

MSU Department of Horticulture and Center for Regional Food Systems Ten Hens Farm

Why Farm in the Winter?

- Increased Farm Sales
- Decreased Labor
 - Weeds
 - Insects
- Management
- Increased Value
- Decreased Local Supply
- It's ok to NOT farm in the winter too!

Marketing Options

- Farmers Markets
- On-Farm
- CSA
- Food Hub
- Schools, Pre-K, Institutional
- Wholesale
- Web-based/Email
- * Where/How You Market Determines Crop Mix















Crop Selection

- Varied Crop Mix
- High Quality
- Consumer Preference
- Uniqueness (to a point)

Botanically





Edible Portion



Combining All Three

- Botanical-For Rotation Planning
- Edible-For Crop Mix Planning
- Environmental-For Time of Planting







Crop Selection Categories

- Warm Season
- Cool Season
 Small Fruit
- Culinary Herbs
- Tree Fruit

Cut Flowers

New or Niche Crops

Warm Season Criteria

- High Temperature Tolerance
- Regular harvesting
- Transplant Production
- Pollination?
- Trellising and Other Supports



Warm Season Crop Spacing

| Crop and Planting Dates | Rows/4 ft bed | In row (ft) | Between Row (ft) |
|--|---------------|-------------|------------------|
| Peppers (April 15-May 15) | 2 | 1.5 | 2 |
| Basil (May 1-15) | 3 | 1 | 2 |
| Tomatoes (April 15-May 15) | 2 | 2 | 2 |
| Eggplant (May 1-May15) | 2 | 1.5-2 | 2 |
| Cucumbers (May 1-May 15) | 2 | 1 | 2 |
| Zucchini/S. Squash (April 15-May 1) | 1 | 2-3 | N/A |





Cool Season Criteria

- Low Temperature Tolerance
- Thawing and Freezing Tolerance
- Multiple Harvests
- Direct Seeding and Transplant Production
- Disease Resistance When Cool and Moist

Interior Considerations Inside Tent





Cool Season Categories

- Leafy/Cooking Greens
- Heading Greens
- Root Crops
- Baby Leaf Salad Greens







| Cool Season Crop Spacings (Varies by farm and experience) | | | | | |
|--|-----------------------|-------|-------|-------|--|
| Crop Planting Date Rows/4 ft bed In row (inches) Between Row (Inches) (Inches) | | | | | |
| Large Leafy Greens | 2/15-3/1 8/1-9/11 | 4 | 12 | 12 | |
| Spinach | 2/14-3/1 8/15-9/15 | 4-8 | 6-12 | 6-12 | |
| Heading Greens | 3/1-3/15 8/15-9/1 | 4-5 | 10-12 | 12 | |
| Carrots | 3/1 7/15-8/1 | 6-12 | 6-12 | 4-8 | |
| Beets | 3/1 8/15 | 4-8 | 4-8 | 6-12 | |
| Turnips | 3/1 9/15 | 6-10 | 6-10 | 4-8 | |
| Radish | 3/1 9/15-10/1 | 10-18 | 10-18 | 2.5-4 | |





Grouping Baby Salad Greens • Fast Group • Moderate/+Quality - Red Russian Kale - Bull's Blood Beet - Mizuna - Spinach - Arugula - Chinese cabbage (TB) - Red Giant Mustard - Sorrel • Slow Group - State (Complexity)

- Lettuce (- Cold Tolerant)
 Aruba, Integrata Red
 Mache
- Claytonia

Baby Salad Spacing

- Planting Dates:
 - Early 3/1
 - Latest 9/15-10/15
- As close as:
- 2.5 inches between row
- 0.25 inch in row
- As far as:
- 6 inches between row
- -1 inch in row







Cut Flower Considerations

- Stem Length
- Vernalization Requirements (Perennials?)
- Trellising
- Transplant Production
- Market



Additional Crops

- Ginger
- Early Strawberries
- Sweet Potatoes

Intercropping/Relay Planting



Crop Selection and Scheduling Summary

• Balanced Crop Mix is a Necessity

- Crop Mix Determined by Plant Characteristics
- Depends Upon Labor, Market, and Experience
- Three planting times: Feb-Mar (Cool), April-
- May (Warm), July-October (Cool)
- Keep that space full!

Hoophouse Economics: Why Does This Matter? • Overall Profitability • Individual Crop Profitability • Production Volumes • Market Decisions • Pricing and Income Projections • Return to Labor • When to/If to hire (additional) employees





What to track?

• Yields

- Labor (by activity if you want)
- Gross Sales (by crop or total)
- Total Expenses (by crop or total)
- Marketing Expenses (fees, mileage, bags, time)
- Planting and Removal Dates

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

Pricing Approaches

- What other farmers charge
- Grocery or Terminal Prices
- Cost of Production plus %
- What you would pay
- What you would like to make

Setting Goals

• \$20,000 gross in 2,000 ft2

• 5 beds (\$4,000/bed/yr)

• 3 crops/yr = \$1,333/crop

• 4 crops/yr = \$1,000/crop

Making Money

Carrots: Bed ~ 352 ft2(4 ft x 88 ft) Spacing: $4^{n} X 2^{n}$ 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 ft2 Yield: 1 lb/ 6ft2 352/6 = 58 lbs X 3 cuttings = 176 lbs X 0.80 = 141 lbs \$1,000/141 = \$7.09/lb\$1,333/141 = \$9.45/lb

Making Money

Tomatoes:

Bed ~ 352 ft2 Spacing: 2 rows @ 24" = 88 plants 12 lbs/plant (lower end of yields) 12 lbs X 88 plants = 1,056 lbs \$1,000/1,056 lbs= \$0.94/lb \$1,333/1,056 lbs = \$1.26/lb

Making Money

Carrots: 507 Bunches X \$3/bunch = \$1,521 Baby Salad: 141 lbs X \$8/lb = \$1,128 Tomatoes: 1,056 lbs X \$2.50/lb = \$2,640 Total: \$5,289 (Goal = \$4,000)



| 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 yds3 (@\$20/ yd3) | \$6 | |
| Labor – Amendments and Compost | 45 minutes | \$7.50 | |
| Total Cost | | \$28.31 | |

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 |
| Total Cost | | \$19.40 |



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) |
| Total | \$109 (\$0.06/ft2 or \$21.80/bed) |

| Co | 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 | | |
| | Total Cost/Bed | \$69.51 | | |
| | Total Cost/Ft2 (in production) | \$0.20 | | |

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 |
| Total Cost | | \$13,985.92 (\$1.39/ft2) |

Cost of Production – Pre-Plant • Depreciation – 4 yrs (length of loan) – Economic (Not Tax) Depreciation

- \$13,985.92/4 yrs = \$3,496.48 per year (for all ft2)
- Production Space Only = 5,280 ft2 (1,760 ft2/ tunnel)

 \$3,496.48/5280ft2 = \$0.66/ft2/yr (\$0.002/ft2/day)
- \$0.002 X 528 ft2 (planted area) X 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
- $-X8 = \sim 100,000$ seeds
- @ 14,600/oz
- $-\frac{1}{2}$ 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 | h |

| 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) | |
| | |

| Сгор | 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 cuts



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 | Milea \$ | ge Hi | rs H C | rs ost | # o Ite | of ems | Total \$ | \$/Item |
| 11/5/12 | 61 | \$33.85 | 2 | \$: | 20 | 6 | | \$53.85 | \$8.98 |
| | | | | | Mileage and Labor | | | | |
| | Farn | | aers Market | | \$36.13 | | | | |
| | Resta | | aurants | | \$101.96 | | | | |
| | | Total | al \$138.09 | | | | | | |
| Cate | gory | | Cost | | | ŀ | Total | | |
| Bags | | | 24 @ \$0.09 | | | \$2.16 | | | |
| Bags | Bags | | 35@\$0.03 | | \$1.05 | | \$1.05 | | |
| Tota | 1 | | | | | | \$3.21 | | |
| Tota | l Selling Cost | s | | | | | \$141.3 | 0 | |
| | | | | | | | | | |

| Crop : ARU | GULA No l | Depreciation | 4 year Depreciation |
|-----------------------------|-----------|--------------|---------------------|
| Revenue | \$820 |) | \$820 |
| Costs | \$168 | | \$168 |
| Selling Costs | \$141 | | \$141 |
| Depreciation | 0 | | \$108 |
| Net Income | \$511 | | \$403 |
| Profit/ft2 (528 ft | 2) \$0.9 | 6 | \$0.76 |
| Profit/ft2/day (10 Days) | \$0.0 | 09 | \$0.007 |
| Return to Labor hrs) | 10 \$51. | 10 | \$40.03 |
| Yield/ft2 | 0.20 | lbs/ft2 | 0.20 lbs/ft2 |
| Sales Efficiency | 1009 | 6 | 100% |

| 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 | | | | |
| Profit/ft2 (528 ft2) | \$0.96 | \$0.76 | | | | |
| Profit/ft2/day (102 Days) | \$0.009 | \$0.007 | | | | |
| Return to Labor (10 hrs) | \$51.10 | \$40.03 | | | | |
| Yield/ft2 | 0.20 lbs/ft2 | 0.20 lbs/ft2 | | | | |
| Sales Efficiency | 100% | 100% | | | | |

| Determining Prices | | | | | | |
|---|--|--------------------------|-------------------------------------|--|--|--|
| Crop : ARUGUI | А | With 4 Year Depreciation | | | | |
| Revenue | | \$820 | \$820 | | | |
| Net Income | | \$403 | | | | |
| Yield/ft2 | | 0.20 lbs/ft2 | 0.20 lbs/ft2 | | | |
| | | | | | | |
| | | | | | | |
| Crop : ARUGULA | Gros | ss Revenue 05.5 lbs) | Net Income | | | |
| Crop : ARUGULA \$4.00 | Gros (1) \$422 | ss Revenue 05.5 lbs) | Net Income \$5 | | | |
| Crop : ARUGULA \$4.00 \$6.00 | Gros (1) \$422 \$633 | ss Revenue 05.5 lbs) | Net Income \$5 \$216 | | | |
| Crop : ARUGULA \$4.00 \$6.00 \$8.00 | Gros (1) \$422 \$633 \$844 | ss Revenue 05.5 lbs) | Net Income \$5 \$216 \$427 | | | |

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

| | Salad Mix | Tomatoes |
|-------------|--------------------------|--------------------------|
| Yield | 141 lbs | 1056 lbs |
| Price | \$8 | \$2.50 |
| Gross Sales | \$1,128 | \$2,640 |
| \$/ft2 | \$3.20 | \$7.50 (2.35X higher) |
| Days in Bed | 48 | 180 |
| \$/ft2/day | \$0.067 (1.5X higher) | \$0.042 |



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