

## Economics of High Tunnel Production



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Ten Hens Farm

## Background and Experiences



## Where are We Headed?

Crop :	ARUGULA	No Depreciation	4 year Depreciation
Revenue	\$820	\$820	\$820
Costs	\$168	\$168	\$168
Selling Costs	\$141	\$141	\$141
Depreciation	0	\$108	\$108
Net Income	\$511	\$403	\$403
Profit/ft2 (528 ft2)	\$0.96	\$0.76	\$0.76
Profit/ft2/day (102 Days)	\$0.009	\$0.007	\$0.007
Return to Labor (10 hrs)	\$51.10	\$40.03	\$40.03
Yield/ft2	0.20 lbs/ft2	0.20 lbs/ft2	0.20 lbs/ft2
Sales Efficiency	100%	100%	100%

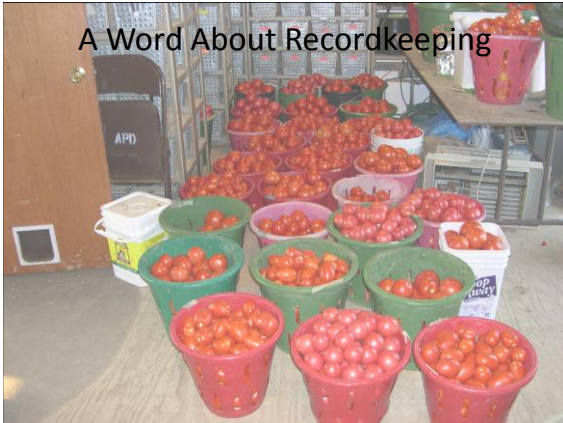
## Outline for Today

- Why This Matters
- Recordkeeping
- Economic Concepts
- Revenue, Costs, and Profit
- Determining Prices
- Return to Labor and Employee Wages
- Beyond \$/Area
- Income Projections
- Questions

## Why Does This Matter?

- Overall Profitability
- Individual Crop Profitability
- Production Volumes
- Market Decisions
- Pricing and Income Projections
- Return to Our Labor
- When to/If to hire (additional) employees

## A Word About Recordkeeping



## Economic Concepts

- Gross Sales (Revenue)
- Net (Profit)
- Costs – Materials and Labor
  - Direct and Indirect
  - Selling Costs
- Sales Efficiency
- Depreciation
- Wages
  - Paid and Unpaid
  - Direct, Overhead, and Selling

## Determining Prices

- ▣ What other farmers charge
- ▣ Grocery store/terminal market prices
- ▣ Cost of production + %
- ▣ What you would pay
- ▣ What you would like to make

## Setting Goal

- ▣ \$20,000 gross in 2000 ft<sup>2</sup> (\$436,600/A)
- ▣ 5 Beds (Make \$4000/bed/yr)
- ▣ 3 crops/yr = \$1,333/crop
- ▣ 4 crops/yr = \$1,000/crop



### Making Money

Carrots:

Bed: 352 ft<sup>2</sup>(4 ft x 88 ft)  
 Spacing: 4" X 2"  
 6/ft X 88 ft = 528 carrots/row  
 528 X 12 rows = 6,336  
 X 0.80 = 5069 carrots  
 5069/10 = 507 bunches  
 \$1,000/507 = \$1.97/bunch  
 \$1,333/507 = \$2.62/bunch

### Making Money

Baby Salad:

Bed: 352 ft<sup>2</sup>  
 Yield: 1 lb/ 6ft<sup>2</sup> (or 0.15 ft<sup>2</sup>)  
 /6 = 58 lbs  
 X 3 cuttings = 176 lbs (0.50/ft<sup>2</sup>)  
 X 0.90 = 158 lbs  
 \$1,000/158 = \$6.32/lb  
 \$1,333/ = \$7.57/lb

### Making Money

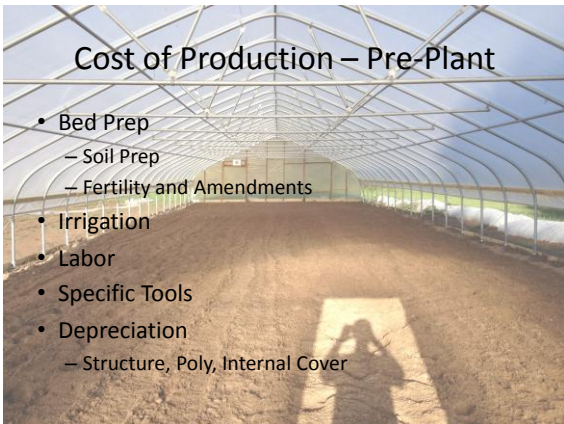
Tomatoes:

Bed: 352 ft<sup>2</sup> (4 X 88 ft)  
 Spacing: 2 rows @ 24" = 88 plants  
 12 lbs/plant (very conservative yield)  
 12lbs X 88 plants = 1,056 lbs  
 \$1,000/1,056 = \$0.95/lb  
 \$1,333/1,056 = \$1.26/lb

### Making Money

Carrots: 507 Bunches X \$3/bunch = \$1,521  
 Baby Salad: 176 lbs X \$8/lb = \$1,408  
 Tomatoes: 1,056 lbs X \$2.50/lb = \$2,640  
 Total: \$5,569 (Goal = \$4,000)  
 What about costs?  
 @50% net = \$2,784.50  
 X 5 beds = \$13,992.50/House

### Cost of Production – Pre-Plant



- Bed Prep
  - Soil Prep
  - Fertility and Amendments
- Irrigation
- Labor
- Specific Tools
- Depreciation
  - Structure, Poly, Internal Cover

### Cost of Production – Pre-Plant

- Bed Prep (For 1 bed at 88ft X 4ft)
- Labor assumed at \$10/hr

Activity	Time or Amount	Cost
Tilling (Walk-behind)	20 Minutes	\$3.33
Blood Meal	4lbs	\$4.80
Potassium Sulfate	4 lbs	\$5.36
Mileage for Blood Meal	30 Miles (@ \$0.55/mile)	\$1.32 (\$0.33/lb)
Compost	0.30 yds <sup>3</sup> (@\$20/yd <sup>3</sup> )	\$6
Labor –Amendments and Compost	45 minutes	\$7.50
<b>Total Cost</b>		<b>\$28.31</b>

## Cost of Production – Pre-Plant

- Irrigation (1 Bed)

Activity	Time or Amount	Cost
Labor for Drip Set Up	30 minutes	\$5
Hoses	\$60 total/3 houses	\$4
Barbs	\$2 each	\$8
Drip Tape	4 runs @ 90 ft	\$2.40
<b>Total Cost</b>		<b>\$19.40</b>



## Cost of Production – Pre-plant

- Internal Cover (1 Tunnel)

Category	Price
Row Cover (AG-19)	\$70
Wire Strainers	\$12 (4 @ \$3)
High Tensile Wire	\$12
Labor	\$15 (\$10/hr at 1.5 hrs)
<b>Total</b>	<b>\$109 (\$0.06/ft2 or \$21.80/bed)</b>

## Cost of Production Per 4 ft X 88 ft Bed – Arugula Pre-Plant Summary

Category	Cost
Bed Prep and Fertility	\$28.31
Irrigation	\$19.40
Internal Covering	\$21.80
<b>Total Cost/Bed</b>	<b>\$69.51</b>
<b>Total Cost/Ft2 (in production)</b>	<b>\$0.20</b>

## Cost of Production – Pre-Plant

- Depreciation (4 Tunnels – 3 @ 30 X 96, 1 @ 30 X 48)

Activity	Time or Amount	Cost
Frames and Endwalls(Used)	10,080 ft2	\$4000
Ground Posts	172 posts plus shipping	\$3,117.74
Additional Materials	Roll-ups, lumber, etc.	\$4,368.18
Labor	Flat Rate	\$2,500
<b>Total Cost</b>		<b>\$13,985.92 (\$1.39/ft2)</b>

## Cost of Production – Pre-Plant

- Depreciation – 4 yrs (length of loan)
  - Economic vs. Tax Depreciation?
- $\$13,985.92 / 4 \text{ yrs} = \$3,496.48$  per year (for all ft2)
- Production Space Only = 5,280 ft2 (1,760 ft2/tunnel)
  - $\$3,496.48 / 5280 \text{ft}^2 = \$0.66/\text{ft}^2/\text{yr}$  ( $\$0.002/\text{ft}^2/\text{day}$ )
- $\$0.002 \times 528 \text{ ft}^2$  (planted area)  $\times 102$  days =  $\$107.71$

### Cost of Production – Planting

- Arugula
  - 8 Rows at 132ft (1.5 beds) – 528 ft2
  - Approximately 12 seeds/ft = 12,672 seeds per row
  - X 8 = ~100,000 seeds
  - @ 14,600/oz
  - ½ lb = 116,800 seeds @ \$20 = \$17.12 in seed
  - @ 10 minutes to seed = \$1.67 in labor
  - Total Cost for seeding = **\$18.79**

### Cost of Production – Arugula Thru Planting With Depreciation

Category	Cost
Bed Prep and Fertility	\$28.31
Irrigation	\$19.40
Internal Covering	\$21.80
Total Cost/Bed	\$69.51
Total Seed for 1.5 beds	\$18.79
Total Cost for 1.5 beds (528 ft2)	\$123.06
Depreciation	\$107.71
Total Cost for 1.5 Beds w/Depreciation	\$230.77

### Yields and Sales (Actual from Fall 2012)

Crop	Area (ft2)/Market	Lbs	Yield/ft2 (Lbs)/Price
Arugula	528	105.5	0.20
Arugula	Restaurant	94	\$7.50/\$705
Arugula	Farmers Market	11.5	\$10/\$115

Yields are lower than previous experience due to later planting date (September 21) only producing around 1.5 on cut-and-come-again arugula



### Additional Costs – Weeding, Harvesting, and Packing Direct Labor and Materials

Category	Hours	Total \$ (@ \$10/hr)
Weeding	0.5	\$5
Harvesting	2.7	\$27
Packing	1.3	\$13
Total	4.5	\$45

### Additional Costs – Mileage and Delivery or Market Labor

Date	Mileage	Mileage \$	Hrs	Hrs Cost	# of Items	Total \$	\$/Item
11/5/12	61	\$33.85	2	\$20	6	\$53.85	\$8.98

Market	Mileage and Labor
Farmers Market	\$36.13
Restaurants	\$101.96
Total	\$138.09

Category	Cost	Total
Bags	24 @ \$0.09	\$2.16
Bags	35 @ \$0.03	\$1.05
Total		\$3.21
Total Selling Costs		\$141.30

### What Now?

Crop :	ARUGULA	No Depreciation	4 year Depreciation
Revenue		\$820	\$820
Costs		\$168	\$168
Selling Costs		\$141	\$141
Depreciation		0	\$108
Net Income		\$511	\$403
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### Beyond \$/Area – Why Days Matter?

Crop :	ARUGULA	Fall 2012 (4 yr depreciation)	Spring 2013 (Estimates)
Revenue		\$820	\$1845 (@ 90%)
Costs		\$168	\$278 (+3 hrs weeding, +8 hrs harvesting and packing)
Selling Costs		\$141	\$150
Depreciation		\$108 (102 days)	\$52 (49 days)
Net Income		\$403	\$1446
Profit/ft2 (528 ft2)		\$0.76	\$2.74
Profit/ft2/day		\$0.007 (102 days)	\$0.056 (49 days)
Return to Labor		\$40.03 (10 hrs)	\$68.86 (21hrs)
Yield/ft2		0.20 lbs/ft2	0.50/ft2
Sales Efficiency		100%	90%
Net/Gross		50%	78%

### Determining Prices

Crop :	ARUGULA	Fall 2012 (4 yr depreciation)	Spring 2013 (Estimates)
Revenue		\$820	\$1845 (@ 90%)
Net Income		\$403	\$1446
Yield/ft2		0.20 lbs/ft2	0.50/ft2

Crop :	ARUGULA	Revenue (105.5 lbs)	Net (if costs are same as 4 yr)
\$4.00		\$422	\$5
\$6.00		\$633	\$216
\$8.00		\$844	\$427
\$10.00		\$1,055	\$638

### Return to Labor/ What Can I Pay Someone?

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