

# High Tunnel Marketing & Economics

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## Introduction

Any new technology should be analyzed from a business prospective to determine if that technology can perform in such a way as to be a good investment for the owner.

Previous research has suggested that high tunnels can increase profitability by: 1. extending the production season, 2. increasing the quality and shelf life of the product, 3. minimizing the use of pesticides, and 4. ensuring a continuous flow of product when the outside environment is not favorable for field production<sup>1</sup>.

The business person needs to determine whether adopting this technology is the best path for their business. The following questions could be considered: 1. Does this technology fit with the goals and strategy of my operation? 2. Is this technology the best path, or are there alternatives that would be a better investment of my time and energies? 3. Can I project the financial impact of this technology and will it meet my financial goals? 4. What are the critical parts of this technology i.e. those things that must be done right for this project to be a success?<sup>2</sup> 5. Can I also improve my chances for success by performing a sensitivity analysis addressing the risks that I will likely encounter such as: economic, schedule, market competitive, and regulatory, 6. Are there ways that I need to modify my management systems to improve success?, 7. How will I measure success?, 8. What assumptions am I making about yield and pricing, and is there a way to quantify and verify these assumptions?, 9. Is there someone who could review my work and verify strengths and point out weaknesses?, 10. Do you have an accountant or financial advisor who could verify the financial projections?

## Marketing

People who have survived in the horticulture business will tell you, if there isn't a market for something, don't grow it! All of your assets including your new high tunnel are liabilities until your customer shows up with his or her money and turns them into assets. If the customer does not show up, the assets remain liabilities. The analysis of the suitability of high tunnels for your operation is incomplete unless you have a good understanding of how your efforts will be received in the marketplace. Marketing tends to be the last chapter and an afterthought for producers who love the processes of production. The success of high tunnels as a sustainable part of your business will fall heavily on success in marketing. The goal of this chapter is to help you make this a successful part of your operation.

## **Grow what the market values**

The true challenge for any fruit or vegetable grower operating on a smaller scale is to find those markets that place high value on her products. Wanting a product and valuing it are different. The customer demonstrates their assessment of value by exchanging money for satisfaction. When asked directly people often underestimate what they are truly willing to pay. The value we seek is the level of satisfaction that produces an exchange that compensates the producer at a sustainable level. The producer needs to achieve a profit level that compensates them for their efforts and the risk they have assumed in production. Profit enables the producer to risk her capital on new ventures to improve quality such as high tunnels.

The key is to understand how the customer values the product. What is the value to a restaurateur to have a tomato in a salad that is more than just a piece of orange in a sea of green? What if the tomato actually caressed the palate of the customer? Would this help to create customer loyalty for the restaurateur? The more your product is a key component of your customer's offering, the greater the value it will be assigned by your customer. What is a restaurant without a good reputation and customers whose behaviors are to come back and bring their friends? Understanding and delivering this kind of value is the key part of developing a competitive product. Capturing your share of the value delivered is the key part of maintaining a sustainable business operation.

The key to wholesale customers is to focus on the value delivered to their operation. This can include more than just product quality. It can include reliability, trustworthiness, timeliness, and an ability to position oneself as a critical cog in their operation. The position to avoid is to be perceived as just another part of their cost structure. The definition of a vulnerable business relationship is one where your wholesale customer views you only as a part of his input cost structure that should be reduced as much as possible.

The possibilities for profitability of high tunnels have been stated. Capturing those profits is not a given. Can we evaluate the market and assess the demand for your products in terms of the premium people are willing to pay for the value you bring. This could be for:

1. First to market with local produce ahead of the regular season and the premium it demands. This is the premier advantage of high tunnels.
2. Higher quality produce having avoided issues associated with longer shipping times and distances – what do we mean by quality? Appearance and shipping quality have become the primary definitions of quality. Taste is lower on the priority list and is a part of high quality when it is “acceptable”. Can you differentiate your products by taste?
3. Are there crops who demand a premium because they are not readily available?
4. Are people willing to pay a premium for certified organic produce or produce produced by natural means?
5. Products priced too low raise quality questions in the mind of the customer. “This is priced to low there must be something wrong with this product!”

## ***Understanding the Customer***

The risks associated with markets can be reduced by a better understanding of you customers especially their behavior patterns. Market analysis identifies customers in two ways: who they are and what they do. The first is called demographic and might identify where people live, how old they are, and how much money they make. These are good things to know about your customers to help you formulate the best win-win deal between what they want and what you have to offer. Not every one wants or can afford a Porsche. The goal is not to convince them to buy a Porsche but to make them a Volkswagen. The Ford Motor Company gave people a sporty looking car (the Mustang) at a price they could afford. This meant forgoing the very expensive high performance components to achieve the price range people could afford.

Even more important than the demographic data is the behavioral data. How do they purchase their produce? How important is taste, presentation, location of purchase, philosophy of production? For some people one or more of these is irrelevant. For others these features are very important. The key is to identify those people who value your unique offerings.

## ***Marketing Channels***

What marketing channels would be conducive to awarding value in this manner? Understanding the customer and their motivations is the key.

Wholesale channels involve customers who are not the end product consumer such as professional chefs or restaurant owners, wholesale produce brokers, produce managers at local grocery stores, or cooperative organizations. Your product is now part of their product. How does your product impact the value that they deliver to their customers?

Retail channels involve customers who are the end product consumer but the interface point could be singularly yours through a roadside or on farm stand, a U pick operation, or through a subscription arrangement such as a Community Supported Agriculture (CSA) structure (buyer assumes some production risks?).

The challenge is to select the market channel that best fits with your goals and situation. Price sensitivities and your profit margins will vary by channel.

Quality is relative. How your quality is ranked will be a function of the quality that presently exists. This will be the reference point by which your customers determine your value. The real goal is to capture a piece of territory in the memory banks of your customers. This is more easily done by identifying your unique position in the marketplace. How can you distinguish your offering and capture memory territory? These are often defined as competitive advantages and are defined by quality, location, seasonality, organic or IPM certification, packaging, processing, or exceptional customer service. Delivering high quality at the point of sale requires an understanding of the post harvest requirements of each crop

## **Market Relationships**

The importance of customer relations cannot be overemphasized. People want quality, but quality without reliability is of little use to the wholesale buyer. If your product is a key part of their offering, they have to know that you can deliver. The last thing a chef wants is to prepare a menu and then not be able to deliver because of the lack of a key ingredient. Communication about status of supply etc. is part of the reliability factor. Such relationships are forged over time. These customers wholesale or retail are your business. They need cultivation like your plants. Establishing systematic methods of communication to wholesale and retail customers is a key to success. It keeps you aligned with their changing needs and makes sure you remain a key part of their goals be they business or personal.

## **Record Keeping**

What is your system for capturing data? It is difficult to establish a win-win business relationship if you do not know your costs and what constitutes a win for you.

Evaluate your financial tracking systems. The system needs to be simple accurate and focused on those numbers that will help you access your best and most profitable crops, horticulture methods, and market channels. With this information you can continue to eliminate inefficiencies and choose profitable pathways. Without it you are left with hunches and are flying with limited visibility. When times are great you may be able to prosper without good systems. But when times become challenging it is much more difficult. What do you think the probabilities are that you will not encounter challenging times? Reasonably priced computer and barcode systems exist that can reduce the tedium, improve accuracy, and give you good management data. It may be that food security issues will generate regulations requiring this level of data. Your customers may demand it before that depending on the regulations and legalities with which they are forced to deal.

## **Financial Analysis**

### **Cost Analysis**

### **Establishment Costs**

How are the costs associated with the establishment of high tunnels classified? Are there capital costs that will be depreciated? What part of the establishment of the tunnels can be expensed? What are the tax implications? Are there labor related costs? Are there any own or lease issues? Do you have a timeline for establishment and a finance plan that matches? (Exhibit #1)

## **Operational Budget**

Exhibit # 2 consists of a series of vegetable enterprise budgets. With these as a guideline can you develop your anticipated budget?

## **Benefit Analysis**

What kind of benefits will come from the high tunnel operation?

### Benefits from increased revenues

It is critical to define the source of value and the justification for high premiums? Will the value come from products that the market recognizes but have a higher value due to timing and quality? Will the value come from features of production that are valued by the marketplace such as organic or reduced use of pesticides? Will the products be new to the market and valued because of their scarcity?

### Benefits from reduced costs

Will the benefits of this system come from a cost reduction? This could be a reduction in the cost of input materials such as chemical pest control?

## **Sensitivity Analysis**

We have identified our anticipated costs for both the establishment and operation of the high tunnel. Using the logic we have established for capturing a premium in the marketplace, we should be able to establish a range of anticipated prices. We can use this information to perform a financial sensitivity analysis of the high tunnel project. By varying yield and price figures we can project the potential value of the project in today's dollars. We do have to assign a time value to money. Most businesses like to earn money at a greater rate than what money presently costs them (the cost of capital). This rate could vary from inflation to a higher expectation linked to the bond or equity markets. At this point it is a factor in the spreadsheet in Exhibit # 3. This spread sheet permits one to vary yields and prices and the value of money to arrive at a Net Present Value (NPV) of the high tunnel project. The example is for tomatoes but can be modified for any other crop.

**Exhibit # 1 – High Tunnel Crop Budget – Tomatoes****TUNNEL CROP BUDGET - TOMATOES**

	<u>\$/Tunnel</u>				
	(20' x 96' - 5 rows - 320 plts./tunnel)				
YIELD (lbs. per plant)	7	10	14	17	20
YIELD (lbs. per tunnel)	2,240	3,200	4,480	5,440	6,400
<b>VARIABLE COSTS</b>					
FERTILIZER	\$20	\$25	\$30	\$35	\$40
PEST CONTROL	\$25	\$25	\$25	\$25	\$25
BLACK PLASTIC MULCH	\$20	\$20	\$20	\$20	\$20
<b>IRRIGATION</b>					
DRIPLINE	\$25	\$25	\$25	\$25	\$25
DRIP IRRIGATION OPERATION	\$25	\$25	\$25	\$25	\$25
PLANT MAINT. (STAKES TWINE)	\$30	\$30	\$30	\$30	\$30
FUEL	\$10	\$10	\$10	\$10	\$10
TRANSPLANT MATERIALS	\$48	\$48	\$48	\$48	\$48
PACKAGING - BOXES (@\$1.25)	\$88	\$125	\$175	\$213	\$250
MARKETING (3% of ave. revenue)	\$50	\$75	\$100	\$150	\$200
<b>LABOR</b>					
TRANSPLANTING	\$60	\$60	\$60	\$60	\$60
TRELLIS - STAKING, TRAINING	\$100	\$100	\$100	\$100	\$100
WEEDING	\$20	\$20	\$20	\$20	\$20
VENTILATION & MONITORING	\$200	\$200	\$200	\$200	\$200
MACHINERY OPERATION	\$30	\$30	\$30	\$30	\$30
HARVEST	\$240	\$288	\$320	\$400	\$480
GRADING/PACKING	\$60	\$72	\$80	\$100	\$120
SEASONAL CLEANUP	\$50	\$50	\$50	\$50	\$50
LAND PREPARATION*	\$50	\$50	\$50	\$50	\$50
INTEREST EXPENSE	\$64	\$71	\$77	\$88	\$99
<b>TOTAL VARIABLE COSTS</b>	<b>\$1,214</b>	<b>\$1,349</b>	<b>\$1,475</b>	<b>\$1,679</b>	<b>\$1,882</b>
<b>FIXED COSTS</b>					
LAND (rent of .2 ac at \$150 per acre)	\$30	\$30	\$30	\$30	\$30
DEPRECIATION	\$700	\$700	\$700	\$700	\$700
<b>TOTAL FIXED COSTS</b>	<b>\$730</b>	<b>\$730</b>	<b>\$730</b>	<b>\$730</b>	<b>\$730</b>
<b>TOTAL COSTS</b>	<b>\$1,944</b>	<b>\$2,079</b>	<b>\$2,205</b>	<b>\$2,409</b>	<b>\$2,612</b>
<b>BREAKEVEN PRICE</b>					
32# box	\$27.77	\$20.79	\$15.75	\$14.17	\$13.06
per pound	\$0.87	\$0.65	\$0.49	\$0.44	\$0.41

**TUNNEL CROP BUDGET - TOMATOES**

## Assumptions:

Planting rate - 64 plants per 96 ft		
Tunnel dimensions: 96' by 20'		Var.
96 ft x 20 x 5 rows = 320 plants per tunnel	Yield	Exp.
Yield at 7 lbs. per plant =	2,240	\$1,214
Yield at 10 lbs. per plant =	3,200	\$1,349
Yield at 14 lbs. per plant =	4,480	\$1,475
Yield at 17 lbs. per plant =	5,440	\$1,679
Yield at 20 lbs. per plant =	6,400	\$1,882
Land area = 1.2 x area of tunnel		
Interest expense = 7% loan 9 month term on: variable expenses		

\* assigned a land preparation charge in lieu of machinery and equipment expenses

**Exhibit # 3 - Sensitivity Analysis****HIGH TUNNEL PRODUCTION SYSTEM - SENSITIVITY ANALYSIS****Yield Cost Breakeven**

YIELD (lbs. per plant)	7	10	14	17	20
YIELD (lbs. per tunnel)	2,240	3,200	4,480	5,440	6,400
TOTAL VARIABLE COSTS	\$1,214	\$1,349	\$1,475	\$1,679	\$1,882
TOTAL FIXED COSTS	\$730	\$730	\$730	\$730	\$730
TOTAL COSTS	\$1,944	\$2,079	\$2,205	\$2,409	\$2,612
BREAKEVEN PRICE					
32# box	\$27.39	\$20.15	\$15.03	\$13.19	\$11.90
per pound	\$0.86	\$0.63	\$0.47	\$0.41	\$0.37

**Price Yield  
Matrix**REVENUE ASSUMPTIONS:  
TOMATOES

	<u>Yield</u>	<u>Yield</u>	<u>Price (lb.)</u>					
	<u>lbs./plant</u>	<u>lbs./tunnel</u>	<u>\$0.75</u>	<u>\$1.00</u>	<u>\$1.25</u>	<u>\$1.50</u>	<u>\$1.75</u>	<u>\$2.00</u>
	<u>7</u>	<u>2240</u>	1,680	2,240	2,800	3,360	3,920	4,480
	<u>10</u>	<u>3200</u>	2,400	3,200	4,000	4,800	5,600	6,400
	<u>14</u>	<u>4480</u>	3,360	4,480	5,600	6,720	7,840	8,960
	<u>17</u>	<u>5440</u>	4,080	5,440	6,800	8,160	9,520	10,880
	<u>20</u>	<u>6400</u>	4,800	6,400	8,000	9,600	11,200	12,800



**HIGH TUNNEL PRODUCTION SYSTEM - SENSITIVITY ANALYSIS**

Profitability Scenarios ( 5 year life expectancy of tunnel)

YEAR	<u>Scenario # 1 - Low Price Low Yield</u>					
	<u>0</u>	<u>1</u>	<u>2</u>	<u>3</u>	<u>4</u>	<u>5</u>
AVERAGE YIELD (lbs. per tunnel)		2240	2240	2240	2240	2240
AVERAGE PRICE (per pound)		\$1.00	\$1.00	\$1.00	\$1.00	\$1.00
REVENUES		\$2,240	\$2,240	\$2,240	\$2,240	\$2,240
EXPENSES		\$1,944	\$1,944	\$1,944	\$1,944	\$1,944
PROFIT / CASH FLOW	\$ (3,500)	\$ 296	\$ 296	\$ 296	\$ 296	\$ 296
PV OF CASH FLOW @ 10 %	\$ (3,500)	269	245	222	202	184
NPV @ 10 %	\$ 1,122					
	\$ (2,378)					

Scenario # 2 - Medium Price Medium Yield

YEAR	<u>YEAR</u>					
	<u>0</u>	<u>1</u>	<u>2</u>	<u>3</u>	<u>4</u>	<u>5</u>
AVERAGE YIELD (lbs. per tunnel)		4480	4480	4480	4480	4480
AVERAGE PRICE (per pound)		\$1.25	\$1.25	\$1.25	\$1.25	\$1.25
REVENUES		\$5,600	\$5,600	\$5,600	\$5,600	\$5,600
EXPENSES		\$2,205	\$2,205	\$2,205	\$2,205	\$2,205
PROFIT / CASH FLOW	\$ (3,500)	\$ 3,395	\$ 3,395	\$ 3,395	\$ 3,395	\$ 3,395
PV OF CASH FLOW @ 10 %	\$ (3,500)	3,086	2,806	2,551	2,319	2,108
NPV @ 10 %	\$ 12,870					
	\$ 9,370					

Scenario # 3 - High Price High Yield

YEAR	<u>YEAR</u>					
	<u>0</u>	<u>1</u>	<u>2</u>	<u>3</u>	<u>4</u>	<u>5</u>
AVERAGE YIELD (lbs. per tunnel)		6400	6400	6400	6400	6400
AVERAGE PRICE (per pound)		\$2.00	\$2.00	\$2.00	\$2.00	\$2.00
REVENUES		\$12,800	\$12,800	\$12,800	\$12,800	\$12,800
EXPENSES		\$2,205	\$2,205	\$2,205	\$2,205	\$2,205
PROFIT / CASH FLOW	\$ (3,500)	\$ 10,595	\$ 10,595	\$ 10,595	\$ 10,595	\$ 10,595
PV OF CASH FLOW @ 10 %	\$ (3,500)	9,632	8,756	7,960	7,237	6,579
NPV @ 10 %	\$ 40,163					
	\$ 36,663					

## References

1. High Tunnel Production Manual, Department of Horticulture, Pennsylvania State University
2. Gregory, Patrick J., Maximum Return – The Ultimate On-Time, On-Budget, Results-Driven Project Planning Guide, Living Spirit Press, 2003.