Addressing seasonality barriers in farm-to-college initiatives with winter storage vegetables

Final Report for CNE08-043

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State: Pennsylvania
Project Leader:

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Project Information

Summary:

"Addressing Seasonality Barriers in Farm to College Initiatives with Winter Storage Vegetables" was a research project focused on determining supply and demand for winter storage vegetables for wholesale markets in the Philadelphia region. We visited with six farms in Southeastern Pennsylvania and Northern Vermont to learn more about their successful storage facilities. To determine demand for a viable marketplace for these vegetables, we interviewed 15 institutional buyers and drew upon our own experience as a year-round wholesale buyer of local farm products. We also researched commodity prices of conventional crops sold at the Philadelphia Wholesale Terminal that can be grown, stored and sold in this region. Produce at the Terminal is often grown out of the region. We came to the conclusion that there is large wholesale market demand for winter storage vegetables in Philadelphia and the region. However, we learned that currently, there is a limited supply of these winter storage crops to meet this demand. Our research has indicated that the gap between supply and demand may presengood economic opportunities for local farms.

Project Objectives:

- Determine market demand from schools, hospitals and retail stores for winter storage crops produced locally
  Research and visit farms that are currently growing for winter storage. This includes 3 + different examples of on-farm storage with varying farm sizes, facilities and markets.
  Research market prices vs. local/organic prices of a number of different root crops
  Determine feasibility of other farms building storage facilities or retrofitting current available space on their farms.
  Develop strategies for farmers looking to start growing and storing winter crops

Introduction:

For this project, we proposed to address the issue of unmet demand for winter storage vegetables in college dining services by researching the following: supply and storage capacity of winter vegetables, market demand for these vegetables, on-farm storage crop facility feasibility, centralized storage crop facility feasibility and the cooperative approach to storage vegetables for the wholesale marketplace. The project was started in the Fall of 2008 and was completed in the Spring of 2010. All project details follow in their respective sections below.

Cooperators

- Liz and Bill Andersen

  Charlestown Farm

- Eli Fisher

  Elm Tree Organics

- Jeffrey Hyde

  Penn State College of Ag Sciences

- Chris Poshpeck

  Deep Root Organic

Research

Materials and methods:

Materials & Methods, Performance Target 1: Determine market demand from schools, hospitals and retail stores for winter storage crops produced locally.

Utilizing our contacts through Fair Food's Farm to Institution Program, we contacted at least 24 institutions, including hospitals, schools, colleges and elder care facilities, in order to assess their demand for winter storage vegetables. From this initial group, we obtained in-depth interviews with 15 institutions. These institutions vary in size, serving from 700 to 45,000 customers daily, with a combined total customer base of 70,820 people. These institutions are located in downtown Philadelphia, southeastern Philadelphia and central New Jersey. All institutions surveyed have walk-in coolers and many have large freezers for food storage, as is standard for institutional food service. All of these institutions were already purchasing locally grown foods from either Philadelphia's all-local distributor, Common Market, or from Lancaster Farm Fresh Co-op, a large, farmer-owned cooperative, based in Lancaster County, PA. Of these institutions, 5 are also already purchasing directly from at least one additional local farm.

All of these institutions expressed an intense interest in purchasing winter storage

vegetables, with the following vegetables being most popular: potatoes, onions, carrots, cabbage, beets, sweet potatoes, and garlic. Rarely popular were: celeriac, Jerusalem artichokes, rutabaga, parsnips and turnips. We also inquired about the need for minimal processing, like peeling or chopping. Seven of these institutions said that they needed no processing for these items, while the other 8 preferred fresh cut processing on some vegetables (peeled squash, minced garlic, chopped onions). On a weekly basis, this group collectively purchases over 1,100 lbs of potatoes, 370 lbs of carrots, 310 lbs of cabbage, 265 lbs of beets, and 220 lbs of onions. At this time, these items are largely being sourced from outside the Delaware Valley region. These institutions are hungry for more, as Leah Nichols from Rodale Dining Service, said, “If it's out there and it's seasonal we get it from a local organic farm. We don’t want anything pre-cut processed because we prep everything from scratch and waste nothing. I just wish there was more available!"

As we assessed wholesale demand for these crops, we could not overlook our own experience running a year-round, all-local grocery store in Philadelphia’s Reading Terminal Market. The project manager for this project is also the Product Manager and buyer for our business, the Fair Food Farmstand. Over the fall, winter, and early spring of 2009 – 2010, we had a difficult time sourcing vegetables like cabbage, carrots, and garlic to keep our store fully stocked. In fact, last winter, after visiting Deep Root, we expanded our usual all-local focus to include carrots, parsnips and cabbage from the VT co-op, since we were unable to source it locally. Through February and March 2010, each week we purchased and sold about 150 lbs of carrots, 50 lbs of parsnips and 150 lbs of cabbage from Deep Root, and from three different chemical free local growers, we purchased and sold 75 lb of beets, 200-250 lbs of potatoes, and over 200 lbs of sweet potatoes.

Materials & Methods, Performance Target 2: Research market prices vs. local/organic prices of a number of different root crops.

Early in our research efforts, we determined that without knowledge of conventional market prices for these root crops, our research on wholesale demand would not be complete. For this reason, we researched wholesale prices paid at the Philadelphia Produce Terminal over the course of 2009, obtained from the USDA Agricultural Marketing Service Vegetable Market News Portal. We then compared these prices with averages of prices for the same products, but Certified Organic. [See Image 1: Conventional vs. Organic Prices, Winter 2009.] This comparison was based on pricing information from Deep Root Organic Co-op and from 5 local winter storage vegetable growers. The Organic prices were often twice the conventional price, which may be a barrier to institutions that wish to purchase these same items from a small to mid-sized sustainable grower in our region.

Materials & Methods, Performance Target 3: Research and visit current farms that are growing for winter storage. This includes 3+ different examples of on-farm storage with varying farm sizes, facilities and markets.

In addition to our assessment of market demand for winter storage vegetables, we researched several successful examples of on-farm storage of these crops. The project manager visited two farms in Pennsylvania: Elm Tree Organics in Lancaster County, PA, and Charlestown Farm. The project manager also visited several farms that are members of the Deep Root Organic Co-Operative and the Deep Root warehouse in Johnson, VT.

Elm Tree Organics: In the winter of 2009, the project manager visited Elm Tree Organics. Elm Tree is owned and operated by Eli Fisher and is a member of Lancaster Farm Fresh Co-Op. This was the prime time to visit the farm, as the root cellar was packed with carrots, potatoes, and parsnips. Eli Fisher is an Amish farmer, and constructed a simple but highly functional root cellar with little financial

investment. Eli, shortly upon utilizing his storage facility, saw a positive return on the three crops mentioned above. With little maintenance, he kept carrots, parsnips and potatoes until he sold out in the late winter/early spring of 2009, earning about 25% more for the same produce in January than he did the previous October. With inspiration from the book, “Root Cellaring: Natural Cold Storage of Fruits & Vegetables,” by Mike and Nancy Bubel, Eli decided to retrofit an existing structure on his property. As he told the project manager, his motivation was sparked when he purchased Bubel’s book at a used bookshop and immediately decided to build a root cellar for his storage crops. It took him one month to construct his storage room, with the help of friends and family. His total investment cost just under $3,000.

Eli used the bottom room of a classic Pennsylvania bank barn to create his cold storage facility. Installation of the concrete floor cost about $750 and labor cost $2,000. His facility is 12 x 34 ft and he can fill the entire space with 28 pallets, adding up to a total of 14 tones, or about 28,000 lbs of produce. His electricity bill was $0 before and after storage, as he uses the earth and insulation of the stone foundation to keep the room cool. In addition to the concrete floor, he built an air vent to control humidity, and he uses the doors to the outside to control the inside temperature. For example, he can open the door at night to cool the space and close it during the day so it stays cool. His main recurring costs are for building additional storage equipment (wooden bins to store the produce after harvest) and labor during harvest times from November through early December. Eli uses untreated locust crates, which he makes on his farm, to store the potatoes and carrots, and he can purchase additional locust when he runs out.

Deep Root Organic: After visiting member farms of the Deep Root Organic Co-Operative, the project manager learned about several different storage facilities: one of which was very similar to that at Elm Tree Organics. The others were much more high-tech. The project manager visited, observed, and collected information and data from three member farms: Ways Mills Market Garden, Vallons Maraichers, and Sanders Farm.

The Deep Root Organic Co-Op in Johnson, VT consists of 18 growers; 10 in Vermont and 8 in Quebec. The cooperative currently delivers twice weekly to Vermont Food Co-Ops, Whole Foods Mid-Atlantic, and Albert’s Organics; all of which are located along the East Coast of the United States. Deep Root has been in business since 1986 and conducted almost $3 Million in business in 2009, with their top sellers being winter squash ($700,000), parsnips ($25,000), and beets ($250,000) in the fall and winter, as well as lettuces ($70-80,000), kale ($100,000), and collards ($60-70,000) in the summer/fall.

The smallest and simplest facility within Deep Root’s network was at Ways Mills Market Garden, operated by Tony Scott. At the time, Tony had 2 employees working in his fields in the winter and up to 10 employees during the summer. The farm grows about 3 acres of parsnips, 1 acre of carrots, 2 acres of rutabaga and 5 acres of squash. At the time of the visit, the farm sold about $160,000 of vegetables through Deep Root, accounting for 50% of the farm’s total business. During the research period, Tony also sold directly at 2 farmers markets during the summer.

The farm’s cooler was originally built by Tony, with the help of friends, and cost about $20,000. The farm’s cooler was 17’ x 23’ x 10’, – slightly smaller than the storage facility observed at Elm Tree Organics in PA. Ways Mills utilizes their facility to cool greens and other vegetables during the summer, and to store rutabaga, parsnips and carrots during the long Canadian winter. Additional costs to the facility have included a replaced compressor, which cost the farm $5,500. Utility costs varied by season, with high costs at about $100 per month during the warmest

months of the year for electricity. All vegetables at Ways Mills are hand-picked, and then stored, unwashed in burlap sacks. When orders are to be filled, crops are then removed from storage, washed, trimmed and packed. [See photos of Ways Mills below]

The Deep Root member farm that had the largest facility was Vallons Maraichers, in Compton, Quebec, Canada. Vallons Maraichers is a 200-acre farm that sells their products through Deep Root, another Canadian Co-Op, and via a private label. Their estimated revenue at the time of the research was about $1.5 million per year. Vallons Maraichers initially invested $250,000 to construct their cold storage facility. The construction involved two phases– the first cooler was built with $120,000 capital, and the additional facilities were added on in later years. Total cold storage includes two large coolers – one that operates at 36 degrees F and the other at 40 degrees F, each retrofitted with ethylene filters, as well as a loading dock, a large packing room and additional storage. [See photos of Vallon Maraichers below.]

Research Successes and Challenges

Successes: We learned quite a lot from the on-farm visits with Elm Tree Organics and the farms in the Deep Root Organic Co-Operative. Based on this research, we recommend on-farm storage as opposed to a centralized storage facility for winter storage vegetables. Aside from not having any examples of a successful centralized facility, an on-farm facility gives the farmer control of his/her post-harvest handling, storage and even his/her sales outlet with no additional transportation or rental costs before the produce is sold.

After visiting these farms, and attending a workshop run by Don Kretchman of Kretchman Farms at the 2010 PASA Conference, we learned the following basic guidelines to building and maintaining a winter storage crop facility. On the most basic level, successful storage involves proper handling during harvest, sanitation, and temperature and humidity control. Most crops require cooling after harvest, while potatoes, onions and winter squash require a warm ‘curing’ process before they are stored to help prevent bruising and fungal growth. The classic root crops, like beets, parsnips, carrots, cabbage, rutabaga, onions and more are usually stored in some sort of packing material, including sand, peat moss, dried leaves, sawdust and clean straw. There are numerous tip sheets and tables outlining storage details by vegetable, available online and through state extension offices. A very thorough version was compiled by Marita Cantwell, at UC Davis Postharvest Technology Research and Information Center, and is available online: http://postharvest.ucdavis.edu/produce/storage/.

Once the on-farm and market demand research was completed, we decided not to survey local farms on their capacity for storage facilities. Since there are so many different types of storage facilities, we determined that it is possible for any farm that already has the volume and infrastructure to sell wholesale to build a storage facility. This was one deviation from our original plan; the remainder of our research supported our initial findings, and we are confident of our assessed marketplace demand for stored winter crops, and feasibility of the storage of these crops on-farm by those who grow them.

Challenges: Visiting additional root storage facilities, while ideal, was difficult due to the time, resources, and availability of farmers to accommodate these day-long visits. We know there are additional facility and business models to explore in order to obtain a more well-rounded view of root vegetable storage in the region, and over time, we anticipate continuing to visit and learn from our region’s growers in this capacity.

An additional challenge presented itself in terms of the proposed economic analysis.

After surveying market demand, visiting farms, and better understanding the availability of certain financial data points for farmers, we opted to forego using the model for Net Present Value for further analysis, created by Jeff Hyde. This model is a detailed excel spreadsheet, requiring several pieces of date. The first set of data, which we were able to collect from the farms we studied includes investment costs of building a storage system. The second set of data, includes price and sales of each vegetable, with and without storage. Not all farmers had that detailed information or were unwilling to share it. Furthermore, the entire model, as Jeff noted, is intrinsically flawed, because it also relies on predictions of sales in the future. In addition, we learned that given that we have more to learn about market demand, this detailed analysis proved to be pre-emptive in this research project, which was designed to be a rudimentary survey of the demand for stored root vegetables in the marketplace, and the feasibility of farmers to construct, maintain, and profit from the investment of cold storage facilities on-farm.

We believe a solid economic analysis and financial modeling of the feasibility of root crop values should be performed in the future. We look forward to better understanding the more nuanced financial metrics when additional data is available for modeling.

- Ways Mills
- Storage Bins
- Vallons Maraichers Cooler
- Ferme Sanders Parsnips, cleaned and bagged
- Ways Mills, purple top turnips
- Conventional vs. Organic Prices, Winter 2009
- Vallon Maraichers Carrot Cleaning Assemply Line

Research results and discussion:

This project determined that there is positive economic potential for farms growing and storing root crops in Southeastern PA. Based upon the data we collected with respect to purchasing volumes among large wholesale buyers like institutions, as well as our first-hand experience managing and purchasing for the Fair Food Farmstand, we project possible wholesale volumes of over $3,000 per week for winter storage vegetables during the coldest months of the year. [See Image 1: Weekly Purchasing Power of Philadelphia Institutions for Winter Storage Vegetables.] This research did not include an extended network of restaurants and retail stores in Philadelphia that are currently already purchasing from local farms on a daily basis during the growing season.

In addition, we were able to gauge interest and opinion from the general public when the Fair Food Farmstand began to carry storage crops from Deep Root in February 2010. Our customer base knows us as a strictly all-local shop, so what the reaction of our customers to more "regionally" sourced products would be to these products was unknown. However, with careful and deliberate signage explaining this research project, as well as the approval from our product manager who visited the co-op first hand, we got very positive feedback from our customers. Regulars were pleased with the quality and the selection and got excited about the inspiration Deep Root may have on local farms.

- Weekly Purchasing Power of Philadelphia Institutions for Winter Storage

Vegetables

Participation Summary

Education & Outreach Activities and Participation Summary

PARTICIPATION SUMMARY:

Education/outreach description:

No publications or media outlets grew out of this project. This project was focused primarily on the economic feasibility of building greater capacity for root vegetable storage among our region's growers. As anticipated, next steps could include a workshop or series of workshops in conjunction with Penn State Extension and PASA to educate farmers on the options for growing for storage as well as building a storage facility. This will also spread the word that the demand is there, and supply needs to catch up. As we determined, the market is strong for these products and the distribution channels already exist.

Fair Food's strength lies in connecting farmers with wholesale markets and experts in growing. The next step will be to pursue funding and partnerships with Penn State extension, PASA, and CISA to host a workshop or series of workshops for farmers in our region. In addition to these organizations, we would invite farmers who have demonstrated their knowledge on building and working with cold storage in our region: Don Kretchman from Kretchman Farms and Dan Landis from Landisdale Farm. We would invite farms that are already involved with Fair Food and sell direct wholesale, as well as farms that sell to distributor/co-op types, like Common Market and Lancaster Farm Fresh, to participate in these workshops.

A press release noting the results of this project are scheduled for late fall 2010. We will send the results out via mail and email to over 500 farmers in our network, as well as Penn State Extension, PASA, Lancaster Farming News, and NewFarm.org.

Project Outcomes

Project outcomes:

This project was focused on investigating and learning from established, successful root storage facilities. The partnering farmers in this project had already achieved successful milestones of building and then benefiting from their investments with these facilities. Fair Food has benefited from learning first-hand how these infrastructure improvements and innovations have benefited our region's farmers and how these models may be useful for growers with whom we work directly.

Several elements changed the course of our project. First, we expanded our wholesale demand audience to include hospitals, primary and secondary schools, and retail stores, not just colleges and universities. This was perhaps one of the biggest successes of our project. After repeatedly sending out surveys to our institutional partners, we individually called each one until we got all of the responses that we needed. This was very successful and gave us the specific

numbers we needed to determine their collective purchasing power.

Second, after having done field research with over 6 farms, we have come to understand the multiple ways and means in which a farmer may either retrofit a current space to create additional winter vegetable storage space on his/her farm or to build a new cold storage facilities, with costs ranging from $1,000 to $500,000. This was an exciting discovery, but also made it difficult to establish set criteria or guidelines for farmers interested in expanding their infrastructure to include root vegetable storage facilities.

Ultimately, however, we did not reach any solid conclusions about the feasibility of other farms building storage facilities or retrofitting current available space on their farms. After completing the site visits, we learned that existing structures can be retrofitted with very little investment and new structures can be completed with investment ranging from $20,000 to $250,000. One size does not fit all, and we believe coming to this determination is in itself a milestone. We can, however now assist those growers with whom we work in considering a variety of options for their possible winter vegetable storage initiatives, and help create peer-to-peer learning in this regard.

Our preliminary research indicated that the greatest barrier to farmers in developing a strong winter root vegetable sales base would be competing with conventional pricing and getting their produce to the wholesale customers. Fair Food's network (and Fair Food Farmstand's wholesale suppliers) already includes over 90 farms that are accustomed to selling wholesale in Philadelphia. This network grows every year with new farmers expanding into wholesale. This leaves us with a diverse network of farms who already have committed wholesale customers, and who are poised to increase their offerings through the winter.

As we approached the best practices phase of the project in February 2010, Community Involved in Sustaining Agriculture (CISA) released a comprehensive Winter Storage Resource. This tool includes two case studies: An existing structure retrofit, based on Intervale Community Farm; and one on new construction, stand-alone cold storage. Both are available online at http://buylocalfood.org/page.php?id=67&PHPSESSID=b908f80be8f1f46c68edc74b903c4482. Instead of re-creating similar work, we would like to partner with CISA in the future, so that they may help educate farmers in our region and so that we may draw on each other's expertise.

Assessment of Project Approach and Areas of Further Study:

Potential Contributions

Economic Analysis

Our research on demand in the wholesale marketplace shows the collective buying power of 15 institutions and our own retail store to total about $3,100 per week. Over the course of one winter, that could total nearly $50,000 in root vegetable sales-- currently an untapped market in our region due to low availability of those products. Certainly, a challenge for local growers once they have built and filled their storage facilities will be competing with commodity prices and offering 'fresh cut' for institutions, but there is great demand without addressing those issues. Deep Root Organic is widely known for and has built its successful business on marketing winter storage crops. They have been so successful that Common Market Philadelphia chose to distribute their products in the winter of 2009-2010, filling a void in local availability.

On the farmer's side of the equation, the possibilities for building a cold storage

facility are (almost) endless. Elm Tree Organics invested very little ($3,000) and was able to sell an additional 14 tons of produce. If this were divided among carrots, parsnips and specialty potatoes (German Butterball and All Blue varieties of potatoes), that can be up to $27,200 in sales (based off 9,333 lbs of each with market prices being $.64/lb for carrots, $1/lb for specialty potatoes, and $1.50/lb for parsnips, all Certified Organic).

Future Recommendations

Areas Needing Additional Study

Additional study is needed to make complete, detailed recommendations for best practices for farmers looking to build cold storage facilities. In addition to construction and maintenance of cold storage facilities, farmers will also benefit from guidance on planting and harvesting, with tips varying from time and succession of plantings to the best varieties of different crops for storage (for example, Nantes Carrots are better than other varieties for storage).

- Complete Final Report for CNE08-043