**Chapter 5: High Tunnel Structure Maintenance**

High Tunnels require regular maintenance to keep them in good condition. In addition to managing a healthy crop, growers need to routinely inspect the structure of their high tunnel. When working inside the tunnel or opening the sidewalls make note of any damage or disrepair. Inspect the high tunnel for damage after weather events such as strong wind, hail, heavy rain, or snowstorms. The assessment should include looking over the frame, the plastic covering, and the end and side walls. Look for holes and tears, shaky or unsteady structural components, or pieces that may have blown off. It is important to winterize your high tunnel each year. This involves preparing the structure and irrigation system for freezing temperatures and snowfall.

Since the plastic covering of the tunnel is essential to season extension, it needs to be replaced when it has degraded or has excessive holes. Small patch repairs can be made to the plastic using poly repair tape which can be purchased from grower supply or hardware stores. However, after several growing seasons or when the cover is severely damaged, consider removing the entire plastic sheet and re-covering the tunnel. The longevity of the plastic covering will depend on several factors: how well it was installed, amount and intensity of weather events (wind, hail, etc.), and sun intensity. Generally, plastic coverings last 4-5 years, but can last longer. As the plastic ages beyond 4-5 years, light penetration in the tunnel can decrease as the plastic yellows and becomes less transparent. This impacts plant growth. Take advantage of the removed cover to complete any other needed repairs to the frame, such as:

* Replace any rotten hip boards or baseboards. Wooden parts will break down over time and may need to be replaced.
* Add upgrades to the basic high tunnel frame to improve your production system. Some examples of useful upgrades include adding electricity for automatic sides or modifying end walls to allow entry of larger equipment.
* Consider leaving the plastic off from November to February to allow the soil to be exposed to rainfall and other precipitation. This can assist with leaching out excess salt that may have built up in the soil.

The following are resources on high tunnel maintenance.

* 1. Damaged plastic
		1. Removing plastic
		2. Making simple patch repairs to plastic
	2. Putting on plastic
		1. *Pulling the Main Sheet of Plastic (Resource ###)*
			+ This is a one and a half-minute from Grow Appalachia showing how to pull the main sheet of plastic covering over a small high tunnel.
			+ <https://www.youtube.com/watch?v=q4r_5LeMJEg>
		2. *Securing Main Sheet of Plastic (Resource ###)*
			+ This three-minute video from Grow Appalachia demonstrates how to secure the plastic cover onto a small high tunnel.
			+ <https://www.youtube.com/watch?v=LlgcOXnqLcI>
		3. *High Tunnel: Main Cover Install (Resource ###)*
			+ A four-minute video produced by Texas A&M demonstrating how to cover a large high tunnel. It includes the golf/tennis ball technique for pulling a large piece of plastic across the top of the tunnel to the other side.
			+ [*https://www.youtube.com/watch?v=OCcvNDlNe0U*](https://www.youtube.com/watch?v=OCcvNDlNe0U)
		4. *‘*Covering a High Tunnel’and ‘Tips for Attaching the Plastic’ *(Resource ###)*
			+ These neighboring sections (p.47-48) from the “Construction Tips” chapter in *High Tunnels: Using Low-Cost Technology to Increase Yields, Improve Quality and Extend the Season,* a resource produced by the Regional Farm and Food Project, Cornell University, USDA and distributed by the University of Vermont Center for Sustainable Agriculture describe the process for covering a high tunnel and securing the plastic in a written format.
			+ <https://www.sare.org/resources/high-tunnels/>
	3. Irrigation Systems
		1. *Principles of Water Management on Small Farms (Resource ###)*
			+ Pages 7-8 of this resource discuss how tunnel location and farm topography may impact water in a high tunnel. This is the chapter 2 section in the publication *Water Management for Vegetable Crops on Small Farms* from Purdue University. The resource mentions managing excess water through improving runoff and drainage.
			+ <https://edustore.purdue.edu/ho-341-w.html>
		2. *High Tunnel Winterization and Maintenance Workshop (Resource ###)*
			+ A video workshop from Grow Appalachia with specific information on why and how-to winterize your high tunnel including the irrigation system.
			+ <https://youtu.be/Y1xeU4VqBBQ?si=wDC131PVH9U_9rx0>

See more resources on crop irrigation in chapter 6 of this toolkit

* 1. Replacing boards and other components
		1. *Installing the Baseboards (Resource ###)*
			+ A nine-minute video on installing baseboards to a high tunnel structure
			+ <https://www.youtube.com/watch?v=4vU7_vrLGSw>
		2. Attaching the Hip Boards (Resource ###)
			+ Eight-minute video from Grow Appalachia demonstrating the installation of hip boards
			+ <https://www.youtube.com/watch?v=yYzHkAlXHrM>
	2. Managing soil salinity

*Resources on managing high tunnel soil salinity can be found in Chapter 7 of this toolkit, ‘High Tunnel Soil Health*’