As a result, even with additional demand for retail products, many sugarmakers don't have the ability or interest to step up production for the retail market, and have made the calculation that the reduced income resulting from bulk sales rather than retail is balanced by the reduced labor and time costs.

Beneficiaries

The 250 maple-product producing members of our association benefitted through this work through increased visibility and increased sales. The vast majority of our members have diversified farms with maple production as just one component, so the additional income that resulted from this work helped to sustain farms that provide a range of agricultural products and services throughout the state.

As mentioned above, our surveys are unscientific. Income from sugaring increased significantly between 2010 and 2011 for those farms that did respond to the survey, but that is likely largely attributable to the doubling of production mentioned above, thanks to the favorable weather. Anecdotally, many members reported that their customers – both new and returning – mentioned hearing the underwriting ads on the radio and seeing the ads in the buy local directories. In the absence of scientific proof as to the scope of the campaign's outcome, the organization and membership felt that the effort to promote Massachusetts maple products was a success.

Lessons Learned

Our primary learning from these activities, based on conversations with customers and members of the general public, was that the radio sponsorship was the most effective

way to reach new customers. Readers of the 'buy local' publications, we determined, are most likely already customers of local sugarhouses, but the outreach to the general public via radio helped attract consumers who might otherwise not have known about the availability of local maple products.

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Promoting the Local Buying of Massachusetts Specialty Crops, Year Round (FINAL REPORT)

Project Summary

The purpose of this project was to promote specialty crops throughout the year to increase the long-term purchase and consumption of specialty crops by children and adults across the Commonwealth. The value of agricultural products sold directly to individuals for human consumption increased state wide, from \$31 million to \$42 million (34%) during the 2002-2007 period [NASS Census]. Most of these edible agricultural products are specialty crops. But, despite these gains, much of the food that we eat is imported from elsewhere, and farmers across the state worry about their bottom lines and the future of their businesses. We are still in the midst of a deep recession, and consumers are watching spending carefully. Several key barriers impede the increase of sales and consumption of specialty crops, including a lack of awareness about the availability and seasonality of specialty crops, where to purchase specialty crops (farm stands, pick your own, grocery retailers, and restaurants), and how to purchase, preserve, and use specialty crops throughout the year. Together the Buy Local organizations in the state engaged in the following activities to promote specialty crops: a media campaign; winter markets; promotion of specialty crops to schools; the development of seasonal shopping lists, nutritional information, and recipes; canning and preserving workshops; and events that feature local specialty crops. These activities tap into the growing interest in local food and allow consumers to immediately act on that interest by providing them with the resources and contacts to purchase local specialty crops. While not all activities occurred in every part of the state, each region had activities centered on the promotion of specialty crops. By sharing our expertise and expanding the activities of individual groups, we will increase the sale and consumption of specialty crops throughout the Commonwealth.

Project Approach

Through this project CISA and our partners completed the activities below. Partners were critical in undertaking activities in their specific regions and the completion of activities was spearheaded by regional groups. For this project CISA and partners:

- Ran four regional media campaigns (CISA, SEMAP, Northeast Harvest, Sustainable Nantucket);

Regional media campaigns reflected the outreach needs of individual regions

Regional lead	Campaign Details	Impact
CISA	CISA's radio campaign featured four different ads on WRSI over 10 weeks: 20 ads aired per week, 2 weeks on, one week off from July- October. SCBG money paid for half of the ads.	WRSI is widely listened to from Hampden County through southern Vermont, but does not subscribe to ratings agencies. They estimate that we had 527,000 impressions.
SEMAP	Ran a print ad campaign focusing on tomatoes, apples, and Kale each crop was featured once in each of these outlets: edible Cape Cod, edible South Shore, SOCO Magazine, Along Route 28 Newspaper, and via email newsletter.	<p>July 14th email newsletter had 762 opens, 175 clicks, 30 of those going to the On-Line Farm Guide – where we encouraged readers to search for local tomatoes.</p> <p>August 26th email newsletter had: 732 opens, 133 clicks, 35 clicks to Tomato Canning Class.</p> <p>October 14th email newsletter promoting Apple nutrition card and apple pie class promoted, 844 opens, 62 clicks</p>
Northeast Harvest	<p>Aired a 60-Second Ad and a 15 second radio ad.</p> <p>The 60 second ad aired 23 times in Essex (WBOQ) and 15 times in Middlesex (WNBK). The 15-Second Ad was aired on (WBZ-AM) in all of eastern Massachusetts through Boston station. 18 15 second ads were broadcasted throughout different times of the day to reach a diverse audience.</p>	<p>*The normal hits on our website can range from 200 – 350. During the first week of advertising, the number increased by 74% and continued to increase to 150% of the average.</p> <p>*Northeast Harvest was contacted by 10% of our farmers that because of the radio ads, traffic to their farms had increased.</p> <p>*Northeast Harvest received communication both verbally and written</p>

		(email) that they had heard the broadcast of ads.
Sustainable Nantucket	Ran a print and on-line ad campaign with three print ads in the Inquirer & Mirror, the Island paper, 5 online ads on Mahon About Town – a local online e-newsletter, and advertisements in our own Nantucket Grown magazine (6500 hard copies), on the website, in e-blasts, on Facebook and Twitter and in local calendars.	Ads and outreach resulted in a bump in traffic to website.

- Hosted or supported five winter markets (CISA, Berkshire Grown); two markets in Great Barrington, one in Williamstown, one was in Northampton, and one was in Springfield. Information about vendors and attendance is included below. While winter farmer’s markets included non-specialty crop vendors, the funding from this grant was used solely for promoting specialty crops. All markets were supported by additional funding from other sources.
- Promoted specialty crops at schools reaching 2,200 students (Sustainable Nantucket and Island Grown);
- Developed three seasonal shopping lists, which educate consumers about what crops are available during the off-seasons, and nutritional information and recipes for 16 specialty crops (CISA, Cape Cod, SEMAP); Shopping lists were available on-line and distributed at Farmer’s Markets. Approximately 300 hard copies were made of each and distributed.
- Held 29 canning and preserving workshops focused on preserving local crops, primarily tomatoes, apples, and crops for pickling (Sustainable Nantucket, Berkshire Grown, CISA); and
- Hosted seven dinner events that feature local specialty crops (Sustainable Boston, Berkshire Grown). The 6 AL Local Dinners had an average of 45 people per dinner. Berkshire Grown’s restaurant events worked with 25 and 19 different restaurants respectively.

The specific activities are listed in the summary of activities timeline table below.

Summary of Activities

<i>Activities</i>	<i>Completed?</i>	<i>Notes</i>
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By February 28, 2011 the Contractor will have:			
1.	Draft overall messages of the campaign (CISA)	Yes	
2.	Held a phone meeting among all the Buy Locals and NEVBGA and organize schedule of activities (ALL " All of the Buy local groups specified in Attachments C and E")	Yes	We held a phone conversation on March 21 st .
By March 30, 2011 the Contractor will have:			
1.	Written content for extending the seasons of eating for specialty crops and work with Northeast Harvest on a minimum of six radio ads (CISA, Northeast Harvest)	Yes	<p>CISA has written and produced two new ads and has shared the three ads previously produced. Northeast Harvest will finalize and produce their ads for fall airing. SEMAP also is working on ads, which were ready by June 30th. All ads will be created and aired within the grant timeframe.</p> <p>Northeast Harvest a 60-second and a 15-second ad promoting locally grown specialty crops. Ad text is attached to this report.</p>
2.	Coordinate with other Buy Local groups for input and review (ALL)	Yes	CISA has coordinated individually with each group.
3.	Researched recipes and nutritional information to promote recipes using local specialty crops. (Cape Cod)	Yes	<p>Recipes and nutritional info was developed, approved, and is now ready for distribution.</p> <p>SEMAP also prepared and disseminated nutrition information cards for</p>

		Strawberries, tomatoes, apples, and kale.
4.	<i>Purchasing & Consumption of Specialty Crops in the Schools.</i> This shall include Taste Tests and ServSafe trainings and items specified in Attachments C and E (Island Grown)	Yes See below.
5.	Held (1) one (Sustainable Nantucket) of (8) preserving workshop offered by all the Buy Locals	Yes One workshop was held on March 5 th with 6 people in attendance.
By April 30, 2011 the Contractor will have:		
1.	Continued to draft advertising content (CISA)	Yes
2.	<i>Purchasing & Consumption of Specialty Crops in the Schools: Taste Tests and school gardens</i> (Island Grown)	Yes See below.
3.	Held (1) one (Sustainable Nantucket) of (8) preserving workshop offered by all the Buy Locals	Yes One workshop was held on March 9 th with 6 people and another was held on April 5 th with 4 people in attendance.
By May 30, 2011 the Contractor will have:		
1.	Approved ad content (CISA)	Yes SEMAP also developed and approved ad content.
2.	Identified advertisement placement for advertisements and completed purchases of media and web advertising (CISA, Northeast Harvest)	Yes In addition SEMAP identified ad placements for their ads.
3.	Developed content for this project (food preserving, recipes, etc.) available to	Yes CISA has made new content on our website, editorials etc. available to other buy local groups and we serve as a

	Massachusetts Buy Local groups for use in their e-newsletters (through CISA)		conduit for info others have created.
4.	Placed project-developed content on the Buy Locals' websites (All)	Yes	<p>We were delayed in getting content approved through MDAR and then distributed. Now that we are in the height of the growing season, some of our partners may not be able to get content up on their sites for several months – though we anticipate having material available by the end of the grant period.</p> <p>CISA created a drop box folder for the Buy Locals to share material and resources- recipes and ads have been uploaded there for other organizations to use and share. Additional material will be uploaded as the work on this grant continues.</p>
5.	Held a phone meeting among all the Buy Locals and NEVBGA (All)	No	Since we held our in person meeting in this time period we did not hold a group phone call.
6.	Identified (1) one event in underserved communities, promoting health benefits of Specialty Crops (SBN)	Yes	<p>SBN is in negotiation with Haley House in Roxbury, MA about a partnership event.</p> <p>SBN created the Do It Yourself Demo Booth for the Buy Local Food Festival and partnered with how2heros to record presentations for promotion and educational outreach.</p>
7.	Held two (2) AL Local Dinners dinners (of the 6	Yes	One dinner was held in March 2011.

	planned) promote nutritional benefits and locally grown specialty crops (SBN)		One dinner was delayed to June and was successfully held on June 13 th with 40 attendees and products from 17 MA farms.
8.	Held (1) one (Sustainable Nantucket) of (8) preserving workshop offered by all the Buy Locals	Yes* note change.	Sustainable Nantucket has planned 3 additional workshops, but cancelled them due to low attendance. They are scheduling another for September and held two free-public canning demonstrations at their Farmers' market.
9.	Created easily-accessible format for recipes and nutritional information to be used in different media (e.g., printed cards, email newsletters, websites, FM use, member use) (Cape Cod)	Yes	This information is available to all in multiple formats. There are recipes and nutritional info available for 16 crops.
10.	Held ½ day meeting of Buy Locals (ALL)	Yes	Held May 24 th .
By June 30, 2011 the Contractor will have:			
1.	Launched the promotional campaigns (to continue <u>through November</u>) (CISA, Northeast Harvest)	Yes	CISA and SEMAP and Sustainable Nantucket launched promo campaigns. Northeast Harvest will begin theirs in the fall.
2.	Monitored all the ads and collect documentation (CISA, Northeast Harvest)	Yes	Ongoing.
3.	Recorded anecdotal feedback (all)	Yes	Ongoing.
4.	held the two (2) events <i>Specialty Crops in Restaurants: Farmed & Foraged</i> (Berkshire Grown)	Yes	Farmed and Foraged took place May 20-22 nd with 25 restaurants participating and Restaurant Week took place June 5-9 th with 19 restaurants participating.

<p>5. Held the program <i>Purchasing & Consumption of Specialty Crops in the Schools: Taste Tests and work with school gardens</i> (Island Grown)</p>	<p>Yes</p>	<p>Five schools completed taste tests this fall and trainings and conversations with Chartwells were completed. More training and taste tests will continue in the fall.</p> <p>During the full year of this grant funded project, Island Grown held</p> <p>taste testings of local food for 1819 students on Martha's Vineyard, 82% of all island children, both in classrooms and cafeterias. Students ranged in age from 2 to 18, at island pre-schools all the way through high schools. Some foods were prepared with students, including squash smoothies, and some were served to them in their lunch lines.</p> <p>Island Grown reports that the most important lesson they learned from this experience is that when children are exposed to new foods with their peers, and their peers are eating it, they will eat it to, and 9 times out of 10 they'll find that they love it. "The comments we got from the children were inspiring, funny, and encouraging, and the comments we heard from parents about their children's' changed attitudes towards food were wonderful to hear."</p>
<p>6. Held the program <i>Purchasing & Consumption of Specialty Crops in the Schools: Taste Tests and work with school gardens</i></p>	<p>Yes</p>	<p>Planning has been completed- but the actual taste tests will take place in the fall of 2011 with garden harvests!</p>

(Sustainable Nantucket)		10 taste tests were held in local public and private schools this fall and SN worked with 4 school gardens, impacting over 400 students.
By October 30, 2011 the contractor will have:		
1. performed ongoing media campaign (CISA, Northeast Harvest)	Yes	<p>CISA's media campaign was completed by early November. Northeast Harvest's campaign is being finalized now.</p> <p>SEMAP performed ongoing media campaign with tomato and apple ads in, edible Cape Cod, edible South Shore, SOCO Magazine, and Along Route 28 Newspaper, included in e-newsletters.</p> <p>Sustainable Nantucket ran 5 on-line ads, 3 display ads, and included promotional material in their own Nantucket Grown magazine.</p> <p>Northeast Harvest ran a 60-second ad in Middlesex and Essex Counties, and a 15-second ad throughout eastern Massachusetts</p> <p>On Boston station WBZ-AM.</p> <p>During the first week of advertising, the number of</p>

		<p>visitors</p> <p>to the Northeast Harbor website</p> <p>increased by 74% and continued to</p> <p>increase to 150% of the previous</p> <p>Average. Ten percent of Northeast</p> <p>Harbor's participating farmers contacted Northeast Harbor to</p> <p>Report that consumer traffic was up following the advertising.</p> <p>SEMAP ran ads focused on kale in</p> <p><i>edible Cape Cod, edible South Shore, SOCO Magazine, and Along</i></p> <p><i>Route 28 Newspaper, and their own</i></p> <p>E-newsletters.</p>
<p>2. performed Outreach and distribution of materials at Farmers Markets (Through November) (SEMAP, CISA)</p>	<p>Yes</p>	<p>CISA: Had material available at over 17 Farmers' Market throughout western MA.</p> <p>SEMAP:</p> <p>This work will continue through the month of November when most summer farmers' markets close for the season. SEMAP performed outreach and distribution of materials at Farmers Markets and 7 public events throughout Southeastern Mass handing out tomato and</p>

		<p>apple cards (promoting the perfect apple pie class in November with apple cards);</p> <p>SEMAP created nutrition information cards and tabled at farmers' markets and the Marion Institute's Connecting for Change Conference (3000 attendees). They Held 3 workshops at the conference, with a total of 133 attendees.</p>
3.	Held a phone meeting among all the Buy Locals and NEVBGA (ALL)	<p>Yes</p> <p>Held phone meeting with Buy Locals on Friday, September 9th.</p>
4.	held Specialty crops in Restaurants/Community Events: AL Local Dinners (2) and 1 community event (SBN)	<p>Yes</p> <p>The second of these dinners took place in July.</p> <p>Planning is underway for the remaining AL Local dinners to be completed before the end of March 2012.</p> <p>SBN attached a community-focused feature to the Boston Food Fest: 12 DIY experts presented as part of the Do It Yourself Demo Booths, which showcased how to preserve and use specialty crops.</p> <p>SBN completed their ALL Local</p>

		Dinners.
5.	Held (1) one (Sustainable Nantucket) of (8) preserving workshop offered by all the Buy Locals	Yes SN planned workshops for 5/7, 7/31 and 10/2, but cancelled all due to low turnout. In exchange they offered three free public canning demonstrations at the Farmers; market on 6/25, 7/23 and 8/13.
By November 30, 2011 the contractor will have:		
1.	Written content for extending the seasons of eating for specialty crops and work with Northeast Harvest on radio ads (CISA, Northeast Harvest)	Yes CISA is working with Northeast Harvest on finalizing their ad content now. Ad content is attached.
2.	Held Preserving and Canning Workshops (SEMAP, Northeast Harvest, Berkshire Grown)	Yes SEMAP held a tomato canning class on September 10, attended by 7 participants. Berkshire Grown hosted 9 workshops (they originally promoted 12, but had to cancel 3 due to low turnout). Press releases about the workshops were sent to 23 news organizations. CISA offered popular and well attended preserving workshops as Part of our Winter Fares in

		<p>January. Average workshop had 20 attendees, workshops focused on basic tomato and fruit canning; storage of crops, and other basic preservation techniques for specialty crops.</p>
<p>3. Held the program <i>Purchasing & Consumption of Specialty Crops in the Schools: Taste Tests and work with school gardens</i> (Sustainable Nantucket)</p>	<p>Yes</p>	<p>Island grown: Harvested 15,000 pounds of food for our schools and islanders in need through our Island Grown Gleaning program;</p> <ul style="list-style-type: none"> * Led more than 50 class periods, both in indoor classrooms and in our outdoor garden classrooms; * Brought more than 100 students on farm field trips; * Continued our support for other communities (including Puerto Rico, Charlottesville VA, Marblehead, and Nantucket) who are building their own farm to school and gleaning programs; * Five island farms are selling regularly to the schools now, with the help of Produce Connection's delivery service; * All seven schools are holding special Local Harvest Meals this year, one in the fall, one in the winter, one in the spring, and one in early summer. The first series is happening this week! <p>Sustainable Nantucket:</p> <p>Worked with 5 schools to offer both taste tests and garden support that have impacted over 400 students. So far during this grant they have offered:</p> <ul style="list-style-type: none"> *10 taste tests on specialty crops such as chard, lettuce,

		<p>beets, carrots, etc.</p> <p>*worked with 4 school gardens on planting, plant identification, and soil enrichment, etc.,</p> <p>*coordinated garden activities for afterschool community programs including the Community School, the Community Network for Children, The Teen Center, and the Boys & Girls Club.</p>
By December 31, 2011 the contractor will have:		
1. Coordinated with other Buy Local groups for input and review (All)	Yes	
2. held two (2) Holiday Farmers Markets (Berkshire Grown)	Yes	<p>The Holiday Farmer's Markets will take place on Saturday November 19th in Great Barrington and Sunday November 20th in Williamstown and on Saturday December 17th in both Great Barrington and Williamstown.</p> <p>On November 19 and 20, <i>Berkshire Grown</i> hosted more than 65 regional farmers and food producers in the Berkshires attracting more than 2,600 community members to the third annual Holiday Farmers' Markets the weekend before Thanksgiving. The markets, which help bridge the gap in locally grown food access during months when farmers' markets are not available in the region, generated more than \$45,000 in vendor income at the two four-hour Great Barrington and Williamstown markets</p>

		<p>combined, an increase of five percent over last year's November figures. The 23 specialty crops producers at these markets saw \$20,000 in revenue.</p> <p>On December 17th, Berkshire Grown repeated this success with markets that attracted more than 2,400 people and featured more than 70 regional farmers, food producers and artisan crafters. The December markets featured 21 specialty crops producers who saw \$16,000 in revenue.</p>
By January 30, 2012 the Contractor will have:		
<p>1. Held Winter Farmer's Market (CISA)</p>	<p>Yes</p>	<p>CISA is coordinating with 3 winter markets in the region to expand and promote their markets in January, which has proven to be a slow month for winter market sales. CISA's Northampton Winter Fare was held on January 14. 1000 shoppers patronized 22 vendors (half of which sold specialty products and an additional four vendors sold value-added products featuring specialty crops), spending approximately \$21,000, including \$727 in SNAP sales. A follow-up vendor survey indicated that 95% of vendors were satisfied with the market, 100% would choose to vend again, and 100% thought the market was well managed. Four workshops were attended by 120 people. Springfield Winter Fare, on January 28th, was held at the Farmers' Market</p>

		in Forest Park. There were 444 attendees, and a consumer indicated that almost half of them were attending the market for the first time. CISA offered tastings, cooking demonstrations, and workshops designed to help shoppers learn to use winter produce. Anecdotal response from vendors confirmed that sales were up considerably on that day.	
2.	Held two (2) AL Local Dinners (2) (SBN)	Yes	SBN completed their AL Local Dinners.
By February 28, 2012 the Contractor will have:			
1.	Conducted survey and gather results (ALL)	Yes	Each Buy Local group conducted different work under this project and evaluated that work in different ways. Evaluation information has been incorporated into this report in the appropriate sections.
2.	Held final phone conference (All)	Yes	
By March 31, 2012 the Contractor will have:			
1.	Provided final report with results and outcomes (CISA, all)		

Focus on Specialty Crops

The Scope of Services for this project clearly states that the project is intended to promote specialty crops in Massachusetts. This Scope of Services was attached to the subcontracts signed by each of our project partners.

The recipes, nutritional information, preserving workshops, taste tests, ads and promotional activities funded through this program focused only on specialty crops. For example, SEMAP created ads and promotional cards for strawberries, tomatoes, apples, and kale, and Sustainable Nantucket did taste tests of chard, lettuce, beets, and carrots.

Specialty dinners and farmer’s markets, by necessity included non-specialty crop items. These events were supported with additional non-specialty crop funding. However, we strongly believe that we would not have been able to achieve our goal of highlighting and supporting specialty crops, without including non-specialty crops in these venues. Diners are less likely to come to a dinner that features the bounty of specialty crops without any grains, wheats, dairies or meats. And shoppers now demand markets with a wide diversity of products. In this region, many of these non-specialty crops are produced by local farmers who sell their product directly to consumers and restaurants: they are not selling into the commodity world and are not eligible for commodity subsidies. Furthermore many farmers in our sell specialty crops as well as non-specialty crops. For instance, dairy farmers often also have sugaring operations for maple syrup on their farm as part of the same business. Many vegetable farms also raise chickens for eggs.

Goals and Outcomes

The long term goal of this project is to increase sales and consumption of specialty crops throughout the Commonwealth. The truest measures of success can be found in data collected by the National Agriculture Statistics Survey, which measures direct sales from farmers to consumers every five years. It is the NASS data that allows us to determine in a statistically valid way, how much specialty crop farmer income increased and the total value of agricultural products being sold directly to individuals. The most recent data was from 2007, prior to this project and the next survey is being undertaken in 2012 with data available by 2014.

In addition to NASS, CISA’s completes an annual survey of farmers. Surveys were distributed to 240 farms in print and made available on-line. Eighty-one farmers responded and results were tabulated using survey monkey. Data was then compared to previous year farms, by matching farm data from the two years and comparing. We found that 49% of the survey respondents’ income increased in 2011 over 2010. Over this time period specialty crop producers saw an average increase in income of \$45,500. Data for 2012 will be collected over the winter. We have shared the year-end evaluation tools with all of our partners and will support them in collecting data this winter. This tool will help all of our partners develop and maintain baseline data for measuring the impact of their programming on farmers, and changes in farm makeup, income and needs.

According to web statistics from the on-line searchable database used by many of the Buy Locals in the state including CISA, the following specialty crops were frequently searched:

<i>Search Term</i>	<i>Number of searches and % change over precious year.</i>
Honey	522, 19%
Blueberries	366, 54%

Strawberries/berry	504, 52%
Apples/Apple/Apple Picking	526, 28%
Corn	180, 61%
Peaches	160, 21%
Maple Syrup	156, -17%
Christmas Trees/Tree	227, -9
Flowers	124, 23%
Garlic	105, 13%
Pumpkins	103, -15%
Kale	56, 280%
Tomatoes	112, 79%

This data suggests that of the most frequently searched specialty crops, the majority saw an increase in the number of searches. Of the crops that were highlighted in campaigns run by the Buy Locals apples saw a 28% increase in searches, kale saw a 280% increase, and tomatoes saw a 79% increase in searches.

We also saw an increase in the number of visitors to the Buy Local websites and on-line database of farm products. The total number of visitors increased during this grant over the previous period by 69% (2.7 million versus 1.6 million) with 66% of total visits from new visitors (1.8 million). We expect that this increase in website visits will be mirrored in the NASS census which will show total direct sales of specialty crops.

New customers: if we see an increase in the direct sales, coupled with the increase in number of people that search for and specialty crops on-line and visit the Buy Local websites, then we can make a safe assumption that the number of customers has increased.

Beneficiaries:

The beneficiaries of this project were the 1,800 farmers who grow specialty crops and the hundreds of thousands of consumers who learned more about local specialty crops (including the 2200 students). Beneficiaries are from the counties of Berkshire, Essex, Franklin, Hampshire, Hampden, Essex, Middlesex, Barnstable, Bristol, Plymouth, Dukes, Nantucket and Worcester.

Lessons Learned/ Recommendation for further work

Massachusetts Buy Locals concur that growth in market outlets for local food provides both a challenge and an important opportunity for farmers and their supporters. Although the work completed through this project helped to raise awareness and create opportunity for local sales of specialty crops, market research consistently suggests that outreach must be sustained and repeated to have a long term impact. Each of our organizations will continue to look for funding to maintain the good work of this project.

Additional Information:

Exhibit 3: Survey

Exhibit 4: Survey data

Contact Information:

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Attachments:

Northeast Harvest 60-second Ad Copy

NORTHEAST HARVEST COPY 11/25 - 12/18/11

THERE IS NOTHING LIKE THE FRAGRANCE OF an evergreen IN YOUR HOME. START A FAMILY TRADITION THIS YEAR AND HEAD TO YOUR LOCAL TREE FARM TO CUT YOUR OWN HOLIDAY TREE AND ENJOY THE OUTDOORS BROUGHT INSIDE. BY SUPPORTING LOCAL AGRICULTURE, YOU ARE SUPPORTING THE LOCAL ECONOMY. Look to NORTHEAST HARVEST DOT COM and you'll FIND THE FARM NEAREST YOU. Northeast harvest.com will help you locate GREENS FOR YOUR HOME, FRESHLY CUT OR HAND-CRAFTED INTO WREATHS, GARLANDS AND holiday arrangements. How about GIFTS OF local wine, artisan CHEESES, and HONEY? Or FRESH EGGS AND DRIED

GARDEN HERB for the kitchen? HOW ABOUT A SHARE IN A CSA? COMMUNITY SUPPORTED AGRICULTURE HELPS FARMERS plant IN THE SPRING AND YOU GET FRESH VEGETABLES AND MORE THROUGHOUT THE SUMMER AND INTO THE FALL. What a great gift. So before you head OVER THE RIVER AND THROUGH THE WOODS head to www.northeastharvest.com and find a A FARM, FARM STAND, OR FARMERS MARKET THIS SEASON. SUPPORT LOCAL AGRICULTURE THE HEALTH OF OUR LOCAL ECONOMY visit. NORTHEAST HARVEST DOT COM....CONNECTING THE CONSUMER TO THE FARM

Northeast Harvest 15-second Ad copy

EVERYONE WANTS THE BEST FOR THEIR HOLIDAY! DISCOVER FRESH, FLAVORFUL, DELICIOUS APPLES, PUMPKINS, WINTER VEGETABLES PLUS TREES AND GREENS, AT YOUR LOCAL FARMERS' MARKET OR FARM STAND. FIND ALL OF THESE AND MORE AT NORTHEAST HARVEST DOT COM – WHERE THE CONSUMER MEETS THE FARM.

New England Small Farm Institute (NESFI): Jump-starting Local Fruit and Nut Specialty Crop Production and Marketing in Massachusetts (FINAL REPORT)

Project Summary

a) *Background*

According to a recent study¹, only 25% of specialty fruit crops currently purchased in Massachusetts are grown in state. *The purpose of this Project is to increase this number.* Orchard start-up can be a daunting endeavor, whether for new farmers or experienced farmers looking to diversify. This is particularly so when plans include planting, managing and marketing unfamiliar “specialty” crops. Challenges include: 1) a lack of information, practical, hands-on training, and experienced mentors; 2) low profitability of wholesale markets; 3) rising cost of fertilizers, pesticides and herbicides associated with conventional production practices; 4) lack of public familiarity with the taste and nutritional value of many (if not most) of the novel specialty crops that can be grown in Massachusetts; and 5) long lag time between orchard start-up and first harvest income. This Project offers an innovative and practical approach to addressing these challenges – by establishing and managing a demonstration teaching orchard of specialty crop fruits and nuts² suited to Massachusetts soils and climate; using the orchard site for in-depth training and mentorships in crop production; adopting, developing and testing the highly successful CSA model for direct marketing and

¹ Timmons, D.Q. Wang, and D. Lass (2003) Local Foods: Estimating Capacity. *Journal of Extension* 46:5, Article # 5FEA7, accessed on 15 April 2010 at <http://www.joe.org/joe/2008october/a7p.shtml>. This statistic (“25% of the fruit currently purchased in MA is grown locally”) excludes cranberries. Since nearly all (99.995%) of the cranberries grown in MA are shipped out of state, they skew the import statistics significantly, giving an inaccurate picture of the local fruit-growing sector overall. The figure includes apples, blueberries, pears, peaches, strawberries and raspberries. Since all citrus is shipped from out of state, including it would further decrease the percentage of locally grown fruit.

² The orchard is being established at Lampson Brook Farm, a 400-acre, publicly owned demonstration and training farm managed by New England Small Farm Institute and located in Belchertown, MA.

distributing orchard products; and testing the efficacy of permaculture practices and innovative methods for reducing lag time to first harvest.

b) Importance and timeliness of the project

During the two-year grant period, the United States and New England have experienced an unusual series of extreme weather events, ranging from a freak Halloween snowstorm to the most severe drought in 50 years, and from a hot, early spring with late frost to two massive and destructive hurricanes (Irene and Sandy)—all of which have had a profound impact on agriculture and have raised public awareness of climate change as a present reality and not just a vague future possibility. Permaculture was developed to create resilient agricultural systems that could withstand the effects of climate change and fossil fuel scarcity and provide food security in the face of disruption—a “permanent agriculture.” By its nature, perennial agriculture is deeply rooted, providing a buffer from drought, wind, and weather that would wipe out an annual crop. I witnessed the contrast between annual and perennial agriculture starkly during the project, as my annual crops withered in the extended heat wave and drought even with weekly watering while my newly-planted, deeply-mulched trees stayed fresh and vibrant being watered only once every six weeks.

In addition to sturdy perennial root systems, this project employs a range of other drought-proofing strategies: keyline plowing, irrigation ponds and gravity-fed drip irrigation, biochar, ramial wood chips, soil drenches and inoculation to encourage deep vigorous root systems, and deep infrequent watering. These will be discussed in more detail later in this report.

Perennial crops have been shown to retain water five times more effectively, preserve topsoil 54% more effectively, and sequester 50% or more extra carbon than annual crops.³ At the same time, they require significantly less fossil fuel use for plowing, planting, weeding, and harvesting while improving soil structure and soil biology. While perennial crops aren't likely to completely replace annual crops, they can increasingly supplement a healthy diet, contributing a wide variety of specialty crops such as: tree fruits and berries, perennial vegetables (over 50 kinds for the New England region, from asparagus to bamboo shoots to perennial kale, broccoli, and tender Tilia leaf salad), nuts (chestnuts, walnuts, hardy pecans, hicans, and butternuts), medicinal plants, herbs, and flowers. A typical forest garden, such as this Project, interplants a wide variety of perennials, fulfilling many human and ecosystem needs, including wildlife and pollinator habitat, soil building, water and nutrient retention, carbon sequestration, beauty, peace, and refuge. It addresses some of humanity's most pressing (and increasingly expensive) problems, including climate change.

c) Connection to previous Specialty Crop Block Grants

To the best of my knowledge, this is the first project of its kind, using agroforestry and permaculture practices to grow and market a variety of specialty crop fruits, berries, and nuts using the CSA model. It does, however, build on ideas that have proven successful in previous Specialty Crop grant projects, especially the “buy local” and CSA

³ Glover, J. D., C. M. Cox, J. P. Reganold (2007). Future Farming: a return to roots? *Scientific American* **297**, 82-89.

movements pioneered by many Specialty Crop projects and the berry CSA model so masterfully demonstrated by the Agriberry CSA project in Virginia in 2008.

Project Approach

a) *Activities and Targets:*

During the two-and-a-half-year Project period, the following activities have been accomplished in fulfillment of Project goals:

A) DEMONSTRATION: Established Demonstration Specialty Crop Plantings (ongoing) and recruited CSA members

B) EDUCATION: Conducted Producer Training and Education

C) OUTREACH: Conducted Outreach to Potential Specialty Crop Orchardists

Follow-up surveys of Project participants have documented the following measurable outcomes:

- **Target ONE outcome:** CSA members reported an average 36% increase in consumption of Massachusetts-grown specialty crop fruits during distribution weeks, with a range from 18% to 72%, up from a baseline of 0% for most members.
- **Target TWO outcome:** Of 155 Project participants (13 CSA trainees, 60 workshop participants, 40 Permaculture CSA Species Calculator users, and 42 tour participants) who received training sponsored by the NESFI demonstration fruit-and-nut specialty crop orchard:
Nine participants are either launching, helping to launch, or planning to launch new MA fruit-and-nut specialty crop CSA enterprises, or adopting, on an existing MA CSA farm, techniques learned through the project. Once established and depending on CSA membership size, these new fruit-and-nut CSA's will have the potential to meet or exceed our target to serve cumulatively and annually 2,000 CSA members, produce 250,000 pounds of local fruit, generate \$600,000 in net orchard income, and reduce CO2 emissions by 160 tons through lower transport miles.⁴

b) *Benefit to commodities other than specialty crops*

Not applicable.

⁴ For Measurable Outcome calculations, see attached Appendices. Please note that the CO2 reduction number does not include sequestration from biochar use, which hasn't yet been calculated and which may be significant.

c) Contributions and roles of project partners

- UMass Amherst, Stockbridge School of Agriculture, has been an essential partner, including the following programs and professors:
 - Dr. John Gerber, Director, Sustainable Food and Farming (SFF) Program, Permaculture concentration – advising and support in development of the Forest Garden CSA practicum course, including adding it to the core curriculum and arranging for presentations and tours of the project for his Sustainable Agriculture (25 students) and Sustainable Living (100-300 students) classes. Many practicum students have learned about the course through these presentations.
 - [UMass Permaculture Initiative](#) – Trainee recruitment and collaboration on permaculture curriculum development, including future permaculture graduate program
 - Dr. Wes Autio, Director, Stockbridge School of Agriculture, Pomologist at Cold Spring Orchard research station – monitoring and advising on paw paw and strawberry-biochar research as part of Master's degree research.
 - Dr. Rob Wick, Professor, Mycology and Plant Pathology – advising on the mycorrhizal aspects of the strawberry-biochar and morel research.
 - Dr. Baoshan Xing, Professor, Environmental Chemistry, Biochar expert – overseeing research and advising on biochar.
- New England Biochar – manufacture, training and technical support for the Adam Retort for biochar production
- Pioneer Valley Biochar Initiative (PVBI) – advising on biochar research
- Northeast Organic Farming Association (NOFA) – networking and outreach
- Permaculture Institute of New England (PINE) – networking and outreach
- Western Massachusetts Permaculture Guild – networking and outreach

Goals and Outcomes Achieved

a) Activities to achieve performance goals and measurable outcomes

A) DEMONSTRATION: Establish Demonstration Specialty Crop Plantings (ongoing) and recruit CSA members

Over 100 specialty crop fruit trees and berry bushes have been planted to date, including: apple, peach, plum, apricot, cherry, pawpaw, mulberry, blueberry, strawberry, Juneberry, raspberry, blackberry, black raspberry, and companion herbaceous perennials. Installation of a 30x96 foot EQIP high-tunnel hoophouse greatly expands the season of fresh specialty crop fruit for CSA members and generates early-year orchard income. Five hundred square feet of hoop house beds have been planted to day-neutral gourmet strawberry varieties (Seascape, Mara des Bois, and Albion) in a research trial with four different levels of biochar.

(Research trial results will be available next year.) These strawberries will command premium prices due to off-season sales and organic, wild-berry gourmet quality. Other hoop house beds are planted to blackberries, black raspberries, and perennial vegetables; fig trees will be planted in the spring, with the remainder of the space to be used for nursery propagation. Another research trial of 32 pawpaw trees, half Root Production Method (RPM) stock and half ordinary nursery stock, were planted to compare the different rooting methods, as measured by years to maturity, yield, height, shoot length, and trunk diameter. This is a long-term trial and will be monitored for the next ten years.

The following **drought-proofing techniques** are being practiced on the site, including:

1. **Keyline practices** – Using Keyline practices, water is stored in the landscape in two ways: in the soil itself (by deepening topsoil and rooting depth using a Yeoman's chisel plow and tap-rooted cover crops) and in irrigation ponds (located high on the land and at the keypoints).⁵ Using keyline plowing and ponds for water management and topsoil production has cost no more than hooking up to town water on the Belchertown site, while at the same time eliminating future water bills, providing a more versatile model for those on remote sites to follow, and buffering against the effects of drought and future climate change.
2. **Irrigation ponds** – We excavated three ponds (30 x 90 feet, 35 feet diameter, and 10 x14 feet) with a combined capacity of over 100,000 gallons, enough to provide gravity-fed drip irrigation to orchard plantings during a three-month drought.
3. **Drip irrigation** – Used throughout the site and in the hoophouse, drip irrigation, buried under deep mulch, delivers water directly to the plant root zone, dramatically boosting water efficiency.
4. **Biochar** – We are applying biochar (agriculturally-beneficial charcoal produced through pyrolysis) in plantings throughout the site, using the New England Small Farm Institute's new Adam Retort to produce quarter-ton batches from scrap wood from neighboring sawmills. Biochar has been shown to reduce the effect of drought, enhance agricultural production, reduce runoff of fertilizers and other agricultural amendments, and sequester carbon in the soil for hundreds to thousands of years, thereby reducing the effects of global

⁵ The keyline is the contour line where a slope begins to flatten, transitioning from convex to concave. A Yeoman's chisel plow is used along this line and in parallel passes throughout the land in a sophisticated system of contour plowing. The keypoint is a point on the keyline, corresponding to the inner crook of the valley contour, where water accumulates and can be efficiently stored and redistributed throughout the orchard system.

warming. Biochar is being used in planting holes (up to 10% by volume) and under mulch.

5. **Ramial wood chips** – Ramial wood chips are chipped branch-wood three inch diameter or less, which have been shown to contain a wealth of plant nutrients, boosting plant health and retaining water, especially effective in orchard settings. We are generously applying ramial chips as a mulch to all plantings from a large supply from last year's Halloween storm damage.
6. **Soil drenches** – Drenches include liquid fish, milk, seaweed, and molasses, all of which stimulate the soil microbial community. We are using drenches in combination with biochar to encourage deep, vigorous rooting and have seen good results.
7. **Root inoculation** – At planting time, we inoculate roots with beneficial bacteria and mycorrhizal fungi. Mycorrhizal hyphae extend root-reach and access to water and nutrients many meters beyond the root tips.
8. **Deep infrequent watering** – Plants become more drought resilient and roots deepen with thorough, infrequent watering.

Ten CSA members were recruited and provided with a reduced harvest share during the inaugural year (2012). As the orchard reaches maturity and production increases, membership will grow and choices of share type will expand to include: Fruit Explorers share, dried fruit share, gourmet mushroom share, perennial veggie share, and nut share. Current CSA members were surveyed to determine their baseline fruit consumption and the change in proportion of MA fruit consumed.

B) EDUCATION: Conduct Producer Training and Education

The specialty crop demonstration plantings are being used as a training tool for aspiring fruit and nut growers through internships, classes, workshops, tours, and distribution of web-based educational materials. We have just completed the second year of a nine-month UMass practicum course for students of the Stockbridge School of Agriculture's Sustainable Food and Farming Program, Permaculture Concentration. Thirteen students have taken the course to date, seven in year one and six in year two. Five of these students have since graduated and gone on to work on farms in MA and elsewhere in the U.S. and abroad. One student served as a consultant to the Eritrean Ministry of Agriculture co-managing the country's first efforts to produce culinary and medicinal mushrooms. Another student, for her senior thesis, is designing a community forest garden for the town of Marshfield, MA, where her father is the Town Planner. Five of the trainees are in the planning stages of establishing a permaculture specialty crop CSA and several are currently working on

established CSA farms and introducing methods they learned during the training. The practicum course blends lecture, hand's-on learning in the field (grafting, propagation, soil analysis, sheetmulching, pond construction and keyline concepts, etc.), field trips to permaculture sites in New England (Tripple Brook Nursery, Whole System Design, and others), and student design projects and presentations. (Practicum syllabus and course schedule attached.)

In addition, the Project Manager gave tours to individuals, classes, and groups of all kinds, including the MA Commissioner of Agricultural Resources (MDAR), the Commissioner of the Division of Capital and Asset Management (DCAM), and other MA agency officials. I gave workshops, presentations, and tours to UMass groups and classes, from the UMass Permaculture Initiative Steering Committee to Sustainable Agriculture classes (25 students) and Sustainable Living (300 students). At most of these events, I gathered names of those interested in receiving a copy of the Permaculture CSA Species Calculator (see details below) and disseminated either the spreadsheet or the web-link.

C) OUTREACH: Conduct Outreach to Potential Specialty Crop Orchardists

The Project Director has disseminated resource lists, articles, and a Permaculture CSA Species Calculator to MA fruit and nut growers through a detailed online website, meetings, and a brochure, as well as provided agricultural consulting as requested by growers. Two articles on the Project (one on drought-proofing and one introducing the Calculator) will be submitted to the national permaculture trade journal, *Permaculture Activist*, when the journal's theme for a future issue is appropriate. These articles will also be disseminated to the state and regional permaculture listservs.

The Calculator spreadsheet is a tool I developed for growers, allowing them to plug in the number of shareholders they want to grow for and calculate fruit, berry, and nut species that will provide a steady supply of food throughout the growing season, as well as fertility plants and land area required. Growers seem to find it very helpful, and I see it as one of the most important outcomes of the Project. (See Permaculture CSA Species Calculator attached.)

b) *Progress made toward long-term outcomes*

I am, for the most part, encouraged. I knew when I set my targets that they were very ambitious, perhaps overly ambitious, but I felt strongly they were the targets we need to meet to address the problems we face, especially climate change. The road has risen to meet me in many astonishing ways, and I no longer feel I am doing this alone. While these targets are still ambitious, we are well on our way.

The major obstacle to meet our long-term targets is farmer access to land. The students I've taught who are in the planning stages of establishing a specialty fruit-and-nut CSA are, without exception, blocked by their lack of access to land. I know others who are rallying aspiring permaculture growers to find cheap land in the West and mid-

West to start permaculture enterprises, but I hope to find a way to keep this energetic, talented pool of farmers here in the Commonwealth. Although I have what I believe to be a well-designed plan to address land access (partnering aspiring fruit-and-nut CSA farmers with existing veggie CSA's – detailed in my Specialty Crop Block Grant proposal as Phase 2), I confess I don't have full confidence that it will be enough to tackle such a large and systemic problem. A policy making available marginal municipal and state land to agro-forestry growers would offer a win-win-win-win solution, providing: 1) tending and care for neglected land; 2) fresh, novel and delicious, locally-grown food to MA citizens; 3) employment for the growers; and 4) sorely needed tax revenue for the Commonwealth. In the meantime, I believe my original plan holds promise, though land availability is still likely to be a frequent barrier.

c) *Actual accomplishments vs. goals*

See details under **Major successful outcomes of the project** below.

d) *Baseline data and progress toward targets*

Baseline data has been gathered on CSA member fruit consumption, both weekly average consumed and percentage of that grown in MA. Trainees were surveyed before attending and upon completion of the practicum course to gauge interests, plans, and intentions. After completion, they are surveyed periodically to track their progress and to offer any assistance they might need in pursuing their dreams. Other baseline data gathered that is less directly related to Project target outcomes but important to show the long-term impact of the project, include soil tests, keyline penetrometer readings, pawpaw RPM trial research data, and strawberry-biochar trial research data. Other data that would be ideal to gather and track over time would be: population data on pollinators, earthworms, and other beneficial insects, frogs, bats and birds; soil food web baseline data and mycorrhizal community density; and wind speed at ground level (which will change as windbreaks and tree crops grow). My hope is to recruit grad students to collect some of this baseline data and then to track changes over time as the forest garden evolves and develops. Some of this surveying could also be done by citizen-scientists, as part of or modeled after the FrogWatch program (run by the Association of Zoos and Aquariums).

e) *Major successful outcomes of the project*

During the two-and-a-half-year Project period, follow-up surveys of Project participants have documented the following measurable outcomes, as compared to anticipated targets:

- **Target ONE:** An anticipated 25% annual increase in consumption of Massachusetts-grown specialty crop fruits within the model CSA customer base. **Actual:** CSA members reported an average 36% increase in consumption of Massachusetts-grown specialty crop fruits during distribution weeks, with a range from 18% to 72% (depending on the amount of fruit typically eaten per week and size of fruit share), up from a baseline of 0% for most members. This percentage is expected to rise over time as the CSA shares increase in size, as the orchard reaches maturity and becomes fully productive.

- **Target TWO:** Of 200 Project participants (CSA trainees, workshop participants, and Permaculture Design Certificate (PDC) candidates) who receive training sponsored by the NESFI demonstration fruit-and-nut specialty crop orchard (including classes, workshops, intensive trainings, and web-based educational materials about agroforestry, RPM, and CSA marketing), *eight farmers will launch new MA fruit-and-nut CSA enterprises or adopt new production methods* using techniques learned through the Project. Once established, these new fruit-and-nut CSA's will cumulatively and annually serve 2,000 CSA members, produce 250,000 pounds of local fruit, generate \$600,000 in net orchard income, and reduce CO2 emissions by 160 tons through lower transport miles.
 - Actual:** Of 155 Project participants (13 CSA trainees, 60 workshop participants, 40 Permaculture CSA Species Calculator users, and 42 tour participants) who received training sponsored by the NESFI demonstration fruit-and-nut specialty crop orchard (including classes, workshops, educational tours, and web-based educational materials):
 - **One tour participant** – is launching a new fruit-and-nut CSA enterprise in MA
 - **One Calculator user** – is launching a new fruit-and-nut CSA enterprise in VT
 - **4 CSA trainees** – are helping launch new permaculture farm enterprises (one in MA, one in NY, one in ME, and one in Eritrea)
 - **5 CSA trainees and one tour participant** – are in the planning stages of launching new MA specialty fruit-and-nut CSA enterprises
 - **1 farmer** – is adopting, on an existing MA farm, new production methods using techniques learned through the Project
 - **2 CSA trainees** – are helping a farmer adopt new production methods using techniques learned through the Project (one in NY and one in Portugal)
 - **1 CSA trainee** – is adopting new production methods using techniques learned through the Project (polyculture plantings with heritage apples) in a research project at the UMass Cold Spring Orchard research station to benefit fruit-and-nut CSA growers
 - **1 CSA trainee** – is designing a community forest garden for the town of Marshfield, MA⁶

While it is difficult to predict at this point what the economic and environmental impact will be of these new and adoptive enterprises, **Nine participants⁷ are either launching, helping to launch, or planning to launch new MA specialty fruit-and-nut CSA enterprises, or adopting, on an existing MA CSA farm, techniques learned through the project. Once established and depending on CSA**

⁶ Four interns are counted twice in this list because they are moving toward their goals of farm establishment by simultaneously helping another farmer launch a new enterprise or doing permaculture-related research while planning their own enterprise. All are wisely gaining skills and experience while planning their own future enterprises.

⁷ None of the nine participants included in the economic and environmental outcome calculations are counted more than once. Details about participants and their activities are available on request.

membership size, these new fruit-and-nut CSA's will have the potential to meet or exceed our target to serve cumulatively and annually 2,000 CSA members, produce 250,000 pounds of local fruit, generate \$600,000 in net orchard income, and reduce CO2 emissions by 160 tons through lower transport miles. Other participants are involved with enterprises located out of state, which will have similar economic and environmental benefits elsewhere, and which will indirectly benefit MA through reducing global greenhouse gas emissions.

Research Summary:

Two research trials were begun during 2012. Presented here are preliminary results. The first trial compared the growth of pawpaw trees using two different rooting methods: Root Production Method (RPM) and standard containerized seedlings as a control. Terminal shoot length was significantly greater in the RPM trees than in the control. RPM trees were significantly taller both on arrival and one year later. Leaf number, leaf size, and overall vitality showed no significant differences. Insect damage was significantly less in the RPM trees.

The second trial compared strawberries grown with three different levels of biochar (5,10, and 20 tonnes per acre) versus a control without biochar. No statistically significant difference was found in yields among the strawberries grown using the varying levels of biochar. There were statistically significant differences in yield between varieties, with Seascape bearing most heavily, Mara des Bois bearing a greater number of berries of lower weight, and Albion bearing very little. (Biochar often shows little to no effect during its first year of application, as it becomes charged with nutrients and a beneficial microbial community, only showing a beneficial effect the following year and thereafter, so next year's results may be more meaningful.)

[See also Exhibit 5: Preliminary Results for more research information](#)

[See also Exhibit 6: Brochure and Link to Calculator](#)

Beneficiaries

a) Groups that benefited from the project's accomplishments include:

- 10 CSA members – The CSA members are ordinary folks, half of whom have never belonged to a CSA before and most of whom buy their groceries from a supermarket. Several of them weigh and measure their food, making tracking the changes in their eating habits easy and reliable.
- 13 CSA trainees – Nine of the trainees were UMass Sustainable Food and Farming majors, one was a UMass Public Health major, and three were Hampshire College students. Most had some farming experience and some had extensive experience; two had received a Permaculture Design Certificate before taking the practicum. They ranged in age from 19-25.

- 60 workshop participants – Workshop participants at the NOFA summer conference included experienced growers, permaculturists, exploring and aspiring growers, and gardeners.
- 42 tour participants – People who have toured the site included UMass Permaculture Initiative Steering Committee members, UMass Sustainable Agriculture students, those in the planning stages of starting a Fruit-and-nut CSA, the MA Commissioner of Agricultural Resources (MDAR), the MA Commissioner of the Division of Capital and Asset Management (DCAM), and MA state agency staff, home growers, and people who were just intrigued.
- 40 Permaculture CSA Species Calculator users – These included interested UMass students, experienced growers, permaculturists, farmers converting an existing farm to a perennial agriculture system, growers establishing a new permaculture specialty crop CSA, gardeners and homeowners, Carbon Farming workshop participants, New England Permaculture Convergence Farmer's group members, NOFA workshop participants, and others.
- Unquantifiable number of website users – I expect this number to increase after publication of the articles below.
- Readers of articles in the *Permaculture Activist* (yet to be published) – 10,000 readers per issue, ranging from experienced permaculture teachers, authors, and experts, to aspiring growers to gardeners and the curious.

b) Potential economic impact of the project

Once established and depending on CSA membership size, the nine new MA fruit-and-nut specialty crop CSA's established as a result of the Project will have the potential to serve cumulatively and annually 2,000 CSA members, produce 250,000 pounds of local fruit, and generate \$600,000 in net orchard income. Another indirect, but real, economic impact of these new CSA's will be the reduction in CO2 emissions by 160 tons through lower transport miles. (As the 2006 Stern Report⁸ demonstrated, the economic impact of climate change will become crippling in time if not addressed, costing up to 20% of global GDP, so any measure helping to prevent this eventuality offers an economic benefit.)

Over the extended ten-year Project monitoring period, the demonstration CSA will continue to train farmers through internships, workshops, online education, and Permaculture Design Certificate trainings, helping to launch an additional average of three fruit-and-nut CSA's per year. If each new fruit-and-nut CSA enterprise trains an average of three aspiring specialty crop growers each year, and if every other year one of them goes on to start a new fruit-and-nut CSA of their own and continues the mentoring process, it is projected that at the end of the ten-year Project monitoring

⁸ Stern, N. (2006). "[Stern Review on The Economics of Climate Change \(pre-publication edition\). Executive Summary](#)".

HM Treasury, London. Archived from [the original](#) on 31 January 2010. Retrieved 31 January 2010.

period, *over eighty new fruit-and-nut specialty crop CSA's will have been started in MA, serving 29,600 CSA members, and annually producing 3.7 million pounds of local fruit, generating \$8.9 million in orchard income, and reducing carbon emissions by 2,400 tons.*⁹

Lessons learned

During early specialty crop orchard establishment, careful site assessment and securing a reliable, on-site water source are both critical. Rainwater catchment is ideal, so as not to be in the position of having to compete (and pay!) for town drinking water or dig an expensive lined well. My goal during site design was to create enough water storage to weather a three-month drought, and though I wondered as we dug if this might be overly generous, after this summer's drought I believe three months may be a good rule of thumb for New England farmers in the coming years.

Implementation of an integrated drought-proofing strategy is essential to success and should include some or all of the following: irrigation ponds and gravity-fed drip irrigation, keyline plowing, use of biochar and deep ramial wood chip mulch, soil drenches and inoculation to encourage deep vigorous root systems, and deep infrequent watering.

The other lesson learned is about luck and timing. The time is ripe! Customers are ready to buy specialty crop fruit CSA shares and willing to join a waiting list for future harvests. Students are eager to start permaculture specialty crop enterprises and are motivated to work hard to fulfill their dreams and benefit all of us with Massachusetts-grown, climate-friendly specialty crop fruits, berries, nuts, and other forest garden products. And amazingly, colleges are ready to start permaculture degree programs. A pipe dream five years ago to have a permaculture study program at UMass has not only been fulfilled, but surpassed. In two short years, from a small student-initiated permaculture garden outside a dining commons and a single Permaculture course in the curriculum, there is now a formal permaculture concentration, and a permaculture graduate degree in the works. (I've been asked to design and teach a course for the new graduate program.) Doors are flying open!

And it's none too soon. With the drought this summer and the largest hurricane on record flooding the New York City subway system, people are waking up to the realities of climate change and sea level rise, and are perhaps now hearing scientists say, one after another, that the changes they've been predicting are happening sooner and faster than expected. While not a panacea, the sturdiness and resilience of perennial, specialty crop agriculture and the drought-proofing techniques demonstrated in this Project offer residents of the Commonwealth one safety net, a secure food system that heals the Earth as it feeds our bellies.

Contact:

⁹ CO2 reduction numbers do not include sequestration from biochar use, which hasn't yet been calculated, but could be significant.

Susanne Hale
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Pond and Lake Water Quality Research Snapshot to Identify Ponds and Lakes linked to Cranberry Bogs that may require Phosphorus TMDLs (FINAL REPORT)

Project Summary

CCCGA recognized a need to assess water quality conditions in ponds and lakes connected to cranberry bogs in anticipation of TMDL regulations. TMDLs are documents that identify the Total Maximum Daily Load of a contaminant that is causing impairment within a water body. A draft TMDL released by MassDEP for White Island Pond in Plymouth identified cranberry bogs as a primary source of phosphorus, the contaminant of concern in that pond. That draft TMDL includes the need to apply a particular method for estimating the contribution of phosphorus from cranberry bogs to ponds and lakes. This method, which is largely based on data collected for DeMoranville and Howes (2005), allowed MassDEP to generally estimate the

phosphorus contribution from the bogs rather than measure phosphorus contributions directly from individual bogs. Given that TMDL provisions of the Clean Water Act will eventually need to be addressed, SMAST proposed to work with CCCGA on an integrated pond sampling and assessment project that will identify ponds with attached bogs that will require water quality management and those that will not. Cranberries, as a native wetland species, requires fresh water for irrigation, harvest, and frost control. It is important for cranberry growers to understand their farm's role within the local environment and to ensure they continue to have access to fresh water.

Our goals with this project were to:

- Create a water quality baseline for assessing the water quality conditions in freshwater ponds associated with cranberry agriculture in southeastern Massachusetts
- Pilot a streamlined sampling program that can readily be expanded to provide the cranberry industry with high quality, independently-generated water quality data for evaluating claims of nutrient impairment
- Survey the potential extent of TMDL regulation for pond water quality as a significant consideration for future cranberry bog operation
- Collect level 1 data that can form the basis of management planning by the industry

Project Approach

CCCGA documented the ponds in Southeastern Massachusetts and Cape Cod that fit criteria for size (greater than 10 acres) and were within 100 meters of cranberry bogs and included cranberry bogs which discharged waters into the pond. The list was narrowed after evaluation of several criteria, including the ease of access to the pond, whether an existing bathymetric map existed, and whether there were any documented water quality issues. Bathymetric maps were sought so that samples could be obtained from the deepest point in each pond. Ponds were also cross-referenced against the MassDEP unified list and whether they were listed as requiring a TMDL.

Access to 11 of the 20 ponds was provided by adjacent cranberry bog owners while the remainder was accessed through public boat ramps. Bathymetric maps existed for 15 of the 20 sampled ponds; for the ponds without a bathymetric map, UMass Dartmouth School for Marine Science Technology's

Coastal Systems Group (SMAST-CSP) staff conducted informal depth surveys to find the deepest location during their sampling procedure.

All ponds were sampled between September 13 and 27, 2011, within the sampling window within the sampling protocol developed by SMAST-CSP for the Cape Cod Pond and Lakes Stewards program. Samples were transported in coolers with ice packs to the Coastal Systems Analytical Facility in New Bedford. Duplicate quality assurance (QA) samples were collected and analyzed. All samples were delivered to the Analytical Facility within six (6) hours of collection.

The results of the analysis was compiled in a Technical Memorandum and distributed to our grower members. Ed Eichner, researcher at SMAST-CSP, presented the finding of this project to cranberry growers at our annual Winter Meeting. That meeting had an attendance of 184 cranberry growers

Contributions and Roles of Project Partners

Since every pond sampled has cranberry bogs associated with the water body, CCCGA staff contacted the growers who owned or farmed bogs adjacent to the pond. Where public boat ramps did not exist, these growers allowed SMAST-CSP staff to access to their property so as to access the pond for launching a boat.

Outcomes and Accomplishments

Long term, CCCGA hopes to continue to measure ponds associated with cranberry farming to better obtain baseline data on the water quality within ponds in the region. The outcomes of this project matched up exactly with the goals in our Contract.

GOALS/OBJECTIVES	ACCOMPLISHMENTS
Pond Selection	<p>May 2011: CCCGA met with SMAST staff to determine criteria</p> <p>June 2011: List of ponds sent to SMAST for review</p> <p>June 2011: List finalized</p> <p>August: Growers were contacted about study and access to pond</p>
Sampling	September 13-27, 2011: All 20 ponds were sampled
Laboratory Analysis	September –October 2011: all samples were analyzed for pH, alkalinity, chlorophyll a, phaeophytin, total nitrogen, and total phosphorus
Water Quality Assessment and Technical Memo	<p>January 2012: Technical memorandum authorized by Ed Eichner and Brian Howes of SMAST-CSP presented to CCCGA</p> <p>March 21, 2012: Ed Elchner presents findings of study to cranberry growers at CCCCGA’s Winter Meeting in Hyannis, MA</p>

Data

The data that was collected is best summarized within the Technical Memorandum (attached) and displayed graphically within multiple charts.

Outcomes

This project was successful for completing all of the objectives that were laid out within Attachment B: Work Plan. As a result of this project, we now have strong data on the water quality of twenty additional ponds within the cranberry growing areas of Southeastern Massachusetts. The twenty ponds sampled support approximately 1180 acres of cranberry bog owned by 30 different farmers. The data is helpful for all growers, however, as it gives the entire industry a better look at the water quality of representative ponds throughout the cranberry growing area of the state.

In March 2012, we had Ed Eichner from SMAST presented his findings at the CCCGA Winter Meeting and Environmental Workshops. He delivered a 30-minute presentation and answered questions from the audience. We had close to 300 growers in attendance. We also published an article in our newsletter in April 2012, describing the results of the study (attached). Our newsletter goes out to over 500 people, which includes all of our grower members, plus related industry and association contacts.

Beneficiaries

The chief beneficiary of this study are the cranberry growers of Massachusetts. Those growers who have bogs near the ponds studied benefit from knowing some important attributes of those ponds. The industry as a whole also gains from having this data as this serves to elevate the conversation about a water quality of ponds through the inclusion of science rather than a reliance on emotional reaction.

In addition to cranberry growers, this study benefits the many people and families that have homes on the ponds studied. They now have data about their pond. And because the long-term goal of this project is facilitate cranberry growers, who own over 40,000 acres of land in southeastern Massachusetts and Cape Cod, to be able to keep the water quality of ponds high, this project benefits anyone who uses the outdoors: anglers, boaters, hunters, swimmers, and more

This project was an important first step for not only the cranberry industry in having baseline data on ponds associated with cranberry production but also for the scientific community and environmentalists, as there is not much data on the water quality of ponds in the region.

Number of Beneficiaries

Cranberry growers, specifically: 30

Acres of bog in relation to ponds sampled: 1180

Cranberry growers, statewide: approximately 400

Acres of bog, statewide: approximately 14,000

It is difficult to assign an economic value or impact of this project. Healthy water bodies are vital to the cranberry industry, an industry with a crop value of \$100 million in 2012. Cranberry production and the businesses that support it employ some 5000 people in Massachusetts. An earlier study by CCCGA found that for every dollar spent in renovating a cranberry bog that 85 cents was spent locally either in hiring workers, equipment operators, and buying supplies. A thriving cranberry industry in

Massachusetts contributes greatly to the local economy but it is only possible with clean and healthy wetland ecosystems.

In addition, healthy ponds contribute greatly to the natural environment that this region is known for and helps to boost the local economy through tourism dollars and real estate values.

Lessons Learned / Project Review

This project allowed us to compile hard scientific data concerning water quality on twenty ponds associated with cranberry production. This baseline data provides us a start on building a more thorough base of knowledge among cranberry growers, local residents, and scientists. The project successfully hit all of our targets and objectives through smart planning and communication between CCCGA, as the project manager, and the researchers at SMAST-CSP who provided the technical expertise to undertake this project. In the future, we look forward to continuing to work toward better understanding the relationship between cranberry production and the health of the ponds and wetlands throughout Southeastern Massachusetts and Cape Cod. Having access to healthy ponds and wetland ecosystems is critical to the long-term health of the cranberry industry. This project provided an invaluable start toward that goal and we plan to continue to work toward monitoring the water quality of those ponds associated with cranberry production.

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Please see Exhibit 7: For the official summary of the research project.

Surveillance, Detection and Best Management Practices for *Phytophthora infestans*

1) A Project Summary

Phytophthora infestans which causes late blight of potato and tomato is well known for the devastating famine of the 1840's in Ireland. Over time, the emergence of the science of plant pathology, the development of modern fungicides, and integrated pest management practices came together resulting in a level of disease control which allowed for acceptable yields even in the presence of *P. infestans*. However, late blight started to re-emerge as a problem in the 1980's and 90's. Up until then, the world population of *Phytophthora infestans* was clonal; that is, it resulted from a single migration of the organism from Mexico throughout the world. This clonal lineage was an A1 mating type and sexually incompatible with itself. During the 80's and 90's new migrations of exotic strains, were globally distributed. In addition to new exotic strains, widespread resistance to the fungicide metalaxyl (or closely related mefenoxam) developed. Prior to resistance development, growers could count on excellent control of late blight with metalaxyl. Along with the spread of new strains of *P. infestans*, the opposite mating type (A2) has been discovered on several continents including the United States. In 2009 genotypes US8 and US22 occurred in New England and Massachusetts and both are A2 mating types. US8 is particularly pathogenic on potato and resistant to the fungicide mefenoxam while US22 is a newly described genotype more pathogenic to tomato, released through the "big box stores". US22 is sensitive to mefenoxam.

Needs addressed by the project included routine scouting of tomato and potato plantings, and "Big Box Stores" that sold tomato plants; free late blight diagnostic services (subsidized by this grant) for farmers as well as the general public; phenotypic and genotypic characterization of *Phytophthora infestans*; evaluation of resistant cultivars; development of best management practices of late blight for conventional and organic farmers, and educational programs on late blight for farmers retail garden center operators.

Late Blight of Potato and Tomato caused by the destructive Oomycete pathogen, *Phytophthora infestans*, reached epidemic proportions throughout the Northeast during the summer of 2009 causing massive crop loss for both commercial growers and home gardeners. The future impact of this disease can be mitigated by early and accurate detection, weather-based disease forecasting, a system for inspecting and certifying imported plants, and education of farmers, home gardeners, and retail employees about Best Management Practices. In the past several years, late blight has consistently occurred in the Connecticut River Valley. It is important that we address these issues now.

This project was not built upon a project that previously received a Specialty Crop Block Grant.

2) The Project Approach

a. Over the life of the grant, routine surveillance for late blight of tomato was carried out at Big Box Stores (Home Depot, Wal-Mart, and Lowes) until the first disease outbreak of the year, or until tomato plants were no longer being sold. Unlike 2009, no late blight was detected in Big Box Stores over the life of the grant. Surveillance was also conducted in tomato and potato fields weekly at selected farms in

the Connecticut River Valley from early July through August as well as at farms in Norfolk and Middlesex counties. In the Connecticut River Valley farms were selected next to the river where fog was common and temperatures were generally lower; conditions favorable to late blight development. In 2011, though conditions were generally favorable for the development of late blight, there was only one outbreak in Wellesley, MA in a community garden. Two attempts to recover *Phytophthora infestans* were unsuccessful.

In 2011, 31 diagnostic samples were received for late blight analysis; none had the disease. During 2012 we had 58 late blight specimens and answered many phone calls and e-mails; about half of the specimens in 2012 were positive for late blight. During 2013, 65 tomato and potato samples were received, 25 were positive for late blight. 75 inquiries were received by phone or email.

Phytophthora infestans isolates from 2012 were sent to Cornell University for genotyping and were determined to be clonal lineage 23. This was borne out by our survey results which showed that Clonal lineage 23 is primarily a tomato pathogen but can cause disease on potato. About two thirds of the potato growers indicated no losses from late blight and about half of the tomato growers had a partial loss with 25% reporting a complete crop failure. Clonal lineage 23 is considered sensitive to the fungicide Mefenoxam but isolates tested in our lab were relatively resistant. The mating type of this clonal lineage is A-1. During 2012 this clonal lineage was found to be widespread on Long Island and timing suggested that it moved into the Connecticut River Valley. *P. infestans* isolates from 2013 are currently being genotyped at The Fry Lab, Cornell University. Extensive phenotypic and genotypic characterization of isolates was not possible due to the low recovery and low survival of *P. infestans* isolates. We are still recovering and maintaining isolates to continue this work.

During March, 2011 we gave a presentation to retail garden centers on our campaign to encourage residential gardeners to buy vegetable transplants that were locally grown. At this meeting, attended by approximately 60 people, we distributed about 60 posters that we produced on “Disease-Free Vegetable Transplants; Buy Locally”. These posters were also distributed to about 470 garden centers and retailers.

During 2012 we hosted a workshop “Potatoes and Tomatoes: Best Practices for Late Blight, Soil Health, Insect and Weed Management” at UMass. Speakers included Dr. Bill Fry, Dr. Thomas Zitter, Dr. Beth Guigno, Dr. Rich Bonanno and Dr. Jude Boucher. Unfortunately we had a blinding snow storm on this evening and only about 12 people were able to participate.

Also in 2012 we were on the MA program “Employee Training for Garden Retailers” at the Public House in Sturbridge where we gave two presentations including Late Blight of Potato and Tomato, and encouraged attendees to advocate for the purchase of locally grown vegetable transplants. Forty-five people attended this program. We wrote and revised our Best Management Practices (conventional, organic and home gardeners) for both potato and tomato. The BMP’s will be continued to be updated as necessary. We made several submissions to the publication VegNotes as well as the Floriculture website, and conducted several media interviews.

During 2012 a fact sheet on late blight for homeowners was distributed to garden centers and gardeners in April 2012. In Vegetable Notes weekly newsletter, 14 articles on late blight were published, one each week from May 31 to September 13 (1400 subscribers), A Late blight webpage was set up at www.umassvegetable.org. Alerts responded to diagnostic reports of new outbreaks as well as to weather and crop conditions (see table below: “Late blight log for 2012: diagnosis, monitoring, forecasting and alerts”).

Late blight log for 2012: diagnosis, monitoring, forecasting and alerts	
Date in 2012	Event/Action
15-May	began calculating LB forecast for dedicated weather stations across MA
21-May	VN alert that threshold for release of LB spores from inoculum sources has been reached.
14-Jun	first LB forecast chart in Veg Notes; 10 sites across MA
3-Jul	late blight outbreak in Middlesex Co -- LB confirmed in field tomatoes
5-Jul	late blight outbreak alert published in Veg Notes
6-Jul	on farm scouting begins in Ct Valley -- 11 sites, 4-6 visited each week.
13-Jul	late blight confirmed in Hampshire County field tomatoes
13-Jul	Late blight outbreak alert published in Veg Notes (updates weekly thereafter)
15-Jul	Hampshire Co grower destroyed infected tomato crop
20-Jul	late blight confirmed in Berkshire County field tomatoes
6-Aug	late blight confirmed in Barnstable& Plymouth County field tomatoes
7-Aug	late blight confirmed in Norfolk County field tomatoes
13-Sep	Last weekly late blight alert published in Vegetable Notes

Our first survey of tomato and potato grower's was carried out in 2012 to help guide our recommendations and educational materials. A summary of the 2012 survey is appended to this report.

In January 2013 we gave a presentation on Late Blight to the New England Vegetable and Berry Growers. As in 2012, many forecasts and alerts were posted. Scouting and survey work was carried out in 16 towns in Massachusetts from the southeast (Seekonk) to the Berkshires (Chesterfield) on 17 Farms. Many of these farms received biweekly visits from May through September.

During 2012, resistant tomato cultivars 'Defiant' Plum Regal' and 'Matt's Wild Cherry' were planted at the UMass Research Farm in South Deerfield and were not protected with fungicides. Late blight was confirmed August 15 and the susceptible commercial cultivars succumbed completely to late blight by late August. The resistant cultivars were ranked: worst, 'Matt's Wild Cherry', went down rapidly; 'Plum Regal' showed moderate resistance with foliar symptoms but harvestable fruit; 'Defiant' foliage and fruit held up and fruit continued to be harvested throughout September.

In 2013, seven cultivars of tomatoes were transplanted on June 19th at the UMass Crops Research and Education Center in South Deerfield, MA, with a single 10 plants per plot and four replicates in a randomized complete block design. Plants were staked, and no fungicides were applied. Late blight was confirmed on tomatoes on farms within four miles in late July. Foliage was rated for disease on the inner five plants per plot every 7-10 days from 8/7 through 10/1. Late blight was observed in the susceptible main season cultivar, 'Mountain Fresh', on the 8/7 and in Legend, a resistant variety, the following week. Other diseases present included powdery mildew, Alternaria blight, and Botrytis grey mold. Harvest began on 9/13; ripe fruit was rated as marketable (no disease) or late blight (fruit symptoms of late blight) and the number of each type was counted in each plot. Fruit with other disease symptoms were not included in fruit counts. 'Defiant' produced the highest number and proportion of marketable fruit over three harvest dates, while fruit of susceptible varieties was nearly 100% infected with LB. 'Matt's Wild Cherry' showed low late blight incidence in both foliage and fruit, but is a small-sized cherry with overabundant foliage that makes it difficult to manage and harvest.' Plum Regal' and 'Iron Lady' fruit were just beginning to ripen as of 9/27 harvest. The trial will continue until frost or the end of marketable fruit, whichever comes first, and data will be analyzed to compare development of late blight foliar and fruit symptoms on all varieties.

Considering the two years, 'Defiant' held up the best each year and 'Matt's Wild Cherry' performed poorly in 2012 and much better in 2013. (The UMass Student Farm was a collaborator in this study,

especially Jake Harness and Lilly Isael who conducted the weekly ratings and harvest and will complete the analysis as part of a senior project.)

b. This project did not benefit crops other than specialty crops.

c. Project partners were farmers from 17 farms in 16 different towns from Massachusetts; their role was to allow scouting on their property.

- 3) Goals and Outcomes Achieved (including the following information) a) A description of the activities that were completed in order to achieve the performance goals and measurable outcomes identified in Attachment B; b) If the outcomes measured are long term, summarize the progress that has been made toward their achievement; c) A comparison of actual accomplishments with the goals established for the grant period; d) Illustration of baseline data that has been gathered to date and the progress towards achieving set targets; and e) Summarize the major successful outcomes of the project in quantifiable terms.**

Phytophthora infestans isolates from 2012 and 2013 were sent to Cornell University for genotyping and were determined to be clonal lineage 23. This was borne out by our survey results which showed that Clonal lineage 23 is primarily a tomato pathogen but can be destructive to certain cultivars of potato. About two thirds of the potato growers indicated no losses from late blight and about half of the tomato growers had a partial loss with 25% reporting a complete crop failure. Clonal lineage 23 is considered sensitive to the fungicide Mefenoxam but isolates tested in our lab were relatively resistant. The mating type of this clonal lineage is A-1. During 2012 and 2013 this clonal lineage was reported to be widespread on Long Island and timing suggested that it moved into the Connecticut River Valley. Additional *P. infestans* isolates from 2013 are currently being genotyped at The Fry Lab, Cornell University. Extensive phenotypic and genotypic characterization of isolates was not possible due to the low recovery and low survival of *P. infestans* isolates.

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- b. Long term goals are to change grower's practices that would reduce losses due to late blight. To achieve this goal we would expect growers to undertake an integrated, holistic approach to managing late blight of potato and tomato. We carried out a lot of educational activities but we have not yet seen the result of our second survey. The second survey may show (or not show) how growers changed their practices as the result of our efforts. Assessment of long term goals, 3 to 5 years from now, were not part of this program.
- c. Goals for surveillance, diagnostics educational activities cultivar evaluation and retail garden center training were met. The expectation for the amount of phenotypic and genetic characterization were not met but data was collected and is still being collected. The development of a phytosanitary proposal was dropped due to lack of interest in Massachusetts and other New England states.
- d. This project was not a data-intensive venture. Data collected included evaluation of tomato cultivars (described above) and limited data on phenotypic and genotypic characteristics of *P. infestans* (described above). We also have the data for one survey attached in the Appendix. Data on resistant cultivars is useful for long term recommendations. Data on *P. infestans* phenotypic and genotypic characteristics is very limited for future years because in our region, *P. infestans* does not survive so

that new migrations would come in every year and this may include variations in clonal lineage as well as sensitivity to fungicides.

- e. Farms were scouted weekly for late blight during two growing seasons; 11 in 2012 and 16 in 2013. Three local “Big Box Stores” were scouted during the month of May for two seasons. Five public presentations on late blight reached approximately 250 farmers and retail garden operators. About 560 posters were distributed to retail garden stores encouraging residential gardeners to buy locally grown vegetable transplants. Two media interviews on late blight occurred. Several articles and “best management practices” were written and posted on the UMass Extension Vegetable Web Site. One hundred and sixty four specimens were examined for late blight from farmers and the general public. Fourteen articles on late blight were published in Veg Notes (1400 subscribers). Two surveys aimed at evaluating grower’s management practices of late blight were distributed. Approximately 60 cultures of *Phytophthora infestans* were obtained from Massachusetts growers but most of them were lost before phenotypic and genotypic studies could be made. Surviving isolates tested were A1, resistant to mefenoxam and clonal lineage 23

4) Beneficiaries (including the following information) a) A description of the groups and other operations that benefited from the completion of this project’s accomplishments; and b) State the number of beneficiaries affect by the project’s accomplishments and / or potential economic impact of the project.

- a. We hope and believe that potato and tomato farmers that took advantage of our educational programs learned how to better manage late blight using integrated management practices. Our educational programs were also directed toward garden center operators and residential gardeners. Finally, the public at large benefits when less pesticides are used in the environment, when their gardens yield more vegetables, and when vegetables are less expensive in the market place.
- b. Perhaps thousands of the general public who accessed our website now better understand how to manage late blight in their residential gardens. We reached hundreds of vegetable growers through live presentations as well as written “Best Management Practices”. The public at large (Massachusetts and southern New England) benefits when our farmers use less pesticides when residential gardens yield more vegetables, and when vegetables are less expensive in the market place.

5) Illustration of the lessons learned as a result of completing this project

This project reinforced my belief in how “Cooperative Extension” and university agricultural programs can reach farmers and the general public with sound plant disease management information. This was made possible by cooperation with the UMass Plant Disease Clinic Diagnostician M. Bess Dicklow; Vegetable Program Leader Ruth Hazzard and Robert Wick, Professor of Plant Pathology. We also learned that *Phytophthora infestans* is difficult to work with and difficult to maintain.

First Survey, 2012

There were a total of 144 responses to the survey which queried growers about the 2012 growing season. Note the number of responses varied depending on the question.

Over half the potato growers said they grow an acre or less and nearly half the tomato growers grow less than one half acre. Three potato growers said they raise over 100 acres and they may account for the vast majority of potatoes in the state. Similarly, nine tomato growers said they grow over five acres and they are probably responsible for the majority of the tomato crop in the state.

Nearly three quarters of the respondents said they are organic, although most said they were not certified organic.

About two thirds of the potato growers indicated no losses from late blight; just under one third had partial losses and a little over 2% have had a total loss. About half of the tomato growers had a partial loss, about 25% each had no loss and 25% had complete loss. This is in keeping with the finding that the predominant clonal lineage of *Phytophthora infestans* was "23", known to be more pathogenic to tomato than to potato.

A little over 60% use certified seed (some of the non-users are probably not potato growers). Only 20 % manage cull piles, but this only applies to potatoes and the crops were not separated in the survey. Thirty-four percent rogue plants and 43 % eliminate volunteers and solonaceous weeds. Nearly 83% do scouting and monitoring and a little over half check forecasting websites. Just over 40% use resistant varieties.

Of those who suffered losses, about 12% attributed it to not using appropriate cultural practices, 40% did not use fungicides, 48% reported that they used fungicides too late and 45% reported that they did not spray enough.

About one third of tomato growers used resistant cultivars as follows:

Tomato cultivars:

Mountain Magic	51.0%
Legend	22.4%
Plum Regal	26.5%
Red Pearl	6.1%
Matt's Wild Cherry	55.1%

Potato cultivars:

Elba	25.5%
Kennebec	90.2%

Rosa	3.9%
Allegheny	2.0%
Sebago	2.0%

Approximately 47% of growers sought information about late blight outbreaks from other growers, 12% from chemical suppliers, 90% from the UMass Extension newsletter or website and approximately 36% from other websites.

A little less than three quarters of the growers applied sprays of either conventional or organic materials for late blight prevention and just over one quarter did not spray anything.

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Multi-State Project: Increasing the Competitiveness of New England Specialty Crops through the Harvest New England Association.

Project Summary

New Englanders seldom think of their region as being plentiful and offering a diverse selection of agricultural specialty crops. Through increased use of the Harvest New England (HNE) logo by producers, wholesalers, and grocery stores, residents of New England will have an increased awareness and greater knowledge of the availability of regional produce.

As a result of activities conducted by HNE the following was accomplished:

1. Increased marketing of New England specialty crops.
2. Increased awareness of the HNE logo and New England specialty crops.

This was accomplished by:

1. Hosting two New England-wide marketing conferences
2. Redesigning the HNE website into a more user-friendly, information-filled website.
3. Developing the HNE logo brand guidelines to inform users how to properly use the logo to keep the standards of the logo consistent
4. Producing banners to line the Avenue of States on the Eastern States Fairgrounds during the annual Big E and year round.

The HNE logo was promoted to potential users, which include all specialty crop producers and distributors, and consumers at a variety of venues and opportunities. These venues will included the 2011 and 2013 Harvest New England Agricultural Marketing Conference and Trade Show, a complete redesign of the Harvest New England website, developing specification sheets for using the HNE logo, and installing light post banners on the Avenue of States during the Big E.

Project Approach

- 2011 and 2013 Harvest New England Agricultural Marketing Conference and Trade Show.
 - In 2011, 392 specialty crop producers and 483 in 2013 were educated on how use the HNE logo and better market their agricultural specialty crop products to New England consumers. In 2011, 54 scholarships were awarded to specialty crop producers from around New England who expressed hardships and could not have attended the conference otherwise.
 - The conference received great responses and feedback. The conference evaluation in 2013 asked attendees that participated in both 2011 and 2013 conferences if they had an increase in sales of specialty crops as a result of marketing techniques learned at the conference. 78% of respondents said they did increase sales of specialty crops thereby solely enhancing the competitiveness of specialty crops in New England.

- Harvest New England website.
 - The website was made more user-friendly for both for the consumers as well as producer, wholesalers, etc. The logo can now be easily downloaded by specialty crop producers, wholesalers, and grocery stores. On the homepage, an overview of the program and drop down menus leading both consumers and producers to information has been added. New “Consumer Pages” providing information on locating New England specialty crop products, seasonality guide, and links to pertinent information such as the New England departments of agriculture websites have been added.
 - A “Producers Page” was also added and includes information on using the Harvest New England logo, logo brand manual, links to other webpages including the New England departments of agriculture websites, extension, among others. This is also the area where HNE can post timely information for the various specialty crop industries.
 - An events page was established. This is where the Harvest New England biennial conference can be highlighted along with any other relevant events.
- Spec sheets for the HNE logo.
 - The original specification ‘spec’ sheets for the HNE logo has been expanded to a more comprehensive logo brand manual. The manual outlines not only specifics of colors and logo graphic design components, but how the logo should be used on promotion materials, in sponsorship opportunities, electronically, etc. This more detailed manual is available for download prior to and after someone requests the download of the HNE logo. This manual will encourage a consistent use of the logo by specialty crop producers, wholesalers, and grocery stores.
- 28 light post banners on the Avenue of States at the Eastern States Exposition during the Big E were installed in 2011. They remained up for the 2012 fair as well as for the 2013 fair..
 - This increased the visibility of the logo by 1,201,428 New England consumers in 2011; 1,365,896 in 2012; and 1,481,917 in 2013 during the height of the harvest season in the region. Attendance in 2013 was reported to be the highest ever since the exposition started in 1917.

HNE ensured these funds solely enhanced the competitiveness of New England specialty crops through the following procedures:

- *2011 and 2013 HNE Conference:* Only specialty crop producers were given access to the HNE logo and only speakers pertaining to specialty crops received honorarium and other associated fees from these funds. Only specialty crop producers were awarded scholarships which was determined by an application process. Additional, non-SCBG funds were available to cover any expenses where non-specialty crop producers benefited or had the potential to benefit.
- *Harvest New England website update:* A disclaimer on the website specifying only specialty crop producers can utilize the HNE logo when marketing their product(s) regionally. Prior to downloading the HNE logo, producers are required

to fill out an online form asking them their basic contact info and to list the general products for which the HNE logo will be used on.

- *Spec sheets for HNE logo:* A disclaimer prior to downloading the manual reminds producers that only specialty crop producers can utilize the HNE logo when marketing their product(s) regionally.

Goals and Outcomes Achieved

GOAL 1	To educate producers on how to use the HNE logo and better market their agricultural specialty crop products through the 2011 and 2013 Harvest New England Agricultural Marketing Conference and Trade Show.
Performance measure:	Specific questions on the evaluation form asked if specialty crop producers were better aware of how to use the HNE logo and market their specialty crop products as a result of attending the conference.
Benchmark:	Approximately 550 of the 800 attendees at the 2009 conference were specialty crop producers.
Summary of activities	A committee of representatives from around New England, in addition to all of the HNE board members, participated in brainstorming, planning, promoting, and executing the conference.
Original target:	At least 550 specialty crop producers will attend the conference in 2011 and 2013. A minimum of 10 scholarships will be awarded to specialty crop producers at the 2011 conference.
Actual target achieved:	In 2011, 392 specialty crop producers and 483 in 2013 attended the conference. 875 specialty crop producers in the end benefited from attending the HNE Conference. A total of 54 scholarships were awarded to specialty crop producers over the two years. At the 2013 conference 78% of respondents said they had an increase in sales as a result of marketing techniques learned at the 2011 and 2013 conference.

GOAL 2	To make the HNE website more user friendly and have a place where the logo can easily be downloaded by specialty crop producers as a result of updating and redesigning the site.
Performance Measure:	The number of logo downloads from the redesigned HNE website.
Benchmark:	There is no benchmark to compare to at this time.
Summary of activities:	A subcommittee of the HNE board of directors solicited three website firms and selected the most appropriate bidder. Website redesign and content was discussed and developed by the subcommittee and a firm was hired.

Original target:	A total of 50 downloads of the HNE logo per year will happen from the website.
Actual target achieved:	The information is still being collected at this time. However, it doesn't appear we'll meet the target of 50 downloads per year.

GOAL 3	To develop a specifications sheet which will give users guidelines on how to properly use the HNE logo.
Performance Measure:	The number of requests or downloads of the spec sheet from the HNE website.
Benchmark:	There is no benchmark to compare to at this time.
Summary of activities:	A subcommittee of the HNE board of directors updated the existing specifications sheets to a more comprehensive 15 page brand manual for the logo.
Original target:	A total of 50 downloads or requests of the spec sheet for the HNE logo per year.
Actual target achieved:	The information is still being collected at this time. However, it doesn't appear we'll meet the target of 50 downloads per year.

GOAL 4	To increase visibility of the logo to New England consumers during the height of the harvest season in New England as a result of producing light post banners to be on display during the Eastern States Exposition's, Big E.
Performance measure:	The number of attendees during the Big E.
Benchmark:	In 2009, 1.26 million people attended the Big E.
Summary of activities:	A New Hampshire company was hired to design and print the light post banners. Eastern States Exposition staff installed the banners prior to the 2011 Big E.
Original target:	To have at least five, up to 12, light posts banners developed with the HNE logo, promoting the purchase of specialty crops.
Actual target achieved:	28 light post banners were installed for the 2011 Big E. They were also on display for the 2012 and 2013 Big E. This allowed a total of 4,049,241 people to view the banners over the three years. The intension is for them to remain on the light banners for an undetermined amount of time.

The 2011 New England Agricultural Statistics (most recent available) reported that specialty crop sales increased by 97% since 2009. While this cannot be attributed solely to this project, it can be said this project is a contributing factor.

Beneficiaries

Specialty crop producers throughout New England had and still have the opportunity to benefit from using the logo to promote their New England Grown products. A total of

875 specialty crop producers benefited from attending the HNE Conference in 2011 and 2013.

Over 4 million people were exposed to the HNE logo at the 2011, 2012, and 2013 Big E combined. This raised awareness of the logo and availability of New England grown specialty crops.

Lessoned Learned

- 2011 and 2013 Harvest New England Conference:
 - Conference planning and execution went quite smoothly both years with no serious problems or delays occurring.

- Harvest New England Website:
 - The HNE website has been completed. The project was more substantial than originally anticipated and the project timeline was drastically off from the original project narrative submission. The website has been live since July 16, 2013.

- Specification Sheets for the HNE Logo:
 - The 'spec' sheet project was also seriously underestimated however turned out to be more economical to produce a 17 page brand guidelines than just a one page spec sheet. The brand manual is available on HNE's website.

- Light Post Banners at the Big E
 - This project was completed without and problems or delays.

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Additional Information

[2011 Harvest New England Agricultural Marketing Conference and Trade Show](#)

[2013 Harvest New England Agricultural Marketing Conference and Trade Show](#)

Harvest New England Website: www.harvestnewengland.org

Harvest New England Brand Manual: <http://www.harvestnewengland.org/hne-logo/>

Light post banners on the Avenue of States:



Project Title: USDA Specialty Crop Grant Multi-State Project: Developing a Viable Hops Production System for Massachusetts and Vermont with information that is applicable for New England (FINAL REPORT)

PROJECT TITLE

Developing a Viable Hops Production System for Massachusetts

PROJECT SUMMARY

New England is home to many high-quality microbreweries. With the popularity of the local food movement reaching into the beverage market, many local breweries have expressed interest in encompassing local ingredients in their beers. As hops haven't been commercially grown in this area for over a hundred years, the purpose of this grant was to provide high-quality local research and technical assistance to farmers looking to diversify with hops. It is projected that in the upcoming year, the number of microbreweries across the nation will increase by 25%. The craft beer industry is highly competitive and brewers are always looking for something that will give them an edge over the competition. Brewing beers with *terroir* is one of these ways. In these tough economic times, diversifying in agriculture is a good way to ensure economic stability. Hops sold locally have a high economic return, grossing between \$10,000 and \$20,000 per acre, and providing an excellent new market. However, the vast majority of hops research and outreach has been developed for the arid Pacific Northwest, where 99% of commercial hops are produced. The applicability of this research is limited in the humid Northeastern climate, fostering the need for locally relevant, high-quality research based information and a source through which that information can be distributed as it is developed.

PROJECT APPROACH

The objective of this program is to develop local and relevant research and outreach

applicable to hops production in the Northeast. Through this project research on hops production has been initiated and numerous educational materials and programs have been delivered to stakeholders.

Hop Variety Trial

Over the last two years, UVM Extension has strived to be a source for relevant information to interested hop growers in the Northeast. To this affect, an experimental hopyard was established in Alburgh, VT during the spring of 2010. The process of constructing the hopyard, setting up the irrigation, materials, and costs were documented and posted on the project website and YouTube for stakeholders to view (see Outreach section below). Within the hopyard nineteen hop varieties were planted in a replicated complete block design with 3 replicates. The hopyard was planted in August 2010, 3 months behind schedule, as that was when the vegetative hop cuttings arrived from our collaborators in Washington, as part of an USDA OREI grant. One goal of this project is to determine hop varieties that demonstrate disease and pest resistance in combination with high yields in a maturing organic yard, and also present desirable characteristics to brewers in the Northeastern climate. **The results presented below are from the first year of production.**

MATERIALS AND METHODS

The replicated research plots were located at Borderview Farm in Alburgh, VT on a Benson rocky silt loam. The hopyard was constructed in the spring of 2010, with a finished height of 16 feet using 20' x 6" larch, tamarack and cedar posts. Aircraft cable (5/16") was used for trellis wires. A complete list of materials and videos on the construction of the UVM Extension hopyard can be found at www.uvm.edu/extension/cropsoil/hops.

The prior crop was an alfalfa/grass crop. The hop beds were prepared by first moldboard plowing only the area where the hops were to be planted. The area was then rototilled to further break up the soil to prepare for planting. This left a strip of grass/alfalfa between the rows of hops. The tillage was implemented prior to construction of the hopyard. Once the hopyard was constructed there were two vegetative hop cuttings planted per hill on August 4th, 2010. The experimental design was a randomized complete block with three replicates; treatments were varieties. Hills of hops were planted 7 feet apart, and rows were spaced at 10 feet. Each plot consisted of five consecutive hills. From planting to harvest, plants were watered with drip irrigation as needed. In-row rototilling and hand weeding was used to control weeds, and as the weeds were brought under control, rows were trained with two strings of coir (coconut fibre) per hill, fertilized, and mulched with hardwood mulch. Pro-Gro® 5-3-4 and Probooster® 10-0-0 (North Country Organics) were applied to give 50 lbs plant available N, 40 lbs P, and 80 lbs K per acre. Boron was also applied at a rate of 10 lbs/acre. As the previous crop had been plowed-down legume/alfalfa we calculated 25 lbs of additional N credit. On June 6 and 7, Chilean nitrate was sidedressed at the rate of 50 lbs N.

On June 13, 2011, downy mildew (*Pseudoperonospora humuli*) was identified, and Regalia (Marrone Bio Innovations, EPA Reg. No. 84059-3), an extract of *Reynoutria sachalinensis*, was sprayed three days later using a Fimco 45 gallon trailer sprayer equipped with a hand gun and pulled by a John Deere 20 hp riding lawn mower. Regalia® is labeled for use on hops against both powdery mildew (*Podosphaera macularis*) and downy mildew, and is a plant extract that is used to help bolster a plant's natural defense mechanisms. It was applied as per label specifications. Starting on June 29, 2011, three leaves per hill and two hills per plot were scouted weekly for presence of insect pests, diseases, and beneficial insects. Potato leafhoppers (*Empoasca fabae*) and two-spotted spider mites (*Tetranychus urticae* Koch) were identified in the hopyard and determined to be above economic threshold.

Economic thresholds for potato leafhoppers in hops has not been documented, but with an in-depth literature review, it was determined that two leafhoppers per leaf was economically damaging to organically grown hops. Economic thresholds for two-spotted spider mites have been determined in the Pacific Northwest to be 1-2 spider mites per leaf in June or 5-10 per leaf in July. Regalia was again sprayed as a preventative measure against downy mildew, and was tank-mixed with Pyganic (McLaughlin Gormley King Company, EPA Reg. No. 1021-1771) and Aza-Direct (Gowan, EPA Reg. No. 71908-1-10163). All are OMRI-approved for use in organic systems, and were applied at rates specified by their labels. Hop harvest was targeted for when cones were between 20 and 25% dry matter. Hop bines were cut in the field and brought to the barn to be handpicked on a table. Harvest date by variety can be found in

Table 1. Dry matter by harvest date and variety.		
Variety	Date harvested	Dry matter %
Cascade	24-Aug-11	22.0
Cascade	26-Aug-11	22.6
Centennial	2-Sep-11	23.7
Chinook	2-Sep-11	23.3
Chinook	6-Sep-11	23.5
Cluster	11-Aug-11	19.1
Cluster	12-Aug-11	18.9
Crystal	12-Sep-11	21.2
Crystal	14-Sep-11	21.4
Fuggle	24-Aug-11	23.6
Fuggle	6-Sep-11	22.0
Galena	31-Aug-11	24.0
Glacier	6-Sep-11	22.1
Glacier	8-Sep-11	23.1
Glacier	14-Sep-11	25.8
Liberty	2-Sep-11	*
Mt. Hood	2-Sep-11	21.4
Newport	14-Sep-11	25.1
Nugget	6-Sep-11	22.7
Perle	2-Sep-11	25.3
Saaz	24-Aug-11	23.7
Santiam	6-Sep-11	19.2
Santiam	14-Sep-11	22.5
Sterling	13-Sep-11	21.4
Sterling	14-Sep-11	23.6
Tettnang	31-Aug-11	24.3
Tettnang	2-Sep-11	23.2
Vanguard	31-Aug-11	26.5
Vanguard	2-Sep-11	21.9
Willamette	31-Aug-11	25.6

*Indicates not enough sample to measure

Table 1. Hop cones from each plot were sent to Alpha Analytics in Yakima, WA where they were analyzed for alpha and beta acids and Hop Storage Index. Yields are presented at harvest moisture and at 8% moisture on a per hill and per acre basis. Per

acre calculations were performed using the spacing in the UVM Extension hopyard of 70 ft² per hill, 622 hills/acre. In all tables, the top performing variety can be found in bold. Varieties that were not significantly lower in performance than the highest variety in a particular column are indicated with an asterisk.

RESULTS

Harvest was targeted for when hop cones were between 20 and 25% dry matter (Table 1).

Cluster outperformed all other varieties, averaging 3.58 lbs/hill at harvest moisture, and 0.74 lbs/hill at 8% moisture, or 2,228 lbs/acre at harvest and 459 lbs/acre at 8% moisture (Table 2). Liberty was the worst performing variety, although statistically not different from Centennial, Crystal, Fuggle, Glacier, Liberty, Mt. Hood, Perle, Saaz, Santiam, Sterling, Tettnang, and Vanguard (Table 2).

Table 2. Yields at harvest moisture and at 8% moisture by variety.

Variety	Yield at harvest moisture		Yield at 8 % moisture	
	lbs/hill	lbs/ac	lbs/hill	lbs/ac
Cascade	1.71	1060	0.41	254
Centennial	0.44	273	0.11	70.0
Chinook	1.20	747	0.30	189
Cluster	3.58*	2230*	0.74*	459*
Crystal	0.37	232	0.09	53.8
Fuggle	0.13	77.8	0.03	19.3
Galena	1.87	1170	0.49	303
Glacier	0.87	539	0.22	138
Liberty	0.02	12.3	0.00	0.0
Mt. Hood	0.53	329	0.12	76.7
Newport	1.54	959	0.41	257
Nugget	1.40	870	0.35	217
Perle	0.07	43.2	0.02	12.0
Saaz	0.05	28.4	0.01	7.3
Santiam	0.31	193	0.06	40.4
Sterling	0.05	31.9	0.01	7.9
Tettnang	0.08	48.9	0.02	12.6
Vanguard	0.37	227	0.09	58.8
Willamette	1.60	993	0.41	256
Mean	0.84	526	0.20	127

Brewing values for select varieties are presented in Table 5. Some varieties did not yield enough sample to be tested for brewing values. Alpha acid percentages for Cluster, Cascade, Galena, and Vanguard fell within industry averages. Nugget and Willamette exceeded industry alpha acid averages (Figure 1). Beta acid levels for Centennial, Cluster, Crystal, Mt. Hood, Newport, Nugget, and Santiam all fell within the industry averages. Cascade, Chinook, Fuggle, and Willamette all had beta acid levels higher than

industry averages (Figure 2).

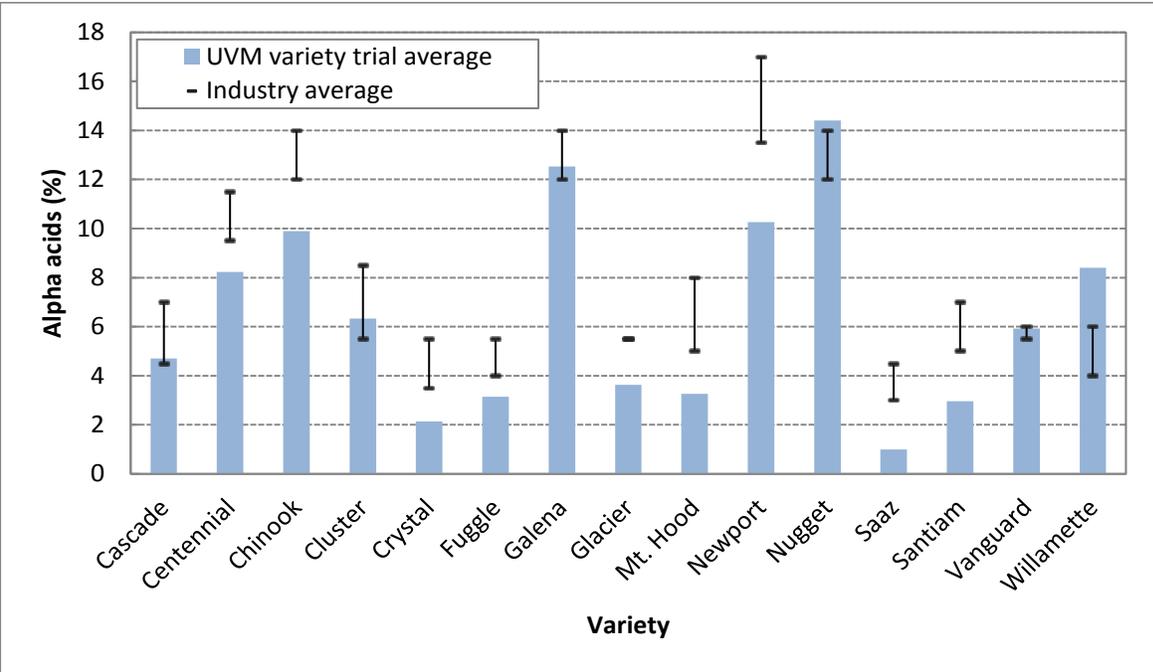


Figure 1. Alpha acid levels from the UVM Extension hopyard compared to industry averages calculated from values presented by Hopunion CBS, LLC and Yakima Chief, Inc.

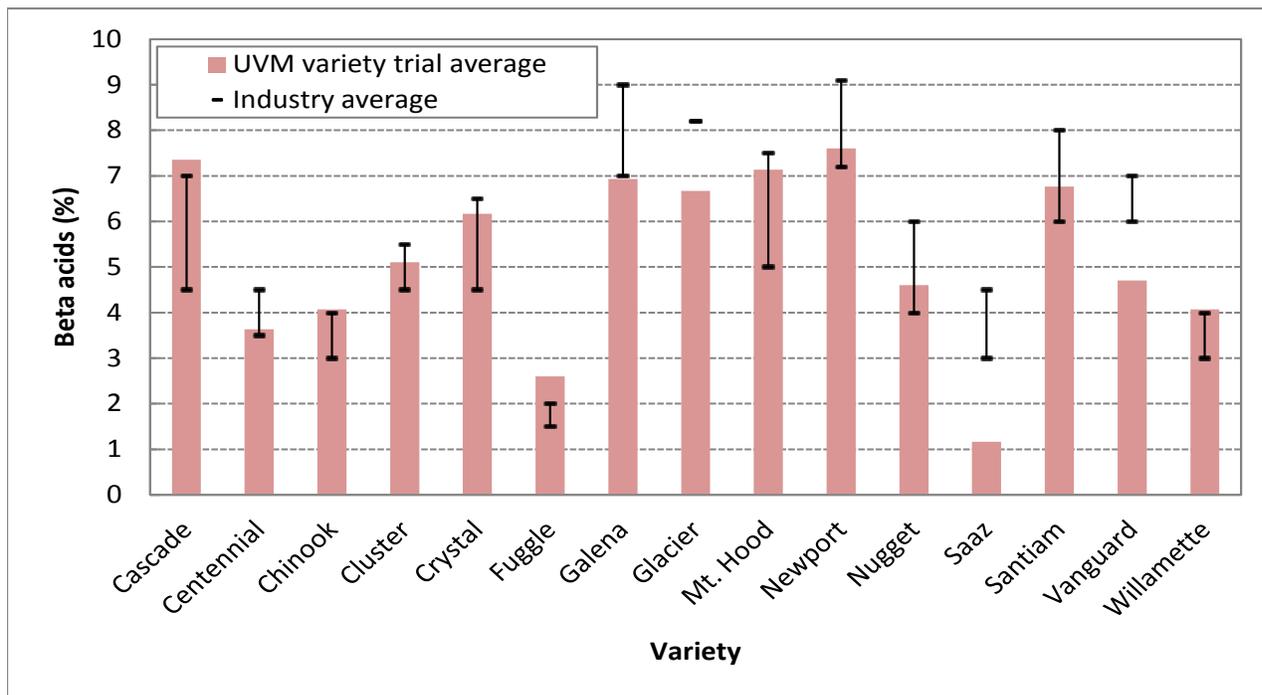


Figure 2. Beta acid levels from the UVM Extension hopyard compared to industry averages calculated from values presented by Hopunion CBS, LLC and Yakima Chief, Inc.

DISCUSSION

The UVM Extension hopyard was planted in August of 2010, putting the yard at stage of maturity between one and two year old plants when the above results were documented. According to Jason Perrault, a fourth generation hop grower who presented at the UVM Extension 2010 Winter Hops Conference, first-year yields are generally assumed to be approximately 25% of a mature yard's yields. Some varieties, such as Cluster and Galena, yielded well for first year-plants. Other varieties, namely Santiam, Fuggle, Tettnang, Perle, Sterling, Saaz, and Liberty, did not thrive nor yield well. Hops, like grapes, have *terroir*: their brewing characteristics and oil content are reflective of their microclimate. Hops grown on the East Coast, even though genetically the exact same, will not be like hops in the Pacific Northwest due to different soils and different climates. Hops grown in the Northeast will present unique brewing characteristics. It is important to evaluate hops in different localities to develop geographically specific profiles for varieties that grow well in those regions.

We are encouraged by the first year yields and performance of the hopyard. However, a perennial crop needs time to express its full potential. A hop plant is considered at maximum production in year 4 of its lifespan. Therefore continued research is a necessity to fully document appropriate varieties for this region. If funding is obtained we plan to continue the variety trial research experiment. It should be noted that this is the first hops research trial to be established in the Northeast. It is also the only certified organic hops research trial in the Northeast. Therefore the data and information is being sought from multiple states.

Leafhopper Prevalence in Variety Trial

The research hopyard has allowed our group to collect other relevant and important data. This has included pest and beneficial insect data. This season leafhopper damage

Variety	Leafhoppers per leaf	Significance
Tettnang	0.42	a
Centennial	0.75	ab
Willamette	0.75	ab
Fuggle	1.58	abc
Perle	1.67	abc
Cluster	1.83	abcd
Chinook	1.92	abcd
Glacier	2.33	abcde
Sterling	2.33	abcde
Nugget	2.67	abcde
Galena	3.08	bcde
Casade	3.42	cde
Vanguard	3.58	cdef
Santiam	3.83	cdefge
Liberty	4.33	defgh
Crystal	4.58	efgh
Newport	6.00	fgh
Mt. Hood	6.25	gh
Saaz	6.58	h
LSD (0.10)	2.50	
Hopyard average	3.05	

to hops was documented. This is not a pest in the PNW and hence there is little data or outreach available on the topic. The hopyard enabled us the opportunity to collect this data and will help us develop additional research proposals. Our hopyard is located in an alfalfa field, and leafhopper damage was first noticed after the first alfalfa cut. Upon scouting the hopyard for pests and diseases, the infestation levels were determined to be economically significant. We found there is a significant difference between levels of leafhoppers between varieties ($p < 0.10$) which suggests this pest has a preference for certain varieties over others. The varieties responded the same across all sample dates which means there is a true difference in the level of leafhoppers between varieties that was not influenced by the sample date ($p < 0.10$).

At this time it is unknown what draws leafhoppers to certain varieties or perhaps repels them from another. It may be due to the plant morphology as with certain leafhopper resistant alfalfa varieties which have leaf glands and hairs that make them undesirable to leafhoppers. Saaz exhibited the highest average of leafhoppers per leaf across the four sample dates while Tettnang had the lowest. We have several hypotheses as to what characteristics of the hop plant drive this trend, such as genetic differences, alpha acid levels, or nutrient levels in the hop. However, further research is needed to study and evaluate the leafhopper and its patterns before any conclusions can be drawn or recommendations made.

Hop Outreach and Education

A goal of this program is to provide potential, new, and established hop growers with high quality and relevant educational resources. A variety of educational resources and

outreach events has been implemented throughout the project and are described below.

A HOP WEBSITE (www.uvm.edu/extension/cropsoil/hops/) was created as part of this project. The UVM Extension Crops and Soils Hops Page presents information on hop production collated from all over the country, interspersed with UVM Extension updates, research, and conference proceedings. Between January, 2011 when the grant was awarded, and September 28, 2012, the Hop Page has been viewed **9,264 times**. The Hop Page is host to the Brewer Survey, a continuation of Rosalie Wilson's work on collecting data from New England brewers on their needs and wants from local hops producers. The Hop Page also hosts the Grower Survey, which surveys visitors on their hop production methodologies. The purpose of the Grower Survey is to continually collect data on the most common hop production practices in the Northeast, and identify problem areas and areas that are in need of improvement. The surveys were a result of this project and are attached to the report. Several bulletins on hops fertility management, hop trellis construction costs, organic fungicides in hops, and pest and beneficial insect updates have all been published on the UVM Extension Crops and Soils webpage.

UVM Extension Crops and Soils Program Hops Page:
www.uvm.edu/extension/cropsoil/hops

- Fertility Guidelines for Hops in the Northeast - <http://www.uvm.edu/extension/cropsoil/wp-content/uploads/HopFertilityManagementNE.pdf>
- Potato Leafhopper Damage in Hopyards - http://www.uvm.edu/extension/cropsoil/wp-content/uploads/Leaf_Hopper_Article.pdf
- Managing Powdery Mildew of Hops in the Northeast - <http://www.uvm.edu/extension/cropsoil/wp-content/uploads/PowderyMildew.pdf>
- Borderview Farm Hopyard Construction Costs - <http://www.uvm.edu/extension/cropsoil/wp-content/uploads/Hopyard-labor-materials-costs.pdf>
- Borderview Farm Hopyard Irrigation System - <http://www.uvm.edu/extension/cropsoil/wp-content/uploads/Hopyard-irrigation-materials-costs.pdf>

Three YouTube videos were produced that detailed the construction of the hopyard, and are available on the UVM Extension Crops and Soils YouTube Channel: <http://www.youtube.com/user/cropsoilsvteam>. Constructing a Hopyard, Parts 1-3 have a total of **25,781 views** as of September 28, 2012. A crop camera was placed in the hopyard in 2011, snapping photos every hour throughout the growing season. The Hop Cam video that was a result of this project can also be found on the UVM Extension Crops and Soils YouTube Channel. A video was also made on hop stringing and training, entitled Organic Hopyard Variety Trial – Year 2 Spring Checklist, with **1,480 views**. A YouTube video was also developed on the hops harvester designed by UVM Extension, and currently has **2,426 views**.

UVM Extension Crops and Soils YouTube Channel:

<http://www.youtube.com/user/cropsoilsvteam>

- Constructing a Hopyard Part 1 - <http://www.youtube.com/watch?v=vPF7QIVGgtA&list=UU7sh59UG2pKqfmPMfaVxpbA&index=26&feature=plcp>
- Constructing a Hopyard Part 2 - <http://www.youtube.com/watch?v=QrRIyWlzTTs&list=UU7sh59UG2pKqfmPMfaVxpbA&index=25&feature=plcp>
- Constructing a Hopyard Part 3 - <http://www.youtube.com/watch?v=P0fOOqwoKGM&list=UU7sh59UG2pKqfmPMfaVxpbA&index=17&feature=plcp>
- Organic Hopyard Variety Trial – Year 2 Spring Checklist – <http://www.youtube.com/watch?v=lxvBuCvAsuc&feature=plcp>
- The Mobile Hop Harvester - <http://www.youtube.com/watch?v=2iZIkdozeXo&feature=relmfu>

The UVM Extension hops blog “What’s Hoppening”, hosted on the UVM Extension Crops and Soils website, has **121 subscribers**, and **49 posts**. UVM Extension Crops and Soils hops blog “What’s Hoppening”: <http://www.uvm.edu/extension/cropsoil/whats-hoppening>

Sample Pest Posts:

- Hop Pest – Eastern Comma: <http://www.uvm.edu/extension/cropsoil/hop-pest-eastern-comma>
- Spider Mite Destroyers and Spined Soldier Bugs: <http://www.uvm.edu/extension/cropsoil/spider-mite-destroyers-and-spined-soldier-bugs>

Sample Hop-News posts:

- Northeast Hop Alliance Fall Hop Conference and Annual Meeting - <http://www.uvm.edu/extension/cropsoil/nehafallhopconferenceandannualmeeting>
- Hop processing equipment for sale - <http://www.uvm.edu/extension/cropsoil/hop-processing-equipment-for-sale>
- Hops Recordkeeping Booklet - <http://www.uvm.edu/extension/cropsoil/hops-recordkeeping-booklet>

During the project period, UVM Extension has hosted two hops conferences. In 2011, the UVM Extension Winter Hops Conference was held at the Trapp Family Lodge in Stowe, VT, with **118 attendees**. At the conference, Adam Krakowski presented on the history of hops production in the Northeast. Dr. John Henning, a research plant geneticist for the USDA-ARS Hop Breeding and Genetics program at Oregon State University discussed his breeding program, as well as strategies for achieving high-quality hop production, and the challenges and opportunities presented by a low-trellis system. Roger Rainville, star of the UVM Extension Constructing a Hopyard YouTube series, presented on how to construction a hopyard and fielded numerous questions from the audience. A Brewer Panel was also on hand with local brewers discussing their excitement about local hops. The Panel fielded questions from the audience, and

dispensed advice on how to successful market hops to brewers. 100% of respondents to the post-conference survey rated the conference Good or Excellent. 96% stated that the conference was educational and interesting, and 80% stated that the conference inspired them to learn more. 71% of respondents who were harvesting hops were getting under a half pound of yield per plant. Conference proceedings can be found at <http://www.uvm.edu/extension/cropsoil/hops>.

In 2012, the UVM Extension Winter Hops Conference was held at the Sheraton Hotel in South Burlington, VT with **137 attendees**. At the conference, a farmer panel discussed their successes and setbacks that they've encouraged on their hop farms. Daniel Sharp from Oregon State University joined us to discuss the aroma compounds of hops, and how they can be affected by mismanagement at harvest. Ann Hazelrigg from the UVM Plant Diagnostic Clinic discussed how to identify problems in Northeastern hopyards and the basics of pesticide rules and regulations. She also discussed the different spray equipment available to hop growers, and how to calibrate them. Students from the UVM School of Engineering who had designed two small-scale hop balers gave short presentations on their models. Roger Rainville gave a presentation put together by Chris Callahan, who was unable to join us due to illness. Chris Callahan and Roger Rainville were largely in charge of designing and fabricating the small-scale hop harvester. Video footage of the harvester in action was shown, and questions fielded from the audience. 96.8% of grower respondents stated that the hop conference met their expectations, with one participant stating "Well done- as a new grower I have tried different things and it was good to hear other's experiments (success and failures)." 100% of brewer respondents said the conference met their expectations. 95% of grower respondents stated that the UVM Extension Hops Program has helped them start or expand their hopyard, and 73% stated that the research and outreach performed by UVM Extension has helped them improve their yields. One grower respondent stated: "Very helpful and informative as always." 100% of brewer respondents stated that the work done by UVM Extension has increased their knowledge and awareness about hops grown in the Northeast. 76% of grower respondents stated that the work done by UVM Extension has helped them find markets and/or connect with brewers, and 83% of brewer respondents said that the conferences and workshops hosted by UVM Extension have helped them connect with local growers. 90% of brewer respondents stated that they have noticed a difference in the supply of regionally-produced hops because of the research and outreach performed by UVM Extension. 97% of grower respondents intend to expand their production. One participant stated: "This is a great conference. Can't wait 'til next year!" Another said "Keep the info and excellent projects coming. You have really done a great job promoting this crop & market." Another remarked: "Thank you so much. An incredibly helpful program." 89% of brewers stated that their brewery intends to buy or continue buying local hops if the supply exists. 100% of brewers stated that they were satisfied "for the most part" with the quality of the local hops that they have been presented with, but noted the lack of brew analysis as a hindrance. Quality parameters were a serious barrier to purchasing locally-produced hops to 63% of brewers, and a noticeable barrier to 37%. 100% of brewer respondents stated that post-harvest processing and packaging were a barrier to purchasing locally-produced hops. 62.5% stated that the

scale of what is available locally is a serious barrier to purchasing locally-produced hops. Harvesting and pelletizing were both independently noted as serious barriers. 100% of brewers stated that they expect that the demand for beer made with local hops will increase, and intend to respond to that demand. One brewer said “The conference has provided a fair amount of information and piqued my interest in Eastern grown hops. My full support is your way. Anything I can help with I'm happy to do so.” Conference proceedings can be found at <http://www.uvm.edu/extension/cropsoil/hops>.

Seven on-farm field days were held in Vermont and Massachusetts with more than **600 attendees**.

On July 8th, 2011, Fletcher Bach and Ian Birkett of Square Nail Farm in Ferrisburgh, VT led a farm tour that looked at alternate methods of hopyard construction and trellising design. Also highlighted was fertility management in first year hops production. Local brewers were given the opportunity to discuss their needs and desires in local hops production. There were **30 attendees**.

Pest management in Northeastern hopyards was discussed at the annual Crops and Soils field day at Borderview Farm in Alburgh, VT on August 4th, 2011, where the UVM Extension research hopyard is located. Also featured was UVM Extension's discovery of potato leafhopper hop varietal preferences There were **225 attendees**.

The newly designed UVM Extension hop harvester was showcased at Four Star Farms in Northfield, MA on August 25th, 2011 to **50 attendees**.

The newly designed UVM Extension hop harvester was showcased at Borderview Farm in Alburgh, VT. Due to Tropical Storm Irene in 2011, the field day was rescheduled to September 7th, 2011, and only **12 attendees** could make it. Such a small group allowed for some in-depth conversations about pest management, harvest timing, post-harvest handling, and packaging.

The UVM Extension hopyard was showcased in the annual Crops and Soils Field Day on August 9th, 2012 at Borderview Farm in Alburgh, VT to **286 attendees**. The hop variety trial was discussed, as were Integrated Pest Management practices.

On August 14th, 2012, a field day was held in Gilbertville, MA at Steve Prouty's Cloverhill Farm, with **34 attendees**. Pest management, harvest timing, and post-harvest handling were discussed. 100% of survey respondents stated that the field day met their expectations. 100% stated the UVM Extension Hops program has helped them start or expand their hopyard and 50% stated that it helped them improve their yields. 63% stated that the research and outreach performed by UVM Extension has helped them improve the quality of their hops. 90% of respondents stated that the work done by UVM Extension has helped them find markets and/or connect with brewers. 80% of respondents stated that the work done by UVM Extension has helped them implement sustainable practices in their hopyard.

Finally, a field day was held at Addison Hop Farm in Addison, VT, with **89 attendees**. Hop trellis design, the economics of hops production, harvest timing, harvest machinery, drying techniques, packaging, and storage were all discussed. 100% of respondents stated that the field day met their expectations. 100% of respondents stated that The UVM Extension hops program has helped them start or expand their hopyard and improve their yields. 100% of respondents also stated that the research and outreach performed by UVM Extension has helped them improve the quality of their hops. 60% stated that the work done by UVM Extension has helped them find markets and/or connect with brewers. 100% also stated that the work done by UVM Extension has helped them implement sustainable practices in their hopyard.

UVM Extension Northwest Crops and Soils Team was also present at the Vermont Brewer's Festival at the request of the Vermont Brewer's Association in both 2011 and 2012, and at the Massachusetts Brewer's Festival at the request of the Massachusetts Brewer's Guild in 2012. Both events provided excellent opportunities to discuss local hops with area brewers, and to answer any questions that the brewers might have.

In November 2011, Dr. Heather Darby, with assistance from Mark Magiera, brewmaster for Bobcat Café and Brewery in Bristol, VT, presented to 90 brewers at the Vermont Brewers Association Sensory Analysis Conference, highlighting the advantages of local hops, and the unique brewing characteristics offered from a regional product. Base brews single dry-hopped with Vermont produced varieties were brewed by Bobcat Café and Brewery and presented to the brewers for sensory analysis.

Twenty-five on-farm visits were conducted in MA and VT. **One hundred and ten phone calls** were fielded from hop growers and those interested in growing hops in MA and VT over the project period. Over **250 emails** were answered with hops questions from growers, brewers, and other interested parties. Questions answered included a broad range of categories including but not limited to pest management, fertility management, pest identification, feasibility, harvest moisture determination, drying, and hop production basics.

Dr. Heather Darby presented at the Northeast Hop Alliance Fall Conference in November, 2011, highlighting proper techniques and considerations for soil preparation in a hopyard and fertility recommendations to over **170 interested hop growers** from all over the Northeast.

In January 2012, Rosalie Madden and Heather Darby presented at the Northeast Organic Research Symposium in Saratoga Springs, NY on organic hop yield and quality in the Northeast. The Northwest Crops and Soils Team also presented a poster on potato leafhoppers in hops in the Northeast.

An article on "Organic Hop Production" was developed and published in Agronomy Journal.

Samuel F. Turner, Chris A. Benedict, Heather Darby, Lori A. Hoagland, Peter Simonson, J. Robert Serrine and Kevin M. Murphy. 2011. **Challenges and**

Opportunities for Organic Hop Production in the United States. *Agronomy Journal* 2011 103: 6: 1645-1654.

A review article on “Low Trellis Hops Production” has been developed and is being reviewed by colleagues in Michigan and Washington. The article slated for publication in the *Journal of Horticulture Science*.

GOALS AND OUTCOMES ACHIEVED

The UVM Extension research hopyard has led to an initial report on the suitability of commercially available hop varieties to the Northeastern climate. As hops are a perennial crop, future research is needed to determine the suitability of these varieties over time, as the plants mature and as they are exposed to different pest and disease cycles. Data collected from the 2012 season has yet to be fully analyzed, but is expected to shed new light on hop variety suitability. Scouting data collected in the hopyard has also led to the discovery of varietal trends in potato leafhopper predation, something that has previously not been researched. Future work is needed with this particular pest, but also with hop pests in general. Pests that attack hops in the Northeast are different than those that are an economic threat in the Pacific Northwest. Through regular scouting in the experimental hopyard pests and diseases are being identified and information is shared with growers through our web resources. The goal was to develop local and relevant research for Northeast hop growers. The hopyard has allowed us to collect valuable information on fertility and pest issues in hopyards. Lastly, we are advisers to 3 growers that were awarded USDA SARE Farmer Grants to investigate fertility, trellis design, and harvesting questions on-farm.

The goal was to design a mobile hop harvester prototype. This was accomplished, and the blueprints have been made public on the UVM Extension Instructional Wiki page. The mobile hop harvester travelled to two farms in 2011, and to three farms in 2012. Many more farms also requested the use of the harvester, but we were unable to meet their needs due to delays from modifications in the design.

The goal was to develop relevant and practical educational programs and material. The outcome has been the development of a diverse array of materials and events that have been accessed by more than 1000 stakeholders. Based on post-conference survey data we have found that stakeholders are improving their hopyard production by accessing the materials. Future work needs to be done to document long term impact of the hops outreach program.

YouTube videos were made and publicized about hop growth, development, hop stringing and training, and other pertinent issues, such as setting up irrigation in a small-scale hopyard.

Twenty-five farm visits were conducted over the granting period in order to assist farms with production questions and pest management issues. 40 blog posts were made during the project period, covering topics from disease identification and management, to fertility, to harvest readiness calculations.

The annual Winter Hops Conference was full to capacity in both 2011 and 2012, with over 118 and 137 participants respectively, bringing together brewers, hop growers, and those interested in hops.

Hop growers were surveyed to determine production practices, production setbacks and issues, and to determining hop yields. Brewers were surveyed to determine their satisfaction with local hops, their willingness to invest in a local product, and any setbacks that they have encountered in purchasing and utilizing local ingredients.

BENEFICIARIES

The several hundred attendees at hop related events, and the several thousand viewers of hops YouTube videos and visitors of the UVM Extension Crops and Soils Hops Page are the beneficiaries of this project. The Northeast Hops Alliance and the New England chapter of the Northeast Hop Alliance are also beneficiaries as they have had the opportunity to access regionally based hops related research, and have had a hand in guiding the research conducted by UVM Extension. These beneficiaries include potential, new, and established hop growers throughout the US and Canada. Additional beneficiaries include other agricultural professionals such as Extension staff, University professors, and US or state government employees. The brewers of Vermont and Massachusetts have also been and will continue to be important beneficiaries as they now have broader access to locally produced hops.

As a result of this project as well as collaborative efforts with other organizations (NEHA, Cornell University), **9 breweries** in Vermont and **12 breweries** in Massachusetts, and numerous breweries in Maine, New Hampshire, Connecticut, Rhode Island, and New York are now purchasing local hops.

There have been 15 new commercial hop producers (New England and Eastern Canada) as a result of this project and collaborative efforts with other organizations. Based on our close interaction with these producers we have been able to assist them with production information. One of the producers commented “I have always wanted to grow hops but never felt like I would have the support or information I would need to be successful. With your program I now feel confident to implement my new crop”. Most of these new growers have just established yards in 2011 or will establish in 2012. Hops produced on first year plants for all new farmers were quickly purchased by eager brewers. One brewer commented that he “wanted to use local hops but he wasn’t able to find any”.

LESSONS LEARNED

Lessons learned by the project staff are numerous. The best way to be able to help producers is to “do it ourselves” so we can really know the production challenges that are being faced by growers. The experimental hopyard is helping us collect valuable data but also allowing us to “experience” hops just like a grower. Through this process we are able to alert growers when pests arrive and/or share our mistakes with new

growers.

Hops are a complex crop. There are significant startup costs, both economically and in time and labor. Constituents have commented how invaluable they have found the Building a Hopyard YouTube videos and construction costs fact sheets, and how much they have appreciated the opportunity to be able to visit a hopyard prior to constructing one themselves.

Variety selection is a major decision, and we are proud to be able to offer some baseline data on variety suitability through our research. Hops are very disease susceptible, particularly to downy mildew, which is a consideration that every grower should be undertaking, but other pest factors seem to be worth consideration as well. There are numerous hop pests and beneficial insects specific to the Northeast that are not found in the main hops production areas of the world. Further work is certainly needed in this domain. Further research is needed in the efficacy of organic chemical controls of pests found in the Northeast, and to determine relevant economic thresholds.

Planting varieties that don't thrive or yield well in this climate is economically unsound. Our first year harvest data is an indicator of the potential of each of the 19 varieties trialed, however, the preliminary data from the 2012 harvest indicates that these trends don't hold true from year to year. As hops take three years to reach peak production, further research is needed.

Small-scale infrastructure is a continued stumbling block in hops production in the Northeast. The mobile hop harvester designed courtesy of a SCBGP grant has taken steps to alleviate this issue, as has UVM Extension's work with small-scale hops balers and oasts. The future bears great promise now that these works have been completed and made publicly available.

CONTACT PERSON

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Title: Enhanced Fruit & Vegetable Prescriptions (FINAL REPORT)

Project Summary:

Background

The purpose of this project was to:

- € Increase the competitiveness and sales of Massachusetts grown specialty crops at farmers markets,
- € Increase consumer knowledge of Mass Grown specialty crops,
- € Increase access to Mass Specialty crops in underserved communities,
- € Create positive, long term positive health impact for children and their families, especially those with high risk health concerns such as obesity and diabetes, through increased consumption of Massachusetts grown specialty crops-fruits and vegetables,
- € Create and test a system that improves the efficiency and reduce the costs of distributing specialty crops to underserved communities through programs that traditionally use scrip mechanisms.

Importance and timeliness

Mass Farmers Markets received funding from MDAR's Mass Grown 2010 grant along with funding from Wholesome Wave Foundation and Mass General Hospital designed to achieve the first 4 goals stated above. Specialty Crop funding leveraged and was leveraged by these grants. In addition it added to the breadth of information generated nationally through existing incentive programs, the Farmers Market Nutrition Programs (FMNP), and in the Healthy Initiatives Pilot (HIP). This work was targeted to low-income populations and in areas where access to healthy foods is problematic thereby addressing "Recommendation 4.7: Provide economic incentives to increase production of healthy foods such as fruits, vegetables, and whole grains, as well as create greater access to local and healthy food for consumers." and "Making research in this area a priority may help to identify the relationship between access and consumption of healthy foods, as well as the causal links between access and diet related health outcomes." as stated in the White House Task Force on Childhood Obesity, Report to the President. See: http://www.letsmove.gov/tfco_fullreport_may2010.pdf for the full report.

Perhaps most notably, this project began scientific evaluation of the concept of using specialty crops as a method of addressing the obesity and diabetes epidemic currently present in the US, particularly among children.

Summary of activities and achievements:

From October 2010 to May of 2011 Mass Farmers Markets created and "bench tested" an electronic Fruit and Vegetable Prescription Program (EFVRx), hired a system operator and concurrently operated and collected data on a first in the nation fruit and vegetable prescription coupon program (FVRx) and a fruit and vegetable coupon

program with Mass General Hospital, in tandem with the Farmers Market Nutrition Program (FMNP).

From June 2nd to October 29th, 2011 Mass Farmers Markets ran the Electronic Fruit and Vegetable Prescription Program (EFVRx) at three farmers markets, providing children and their immediate family members with one additional serving of fruits or vegetables per person per day. EFVRx and FVRx funds were used only for locally grown fruit and vegetables, e.g. Specialty Crops. Vendors not selling specialty crops who were present at the markets were not able to participate in the program, and not issued devices. Market managers were trained to use the EFVRx program and on multiple occasions in Lawrence ran the system without input from our system operator.

In 2011, MFM collaborated with Wholesome Wave Foundation (WW) on a token FVRx system operated in Boston, and ran a coupon based program, limited to local fruits and vegetables in conjunction with The Food Project. (In both 2010 and 2011 coupons were MICR coded, scanned and electronically tracked.)

In addition, MFM operated an electronic gift card program, for fruits and vegetables, in conjunction with Groundwork Lawrence in Lawrence MA.

Promotional items were produced (magnets, healthy eating guides, recipe cards, and farmers market brochures) and distributed at farmers markets in 2010, 2011, and 2012¹⁰. All shoppers, regardless of whether or not they were participating in prescription or coupon programs, were attracted to these items. This increased awareness, better understanding around nutrition, and increased sales, of specialty crops.

In 2012 evaluations and other reports were created and disseminated, including quantitative health outcomes of participants; found at:

<http://wholesomewave.org/wholesomewaveresearch/> and
<http://wholesomewave.files.wordpress.com/2012/09/fvr-x-factsheet.pdf>.

The EFVRx system was used as the basis of HIP redemption work at 3 target farmers markets. Using funds from The Mass Department of Transitional Assistance (DTA) the programming was altered to a web-application in order to create lower operating costs for markets as well as to address connectivity and convenience issues identified during 2011. This effort expanded the system to 2 farmers markets and provides the basis for more economical expansion to farmers markets throughout the country.

Connections were made with hospitals and health insurers resulting in ongoing work with Steward Hospital Systems for their own produce prescription program in target communities across Massachusetts in 2013.

Aggregate results of grant and related work is: Direct work with 124 farmers markets and 200+ farmers, indirect work with an additional 100 markets, service to 360 EFVRx family members, indirect work with an additional 270,000 shoppers and family members, direct added sales of specialty crops in excess of \$115,000.00, and indirect sales of specialty crops in excess of \$3,000,000.00

At conclusion of this work we remain confident that electronic sales and farmer payment systems provide sustainable solutions for more efficiently processing WIC FMNP

¹⁰ All items in 2010 and 2011. No brochures in 2012.

(limited to specialty crop sales) as states work toward the mandate for EBT for WIC, for other incentive programs, and for SNAP, of which an average of some 79% of sales at farmers markets are for specialty crops.

Accounting of funding

item	grant	MFM funding	Wholesome Wave	total
Lap Top Computer		760.00		
2 Routers		62.67		
Battery Charger	279.94	79.89		
Battery	199.95			
Battery back up/surge protector		61.10		
Inverter	87.64			
electric system wiring	13.17			
Printer	239.57			
Single use/proprietary printer cable	37.20			
12 IPODs	1,788.00			
12 I mag card readers	650.63			
Magnetic Cards	608.31			
Rolling Computer Bag		120.00		
IPOD case, anti magnetic foam	195.43	300.00		
Rolling cart		24.44		
Promotional Items		970.00		
Laminated signs for market		40.00		
Participants and Farmers Questionnaires		15.00		
Supplies: Folders, clips, notebooks, printer paper		68.58		
total	4,099.84	2,501.68		6,601.52
travel to second market			850.00	850.00
payroll - System coordinator 787 hours	17,800.00			17,800.00
Cole 461 hours	5,000.16	13,440.00		18,440.16
Sweet 64 hours		2,560.00		2,560.00
				<hr/> 38,800.16
fringe	2,240.00	2,082.00		4,322.00
software (contractual)	21,000.00			21,000.00
prescriptions, 2011 & 2012	10,000.00		57,245.26	67,245.26
Total	60,140.00	20,583.68	58,095.26	138,818.94

Summary of the contributions and roles of project partners

Wholesome Wave Foundation and CAVU Foundation provided \$57,000 and 100's of hours of technical and other support work to specialty crop sales through FVRx and EFVRX programs.

Harvard Pilgrim Health Care Foundation, the City of Boston, Wholesome Wave, and The Food Project committed \$100,000.00 in funds to increasing the sales of specialty crops at Massachusetts farmers markets to underserved residents.

Massachusetts General Hospital, in partnership with The Food Project provided an additional \$30,000.00 in specialty crop incentive coupons, made available at the *Partners Health & Fitness Exposition*.

The Food Project provided \$12,000.00 for specialty crop incentive coupons as part of their 2011 healthy living education programming.

The Mass Department of Agricultural Resources provided advice, support for the coupon programs.

The Mass Department of Transitional Assistance provided over \$75,000.00 and numerous hours of labor to address matters identified as out of the scope of the Specialty Crop grant making the system more effective, more widely applicable, and more easily transferred to farmers markets.

Holyoke Community Health Center and The Greater Lawrence Family Health Center provided hours of community outreach and patient counseling/services, in addition to the many hours of patient record keeping, and data correlation to produce valid statistics and casual relationship assessments with FVRx and EFRVx.

Groundwork Lawrence provided hours of onsite support, FVRx and EFVRx promotion and education, as well as cash for specialty crop sales of over \$1,300.00.

The City of Holyoke provided promotional support, services in kind such as electricity and internet, as well as facility maintenance.

Mass Farmers Markets served various roles; as project administrator, consultant, fiscal agent, and market manager (at 3 markets), in addition to our role of organizer and administrator of the Specialty Crop grant. Total fiscal contribution of Mass Farmers Markets over the course of this grant for services provided, not including grant funds for staff, is in excess of \$60,000.00. This funding came primarily from individual charitable contributions and corporate contributions.

Achievements:

This project was implemented in 5 phases. Phase 5 was added to the original project plan as part of our dissemination goal. Portions of some phases ran concurrently.

Phase 1 - October to December 2010: MFM staff redeemed paper prescriptions in coupon form and other farmers market coupons. Data related to redemption was recorded to track sales of specialty crops. Market managers collected consumer and vendor input and reported to MFM staff member Sweet. MFM ED Cole created an RFP with input from WW, a principle of Citrix, and with significant collaboration from MFM BOD member and Advanced Micro Devices management personnel, Nick Pavey an expert in systems logic.

Cole and Pavey evaluated RFP responses from software engineers and awarded a contract to Cape Cod Consulting Group (CCC). MFM staff reported to CAVU 2010 redemption details: amount redeemed, market where redeemed, date submitted to MFM, coupon tracking number. Ceiling and Visibility Unlimited Foundation (CAVU) funded health centers maintained patient tracking numbers exclusively, to ensure no violations of HIPA protocols could occur. Unfortunately CAVU ceased operations and funding before redemption information was correlated to patient outcome in the 2010 work. The lessons learned from working with the health centers were applied in early 2011 with MFM and WW investing an electronic reporting format that provided doctors direct access to EFVRx and FVRX token data and allowed participating health centers to integrate that data with their patient records systems. This action provided for accurate and timely statistics and peer review of the 2011 work.

Phase 2 – December 2010 to May 2011: Specifications for equipment and supplies were finalized and purchased by Cole. CCC created software and provided operational summaries to Cole who provided feedback on operating parameters from which CCC made alterations to the software. When the programming was functional for testing CCC integrated it with the hardware and Cole hired system operator Laskowski. CCC, Cole, Laskowski and other FMFM staff conducted multiple tests of system at the FMFM office and worked collaboratively on modifications. Paper back-up protocols were established and forms created in order to ensure the ability to operate if system issues or failures occurred. It also provided the basis for recovery of lost data and information instrumental to resolution of programming issues.

Twelve IPOD touches and magnetic stripe readers were purchased to provide Point of Sale devices to farmers along with a battery based power system for use at markets with no access to electricity. IPOD devices were used only for EFVRx point of sale transactions; all other applications were removed or deactivated from each ipod. A MFM provided laptop computer and wireless routers (2- one for back-up) were used to connect with the ipods to the prescription data, record use, and produce reports including vendor payment invoices. 500 custom printed magnetic stripe cards were

purchased to use for prescription redemption. The cards designated the limits of use to fresh fruits and vegetables and EFVRx program restrictions. A specialized portable printer, only printing receipts, was purchased to provide receipts to patients for their purchases as well as to farmers at the end of each market day so that they could confirm sales they recorded and as back up payment records.

To prevent any misuse or non grant related use the devices were locked in a hard case when not in farmers hands at markets and mag stripe cards were secured at the MFM office until release to markets.

Phase 3 – May, 2011 to October 31, 2011: Prior to each market's season opening, farmers who grew and sold specialty crops were trained by Laskowski on equipment use, the program purposes and goals, and its restrictions and policies. An operating manual for farmers and another for managers was produced and distributed. To follow-up, Laskowski coordinated arriving early for the first day of market to review the training with each vendor to ensure they were comfortable operating the system.

WW developed and printed paper prescription pads used by doctors and filled at each market.

Laskowski with support from Cole and CCC operated the system with participating shoppers and farmers. Laskowski, Cole, and CCC staff provided regular on-site vendor support, problem resolution, and additional training. Market managers were trained to use the program on site.

Laskowski provided weekly reports of operations in general, daily reports of issues encountered, consumer and vendor feedback, vendor payment files, and paper records of transactions. CCC worked both remotely and on site during market operations to correct problems and provide additional training to Cole and Laskowski. Sweet paid vendors on a bi-weekly basis.

Laskowski and other MFM staff created and disseminated point of sale materials.

Phase 4 - December 2011 to January 2012: Cole and Laskowski created and disseminated evaluations, reports and recommendations. Cole and Laskowski collaborated with WW regarding evidence based statistics and other reports, and to expand the use of EFVRx.

System operator Laskowski and ED Cole worked at the MFM offices to test the MAG stripe readers and determine the cause of card read error, found to be frequent during operation. ED Cole researched technology for card reading, which had dramatically changed during the term of this grant (and continues to do so).

Cole and Laskowski met with CCC, reviewed the hard and soft copy data from 2011 and operated the system in test mode. This identified the outstanding processing error with new prescriptions and software was re-engineered by CCC. Extensive testing

followed and two in person meetings with CCC arraigned, which successfully identified freezes/return to home screen being due to i-pod connectivity and resulting data integrity issues. These issues are device and environment related and can not be addressed within the scope of this grant.

Phase 5 – November 2011 to December 2012: Cole worked with Wholesome Wave, DAR, and others to present results of this grant to private funders and USDA and advocate for funding of similar initiatives for 2012 and beyond. System concepts were presented to Wal-Mart foundation, Blue Cross and Blue Shield, Harvard Pilgrim, Metro West Medical Center, DTA, FNS, the Farmers Market Coalition, Nuestra Raices, BCFF, Boston Public Health Commission, and numerous market managers.

CCC provided a potential future solution to the i-pod connectivity issue of reconfiguring our software code in order to employ a web application system rather than using a device resident application. As a result, Cole and Laskowski worked through January with CCC, WW, DTA and FNS regarding modifying the programming and procedures, and creating specifications for new equipment to work with SNAP/HIP using a web application system that would include EFVRx functionality. This process was designed to maintain separation of Specialty Crop funds and equipment from any SNAP/HIP work and compliance with regulations on the use of Specialty Crop funding. Compliance was maintained, while concurrently fulfilling the terms of the grant to work to improve and disseminate its products.

Wholesome Wave concluded that they were not interested in supporting national distribution of the EFVRx system and the Famers Market Coalition was not able to allocate resources for national distribution during the term of this grant.

Cole has had discussions with Metro- West Medical Center regarding implementing similar programs through their facilities that will increase the sales of specialty crops and access to those healthy foods and is in detailed conversation with Steward Hospital System to institute a trial fruit and vegetable prescription program at St. Elizabeth's, St. Anne's, and Carney Hospitals during the 2013 winter farmers market season with a roll out to all of their hospitals during the summer of 2013

Lessons:

Farmers, market managers, and shoppers are both interested and capable of using electronic systems at farmers markets. Such systems lessen their burdens in completing transactions of incentives, coupons, EBT cards, and other such forms of payment. In fact in the token FVRx market only \$5221.00 of an available \$20,000.00 was redeemed. This would indicate that an electronic system engenders more use, however further study would be required to determine this.

Our follow up research shows that technology related to mobile electronic processing is in rapid growth. Private investors are seeking solutions and some have focused on farmers markets. For example combination card readers and printers are now available

in the \$250.00 range and offer a relatively low cost option for mobile POS efforts and printing that may further decentralize incentives, coupons, and other such payments at farmers markets. .

At the beginning of the year some of the farmers expressed concern that the 2010 paper program was possibly misused by participants due to the fact that there was a large variance in the number of coupons that different families had. This years' electronic approach allowed for more control and significantly reduced the potential for abuse, increasing the farmers' confidence in the program.

Device resident applications coupled with wi-fi are subject to connectivity issues, known in programming as a "handshake" issues. The devices are not transferring data each time with 100% accuracy as required in the programming. There are a large number of possible interruptions to data transfer, which with an application can only be fixed with extensive programming costing 10's of thousands of dollars. Our test in 2012 of a web-application showed such to be an effective solution. However we learned that wi-fi is subject to signal loss and disruption from trees, people's bodies, and other water containing items. Careful attention to antenna placement is critical for uninterrupted connection and data processing as is vendors not operating the ipos while standing between the device and wi-fi antenna.

The recipe cards attracted the most attention of all promotional materials with their pleasing art work. Often program participants would return throughout the season to take additional recipes. Participants found the recipe cards to be helpful when deciding what to purchase

In Lawrence the program was expanded to allow Ground Work Lawrence to distribute electronic gift cards to be used at their markets for only for local fruits and vegetables. The gift card system worked, proving the EFVRx electronic program is expandable and able to accommodate a variety of funding sources as designed. Note: GWL provided \$500.00 in programming expense necessary to allow GWL to run their gift card program through the EFVRx program.

The card scanners we purchased (approx \$57.00 per) did not work as flawlessly as hoped. More expensive mag-stripe cards helped a good deal, however in our 2012 work we found that more expensive readers/printers (approx \$450.00) performed much better with all types of mag-stripe cards. But such reading is a device specific application, requiring different programming for different device types, such as tablets, apple products, and the number of android smart phones. We believe that as competition increases in this market more effective and lower cost options will be created.

The paper back-up records Laskowski maintained and collected proved instrumental in maintaining the ability to operate, as the system did experience issues in the field early on that disrupted electronic operations/record keeping. Manual data entry from paper records were used to solve the immediate issue while the programming was fixed and the system tested prior to the next market. We recommend that any market operating

new programs maintain an alternative record keeping system until it is proven to be flawless.

IIF files created by our system did not work with QB and we could not resolve the problem with our level of expertise. Therefore Laskowski transmitted weekly vendor invoices to Sweet in spreadsheet format. One advantage gained is that this provided for data redundancy, and alternative reporting formats, which at time may be helpful. Even if electronic file transfer is used for farmer payments we recommend an alternative report format for redundancy and error checking capabilities.

Outcomes and beneficiaries:

The primary objective was to increase in specialty crop sales throughout 2011, by at least \$30,000.00 measured by our farmer payment statistics. At the height of markets \$2625 per week was issued to be spent on approved produce at the three trial markets. \$23,202.18 in sales occurred in 2011. A token system operated in Boston where \$5221.00 was redeemed. A coupon based program, limited to local fruits and vegetables ran successfully during the 2010 and 2011 season. These increased specialty crop sales by \$41,307.50, and the trial gift card program by \$1,303.50. Total direct impact equaling \$71,034.18.

MFM staff was hired and the system operated successfully at 3 farmers markets and farmers report additional employees were hired for farmers markets. We estimate that at least 27 jobs were created as a result of or in tandem with this project.

We sought to directly benefit 204 individuals and 30 farmers at 2 farmers' markets. 138 individuals from 30 families participated in Holyoke and 237 individuals from 55 families in Lawrence. (An additional 7 families were issued prescriptions that were not redeemed.) Total direct prescription benefits went to these 375 individuals with some 1000 served with the coupon programs.

12 farmers at 3 markets benefited from EFVRx and 171 farmers at 123 farmers markets from related coupons (exclusive of FMNP).

We anticipated increased cash sales of specialty crops due to exposure to the taste and value provided by farm direct sales a reported increase in the consumption of and percentage of income spent on fresh fruits and vegetables in the target population. This was self reported by shoppers.

Wholesome Wave was able to measure quantitative health outcomes with the volume of increase in consumption of fresh fruits and vegetables (specialty crops). Summary report attached.

We created \$60,000.00 of software for \$21,000.00. Pavey, upon reviewing the RFP and bids strongly recommended abandonment of the grant. He stated that the fair market value of the work was at least \$60,000.00 and as a result the grant could not be fulfilled with the available funds. The principle of Citrix said only that the programming work could not be completed with the available funds. Due to the commitment of MFM and CCC to the farmers market industry we were able to accomplish the goals. All Farmers, market managers, and even competitive software engineering companies benefited from lessons learned and results achieved from this work.

On a number of occasions the manager successfully operated the EFVRx system under Laskowski's guidance, and in Holyoke Laskowski often operated EFVRx and successfully served as the on-site market manager. This proves it is possible to run both the EFVRx program and manage a market without difficulty as we had set for a goal. And on two separate occasions the program was run by the market managers in Lawrence without Laskowski present proving that, without an intimate knowledge of the programming and its intricacies, managers are able to successfully operate the system.

Our system provided some basis for market protocols and has influenced future development of electronic processing at farmers markets, and has engendered private competition to develop systems that are inexpensive and operate with a high degree of proficiency¹¹. DTA/FNS provided funding and other resources in excess of \$75,000.00 to purchase equipment and programming to operate an electronic SNAP/HIP system using EFVRx data structure formats, lessons learned, and applicable software code. A web application was created and successfully tested that solved connectivity issues, provides access to; customer funds available to be spent, customer sales for each farmer, and total sales for the farmer as of time of inquiry, and addressed visibility issues raised by farmers. This system has successfully addressed the future work not included in this grant as identified in interim reports.

Illustration of baseline data

Preliminary reports in late 2011 from health centers show that children who participated in the program have decreased/maintained their BMIs, decreased consumption of sweetened drinks, increased physical activity, and decreased "screen-time".

Doctors who participated found the program to be beneficial to their patients. According to Dr. Biggs of Holyoke "There is no question in my mind that this is a valuable program to the Holyoke residents that we serve." In addition to serving the community the electronic aspect of the program has also been successful "EFVRx prescriptions were easy to use and I felt like they were much better than the system we used last year The swipe card system seemed to be very well received by our families." Similarly in Lawrence Dr. Teplow indicated that the swipe cards were well received and that the program was beneficial.

Response from the participants of the program was mainly positive, they felt it had a positive effect on their health and they reported that they spent more money on produce than they had in the past and that they now frequented farmers markets instead of buying produce at supermarkets. Many said they would try to continue with their healthier eating habits, and increased purchases of fruits and vegetables.

Participant Questionnaire

question	Yes	No/Unsure	No Answer
Does the EFVRx	75%	0%	25%

¹¹ Firms such as Nova Dia Group, ii2P, and others are aggressively pursuing systems for WIC FMNP, SNAP, and other programs that material impact and increase sales of specialty crops.

program increase the amount of vegetables/fruits you eat on a regular basis?			
Will you continue to eat more vegetables when the program ends?	80%	15%	05%
Do you buy more produce now that you have EFVRx funds?	85%	10%	05%
Do you Buy produce with non EFVRx funds?	55%	35%	10%
Has this program affected your health in a positive way?	80%	10%	10%

Farmers had a positive reaction to the program. Most agreed that the IPODs were easy to learn to use and that the program was beneficial to all involved.

Farmer Questionnaire

	Easy to understand	Moderately Easy	Moderately Difficult	Difficult to Understand
The rules of the program were:	5	2	0	0
The IPOD program was:	3	3	1	0
The Prescription Cards were:	5	2	0	0
	Strongly Agree	Moderately Agree	Moderately Disagree	Strongly Disagree
The electronic Program was more efficient that the paper program	4	2	1	0
	True	False	No answer	
I would rather use the paper/coupon program instead	1	5	1	

	Yes	No	Unsure	
Did you feel the program brought people to market who otherwise would not come?	4	0	3	
Do you feel the program increased Specialty Crop sales?	3	1	3	
Did you feel the program was successful overall?	6	0	1	
Would you be willing to participate in the EFVRx program in the future?	7	0	0	

Market Managers also had similarly positive reactions to the program and expressed that the program decreased the amount of work associated with coupon programs.

Holyoke Market Sale Data

The total sales for the summer in Holyoke were \$7577.37.

	Week 1	Week 2	Week 3	Week 4	Monthly Sales	Program Participants
June	\$86.30	\$215.15	\$112.10	\$404.03	\$817.85	16
July	\$380.30	\$312.33	\$439.30	\$561.35	\$1693.28	29
August	\$594.94	\$960.84	\$389.58	\$335.71	\$2281.07	30
September	\$449.24	\$385.55	\$350.59	\$377.69	\$1863.18	30
October	\$374.52	\$237.91	\$206.58	\$102.98	\$921.99	30

Lawrence Market Sale Data

All together \$15624.81 in EFVRx funding was spent in Lawrence in 2011. Not only were there two markets run in Lawrence but there were twice as many participants with 62 scripts written.

	Week 1	Week 2	Week 3	Week 4	Week 5	Monthly Sales week	Total Monthly Sales	Program Participants

July	S	\$123.88	\$233.63	\$372.58	\$736.69		\$1466.78	\$2376.88	49
	W		\$146.45	\$206.05	\$557.60		\$910.10		
August	S	\$613.99	\$618.70	\$484.52	\$597.20		\$2314.41	\$4452.41	54
	W	\$273.00	\$424.50	\$537.15	\$440.95	\$462.40	\$2138.00		
Sept	S	\$596.19	\$635.80	\$399.20	\$634.95		\$2566.14	\$4193.49	55
	W	\$361.70	\$462.15	\$349.50	\$454.00		\$1627.35		
October	S	\$594.33	\$438.65	\$526.4	\$741.00	\$679.00	\$2979.38	\$4611.38	55
	W	\$432.00	\$510.00	\$332.00	\$349.00		\$1632.00		
							Yearly Sales	\$15637.16	

Market	TFP 2011	Prescrip 11	2010 TFP (Coupons)	Prescrip 10 (Coupons)	MGH 2010 (Coupons)	Total Coupons
	2010 - 11	2010 - 11	2010 - 11	2010 - 11	2010 - 11	Apr '10 - Dec 11
m221Mobile Market	-	10.00	0.00	0.00	0.00	-10.00
m190Holyoke-Peoples Bank	0.00	0.00	0.00	57.50	0.00	-57.50
m189Yarmouth/Bass River	0.00	0.00	0.00	0.00	-7.50	-7.50
m148Hyde Park	30.00	0.00	-5.00	0.00	-5.00	-40.00
m180Palmer 3 rivers	0.00	0.00	0.00	225.00	0.00	225.00
m187Worcester Commons	0.00	-20.00	0.00	0.00	0.00	-20.00
m150Indian Orchard	0.00	0.00	0.00	262.50	0.00	262.50
Springfield	0.00	0.00	0.00	0.00	0.00	0.00
m179Westborough	0.00	-15.00	0.00	0.00	0.00	-15.00

m143Hampden	0.00	0.00	0.00	0.00	-10.00	-10.00
	-	-				-
	247.5	520.0				767.5
m155Brookfield	0	0	0.00	0.00	0.00	0
m169Spencer	0.00	0.00	0.00	0.00	-5.00	-5.00
m160Walpole	0.00	0.00	0.00	0.00	-77.50	-77.50
m171Chelmsford	0.00	0.00	0.00	0.00	-22.50	-22.50
				-		-
m119Lawrence				485.0		495.0
Sat	0.00	0.00	0.00	0	-10.00	0
			-			
m159Acton	0.00	0.00	10.00	0.00	-22.50	-32.50
m173Boston						
University	0.00	0.00	0.00	0.00	-7.50	-7.50
m202Stoneham	0.00	0.00	0.00	0.00	-85.00	-85.00
					-	-
			-		1,115.0	1,130.
m161Everett	0.00	0.00	15.00	0.00	0	00
						-
						112.5
m162Weymouth	0.00	0.00	0.00	0.00	-112.50	0
m152Fitchburg						
Riverfront Park	0.00	0.00	0.00	0.00	-27.50	-27.50
m13Newburyport	0.00	0.00	0.00	0.00	-10.00	-10.00
m75Grafton	0.00	0.00	0.00	0.00	-22.50	-22.50
						-
	-					105.0
m170Braintree	12.50	0.00	0.00	0.00	-92.50	0
						-
m200Prudential	-					177.5
Ctr. Boston	20.00	0.00	0.00	0.00	-157.50	0
m183Bedford	0.00	0.00	0.00	0.00	-10.00	-10.00
			-	-		-
M140Codman			137.5	987.5		1,480.
Square	0.00	0.00	0	0	-355.00	00
m192Westminster	0.00	0.00	0.00	0.00	-22.50	-22.50
m142Canton	0.00	0.00	0.00	0.00	-85.00	-85.00
m196Pepperell	0.00	0.00	0.00	0.00	-5.00	-5.00
	-	-				-
m136Worcester	322.5	807.5		-		1,165.
South Main	0	0	0.00	30.00	-5.00	00
	-		-			-
m138Boston	750.0		250.0			1,000.
Medical Center	0	0.00	0	0.00	0.00	00
m191Dorchester/B	-		-			-
owdoin Sq.	577.5	0.00	80.00	0.00	-42.50	700.0

	0					0
						-
m123Worcester Umass Medical M137 Brimfield	- 80.00 -2.50	-50.00 0.00 0.00	0.00 0.00 0.00	0.00 0.00 0.00	0.00 0.00 0.00	130.0 0 -2.50
	-					-
	102.5					130.0
m100Kendall Sq. m02Springfield at the X	0 0.00	0.00 0.00	0.00 0.00	0.00 -5.00	-27.50 0.00	0 -5.00
		-				-
m03Worcester Chandler St. m06Cambridgepor t	- 30.00 0.00	327.5 0	0.00 0.00	- 45.00 0.00	- -22.50 -15.00	425.0 0 -15.00
						-
m07Natick	- 42.50	-17.50	0.00	0.00	-70.00	130.0 0
						-
				280.0		280.0
m08Dudley m103Franklin m105Westford	0.00 0.00 0.00	0.00 0.00 0.00	0.00 0.00 0.00	0 0.00 0.00	0.00 -7.50 -30.00	0 -7.50 -30.00
	-	-	-			-
m106East Boston	815.0 0	250.0 0	480.0 0	- 12.50	-	1,657. 50
						-
m107Union Square m108Worcester Grt Brk Val m109Provincetow n	0.00 0.00 0.00	0.00 -5.00 0.00	- 12.50 0.00	0.00 0.00 0.00	-240.00 -27.50 -10.00	252.5 0 -32.50 -10.00
						-
m10Charlestown m110Wayland at Russell's m111Hyannis, Main St.	- 97.50 0.00 0.00	- 0.00 0.00 0.00	- 15.00 0.00 0.00	- 0.00 0.00 0.00	- -337.50 -42.50 -15.00	450.0 0 -42.50 -15.00
						-
m113Revere	- 10.00	- 0.00	- 27.50	- 0.00	- -747.50	785.0 0
						-
m114Lexington, Mass AVE	0.00	0.00	0.00	0.00	-132.50	132.5 0

m116South End	0.00	0.00	-7.50	0.00	-70.00	-77.50
m118Gloucester	0.00	0.00	0.00	0.00	-12.50	-12.50
	-					
m11Ipswich	17.50	0.00	0.00	0.00	0.00	-17.50
m120Rowley	0.00	0.00	0.00	0.00	-7.50	-7.50
m122 Peabody Square	-			-		347.5
Dorchester	22.50	0.00	-2.50	10.00	-312.50	0
m124 Carlisle	0.00	0.00	0.00	0.00	-20.00	-20.00
				-		-
			-	100.0		175.0
m127Mattapan	-5.00	0.00	27.50	0	-42.50	0
m128Medford	0.00	0.00	0.00	0.00	-70.00	-70.00
			-			-
m130Dorchester House	-5.00	0.00	187.5	-		272.5
m134Andover	0.00	0.00	0	52.50	-27.50	0
				0.00	-37.50	-37.50
						-
						145.0
m184Dedham	12.50	0.00	0.00	0.00	-132.50	0
m14Norwood	0.00	0.00	0.00	0.00	-42.50	-42.50
						-
						242.5
m16Melrose	70.00	0.00	0.00	0.00	-172.50	0
m18Taunton	0.00	0.00	0.00	0.00	-12.50	-12.50
m19Holden (Tues.)	-					-
	30.00	0.00	0.00	0.00	0.00	-75.00
						-
				110.0		110.0
m20Amherst	0.00	0.00	0.00	0	0.00	0
						-
m23Brigham Circle/Mission Hill	802.5		-	-		1,062.
m24Belmont	0	0.00	70.00	75.00	-115.00	50
	-2.50	0.00	0.00	0.00	-12.50	-15.00
	-		-	-		-
	107.5		265.0	1,330		1,785.
m25Fields Corner	0	0.00	0	.00	-82.50	00
						-
						327.5
m26Jamaica Plain	37.50	0.00	52.50	60.00	-177.50	0
	-			-		-
	775.0		-	465.0		2,055.
m27Roslindale	0	0.00	82.50	0	-732.50	00
	-					-
m28Boston City Hall/Scollay	610.0		-			1,147.
	0	0.00	57.50	-5.00	-475.00	50

m29Salem	0.00	0.00	0.00	0.00	-97.50	-97.50
m30Brockton Fairgrounds	- 17.50	0.00	0.00	0.00	-55.00	-72.50
m31Brockton City Hall	0.00	0.00	0.00	0.00	-42.50	-42.50
			-			-
			205.0			852.5
m32Brookline	80.00	0.00	0	0.00	-567.50	0
						-
m33Cambridge/Ce ntral Square	- 52.50	0.00	- 47.50	0.00	-390.00	490.0 0
						-
m34Chicopee	0.00	0.00	0.00	77.50	0.00	-77.50
						-
m36Fall River - Kennedy Park	0.00	0.00	0.00	0.00	-35.00	987.5 0
m38Framingham Rte 135	0.00	0.00	0.00	0.00	-10.00	-10.00
m40Gardner	0.00	0.00	0.00	0.00	-15.00	-40.00
						-
	-	120.0				175.0
m41Auburn	35.00	0	0.00	0.00	-20.00	0
m43Haverhill	0.00	0.00	0.00	0.00	-7.50	-7.50
m44Hingham	0.00	0.00	0.00	0.00	-27.50	-27.50
m45Dartmouth	0.00	0.00	0.00	0.00	-70.00	-70.00
						-
				3,455		3,455.
m46Holyoke	0.00	0.00	0.00	.00	0.00	00
						-
				3,647		3,730.
m48Lawrence	0.00	0.00	0.00	.50	-82.50	00
						-
m49Lowell	0.00	0.00	32.50	0.00	-5.00	-37.50
						-
m51Newton American Legion	0.00	0.00	0.00	0.00	-132.50	132.5 0
m52Middleboro	0.00	0.00	0.00	0.00	-27.50	-27.50
						-
m53Dudley Town Common	807.5 0	0.00	365.0 0	102.5 0	-452.50	1,727. 50
						-
						250.0
m54Newton	10.00	0.00	32.50	0.00	-207.50	0
m57HarvardUnive rsity	-2.50	0.00	0.00	0.00	-10.00	-12.50
m60Quincy	-	0.00	0.00	-	-320.00	-

	57.50			425.00		802.50
				0		0
						-
m61Somerville/Davis	-7.50	0.00	42.50	10.00	-407.50	467.50
						0
						-
						165.00
m62Arlington	50.00	0.00	0.00	0.00	-115.00	0
m63Hopkinton	0.00	-10.00	0.00	0.00	-20.00	-30.00
m65Sterling	0.00	0.00	0.00	0.00	-12.50	-12.50
m66Allston	0.00	0.00	0.00	0.00	-10.00	-10.00
m68North Easton	0.00	0.00	0.00	0.00	-40.00	-40.00
m69Fall River - Ruggles Park	0.00	0.00	0.00	0.00	-15.00	-15.00
						-
						140.00
m70Milton	77.50	0.00	-2.50	10.00	-50.00	0
						-
						167.50
m72Marblehead	0.00	0.00	0.00	0.00	-167.50	0
						-
						165.00
m74Winchester	0.00	0.00	0.00	0.00	-165.00	0
						-
						432.50
m147Dewey Square	42.50	-20.00	82.50	-7.50	-280.00	0
m76Carver	0.00	0.00	0.00	0.00	-92.50	-92.50
m77Maynard	0.00	0.00	0.00	0.00	-82.50	-82.50
						-
						442.50
m78Lynn	0.00	0.00	0.00	0.00	-442.50	0
						-
						-
m79Copley Square	1,150.00	0.00	190.00	122.50	1,285.00	2,747.50
m80Mansfield	0.00	0.00	0.00	0.00	-25.00	-25.00
						-
						160.00
m81South Boston	45.00	0.00	75.00	0.00	-40.00	0
m82Cambridge/Charles Square	0.00	0.00	0.00	0.00	-15.00	-15.00
						-
m83Worcester-Northeast Side	730.00	172.50	0.00	0.00	-32.50	935.00
m84Westport	0.00	0.00	0.00	0.00	-27.50	0
m85Framingham Village Green	0.00	0.00	0.00	0.00	-30.00	-30.00

m87Cohasset	0.00	0.00	0.00	0.00	-25.00	-25.00
m90Plymouth	0.00	0.00	0.00	0.00	-17.50	-17.50
m91New Bedford - Clasky Commons	0.00	0.00	0.00	0.00	-32.50	-32.50
						-
						557.5
m92Chelsea	0.00	0.00	0.00	52.50	-505.00	0
						-
m93Holyoke/Dona hue Elem.	0.00	0.00	0.00	0.00	-200.00	200.0
						0
m95Beverly, Cabot St.	0.00	0.00	0.00	0.00	-10.00	-10.00
m97Saugus	0.00	0.00	0.00	0.00	-32.50	-32.50
						-
						322.5
m98Waltham	55.00	0.00	0.00	0.00	-267.50	0
	-	-	-	-	-	-
	8,867	2,335.	2,860	12,50	13,715.	41,30
Total	.50	00	.00	7.50	00	7.50

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Health Bucks: Promoting Specialty Crops at Farmers' Markets in Underserved Communities through Education (FINAL REPORT)

Project Summary

The purpose of The Food Project's Farm Fresh Coupon Program is to forge stronger connections between producers of Massachusetts specialty crops and consumers in Boston's low-income communities. The initiative was motivated by the belief that this connection constitutes a mutually beneficial partnership: one that improves community health while developing and expanding a new direct-to-consumer market for Massachusetts-grown fruits and vegetables.

The number of farmers' markets in these communities is rapidly rising, representing a direct-sales growth opportunity for specialty crops producers in the state—particularly those that might be unable to find space at the larger, more established markets in wealthier areas of the city, or those that themselves have ties to these neighborhoods. At the same time, however, many markets have struggled to gain a foothold in underserved areas, closing after only a few years of operation. By distributing farmers' market incentives alongside educational programming, the Farm Fresh Coupon Program is designed to create both a short-term impact—nearly ten thousand dollars of redeemed coupons, plus additional out-of-pocket money, directed to local specialty crops producers—and a deeper, longer-term impact—changes in consumption habits and perceptions about farmers' markets that may help to create a more loyal, enduring farmers' market customer base among low-income Bostonians. By distributing the coupons specifically through partners engaging low-income individuals and families in health-focused work, the program aims to build the case for farmers' markets within a structured environment that reinforces the positive personal benefits of fresh fruit and vegetable consumption, and allow this impact to ripple outwards through recommendations to other community members. In turn, these longer-term behavioral shifts will not only benefit local specialty crops producers, but support improved health and well-being among these communities.

The program builds off of The Food Project's strong background in this work, and particularly the innovative Boston Bounty Bucks program, on which we have partnered with the Massachusetts Department of Agricultural Resources (MDAR) in the past. Bounty Bucks provides a dollar-for-dollar matching incentive to all SNAP purchases up to \$10 made at participating Boston farmers' markets. From 2008 to 2011, the program grew from just nine participating markets redeeming a few thousand dollars of SNAP benefits and matching incentives to more than 20 markets redeeming upwards of \$100,000; this winter, The Food Project turned the program over to the Boston Collaborative for Food & Fitness at the Boston Public Health Commission. The Farm Fresh Coupon Program expands the reach of these market incentives to a population not necessarily receiving SNAP benefits, and does so in a structured framework that may help to reinforce the efficacy of the incentives and create more enduring behavioral change.

Project Approach

As described in our Progress Report, work on the program commenced in the winter of 2010, when our staff began to analyze our evaluations from the previous season and identify the key traits of our most successful partners. Based on this information, we designed a Request for Proposals (RFP) that we made widely available through multiple electronic channels, and distributed directly to several particularly strong candidates—including organizations that had participated in the program previously, those that we had collaborated with in other capacities, and those recommended to us by Ms. Kathy Cunningham of the Boston Public Health Commission. In response to our RFP, 16 organizations submitted proposals by the deadline of May 20, and many submitted multiple proposals for individual programs housed within their organization: Action for Boston Community Development, for example, submitted three separate proposals for their Head Start program, their “Food Dollars” elder nutrition program, and their “Green Thumbs” intergenerational gardening program.

By mid-June, our staff completed their review of these materials and selected 19 individual programs with which to partner for the 2011 season. These programs were housed within 12 unique organizations, including several that were new partners for The Food Project—the Boston Living Center, Roxbury Comprehensive Community Health Center, and the Center for Integrated Medicine and Healthcare Disparities at the Boston Medical Center. During this period, we also collaborated with the Federation of Massachusetts Farmers’ Markets (FMFM) to develop and print the physical Farm Fresh Coupons themselves, and create a plan for their redemption. During this process, we took several steps to ensure that they would be used solely to enhance the competitiveness of specialty crops:

- The coupons were printed clearly with the message: “May be used only for fresh fruits, vegetables, and cut herbs. Non-farm vendors ineligible.”
- They were made redeemable through the FMFM using the rules and channels used by the WIC Farmers’ Market Nutrition Program (FMNP), which carries the same restrictions as the Specialty Crops Block Grant;
- They were made redeemable only by vendors certified to accept WIC FMNP; and
- All vendors thus eligible received a mailing from the FMFM that highlighted these redemption rules for the coupon.

By July 5, we had signed formal letters of agreement with each of the selected partners. Shortly thereafter, we distributed to each of these organizations their individual allotment of a total of \$11,250 in coupons, along with our pre-program survey. Programming at our partner organizations ran from July through September, and during this time Program Coordinator Maxwell Gitlen conducted site visits with approximately half of them. A post-program survey was distributed to participating organizations in September; in early October, we distributed guidelines for a brief narrative report to be completed by program coordinators and submitted alongside these surveys. All materials were due by November 25.

We did encounter some challenges in the administration of the project. While we had hoped that our youth interns would be able to deliver their food justice and healthy eating workshops to participating community members, none of our partners expressed interest in hosting one of these sessions. In addition, evaluation posed a particular problem, as several of our partners failed to submit one or more of the required evaluative components. There were complications on both ends of this transaction. Some of our partners seemed not to have the capacity to administer these evaluations as effectively as they had asserted in their proposals; at the same time, some partners noted that our distribution of the evaluative materials did not coincide with the schedules of their programs, or that the materials, provided in English and Spanish, did not meet the range of their constituents' language needs. Despite these challenges, we did gather enough data to measure our progress against our goals for the program—these findings, and the conclusions we drew from them, are discussed at length in the following two sections.

Goals and Outcomes Achieved

The Food Project tracked the success of the Farm Fresh Coupon Program through two primary means: the redemption rate of the coupons distributed, demonstrating how often program participants made use of their incentives, and our pre- and post-program surveys, which were designed to track a variety of indicators—including the number of respondents familiar with the location of their nearest farmers' market, those that increased their consumption of fresh fruits and vegetables, the frequency of their visits to a market when not using their incentives, and the percentage that shared information about the markets with others.

Incentive Redemption

The Food Project submitted our original proposal to MDAR during the implementation of our pilot season of the Farm Fresh Coupon Program (then known as Health Bucks) in 2010. At that time, we predicted that we would see a redemption rate of 80 percent in our pilot year. In actuality, of the \$5,000 worth of coupons that were distributed, \$2,828-worth were redeemed, yielding an overall redemption rate of 57 percent. This year, we distributed \$11,250-worth of coupons, exceeding our \$10,000 prediction. The coupons were given unique serial numbers and processed by FMFM as part of their annual end-of-season cataloguing of benefits and incentive coupons. FMFM then reimbursed vendors, and The Food Project reimbursed FMFM in turn. Of the total amount distributed, \$8,760-worth of coupons were redeemed, yielding a redemption rate of approximately 78 percent—a growth of 21 percent over the previous season. We believe that this increase reflects the hard work of our staff in identifying best practices from our pilot season and their concerted efforts to ensure that partners incorporated them into their programs for 2011.

Survey Data

In our proposal, we identified several key outcomes that we hoped to observe in our survey data for the 2011 season.

- Market Awareness. In our proposal, we expressed the hope that by the end of the program, at least 75 percent of participants would have a familiarity with their local farmers' market and the opportunities to use nutrition assistance programs at those markets. Perhaps due to the amount of time elapsed between our original proposal and project implementation, market awareness exceeded this goal even before the beginning of the program, with 79 percent of respondents on the pre-program survey reporting that they knew the location of their nearest market. This percentage remained constant on our post-program surveys. During the program, we also provided all participants with information about their ability to use federal benefits at Boston farmers' markets. On our pre-season surveys, we asked if participants had known previously that they were able to do so—46 percent indicated that they had not.
- Fruit and Vegetable Consumption. In our proposal, we expressed the goal that at least 50 percent of program participants would increase their consumption of fresh fruits and vegetables over the course of the market season. Due to inconsistencies in the design of our pre- and post-program surveys, we were unable to track this information in the manner that we had hoped. On our post-program surveys, however, we did ask participants whether they had increased their fruit and vegetable consumption this year as compared to the previous season, and found encouraging results—84 percent of respondents replied that they had.
- Market Patronage. Our goal for the program was that at least 50 percent of participants would visit a farmers' market at least one additional time after having exhausted their Farm Fresh Coupons, and that in the aggregate they would spend between \$2,000 and \$4,000 of their own money or benefits (including any non-coupon funds) there. Fifty-five percent of respondents to our post-program surveys reported that they had visited the market at least one additional time without the coupon incentive. In addition, 34 percent reported spending between \$1 and \$25 of their own funds beyond the coupon incentive over the course of the season, 21 percent between \$25 and \$50, 6 percent between \$50 and \$100, and 3 percent \$100 or more. Using the averages of these ranges, we estimate that participants spent approximately \$3,000 of their own funds at the markets over the course of the season. Eighty-five percent of respondents reported that they planned to return to the market in the future.
- Word of Mouth. A major goal of the program was for program participants to share their experiences and information about the market with other members of the community. We had hoped that 25 percent of program participants would do so—in actuality, 73 percent of respondents to our post-program survey replied that they had told others about the market.

Beneficiaries

The immediate benefits of the Farm Fresh Coupon Program were directed toward Massachusetts specialty crops producers selling at markets throughout the Greater

Boston area. Coupons were redeemed at 45 individual markets in neighborhoods throughout the city, as well as in neighboring towns and cities such as Lynn and Arlington. As mentioned above, the program yielded \$8,760 in coupon funds for these growers, and leveraged some additional spending among program participants above and beyond this amount, estimated at approximately \$3,000.

The program's true benefit for producers, however, was its success in creating more lasting culture shifts amongst low-income consumers. Thirty-one percent of respondents to the pre-program survey reported that they had not been to a farmers' market in 2010; at the end of the program, all but 5 percent had shopped at a market in 2011. This increase in market visits, along with the coupon incentives and the complementary work being done by our program partners, helped to change consumers' perceptions. When surveyed at the close of the program, 57 percent of the participants reported that their opinion of the market had improved (36 percent reported that it had stayed the same, and only seven percent that it had decreased). Considering that more than 70 percent shared information about the market with other members of their communities, we believe the program achieved notable success in beginning to dispel myths and change attitudes that are shaping the shopping habits in these communities, and ultimately preventing growers of Massachusetts specialty crops from making inroads into a new demographic market for their produce.

We also surveyed participants about what they felt was positive about their experience at the market, and what they felt was negative; participants were able to select all answers that they felt were applicable. The most appealing elements of the markets were the quality of the produce (cited by 55 percent of respondents), the friendliness of the staff and/or farmers (cited by 43 percent), and that the produce was organic and/or local (cited by 42 percent). The most commonly cited negative aspects were the cost (39 percent) and the selection (25 percent). This information—and further studies—may inform specialty crops producers of the challenges they face in connecting with low-income consumers, and the elements that they might highlight in their publicity efforts.

Lessons Learned

The strongest conclusion to draw from the project is that significant demand for farmers' market produce does exist in Greater Boston's low-income communities, and that interventions such as the Farm Fresh Coupon Program—based on incentives, education, or both—are likely to have a positive impact on market patronage among this population.

Four statistical findings seem particularly of note in this context—that the percentage of respondents who reported that they knew of the existence and location of their local farmers' market remained level throughout the program; that despite this knowledge, before the program 31 percent of respondents hadn't shopped at a farmers' market the previous season, and after the program 85 percent reported that they planned to shop at one again; that after the program, 57 percent of participants reported that their opinion of the market had improved; and that 73 percent of respondents had told others about the market.

Taken together, these figures suggest several conclusions. First, they imply that a lack of awareness is not a primary factor preventing members of these communities from shopping at local markets. While the level of awareness did not change throughout the course of the program, the number of community members both currently frequenting markets and planning to in the future increased. Second, they imply that negative perceptions of the market likely *are* a significant barrier, and that visits to the market, combined with educational information about the health benefits of increased fruit and vegetable consumption, can have a significant impact. Third, they imply that such interventions, even conducted on a small scale, can potentially create more widespread impact throughout a community, as participants share their experiences with friends, family, and other neighborhood residents. Anecdotally, the program coordinator at the Roxbury Comprehensive Health Center shared that one participant in their program had told him that he had “turned [her] into a believer,” and that she continued to do her shopping at the market throughout the rest of the season.

The fact that a minority of participants reported cost as a negative aspect of their market experience, that a majority cited superior quality as a positive aspect, that a majority returned to the market even without the use of the Farm Fresh Coupon incentive, and a large majority planned to return to the market again also positively suggests that these consumers may be more enthusiastic about the markets’ superior produce quality than concerned about any real or perceived difference in price. However, it is important to consider as well that the participants in this program may be a more receptive group than most to the health-focused case for increasing fresh fruit and vegetable consumption—many of the program partners, though not all, specifically engage populations struggling with diabetes, obesity, or other diet-related health issues, and the participants’ desire to attend these programs indicates a that they may already have a willingness to take action toward lifestyle change.

In terms of program administration, we learned several lessons that may be useful for other organizations wishing to replicate or adapt the program. One primary challenge was simply that it necessitated more staff time to properly administer the program than we had initially anticipated, and having only one staff person managing both the Farm Fresh Coupon Program and our Boston Bounty Bucks program stretched our capacity to ensure the highest possible quality of program delivery. One implication of this issue was that our program coordinator was only able to conduct site visits with approximately half, rather than all, of the program partners—in retrospect he expressed his belief that an in-person visit to each partner would have helped ensure that all parties had a mutual understanding about program administration, expectations, timelines, and reporting requirements, and may have smoothed some difficulties of the evaluation process. It is also important to note that, given these constraints, the unique nature and schedule of each individual program sometimes presented challenges to program administration, as with the timing of the distribution of evaluation materials.

In general, it is our belief that, given the considerable amount of responsibility being invested in each of the partners, a program such as this would fare best within the context of an extant inter-agency partnership, with established lines of communication and more robust systems of collaboration. That being said, we were also pleased with

the results of the program's second year. Moving forward, however, we plan to re-focus on our core programs and away from our market promotion efforts (which, as mentioned earlier, have been taken up by other local partners, such as the Boston Collaborative for Food & Fitness). We do not plan to continue the program in the coming year.

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FARM TO INSTITUTION CONNECTIONS: PROMOTION, SALES, AND DISTRIBUTION OF MASSACHUSETTS SPECIALTY CROPS (FINAL REPORT)

PROJECT SUMMARY

Building on work funded by a previous Specialty Crops grant, the Mass. Farm to School Project educated Massachusetts wholesaling farm operations about the potential benefits of direct or indirect specialty crop sales to schools and other institutions; urged institutional customers to insist upon local foods product integrity from distributors; and explored opportunities for increasing the volume of specialty crops available to meet increased demand.

PROJECT APPROACH

Mass. Farm to School Project Meetings, Workshops & Presentations

- Berkshire County Agricultural Commission Meeting Presentation 2/5/11
- Real Food Challenge Summit Workshop 2/26/11
- Harvest New England Conference Workshop 3/3/11
- New England Vegetable & Berry Growers' Meeting Presentation 3/15/11
- Mass. Fruit Growers' Association Meeting Presentation 3/15/11
- Harvard Business School Farm to School Presentation 3/18/11
- Project Bread All Staff Presentation 3/31/11
- Franklin County Farm to School Forum Presentation 4/2/11
- SEMAP/FoodEx Distribution Hub Launch Tour Workshops 5/9/11 & 5/10/11
- MFTSP & Food Processing Center Farmer Meeting 5/16/11
- NEA/MTA Nutrition Roundtable Presentation 6/16/11
- MFTSP "Distributor Shoptalk" Meeting 6/29/11
- SNA Summer Institute New Food Directors' Presentation 8/16/11

- SNA Summer Institute FFVP Recipient Presentation 8/17/11
- Massachusetts Food Policy Council Presentation 11/4/11
- MTA-ESP Farm to School Training 11/17/11

We had a strong year of workshops and presentations for agricultural groups, institutional food service professionals, distribution entities and community advocates. Our topics varied slightly based on the audience, but there were consistent themes:

- local food product transparency and traceability along the entire distribution chain;
- a need for increased availability of Massachusetts-grown specialty crops and more acres in production;
- education of growers and customers about the potential benefits of direct and indirect specialty crop sales / purchases; and
- innovative ways to incorporate more locally grown food into institutional menus and community dialogues.

We believe we have been successful in enhancing the perception of locally grown specialty crops as a valuable product for farmers and as popular foods for institutional food services. In addition, we believe we have had some success in increasing the standard for transparency and traceability of farm product when arriving at an institution via a distribution company, and we continue to champion the need for increased acreage in specialty crops to meet the skyrocketing institutional demand. We received excellent feedback regarding our presentations, workshops, and meetings (see “evaluation” sections below).

BENEFICIARIES

The Beneficiaries, as detailed below from the Farm to Schools programs measurables, are the schools, institutions and farms that have shown an increase either in purchasing local food or selling local food respectively.

Measurables

Presentation Evaluations – Farmers

We administered an evaluation to judge the efficacy of our presentations at the following events: Harvest New England Conference, Deerfield Agricultural Commission Conference, New England Vegetable and Berry Growers Annual Meeting, Massachusetts Fruit Growers Association Annual Meeting, and the Rutland Agricultural Commission / Wachusett Regional School District Meeting. Of the 49 farmers surveyed, 48 agreed that the information presented was useful. 1 farmer said the information was “somewhat useful”, and 0 farmers reported that the presentation was not useful. Most farmers reported that the possibility or reality of selling to institutions is appealing because it could increase revenue and possibly be a promotional move, and because institutions appear to be steady customers purchasing substantial volume. Another question asked about potential and/or real difficulties in selling to institutions. Common answers included quantity and seasonality issues, financial viability concerns, distribution logistics, insurance, invoicing and other paperwork.

Presentation Evaluations – Institutional Food Service Staff

We administered an evaluation to judge the efficacy of our presentations at one event where food service staff were present: The Wachusett Regional School District / Rutland Agricultural Commission meeting. Of the 4 food service staff present, each reported that the meeting and presentation on farm to school involvement was useful. They were enthusiastic about purchasing directly from local farms, and anticipated the biggest challenges to be ordering and price point.

Survey of Farmers Regarding Institutional Sales & Revenue Generated

Our annual farmer survey took place in February and March 2011. Over 300 farms were contacted, including farms that have sold to institutions in the past, currently sell to institutions, or have not sold to institutions. The results were positive: at least 110 farms sold directly to institutional customers during 2010, which is 16 more than in 2009. During this survey, we ask farmers whether they would like to be included in our annual Directory of Farms Interested in Institutional Sales, and received 24 new inclusions, and 1 farm that asked to be removed. Also in 2011, a second survey of farmers was conducted to gather information about revenue generated by institutional sales. A similar survey was conducted in 2009. Most of the farms reporting grow specialty crops. A full report is available on the Mass. Farm to School Project's website. Here is an overview of the numbers:

- In 2008, 29 farms reported grossing \$760,000 in sales to schools and other institutions
- In 2010, 42 farms reported grossing \$1.32 million in sales to schools and other institutions

Survey of Public School Districts, Private Schools, and Colleges On Local Purchasing

During the months of April, May, and June 2011, all public school districts in the state and many charter schools (~400), most colleges (~100), and many private schools (~100) were called by the Mass. Farm to School Project. Approximately 2/3 of schools or districts completed the survey and the outcomes were positive. The number of public schools, colleges, and private schools that purchased locally grown products (primarily specialty crops) in school year 2010-2011 all increased from the previous year's numbers. Most of the schools who reported not purchasing local products in the previous school year expressed interest in assistance either finding or affording local products. Information on schools seeking help was given to Farm to School technical assistance staff for follow up.

- Public school districts purchasing local in 2010-2011 217
- Colleges and universities purchasing local in 2010-2011 48
- Private schools purchasing local in 2010-2011 33

USDA Fresh Fruit and Vegetable Program Grant Recipient E-Blast System

We continued our e-blast system to communicate with FFVP recipient food service directors about when local crops were in season or in surplus and how to obtain them from farms. We received availability lists from farms across the state and forwarded them in an easy-to-use format, giving the food service directors a chance to do one-stop

shopping for local produce. This year, for the first time, we split the e-blasts up by region, based on where the farms providing availability lists were able to deliver. This made the e-blasts completely relevant to each food service director, and streamlined the process.

We sent out seasonal weekly blasts to Chicopee, Orange, Boston, North Adams, Pittsfield, Fall River, Springfield, Lawrence, Lowell, Salem, Abby Kelley Foster (Worcester), Wareham, Quaboag, Fitchburg, Somerville, Cambridge, Quincy, Worcester, New Bedford, Webster, Waltham, Seven Hills Charter (Worcester), and Randolph. The farms included were Equinox Farm in Sheffield, Czajkowski Farm in Hadley, Long Plain Farm in Deerfield, Atlas Farm in Deerfield, Next Barn Over Farm in South Hadley, New Salem Preserves in New Salem, Red Fire Farm in Granby, Oakdale Farm in Rehoboth, and Long Hill Orchard in West Newbury.

General Technical Assistance

In addition to the above-mentioned activities, the Mass. Farm to School Project provided individualized technical assistance to at least 88 farms, 110 institutions, and 15 distribution entities statewide during the grant period. Our staff attended many conferences and meetings in order to network with agricultural producers, food service professionals, distributors, legislators, students and community advocates for the promotion of sustainable, long-term purchasing relationships that are profitable for farmers, affordable for institutions, and healthy for our communities.

Lessons Learned

Through the results of this program the Farm to School program has developed the following initiatives / plans for the continuation of this program.

Technical Assistance

We will continue to focus on providing technical assistance to farms and institutions to facilitate sustainable purchasing relationships that increase the volume of Massachusetts-grown specialty crops being sold to institutions statewide. We will continue to offer informational sessions and workshops in the agricultural, food service and distribution communities. In 2011, we hired an eastern Mass. technical assistance specialist who is based in greater Boston. As demand from customers continues to grow, we need more intensive, on-the-ground technical assistance to farms around the state. The result of our constant promotion of specialty crops over the years has been a very substantial increase in the demand from institutional customers. This year, for the first time, we saw the demand outstrip the supply. As we look forward, a major focus of our technical assistance will be to educate growers about the need for many more acres in production of specialty crops statewide, in addition to continuing to work on distribution and processing solutions.

Massachusetts Farm to School Network Launch

As a result of feedback and requests from various constituencies, and because of the unique position we have as a statewide entity in a commonwealth of regional projects, we are strongly considering launching a farm to school network. We envision this as a way to connect the many organizations, state departments, producers and consumers working toward a relocalization of Massachusetts-grown foods and an increase in

producing acreage of wholesale crops. The Farm to School movement is becoming known as a resource hub for information on procurement, school gardens, agricultural curriculum, cooking classes for kids, and more. We hope to formalize the idea of a networking hub in order to make the most of the momentum in Massachusetts and beyond.

Regional Distribution Research and Outreach

We are working with the regional Farm to School Network (Maine, New Hampshire, Vermont, Massachusetts, Connecticut and Rhode Island) to research current distribution models that seem to be successfully moving local foods from the farm to the cafeteria in a way that preserves the identity of specialty products and generates positive community awareness for the growers. We are also working to compile detailed information about regional distribution companies that serve Massachusetts in order to facilitate transparent and traceable movement of locally grown foods from the farm to the customer.

USDA Fresh Fruit and Vegetable Program Grant Recipient E-Blast System

The FFVP e-blast system bears looking at once again to determine if it can be more effective. Schools with FFVP money represent a potentially lucrative market for Massachusetts farmers. We will continue to research the best ways of connecting these food service directors and growers, of promoting schools that are purchasing local produce with this grant money, and of increasing farm sales to these selected institutions.

Survey of Public School Districts, Private Schools, and Colleges on Local Purchasing

Surveys will be completed earlier in the spring of 2012 to ensure that food service staff are available. We are currently working on a way to allow food service directors to complete the survey either via email or online, as a number preferred electronic communications to the telephone.

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THE KINDERGARTEN INITIATIVE COMES TO WORCESTER (FINAL REPORT)

PROJECT SUMMARY

Children are not eating the kinds of food they need to grow up healthy; in particular, they do not consume enough fruits and vegetables and childhood obesity has become a national concern. At the same time, specialty crop producers struggle to stay in business.

In response to this, the Massachusetts Farm to School Project, and the Worcester Public School District launched a Kindergarten Initiative (KI). Based on a program developed by The Food Trust in Pennsylvania, the KI encompasses a local foods and nutrition education curriculum aligned to appropriate educational standards combined with regular hands-on activities including visits to local farms, in-class taste-tests, and cooking demonstrations that involve parents and family members.

Evaluation of the Kindergarten Initiative in Philadelphia shows that this combination of classroom education, healthy snacks, farm visits, and parent and community involvement successfully encouraged children to make healthy eating choices, while educating them about where their food comes from.

Worcester, the second largest school district in Massachusetts, serves a high percentage of low-income, urban students. The Director of Nutrition Services in Worcester reports that emphasizing local specialty crops on her menus has already improved the quality of lunches and increased student meal participation. Building on this foundation, Worcester was chosen as the site to pilot the KI in Massachusetts, an intensive approach to increasing student consumption of specialty crops, while improving student knowledge about nutrition and local agriculture.

PROJECT APPROACH

The purpose of the Kindergarten Initiative is to teach very young students and their parents and caregivers about local foods, primarily specialty crops, and healthy eating. The program combines an in-class curriculum focused on healthy eating and local fruits and vegetables with out of class activities that usually focus on specialty crops: taste-tests of local specialty crops, cooking demonstrations featuring dishes made with specialty crops, and farm visits to local specialty crop farms. Beyond the educational value of the program, the KI seeks to grow student and parent interest in purchasing and consuming local specialty crops. Students and parents are given information on where to find local specialty crops in and around Worcester, are taught how to cook with those specialty crop ingredients, and have an opportunity to taste-test specialty crop items they might not have previously been exposed to.

All of the money from this Specialty Crops funding, including the matching funding identified in our proposal, was used solely to enhance the competitiveness of specialty crops in Massachusetts, with a focus on Worcester and Central Mass. specialty crop farmers. The pieces of the KI that do not directly relate to this effort (a visit to a dairy farm, taste-testing goat cheese, local wheat bread at a cooking demonstration) were funded through other sources and are not discussed in this report.

Below is an overview of the key tasks of this Specialty Crops contract as outlined in our Scope of Services. Following the overview is a complete copy of our work plan, with the phase during which each task was completed and notes about each task.

Mid-Year Learning Assessment of Students

The mid-year student learning assessment was scheduled to be completed by mid-January 2011. Unfortunately, this could not be accomplished, primarily due to the unusual number of snow days during the 2010-2011 school year. Because of the number of snow days, teachers fell behind in their lesson plans and the in-class

evaluations had to be pushed further and further out. A number of evaluations that were rescheduled also had to be cancelled due to more snow. By the end of February, when the mid-year assessments had still not been completed, we decided to forgo the mid-year assessments and focus our evaluation efforts on planning for the end of year assessments in May, when classrooms would be caught up.

Community and Media Events Highlighting Students' Activities

In October 2010 the Massachusetts Farm to School Project and the Worcester Public Schools co-sponsored "The Three Commissioners" event at City View School, bringing together the Massachusetts Commissioners of Agriculture, Public Health, and Elementary and Secondary Education to highlight the broad social and economic benefits of the Kindergarten Initiative and the Mass. Farm to School Project. Dr. Melinda Boone, Worcester Superintendent; Donna Lombardi, Worcester Director of School Nutrition; Kelly Erwin, Director of the Mass. Farm to School Project; and Rick Melone of Clearview Farm in Sterling joined the Commissioners speaking to the powerful combination of farms, schools, students, and locally grown foods.

Throughout the school year, cooking demonstrations were held at two Kindergarten Initiative schools for the kindergarteners and their families. A professional chef prepared dishes featuring local specialty crop ingredients and the families were sent home with goodie bags of local products and recipes. These demonstrations allowed kindergarteners to share a bit of their specialty crop tasting experiences with their parents and guardians and for the parents and guardians to learn about new specialty crops and recipes.

The biggest Kindergarten Initiative event was the strawberry festival at Tougas Farm in June for all kindergarten classrooms. More than three hundred students, teachers, and some family members enjoyed a rollicking specialty crop farm trip and ate fresh strawberries during the height of the strawberry season. We invited members of the local press, School Committee, the Mayor, the Superintendent, and other interested parties to attend.

Throughout the year the Kindergarten Initiative was also promoted at numerous industry events, such as the Mass. Agriculture in the Classroom conferences, the Mass. Dietetic Association conference, and the Massachusetts Health Council gala. This gala honored Worcester with the Healthiest School District award and Dr. Boone, Worcester Superintendent, highlighted the District's commitment to locally grown food to an audience of several hundred public health and community activists in Boston.

Two-Semester Curriculum

The Kindergarten Initiative curriculum used in Worcester was assembled by combining The Food Trust's original KI curriculum with edits and activities added by the Worcester Public Schools Early Childhood Education Facilitator. Worcester's Kindergarten Initiative curriculum was then aligned with Mass. Department of Elementary and Secondary Education standards by Dr. Deborah Habib of the Seeds of Solidarity Farm Education Center. The curriculum was approved by the WPS Quadrant Managers (senior staff specializing in classroom learning), and distributed to the pilot classrooms. Teachers were supplied with materials needed to implement the curriculum throughout the year by the Kindergarten Initiative Coordinator.

Visits to Farms

Each of the twelve Kindergarten Initiative classrooms went on three field trips during the 2010-2011 school year (primarily to specialty crops farms). The variety of farms visited was particularly exciting, and included KE Farms in Sturbridge where students marveled at the transformation of tree sap into real maple syrup. Students also visited Little Bit Farm in Leicester, where Farmer Dianna showed them the link between her honeybees and the wide variety of vegetables and berries produced on her farm. At Tougas Farm in Northborough, each student received a pint of strawberries to take home for their families. Specialty crops farms visited by the Kindergarten Initiative include:

- Little Bit Farm, Leicester
- KE Farm, Sturbridge
- Breezy Gardens, Leicester (a very popular destination)
- Tougas Farm, Northborough

Produce Sent Home with Recipes and Nutrition Information

Kindergarteners and their families enjoyed a wide variety of Massachusetts specialty crops during this pilot year of the program. As mentioned above, all 300 students took home sweet strawberries from Tougas Farm as part of the big strawberry festival. The Initiative also purchased a large quantity of salad greens and fresh spinach from Equinox Farm in Sheffield. Ted Dobson at Equinox Farm grows best-quality greens served in fine restaurants; it was a pleasure to share his nutritious and flavorful produce with so many families. Families received fresh pumpkins from Breezy Gardens in Leicester, apples from Carlson Orchards in Harvard, and triple berry jam from Joe Czajkowski Farm in Hadley.

Before each delivery was sent home we provided teachers with information on the crop, the farm and farmer, its nutritional benefits, how it is grown, and included ideas for recipes, cooking, and serving. When feasible, as with the take-home bags of Carlson Orchards apples, we included nutrition information both in English and in Spanish.

Post-Curriculum Assessment of Students' and Students' Families Specialty Crop Knowledge

The Mass. Farm to School Project contracted with Fertile Ground, a professional education evaluation organization that specializes in agriculture in the classroom, to create and conduct the student evaluations. Information on Fertile Ground can be found at www.fertilegroundschools.org. Survey instruments were approved by the Worcester Public Schools and can broadly be defined as both anecdotal data (narratives) as well as evaluation instruments with measurable/mathematical data.

The post-curriculum assessment was conducted in four KI classrooms, one at each school, at the end of the 2010-2011 school year. More detailed information on the content and results of the evaluation can be found below in the Measurable Outcomes section.

Fertile Ground also created parent surveys that were available online. The thinking was that the convenience of an online survey would encourage more parents to participate. Unfortunately, the parent response rate was very low (only one parent responded), so

the results are not especially meaningful. More detailed information about the parent survey can also be found below in the Measurable Outcomes section.

Farmer Survey

To assess if working with the Worcester Kindergarten Initiative was good for the specialty crop farmers involved, we called all of them after the end of the 2010-2011 school year to complete a short survey on their experiences. Out of the farms called, we ended up with eleven responses: five from farms who hosted field trips (four specialty crop farms and one non-specialty crop farm) and six local farms who sold products for taste-tests, cooking demonstrations, or take-home packages (five specialty crop farms and one non-specialty crop producer). More information on the results of the farmer survey can be found below in the Measurable Outcomes section.

Beneficiaries to the Project

The beneficiaries of this project are:

- Approximately 300 (enrollment fluctuated slightly throughout the school year but there were roughly 300 KI students at any time during the year) kindergarten students in four of the lowest-income schools and neighborhoods in Worcester
- The more than 500 parents, caregivers, and family members (we do not have exact family sizes for KI students but know that there are at least 500 total family members living in the households of our KI students) that received local specialty crop take-homes and nutrition and cooking information during the school year
- The approximately 85 parents, caregivers, and other KI student family members who attended cooking demonstrations featuring meals made with local specialty crop products
- Staff of the Worcester Public Schools who participated in in-class lessons on healthy food and local specialty crops, visited area specialty crop farms with the KI students, and attended cooking demonstrations featuring local specialty crops: 12 teachers, 12 classroom aides, food service personnel and principals at each of our four KI schools, as well as curriculum personnel, primarily the Early Childhood Facilitator, and Administration food service personnel, primarily the Director of Child Nutrition Programs
- Local farmers: Students visited four Worcester-area specialty crop farms at an average price of \$6 per student per visit (a total of approximately \$1,800 total spent on farm visits to specialty crop farms); purchased specialty crop products for snacks, cooking demonstration ingredients, and take-home package produce from six Massachusetts specialty crop farms: Joe Czajkowski Farm, Carlson Orchards, Equinox Farm, Tougas Farm, Fairland Farm, and Breezy Gardens for a total of just under \$12,000 spent on local specialty crop products

Measurable Outcomes

A. Post-Curriculum Assessment of Students and Students' Families

As noted above, the Mass. Farm to School Project contracted with Fertile Ground to conduct post-curriculum evaluations of KI students and KI students' families. For students, the evaluations took place near the end of the school year in each of the four KI schools. The evaluations consisted of four parts: 1. Assessing what students

remembered from taste-tests throughout the year by showing them images of the foods and asking for feedback, 2. Assessing student ability to understand healthy vs. not healthy and to make healthy food decisions by asking them to describe foods as “sometimes” or “anytime” (a distinction the program uses to explain healthy and not healthy to students) and to build a healthy lunch tray with images of possible lunch foods, 3. Assessing student ability to differentiate between fruits and vegetables by asking them to sort images into the two categories, and 4. Assessing student availability of what can grow nearby by asking them to place images of foods either inside or outside a map of Massachusetts.

When asked about their memories of taste-tests throughout the year, more than 60% of students remembered the tasted items and 50% indicated that they would try each item again. Overall, 82% of students correctly identified “anytime” foods and 74% identified “sometimes” foods. During the exercise in which students selected six items for their lunch tray from twelve choices, over 85% of their selections were healthy and included fresh produce. Blueberries, carrots, and apples were among local specialty crops mentioned when students were asked for examples of anytime foods. When asked why they were selecting certain items for their healthy lunch, student responses showed an appreciation for the nutritive value of fruits and vegetables and included, “Broccoli is healthy!” “Yogurt makes bones and teeth strong,” and “[With soda} you get cavities and go to the dentist, it is not healthy.”

Students also showed an understanding of local versus food grown far away, which is a complex concept for kindergarteners. When asked to define “local” answers included, “If a fruit or vegetable is grown in Massachusetts” and “Good food!” demonstrating appreciation for the flavor of locally grown foods. In an exercise in which students are asked to name which products are local and which are not, most students (62%) were able to indicate the specialty crop items that are grown locally in Massachusetts.

When asked anecdotally, most students were able to explain the basic ideas of how specialty crop fruits and vegetables grow, beginning from seeds that are planted in the ground, through watering, all the way to harvesting. Students also indicated that these fruits and vegetables were grown on farms like the specialty crop farms that they visited near Worcester.

The student evaluation did not ask about students’ eating habits, but data on that was collected from teacher surveys and was attempted to be collected from family surveys at the end of the year. As noted above in Project Approach section, parents and family members were sent an online survey at the end of the year. There was extremely limited data from the end of the year survey (only one parent responded) but the data was very positive. That parent noted that her child now requests more vegetables and healthy smoothies and that her child talks about local farms, healthy eating, and fruits and vegetables. She also mentioned that the KI has impacted how she cooks and shops for her family “a lot” and that she buys locally grown food “often.”

Teachers and instructional aides were also surveyed at the end of the 2010-2011 school year. Much of the survey focused on the way the KI program was run, but teachers also commented on their perceptions of student understanding about local specialty crops, on student eating habits, and on feedback received from parents of KI

students. Among other anecdotal responses, teachers said, “The parents said their children talked about many of the fruits and veggies we had,” “Several parents commented about the fresh produce and locally produced foods they were given,” and “Parents enjoyed the nutritional knowledge that their children would bring home.” When asked about the local specialty crop snacks their students taste-tested and the farm visits to local specialty crop farms, 100% of teachers said that the snacks and the farm visits opened students’ eyes to new local foods and helped them to understand what local means and to appreciate local specialty crop farmers. Teachers anecdotally noted that enforcing a one-bite rule for local specialty crop taste-tests meant that many students tried foods they thought they might not like and resulted in students eating more local fruits and vegetables in their classrooms.

A complete report from Fertile Ground on the results of their student, parent, and teacher surveys for the 2010-2011 school year is available.

B. Survey of Farmers

As noted above, the Mass. Farm to School Project surveyed farmers who were involved with the Kindergarten Initiative just after the 2010-2011 school year.

Of the farms that hosted field trips, everyone who was available to complete the survey had a positive experience, saying that the groups were an appropriate size, the children were well behaved, and they were fairly compensated for the trips. Farms that sold products to the Worcester Schools through the Kindergarten Initiative also reported positive experiences, with all of them rating their experience as “good” or “excellent.”

All of the farms surveyed said that they would be happy to host a Kindergarten Initiative field trip or sell to the Worcester Public Schools again in future school years.

While there was certainly an increase in each farm’s income due to farm visits from KI schools or specialty crops sold to the KI for taste-tests, take-homes, or cooking demonstrations, there is no data showing definitely that farm incomes increased in other ways as a direct result of the Kindergarten Initiative. Families of KI students were given information about each farm that they received products from, though, and sharing this information raised each farm’s community profile, whether by having parents know that these farms are close enough to visit outside of school hours or by letting parents know that these farms sell their products at farmers markets in Worcester.

We are working with the Worcester Public Schools to find out if they have increased their purchases from specialty crop farmers associated with the KI or have begun to buy products from a KI specialty crop farm from whom they have not previously sourced products.

Problems or Delays Encountered

The most challenging aspect of the Kindergarten Initiative was scheduling different entities across four schools, with the approval of Worcester Public School administration and School Nutrition. The farmer deliveries of produce for the classrooms were fairly simple, as were the field trips. However, other activities like the cooking demonstrations and classroom evaluation time proved very difficult. Coordination between the different parts of the Worcester Public Schools was also problematic at times – an unfortunate byproduct of working within a quite large school district.

The mid-year learning assessment was problematic as well. Because of record snowfall and missed school days, teachers were not readily available for extra activities like in-class evaluations during January, and by February Mother Nature had us beat. Forgoing the mid-year assessment, we focused instead on a detailed year-end evaluation and assessment.

Lessons Learned

The Kindergarten Initiative is now into its second year at the Worcester Public Schools. Because of population growth we are serving fourteen classrooms and about 375 students. Our goal is to learn from the challenges of the pilot year, and this strategy is paying off. The 2010-2011 school year was our first full school year of the Kindergarten Initiative in Worcester and we learned many things.

Through observation (and as recent research shows), we have clearly seen that tactile experiences, the activities where students have an opportunity to learn in a hands-on way about produce or farms, have the most impact on student knowledge and understanding.

We have learned many lessons about the benefits of partnering with other organizations and how working with an organization like Cooking Matters, whose explicit focus is on activities such as cooking demonstrations, can allow us to focus our energy in the most appropriate places—coordinating logistics, communicating with the schools, and working with specialty crop farmers for the benefit of them and the Kindergarten Initiative.

Important lessons were certainly learned this year about scheduling many different activities at multiple schools in a very busy school district. We are making efforts to schedule events as far in advance as possible to make sure that dates and times work for everyone involved and to encourage as much parent/family participation (where appropriate) as possible.

Next Steps

To ensure that our relationship is as smooth as possible, we have created a Memorandum of Understanding with the Worcester Public Schools, signed by the Superintendent and developed with District professionals, that outlines all major Initiative components, who owns each task, and due dates. The MOU is a working document and is keeping everyone on the same page.

We have partnered with Cooking Matters, a nationwide family cooking, nutrition advocacy, and teaching organization, to coordinate the family cooking demonstrations using healthy, local specialty crop ingredients.

We have already completed the fall 2011 assessments in conjunction with Fertile Ground.

Given the positive response of specialty crop farmers to our farm visits, we are planning more local farm field trips for the students this year. Some of the farms that were visited last year do not typically do farm trips but have realized that it can be a great part of their business model. It is gratifying to help Massachusetts specialty crop producers

grow and change their businesses to accommodate the Worcester kindergarteners and to open up a new market for themselves.

Lastly, sourcing local produce from specialty crop farms that are new to the Kindergarten Initiative is a priority; our goal is to create long-term business relationships between the Worcester Public Schools – a tremendous local food buyer – and a wide variety of growers. To that end, we are actively seeking out area farmers who do not have a history of selling to the Worcester Public Schools but have crops that are appropriate and who may be interested in a purchasing relationship.

Funding Expended

		Specialty Crops	Matching Funds
Personnel			
Kindergarten Initiative Coordinator	1154 hours @ \$25/hour	\$15,768	\$13,076
Supplies			
Locally Grown Snacks	Snacks and take-home packages of products purchased from 11 local specialty crop producers for 300 kindergarten students. Products included apples, strawberries, maple syrup, spinach, salad greens, and cranberries.	\$6,782	\$5,079.74
Farm Store in the School		\$0	\$0
Travel			
Transportation	19 buses trips – 4 schools, 1 to 2 buses per school, 3 trips each school	\$2,250	\$1,930
Other			
Photocopying	Materials for Kindergarten Initiative classroom activities or events	\$200	\$110.80

Total	\$25,000	\$20,196.54
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Contact

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Development and Implementation of USDA Good Agricultural Practices (GAP) training and certification for fruit and vegetable growers in Massachusetts (FINAL REPORT)

Development and Implementation of USDA Good Agricultural Practices (GAP) training and certification for fruit and vegetable growers in Massachusetts (FINAL REPORT)

1) Project Summary:

a) Background of the initial purpose of the project, including the specific issue, problem or needs that were addressed:

The purpose of this project was to provide food safety training, resources and audits for growers of produce. Background: Food safety concerns have worried consumers, based partly on food outbreaks that have occurred and the corresponding publicity. Many supermarkets started to require independent third party audits to demonstrate that produce was grown, harvested, packaged and transported according to best management and agricultural practices. USDA Good Agricultural Practices and corresponding audits offered a cost effective option for growers to meet this cost of doing business. Direct marketing success depends on consumer confidence. It was critical that MDAR have a role to encourage growers to implement USDA GAP food safety plans and promote their food safety efforts to their direct market customers. The focus for growers, either selling wholesale or direct, continues to be to prevent contamination.

b) Description of the importance and timeliness of the project;

This project was timely and important because growers affected by the publicity of recent food outbreaks, most recently tomatoes, have suffered significant economic losses. Considering the strong direct marketing opportunity with the interest in buy local – Massachusetts growers, regardless of the size of their business, need to have a food safety plan. For wholesale growers selling to some supermarkets, a third party audit is a requirement. The size of a farm business or the market channel does not negate the need for a food safety program. Massachusetts has some 249 summer farmers markets and 40 winter markets, at least 415 roadside stands and some 220 CSAs. At \$42 million, Massachusetts growers were responsible for 40% of New England's total direct sales. MDAR supports efforts to make GAP work at the farmer level and to ensure that costs of training and GAP audits for small growers are reasonable. A cost share program coordinated by MDAR was available to continue to offset audit costs.

c) If the project built upon a project that previously received Specialty Crop Block Grant, describe how the project complemented and enhanced previously completed work:

The project complemented and enhanced previously completed work by continuing with updated and timely GAP education, Harmonized GAP, general food safety as well as, information and updates about the FDA Food Safety Modernization Act (FSMA).

This project was a continuation of a previous Specialty Crop program, coordinated by UMASS Extension with collaboration and organizational assistance from MDAR. Over the 2 years of the previous project, 355 participants attended workshops and one on-line training in eight locations across the state.

Overall evaluations from the first project were very positive from the participants, including the review of the instructors and resources. They also reported that the trainings provided a good background and identified strong resource material, however in general participants did not develop farm plans as a result of the training. This was true during the current project being reported on. Growers have not completed farm plans unless required to do so for an audit.

2) The Project Approach:

a) Brief summary of activities performed and goals and / or targets achieved throughout the entire grant period. This should represent the activities/ goals and targets specified in Attachment B: Work Plan;

The following work was accomplished during the grant period. MDAR solicited proposals to hire a contractor/ consultant for training and certification of produce growers for USDA “Good Agricultural Practices” farm plan development and audit preparation for small farmers, packers, and processors to enhance food safety. The proposal included two-day workshops for USDA GAP training for growers to be able to develop plans on the second day. The workshops were targeted towards farmers required by buyers to provide third party verification of their food safety practices and those considering becoming certified. UMASS extension was awarded the contract.

Anecdotal provided by growers early in this project showed that growers were not favorable for 2 day sessions. Some growers commented that even the one-day session was too long and preferred smaller portions of information added to Twilight or other grower meetings. Considering everything that a grower needs to do, adding two day training made some feel overwhelmed. They were not expected to leave the training with a farm plan, but instead have an understanding of the basics for on-farm food safety.

Continued one day and on-line trainings were to be updated and offered, and to be provided through several options to meet grower needs for education. This was accomplished (described in 3e) in one day meetings, Twilight evening meetings and as part of grower association meetings.

Offering the course in Spanish or providing materials in Spanish was to be reviewed but because of the focus on FSMA, this idea was put on hold and can be reconsidered in the future. A review of the most common languages spoken by MA farm laborers would also be important to know.

An amendment to the project was accepted by USDA – SCBGP in October, 2012. Work had been on hold in anticipation of the Food Safety Modernization Act regulations, however with a lack of clarity, and considering that the industry was moving forward with Harmonized GAP standards, work began again. The original budget and work plan for this GAP / GHP project had the same focus and measurables; however a portion of the budget was allocated towards (1) cost share reimbursements to growers for up to \$750 (2) educator, auditor and pre-auditor training in USDA Harmonized GAP and (3) a change in

materials to include educational flip charts. Cost share audit reimbursements were included because produce and cranberry/producer handlers, who originally did not schedule audits according to our expectations, were now making the request for audits as their retail (supermarket) customers including Hannafords, Stop N Shop and Price Chopper required them. Cost share requests were expected to exceed 40 in 2013 based on current program participants, as well as an assessment of anticipated audit requests provided by buyers who have made GAP or Harmonized GAP adoption a mandatory requirement for procurement in 2013.

b) A summary of the contributions and roles of project partners.

The main project partner was **UMASS** including Kathleen Carroll, director UMASS Extension and most specifically, Dr. Rich Bonanno, PhD., food safety specialist and president, MA Farm Bureau. Lisa McKeag, a member of the UMASS Amherst Vegetable Program, provided technical assistance to Dr. Bonanno. UMASS donated space at their Shrewsbury location. The **MA Farm Bureau** donated space for many of the trainings. Farm Bureau also included USDA GAP and food safety training as a part of their annual meetings and helped promote the events through their newsletters. **Harvest New England**, a collaborative group representing the six New England State Departments of Agriculture, was a partner to include food safety and GAP training as part of workshops held during their regional marketing conference. The **MA Fruit Growers Association** and **New England Vegetable and Berry Growers Association** also were partners in promoting the educational sessions to their members through newsletter. Massachusetts Buy Local Groups that promoted the trainings included **Community Involved in Sustaining Agriculture**, **Northeast Harvest**, and the **Southeast MA Agricultural Partnership**. **MDAR** wrote and managed the grant. MDAR internal project members included those representing the Marketing Division as well as the Division of Technical Assistance. MDAR's informal advisory team, including staff members from Cornell and Rutgers University.

3) Goals and Outcomes Achieved (including the following information)

a) Summarize the major successful outcomes of the project in quantifiable terms.

As a result of this project, we successfully provided direct trainings for at least 480 growers on food safety/USDA GAP/USDA Harmonized GAP training. A total of 61 growers became USDA GAP or USDA Harmonized GAP certified. These same growers plus more had food safety training and information relating to the Food Safety Modernization Act.

Hits to the UMASS website for food safety programs and GAP education from September 1, 2010 to the present totaled 9,438 <http://extension.umass.edu//nutrition/programs/food-safety/programs/good-agricultural-practices/gap-manual>

New training materials for growers were updated and developed for handouts and were placed on memory sticks. Updated training material was needed to incorporate new examples of templates for growers and new materials such as the flip chart from Rutgers with food safety information explained mainly through images and also in the 150 manuals. Training materials were updated and all information was made available on the UMASS website.

b) A comparison of actual accomplishments with the goals established for the grant period;

Goals for this grant included the development and implementation of two – day USDA GAP program including mock audit and farm plan development. As described previously, this was not perused based on anecdotal grower feedback.

A second goal was the continuation, promotion and evaluation of GAP online course, at least two every six months. The GAP on-line course was abandoned in favor of live trainings, but can be used moving forward if there is enough interest with support from the Cornell platform. Considering the focus on informing growers about FSMA and food safety in general and promoting responses during the comment period, the GAP on-line course was not offered. For the same reason, offering the course in Spanish or providing materials in Spanish was not perused.

Continuation, promotion and evaluation of GAP one day training, at two every six months, with association meetings such as Farm Bureau, NEVBGA, etc. was achieved and is described in section e below).

UMASS Extension, as the contractor, did at least two revisions, and updates to the training materials for on-line and printed manual materials. It was promoted and posted on the UMASS website, as well as linked to MDAR's site and is described in section e that follows.

The targeted goal for the number of growers to become GAP certified upon completion of this training was 30 cranberry growers and 20 fruit/vegetable growers for GAP/GHP audits. There were 28 GAP and Harmonized Gap certified growers in 2013, fewer than expected because the cranberry growers plan to move towards this requirement in 2014.

Expectations were that the Food Safety Modernization Act would produce regulations affecting education and audits, however with those outstanding; the industry continued moving towards Harmonized GAP standards.

Sending members of the MA - MDAR team to trainings allowed MA to both develop appropriate educational training materials and relevant pre-audits in anticipation of the audit.

MDAR's informal advisory team, including members from Cornell and Rutgers, had reported a good response from growers for training their employees on basic food safety issues using a flip chart developed by Rutgers, which was also incorporated into the budget.

By November 2012 the following were accomplished:

- The Department started the process of entering into a contract for contractual services with UMASS
- The Contractor UMASS Extension procured the supplies necessary for the educational sessions.

By the end of September 2013, the following were accomplished:

- The Department conducted mock audits and Cost share audits as requested by growers (described in section d, below)
- The contractor UMASS updated and printed educational materials, updated UMASS website
- The contractor UMASS c All training sessions (described in section e, below)

c) If the outcomes measured are long term, summarize the progress that has been made toward their achievement;

The outcomes of the project included increasing MA expertise in Harmonized GAP. Outcome: The September 11- 13, 2012 GAP Harmonized Standards 'Train the Trainer' workshop for Field Operations and Harvesting, organized by Produce GAPs Harmonization Initiative and United Fresh, was attended by Dr. Rich Bonanno of UMass Extension and three MDAR staff.

A long term outcome was that a Harmonized GAP template is going to be added to the website in 2014, which will be several hundred pages. Progress: Initial steps have begun, comparing Harmonized GAP to GAP, and working with Cornell for updated training materials and information. This is expected to be completed in 2014.

An outcome/outlook related to audits is that it is reasonable to expect that the number of audit requests will increase in 2014. 2013 is the highest number of GAP audits to date with 28. Each year the expansion in the number of participants was expected to be fast but in fact has been slow since growers weren't ready citing a lack of time to develop a farm plan and implement record keeping or infrastructure requirement relating to packing houses for example. But retailers wanted local product, so retailers extended their deadlines. The Pioneer Valley Growers Association (PVGA), a vegetable cooperative in western MA reported that Stop & Shop Supermarket initially required GAP certification, but lately has allowed evidence to show efforts towards a food safety plan such as attending training classes and participating in pre-audits.

In addition, in the next few years it is likely that an audited program will be required to sell through Stop & Shop and other supermarkets. They delayed their requirement for another year with Harmonized GAP being required in 2014, so growers that were expected to be audited decided to wait another year. Market Basket Supermarket also reported that they would be requiring Harmonized GAP. For example, Hannaford Brothers supermarket accepts an audit based on a single crop. Market Basket is also looking for food safety verification, but may consider a state program. Next year, 20 - 25 audit requests are expected from PVGA members. Wegman's Supermarket is now requiring Harmonized GAP.

One of the MA cranberry cooperatives, Decas Cranberries, is requiring Harmonized GAP audits. Eight cranberry audits were efficiently completed in 2013 since they had developed Standard Operating Procedures and Best Management Practices for their members. Company representatives joined the audits and made notes for their own food safety manuals. All their members are expected to have Harmonized GAP audits over the next three years, with at least 12 audits per year. Ocean Spray, another cranberry grower cooperatives working with Primus for the Harmonized GAP audits that they are requiring.

An additional outcome was related to educational support regarding broad food safety topics including Harmonized GAP as well as auditor support. MDAR used SCBG funds to send to one staff member to training to become an auditor, being licensed the first year and then working towards Harmonized GAP

in the following year. In addition, two staff members were sent to the training to assist with food safety education.

d) Illustration of baseline data that has been gathered to date and the progress towards achieving set targets;

Baseline data indicates that as a result of this project, GAP/Harmonized audits increased:

	Mock Audits	GAP/Harmonized GAP audits	GAP cost share
2011	15*	11	12
2012	22*	22	15
2013	14*	28*	13+

* (four dropped out from the previous year for various reasons re: health and changes in market channels)

+In 2014, 20 - 25 audit requests are expected from MA growers including members of the Pioneer Valley Growers Association.

e) A description of the activities that were completed in order to achieve the performance goals and measureable outcomes and results indentified in Attachment B;

The following activities were completed in order to achieve the performance goals.

Goal: Continued promotion and evaluation of GAP one day training, at two every six months, with association meetings such as Farm Bureau, NEVBGA regular and Twilight meetings. Outcome:

2011

- May 25, 2011, 4 hour GAP Training by Dr. Bonanno, Shrewsbury, 17 participants
- December 1, 2011, Food Safety and GAP update by Dr. Rich Bonanno, Farm Bureau meeting, Fitchburg, 39 participants

2012

- January 31, 2012, 6 hour GAP training by Dr. Bonanno, Marlborough, 26 participants
- ❖ February 2012, Harvest New England session on Food safety, The Food Safety Modernization Act – assuring that you have the best food safety practices and using GAP: Rich Bonanno and Wes Kline, Rutgers, 45 attendees
- April 12, 2012, 6 hour GAP training by Dr. Bonanno, Marlborough, 15 participants
- December 6, 2012, 6 hour Harmonized GAP training by Dr. Bonanno, Marlborough, 23 participants including buyer from Wegmans

2013

- April 17, 6 hour Harmonized GAP training by Dr. Bonanno, Marlborough, 20 participants including representatives from MA Farm to School program
- June 13, UMASS Twilight Meeting, 2 hours by Dr. Bonanno: Food Safety and GAP Issues for Farmers, Waltham, 19 participants
- August 13, American Farmland Trust webinar on food safety, FSMA and GAP featuring Dr. Bonanno focus on FSMA and food safety, 68 participants from MA
- August 22, Plainville Farm, Hadley, 2 hour FSMA listening session moderated by Dr. Bonanno, 168 participants
- September 24, Dartmouth, SEAMAP FSMA, GAP and food safety featuring Dr. Rich Bonanno – 40 participants

Goal: Review and update all material and post GAP training /educational materials on relevant websites. Outcome: September, 26, 2011 UMASS UTUBE video on GAP training was completed featuring Dr. Bonanno UMass (accessed by Smartphone or computer) which teaches Massachusetts beginning farmers and established growers strategies for controlling microbial food safety hazards throughout all phases of production, harvest, and post-harvest handling. This information also prepares growers for the Good Agricultural Practices (GAP) certification process. In addition, all the educational content for printed, memory sticks and on-line material was updated including the Power Point presentation used in the day long trainings and all the links embedded into the materials
UMASS Food Safety: <http://extension.umass.edu/nutrition/programs/food-safety>

MDAR GAP & GHP Audit Program: <http://www.mass.gov/eea/agencies/agr/farm-products/gap-and-ghp-audit-program.html> (also linked to UMASS page)

Goal: Dissemination of the project results, impact and recommendation on relevant websites.

Outcome: The GAP Manual page views for the following page:

<http://extension.umass.edu//nutrition/programs/food-safety/programs/good-agricultural-practices/gap-manual> Web hits from Sept. 1 2010 to October 2013 was 9,438. Information regarding on-farm food safety education and GAP/Harmonized GAP trainings and audits was disseminated at all of the events listed previously, as well as on the UMASS and MDAR websites. MDAR's Farm and Market Report, the New England Vegetable & Berry Growers Association and Buy Local newsletters announced these training events including CISA, SEAMAP and Northeast Harvest. MDAR's Farm and Market report has 6,000 subscribers representing production agriculture and industry service providers.

Goal: The target goal for the number of growers to become GAP certified upon completion of this training was 30 growers. Outcome: There were 28 GAP and Harmonized Gap certified growers in 2013, fewer than expected. Originally the GAP cost share targeted first time participants, but since the uptake was less than expected, all growers that were GAP audited were invited to request GAP cost share funds.

4. Beneficiaries

- a) **A description of the groups and other operations that benefited from the completion of this project's accomplishments; and**

Massachusetts fruit and vegetable growers were the beneficiaries from the completion of this project, benefiting from direct training. Food safety trainings focused on key topic areas were also completed at New England Vegetable Grower and Fruit Growers Association Twilight meetings.

In addition, over the course of this grant, growers also became USDA GAP or Harmonized Gap certified.

UMASS was a beneficiary to have financial resources through this grant to update food safety information for the website, and MDAR to have a link to the UMASS information. The updated website is: <http://extension.umass.edu/nutrition/programs/food-safety/programs/good-agricultural-practices> In addition, this grant provided an opportunity to update the training materials and the presentation.

Supermarkets have accepted GAP and USDA GAP.

b) State the number of beneficiaries affect by the project's accomplishments and / or potential economic impact of the project.

At least 480 growers had direct training on food safety/USDA GAP/USDA Harmonized GAP training. A total of 61 growers became USDA GAP or USDA Harmonized GAP certified. These same growers plus more had food safety training and information relating to the Food Safety Modernization Act.

Hits to the UMASS website from September 1, 2010 to present totaled 9,438.

It's difficult to quantify the economic impact of food safety training, however the impact of a food safety outbreak would be significant, based on the economics of previous outbreaks with spinach and tomatoes (which turned out not to be tomatoes).

5. Illustration of the lessons learned as a result of completing this project

It has been difficult to anticipate the number of growers that would seek GAP audits. Food safety training, in anticipation of customer (retail) requests for USDA GAP or Harmonized GAP training as well as in anticipation of the Food Safety Modernization Act has been very fluid during the period of this grant.

Growers are recognizing that food safety is an important component of their business and want their customers to be comfortable with food safety. There is an overall recognition of the importance of food safety education. Attitudes towards food safety education, training and audits have changed from being resistant to wanting to know how to coordinate food safety on the farm efficiently and affordably. At the same time, growers have been reluctant to move forward with farm plans and audit programs with FSMA rules unclear or unless required by a customer.

Based on feedbacks from mock audits, we learned that there is a need to support food safety expenses that include water testing, water filtering, hand washing stations and packing house upgrades. Hand washing stations would be a priority. Some growers are using the MA Farm Viability program for improvements to packing facilities for example, however mini or short-term grants and/or other support is worthy of discussion within MDAR. Continued cost share for audits including repeat audits is important, since the Harmonized audits cost about \$750 - \$900 since they take more time since they are based on a narrative report rather than a checklist The cost is \$92/hour.

A grower's attitude about worker hygiene is an important indicator of how they embrace food safety issues: Worker hygiene is a critical component of food safety on the farm. Growers needed clear information to address worker hygiene issues, which all of the employees need to embrace. It starts with providing a good hand washing facility. Examples of affordable hand washing stations have been part of the training information. A handy grower can build one but a hand washing station can also be purchased for approximately \$350.

There has been a lot of "wait and see" attitude about food safety during the FMSA comment period which has influenced both how stores and growers reacted, deciding to wait to become GAP certified. A best case scenario would be that FDA recognizes either or both GAP or Harmonized GAP as being compliant with FSMA. Educators in Massachusetts have been reluctant to push growers in one direction or another, not knowing the final shape of FSMA.

The educational curriculum with general food safety information is important across the board for everyone, especially for those that do not plan to become GAP or Harmonized GAP audited. A focus may be farm plan development. Cornell is developing a new curriculum that will be shared - with a focus towards improving overall food safety. Harmonized audits are more time consuming with more inputting of data into a program and reporting requirements. Investments into new laptops and other uses of technology will aim for efficiency. Laptop computers can be used during trainings with farm templates loaded, that participants can customize and develop for their own farm plan. MDAR members Bonita Oehlke and Mike Botelho are members of the Produce Safety Alliance coordinated by Cornell, and look forward to the completion of their training materials which can again be used to update Massachusetts resources.

Contact Information

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Commonwealth Quality Program Phase II (FINAL REPORT)

Project Summary

Background of the initial purpose of the project, including the specific issue, problem or needs that were addressed:

The Commonwealth Quality Program (CQP) was created in 2009, and launched in 2010, to identify, train and support specialty crop growers who adopt Best Management Practices (BMPs), food safety procedures (GAPs) as well as identified environmental and sustainability standards included in the program's requirements.

The phase II project was initiated to increase the overall awareness of the program through a specialty crop grower recruitment campaign and a more elaborate consumer campaign across multiple channels. These channels included traditional and grassroots marketing opportunities, as well as print and web channels. The project also allowed for the continued program presence at trade shows, association meetings, buyer sponsored events and workshops as well as targeted partner opportunities to assist in program uptake and awareness.

Description of the importance and timeliness of the project;

This project was important and timely because specialty crop growers in Massachusetts have been and continue to experience new market challenges as food safety and environmental impact concerns alter production costs and market patterns of production, supply and procurement. The definition of local procurement areas have presented a further challenge for specialty crop growers as retail establishments, and the distribution partners who enable supply, have dissimilar local definitions for different specialty crops and commodities.

These factors have provided additional barriers to small specialty crop growers who must diversify and expand their markets as they increase acreage/production in order to reach and maintain sustainable profitability.

The CQP program has provided a market access tool to small to mid size Massachusetts specialty crop producers. CQP program participants are able to control and counter emerging market concerns through the adoption of a standard based audit program that clearly identifies practices that mitigate and limit food safety and environmental impact concerns, and defines local as grown and harvested in Massachusetts.

The project further extends CQP brand recognition and helps communicate the core requirements and practices that promote food safety and environmental sustainability to consumers, buyers, and partners.

If the project built upon a project that previously received Specialty Crop Block Grant, describe how the project complemented and enhanced previously completed work:

This project is built upon a previously received Specialty Crop Block Grant, coordinated by MDAR. The previous project work included the development and deployment of a grower survey, the development of the initial marketing collateral material (including the design of a website), and the coordination of educational workshops and seminars to introduce the Commonwealth Program to specialty crop growers/future CQP participants. The project expanded and continued the crucial work of the Phase I initiative to expand program reach and promote new sign-ups.

The Project Approach

Brief summary of activities performed and goals and / or targets achieved throughout the entire grant period. This should represent the activities/ goals and targets specified in the work plan.

MDAR solicited proposals for the development of identified materials and initiatives in accordance with the phase II work plan. Proposals were received in response of the deployed RFR and a contractor to execute the plan was selected. Work was performed during the grant cycle and included proto type development, revisions, production, market testing, and deployment. Specific tasks completed are identified below;

1. Outreach and support was continued under phase II and provided support to both current participants as well as to interested specialty crop growers.
2. The CQP website was redesigned to support and incorporate a list of all growers who have joined the program and received technical assistance. Update information includes contact information, audit dates, as well as enrollment dates.

This will allow customers, including wholesale buyers, to easily indentify and contact participating members, enhancing interest in the program.

3. Customizable marketing materials, including business cards, brochures, and rack cards have been made available to specialty crop growers and have already been distributed to interested growers.
4. A redesigned participant webpage has been developed for each member. This data sheet now includes a link to the participant's website along with key product information, a picture, and contact information.
5. Unique QR codes that link to each participant's webpage (hosted on the CQP website) have been allocated to each participant and have been integrated by some members into their marketing materials as a unique identifier and useful tool for trace-back and product information.
6. The Department continued its presence at trade shows and agricultural meetings to promote the Commonwealth Quality Program using Trade show support materials that were developed under the grant.

Project did not benefit commodities other than specialty crops along with a summary of the contributions and roles of project partners.

The phase II project only benefitted Specialty Crop Growers who are supported under the produce sector of the CQP program. The Commonwealth Quality Program (CQP) Coordinator was the project manager for this initiative. Contractors were selected based upon a competitive procurement to perform the necessary project duties as outlined in the scope of work as well as in the activities performed.

3) Goals and Outcomes Achieved

Summarize the major successful outcomes of the project in quantifiable terms.

All prior reported delays were rectified and all deliverables identified in the work plan have been completed. Channels which were deemed ineffective or were constrained by budget were not supported. Emphasis was placed on customizable marketing materials and web-related resources that extended and enhanced existing communication and partnerships. This was achieved by a detailed analysis of both the consumer and participant surveys conducted under a previous grant, as well as through phone interviews and through the use of on-line survey tools such as survey monkey.

When it comes to buying local, many Massachusetts residents believe it is important to buy local, but don't always practice their beliefs. This was among the key findings of the study with 89% of respondents claiming it is very important or somewhat important to buy local when they can. However, when in season, only 28% said they purchase local products either daily or 2-3 times a week.

This report is the outcome of a statistically valid study of Massachusetts residents on locally grown purchasing habits and opinions. The results better help identify what consumers purchasing habits currently are and what gauges their awareness on CQP and the importance of buying local products. The findings are based on 375 interviews with Massachusetts residents, in proportion to each county's population.

The study's key findings include:

- 89% of respondents believe it is important to buy local products when they can.
- 28% of respondents purchase local products either daily or 2-3 times a week in season.
- 30% of respondents believe the term 'local' means no further than their county.
- 98% of respondents agree that locally grown products are fresher.
- 98% of respondents think it is important to keep family farmers in business when purchasing local products.
- 95% of respondents have not heard of the Commonwealth Quality Seal Program.
- 96% of respondents are likely to purchase products with an easily recognizable seal assuring locally grown with high standards for safety, production and the environment.

Supporting local economies and freshness are the top responses for purchasing local.

75% of respondents decide where to purchase locally grown products by driving by a farm stand or farmers' market. A copy of the survey results that was utilized is attached.

Goal	Outcome
Survey/Analysis	A specialty crop grower survey along with retail intercept interviews with consumers was conducted in an attempt to refine our messaging and positioning around the CQP plan/campaign.
Newspaper/Online News	Press releases and event notices were published in regional and local press and program participants conducted interviews with media outlets in their respective areas.
Sign-ups	We fell short on the inclusion of 100 new specialty crop growers in the CQP Program based on several factors that were difficult to identify and address earlier. These included infrastructure upgrades and the lack of capital to support investment as well as fears of impending regulations, such as FSMA, and its impact on program requirements. These issues have become clearer as grant programs created to assist in infrastructure upgrades have come on line and education and outreach has commenced on FSMA requirements.
Public Relations (Traditional)	Earned media value was created to exponentially increase media awareness beyond paid means. New audiences and demographics were exposed to information about the Commonwealth Quality Program (CQP) statewide that helped create positive perceptions and awareness of the brand.
Public Relations (Digital)	Massachusetts-based bloggers and influencers were engaged to spread the word on the Commonwealth Quality Program.
Interactive/Campaign Micro-site	The CQP website was enhanced to become a useful tool to measure the growth of the program. The website allows users to find local growers, participate in promotions, and also invite other growers to enter the program.
Collateral Material	Brochures, rack cards and other promotional materials were developed to extend brand recognition and awareness of the core practices and requirements of the program.
POP/POS Promotion	<p>MDAR distributed collateral which could serve to raise awareness of the campaign and drive users to the online destinations/social media communities in which to mobilize around CQP.</p> <p>MDAR will work with local businesses and retailers to determine who would support helping promote this campaign, which will help the retailer garner positive public relations towards the program.</p>

Beneficiaries

The beneficiaries of this program are the 55 registered specialty crop participants as well as future specialty crop producers who take advantage of the program and its benefits. These program benefits include the deployment and verification of best management practices on the farm, centered on key market drivers and criteria for purchase, such as food safety practices and environmental practice components. The program also offers a license based marketing layer that clearly communicates to consumers and buyers key program requirements in a way that helps educate consumers as to why and how local specialty crop products are as safe and eco-conscious as their larger food system cousins.

In short, this grant has increased the brand recognition of the program, while assisting producers in the program with identifying and selling their products in an ever changing and more competitive market.

Furthermore, this grant has allowed farmers to demonstrate that their products already adhere to state and national Industry standards of food safety, quality and environmental sustainability.

This program also benefits consumers, by identifying products and their producers who adhere to recognized standards of food safety and quality.

Illustrations of the lessons learned

We learned the creation of the collateral materials and marketing initiatives furthered the overall program objective of deploying a standards based eco-label program that offers small to mid size growers a market access tool, allowing them to stay competitive in an ever changing market space.

We also learned that while the initial focus on a multi-faceted marketing approach seemed attractive, a review of survey results along with a commitment to work with local farms identified key target areas of implementation that allowed for a more effective use of funds. Promulgating program information through existing B2B channels and agricultural partnerships was deemed far more effective as specialty crop growers attempt to capture new clients and modify existing price points.

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