

# 2022 COST ESTIMATES OF PRODUCING AND PACKING FRESH-MARKET BARTLETT PEARS IN SOUTH WASHINGTON



## Preface

The results presented in this WSU publication serve as a general guide for evaluating the feasibility of producing fresh-market Bartlett pears in South Washington in 2022. The primary use of this publication is in identifying inputs, costs, and yields considered typical of well-managed Bartlett pear orchards. This publication is not intended to be a definitive guide to production practices, but it is intended to be helpful in estimating the physical and financial requirements of comparable plantings. Specific budget assumptions were adopted for this study, but these assumptions may not represent the conditions in all production and marketing situations since production costs and returns vary across orchard operations, depending on the following factors:

- Capital, labor, and natural resources
- Crop yields
- Type and size of machinery, irrigation, and frost control systems
- Input prices
- Cultural practices
- Fresh-market Bartlett prices
- Orchard size
- Management skills
- Biotic and abiotic orchard variables

Cost estimations in the enterprise budget also vary depending on its intended use. To avoid drawing unwarranted conclusions for any particular orchard, readers must closely examine the assumptions made in this guide and then adjust the costs, returns, or both as appropriate for their own orchard operation.

## Fresh-Market Bartlett Pear Production in Washington State

Washington State is the number one producer of fresh-market pears in the United States. In 2020, the value of production was \$136 million, comprising about 42% of the U.S. total value of production for this crop destined for the fresh market (USDA NASS 2022).

Bartlett pears are second to Anjou pears in terms of its share of bearing acreage, which are 37% and 40% of the state total, respectively, in 2017. There were 7,663 bearing acres of Bartlett pears in 2017, distributed in the following production regions: 53% in Wenatchee, 42% in the Yakima Valley, and 5% in the Columbia Basin and other areas (USDA NASS 2017). The free on board (FOB) price of fresh-market Bartlett in 2021 was \$32.65/box. Between 2017 and 2021, the minimum and maximum prices of Bartlett were \$26.74/box and \$32.65/box, respectively. The five-year-average FOB price was \$28.98/box, which is about 11% lower than in 2021 (WSTFA 2021).

## Study Objectives

This publication is designed to enable growers to estimate: (1) the costs of equipment, materials, supplies, and labor required to produce Bartlett pears destined for the fresh market, including packing costs, and (2) the ranges of price and yield at which Bartlett pear production would be a profitable enterprise.



# Information Sources

The data used in this study were collected from information shared by a group of experienced Bartlett pear growers in Washington. Their production practices and input requirements form the baseline assumptions that were used to develop the enterprise budget. Additionally, the data represent what these owner-operators anticipate would occur over an orchard’s life if no unforeseen failures occur. The pesticide programs are based on what most growers were spraying for, and the most common products they used for each purpose.

Given that many factors affect production costs, pack-out, and returns, individual growers can use the Excel Workbook (available at the WSU School of Economic Sciences’ [Crop Enterprise Budgets website](#)) to make necessary modifications and estimate their own costs and returns.

# Budget Assumptions

1. The area of the total farm operation is 300 acres. Bearing acres include 217 acres of Bartlett pears and 83 acres of winter pears, including Anjou, Bosc, Bosc Golden, Red Anjou, and others.
2. This budget is based on a 10-acre fresh-market Bartlett pear block within a 300-acre diverse cultivar pear orchard. It is assumed that 1 acre of this block is dedicated to roads, pond, loading area, buildings, etc., rather than to fruit production. Therefore, the total productive area for this block is 9 acres, of which two-thirds of the area is dedicated to fresh-market Bartlett pears (i.e., 6 acres). The remaining one-third of the area (i.e., about 3 acres) is dedicated to fresh-market Anjou pears that are used as pollenizers. Table 1 shows the assumed Bartlett block specifications, which are generally accepted across all growers interviewed.
3. The total value of bare agricultural land (including water rights) is \$18,000 per acre with annual property taxes of \$110 per acre.
4. The irrigation system consists of overhead cooling and under tree sprinklers, with two separate sub-mainlines. Water is provided through a public irrigation district.
5. The pond, mainline, and pump already exist; the irrigation system and wind machine are newly installed.

Table 1. Fresh-market Bartlett block specifications.

Block size	10 acres
Size of productive block	9 acres
Rootstock	Old Home Farmingdale (OH×F) 97
In-row spacing	6 feet
Between-row spacing	13 feet
Tree density	558 trees per acre; 33% of the planted trees are pollenizers (Anjou)
Planting architecture	V trellis

6. Cultural practices and harvest activities are done by using manual labor and ladders. The hourly manual labor rate is calculated using the Washington adverse wage rate for 2022 at \$17.41/hour. In this analysis, we add 25% to reflect medical leave and all administrative costs for H2A employees, including housing, amounting to \$21.76/hour. Activities such as chemical application, irrigation, and frost protection are assumed to cost \$23.01/hour (i.e., base of \$18.41/hour plus 25%). Harvest labor rates follow the Department of Labor rates, plus 4% to account for mandated paid rest breaks. These labor rates are assumed to be the same for all years of production.
7. Expected gross yield of Bartlett pears is 38 bins (1,100 pounds per wood bin), and 19 bins of Anjou pears. The pack-out rate is 87.5%.
8. The gross price or gross return is \$29.68 per box for Bartlett and \$27.00 per box for Anjou, or \$742 per bin and \$675 per bin, respectively, given that there are 25 44-pound boxes per bin.
9. Total warehouse packing charges of \$263 per bin are included in the variable costs.
10. Management is valued at \$450 per acre.
11. Interest on investment represents a 5% opportunity cost to the enterprise. These are forgone earnings for investing money in orchard, equipment, and buildings rather than in an alternative activity. This also represents interest on funds borrowed to finance orchard, equipment, and building purchases.

# Summary of Study Results

The estimated annual cost and returns for a ten-acre block of Bartlett pears in South Washington are shown in Table 2. Production costs are classified into variable costs and fixed costs. Variable costs comprise orchard operations, harvest activities, materials, maintenance and repairs, and packing costs. Fixed costs are incurred whether or not Bartlett pears are produced. These costs will generally be calculated for the whole farm enterprise and allocated across each unit of production. The fixed 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 because, like land, management has been committed to the production cycle of the crop.

Table 2. Cost and returns per acre of producing fresh-market Bartlett pears on a nine-acre orchard block in South Washington.

	Establishment Years						Full Production <sup>a</sup>
	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	
<b>Net Production (bin/acre)<sup>b</sup></b>							
Bartlett, fresh			3.00	11.00	18.00	24.00	33.00
Anjou, fresh			2.00	6.00	9.00	11.00	17.00
Cull			0.00	3.00	3.00	5.00	7.00
Gross Price (\$/bin) <sup>c</sup>							
Bartlett, fresh			742.00	742.00	742.00	742.00	742.00
Anjou, fresh			675.00	675.00	675.00	675.00	675.00
Cull			20.00	20.00	20.00	20.00	20.00
<b>TOTAL RETURNS</b>			<b>3,576.00</b>	<b>12,272.00</b>	<b>19,491.00</b>	<b>25,333.00</b>	<b>36,101.00</b>
<b>Variable Costs (VC):</b>							
<u>Establishment</u>							
Soil Preparation	2,451.00						
Trees (including labor)	5,046.55						
<u>Orchard Activities</u>							
Pruning & Training <sup>d</sup>	275.63	660.05	826.88	776.11	834.13	1,000.96	1,000.96
Green Fruit Thinning <sup>d</sup>	0.00	0.00	0.00	217.60	304.64	369.92	435.20
Irrigation Labor <sup>e</sup>	115.05	161.07	161.07	207.09	207.09	207.09	207.09
Chemicals <sup>e,f</sup>	151.55	433.95	1,069.35	1,422.35	1,422.35	1,422.35	1,422.35
Fertilizer <sup>e,f</sup>	63.01	143.01	323.01	423.01	423.01	423.01	423.01
Frost Protection (labor) <sup>e</sup>			17.26	17.26	17.26	17.26	17.26
Beehives			114.00	114.00	114.00	114.00	114.00
General Farm Labor <sup>g</sup>	225.00	225.00	225.00	225.00	225.00	155.00	225.00
Irrigation Water & Electric Charge	275.00	275.00	275.00	275.00	275.00	275.00	275.00
<u>Harvest Activities<sup>h</sup></u>							
Picking Labor			165.90	663.60	995.40	1,327.20	1,891.26
Other Labor (checkers, tractor drivers)			60.00	240.00	360.00	360.00	360.00
Hauling			0.00	0.00	0.00	0.00	0.00
<u>Warehouse Packing Charges<sup>i</sup></u>			1,315.00	5,260.00	7,890.00	10,520.00	14,991.00
<u>Maintenance and Repairs</u>							
Maintenance & Repair	265.00	265.00	265.00	265.00	265.00	300.00	300.00
Fuel & Lube	360.00	360.00	360.00	360.00	360.00	360.00	360.00
<u>Other Variable Costs</u>							
Crop Insurance			200.00	200.00	200.00	200.00	200.00
Overhead (5% of VC) <sup>j</sup>	461.39	126.15	268.87	533.30	694.64	858.59	1,127.31
Interest (5% of VC) <sup>k</sup>	484.46	132.46	282.32	559.97	729.38	676.14	887.75
<b>Total Variable Costs</b>	<b>10,173.64</b>	<b>2,781.70</b>	<b>5,928.66</b>	<b>11,759.29</b>	<b>15,316.91</b>	<b>18,706.52</b>	<b>24,561.19</b>
<b>Fixed Costs:</b>							
<u>Depreciation</u>							
Irrigation System	154.00	154.00	154.00	154.00	154.00	154.00	154.00
Machinery, Equipment & Building	229.22	229.22	229.22	229.22	229.22	229.22	229.22
Mainline & Pump	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Trellis	280.00	280.00	280.00	280.00	280.00	280.00	280.00
Wind Machine			144.59	144.59	144.59	144.59	144.59
<u>Interest</u>							
Irrigation System	96.25	96.25	96.25	96.25	96.25	96.25	96.25
Land <sup>l</sup>	900.00	900.00	900.00	900.00	900.00	900.00	900.00

	Establishment Years						Full Production <sup>a</sup>
	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	
Machinery, Equipment & Building	82.05	82.05	82.05	82.05	82.05	82.05	82.05
Mainline & Pump	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Trellis	175.00	175.00	175.00	175.00	175.00	175.00	175.00
Wind Machine			90.37	90.37	90.37	90.37	90.37
Establishment Costs (5%)		646.01	954.72	1,269.16	1,456.06	1,469.23	
<b>Other Fixed Costs</b>							
Miscellaneous Supplies	190.00	190.00	190.00	190.00	190.00	190.00	190.00
Land & Property Taxes	110.00	110.00	110.00	110.00	110.00	110.00	110.00
Insurance Cost (all farm)	80.00	80.00	80.00	80.00	80.00	80.00	80.00
Management Cost	450.00	450.00	450.00	450.00	450.00	450.00	450.00
Amortized Establishment Costs <sup>m</sup>							2,251.39
<b>Total Fixed Costs</b>	<b>2,746.52</b>	<b>3,392.52</b>	<b>3,936.19</b>	<b>4,250.64</b>	<b>4,437.53</b>	<b>4,450.70</b>	<b>5,232.87</b>
<b>TOTAL COSTS</b>	<b>12,920.16</b>	<b>6,174.23</b>	<b>9,864.86</b>	<b>16,009.92</b>	<b>19,754.44</b>	<b>23,157.22</b>	<b>29,794.06</b>
<b>ESTIMATED NET RETURNS</b>	<b>(12,920.16)</b>	<b>(6,174.23)</b>	<b>(6,288.86)</b>	<b>(3,737.92)</b>	<b>(263.44)</b>	<b>2,175.78</b>	<b>6,306.94</b>
<b>Accumulated Establishment Costs</b>	<b>12,920.16</b>	<b>19,094.39</b>	<b>25,383.24</b>	<b>29,121.17</b>	<b>29,384.60</b>	<b>27,208.83</b>	

<sup>a</sup> Net production refers to the bins that the packinghouse was able to sell. The full production year is representative of all the remaining years that the block is in full production (Year 7 to Year 25).

<sup>b</sup> Estimated net production considers an average pack-out of 87.5%.

<sup>c</sup> The prices of Anjou and Bartlett reflect the packinghouse door negotiated with retailer. This is not the price the grower receives; this is the gross return or price before the packinghouse discounts their charges. Bin size is 1,100 lb.

<sup>d</sup> Hand labor rate is \$21.76/hour and includes all applicable additional expenses.

<sup>e</sup> Tractor/machinery, irrigation, and frost protection labor rate is \$23.01/hour and includes all H2A related expenses plus all applicable payroll taxes and benefits.

<sup>f</sup> Includes materials and labor.

<sup>g</sup> General farm labor rate is a lump sum per acre and is applied to miscellaneous/all other labor. Rate includes applicable additional expenses.

<sup>h</sup> Picking rate = \$33.18/bin; Checkers' and tractor drivers' rate = \$12/bin; Hauling rate = \$0/bin (hauling cost already included in the receiving/cold storage charge).

<sup>i</sup> Packing charges for fresh-market Bartlett and Anjou include per bin and per box charges.

<sup>j</sup> Captures indirect costs of operations in the orchard that fluctuate with the level of production but are not accounted by the variable costs already identified. Also captures unforeseeable expenses.

<sup>k</sup> Interest expense on full year during establishment years and for three-quarters of a year during full production.

<sup>l</sup> The opportunity cost of land is approximated by using the 5% interest rate multiplied by the land value of \$18,000 per acre.

<sup>m</sup> Represents the costs incurred during the establishment years (minus revenue during those years) that must be recaptured during the full production years. It is calculated as: accumulated establishment costs in Year 6 amortized at 5% for 19 years.

This study assumed that a Bartlett pear orchard could achieve full production in the seventh year. Based on the above assumptions, the total production costs for fresh-market Bartlett pears in South Washington are estimated at \$29,794 per acre. The net returns during full production are about \$6,307 per acre. Table 3 shows the sensitivity of net returns to different combinations of price and yields. For this analysis, the FOB prices considered are \$670–\$815 per 1,000-pound bin, and the net yields of fresh-market Bartlett are 20–35 bins per acre, given an 87.5% pack-out. A gross yield-price combination of 40 bins per acre or greater and \$699 per bin or higher would result in positive net returns for the owner-operator, based on the study's production and cost assumptions.

Table 4 shows the break-even return given different yield levels during full production. As of 2022, the first break-even return of fresh-market Bartlett pears was about \$392 per bin. This is the minimum return needed for the owner-operator to cover the operation's variable costs. Returns lower than this figure suggest that it is more profitable not to operate (shutdown price) to produce Bartlett pears for the fresh market. The second break-even return is about \$404 per bin, which is needed to cover the total cash costs and to be economically viable in the short run. The third break-even return is \$428 per bin, which is needed to cover the cash costs plus depreciation of machinery and buildings. This return must be realized for the operation to be financially viable in the long run. The fourth break-even return is about \$551 per bin. When this return is received, the owner-

operator would recover all out-of-pocket expenses plus realize a competitive return on equity capital invested in land, Bartlett pear orchard, machinery, equipment, and buildings. Failure to obtain this break-even return level means that the owner-operator will not receive a return on capital contributions equal to what could be earned in alternative uses.

Most of the budget values given in Table 2 are based on more comprehensive underlying cost data, which are shown in Tables 5 through 8. Table 5 presents the annual capital requirements for a ten-acre Bartlett block. Table 6 specifies the machinery and building requirements for the 300-acre pear orchard. Interest costs and depreciation are listed in Table 7 and Table 8, respectively. Interest costs represent the required return on investments. They can be actual interest payments on funds borrowed to finance farm operations and physical capital

investments, an opportunity cost (a return that would have been received if the investment had been in an alternative activity), or a combination of the two. Depreciation costs are annual, non-cash expenses that are calculated over the asset's useful life. These expenses represent the loss in an asset's value due to use, age, and obsolescence.

The key results of this enterprise budget are formed by production-related assumptions established for the study. Production costs and returns for individual owner-operators may differ; thus, the results cannot be generalized to represent all fresh-market Bartlett pear operations in South Washington. An interactive Excel Workbook, described below, is provided to enable individual owner-operators to estimate their returns based on the costs of their production.

Table 3. Estimated net returns per acre at various prices and yields of fresh-market Bartlett pears during full production.

Gross Yield (bin/acre)	Gross Yield, Bartlett (bin/acre)	Net Yield, Bartlett (bin/acre) <sup>a</sup>	FOB Packinghouse Door Price Equivalent (\$/bin) <sup>b</sup>					
			\$670	\$699	\$728	\$757	\$786	\$815
<b>Estimated Net Returns (\$/acre)</b>								
35	23	20	-\$1,503	-\$923	-\$343	\$237	\$817	\$1,397
40	27	24	-\$482	\$214	\$910	\$1,606	\$2,302	\$2,998
45	30	26	\$550	\$1,304	\$2,058	\$2,812	\$3,566	\$4,320
50	34	30	\$2,901	\$3,771	\$4,641	\$5,511	\$6,381	\$7,251
55	37	32	\$3,257	\$4,185	\$5,113	\$6,041	\$6,969	\$7,897
60	40	35	\$4,959	\$5,974	\$6,989	\$8,004	\$9,019	\$10,034

Note: Shaded area denotes positive net returns based on the combination of net yield and price.

<sup>a</sup> Net yield refers to the number of bins that the packinghouse was able to sell. This figure considers a pack-out percentage of 87.5%.

<sup>b</sup> Refers to gross price. Bin size is 1,100 lb.

Table 4. Break-even return of fresh-market Bartlett pears for different levels of enterprise costs during full production in South Washington.

	Cost (\$/acre)	Break-even Return (\$/bin) <sup>a</sup>
1. Total Variable Costs	24,561.19	392.31 <sup>b</sup>
2. Total Cash Costs <sup>c</sup> = Total Variable Costs + Land & Property Taxes + Insurance Cost + Miscellaneous Supplies	24,941.19	403.82 <sup>d</sup>
3. Total Cash Costs + Depreciation Costs	25,749.00	428.30 <sup>e</sup>
4. Total Costs = Total Cash Costs + Depreciation Costs + Interest Costs <sup>f</sup> + Management Cost	29,794.06	550.88 <sup>g</sup>

<sup>a</sup> Break-even return of Bartlett is calculated as  $BE\ Return = [Cost - (Price\ of\ Anjou \times Net\ yield\ of\ Anjou) - (Price\ of\ Cull \times Culls)] \div Net\ yield\ of\ Bartlett$ . All variables in this equation are held constant, except for the "Cost," which takes the Total Variable Costs, Total Cash Costs, Total Cash Costs + Depreciation Costs, or Total Costs, depending on the level of enterprise cost that the break-even return is being calculated.

<sup>b</sup> If the return is below this level, fresh-market Bartlett pears are uneconomical to produce.

<sup>c</sup> If there are other cash costs on an individual's orchard, these costs must be identified and included in the cash cost break-even return calculation.

<sup>d</sup> The second break-even return allows the producer to stay in business in the short run.

<sup>e</sup> The third break-even return allows the producer to stay in business in the long run.

<sup>f</sup> Interest costs include some actual cash interest payments.

<sup>g</sup> The fourth break-even return is the *total cost break-even return*. Only when this break-even return is received can the grower recover all out-of-pocket expenses plus opportunity costs.

Table 5. Summary of annual capital requirements for a nine-acre fresh-market Bartlett pear block.

	Establishment Years						Full Production <sup>a</sup>
	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	
<b>Annual Requirements (\$)</b>							
Land (10 acres)	180,000						
Trellis System	63,000						
Irrigation System	34,650						
Mainline & Pump	0						
Pond	0						
Wind Machine			32,533				
Operating Expenses	99,033	32,505	60,828	113,304	145,322	175,829	228,521
<b>Total Requirements (\$)</b>	<b>376,683</b>	<b>32,505</b>	<b>93,361</b>	<b>113,304</b>	<b>145,322</b>	<b>175,829</b>	<b>228,521</b>
<b>Receipts (\$)</b>	<b>0</b>	<b>0</b>	<b>32,184</b>	<b>110,448</b>	<b>175,419</b>	<b>227,997</b>	<b>324,909</b>
<b>Net Requirements (\$)</b>	<b>376,683</b>	<b>32,505</b>	<b>61,177</b>	<b>2,856</b>	<b>(30,097)</b>	<b>(52,168)</b>	<b>(96,388)</b>

<sup>a</sup> The full production year is representative of all the remaining years the orchard is in full production (Year 7 to Year 25).

Table 6. Machinery, equipment, and building requirements for a 300-acre diverse cultivar pear orchard.

	Purchase Price (\$) <sup>a</sup>	Number of Units	Total Cost (\$)
Housing for Manager	135,000	1	135,000
Machine Shop/Shed <sup>b</sup>	150,000	1	150,000
Tractor-70HP, 4WD	45,000	5	225,000
Tractor-40HP, 4WD	25,000	2	50,000
4-Wheeler	7,500	3	22,500
Speed Sprayer	25,000	5	125,000
Weed Spray Boom & Tank	7,000	1	7,000
Mower—Rotary (7 ft)	5,000	1	5,000
Flail Mower	8,000	1	8,000
Forklift	25,000	2	50,000
Bin Trailer	7,500	3	22,500
Pickup Truck	35,000	1	35,000
Ladder (10 ft)	210	100	21,000
Miscellaneous Equipment <sup>c</sup>	50,000	1	50,000
Shop Equipment <sup>d</sup>	15,000	1	15,000
<b>Total Cost</b>			<b>921,000</b>

Notes: These are the machinery, equipment, and building requirements for the 300-acre pear orchard, which include fresh-market Bartlett pears. The costs of fixed capital are allocated on the entire farm operation.

<sup>a</sup> Purchase price corresponds to new machinery, equipment, or building.

<sup>b</sup> Includes manager office, restroom, pesticide handling area and storage, dry storage, area for equipment cover, and shop bay for equipment work and repair.

<sup>c</sup> Includes two mobile portable toilets, box blade, straight blade, quick connect loader, mechanical weeder, detachable bucket for loading fertilizer, gopher baiter, soil aerator, utility trailer, and two ladder trailers.

<sup>d</sup> Includes compressor, welder, pressure washer, and miscellaneous tools.

Table 7. Annual interest costs per acre for a nine-acre fresh-market Bartlett pear block.

	Total Purchase Price (\$)	Salvage Value (\$) <sup>a</sup>	Number of Acres	Total Interest Cost (\$)	Interest Cost per Acre (\$) <sup>b</sup>
Irrigation System <sup>c</sup>	34,650	0	9	866	96.25
Land	180,000	N/A	10	9,000	900.00
Machinery, Equipment & Building <sup>d,e</sup>	921,000	63,600	300	24,615	82.05
Trellis <sup>c</sup>	63,000	0	9	1,575	175.00
Wind Machine <sup>c</sup>	32,533	0	9	813	90.37
<i>Interest Rate</i>	<i>5.0%</i>				

<sup>a</sup> Not applied to land because land is not a depreciable asset.

<sup>b</sup> Interest cost is calculated as: (Total Purchase Price + Salvage Value)/2 × Interest Rate. For land, the calculation is: Total Purchase Price × Interest Rate, because there is no salvage value for land.

<sup>c</sup> The irrigation system and wind machine are used for the direct production of the fruit. Hence, their respective interest costs are divided by the production area (i.e., nine acres) to get the interest cost per acre.

<sup>d</sup> Total area of the diverse cultivar pear orchard operation is 300 acres, and the machinery, equipment, and building are used in the entire farm. Thus, the corresponding interest costs are divided by the total area (i.e., 300 acres) to derive the interest cost per acre.

<sup>e</sup> See the Excel Workbook (Appendix 3) for a detailed calculation of the salvage value of the machinery, equipment, and building.

Table 8. Annual depreciation costs per acre for a nine-acre fresh-market Bartlett pear block.

	<b>Total Purchase Price (\$)</b>	<b>Number of Acres</b>	<b>Total Value per Acre (\$)</b>	<b>Years of Useful Life</b>	<b>Depreciation Cost per Acre (\$/yr)<sup>a</sup></b>
Irrigation System	34,650	9	3,850.00	25	154.00
Trellis	63,000	9	7,000.00	25	280.00
Wind Machine	32,533	9	3,614.73	25	144.59
Machinery, Equipment & Building <sup>b</sup>					229.22

<sup>a</sup> The depreciation cost is calculated as straight-line depreciation: (Total Purchase Price – Salvage Value)/Years of Use.

<sup>b</sup> See the Excel Workbook (Appendix 3) for calculation of the depreciation cost of the machinery, equipment, and building.

## Excel Workbook

The enterprise budget (Table 2) as well as associated data underlying the per-acre cost calculations (Tables 5 through 8 and Appendices 1 through 5 for establishment costs, full production costs, calculation of salvage value and depreciation costs, amortization calculator, and all production-related data) are available at the [WSU School of Economic Sciences Extension website](#). Owner-operators can modify select values and thus use the Excel Workbook to evaluate their own production costs and returns.

## Acknowledgment

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## References

USDA NASS (National Agricultural Statistics Service). 2017. [Washington Tree Fruit Acreage Report 2017](#).

USDA NASS (National Agricultural Statistics Service). 2022. [Quick Stats](#).

WSTFA (Washington State Tree Fruit Association). 2021. Annual Crop Summary: 2017–2021 Production and Marketing Season.

By

**R. Karina Gallardo**, Professor and Extension Specialist, School of Economic Sciences, Puyallup Research and Extension Center, Center for Precision and Automated Agricultural Systems, Washington State University

**Suzette P. Galinato**, Extension Assistant Professor, Agriculture and Natural Resources, Washington State University

**Louis Nottingham**, Research Assistant Professor, Tree Fruit Entomology, Washington State University



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