



2011 Cost Estimates of Establishing, Producing, and Packing Honeycrisp Apples in Washington

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Preface

Production costs and returns are highly variable for any particular orchard operation due to case-specific:

- Capital, labor, and natural resources
- Crop yields
- Type and size of machinery implements
- Input prices
- Cultural practices
- Commodity prices
- Operation size
- Management skills

Cost estimation also varies with the intended use of the enterprise budget. The information in this publication serves as a general guide for establishing and producing Honeycrisp apples in Washington as of 2011. To avoid drawing unwarranted conclusions for any particular orchard, the reader must closely examine the assumptions

made and adjust the costs and/or returns as appropriate for their situation.

Honeycrisp Production in Washington

Honeycrisp is a relatively new apple variety. Although the first significant plantings of Honeycrisp were in 1999 (Washington Growers Clearing House [WGCH] 2010), it was in the top three most popular apple varieties planted between 2004 and 2010, surpassing Fuji and Gala apple plantings in 2008 (Figure 1). As of 2011, 9,098 acres are planted to Honeycrisp, more than double the acreage planted with the same variety in 2006. About 43 percent of this acreage is located in the Yakima Valley, 31 percent in the Columbia Basin, 22 percent in Wenatchee, and 4 percent in other areas (U.S. Department of Agriculture National Agricultural Statistics Service 2011).

Growers experience challenges in producing and obtaining a high number of packs per bin of Honeycrisp, but the variety commands a relatively high market price. The five-year freight on board (FOB) average per pound for Honeycrisp apples is \$1.03 compared to \$0.51 for Fuji apples and \$0.49

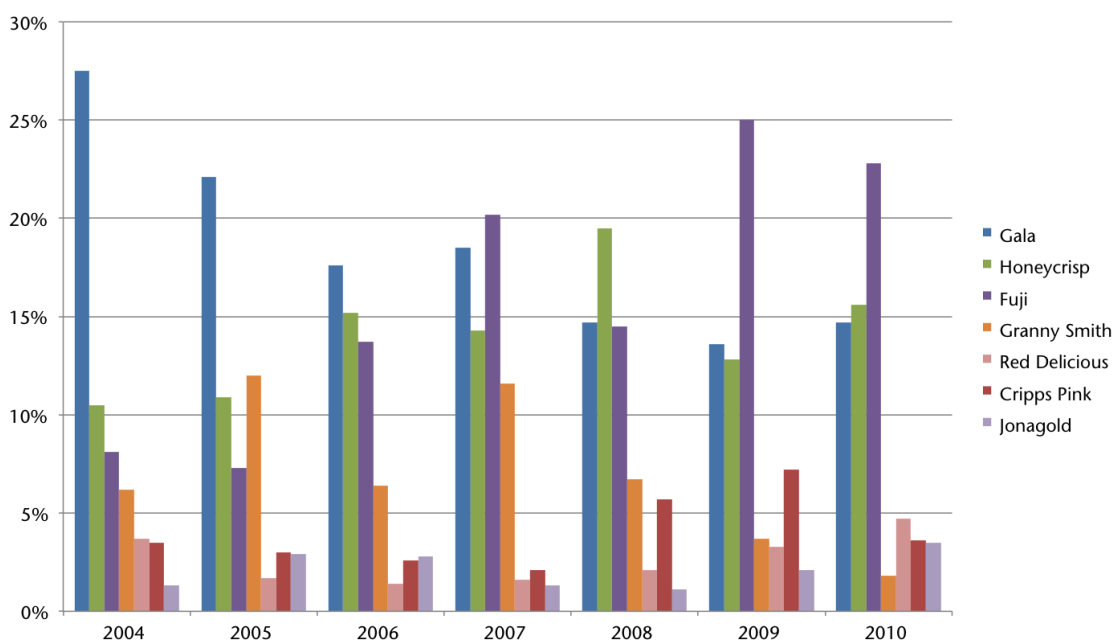


Figure 1. Apple Trees Sold by Variety in Washington as a Percent of the Total, 2004–2010 (Buckner 2008).

for Gala apples during the same period (WGCH 2008 and 2010).

Study Objectives

This publication is designed to enable growers to estimate (1) the costs of equipment, materials, supplies, and labor required to establish and to produce a modern Honeycrisp orchard; and (2) the ranges of price and yield at which Honeycrisp production would be a profitable enterprise.

The data used in this study were gathered from a group of experienced Honeycrisp growers from various production regions in Washington. Their production practices, input requirements, and views about the latest developments in production methods form the baseline assumptions that were used to develop the enterprise budget. Additionally, the data represent what these area growers anticipate over an orchard's life, if no unforeseen failures occur. Note also that many factors affect production costs, packout, and returns. Therefore, individual growers should use the blanks provided on the budget's right-hand column (Table 2) to estimate their own costs and returns.

The primary uses of this report are to identify inputs, costs, and yields considered to be typical of well-managed Honeycrisp orchards. This publication does not represent any one particular farm and is not intended to be a guide to production practices. However, it describes current industry trends, and as such, can be helpful in estimating the physical and financial requirements of comparable plantings.

Budget Assumptions

1. This budget is based on an 11-acre block within a 100-acre orchard. It is assumed that 1 acre of this block is not used for the direct production of tree fruit, but is dedicated to roads, a pond, loading area, etc. Therefore, the total productive area for this block is 10 acres. Table 1 shows the assumed Honeycrisp block specifications.
2. The irrigation system consists of overhead cooling and under tree drip sprinklers, with two separate sub-main lines. Water is provided through a public irrigation district.
3. Typically, a pond is used when production starts in Year 3. In this case study, the pond is installed in Year 1 since it is used in the irrigation during the first two years.
4. Labor is assumed to be hand and ladder, without use of platforms.
5. Interest on investment represents a 5% opportunity cost to the enterprise. These are foregone earnings for investing money in the orchard, equipment, and buildings rather than in an alternative activity. This also represents interest on funds borrowed to finance the orchard, equipment, and buildings.

Summary of Results

The estimated annual cost and returns for a 10-acre production of Honeycrisp in Washington are shown in Table 2. Production costs are classified into variable costs and fixed costs. Variable costs comprise orchard operations and harvest activities, materials, machinery maintenance and repairs, and packing costs. Fixed costs are incurred whether or not apples are grown. These costs include depreciation on capital, interest, taxes, insurance, management, and amortized establishment costs. Management is treated as a fixed cost rather than a variable cost. The study assumed that a Honeycrisp orchard can achieve full production in 6 years. Based on the given assumptions, the total production costs starting Year 6 is estimated at \$21,486 per acre. Table 3 shows the sensitivity of net returns to different price and yield scenarios.

Most of the budget values given in Table 2 are based on more comprehensive underlying cost data, which are shown in Tables 4 to 7. Annual capital requirements for a 10-acre Honeycrisp block are listed in Table 4. Table 5 presents the detailed machinery and building requirements for a 100-acre orchard. Interest costs and depreciation are respectively listed in Tables 6 and 7. All interest and amortization costs assume a 5 percent interest rate. The amortized establishment costs assume a total productive life of 15 years, which includes 5 years of establishment and 10 years of full production. These costs must be recaptured during the full production years in order for an enterprise to be profitable.

Interest costs represent the interest payments on funds borrowed to finance farm operations and physical capital purchased for the orchard. They also represent an opportunity cost or the returns foregone by investing in the orchard rather than in alternative activities. Depreciation costs include the annual replacement cost of machinery and building. The use of replacement prices may overstate costs currently being experienced by growers. However, it provides an indication of the earnings needed to replace depreciable assets. Recent increases in prices paid for machinery and equipment mean that the depreciation claimed on older purchases substantially understates the amount of capital required to replace that asset. When looking at the long-term viability of the enterprise, it is important to consider its ability to replace its depreciable assets on a replacement cost basis.

An Excel spreadsheet version of this enterprise budget (Table 2), as well as associated data underlying the per acre cost calculations (Tables 5–7 and Appendixes 1-4 on establishment costs, full production costs, packing costs, and amortization), are available at the WSU SES Extension website: http://extecon.wsu.edu/pages/Enterprise_Budgets. Growers can modify select values and thus use the Excel Workbook to evaluate their own production costs and returns.

References

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Table 1. Honeycrisp Block Specifications

Architecture	Two-dimensional system (planar canopy), randomly trained with an 18" radius from tree center
In-Row Spacing	3 feet
Between-Row Spacing	10 feet
Variety and Root Stock	Dwarf—9 series
Block Size	10 acres
Life of Planting	15 years
Tree Density	1,452 trees

Table 2. Cost and Returns per Acre of Establishing, Producing, and Packing Honeycrisp on a 10-Acre Orchard Block

	Establishment Years					Full Production ¹	Your Costs
	Year 1	Year 2	Year 3	Year 4	Year 5		
Estimated Net Production (bins/acre) ²			11.00	25.00	40.00	43.00	
Estimated FOB Price (\$/bin) ³			650.00	650.00	650.00	650.00	
Total Returns			7,150.00	16,250.00	26,000.00	27,950.00	
Variable Costs (\$/acre):							
<u>Establishment</u>							
Soil Preparation	1,700.00						
Trees (including labor)	9,917.16						
<u>Orchard Activities</u>							
Pruning & Training ⁴	700.00	700.00	650.00	250.00	250.00	250.00	
Green Fruit Thinning			322.50	645.00	645.00	645.00	
Chemicals ⁵	657.50	657.50	1,200.00	1,200.00	1,200.00	1,200.00	
Fertilizer ⁵	250.00	250.00	350.00	350.00	350.00	350.00	
Beehives			45.00	45.00	45.00	45.00	
General Farm Labor	215.00	215.00	215.00	215.00	215.00	215.00	
Irrigation/Electric Charge	200.00	200.00	200.00	200.00	200.00	200.00	
<u>Harvest Activities</u>							
Picking Labor			420.00	980.00	1,540.00	1,680.00	
Other Labor (checkers, tractor drivers)			105.00	245.00	385.00	420.00	
Hauling Apples			120.00	280.00	440.00	480.00	
<u>Warehouse Packing Charges⁶</u>			2,503.31	5,841.07	9,178.82	10,013.26	
<u>Maintenance and Repairs</u>							
Machinery Repair	50.00	75.00	100.00	120.00	140.00	140.00	
Fuel & Lube	70.00	70.00	110.00	130.00	140.00	140.00	
Wind Machine & Alarm System Repair			30.00	30.00	30.00	30.00	
Mainline, Pump & Pond Maintenance	50.00	50.00	50.00	50.00	50.00	50.00	
<u>Other Variable Costs</u>							
Overhead (5% of VC)	690.48	110.88	321.04	529.05	740.44	792.91	
Interest (5% of VC) ⁷	725.01	116.42	337.09	555.51	777.46	624.42	
Total Variable Costs	15,225.15	2,444.79	7,078.95	11,665.63	16,326.72	17,275.59	
Fixed Costs (\$/acre):							
<u>Depreciation</u>							
Irrigation System	145.80	145.80	145.80	145.80	145.80	145.80	
Mainline & Pump	33.33	33.33	33.33	33.33	33.33	33.33	
Pond	66.67	66.67	66.67	66.67	66.67	66.67	
Trellis	122.25	122.25	122.25	122.25	122.25	122.25	
Wind Machine			150.00	150.00	150.00	150.00	
Machinery & Building Annual Replacement Cost	240.00	240.00	240.00	240.00	240.00	240.00	
<u>Interest</u>							
Irrigation System	66.83	66.83	66.83	66.83	66.83	66.83	
Land	400.00	400.00	400.00	400.00	400.00	400.00	
Machinery & Buildings	92.24	92.24	92.24	92.24	92.24	92.24	
Mainline & Pump	12.50	12.50	12.50	12.50	12.50	12.50	
Pond	25.00	25.00	25.00	25.00	25.00	25.00	
Trellis	45.85	45.85	45.85	45.85	45.85	45.85	
Wind Machine	68.75	68.75	68.75	68.75	68.75	68.75	
Establishment Costs (5%)		844.97	1,093.17	1,246.98	1,182.82		
<u>Other Fixed Costs</u>							
Land & Property Taxes	20.00	20.00	50.00	50.00	60.00	60.00	
Insurance Cost (all farm)	35.00	35.00	135.00	135.00	135.00	50.00	
Management Cost	300.00	300.00	400.00	400.00	400.00	400.00	
Amortized Establishment Costs ⁸						2,231.39	
Total Fixed Costs	1,674.21	2,519.18	3,147.37	3,301.19	3,247.03	4,210.60	
TOTAL COSTS	16,899.36	4,963.97	10,226.32	14,966.82	19,573.76	21,486.19	
ESTIMATED NET RETURNS	(16,899.36)	(4,963.97)	(3,076.32)	1,283.18	6,426.24	6,463.81	
Accumulated Establishment Costs	16,899.36	21,863.33	24,939.65	23,656.47	17,230.23		

¹The full production year is representative of all the remaining years the orchard is in full production (Year 6 to Year 15).

²Estimated net production takes into account an average packout of 72%.

³Prices represent gross FOB prices (no warehouse charges deduction).

⁴Also includes crop removal cost during Year 1 and Year 2; Dormant Pruning during Year 4, Year 5 and Full Production Year.

⁵Includes labor.

⁶Assumes an 825-lb bin and a 72% packout.

⁷Interest expense charged on full year during establishment years and for 3/4 of a year during full production.

⁸Represents the costs incurred during the establishment years (minus revenues during those years) that must be recaptured during the full production years.

Table 3. Estimated Net Returns of Honeycrisp per Acre at Various Prices and Yields during Full Production¹

Yield (bins/acre) ²	FOB Price (\$/bin) ³						
	350	400	450	500	550	600	650
20	(7,169.51)	(6,169.51)	(5,169.51)	(4,169.51)	(3,169.51)	(2,169.51)	(1,169.51)
25	(7,020.03)	(5,770.03)	(4,520.03)	(3,270.03)	(2,020.03)	(770.03)	479.97
30	(6,870.56)	(5,370.56)	(3,870.56)	(2,370.56)	(870.56)	629.44	2,129.44
35	(6,721.08)	(4,971.08)	(3,221.08)	(1,471.08)	278.92	2,028.92	3,778.92
40	(6,571.61)	(4,571.61)	(2,571.61)	(571.61)	1,428.39	3,428.39	5,428.39
45	(6,422.13)	(4,172.13)	(1,922.13)	327.87	2,577.87	4,827.87	7,077.87
50	(6,044.01)	(3,544.01)	(1,044.01)	1,455.99	3,955.99	6,455.99	8,955.99

¹Includes amortized establishment costs.

²Assumes an 825-pound bin. Takes into account an average packout of 72%.

³Price represents gross FOB price (no warehouse charges deduction).

Table 4. Summary of Annual Capital Requirements for a 10-Acre Honeycrisp Block

	Establishment Years					Full Production ¹
	Year 1	Year 2	Year 3	Year 4	Year 5	
Annual Requirements						
Land (11 acres)	88,000.00					
Trellis System	18,338.00					
Irrigation System	24,300.00					
Mainline & Pump	5,000.00					
Pond	10,000.00					
Wind Machine			25,000.00			
Operating Expenses	155,801.50	27,997.94	76,639.48	122,506.27	169,217.25	177,855.91
Total Requirements	301,439.50	27,997.94	101,639.48	122,506.27	169,217.25	177,855.91
Receipts			71,500.00	162,500.00	260,000.00	279,500.00
Net Requirements	301,439.50	27,997.94	30,139.48	(39,993.73)	(90,782.75)	(101,644.09)

¹The full production year is representative of all the remaining years the orchard is in full production (Year 6 to Year 25).

Table 5. Machinery and Building Requirements for a 100-Acre Orchard

	Purchase Price (\$)	Number of Units	Total Cost (\$)
Housing for manager	110,000	1	110,000
Machine shop/shed ¹	50,000	1	50,000
Tractor-70HP, 4WD	32,500	2	65,000
Tractor-40HP, 4WD	25,000	1	25,000
4 wheeler	4,000	2	8,000
Speed sprayer	20,000	2	40,000
Weed spray boom & tank	4,000	1	4,000
Mower-rotary	4,500	1	4,500
Fork lift	12,500	1	12,500
Bin trailer	7,000	2	14,000
Ladder-8'	120	20	2,400
Total Cost			335,400

¹Includes pesticide storage

Note: Purchase price corresponds to new machinery, equipment, or building.

Table 6. Interest Costs per Acre for a 10-Acre Honeycrisp Block

	Total Purchase Price (\$)	Salvage Value (\$)	Number of Acres	Total Interest Cost (\$)	Interest Cost Per Acre (\$)
Irrigation System	24,300	2,430	10	668	66.83
Land	88,000	88,000	11	4,400	400.00
Machinery & Buildings	335,400	33,540	100	9,224	92.24
Mainline & Pump	5,000	0	10	125	12.50
Pond	10,000	0	10	250	25.00
Trellis	18,338	0	10	458	45.85
Wind Machine	25,000	2,500	10	688	68.75
<i>Interest Rate</i>	<i>5.0%</i>				
<i>Salvage Value¹</i>	<i>10.0%</i>				

¹Not applied to land because land is not a depreciable asset.

Table 7. Depreciation Costs per Acre for a 10-Acre Honeycrisp Block

	Total Purchase Price (\$)	Number of Acres	Total Value Per Acre (\$)	Years of Use	Depreciation Cost Per Acre (\$)
Irrigation System	24,300	10	2,430.00	15	145.80
Mainline & Pump	5,000	10	500.00	15	33.33
Pond	10,000	10	1,000.00	15	66.67
Trellis	18,338	10	1,833.80	15	122.25
Wind Machine	25,000	10	2,500.00	15	150.00
Machinery & Building Annual Replacement Cost ¹					240.00

¹An estimate of average annual replacement costs, rather than depreciation costs, is used for machinery and buildings. Replacement prices may overstate costs growers experience, but they indicate the earnings needed to replace depreciable assets. When looking at long-term enterprise viability, it is important to consider the ability to replace depreciable assets.



By **Suzette P. Galinato**, Research Associate, IMPACT Center, School of Economic Sciences, Washington State University, Pullman, and **R. Karina Gallardo**, Assistant Professor and Extension Specialist, School of Economic Sciences, Tree Fruit Research and Extension Center, Washington State University, Wenatchee.

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