**Introduction:**

This high tunnel tool kit was developed to provide growers with resources and foundational skills for successful high tunnel production. The information in this guide has been sourced from cooperative extension publications, published, and unpublished research, and collaborative professional experience from the following sources:

* University of Kentucky Martin-Gatton College of Agriculture, Food and Environment
* Grow Appalachia - Berea College
* Kentucky Horticulture Council
* Natural Resources Conservation Service (NRCS) of the USDA
* Kentucky farmers
* other agricultural professionals from around the state

Growing crops in high tunnels can extend the production season and result in higher quality produce. A longer growing and sales season can help growers capture premiums during times of limited availability and increase cash flow beyond traditional field production systems.

This high tunnel tool kit integrates various educational resources on a range of different topics related to high tunnels structures, production, and economics. These resources have been curated to ensure that the information contained is practical, scientifically sound, easy to use, and relevant for Kentucky high tunnel producers at various scales.

This tool kit is arranged in a tabbed format to help users find information quickly on the topics most relevant to them through the table of contents.

To navigate the tool kit, users may use one or more of the following:

* The tabs from the table of contents.
  + These are laid out in order of importance when considering high tunnel production for your farm.
  + This is the most comprehensive entry point that contains all topics within the tool kit
* High tunnel graphics that include the interior and exterior elements of a high tunnel with clickable links relating to each visual element. Navigate by clicking the element you wish to learn about which takes you to the appropriate chapter.
* A high tunnel checklist to help new producers consider the steps necessary to start and be successful with high tunnel production.

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What is a High Tunnel?

A high tunnel is a structure built for the purpose of crop protection and season extension for specialty crops like fruits and vegetables that are grown in the ground. A high tunnel typically consists of the following features:

* **Frame** - A series of bows that act as structural ribs that are connected to form a “tunnel” framework.
  + Galvanized steel is preferred for a high tunnel frame, though other types of metal or wood are also occasionally used.
* **Size** - The frame should be high enough for people to work comfortably underneath while managing crops.
  + High Tunnels are typically 12-36 feet wide. Length can vary, but they are often 48-96 feet long.
* **Covering** - Over the framework, 1 or 2 layers of UV treated greenhouse plastic film form a skin over the structure to retain heat, and shelter crops from rain and wind.
* **Crops Grown in the Ground** - In a high tunnel, crops are grown in the ground as in traditional field production. Raised beds may be added in some cases.
* **Passive Solar Heat** - High tunnels are generally heated through passive energy from the sun; however, heaters may be added for additional heat in colder months.

How High Tunnels are Different from Other Structures

High tunnels are related to other season extension and crop protection structures such as greenhouses, caterpillar tunnels, low tunnels, etc., but have key differences that should be considered when choosing which structure is best suited for your farm. Below are related systems and how they are different from a high tunnel:

* **Greenhouse** 
  + A greenhouse can use the same frame and covering as a high tunnel, or they may be covered in glass or rigid plastic panels.
  + Greenhouses are actively heated using gas, wood, or electric heaters.
    - While adding heaters is an option for high tunnels, it isn’t required.
  + Key Difference – Plants aren’t usually grown in the ground in greenhouses. They typically have a gravel, concrete, or landscape fabric floor and plants are grown in containers on the floor, on benches, or hanging from the frame.
  + Greenhouses are typically more expensive, permanent structures that are for producing seedlings (transplants) and ornamental plants. They can grow food crops but require more climate control systems and infrastructure for these crops than a high tunnel.
* **Caterpillar Tunnel/Hoop House** 
  + A caterpillar tunnel or hoop house also uses similar structural elements as a high tunnel, such as bows and plastic greenhouse sheeting.
  + Key Difference - These structures are not designed for year-round use - they aren’t as well braced as high tunnels for snow and wind, so are considered more seasonal structures and may not hold up to winter snow conditions in KY.
  + These structures can be disassembled and/or moved more easily than a high tunnel, typically lacking doors and end-walls as well as the additional bracing required by a high tunnel.
* **Low Tunnel**
  + A low tunnel uses shorter hoops to support row cover, insect netting, or specialized plastic coverings over one or more rows of a crop.
  + Key Difference – Low tunnels are too low to accommodate a person working under them, so the covering must be removed to access the crop underneath for management or harvest.
  + Low tunnels can be used inside of high tunnels to offer additional protection to a crop depending on the season and purpose.

1. **More on season extension techniques related to high tunnels**
   1. Season Extension Tools and Techniques (Resource ###)

* A five-page summary of various season extension tools and strategies for Kentucky growers with marketing and economic considerations.
* <https://ccd.uky.edu/sites/default/files/2024-12/ccd-sp-03_extension.pdf>