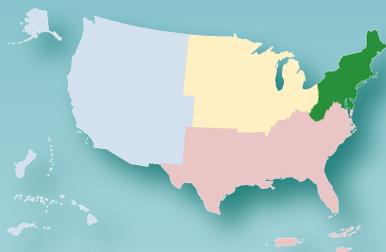


EDUCATION INNOVATIONS

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Winter Storage Options for the Northeast

Project Summary

To help farmers in the Philadelphia area learn about various winter storage options, the nonprofit Fair Food conducted site visits of well-established winter storage operations in Pennsylvania, Vermont and Quebec. Project participants also created a collection of existing resources on winter storage, including construction case studies and detailed information about individual vegetables' storage needs (see "Additional Resources").

Top Findings and Lessons Learned

- Farmers with existing winter storage capabilities prefer to have an on-farm storage system as opposed to a shared, centralized facility. They tended to prefer the advantages of having their own storage: maintaining control over storage and post-harvest handling, and avoiding the need for extra transportation.
- There is not a best, one-size-fits-all style of facility. Depending on their needs and existing resources, farmers can retrofit existing structures for a few thousand dollars, or build a new one for anywhere from \$20,000 to \$250,000.

COVER PHOTOS: Workers process root vegetables at the winter storage facilities of Vallons Maraichers (left) and Ways Mills Market Garden (right), both members of the Vermont-based Deep Root Organic Co-op. Vallons Maraichers has the most sophisticated storage and processing facility in the co-op, and Ways Mills has the simplest. *Photos courtesy Fair Food*

Winter Storage Facility Site Visits

Fair Food's project manager visited several farms that use different styles of winter storage facilities: Elm Tree Organics in Lancaster County, Penn.; Charlestown Farm in Phoenixville, Penn.; several farms that are part of the Deep Root Organic Co-op; and the Deep Root warehouse in Johnson, Vt.

Elm Tree Organics

During a winter 2009 visit to Elm Tree Organics, owned and operated by Amish farmer Eli Fisher, the root cellar was packed with carrots, potatoes, and parsnips. Fisher constructed a simple but highly functional root cellar with a financial investment of just under \$3,000. Fisher, shortly after setting up 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 percent more for the same produce in January than he did the previous October—an increase of about \$27,200.

With help from friends and family, Fisher retrofitted 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 feet by 34 feet, and he can fill the entire space with 28 pallets, adding up to a total of 28,000 pounds 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 the November-December harvest. Fisher uses untreated locust crates to store the potatoes and carrots; he makes the crates on the farm but buys material for them as needed.

Deep Root Organic Co-op

After visiting member farms of Deep Root Organic—Ways Mills Market Garden, Vallons Maraichers and Sanders Farm—the project manager learned about several different storage facilities, one of which was very similar to the one at Elm Tree Organics. The others were much more high tech.

The Deep Root Organic Co-op in Johnson, Vt., consists of

Additional Resources

Project coordinators originally set out to develop a winter storage best practices guide, but did not because, during the course of their project, they discovered many useful resources already existed, including:

- Two case studies from Community Involved in Sustaining Agriculture (CISA) describing two types of winter storage facilities—a retrofit and a new construction. Available at: <http://buylocalfood.org/page.php?id=347>.
- Project coordinators found 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 the University of California, Davis Postharvest Technology Research and Information Center. Available at: http://postharvest.ucdavis.edu/produce_information/StorageFreshProduce/.
- Eli Fisher, of Elm Tree Organics in Pennsylvania, was inspired and guided by the book *Root Cellaring: Natural Cold Storage of Fruits and Vegetables*, by Nancy and Mike Bubel. The book is available through Storey Publishing, at www.storey.com.

18 growers: 10 in Vermont and eight 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 U.S. East Coast. 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 (\$70,000-\$80,000), kale (\$100,000) and collards (\$60,000-\$70,000) in the summer/fall.

The smallest and simplest facility within Deep Root's network was at Ways Mills Market Garden in Quebec, operated by Tony Scott, who built the cooler, with the help of friends, for about \$20,000. The cooler is 17 feet by 23 feet by 10 feet, which is slightly smaller than the facility at Elm Tree Organics. Ways Mills uses their facility to cool greens and other vegetables during the summer and to store rutabaga, parsnips and carrots during the long Canadian winter. Extra costs to the facility have included a replaced compressor, which cost \$5,500. Utility costs varied by season, peaking at about \$100 per month during the warmest months. 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.

At the time, Scott had two employees working in his fields



Produce bins at the Vallons Maraichers storage facility. *Photo courtesy Fair Food*

in the winter and up to 10 during the summer. The farm grows about three acres of parsnips, one acre of carrots, two acres of rutabaga and five acres of squash. At the time of the visit, the farm sold about \$160,000 of vegetables through Deep Root, accounting for 50 percent of the farm's total business. During the research period, Scott also sold directly at two farmers markets during the summer.

The Deep Root member farm that had the largest facility was Vallons Maraichers, in Compton, Quebec. 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 for \$120,000, and additional facilities were added in later years. In total, storage includes two large coolers—one that operates at 36 degrees and the other at 40 degrees, each retrofitted with ethylene filters, as well as a loading dock, a large packing room and additional storage.

Areas Needing Additional Study

While Fair Food learned a great deal about successful models of winter storage in the Philadelphia area, and discovered existing resources that can help farmers who are interested in cold storage (See Resources, page 2), they found there

is a need for comprehensive, location-specific recommendations for best practices. In addition to construction and maintenance of cold storage facilities, farmers would also benefit from guidance on planting and harvesting, with advice ranging from time and succession of plantings to which varieties of different crops are best for storage.

In addition, the project manager was unable to do the more complete economic analysis that was originally planned. After surveying market demand and visiting farms, Fair Food found that not all farmers had detailed information on sales prices and volumes, or were unwilling to share that data.

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