

High Tunnels Help RI Farmers Adapt to Climate Variability

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Farmers are always planning for change. Responsibilities such as managing seasonal crops, planting schedules, harvests, soil amendments, scouting for insect pests and disease, and moderating water use keep farmers in tune with weather conditions and trends so that they may produce optimum yields.

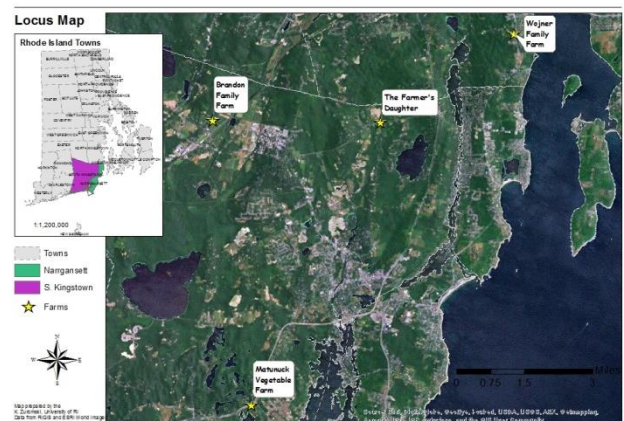
Continuing research pins climate change as a stressor to ecological and human communities alike, with many implications for agriculture. Southern New England's climate is shifting to become warmer and wetter according to the Northeast Climate Assessment, which may present some advantages to growers. However, precipitation events may become more extreme as components impacting storms in the region change, such as jet stream shifts from warming ocean temperatures. Extreme weather events can also cause severe crop damage and soil erosion. The longer, wetter and warmer growing seasons may also be more favorable to pest populations and disease. Flooding throughout Rhode Island in 2010 was a wake-up call to local communities about the impacts that severe weather events can bring.

To ensure long-term farm success and sustainability, Rhode Island farmers will need to stay abreast of environmental trends and employ management practices that address natural resource concerns associated with weather variability. High tunnels are a tool that can help farmers adapt to increasingly irregular weather conditions by protecting crops and soil during severe weather events. Also known as hoop-houses, high tunnels are structures made

of plastic or metal pipe that are covered with plastic or other sheeting. Generally functioning as unheated greenhouses, high tunnels provide an energy-efficient way to extend the growing season. High tunnels rely on sunlight to modify the climate inside, which often creates more favorable conditions for growing vegetables and other specialty crops.

Some farmers in Rhode Island even use high tunnels year-round for local winter and early spring markets. Sarah Partyka of The Farmer's Daughter in South Kingstown, appreciates the value of growing in high tunnels during the shoulder seasons. Her farm lies in a valley where there is often a late spring frost and early fall frost; growing in high tunnels offers valuable crop protection. Partyka has noticed changes in seasonal trends and remarked upon the lateness of the fall frosts over the past several years, which has been coming almost a month later than usual.

Farmers Asked About High Tunnels in Southeastern Rhode Island



Intensive, growing in high tunnels also offers a more controlled and consistent environment. During warmer weather, the sides of the high tunnels can be rolled up to improve air exchange

and foliage can be kept dry by supplying water to plants through drip irrigation. This option helps to eliminate problems like mildew.



Perry Raso shows crushed oyster shells used as soil amendment.

Perry Raso, of Matunuck Oyster and Vegetable Farms, and his farm manager Jason McCartney, grew kale through the winter in a heated high tunnel, along with micro greens, salad greens.

During one of the snowiest winters recorded in Rhode Island's history, Raso's high tunnels stood up well against drifting snow. The gothic style of his high tunnels helps shed precipitation. "If snow builds up too high on the sides before it melts, we can shovel it off," Raso noted. While affordability and ease of assembly are seen as benefits of high tunnels, the process of setting up the support poles in rocky soils was actually quite difficult, according to Raso. However, the ability to grow and harvest crops in fall, spring and even winter months is beneficial to Raso as he can supply his nearby restaurant, Matunuck Oyster Bar, with fresh greens all year long.

In addition to using high tunnels, some farmers cover their soils with Agribon, a fabric made of spun and bonded polypropylene. Mike and Josh Wojner of Wojner Farm in Saunderstown use this method to keep soils warmer within their high tunnel during cold months. The fabric is simply draped over low-growing plants to protect them from cooler nighttime

temperatures, and this made a late fall planting of carrots and spinach possible through the winter. The fabric also acts to provide shade in the high tunnel when summer temperatures are high. During these months, the Wojners grow strawberries, peppers and microgreens.

Earlier this summer, Alby Brandon of Brandon Family Farm in South Kingstown, installed his 4th high tunnel for his heirloom tomatoes, which will be rotated occasionally with cucumbers, peppers, lettuce, and a winter spinach crop.



Rolled up sides on high tunnel at Brandon Family Farm.

Brandon notes that having early crops is particularly helpful for direct market sales at farmers markets. "Beyond season extension, the high tunnels protect the crops from rain, wind, hail and other weather events; plants simply grow faster when not subject to these stresses. Protection from rainfall is particularly beneficial with tomatoes and some other crops as most common fungal diseases need free moisture on the foliage to infect the plants."

It took about 150 person hours of labor to construct Brandon's new 30 x 96 foot high tunnel, which went up fairly easily over a young tomato crop. High tunnels are usually covered with a double layer of plastic with an insulating air pocket between them. The plastic covering was installed on a hot July day and gave Brandon's high tunnel-building team a bit of trouble. "Condensation was building up between



High tunnel under construction at Brandon Family Farm.

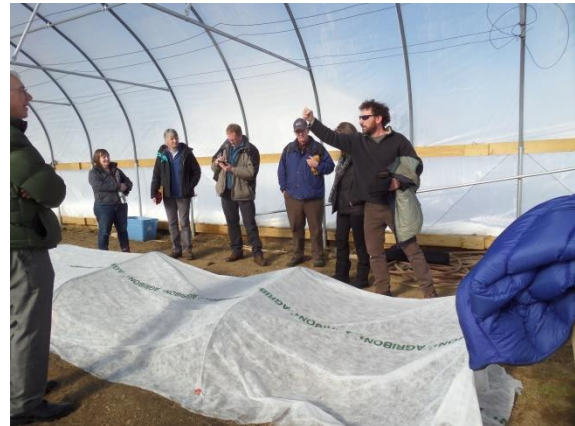
the plastic layers causing them to stick together as we were trying to pull the cover over the frame. One of the guys had to climb up to pull the sheets apart,” recalls Brandon.

As of February 2015, eighty-seven high tunnels have been constructed in Rhode Island with assistance from the Natural Resources Conservation Service (NRCS). The NRCS provides technical and financial assistance to farmers to protect natural resources, like soil and water. Eric Boettger, Resource Conservationist with NRCS in Rhode Island, says high tunnels have grown in popularity every year since they started offering the structures as a conservation practice under Environmental Quality Incentives Program (EQIP).

In the spring of 2015, staff from the USDA Northeast Climate Hub met with researchers and extension specialists at the University of Rhode Island (URI) to discuss climate change impacts on local agriculture. The Climate Hubs were established in February of 2014 to deliver science-based knowledge, practical information and program support to farmers, ranchers, forest landowners, and resource managers to support climate-informed decision-making in light of the increased risks and vulnerabilities associated with a changing climate.

The group discussed current agricultural research being conducted at the University and

issues related to farming, forestry and climate change, including biological control of insect pests, invasive plants, and crop diseases.



Andy Radin, URI Extension, talks about growing in high tunnels. Polypropylene fabric keeps low-growing winter crops warm.

The University Extension featured high tunnel growing as a topic of discussion at their Twilight Growers series meeting in April 2015. At this meeting, Andy Radin of URI Extension presented the results of an intensive tomato production trial in high tunnels. Radin assessed the potential of 13 tomato varieties and was also able to provide recommendations for planting, pruning and trellising to maximize production.

Dr. Rebecca Brown, professor of plant sciences at URI says there is much interest in high tunnels from area farmers. “Most of our growers are new to high tunnel growing, and have questions about everything from tunnel construction to what crops to grow, to managing soil fertility, insects, and disease”.

With regards to climate change, Dr. Brown sees high tunnels being used in two ways: “Tunnels are very useful to protect summer crops from frequent rainfall, and the resulting fungal diseases. Many of our growers have given up growing tomatoes in the open field, because it is so much easier to manage disease in high tunnels. As climate change increases the

frequency with which we get tropical storm systems, this becomes more important. It is not just growers in New England, either – in the Midwest and Mid-Atlantic there has been a trend towards growing perennial fruit crops such as raspberries and cherries in large summer-only tunnels just to keep the rain off!” Brown says high tunnels also help ensure that growers can get crops of spring vegetables as they are not dependent on waiting for snow to melt or on soil to dry out enough to get into the fields.

In summary, high tunnels may help farmers adapt to environmental changes associated with climate conditions. Natural resource managers continue to look for ways to better assist farmers in applying scientifically sound practices. New tools, applications, management strategies and policies are being developed to ensure that farms and forests are more resistant and resilient to climate change so that they may continue to supply local communities with economic and environmental value. High tunnels are one tool in the toolbox for adaptation and resilience to environmental changes.

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