High Tunnel or Greenhouse?

A high tunnel is low-cost version of a regular greenhouse most people are familiar with. Another name for high tunnel is “hoophouse.” Although it is sometimes hard to tell the difference between a high tunnel and a greenhouse, a high tunnel is usually a freestanding or gutter-connected covered structure without heating or electrical power. It uses passive ventilation for air exchange and cooling and an irrigation system for crop production. A high tunnel can be as simple as only pipes or other framework covered by a single layer of greenhouse-grade 4- to 6-mil plastic. Or it may be as complicated as many greenhouses.

Because there is often no electricity in a high tunnel, there are no automated cooling or heating systems. Cooling is through roll-up sides and large open doors at both ends. With the walls and doors closed, heating is by naturally trapping solar heat during the daytime and keeping it in through the night. Although there is normally no permanent heating system, a portable heater or another method of heating is sometimes used to protect crops against low temperature extremes. Often, the only external utility connection is an irrigation line.

There are many forms of high tunnels, just as there are many forms of greenhouses. The simplest high tunnel is a single (one-bay) free standing ground-to-ground structure (Quonset-shaped). Multi-bay high tunnels with 2 or more bays have each bay sharing the side wall with the next bay. High tunnels can also be lean-tos against walls or be built into hillsides.

Use a High Tunnel To Extend the Season

High tunnels provide protection, compared to open field production. They are used mainly in temperate regions to increase temperature in early spring, fall, and sometimes winter or to moderate the fluctuation of temperatures for crop production.
More Benefits

High tunnel production is a hybrid of open field and greenhouse production. It does not require as much capital investment as greenhouse production while providing a greater level of environmental protection than field production can offer.

It offers premium pricing for off-season produce. Growers can start planting in high tunnels earlier than in the field in spring and thus have an early harvest. Crops can also keep producing under high tunnel when the temperature is too cold for field production in the fall.

It offers better quality and improved yield. In addition to extending the season, a high tunnel keeps out rain, which means less moisture on the foliage and less chance for disease. In tropical regions, high tunnels work more like a rain shelter for crop production during the rainy or monsoon seasons. High tunnels also are used as windbreaks and for storm protection. It has been reported that high tunnel yields are better than those from field production in terms quality and quantity, and this means better profit.

It reduces weed problems. In most high tunnels, crops are grown with plastic mulch and drip irrigation. Weed seed germination is reduced tremendously because there is no natural rainwater in the tunnels, greatly limiting soil moisture where crops are not grown.

When the tunnels are closed, crops are protected from birds and deer damage. Insect screens can be installed to keep out insects when the tunnel is open, further reducing potential for damage to crops.

Feasibility of High Tunnels in Mississippi

Mississippi and the central Gulf Coast states have low annual temperatures in the teens and single digits in most years. In winter, average daily high temperatures range from the upper 40s in the northern part of Mississippi to the upper 50s in southern Mississippi. Lows are mostly in the 30s and upper 20s. Temperatures can be quite variable, though, with highs in the 60s and low 70s on many days.

Combined with monthly rainfall of 3.5 to more than 5.0 inches in most places in December, January, and February, the outdoor environment does not encourage most winter vegetable crops. Some English peas and collards are grown, along with annual strawberries, faba beans, and some other minor crops. High tunnels may allow production of lettuce, herbs, and many other crops that are impossible to grow outside during a Mississippi winter.

The average high and low daily temperatures from Dec. 1, 2007 to April 21, 2008 were 62 °F and 40 °F in Starkville. But during the 143 days, 46 days had temperatures below freezing, and the latest was on April 15, 2008. Unlike northern states, where prolonged periods of cold temperatures limit growing crops in the winter, the average maximum and minimum daily temperatures in the Midsouth are suitable to grow many crops in the winter. Farmers here face the obstacle of a limited growing season often only because short spells of subfreezing temperatures during the mild winter and early spring put crops in danger.

High tunnels are a low cost technology to temper the environment and reduce the environmental and economic risks of year-round production for farmers and market gardeners in Mississippi.