

WISCONSIN SCHOOL GARDEN NETWORK BRIEF

HIGH TUNNELS



Fresh, local spinach in February? What seems impossible becomes reality with the use of high tunnels. These plastic-covered structures protect against Wisconsin's cold winters so schools can enjoy fresh spinach and other produce into the late fall and during the early spring months. This brief offers information for building and using a high tunnel on school grounds.

What is a high tunnel?

High tunnels are unheated, plastic-covered structures under which seeds and transplants are planted directly into the soil. The environmental protection and control afforded by high tunnels extend the planting season beyond what is possible in open fields. As a semi-permanent structure, high tunnels are often more affordable than a greenhouse, which requires a cement slab, heating system, and benches or tables.



Benefits of high tunnels

- Extends the growing season via warmer soil temperatures
- Allows modification in growing conditions
- Offers protection against field pests, high winds, driving rains, and hail
- Potentially higher crop yields

Challenges of high tunnels

- Initial costs may be prohibitive
- Requires system for frequent watering in summer months
- Need technical know-how for new growing conditions
- Requires constant monitoring of growing conditions

Building a high tunnel

High tunnel designs vary, but most involve metal conduit pipe or flexible PVC that are bent into hoops and covered by greenhouse-grade plastic. The plastic covering is then fastened to the perimeter of the structure using u-channel and wiggle wire or similar fastener systems. Ventilation systems regulate temperature and allow air flow that disrupts the growth of pathogens or disease. Ventilation is typically passive; roll-up side walls and gable vents allow heat to escape and wind to pass through. Side walls and gable vents are typically manually operated, but can be automated with thermostats and motors.

Choices related to the size and materials used will impact the overall cost of a high tunnel. A document developed by the Institute of Agriculture and Trade Policy (see resources section) lists high tunnel costs between \$2.95 and \$6.13 per square foot.

Tips for High Tunnel Building

- Choose materials wisely. A Wisconsin high tunnel must withstand the elements. Decide if higher gauge hoops and plastic are needed to handle snow.
- Check the soil. Plants grow directly in the soil beneath the structure. Before building, determine permeability and quality of the soil and address any deficiencies.
- Position appropriately. Ensure the structure is on level soil. Also, high tunnels are typically positioned perpendicular to prevailing summer winds to ensure good ventilation.
- Assess needs for electricity. Depending on the design, high tunnels may require electricity to power ventilation systems or for an inflation fan if a double-layer cover is used.
- Drainage is key. Water running off the high tunnel should be directed away from the structure.

Tips for High Tunnel Growing

- Consider incorporating irrigation systems. Growing in a high tunnel involves a lot of moisture. While hand-watering is an option, drip irrigation will be much more efficient.
- Use mulch. A light layer of straw or other mulch will help suppress weeds and maintain soil moisture.
- Protect your plants. Floating row cover will protect plants from frost when the high tunnel temperature drops.

Resources

Extending the Growing Season :High Tunnels Use and Farm to School in the Upper Midwest By Pete Huff (IATP): http://www.iatp.org/files/2015_04_02_SeasonExtension_PH_0.pdf

Growing School Gardens: Tunnels, Cold Frames, and Greenhouses. By the Center for Ecoliteracy for Annie's: http://www.annies.com/wp-content/uploads/2014/12/Cold-Frames-Tunnels-and-Greenhouses_Annies-Homegrown.pdf

University of Minnesota's High Tunnel Materials: <http://hightunnels.cfans.umn.edu/>

UW-Extension Brown County: http://www.co.brown.wi.us/i_brown/d/uw_extension/high_tunnels_for_farms_final_version.pdf

Chequamegon Bay High Tunnel Project

The growing season is short in Wisconsin, and even shorter in northern Wisconsin. With support from the Bayfield Regional Food Producers Co-Operative, University of Wisconsin Extension, and the DATCP's Farm to School AmeriCorps program, local produce is now available even before the frost has lifted. To extend the season as much as possible, five school districts were awarded Farm to School Grant Program funding from the USDA's Food and Nutrition Services. High tunnels packed with spinach, lettuce, peas, and more can be found in school yards at South Shore, Drummond, Washburn, Bayfield, and Ashland. While the produce is a welcomed addition to the school meals, creating opportunities for hands-on student education is the primary goal of the high tunnels. And hands-on it is. During a visit to Washburn High School, the high tunnel was filled with students caring for and harvesting the produce for a majority of the school day. Said teacher, Gina Nelson, "I love being able to take the students out to the high tunnel. They love the work and the hands-on tie to our curriculum."

This hands-on learning will not end at the close of the school year. Thanks to a specially designed "agripreneur" program, high school students from each district with interest in horticulture or agriculture careers will learn about the daily operations and financial benefits involved with maintaining a high tunnel. "We're really excited about this opportunity," said teacher Greta Kochevar. "The students are too. We all win."



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