2021–2022 COST ESTIMATES OF ESTABLISHING, PRODUCING, AND PACKING SKEENA SWEET CHERRIES IN WASHINGTON STATE

Preface

The results presented in this WSU publication serve as a general guide for evaluating the feasibility of producing Skeena sweet cherries in Washington State in 2021–2022. 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
- Sweet cherry prices
- Orchard size
- Management skills

Cost estimations in the enterprise budget also vary depending on the budget's 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.

Skeena Sweet Cherry Production in Washington State

Washington State is the number one producer of sweet cherries in the United States. In 2019, the gross value of sweet cherries was about $394 million, ranking it eighth in terms of overall value of agricultural commodities produced in the state (WSDA 2021).

The top five sweet cherry varieties in Washington State, in terms of bearing acreage, are Bing, Sweetheart, Chelan, Rainier, and Skeena. The bearing acreage of Skeena is about 6% of the state total for sweet cherries in 2017, as compared to the respective shares of Bing, Sweetheart, Chelan, and Rainier at 53%, 11%, 10%, and 7%. There were 2,468 bearing acres of Skeena sweet cherries in 2017, distributed among four production regions: 37.7% in the Yakima Valley, 37.6% in Wenatchee, 22.6% in the Columbia Basin, and 2.1% in other areas (USDA NASS 2017). The free on board (FOB) price of Skeena in 2021 was $2.27/lb. Between 2017 and 2021, the minimum and maximum prices of Skeena were $1.77/lb and $2.96/lb, respectively. The five-year average FOB price was $2.19/lb, which is about 4% lower than in 2021 (WSTFA 2021).

Study Objectives

The primary use of this report is in identifying inputs, costs, and yields considered typical of well-managed Skeena sweet cherry orchards.

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

Information Sources

The data used in this study were collected from information shared by a group of experienced Skeena cherry 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

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EXTENSION

no unforeseen failures occur. Given that many factors affect production costs, packout, and returns, individual growers can use the Excel Workbook (available at the School of Economic Sciences Crop Enterprise Budgets) 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 225 acres of apples (75% of total area), 48 acres of sweet cherries (16%), and 27 acres of pears (9%).
2. This budget is based on a 13-acre Skeena sweet cherry block within a 300-acre 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 12 acres. Table 1 shows the assumed Skeena block specifications, which are generally accepted among all growers interviewed.
3. The total value of bare agricultural land (including water rights) is $18,000 per acre with annual property taxes of $107 per acre.
4. The irrigation system consists of dual system drip irrigation and micro under-tree sprinkler system. Water is provided through a public irrigation district.
5. This study assumes that the pond, mainline, and pump already exist and that only the irrigation system and wind machine are newly installed.
6. Cultural practices and harvest activities are done by using a combination of manual labor, ladders, and labor-enhancing equipment. The hourly manual labor rate for 2020 is calculated using the Washington adverse wage rate for 2021 at $16.34/hour. In this analysis, we add 25% to reflect medical leave and all administrative costs for H2A employees, including housing, amounting to $20.43/hour. Activities such as chemical application, irrigation, and frost protection cost $21.68/hour (i.e., base of $17.34/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 the same for all years of production.
7. The FOB price or gross return for Skeena sweet cherries is $2.35/lb, which is the return before all expenses, including packing charges, are subtracted.
8. Average packout for Skeena sweet cherries is 80%. Packout rate is determined by the amount of Skeena cherries that can be packed for the primary (fresh) market divided by the amount of Skeena cherries harvested.
9. Management is valued at $450 per acre.
10. 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 12-acre block of Skeena sweet cherries in 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 sweet cherries 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.

The study assumed that a Skeena sweet cherry orchard could achieve full production in the sixth year. Based on the above assumptions, the total production costs for Skeena sweet cherries during full production are estimated at $33,282 per acre. The net returns during full production are about $12,030 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 $1.75–$2.95 per pound, and the net yields are 6,400–19,200 pounds per acre, given an 80% packout. A gross yield-price combination of 16,000 pounds per acre or greater and $2.05/lb 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 2021, the break-even return for Skeena cherries is estimated at $1.97/lb for a gross production of 16,000 lb/acre and 80% packout.

Table 1. Skeena sweet cherry block specifications.

Architecture	Central leader, three-dimensional
In-row Spacing	6 feet
Between-row Spacing	12 feet
Rootstock	Gisela G12 rootstock
Productive Block Size	12 acres
Life of Planting	25 years
Tree Density	605 trees per acre
Trellis System	Vertical trellis

Table 2. Cost and returns per acre of establishing, producing, and packing Skeena sweet cherries on a 12-acre block.

	Establishment Years					Full Production[a]
	Year 1	Year 2	Year 3	Year 4	Year 5	
Estimated Net Production, Fresh (lb/acre)[b]			6,400.00	12,800.00	16,000.00	19,200.00
Estimated Price, Fresh ($/lb)[c]			2.35	2.35	2.35	2.35
Estimated Net Production, Cull (lb/acre)			1,600.00	3,200.00	4,000.00	4,800.00
Estimated Price, Cull ($/lb)			0.04	0.04	0.04	0.04
Total Returns ($/acre)			15,104.00	30,208.00	37,760.00	45,312.00
Variable Costs ($/acre):						
Establishment						
Soil Preparation	2,437.52					
Trees (including labor)	8,667.50					
Orchard Activities						
Pruning & Training[d]	204.30	715.05	1,021.50	1,225.80	1,225.80	817.20
Green Fruit Thinning[d]	0.00	0.00	0.00	0.00	0.00	0.00
Irrigation Labor[e]	108.40	151.76	151.76	195.12	195.12	195.12
Chemicals[e,f]	626.10	1,060.03	1,494.40	1,639.30	1,639.30	1,639.30
Monitoring & Testing[g]	66.00	66.00	206.00	206.00	206.00	228.00
Fertilizer[e,f]	80.14	160.50	240.64	267.76	267.76	267.76
Frost Protection (labor)[e]			16.26	16.26	16.26	16.26
Beehives			114.00	114.00	114.00	114.00
General Farm Labor[h]	225.00	225.00	225.00	225.00	225.00	225.00
Irrigation Water & Electric Charge	275.00	275.00	275.00	275.00	275.00	275.00
Drying Cherries[i]			350.00	350.00	350.00	350.00
Harvest Activities[j]						
Picking Labor			2,000.00	4,000.00	5,000.00	6,000.00
Other Labor (checkers, tractor drivers)			400.00	800.00	1,000.00	1,200.00
Hauling			120.00	240.00	300.00	360.00
Warehouse Packing Charges[k]			4,800.00	9,600.00	12,000.00	14,400.00
Maintenance and Repairs						
Maintenance & Repair	200.00	200.00	235.00	235.00	235.00	235.00
Fuel & Lube	120.00	135.00	140.00	160.00	180.00	180.00
Other Variable Costs						
Crop Insurance			375.00	375.00	375.00	375.00
Overhead (5% of Variable Costs)[l]	650.50	149.42	608.23	996.21	1,180.21	1,343.88
Interest (5% of Variable Costs)[m]	683.02	156.89	638.64	1,046.02	1,239.22	1,058.31
Total Variable Costs	14,343.48	3,294.65	13,411.42	21,966.48	26,023.68	29,279.83
Fixed Costs ($/acre):						
Depreciation						
Irrigation System	128.33	128.33	128.33	128.33	128.33	128.33
Machinery, Equipment & Building	261.92	261.92	261.92	261.92	261.92	261.92
Mainline & Pump	0.00	0.00	0.00	0.00	0.00	0.00
Pond	0.00	0.00	0.00	0.00	0.00	0.00
Trellis	225.00	225.00	225.00	225.00	225.00	225.00
Wind Machine			120.46	120.46	120.46	120.46

	Establishment Years					Full Production[a]
	Year 1	Year 2	Year 3	Year 4	Year 5	
Interest						
Irrigation System	96.25	96.25	96.25	96.25	96.25	96.25
Land[n]	900.00	900.00	900.00	900.00	900.00	900.00
Machinery, Equipment & Building	92.04	92.04	92.04	92.04	92.04	92.04
Mainline & Pump	0.00	0.00	0.00	0.00	0.00	0.00
Pond	0.00	0.00	0.00	0.00	0.00	0.00
Trellis	112.50	112.50	112.50	112.50	112.50	112.50
Wind Machine			90.35	90.35	90.35	90.35
Establishment Costs (5%)		849.48	1,188.98	1,306.65	1,102.75	
Other Fixed Costs						
Miscellaneous Supplies	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
Insurance Cost (all farm)	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
Amortized Establishment Costs[o]						1,145.72
Total Fixed Costs	2,646.04	3,495.52	4,045.84	4,163.50	3,959.60	4,002.57
TOTAL COSTS	16,989.53	6,790.16	17,457.26	26,129.97	29,983.27	33,282.40
ESTIMATED NET RETURNS	(16,989.53)	(6,790.16)	(2,353.26)	4,078.03	7,776.73	12,029.60
Accumulated Establishment Costs	16,989.53	23,779.69	26,132.95	22,054.92	14,278.20	

[a] The full production year is representative of all the remaining years the orchard is in full production (Year 6 to Year 25).
[b] Estimated net production considers an average packout of 80%.
[c] Price reflects the FOB price or gross return (i.e., the return before all expenses, including packing charges, are subtracted).
[d] Hand labor rate is $20.43/hour and includes all applicable additional expenses.
[e] Tractor/machinery, irrigation, and frost protection labor rate is $21.68/hour and includes all applicable additional expenses.
[f] Includes materials and labor.
[g] Includes the cost of monitoring each tree for symptoms and cost of testing plant sample for little cherry virus and western X.
[h] General farm labor rate is a lump sum per acre and is applied to miscellaneous/all other labor. Rate includes applicable additional expenses.
[i] Cost of drying cherries (three weeks before harvest and one week during harvest) when cherries start to turn color.
[j] Picking rate = $0.20/lb. Checkers & tractor driver rate = $0.05/lb. Hauling rate = $0.02/lb.
[k] Warehouse packing charge = $0.60/lb.
[l] Captures indirect costs of operations in the orchard that fluctuate with the level of production but are not accounted for by the variable costs already identified. Also captures unforeseeable expenses.
[m] Interest expense on full year during establishment years and for three-quarters of a year during full production.
[n] Land cost is approximated by using the 5% interest rate multiplied by the land value of $18,000 per acre.
[o] 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 5 amortized at 5% for 20 years.

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 12-acre Skeena block. Table 6 specifies the machinery and building requirements for the 300-acre multi-crop orchard. Interest costs and depreciation are listed in Tables 7 and 8, respectively. Interest costs represent 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. All interest and amortization costs assume a 5% interest rate. The amortized establishment costs assume a total productive life of 25 years, which includes 5 years of establishment and 20 years of full production. The amortized establishment costs must be recaptured during the full production years in order for an enterprise to be profitable. Depreciation costs are annual, noncash 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 the

population of sweet cherry operations in Washington State. An interactive Excel Workbook, described below, is provided to enable individual owner-operators to estimate their returns based on the costs of their production.

2022 Updates

Key cost centers have increased as of 2022 compared to 2021, mainly hourly labor, propane and fuel, and fertilizer. This increase, coupled with weather events leading to a short crop size compared to previous years, compelled the inclusion of the latest data in this publication.

For labor, the manual labor rate for 2022 is calculated using the Washington adverse wage rate for 2022 at $21.76/hour (that is, a base of $17.41/hour plus 25% to reflect medical leave and all administrative costs for H2A employees, including housing). The labor rate for activities such as chemical application, irrigation, and frost protection is $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.

Other assumptions in calculating the costs and returns for 2022 are the same as for the 2021 study.

Table 9 shows the total production costs for Skeena sweet cherries during full production, estimated at $33,815 per acre. The net returns during full production are about $11,497 per acre. Table 10 shows the sensitivity of net returns to different combinations of price and yields. A gross yield-price combination of 16,000 lb/acre or greater and $2.05/lb or higher would result in positive net returns for the owner-operator, based on the study's production and cost assumptions. The break-even price for Skeena cherries as of 2022 is estimated at $2.01/lb, assuming 80% packout and a gross production of 16,000 lb/acre (Table 11).

Excel Workbook

An Excel spreadsheet version of this enterprise budget (Table 2) as well as associated data underlying the per-acre cost calculations (Tables 5 through 8 and Appendices 1 through 6 for establishment costs, full production costs, calculation of salvage value and depreciation costs, amortization calculator, all production-related data, and net present value and payback period calculators for the Skeena sweet cherry orchard investment) are available at the WSU School of Economic Sciences Crop Enterprise Budgets website. The spreadsheets with updates for labor, fertilizer, propane fuel, and fertilizer costs as of 2022 are also available at this website.

Owner-operators can modify select values and thus use the Excel Workbook to evaluate their own production costs and returns.

Table 3. Estimated net returns ($) per acre at various prices and yields of Skeena during full production[a].

Gross Yield (lb/acre)	Net Yield (lb/acre)[b]	FOB Price ($/lb)[c]				
		$1.75	$2.05	$2.35	$2.65	$2.95
8,000	6,400	($6,070)	($4,150)	($2,230)	($310)	$1,610
12,000	9,600	($4,425)	($1,545)	$1,335	$4,215	$7,095
16,000	12,800	($2,780)	$1,060	$4,900	$8,740	$12,580
20,000	16,000	($1,135)	$3,665	$8,465	$13,265	$18,065
24,000	19,200	$510	$6,270	$12,030	$17,790	$23,550
Overhead Cost	*5%*					
Interest Cost	*5%*					

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

[a] Includes cull value. Culls comprise what remains after packing (20% of gross yield).

[b] Takes into account an average packout equivalent to 80%.

[c] Price represents the FOB price or gross return (the return before total production costs, including packing charges, are subtracted).

Table 4. Break-even return ($/lb) of Skeena sweet cherries given different crop yield levels during full production.

Gross Yield (lb/acre)	Net Yield (lb/acre)[a]	Break-even Return ($/lb)[b,c]
8,000	6,400	2.70
12,000	9,600	2.21
16,000	12,800	1.97
20,000	16,000	1.82
24,000	19,200	1.72

[a] Accounts for an average packout of 80%.

[b] Includes cull value. Culls comprise what remains after packing (i.e., 20% of gross yield).

[c] This 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. It is calculated as: *total cost minus the gross return of culls, then divided by net yield of fresh Skeena cherries*. The calculation considers the gross yield and packout, and

their associated harvest and packaging costs. For instance, if the gross yield during full production is 8,000 lb/acre, the net yield is 6,400 lb/acre given an 80% packout. Given this net yield, a return of approximately $2.70/lb must be received for the Skeena sweet cherry enterprise to break even.

Table 5. Summary of annual capital requirements for a 12-acre Skeena sweet cherry block.

	Establishment Years					Full Production[a]
	Year 1	Year 2	Year 3	Year 4	Year 5	
Annual Requirements ($)						
Land (13 acres)	234,000					
Trellis System	54,000					
Irrigation System	46,200					
Mainline & Pump	-					
Pond	-					
Wind Machine			43,367			
Operating Expenses	182,082	49,496	170,897	273,558	322,244	361,318
Total Requirements ($)	516,282	49,496	214,264	273,558	322,244	361,318
Receipts ($)	-	-	181,248	362,496	453,120	543,744
Net Requirements ($)	516,282	49,496	33,016	(88,398)	(130,876)	(182,426)

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

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

	Purchase Price ($)[a]	Number of Units	Total Cost ($)
Housing for Manager	135,000	1	135,000
Machine Shop/Shed[b]	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
Fork Lift	25,000	2	50,000
Bin Trailer	7,500	3	22,500
Pickup Truck	35,000	1	35,000
Ladder (8 ft)	100	100	10,000
Platforms	40,000	3	120,000
Miscellaneous Equipment[c]	50,000	1	50,000
Shop Equipment[d]	15,000	1	15,000
Total Cost			1,030,000

Notes: Machinery, equipment, and building requirements are utilized in growing diverse crops in the 300-acre farm, which include Skeena sweet cherries. The costs of fixed capital are allocated to the entire farm operation.

[a] Purchase price corresponds to new machinery, equipment, or building.

[b] Includes manager office, restroom, pesticide handling area and storage, dry storage, area for equipment cover, and shop bay for equipment work and repair.

[c] 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.

[d] Includes compressor, welder, pressure washer, and miscellaneous tools.

Table 7. Annual interest costs per acre for a 12-acre Skeena sweet cherry block ($/acre).

	Total Purchase Price ($)	Salvage Value ($)[a]	Number of Acres	Total Interest Cost ($)	Interest Cost per Acre ($)[b]
Irrigation System[c]	46,200	0	12	1,155	96.25
Land	234,000	N/A	13	11,700	900.00
Machinery, Equipment & Building[d,e]	1,030,000	74,500	300	27,613	92.04
Mainline & Pump[c]	0	0	12	0	0.00
Pond[c]	0	0	12	0	0.00
Trellis	54,000	0	12	1,350	112.50
Wind Machine[c]	43,367	0	12	1,084	90.35
Interest Rate	*5.0%*				

[a] Not applied to land because land is not a depreciable asset.
[b] 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.
[c] The irrigation system, mainline and pump, pond, trellis system, and wind machine are used for the direct production of the fruit. Hence, their respective interest costs are divided by the production area (12 acres) to get the interest cost per acre.
[d] Total area of the farm 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 (300 acres) to derive the interest cost per acre.
[e] See Appendix 3 of the Excel Workbook at the Crop Enterprise Budget website for a detailed calculation of the salvage value of the machinery, equipment, and building.

Table 8. Annual depreciation costs per acre for a 12-acre Skeena sweet cherry block ($/acre).

	Total Purchase Price ($)	Number of Acres	Total Value per Acre ($)	Years of Useful Life	Depreciation Cost per Acre ($/yr)[a]
Irrigation System	46,200	12	3,850.00	30	128.33
Mainline & Pump	0	12	0.00	30	0.00
Pond	0	12	0.00	50	0.00
Trellis	54,000	12	4,500.00	20	225.00
Wind Machine	43,367	12	3,613.88	30	120.46
Machinery, Equipment & Building[b]					261.92

[a] The depreciation cost is calculated as straight-line depreciation: (Total Purchase Price – Salvage Value)/Years of Use.
[b] See Appendix 3 of the Excel Workbook in the Crop Enterprise Budget website for the calculation of the depreciation cost of the machinery, equipment, and building.

Table 9. 2022 cost and returns per acre of establishing, producing, and packing Skeena sweet cherries on a 12-acre block.

	Establishment Years					Full Production[a]
	Year 1	Year 2	Year 3	Year 4	Year 5	
Estimated Net Production, Fresh (lb/acre)[b]			6,400.00	12,800.00	16,000.00	19,200.00
Estimated Price, Fresh ($/lb)[c]			2.35	2.35	2.35	2.35
Estimated Net Production, Cull (lb/acre)			1,600.00	3,200.00	4,000.00	4,800.00
Estimated Price, Cull ($/lb)			0.04	0.04	0.04	0.04
Total Returns ($/acre)			15,104.00	30,208.00	37,760.00	45,312.00
Variable Costs ($/acre):						
Establishment						
Soil Preparation	2,439.52					
Trees (including labor)	8,667.50					
Orchard Activities						
Pruning & Training[d]	217.60	761.60	1,088.00	1,305.60	1,305.60	870.40

	Establishment Years					Full Production[a]
	Year 1	Year 2	Year 3	Year 4	Year 5	
Green Fruit Thinning[d]	0.00	0.00	0.00	0.00	0.00	0.00
Irrigation Labor[e]	115.05	161.07	161.07	207.09	207.09	207.09
Chemicals[e,f]	634.57	1,074.94	1,515.77	1,662.82	1,662.82	1,662.82
Monitoring & Testing[g]	66.00	66.00	206.00	206.00	206.00	228.00
Fertilizer[e,f]	84.89	170.00	254.89	284.26	284.26	284.26
Frost Protection (labor)[e]			17.26	17.26	17.26	17.26
Beehives			114.00	114.00	114.00	114.00
General Farm Labor[h]	225.00	225.00	225.00	225.00	225.00	225.00
Irrigation Water & Electric Charge	275.00	275.00	275.00	275.00	275.00	275.00
Drying Cherries[i]			350.00	350.00	350.00	350.00
Harvest Activities[j]						
Picking Labor			2,000.00	4,000.00	5,000.00	6,000.00
Other Labor (checkers, tractor drivers)			400.00	800.00	1,000.00	1,200.00
Hauling			120.00	240.00	300.00	360.00
Warehouse Packing Charges[k]			4,800.00	9,600.00	12,000.00	14,400.00
Maintenance and Repairs						
Maintenance & Repair	265.00	265.00	300.00	300.00	300.00	300.00
Fuel & Lube	240.00	270.00	280.00	320.00	360.00	360.00
Other Variable Costs						
Crop Insurance			375.00	375.00	375.00	375.00
Overhead (5% of Variable Costs)[l]	661.51	163.43	624.10	1,014.10	1,199.10	1,361.44
Interest (5% of Variable Costs)[m]	694.58	171.60	655.30	1,064.81	1,259.06	1,072.13
Total Variable Costs	14,586.21	3,603.65	13,761.39	22,360.93	26,440.18	29,662.40
Fixed Costs ($/acre):						
Depreciation						
Irrigation System	128.33	128.33	128.33	128.33	128.33	128.33
Machinery, Equipment & Building	261.92	261.92	261.92	261.92	261.92	261.92
Mainline & Pump	0.00	0.00	0.00	0.00	0.00	0.00
Pond	0.00	0.00	0.00	0.00	0.00	0.00
Trellis	225.00	225.00	225.00	225.00	225.00	225.00
Wind Machine			120.49	120.49	120.49	120.49
Interest						
Irrigation System	96.25	96.25	96.25	96.25	96.25	96.25
Land[n]	900.00	900.00	900.00	900.00	900.00	900.00
Machinery, Equipment & Building	92.04	92.04	92.04	92.04	92.04	92.04
Mainline & Pump	0.00	0.00	0.00	0.00	0.00	0.00
Pond	0.00	0.00	0.00	0.00	0.00	0.00
Trellis	112.50	112.50	112.50	112.50	112.50	112.50
Wind Machine			90.37	90.37	90.37	90.37
Establishment Costs (5%)		861.61	1,217.18	1,353.75	1,171.93	
Other Fixed Costs						
Miscellaneous Supplies	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
Insurance Cost (all farm)	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
Amortized Establishment Costs[o]						1,295.73
Total Fixed Costs	2,646.04	3,507.65	4,074.08	4,210.65	4,028.83	4,152.63

	Establishment Years					Full Production[a]
	Year 1	Year 2	Year 3	Year 4	Year 5	
TOTAL COSTS	17,232.25	7,111.30	17,835.47	26,571.58	30,469.01	33,815.03
ESTIMATED NET RETURNS	(17,232.25)	(7,111.30)	(2,731.47)	3,636.42	7,290.99	11,496.97
Accumulated Establishment Costs	17,232.25	24,343.55	27,075.02	23,438.60	16,147.61	

[a] The full production year is representative of all the remaining years the orchard is in full production (Year 6 to Year 25).
[b] Estimated net production considers an average packout of 80%.
[c] Price reflects the FOB price or gross return (i.e., the return before all expenses, including packing charges, are subtracted).
[d] Hand labor rate is $21.76/hour and includes all applicable additional expenses.
[e] Tractor/machinery, irrigation, and frost protection labor rate is $23.01/hour and includes all applicable additional expenses.
[f] Includes materials and labor.
[g] Includes the cost of monitoring each tree for symptoms and cost of testing plant sample for little cherry virus and western X.
[h] General farm labor rate is a lump sum per acre and is applied to miscellaneous/all other labor. Rate includes applicable additional expenses.
[i] Cost of drying cherries (three weeks before harvest and one week during harvest) when cherries start to turn color.
[j] Picking rate = $0.20/lb. Checkers & tractor driver rate = $0.05/lb. Hauling rate = $0.02/lb.
[k] Warehouse packing charge = $0.60/lb.
[l] Captures indirect costs of operations in the orchard that fluctuate with the level of production but are not accounted for by the variable costs already identified. Also captures unforeseeable expenses.
[m] Interest expense on full year during establishment years and for three-quarters of a year during full production.
[n] Land cost is approximated by using the 5% interest rate multiplied by the land value of $18,000 per acre.
[o] 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 5 amortized at 5% for 20 years.

Table 10. 2022 estimated net returns ($) per acre at various prices and yields of Skeena during full production[a].

Gross Yield (lb/acre)	Net Yield (lb/acre)[b]	FOB Price ($/lb)[c]				
		$1.75	**$2.05**	**$2.35**	**$2.65**	**$2.95**
8,000	6,400	(6,603)	(4,683)	(2,763)	(843)	1,077
12,000	9,600	(4,958)	(2,078)	802	3,682	6,562
16,000	12,800	(3,313)	527	4,367	8,207	12,047
20,000	16,000	(1,668)	3,132	7,932	12,732	17,532
24,000	19,200	(23)	5,737	11,497	17,257	23,017
Overhead Cost	*5%*					
Interest Cost	*5%*					

Note: Shaded area denotes net returns based on the combination of net yield and price.
[a] Includes cull value. Culls comprise what remains after packing (20% of gross yield).
[b] Takes into account an average packout equivalent to 80%.
[c] Price represents the FOB price or gross return (the return before total production costs, including packing charges, are subtracted).

Table 11. 2022 break-even return ($/lb) of Skeena sweet cherries given different crop yield levels during full production.

Gross Yield (lb/acre)	Net Yield (lb/acre)[a]	Break-even Return ($/lb)[b,c]
8,000	6,400	2.78
12,000	9,600	2.27
16,000	12,800	2.01
20,000	16,000	1.85
24,000	19,200	1.75

[a] Accounts for an average packout of 80%.
[b] Includes cull value. Culls comprise what remains after packing (i.e., 20% of gross yield).
[c] This 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. It is calculated as: *total cost minus the gross return of culls, then divided by net yield of fresh Skeena cherries*. The calculation considers the gross yield and packout, and their associated harvest and packaging costs. For instance, if the gross yield during full production is 8,000 lb/acre, the net yield is 6,400 lb/acre given an 80% packout. Given this net yield, a return of approximately $2.78/lb must be received for the Skeena sweet cherry enterprise to break even.

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