Cornell University Cooperative Extension
SCNYAG South Central New York Agriculture Team
FRUIT & VEGETABLE PRODUCTION
Schuyler Tompkins Cortland Chemung Tioga

Where's the money in high tunnel production?

Molly Shaw, South Central NY Ag Team Fruit and Vegetable Specialist
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New York has a seasonal growing weather, but produce farmers want an income year round and consumers want fresh produce year round too.

Where can those three realities come together to the benefit of all? In a high tunnel! Cornell Cooperative Extension, funded in part by the NY Farm Viability Institute, has been doing high tunnel research for the last two years with the goal of figuring some of the best plant growing and management practices for crops in our NY tunnels.

High tunnels are generally described as "temporary" structures (no foundation) where plants are grown directly in the ground without extra heat or lights. Tunnels protect the plants from rain and other weather conditions and capture the sun's natural heat and light.

But contrary to popular belief, a single-layer plastic covered house looses its stored heat very quickly when the sun goes down. At night the house can actually be colder inside than outside because of radiation cooling. Consequently, growers sometimes add heat to bring plants through particularly cold nights in spring and fall. The heating system isn't permanent because high tunnels, as opposed to luxurious greenhouses, are supposed to be a cheap growing solution.

Tomatoes are one of the more profitable crops in a high tunnel, and production of early tomatoes is the quest of almost every farmer. So wouldn't it be tempting to also add a little heat inside the tunnel to get those warmth-loving tomatoes up and going sooner? Be the first at the market with home grown tomatoes?

And voila! We build a permanent in-ground hot water heating system in a "high tunnel," and the lines between a high tunnel and a greenhouse grow increasingly blurry.

The nomenclature is all semantics anyway, what we really care about is the bottom line. Does a heated high tunnel, with all the extra associated costs, make us more money than a cheaper, unheated structure?

That is precisely what we've spent the last two years trying to determine, and it's surprising how complicated that simple question becomes.

Available in the full project report (upon request) are two case studies of high tunnel tomato production budgets in 2006-7. One farm (Farm A) produces tomatoes using a typical unheated high tunnel with 4800 ft^2 of growing space. The other farm's (Farm B) 2880 ft^2 tunnel is equipped with ground and air heat that allow the grower to set out tomato plants as early as February or March.

Because Farm B has a permanent heating system in place, the tunnel has become immobile. After about 3 years of growing tomatoes in the same soil, diseases build up enough to reduce yield by 50% or more. To cope with this, Farm B uses grafted tomatoes with disease-resistant rootstock at a cost of $2.30 per plant. Farm A's tunnel, with no permanent trappings, gets picked up and moved to fresh soil every couple years to avoid the soil-born disease problems. Farm A only pays $1.00 per plant for their ungrafted seedlings.

Some economic differences between the two farms are highlighted below:

	Farm A unheated	Farm B, heated
Typical 1st yield date	early July	Mid June
last harvest date	beginning Oct	end Oct
total yield/plant	21.00 lb	14.25 lb
tunnel cost/ft2/yr	$0.32	$1.57
tunnel cost/lb yield	$0.08	$0.79
avg sale price	$0.75	$2.88

Notes of interest:
Heating the high tunnel gives the potential for earlier tomatoes by three weeks in 2006. In 2007 the heated tunnel started producing at the same time as the unheated tunnel. Several factors could have delayed yield at Farm B in 2007. Grafted plants are more vigorous and sometimes do not yield as early as ungrafted plants. In a similar way, over-fertilized tomato plants will be vegetatively vigorous, delaying the early fruit. Also, the farmer reported some scheduling glitches with the production in 2007.

Farm A had a higher per-plant yield. This may be attributable to management differences, but tomato varieties and the tunnel structures themselves (shading) were also different.

Farm A with the unheated tunnel has a cheaper growing system in place, both in terms of the fixed costs of a square foot of tunnel space and in terms of the fixed cost per pound of tomatoes yielded. If the heated tunnel's yield had been as high as the unheated tunnel, the cost of the heated tunnel space per fruit yield would still have been $0.54/lb tomato, much higher than the $0.08/lb in the unheated tunnel.

The average sale price from the two farms is vastly different, and that ***sale price was the single most important thing affecting profitability in the two tunnels*.** Farmer A sold the tomatoes primarily at a produce auction, with a few sold at his farm market, and ended up with a season long average of $0.75/lb for their tomatoes. Farm B sold their tomatoes at farmers markets and their farm stand, receiving an average price of $2.88/lb. Every day Farm B goes to a market, a major investment in labor which is spread over all their crops, including tomatoes. Conversely, selling at the auction is quicker and requires less time, but Farm A has no control over the price they receive.

The biggest lesson we learned by comparing these two budgets was this: You can grow better, and you can have a cheaper structure, but if you don't sell for a good price you're no further ahead than before.

So where's the money in high tunnel production? It's in the sales of the premium produce.