

Enterprise Budget for Cherry Tomatoes

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Cooperators:

- Ann Franzenburg - Van Horne
- Emma Johnson - Central City

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In a Nutshell

- Two farmers provided enterprise budgets for cherry tomato production in 2017.
- Cherry tomatoes were grown in a heated greenhouse (Ann Franzenburg), and an unheated high tunnel (Emma Johnson).
- Revenue and expenses, including a breakdown of labor, was reported by each farmer.

Key Findings

- Labor was the largest expense for both Franzenburg and Johnson, accounting for 62% and 68% of their total expenses, respectively.
- Harvesting and packing was the most time-consuming task on both farms, accounting for 74% of labor-hours at Franzenburg and 62% of labor-hours at Johnson.
- Both farms had profitable cherry tomato crops, netting \$1.31/lb at Franzenburg and \$1.54/lb at Johnson.

Project Timeline:

March 2017 - November 2017

Background

In past years, Practical Farmers' research cooperators have done enterprise budgets in high tunnels (Worley et al., 2011, 2012). In 2015, three farmers – Ann Franzenburg, Emma Johnson, and Jan Libbey – began tracking their enterprise budgets for cucumbers in the greenhouse, high tunnel and field. They collected and reported expense and revenue data for 2015 and 2016, producing two years of research reports on cucumber enterprise budgets



Cherry tomatoes at Johnson.

(Kolbe et al., 2015; Kolbe et al., 2016). They found the results were useful to their bottom line and improved farmer-to-farmer conversations about production and marketing. Mostly, it helped them focus on finding and discussing labor inefficiencies.

Franzenburg and Johnson identified the next target crop as cherry tomatoes – a popular item at markets, but another one with high labor costs.

University extension programs also offer enterprise budgets examples for tomatoes, but not many for cherry tomatoes. Iowa State University's Chase and Naeve (2013) provide a high tunnel budget example with slicer tomatoes, breaking down expenses and labor, showing a net income of \$3.14/ft². A 2007 case study between the University of Vermont and Intervale Community Farm showed a net return of \$2.11/ft²;

again, for red slicers (University of Vermont Extension, 2007.)

While these studies are valuable, producers in the present study still had questions about the differences in their variety choices and management decisions, and how those variations by farm impacted the bottom line. Farmers also question the high net returns shown in some university studies. The breakdown of labor by task in this study – for high tunnel and greenhouse – is of particular interest.

Objectives:

1. Determine differences in enterprise budgets for cherry tomato in the greenhouse and high tunnel at two farms.
2. Determine differences in labor efficiency for various tasks.

Methods

Each farm planted and managed cherry tomatoes according to their own timing, markets and preferred practices. Data collected from each farm was standardized to provide insight into cost and labor efficiency at each farm. Planting and management details can be found in **Table 1**. Both farmers tracked data on cherry tomatoes raised in structures, which are trellised to maximize space and lengthen the harvest window. Both growers used drip irrigation.

At Pheasant Run Farm near Van Horne in Benton County, Ann Franzenburg trellised cherry tomatoes in her heated greenhouse with orange twine and plastic vine clips. She grows Sun Gold cherry tomatoes; a tangerine-orange colored F1-hybrid, noted for their sweet flavor. Johnny's Seeds highlights them as an "easy choice," especially for local markets (Johnny's Seeds, 2017). Ann sells primarily to grocery and other retail stores.

Emma Johnson at Buffalo Ridge Orchard near Central City in Linn County grew four varieties of cherry tomatoes in an unheated, moveable high tunnel. Her varieties were: Black Cherry – a round, dark purple variety; Esterina – an F1-hybrid yellow-gold variety; Sakura – an F1-hybrid early red; and Sunpeach – an F1-hybrid pink fruit, which is a sister to Sun Gold (Johnny's Seeds, 2017). Johnson trellised using nylon mesh and tomato clips. Johnson marketed cherry tomatoes through farmers market and institutional accounts, and distributed them in the farm's CSA boxes.

Results and Discussion

Growing degree day information for both farms is available in **Table 2**. Weather in 2017 was acceptable for tomato production, though May and August were cooler than normal. Because the crops were indoors with drip irrigation, precipitation is not a factor in production.

Table 1

Production Practices for Cherry Tomatoes, 2017		
Farm	Ann Franzenburg (Pheasant Run Farm)	Emma Johnson (Buffalo Ridge Orchard)
Structure and protection	Heated Greenhouse	Moveable high tunnel (unheated)
Production Area (ft²)	1,080	700
Planting	Seeded trays Jan. 17; transplanted to greenhouse March 15	Seeded peat pods Feb. 25; transplanted to HT April 25
Within row spacing	Staggered double row, 12 in. btwn row, 24 in. in-row	24 in.
Irrigation	Drip	Drip
Variety	Sun Gold	Sakura, Black Cherry, Esterina, Sunpeach
Trellis	Plastic vine clips on string from purlins.	Plastic vine clips on nylon netting from purlins
Harvest Window	18 weeks; June 26 – Oct. 27	12 weeks; July 19 – Oct. 9

Table 2

Monthly Growing Degree Days (base 50°F) for the period March 2017 – Oct. 2017 and the long-term averages.

Month	2017 GDD	Avg. GDD
March	69	69
April	217	210
May	331	417
June	613	616
July	734	741
Aug.	563	690
Sept.	513	489
Oct.	513	489

Climate data were accessed from the Iowa City (120 years) weather stations (Iowa Environmental Mesonet, 2017).

GDD values in bold indicate that the 2017 value was more than one standard deviation from the historical average.



Brianna planting Sun Gold in the greenhouse with Tigger at Pheasant Run Farm (Franzenburg).

Enterprise Budgets for Cherry Tomato Production

Net Income

Revenue, costs and net income were analyzed three ways: per pound sold, per pint sold and per square-foot in production. As seen in **Figure 1**, cherry tomatoes were profitable for both farms, and Johnson earned more net income per pound, per pint and per square-foot compared to Franzenburg. The two farms were similar in their net income per pound, with Johnson netting \$1.54/lb compared to Franzenburg's \$1.31/lb. This ratio is the same as per pint, as both farms assume pints weigh 0.75 lb. Per square-foot, there was a larger difference in net income. Johnson earned \$2.64/ft², while Franzenburg netted \$1.14/ft².

Yield and Revenue

Looking at the enterprise budgets in **Table 3**, differences in yield and expense categories begin to emerge. Johnson harvested nearly twice as much fruit per square-foot (1.71 lb/ft²) as Franzenburg (0.87 lb/ft²), despite harvesting for six fewer weeks than Franzenburg. Johnson thought this yield difference could be due in part to differences in fruit size; Sun Gold is a smaller variety, about 15-20 g per fruit. Sakura, which was over half of Johnson's crop, is 20-22 g/fruit. Taken at the extremes, the difference in fruit size is 30%.

Franzenburg's overall revenue was higher per pound and per pint; she averaged \$2.81/pt in revenue compared to \$1.98/pt for Johnson (**Table 3**). Johnson noted the difference in revenue per unit received between the farms, and the difference was likely related to their markets. "We sell some cherry tomatoes at farmers market," she said, "but we grow them for wholesale and we sell them to wholesale, which is why our price is so low."



Emma Johnson preparing to weigh cherry tomatoes.

Figure 1

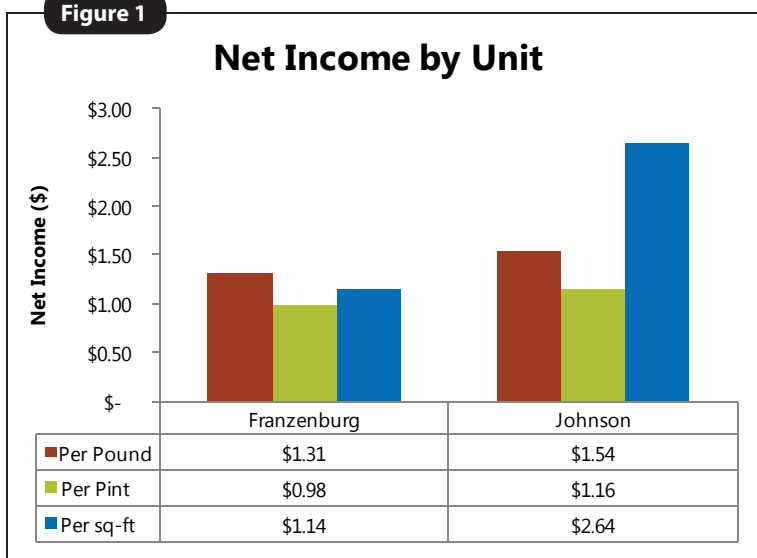


Figure 1: Net income (gross revenue – total costs) calculated per pound, per pint, and per ft².

Table 3

Cherry Tomato Enterprise Budget		
	Franzenburg	Johnson
Marketable Harvest (lb)	941	1,200
Marketable Harvest (pint)	1,255	1,600
Marketable lb/ft ²	0.87	1.71
Marketable pint/ft ²	1.16	2.29
GROSS REVENUE		
GROSS REVENUE	\$3,524.10	\$3,160.00
Revenue per lb	\$3.74	\$2.63
Revenue per pint	\$2.81	\$1.98
Revenue per ft ²	\$3.26	\$4.51
Transplant Supply Costs		
Transplant Supply Costs	\$12.70	\$63.78
In-field Supply Costs		
In-field Supply Costs	\$202.95	\$231.50
Marketing Cost		
Marketing Cost	\$424.00	\$38.70
Machinery Cost		
Machinery Cost	-	\$6.75
Building/Structure Cost		
Building/Structure Cost	\$236.63	\$77.50
Land Cost		
Land Cost	\$6.20	\$3.20
Total Labor Cost		
Total Labor Cost	\$1,410.00	\$887.90
TOTAL COSTS (ANNUAL)		
TOTAL COSTS (ANNUAL)	\$2,292.48	\$1,309.33
Per lb cost	\$2.44	\$1.09
Per pint cost	\$1.83	\$0.82
Per ft ² cost	\$2.12	\$1.87
Efficiency Ratio (Costs / Revenue)	0.65	0.41
NET INCOME		
NET INCOME	\$1,231.62	\$1,850.67
Per lb net income	\$1.31	\$1.54
Per pint net income	\$0.98	\$1.16
Per ft ² net income	\$1.14	\$2.64
Net income ratio (net / gross)	0.35	0.59

Production Costs

Labor cost (at \$10-15/hr) was the largest contributor to production costs at both farms. For Franzenburg, labor cost accounted for 62% of total costs; for Johnson labor cost was 68% of total costs. Looking beyond labor, the breakdown of cost categories varied by farm. This breakdown can be seen in actual dollar amounts in **Table 3**, and by percent in **Figure 2**. For Franzenburg, the remaining costs fall mostly into marketing, building/structures and field supplies (**Figure 2**). Marketing supplies includes clamshell boxes, which are required for selling to grocery stores, and fuel for greenhouse heat. Johnson's costs are largely field supplies, and half of that cost is straw bales used for mulching beds and walkways.

Overall, Franzenburg had the highest costs per pound, pint, and square-foot (**Table 3**), and as a result had lower net income (even with higher revenue). Both farms had strong net income ratios for their cherry tomatoes; 0.35 for Franzenburg and 0.59 for Johnson (**Table 3**). According to Iowa State University, net income ratios of 0.35 and higher are considered excellent (Chase, 2012).

Labor for Cherry Tomato Production

As discussed in the enterprise budget section, labor is the primary cost for each farm's cherry tomato production. Are these hours well spent? **Figure 3** provides the gross revenue and net income per labor-hour by farm. Gross revenue per labor-hour, shown in red, ranges from \$35.60 for Johnson to \$25.40 for Franzenburg, while net income ranges from \$20.80 per labor-hour for Johnson to \$8.90 for Franzenburg. Gauging by these numbers, both farms are profitably using their time, but they are still focused on ways to be more efficient with their time.

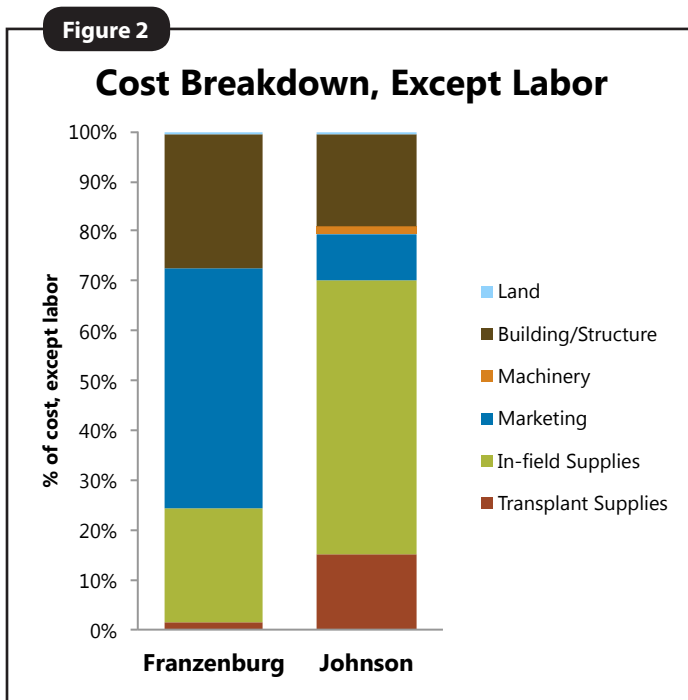


Figure 2: Breakdown of non-labor costs by category.

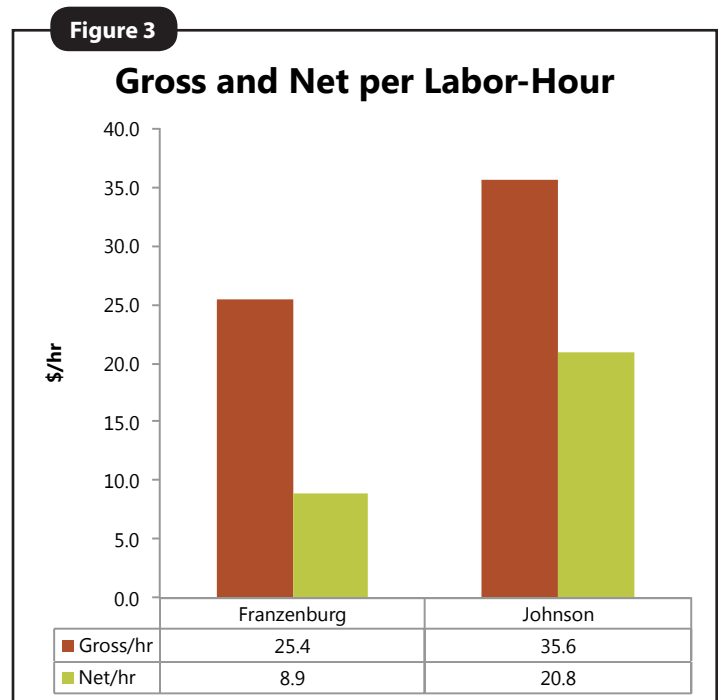


Figure 3: Gross revenue and net profit per labor-hour for each farm.



Cherry tomatoes working up the mesh trellis in Johnson's high tunnel.

"We were really concerned about the amount of labor for cherry tomatoes; especially the time spent harvesting," said Johnson. By percent of total labor-hours at each farm, harvesting and packing accounted for the bulk of labor with cherry tomatoes (**Figure 4**). On Franzenburg's farm, harvesting and packing accounted for 74% of the total labor; at Johnson's harvesting and packing was 62% of total labor hours. "My mom does a lot of the harvesting, and she is a machine," said Johnson. "Other people would not work as efficiently; she picks a flat – about 20 pounds – in an hour. We pick into a harness and then transfer to flats." Johnson's farm harvested 33 times over 12 weeks; Franzenburg harvested 32 times over 18 weeks, beginning 3 weeks earlier than Johnson and ending 3 weeks later (Oct. 29).

Johnson did note that the Sakura was more difficult to harvest than other varieties because the stems did not detach easily from the fruits. "Mom said she could harvest the other varieties more quickly than Sakura because of the stems. Though they were very crack resistant, Sakura did tend to crack if you had to manually remove the stem. If we knew we were taking the cherry tomatoes to farmers market and not selling them wholesale, we just left the stems on," said Johnson.

Franzenburg also commented on stem issues. "Sun Gold are the ultimate local food – they're sweet and delicious, and too delicate to ship," she said. Sun Gold do have a tendency to crack; especially later in the season, Franzenburg noted. "Later in the season, the stems hang on a little tighter, and you basically have to use two hands to remove them gently. I can usually tell if one is going to crack, and just pop that one in my mouth and move on," she said. This is her third season growing Sun Gold, and she plans to continue with them. "One of the great things about Sun Gold is its steady fruiting; I pretty much know every week that I will have a certain number of pints. We used to grow Five Star Grape and found that a lot of the fruit came on all at once, flooding us with grape tomatoes for a couple weeks and then production dropped off." She also commented on the vigor of the plants, "We pruned the Sun Gold really hard this year. As we cut them back, we'd get larger fruits."

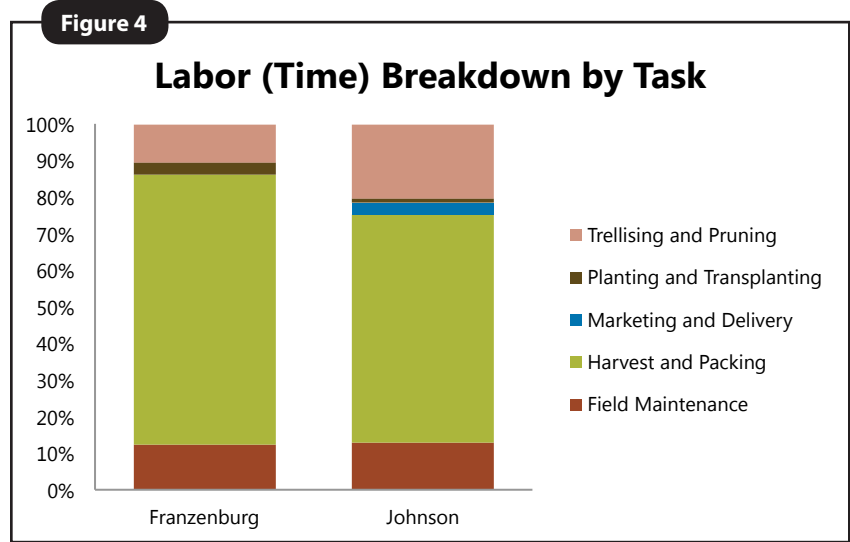


Figure 4: Cherry tomato labor-hours broken down by task on each farm.

Johnson trellised cherry tomatoes using netting hung from the high tunnel purlins; trellising and pruning accounted for 20% of her farm's cherry tomato labor-hours. Field maintenance, including bed-making, moving the hoophouse, irrigation set-up, fertilizer, and pest management accounted for 13% percent of the labor.

At Franzenburg's, most of the labor was in harvesting and packing (74% of total labor), which also included putting tomatoes into clamshell pints and adding an "Organic" sticker. Franzenburg noted that she had new, young workers this year. "Inexperienced workers average 5 minutes per pint for harvest and packing into clamshells," Franzenburg said. "Fast workers can easily do 12 pints in half an hour – half the time." Trellising and pruning took 11% of Franzenburg's labor, and field maintenance and prep accounted for 12% of labor hours. A detailed breakdown of labor-hours can be found in **Table 4**.

Farm	Category	Hours	Annual Cost	% of Total Labor	Min./lb	Min./pint	Min./ft ²	\$/lb	\$/pint	\$/ft ²
Franzenburg	Field Maintenance	15	\$170	0.12	0.94	0.71	0.82	0.18	0.14	0.16
	Harvesting and Packing	105	\$1,045	0.74	6.66	5.00	5.81	1.11	0.83	0.97
	Marketing and Delivery	-	-	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Planting and Transplanting	5	\$45	0.03	0.29	0.22	0.25	0.05	0.04	0.04
	Trellising and Pruning	15	\$150	0.11	0.96	0.72	0.83	0.16	0.12	0.14
Total		139	\$1,410	1.00	8.84	6.63	7.71	1.50	1.12	1.31
Johnson	Field Maintenance	11	\$115	0.13	0.57	0.43	0.98	0.10	0.07	0.16
	Harvest and Packing	55	\$552	0.62	2.76	2.07	4.73	0.46	0.34	0.79
	Marketing and Delivery	3	\$29	0.03	0.15	0.11	0.25	0.02	0.02	0.04
	Planting and Transplanting	1	\$13	0.01	0.06	0.05	0.11	0.01	0.01	0.02
	Trellising and Pruning	18	\$180	0.20	0.90	0.68	1.54	0.15	0.11	0.26
Total		89	\$888	1.00	4.44	3.33	7.61	0.74	0.55	1.27

Averaging labor-hours over yield, number of pints and production area provides an interesting approach, in **Figure 5**. The farms were very similar in labor-time/ft², with Franzenburg at 7.71 min./ft² and Johnson at 7.61 min./ft². Per pound and per pint, however, Franzenburg's labor is higher. This is likely due to the extra labor required for packing in pints, and potentially the increased time needed to fill volume with smaller fruits, and the difference in beginner vs. experienced labor (Franzenburg had some new employees).

Conclusions and Next Steps

Cherry tomatoes were a profitable crop at both farms, netting \$1.31/lb at Franzenburg's and \$1.54/lb at Johnson's. Labor was the highest expense for cherry tomatoes at both farms, and most of the labor-hours were used for harvesting and packing. Johnson had more efficient harvest, which earned them higher profits per pound and per square-foot.

Tomato variety matters. Johnson was disappointed with their old varieties, and the four varieties they grew in 2017 were new for them, chosen because of their resistance to cracking. "We needed some major changes to what we were doing. For many years we grew Bumble Bee varieties and last year we grew Tiger – they were delicious. But because they're so sweet, they crack if you look at them. We stopped growing them cold-turkey. We probably won't grow Sakura again because of the difficulty stemming, but they were very productive."

Franzenburg noted that cracking in the Sun Gold was more common later in the season, but might have been exacerbated by an irregular watering schedule. "We stick to a very regular watering schedule through the summer, but as usual, things get hectic toward the end, especially when row crop harvest begins. Next year I might try to give the tomatoes a good watering the morning I plan to harvest and see if that makes a difference."

Both farms plan to repeat the cherry tomato enterprise budget in 2018 to provide a two-year look at the crop's production and profitability.

Figure 5

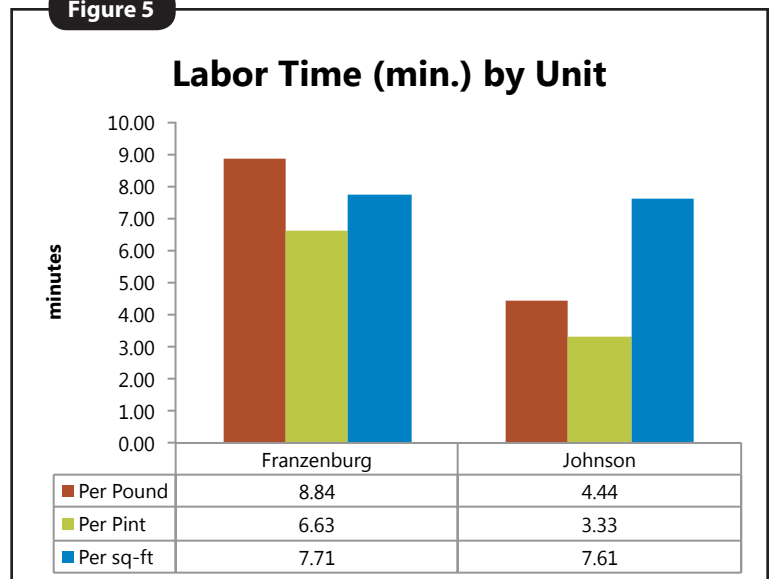


Figure 5: Labor-hours converted to minutes, averaged by pound sold, number of pints sold, and production area in square feet.



Mary Zahradnik in the high tunnel at Johnson's.

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