**Chapter 4: Building plans: Site Selection, Design, and Construction**

If you have assessed the costs and benefits of high tunnel production and decided that owning and operating a high tunnel is the best direction for you, there are several more steps to take before you can begin growing crops. Site selection is an important next step as it can strongly affect the longevity of the high tunnel structure, the amount of maintenance that will be required, as well as long-term production success.

**Orientation**

When thinking about which direction to orient your high tunnel, consider both sun and wind. Other factors to consider are sun exposure trees, existing structures, and other features that would create shade or debris that could puncture plastic or damage the structure.

**Access to electricity and water**

Although electricity is not absolutely necessary for high tunnel production, it may be useful and is essential for designs that include two plastic layers with an inflation blower. Water for irrigation of crops is necessary. Make sure you have nearby access to water and a plan for *how* to access that water.

For more *information* on irrigation, see Chapter 6.

**Soil type and drainage**

Ideally, a high tunnel should not be positioned on a slope or in a low spot where flooding or standing water is likely. Think about past weather events on your farm and where there have been issues. It may be necessary to install additional drainage to divert water.

**Type and size of high tunnel**

Will your high tunnel be stationary or moveable? How big of a high tunnel are you considering?

**Design**

The design, dimensions, and materials of your high tunnel should also be planned before construction begins. Although there are several structural options available for high tunnels, gothic-style roofs are recommended for Kentucky because of the ability to shed snow and rain. Other design considerations include:

Budget

* Knowing your budget beforehand and what you are able or willing to spend will influence many of your decisions.

Dimensions

* High tunnels come in many sizes. The width and length of your high tunnel will depend on your budget, your future production plans, and the site available on your farm.

Bow spacing

* + For Kentucky high tunnels, 4 ft bow spacing is recommended as this provides the most structural integrity and can better withstand snow loads and wind.

Structure material

* Metal vs. wood. Wood will be less expensive, but metal will last longer. Wood is subject to warping and rotting. In many cases, wooden components of the high tunnel can be replaced with metal equivalents later.

Single vs. double layer plastic

* If growing from spring through fall, a single layer of plastic is sufficient. If growing through the winter, a double layer should be considered. Electricity is needed to inflate the space between the two layers of plastic.

Ventilation

* In addition to sidewalls and end walls, other ventilation may be added such as ridge vents, butterfly end wall vents, and interior circulation fans. Not all of these may be required but should be considered based on tunnel size and crops grown.

 Roll up vs. drop down curtains

* Roll up curtains are the standard option for most tunnels but if your primary crops are grown in cold weather buffer seasons, drop down curtains may be a better option keep frost off crops.

End walls, doors, and access

* For best practice management consider width of doors based on equipment size. Choosing doors on rollers and framing materials for minimal maintenance and longevity i.e., wood vs square tubing.

Bracing

* High tunnels on sites that experience high winds and tunnel supported trellising should consider additional diagonal bracing and rafter cross ties for best practice.

Shade cloth

* Shade cloth is necessary to minimize exposure to the sun during periods of extreme heat and keeps the temperature of the tunnel cooler. Different choices are available based on the percentage of light the product blocks. Choose percentage weight based on crop grown and potential sun exposure for the specific tunnel(s) you will cover (some tunnels may already receive partial shading from trees, terrain, or nearby structures). 30% shade cloth is a versatile choice for many crops grown over the summer in Kentucky.
1. **Design and site considerations**
2. *High Tunnel Site Selection (Resource #)*
* This 4-page publication from Utah State University discusses the different factors of proper site selection.
* *https://berea.box.com/s/yvcj52wo89pcseqrmcw6mfclts6tv02l*
1. *High Tunnel System (Resource #)*
* This job sheet from NRCS provides guidance on what a high tunnel can and cannot be used for, guidance on layout and location, and practices for preparing the site for high tunnel construction. Although many aspects are applicable for most new high tunnel growers these resources are aimed at growers who received NRCS cost share.
* *https://berea.box.com/s/mots4l9vbq2i19j08bqqq9civ8qy3x1u*
1. *Moveable High Tunnels (Resource ###)*
* This publication discusses benefits and considerations of moveable tunnels as well as design details and potential crop rotations.
* [*https://www.uky.edu/ccd/sites/www.uky.edu.ccd/files/MovableHighTunnels-CCD-SP-15.pdf*](https://www.uky.edu/ccd/sites/www.uky.edu.ccd/files/MovableHighTunnels-CCD-SP-15.pdf)
1. High Tunnel Management for Beginners (Resource#)
* A YouTube video from University of Kentucky Vegetable Extension Specialist that discusses all of the above aspects can be found [here](https://www.youtube.com/watch?v=flZ2EipPsHM&t=76s).
* https://www.youtube.com/watch?v=flZ2EipPsHM&t=76s