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Should Production in High Tunnels Be Part of Your Specialty Crop Enterprise?

H. Chris Wien, Miguel I. Gómez, and Bradley Rickard
Professor, Department of Horticulture,
Assistant Professors, Department of Applied Economics and Management
Cornell University

Everyone seems to be thinking about producing horticultural crops in high tunnels these days. High tunnels are inexpensive, unheated greenhouses in which the crops are planted in the ground. The structures are commonly covered by a single layer of polyethylene plastic and have rudimentary ventilation arrangements that regulate internal temperatures. High tunnels can significantly increase the length of the market season by allowing earlier planting and by protecting plants from frost in the fall. With tomatoes, for instance, one can expect to plant a month earlier and market for a month longer than for a field-grown crop. During summer, tunnels protect sensitive crops like raspberries and cut flowers from wind and rain. So high tunnels are attractive, but are they affordable?

A recent economic study conducted by Wen-fei Uva and Mei-Luan Cheng, Cornell University, and involving several New York producers using high tunnels indicates that these structures can be profitable, but it depends on the crop grown and how it is marketed. The study, sponsored by the New York Farm Viability Institute, surveyed growers of tomatoes, English cucumbers, cut flowers and raspberries, keeping track of expenses and income from crops sold for the 2006 and 2007 growing season. In addition, the growers shared information about the initial cost of the high tunnels they had erected on their farms.

The cost of building a high tunnel is often a major deciding factor in use of this technology. Among the growers surveyed, costs varied by a factor of 8, depending on the complexity of the structure and how and by whom it was constructed (Table 1). Tunnels ranged in floor area from 2,400 to 4,800 ft²; the less expensive structures were either constructed by the grower or purchased from commercial sources. Farmer B's tunnel was purchased, included an in-ground heating system, and included a more costly system for ridge ventilation, while the other tunnels were ventilated by roll-up sides.

Table 1. Initial fixed costs of materials and construction for five high tunnels in New York State, compiled in 2006.

Location and crop	Tunnel size (ft ²) and type	Fixed cost, \$/ft ²
Farm A, cucumbers	2400, welded frame	1.53
Farm A, tomatoes	4800, welded frame	1.67
Farm B, tomatoes	2880, pipe frame, gothic	11.93
Farm C, cut flowers	2880, pipe frame, gothic	3.56
Farm D, raspberries	2880, pipe frame, gothic	3.72

The costs of the structure would normally be amortized over its probable useful life. The study assumed a life span of 10 years on the tunnel skeleton and 3 years on its plastic covering. To determine income, the farmers kept track of the yields and the selling price of their commodities in each year of the study. Labor costs for crop management and harvest were also compiled. In addition to the fixed costs of the structure (Table 1), production costs, including plants, fertilizer, pest control and labor were compiled (Table 2). Income from sale of the crops could then be compared to the costs, resulting in a net income per unit high tunnel area for each of the crops (Table 2).

Table 2. Annual production cost, revenue and net income per unit area for six high tunnel-grown crops, averaged over the 2006 and 2007 growing seasons for the annuals, and over 10 years for raspberries.

Location and crop	Annual production cost, \$/ft ²	Annual revenue, \$/ft ²	Net income, \$/ft ²
Farm A, cucumbers	1.71	1.49	-0.53
Farm A, tomatoes	1.70	2.60	0.57
Farm B, tomatoes	2.34	4.66	1.44
Farm C, lisanthus	0.57	3.02	2.08
Farm C, sunflower	0.38	0.86	0.14
Farm D, raspberries ^z	1.15	3.47	1.51

^zIncome averaged over a 10-year production period

Table 2 highlights the finding that net income was very dependent on the crop grown. The cut flower crop lisianthus, which was marketed at a farmers market and to florists, was most profitable, due to a low production cost and high selling price. Cucumbers, on the other hand, lost money because production costs exceeded the selling price. It and the sunflowers only occupied the high tunnel for part of the season, but the calculations did not consider additional income in that season from successive crops. The calculations emphasize the importance of growing income-producing crops in the structure for the entire growing season. The nearly three-fold difference in net income from tomatoes is largely due to differences in marketing: tomatoes from Farm A went to a wholesale auction market; those from Farm B were sold retail at a farmers market.

When high tunnels are intended for perennial crops such as raspberries, an additional factor must be kept in mind. Raspberries will take a couple of years to produce berries, so expenses will exceed income until the third year. In spite of the lag in income production, net income from raspberries average out at \$1.51/square foot over 10 years (Table 2). For a detailed

analysis of costs and income on raspberry high tunnels, see the high tunnel raspberry and blackberry manual at:

<http://www.fruit.cornell.edu/Berries/bramblepdf/hightunnelsrasp.pdf>

So are high tunnels for you? As long as you have a good market for your product, and can meet the expectation of buyers with regard to product availability, product quality, price and level of value-added features, the answer could well be “yes”.

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