

**AEB 0062**  
**March2020**

# **Blueberry Economics: The Costs of Establishing and Producing Organic Blueberries in the Willamette Valley**

*Scout Sutton and James Sterns*



**Oregon State University**  
College of Agricultural  
Sciences

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December 15, 2019

## INTRODUCTION

The production of blueberries in the Willamette Valley, Oregon has increased dramatically in the last twenty years. Figure 1 shows that in 1995 there were 1,950 acres of blueberries harvested in the Willamette Valley. By 2017, the acreage of harvested blueberries had increased to 11,700. This represents a 500 percent increase in acreage over a 22-year period. The relationship of blueberry prices per pound to total production in the Willamette Valley is illustrated in Figure 2. The grower price for fresh and processed blueberries has varied from year to year, often related to national supply and demand for fruit. While prices reached record highs from 2005-2007 and again from 2010-2012, recent prices have declined from the 2007 peak. In 2017 and 2018, the price for fresh and processed has been slowly trending upwards compared to the previous few years. It is important to understand that returns for blueberries vary from year to year and to plan for this when developing your own budgets for a farm.

This study uses available price data as of the 2019 growing season combined with a set of assumptions about management practices for a “representative” (i.e. hypothetical) twenty acre organic blueberry farm enterprise.

Organic acreage in Oregon is increasing at a rate similar to, or higher than, the national average, through transitioning of existing acreage or establishment of new organic acreage.

Blueberries are an expensive crop to produce. Profit and loss depend greatly on yield and price per pound. Yield for a mature farm will vary with cultivar or variety grown, soil type, and management practices. The number of years to reach full production may also vary by farm, with poorer performing farms taking longer than the 7 years assumed in this analysis. This cost of establishment and production study provides growers with a tool for economic management and decision making. This study is a product of cooperative input from interviewed growers, field representatives, researchers, and farm suppliers. The study provides typical costs and returns for a well managed 20-acre organic blueberry farm in the Willamette Valley of Oregon. Growers are encouraged to substitute their own costs to get an accurate accounting for their farm.

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\*Scout Sutton, Agricultural Business Management Research Student; James Sterns Agricultural Economist and Associate Professor; Department of Applied Economics, Oregon State University.

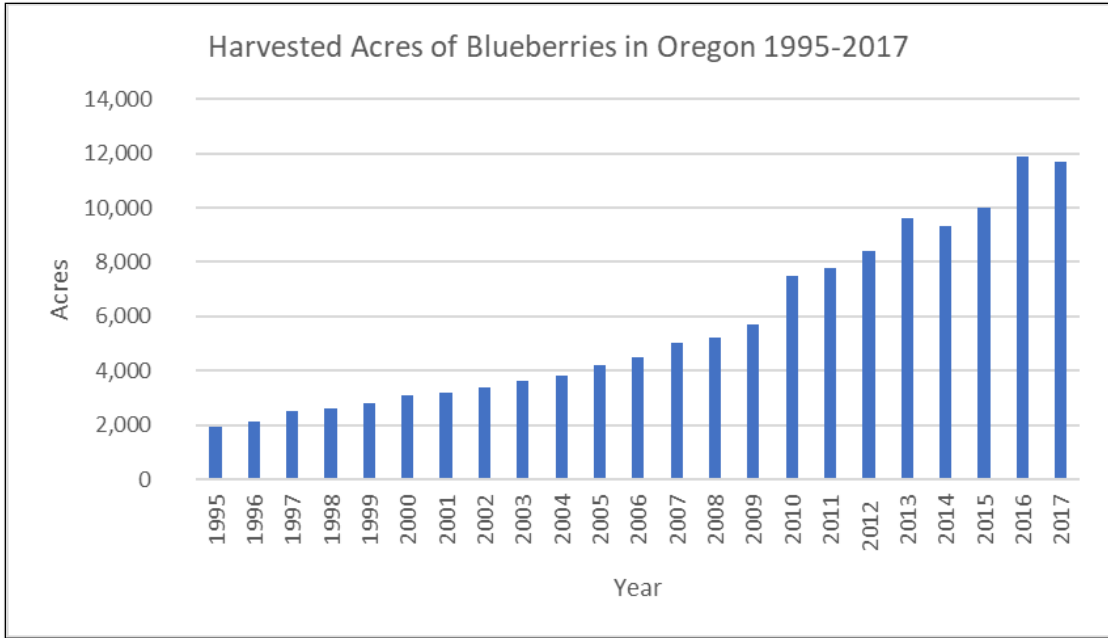


Figure 1. Harvested acres of blueberries in Oregon, 1995–2017.  
Source: USDA/NASS Fr Nt 1-3 (96 to 11).

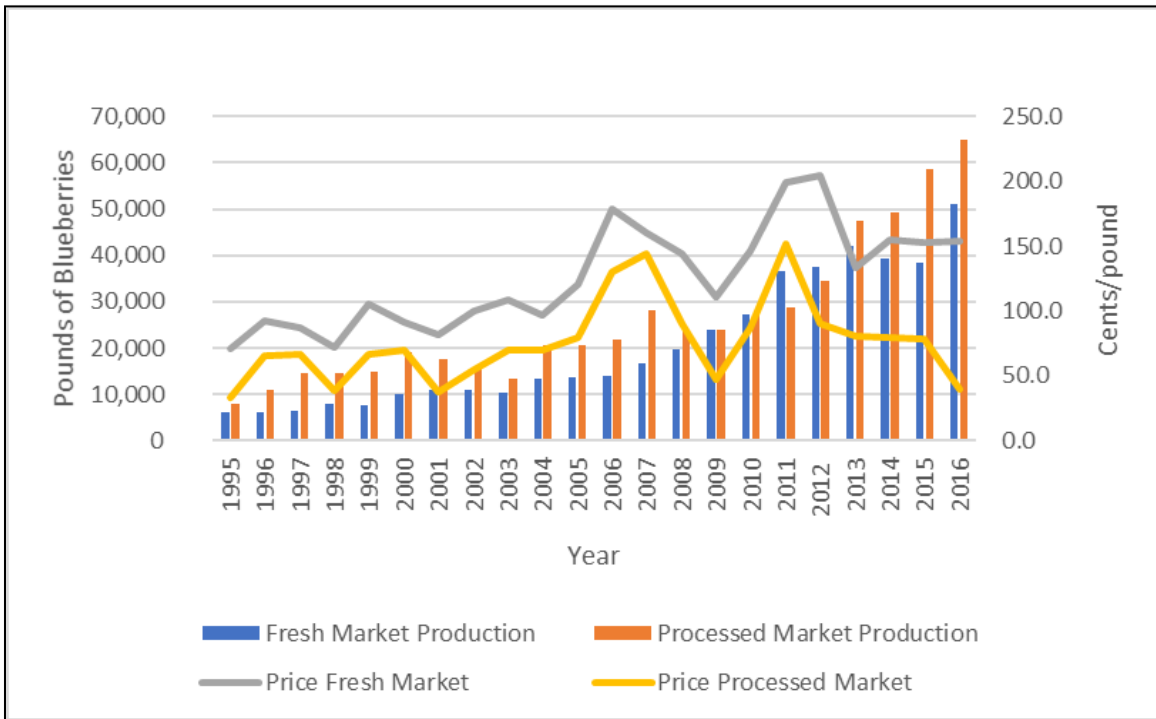


Figure 2. Oregon fresh and processed market blueberry production and prices, 1993–2010.  
Source: USDA/NASS Fr Nt 1-3 (95 to 11).

## ASSUMPTIONS

- 1) A typical producer of organic blueberries in the Willamette Valley raises 20 acres of blueberries on a 100-acre farm.
- 2) The plant spacing is 3ft x 10ft (1, 452 plants/acre). Plants cost \$4.00 each and are planted in October of year 0
- 3) The field has a 25 year life including all establishment years.
- 4) The soil is uniform throughout the 20-acre field and is well suited to blueberry production.
- 5) Pre-planting land preparation (plowing, disking, etc.) is contracted with custom farming providers.
- 6) Sawdust and chicken compost are incorporated prior to forming raised beds and planting blueberries.
- 7) It is assumed the field has been tiled to improve drainage. The cost for tiling (estimated at \$1,200 per acre) is assumed to be on the land's value.
- 8) The field is ready for planting with no weed or soil amendment issues. Land has already been transitioned to and certified for organic production.
- 9) A drip irrigation system is installed before planting in year 0 at a cost of \$50,000 (pump, filter, injector, manifold, lines and emitters) for the 20 acre field and has a 15 year expected life.
- 10) Repairs and maintenance for the irrigation system costs one percent of the purchase price per year.
- 11) Weed mat (landscape fabric) is used for weed management.
- 12) Weed mat is installed as two pieces that overlap in the row and are held down with pins; this allows the weed mat to be "un-zipped" prior to applying granular fertilizer products.
- 13) Sawdust mulch is applied around plants in the ~ 1 foot diameter "planting hole". Hand weeding is used to manage weeds around the blueberry planting hole.
- 14) An organic grass cover crop is established between the rows.
- 15) A string trimmer is used to keep the edges of the cover crop from encroaching on the weed mat.
- 16) Fish emulsion fertilizer is applied through the drip irrigation system at a rate of 25 lb N/a in years 1 and 2. 50 lb in year 3, 100 lb in year 4 and 120 lb N/a beginning in year 5.
- 17) Chicken compost along with any required soil nutrients (e.g. borax, gypsum) are applied in a broadcast band to the row and under the weed mat using a spreader followed by hand raking. This is done every two years, starting in year three.
- 18) Commercial production begins in year 2 with typical yields of 1,500 lbs./acre. Full production begins in year 7 with typical yields of 18,000 lbs./acre.
- 19) Various types of techniques, including cannons and a rented AV alarm, are used to reduce bird depredation.
- 20) Berries are hand harvested through year 6 of establishment and for the purpose of this study, are also hand harvested at full production.
- 21) This study assumes the organic blueberry fresh market price is \$2.10 per lb. and the processed market price is \$1.20 per lb. (based on average prices in the past three years). We assume that all machine harvested berries are sold to berry processors.
- 22) A machine shed and all farm equipment are owned by the operator.
- 23) The machinery and equipment used in the budget reflect the typical machinery complement of a Willamette Valley blueberry grower. A detailed breakdown of machinery values is shown in Table 1. Table 2

- provides estimated machinery costs from the American Society of Agricultural Engineers. Table 3 lists the estimated cost of each operation.
- 24) Gasoline and diesel costs per gallon are \$3.00 and \$3.25, respectively.
  - 25) General labor is valued at \$14.70 per hour and equipment operator labor is valued at \$21.10 per hour, which includes worker's compensation, unemployment insurance, and other labor overhead expenses.
  - 26) The trellis is installed in year 2 at a cost of \$34,000 (\$1,700 per acre). Repairs and maintenance for the system costs one percent of the purchase price per year.
  - 27) The interest rate on operating funds is 8.5 percent and treated as a cash expense. One-half of the cash expenses are borrowed for a six-month period.
  - 28) Machinery and land are owned by the operator and assessed 8.5 and 5 percent rates of interest, respectively, as a return on owner's investment. Land is valued at \$15,000 per acre. The 5 percent return on land is equivalent to the current rate land owners could charge for rent to other growers.
  - 29) \$1,140 per year was budgeted under "Compliance". Compliance includes record keeping, inspection fees, auditing, certification, documentation, training, and lab testing (e.g. water quality). Additional information about Compliance can be found in Table 4.
  - 30) Previous year's net establishment costs are funded by the operator at a charge of 10 percent interest as a return on owner's investment.
  - 31) Unrecovered establishment costs are amortized over the remaining 18 years of assumed field life and included as a fixed cost in the full production budget.
  - 32) Additional assumptions are listed for variable, fixed cash, and fixed non-cash costs in Table 5.
  - 33) Price inflation for the time period of this study is ignored.
  - 34) Owner management, family living, State and Federal income tax consequences are ignored for this study.

**Table 1. Machinery Cost Assumptions.**

Machine	Size or Description	Market value	Hours or miles of annual use	Expected life (years)	Salvage Value
Tractor	4 wheel dr 35hp, new	\$32,000	238	22	\$ 3,475
Mower, Self Prop	25hp gas, mulch kit, 5'	7,000	43	5	\$ 3,137
String Weed Trimmer	Gas, Hand Held	350	187	5	0
Air-Blast Sprayer	200 gallon unit, PTO, New	13,000	110	15	1248
Mower, Flail	5' unit	6,000	6	15	576
Planter	6' unit	5600	8	15	538
Fertilizer spreader	Broadcast bander	4000	14	15	384
Pickup*	1/2 ton 4x4, gas, new	27930	12,000	10	10,562
ATV*	4 wheeler, new	5980	3,000	7	2,983
Potable toilets	Rental units and servicing	750	N/A	N/A	0
Irrigation system	Pump, filter, injector, manifold, lines, and emitters	50000	N/A	15	0
Trellis system, per acre	Two wire, wooden end post, metal in-row post	1700	N/A	20	0
Shop and machine shed	40ft x 80ft Pole barn with partial slab floor	42633	N/A	30	0

\* Truck and ATV budget allocation will be 20% of total farm usage to reflect berry portion of farm.

**Table 2. Machinery Cost Calculations.**

Machine	Size or Description	--- Variable costs ---				----- Fixed costs -----		Total
		Fuel & Lube	Repairs & Maint.	Depr. & Interest	Insurance			
----- Costs per hour -----								
Tractor	4 wheel dr 35hp, new	\$12.15	\$0.50	\$9.90	\$0.67			\$23.22
Mower, Selfprop	25hp gas, mulch kit, 5'	\$4.03	\$0.00	\$23.79	\$1.06			\$28.87
String Weed Trimmer	Gas, hand held	\$0.29	\$0.00	\$0.47	\$0.01			\$0.76
Air-blast sprayer	200 gallon unit, PTO, new	0.00	5.80	11.83	0.63			18.26
Mower	Flail, 5' unit	0.00	2.56	8.64	0.46			11.66
Weed sprayer	3 point, 200 gallon unit	0.00	1.64	23.98	1.27			26.89
Planter	6' unit	0.00	1.10	56.46	2.99			60.54
Fertilizer spreader	Broadcast bander	0.00	1.02	27.10	1.43			29.56
----- Costs per mile -----								
Pickup*	1/2 ton 4x4, gas, new	\$0.29	\$0.06	\$0.24	\$0.09			\$0.68
ATV*	4 wheeler, new	\$0.08	\$0.05	\$0.23	\$0.09			\$0.45
----- Costs per acre -----								
Potable toilets	Rental units and servicing	0.00	0.00	0.00	0.00			37.50
Weed Map	Per Acre	0.00	12.00	250.20	0.00			262.20
Irrigation system	Pump, filter, injector, manifold, lines, and emitters	0.00	25.00	266.67	0.00			291.67
Trellis system, per acre	Two wire, wooden end post, metal in-row post	0.00	17.00	87.55	0.00			104.55
Shop and machine shed	40ft x 80ft Pole barn with partial slab floor	0.00	56.49	198.95	0.00			255.44

\* Truck and ATV budget allocation will be 20% of total farm usage to reflect berry portion of farm.

Operation	Miles per hour	Acres per hour	-- Machine costs --			
			Labor cost per acre	Variable cost per acre	Fixed cost per acre	Total cost per acre
Air-blast sprayer	3.00	1.82	\$14.79	\$10.15	\$12.66	\$37.60
Mower, Flail	3.00	3.09	8.70	4.92	6.36	19.98
Mower, Selfprop	4.50	4.64	4.10	0.87	5.36	10.32
String Weed Trimmer	0.33	0.32	42.18	0.90	1.48	44.57
Planter	2.50	2.42	11.09	5.67	28.88	45.64
Fertilizer spreader	3.00	2.91	9.24	4.70	13.44	27.38

**Table 4. Compliance Costs and Estimations**

Various categories of compliance include legal, regulatory, and market programs. For this enterprise budget compliance costs are estimated to be \$1,140. Specific examples by general categories are listed below. Since not all growers participate in all programs, we recommend that growers compliance costs be based upon specific program participation.

For purposes of this enterprise budget, “compliance” includes: record keeping, inspection fees, auditing, certification, documentation, training, and lab testing.

Category	Examples	Range of Costs
<b>Labor</b>	OSHA Outreach Training	\$79-179 per certification per operation
<b>Environment</b>	Water testing	\$70-150 per test (completed biannually)
	Food Alliance	\$750-1200 (valid for three years)
	LIVE	\$350/acre up to 20 acres. Plus \$5/acre for additional acres above 20.
	Salmon Safe	\$95 Annually
<b>Market Channels</b>	Global GAP	\$153 certificate license fees \$175 for producer registration fee (for operations between 30-100 acres)
	ISO (Such as ISO 22000)	\$1,500-2,500 Initial certification \$600-900 annual cost (annual audits and trainings)
<b>Food Safety</b>	FISMA – Produce Rule compliance	Very small Farm: \$25,000-\$250,000 in annual sales, \$4,477/year
		Small Farm: \$250,001-\$500,000 in annual sales, \$12,384/year

**Table 5. Input assumptions for variable, harvest and fixed cost, per acre.**

	Year 0	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Full (hh)
Prices per lb, fresh market	\$0.00	\$0.00	\$2.10	\$2.10	\$2.10	\$2.10	\$2.10	\$2.10
Prices per lb, processed market	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$1.20
Lbs per acre, fresh market	0	0	1,500	3,600	7,200	10,800	14,400	16,200
Lbs per acre, processed market	0	0	0	0	0	0	0	1,800
Cost of general farm labor, per hour	\$14.70	\$15.39	\$16.34	\$17.30	\$17.82	\$18.36	\$18.91	\$19.47
Cost of tractor driver, per hour	\$21.10	\$21.24	\$22.56	\$23.89	\$24.61	\$25.34	\$26.10	\$26.89
Cost to load & haul berries, per lb	\$0.00	\$0.00	\$0.03	\$0.03	\$0.03	\$0.03	\$0.03	\$0.03
Berry commission fee, \$ per lb	\$0.00	\$0.00	\$0.04	\$0.04	\$0.04	\$0.04	\$0.04	\$0.04
Cost of fertilizer	\$120	\$170	\$350	\$350	\$350	\$350	\$350	\$350
Cost string trimmer supplies	\$0	\$5	\$15	\$15	\$15	\$15	\$15	\$15
Cost of pest/disease control materials	\$0	\$0	\$600	\$600	\$600	\$600	\$600	\$600
Cost of tissue analysis, per acre	\$0	\$0	\$10	\$10	\$10	\$10	\$10	\$10
Cost of soil analysis, per acre	\$8	\$0	\$0	\$0	\$8	\$0	\$0	\$2
Cost of bird control	\$0	\$0	\$150	\$150	\$150	\$150	\$150	\$150
Cost of bee hives	\$0	\$0	\$80	\$80	\$80	\$80	\$80	\$80
Cost of plants	\$4	\$4	\$0	\$0	\$0	\$0	\$0	\$0
Cost of hand-harvest labor, per lb	\$0.00	\$0.00	\$0.75	\$0.75	\$0.75	\$0.75	\$0.75	\$0.75
Cost of irrigation water and power	\$150	\$150	\$150	\$150	\$150	\$150	\$150	\$150
Cost of organic grass seed	\$150	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Cost of sawdust, per unit	\$85	\$85	\$0	\$0	\$85	\$0	\$0	\$85
Cost of loader rental	\$1,250	\$1,250	\$0	\$0	\$1,250	\$0	\$0	\$334
Cost of Chicken Compost, per ton	\$100	\$0	\$0	\$100	\$0	\$100	\$0	\$100
Organic Certification, Oregon Tilth	\$0	\$35.00	\$26.95	\$28.70	\$30.65	\$33.55	\$37.40	\$37.40
Tons of Chicken Compost	5	0	0	5	0	5	0	2.5
Units of sawdust	19	11.00	0	0	11	0	0	4
Hours of labor, pruning	0	0	15	30	50	70	85	85
Hours of labor, to install/open and close weed map	50	0	0	35	0	35	0	17
Hours of labor, to rake compost/mulch	0	0	0	10	0	10	0	5
Hours of labor, hand weeding	0	18	10	10	10	10	10	10
Hours of irrigating labor	32	3	3	3	3	3	3	3
Hours of fertigation labor	0	3	3	3	3	3	3	3
Hours of labor to plant	50	5	0	0	0	0	0	0
Hours of trellis labor	0	0	30	1	1	1	1	1
Hours of IPM scouting	0	0	5	5	5	5	5	5
Hours of bird control	0	0	1	1	1	1	1	1
Hives per acre	0	0	3	3	3	3	3	3
Portable toilets per acre	0	0.50	0.50	0.75	0.75	0.75	0.75	0.75
Times to flail mow	0	2	2	2	2	2	2	2
Times to string trim edges	0	1	3	3	3	3	3	3
Times to fertilize, broadcast app	0	0	0	1	0	1	0	1
Times to apply disease and pest materials	0	2	10	10	10	10	10	10
Times to mow, selfprop.	0	3	10	10	10	10	10	10
Compliance	1140	1140	1140	1140	1140	1140	1140	1140
Property taxes	\$30	\$30	\$30	\$30	\$30	\$30	\$30	\$30
Property insurance	\$25	\$25	\$25	\$25	\$25	\$25	\$25	\$25
Land values	\$15,000	\$15,000	\$15,000	\$15,000	\$15,000	\$15,000	\$15,000	\$15,000
Miscellaneous & overhead	\$200	\$200	\$200	\$200	\$200	\$200	\$200	\$200
Fuel use gal/hr for tractor	3.25	3.25	3.25	3.25	3.25	3.25	3.25	3.25
Gasoline price	\$3.00	\$3.00	\$3.00	\$3.00	\$3.00	\$3.00	\$3.00	\$3.00
Diesel fuel price	\$3.25	\$3.25	\$3.25	\$3.25	\$3.25	\$3.25	\$3.25	\$3.25
Operating interest rate	6.0%	6.0%	6.0%	6.0%	6.0%	6.0%	6.0%	6.0%
Machinery interest rate	6.0%	6.0%	6.0%	6.0%	6.0%	6.0%	6.0%	6.0%
Land interest rate	6.0%	6.0%	6.0%	6.0%	6.0%	6.0%	6.0%	6.0%
Establishment interest rate	6.0%	6.0%	6.0%	6.0%	6.0%	6.0%	6.0%	6.0%
% of operating capital borrowed	50.0%	50.0%	50.0%	50.0%	50.0%	50.0%	50.0%	50.0%
Months to borrow operating capital	6	6	6	6	6	6	6	6
Planted bushes	1452	35	0	0	0	0	0	0



## Results of establishing and producing organic blueberries in the Willamette Valley, Oregon

### *Cash flow analysis*

This section presents cash flow analyses showing the cash costs required to establish a blueberry planting under each of the assumptions previously presented. The income, variable costs and cash fixed costs are shown for establishment through full production years. Table 6 contains a cash flow analysis for establishing an organic blueberry planting. In this scenario, production begins in year two with 1,500 pounds of berries per acre and increases to 16,200 pounds at full production by year seven. Total variable costs are \$11,450.12 per acre in year zero (the planting year). A positive cash flow begins in year four.

Figure 3 shows the major cost components in relation to total cash costs for establishing a fresh market blueberry planting. Harvest costs are the largest cost representing 47 percent of the total cash costs. Hired labor, excluding harvest, is next with 17 percent, followed by fertilizers and chemicals at 5 percent of cash costs.

### *Economic Costs and Returns*

This section presents the economic analyses of establishing a fresh market organic blueberry planting. Economic costs include all the cash costs listed in Table 7 along with the ownership costs that are either an opportunity cost to the owner or interest paid on funds borrowed from a financial institution. Table 7 details the economic costs and returns for the establishment of a fresh market blueberry planting. Total economic costs in year zero are projected to be \$12,807. Gross income exceeds variable costs beginning in year four with a \$5,633

per acre return to the grower. Estimated net returns becomes positive in year four at \$2,279.

Figure 5 shows the cost components in relation to total economic costs. When all economic costs are included, harvest costs are the largest cost item at 40 percent of the total establishment costs. Hired labor is next at 14%. Followed by interest at 13 percent.

Figure 6 shows economic returns from a fresh market production system by planting size over 25 years. The study developed the costs of production based upon a 20 acre planting. If considering establishing a blueberry planting, the size of the planting can impact the likelihood of achieving financial objectives. As with any agricultural enterprise there is a minimum complement of equipment and field infrastructure, such as an irrigation system, necessary to perform all the production and harvest activities. This equipment and infrastructure establish a level of fixed costs that burdens the farm regardless of production and requires a fixed amount of revenue to meet financial obligations. However, when looked at on a per acre basis, this burden decreases as farm size increases. Larger plantings spread these fixed costs over more acres; therefore, each acre requires a smaller amount of gross revenue to cover the fixed cost burden.

Figure 6 shows the impact of operation size (as measured in harvested acres) on economic costs. This study predicts that at 5 acres the operation would leave the grower with cumulative returns of approximately \$74,000.

In comparison, 10-acre, 20-acre, 40-acre and 80-acre operations have approximated cumulative returns (rounded to the nearest 1000) of \$150,000, \$177,000, \$200,000, and \$215,000. respectively. A further note on operation size can be found in Appendix B: *A look at the Oregon Blueberry Industry.*

In addition to Tables 6 and 7, detailed annual budgets for each year of establishment are provided in Appendix A, Tables 8-15.

**Table 6. Cash Costs and Returns of Establishing and Producing Blueberries in Oregon's Willamette Valley.**

<b>Income:</b>	<b>Year 0</b>	<b>Year 1</b>	<b>Year 2</b>	<b>Year 3</b>	<b>Year 4</b>	<b>Year 5</b>	<b>Year 6</b>	<b>Full Prod HH</b>
Yield (lbs/acre) fresh	0	0	1,500	3,600	7,200	10,800	14,400	16,200
Processed	0	0	0	0	0	0	0	1,800
Price (dollars/lb) Fresh	0	0	2.10	2.10	2.10	2.10	2.10	2.10
Price (dollars/lb) Processed	<u>0.00</u>	<u>0.00</u>	<u>0.00</u>	<u>0.00</u>	<u>0.00</u>	<u>0.00</u>	<u>0.00</u>	<u>1.20</u>
<b>Gross Income(dollars/acre)</b>	0	0	3,150	7,560	15,120	22,680	30,240	36,180
<b>Variable Costs (per acre):</b>								
Custom work/Rental equipt.	914.54	62.50	0.00	0.00	0.00	62.50	0.00	16.70
Blueberry bushes	5,082.00	140.00	0.00	0.00	0.00	0.00	0.00	0.00
Fertilizer	0.00	200.00	350.00	350.00	350.00	350.00	350.00	1,000.00
Soil test	8.00	0.00	0.00	0.00	8.00	0.00	0.00	2.00
Chemicals	0.00	0.00	600.00	600.00	600.00	600.00	600.00	600.00
Sawdust/chicken compost	1,775.00	18.00	0.00	500.00	0.00	500.00	0.00	500.00
Weed Mat	1,524.25	12.00	12.00	12.00	12.00	12.00	12.00	12.00
Harvest costs	0.00	0.00	1,240.00	2,962.00	5,914.00	8,866.00	11,800.00	14,770.00
Pruning Labor	0.00	0.00	245.11	519.09	891.10	1,284.96	1,607.12	1,704.76
General labor	1,604.30	394.86	707.85	1,531.41	705.29	912.96	750.85	1,262.82
Machine costs	56.42	61.71	212.90	217.60	199.44	217.60	199.44	223.22
Irrigation	64.70	221.20	175.00	126.91	75.00	75.00	75.00	75.00
Trellis	0.00	0.00	490.21	17.00	17.00	17.00	17.00	17.00
Bee hives	0.00	0.00	240.00	240.00	240.00	240.00	240.00	240.00
Bird Control	0.00	0.00	150.00	150.00	50.00	50.00	50.00	150.00
Organic Certification	0.00	31.25	24.95	28.70	30.65	33.55	37.40	37.40
Shop and machine shed	56.49	56.49	56.49	56.49	56.49	56.49	56.49	56.49
Miscellaneous & overhead	200.00	200.00	200.00	200.00	200.00	200.00	200.00	200.00
Interest: operating capital	<u>165.42</u>	<u>20.97</u>	<u>70.57</u>	<u>112.67</u>	<u>137.07</u>	<u>211.17</u>	<u>236.88</u>	<u>313.01</u>
Total <b>variable</b> costs	11,451.12	1,418.98	4,775.08	7,623.87	9,486.04	13,689.23	16,232.18	21,180.40
<b>Gross Income - Variable Cost</b>	-11,451.12	-1,418.98	-1,625.08	-63.87	5,633.96	8,990.77	14,007.82	14,999.60
<b>Fixed cash costs (per acre):</b>								
Compliance	57.00	57.00	57.00	57.00	57.00	57.00	57.00	57.00
Insurance	93.81	93.81	93.81	93.81	93.81	93.81	93.81	93.81
Property taxes	<u>30.00</u>	<u>30.00</u>	<u>30.00</u>	<u>30.00</u>	<u>30.00</u>	<u>30.00</u>	<u>30.00</u>	<u>30.00</u>
Total <b>fixed</b> cash cost	180.81	180.81	180.81	180.81	180.81	180.81	180.81	123.81
<b>Total cash cost</b>	11,631.93	1,599.79	4,955.89	7,804.68	9,666.85	13,870.04	16,412.99	21,304.21
<b>Net projected returns</b>	-11,631.93	-1,599.79	-1,805.89	-244.68	5,453.15	8,809.96	13,827.01	14,875.79
<b>Cumulative returns</b>	-11,631.93	-13,231.72	-15,037.61	-15,282.29	-9,829.14	-1,019.17	12,807.83	27,683.62

\* Cumulative returns for full production years is the sum of net projected returns for that year and cumulative returns from year 6.

**Table 7. Economic Costs and Returns of Establishing and Producing Blueberries in Oregon's Willamette Valley.**

<b>Income:</b>	<b>Year 0</b>	<b>Year 1</b>	<b>Year 2</b>	<b>Year 3</b>	<b>Year 4</b>	<b>Year 5</b>	<b>Year 6</b>	<b>Full Prod HH</b>
Yield (lbs/acre) fresh	0.00	0.00	1,500.00	3,600.00	7,200.00	10,800.00	14,400.00	16,200.00
Processed	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1,800.00
Price (dollars/lb) Fresh	0.00	0.00	2.10	2.10	2.10	2.10	2.10	2.10
Price (dollars/lb) Processed	<u>0.00</u>	<u>0.00</u>	<u>0.00</u>	<u>0.00</u>	<u>0.00</u>	<u>0.00</u>	<u>0.00</u>	<u>1.20</u>
Gross Income(dollars/acre)	0.00	0.00	3,150.00	7,560.00	15,120.00	22,680.00	30,240.00	36,180.00
<b>Variable Costs (per acre):</b>								
Custom work/Rental equipt.	914.54	62.50	0.00	0.00	0.00	62.50	0.00	16.70
Blueberry bushes	5,082.00	140.00	0.00	0.00	0.00	0.00	0.00	0.00
Fertilizer	0.00	200.00	350.00	350.00	350.00	350.00	350.00	1,000.00
Soil test	8.00	0.00	0.00	0.00	8.00	0.00	0.00	2.00
Chemicals	0.00	0.00	600.00	600.00	600.00	600.00	600.00	600.00
Sawdust/chicken compost	1,775.00	18.00	0.00	500.00	0.00	500.00	0.00	500.00
Weed Mat	1,524.25	12.00	12.00	12.00	12.00	12.00	12.00	12.00
Harvest costs	0.00	0.00	1,240.00	2,962.00	5,914.00	8,866.00	11,800.00	14,770.00
Pruning Labor	0.00	0.00	245.11	519.09	891.10	1,284.96	1,607.12	1,704.76
General labor	1,604.30	394.86	707.85	1,531.41	705.29	912.96	750.85	1,262.82
Machine costs	56.42	61.71	212.90	217.60	199.44	217.60	199.44	223.22
Irrigation	64.70	221.20	175.00	126.91	75.00	75.00	75.00	75.00
Trellis	0.00	0.00	490.21	17.00	17.00	17.00	17.00	17.00
Bee hives	0.00	0.00	240.00	240.00	240.00	240.00	240.00	240.00
Bird Control	0.00	0.00	150.00	150.00	50.00	50.00	50.00	150.00
Organic Certification	0.00	31.25	24.95	28.70	30.65	33.55	37.40	37.40
Shop and machine shed	56.49	56.49	56.49	56.49	56.49	56.49	56.49	56.49
Miscellaneous & overhead	200.00	200.00	200.00	200.00	200.00	200.00	200.00	200.00
Interest: operating capital	<u>165.42</u>	<u>20.97</u>	<u>70.57</u>	<u>112.67</u>	<u>137.07</u>	<u>211.17</u>	<u>236.88</u>	<u>313.01</u>
<b>Total variable costs</b>	11,451.12	1,418.98	4,775.08	7,623.87	9,486.04	13,689.23	16,232.18	21,180.40
<b>Gross revenue - Variable costs</b>	-11,451.12	-1,418.98	-1,625.08	-63.87	5,633.96	8,990.77	14,007.82	14,999.60
<b>Fixed cash costs (per acre):</b>								
Compliance	57.00	57.00	57.00	57.00	57.00	57.00	57.00	57.00
Insurance	93.81	93.81	93.81	93.81	93.81	93.81	93.81	93.81
Property taxes	<u>30.00</u>	<u>30.00</u>	<u>30.00</u>	<u>30.00</u>	<u>30.00</u>	<u>30.00</u>	<u>30.00</u>	<u>30.00</u>
<b>Total fixed cash cost</b>	180.81	180.81	180.81	180.81	180.81	180.81	180.81	180.81
<b>Total cash cost</b>	11,631.93	1,599.79	4,955.89	7,804.68	9,666.85	13,870.04	16,412.99	21,361.21
<b>FIXED NON-CASH COSTS</b>								
Mach. & equip. - dep., & int.	26.43	84.66	211.27	211.27	211.27	229.63	229.63	229.63
Pickup - dep. & int	49.65	49.65	49.65	49.65	49.65	49.65	49.65	49.65
Irrig. and Trellis - dep. & int.	0.00	266.67	266.67	354.22	354.22	354.22	354.22	354.22
Shop & machine shed	198.95	198.95	198.95	198.95	198.95	198.95	198.95	198.95
Land interest charge	900.00	900.00	900.00	900.00	900.00	900.00	900.00	900.00
Int. on prior year's est. costs	0.00	768.42	1,000.51	1,266.48	1,460.00	1,645.40	1,925.59	0.00
Amortized establishment costs	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2,535.73
<b>Total fixed non-cash costs</b>	1,175	2,268	2,627	2,981	3,174	3,378	3,658	4,268
<b>Total All costs</b>	12,807	3,868	7,583	10,785	12,841	17,248	20,071	25,629
<b>Net projected returns</b>	-12,807	-3,868	-4,433	-3,225	2,279	5,432	10,169	10,551
<b>Cumulative returns</b>	-12,807	-16,675	-21,108	-24,333	-22,054	-16,622	-6,453	4,097

\* Cumulative returns for full production years is the sum of net projected returns for that year and cumulative returns from year 6.

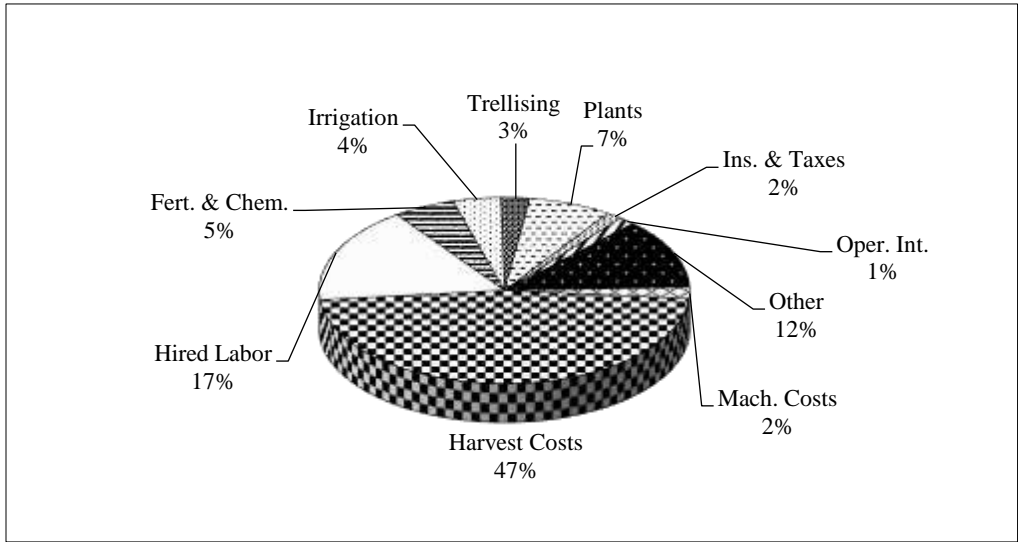


Figure 3. Cash costs per acre from years 0 - 7 to establish and produce fresh market organic blueberries in Oregon's Willamette Valley.

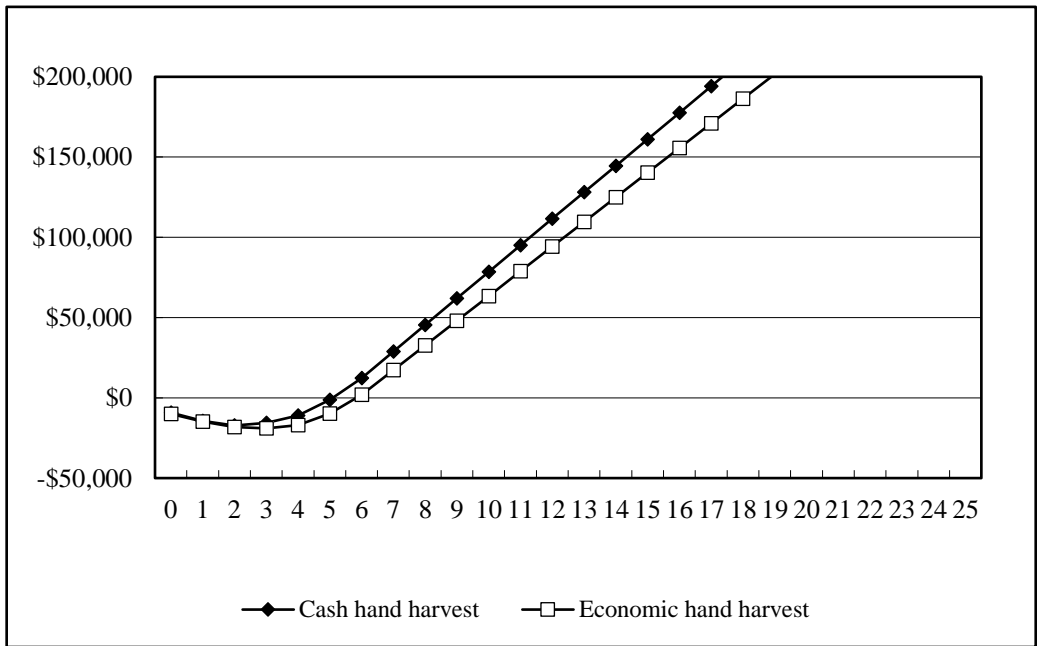


Figure 4. Comparison of cumulative cash and cumulative economic net returns per acre for establishment and production of fresh market organic blueberries in Oregon's Willamette Valley over 25 years.

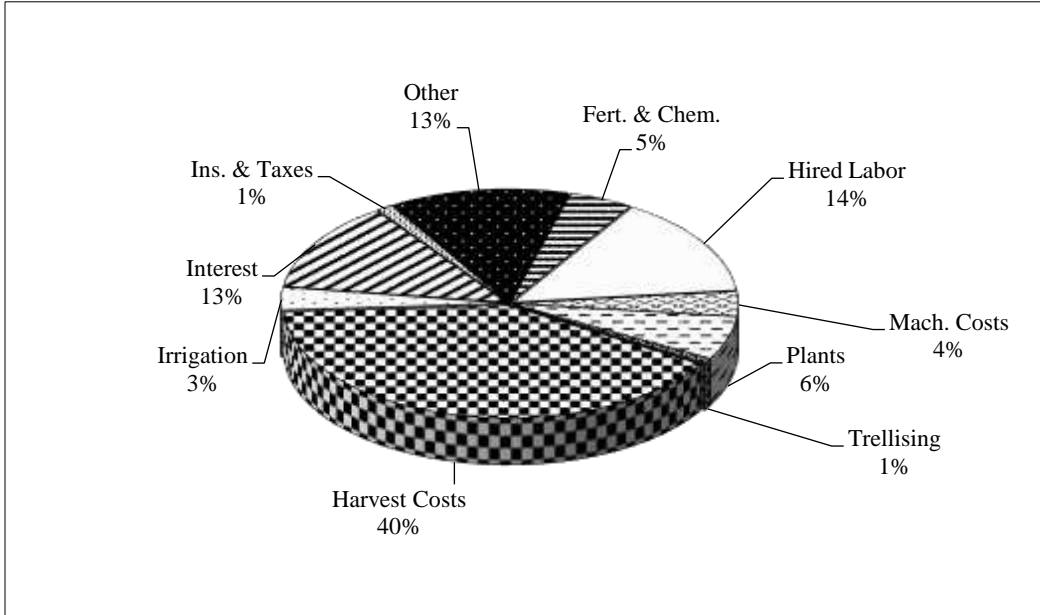


Figure 5. Economic costs per acre to establish and produce fresh market organic blueberries in Oregon's Willamette Valley, the first 7 years of establishment, by percent of total.

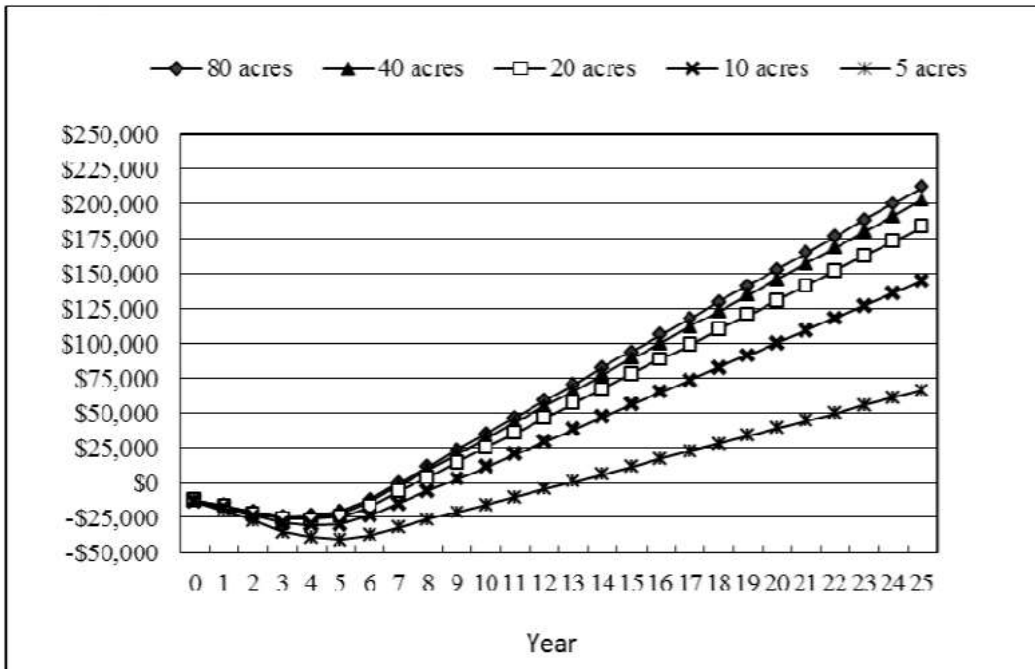


Figure 6. Projected annual economic returns per acre by farm size for hand harvested organic blueberries, over 25 years of establishment and production

## Conclusion

This cost-of-establishment study is a baseline benchmark to be used as a reference point for fresh and processed market blueberry producers and investors who are considering producing organic blueberries. Like any other enterprise budget, however, the intent is that producers use their own estimates of current costs in the budget to make it more relevant and specific to their operations. Many tools are available to assist in budgeting such as templates from university farm management specialists and computer software programs such as AgProfit™. AgProfit™ is available as a download for free at ([www.agbizprofit.org](http://www.agbizprofit.org)). Talk with your local extension agent to find the latest in tools and budget information.

Growers should consider the impact that a particular enterprise such as a blueberry planting can have on the overall financial stability of the farm business. Financial managers can recommend planting one crop over another to improve profitability, but the financial requirements to complete the planting could jeopardize cash flows, increase the debt-to-asset ratio and diminish the solvency of the farm. There are many economic and financial considerations to review before such decisions are made. Seeking advice from university extension and research faculty, industry representatives, or consultants can help in those decisions and keep a farm profitable and economically viable over time.

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- Burton, J. (2017, April). Top 10 Blueberry Producing States in America. Retrieved from <https://www.worldatlas.com/articles/the-top-blueberry-states-in-america.html>.
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# Appendix A

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Enterprise Budgets – Establishment through Full Production



**Table 8. Year 0, Blueberry Establishment, \$/acre economic costs and returns.**

VARIABLE CASH COSTS	Description	Labor	Machinery	Materials	Total
Soil sample	0.2 x / acre			8.00	8.00
-----					
Land prep, custom operation					250.00
Rip, plow, drag and roll	1 x / acre			250.00	
-----					
Preplant sawdust/compost app.					\$1,837.50
Sawdust	15 units @ \$85/Unit			\$1,275.00	
Chicken compost	5 tons @ \$100/unit			\$500.00	
Equipmental rental	\$1250 / 20 acre farm			\$62.50	
-----					
Weed Map					1,524.25
Installation labor	50 hrs / acre @ \$15.38502 / hr	769.25			
Sawdust	3 units @ \$85 / unit			255.00	
Chicken Compost	5 tons /acre @ 100 / ton			500.00	
-----					
Mark field	2 hrs / acre @ \$15.38502 / hr	30.77		10.00	40.77
Shape beds, custom	1 x / acre			500.00	500.00
-----					
Plant bushes					6,577.25
Plant material	\$4/plant @ 1452 plants/acre			5,808.00	
Labor	50 hrs / acre @ \$15.38502 / hr	769.25			
-----					
Drag field	1 x / acre	9.24	4.70		13.94
-----					
Seed cover crop between rows	1 x / acre	11.09	5.67		166.76
Seed	150			150.00	
-----					
Irrigation					64.70
Handline labor, preplant	1 hr / acre @ \$15.38502 / hr	14.70			
Power	\$50 / acre			50.00	
-----					
Pickup			42.12		42.12
ATV			3.93		3.93
Shop and machine shed				56.49	56.49
Miscellaneous and overhead				200.00	200.00
Interest: operating capital	6 months			165.42	165.42
<b>Total variable costs</b>		<b>1,604.30</b>	<b>56.42</b>	<b>9,790.40</b>	<b>11,451.12</b>
<b>FIXED CASH COSTS</b>				<b>Unit</b>	<b>Total</b>
Comliance				acre	57.00
Pickup & ATV insurance				acre	68.81
Property insurance				acre	25.00
Property taxes				acre	30.00
<b>Total fixed cash costs</b>					<b>180.81</b>
<b>FIXED NON-CASH COSTS</b>				<b>Unit</b>	<b>Total</b>
Mach. & equip. - dep., & int.				acre	26.43
Pickup & ATV - dep. & int				acre	49.65
Shop & machine shed				acre	198.95
Land interest charge				acre	900.00
<b>Total fixed non-cash costs</b>					<b>1,175.03</b>
<b>Total fixed costs</b>					<b>1,355.84</b>
<b>Total of all costs per acre</b>					<b>\$12,807</b>
<b>Projected Net Returns</b>					<b>-\$12,807</b>

**Table 9. Year 1, Organic Blueberry Establishment, \$/acre economic costs and returns.**

VARIABLE CASH COSTS	Description	Labor	Machinery	Materials	Total
Weed Control					\$337.01
Weed Mat Repair/Maint.	12/acre			12.00	
String trimmer	1xacre	42.18	0.90	5.00	
Hand weeding	18 hrs / acre @ 15.38502 /hr	276.93			
-----					
Fertilization					246.16
Fertigation labor	3 hrs / acre @ \$15.38502 / hr	46.16			
Fertilizer	\$200/acre			200.00	
-----					
Irrigation					221.20
Labor	3 hrs / acre @ \$15.38502 / hr	46.20			
Repairs and maintenance	\$25 / acre			25.00	
Water and power	\$150 / acre			150.00	
-----					
Plant bushes					231.50
Blueberry bush	\$4 / plant@ 35 plants / acre			140.00	
Sawdust	0.2 units @ \$85/unit			18.00	
Labor	5 hrs / acre @ \$15.38502 / hr	73.50			
-----					
Mowing between rows	3 x / acre	26.09	14.76		40.86
Portable toilet	0.5 unit / acre			18.75	18.75
Pickup			42.12		42.12
ATV			3.93		3.93
Shop and machine shed				56.49	56.49
Miscellaneous and overhead				200.00	200.00
Interest: operating capital	6 months			20.97	20.97
<b>Total variable costs</b>		<b>511.06</b>	<b>61.71</b>	<b>846.21</b>	<b>1,418.98</b>
<b>FIXED CASH COSTS</b>				<b>Unit</b>	<b>Total</b>
Compliance				acre	57.00
Pickup & ATV insurance				acre	68.81
Property insurance				acre	25.00
Property taxes				acre	30.00
<b>Total fixed cash costs</b>					<b>180.81</b>
<b>FIXED NON-CASH COSTS</b>				<b>Unit</b>	<b>Total</b>
Mach. & equip. - dep., & int.				acre	84.66
Pickup & ATV - dep. & int				acre	49.65
Irrig. - dep. & int.				acre	266.67
Shop & machine shed				acre	198.95
Land interest charge				acre	900.00
Int. on prior year's establishment costs				acre	768.42
<b>Total fixed non-cash costs</b>					<b>2,268.35</b>
<b>Total fixed costs</b>					<b>2,449.16</b>
<b>Total of all costs per acre</b>					<b>\$3,868.14</b>
<b>Projected Net Returns</b>					<b>-\$3,868.14</b>

**Table 10. Year 2, Blueberry Establishment, \$/acre economic costs and returns.**

TOTAL GROSS INCOME		Quantity	Unit	\$/Unit	Total		
Blue berries, fresh market		1,500	lbs	2.10	\$3,150		
Total gross income					\$3,150		
VARIABLE CASH COSTS		Description	Labor	Machinery	Materials	Total	Cost \$/lb
Pruning and brush mgmt		15 hr / acre @ \$16.340429742 / hr	245.11			253.87	0.17
Flail Mow		2 x / acre		8.76			
Weed Control						\$269.85	0.18
Weed mat repair/maintenance		12 / acre			12.00		
Hand weeding		13 hrs / acre @ \$16.340429742 / hr	212.43				
String Trimmer		3x / acre	27.72	2.70	15.00		
Disease and insect control						849.34	0.57
Applications		10 x / acre	147.86	101.48			
Materials		\$600/acre			600.00		
Fertilization						412.96	0.28
Spreader appliation		1 x / acre	9.24	4.70			
Fertigation labor		3 hrs / acre @ \$16.340429742 / hr	49.02				
Fertilizer		350/acre			350.00		
Bird control						166.34	0.11
Labor		1 hr / acre @ \$16.340429742 / hr	16.34				
Equipment		\$150/acre			150.00		
Harvest						1,240.00	0.83
Contract laborers		0.75 / lb.			1,125.00		
Load & haul berries		\$0.03 / lb.			45.00		
Berry commission fees		\$0.04 / lb.			60.00		
Tissue analysis		0.2 x / acre			10.00		
Irrigation						224.02	0.15
Labor		3 hrs / acre @ \$16.340429742 / hr	49.02				
Repairs & maint.		\$25 / acre			25.00		
Water and power		\$150/acre			150.00		
Trellis						490.21	0.33
Installation labor		30 hrs / acre @ \$16.340429742 / hr	490.21				
Mow between rows		10 x / acre	86.98	49.21		136.19	0.09
Bee hives		3 hives @ \$80 / hive			240.00	240.00	0.16
IPM scouting		5 hrs / acre @ \$16.340429742 / hr	81.70			81.70	0.05
Portable toilet		0.5 unit / acre			37.50	37.50	0.03
Pickup				42.12		42.12	0.03
ATV				3.93		3.93	0.00
Shop and machine shed					56.49	56.49	0.04
Miscellaneous and overhead					200.00	200.00	0.13
Interest: operating capital		6 months			70.57	70.57	0.05
Total variable costs			1,415.63	212.90	3,146.56	4,775.08	3.18
FIXED CASH COSTS			Unit	Total	Cost \$/lb		
Comliance			acre	57.00	0.04		
Pickup & ATV insurance			acre	68.81	0.05		
Property insurance			acre	25.00	0.02		
Property taxes			acre	30.00	0.02		
Total fixed cash costs				180.81	0.12		
FIXED NON-CASH COSTS			Unit	Total	Cost \$/lb		
Mach. & equip. - dep., & int.			acre	211.27	0.14		
Pickup & ATV insurance			acre	49.65	0.03		
Irrig. & trellis - dep. & int.			acre	266.67	0.18		
Shop & machine shed			acre	198.95	0.13		
Land interest charge			acre	900.00	0.60		
Int. on prior year's establishment costs			acre	1,000.51	0.67		
Total fixed non-cash costs				2,627.04	1.75		
Total fixed costs				2,807.85	1.87		
Total of all costs per acre				\$7,583	5.06		
Net projected returns				-\$4,433	-2.96		

**Table 11. Year 3, Blueberry Establishment, Hand Harvested, \$/acre economic costs and returns.**

TOTAL GROSS INCOME		Quantity	Unit	\$/Unit	Total		
Blue berries, fresh market		3,600	lbs	2.10	\$7,560		
Total gross income					\$7,560		
VARIABLE CASH COSTS		Description	Labor	Machinery	Materials	Total	Cost/lb
Pruning and brush mgmt		30 hr / acre @ \$17.3028810538038 / hr	519.09			527.85	0.15
Flail Mow		2 x / acre		8.76			
Weed Control						\$269.85	0.07
Weed mat repair/maintenance		12 / acre			12.00		
Hand weeding		13 hrs / acre @ \$16.340429742 / hr	212.43				
String Trimmer		3x / acre	27.72	2.70	15.00		
Disease and insect control						849.34	0.24
Applications		10 x / acre	147.86	101.48			
Materials		\$600/acre			600.00		
Fertilization						1,770.92	0.49
Compost application		1 x / acre	9.24	4.70			
Open/close weed map		35 hrs / acre @ 17.302881053/hr	605.60				
Ranking map/compost		10 hrs / acre @ 17.302881053/hr	173.03				
Loader rental		1250/ 20 acre farm			62.50		
Chicken Compost		5 tons @ \$100 / ton			500.00		
Broadcast application		1 x / acre	9.24	4.70			
Fertigation labor		3 hrs / acre @ \$17.3028810538038 / hr	51.91				
Fertilizer		\$350 / acre			350.00		
Bird control						167.30	0.05
Labor		1 hr / acre @ \$17.3028810538038 / hr	17.30				
Equipment		150/acre			150.00		
Harvest						2,962.00	
Contract harvest		0.75 / lb.			2,700.00		0.00
Load & haul berries		\$0.03 / lb.			108.00		
Berry commission fee		\$0.04 / lb.			144.00		
Tissue analysis		0.2 x / acre			10.00		
Irrigation						126.91	0.04
Labor		3 hrs / acre @ \$17.3028810538038 / hr	51.91				
Repairs & maint.		\$25 / acre			25.00		
Water and power		\$50 / acre			50.00		
Trellis						34.30	0.01
Repair & maint.		\$17 / acre			17.00		
Labor		1 hrs / acre @ \$17.3028810538038 / hr	17.30				
Bee hives		3 hives @ \$80 / hive			240.00	240.00	0.07
IPM scouting		5 hrs / acre @ \$17.3028810538038 / hr	86.51			86.51	0.02
Flail mow		10 x / acre	86.98	49.21		136.19	0.04
Portable toilet		0.75 unit / acre			37.50	37.50	0.01
Pickup				42.12		42.12	0.01
ATV				3.93		3.93	0.00
Shop and machine shed					56.49	56.49	0.02
Miscellaneous and overhead					200.00	200.00	0.06
Interest: operating capital		6 months			112.67	112.67	0.03
Total variable costs			2,016.12	217.60	5,390.16	7,623.87	2.12
FIXED CASH COSTS			Unit	Total	Cost/lb		
Compliance			acre	57.00	0.02		
Pickup & ATV insurance			acre	68.81	0.02		
Property insurance			acre	25.00	0.01		
Property taxes			acre	30.00	0.01		
Total fixed cash costs				180.81	0.05		
FIXED NON-CASH COSTS			Unit	Total	Cost/lb		
Mach. & equip. - dep., & int.			acre	211.27	0.06		
Pickup & ATV - dep. & int			acre	49.65	0.01		
Irrig. & trellis - dep. & int.			acre	354.22	0.10		
Shop & machine shed			acre	198.95	0.06		
Land interest charge			acre	900.00	0.25		
Int. on prior year's establishment costs			acre	1,266.48	0.35		
Total fixed non-cash costs				2,980.57	0.83		
Total fixed costs				3,161.38	0.88		
Total of all costs per acre				\$10,785	3.00		
Net projected returns				-\$3,225	-0.90		

**Table 12. Year 4, Blueberry Establishment, Hand Harvested, \$/acre economic costs and returns.**

TOTAL GROSS INCOME		Quantity	Unit	\$/Unit	Total		
Blue berries, fresh market		7,200	lbs	2.10	15,120		
Total gross income					15,120		
VARIABLE CASH COSTS		Description	Labor	Machinery	Materials	Total	Cost/lb
Pruning and brush mgmt		50 hr / acre @ \$17.8219674854179 / hr	891.10			899.10	0.12
Soil sample		0.2 x / acre			8.00	8.00	0.00
Weed Control						235.62	0.03
Weed mat repair/maintenance		12 / acre			12.00		
Hand weeding		10 hrs / acre @ \$17.82 / hour	178.20				
String Trimmer		3x / acre	27.72	2.70	15.00		
Disease and insect control						849.34	0.12
Applications		10 x / acre	147.86	101.48			
Materials		\$600/acre			600.00		
Fertilization						403.47	0.06
Fertigation labor		3 hrs / acre @ \$17.8219674854179 / hr	53.47				
Fertilizer		350 / acre			350.00		
Bird control						67.82	0.01
Labor		1 hr / acre @ \$17.8219674854179 / hr	17.82				
Equipment		\$50 / acre			50.00		
Harvest						5,914.00	0.82
Contract harvest		0.75 / lb.			5,400.00		
Load & haul berries		\$0.03 / lb.			216.00		
Berry commission fee		\$0.04 / lb.			288.00		
Tissue analysis		0.2 x / acre			10.00		
Irrigation						128.47	0.02
Labor		3 hrs / acre @ \$17.8219674854179 / hr	53.47				
Repairs & maint.		\$25 / acre			25.00		
Water and power		\$50 / acre			50.00		
Trellis						34.82	0.00
Repair & maint.		\$17 / acre			17.00		
Labor		1 hrs / acre @ \$17.8219674854179 / hr	17.82				
Bee hives		3 hives @ \$80 / hive			240.00	240.00	0.03
IPM scouting		5 hrs / acre @ \$17.8219674854179 / hr	89.11			89.11	0.01
Flail mow		10 x / acre	86.98	49.21		136.19	0.02
Portable toilet		0.75 unit / acre			37.50	37.50	0.01
Pickup				42.12		42.12	0.01
ATV				3.93		3.93	0.00
Shop and machine shed					56.49	56.49	0.01
Miscellaneous and overhead					200.00	200.00	0.03
Interest: operating capital		6 months			140.07	140.07	0.02
Total variable costs			1,563.54	199.44	7,715.06	9,486.04	1.32
FIXED CASH COSTS			Unit	Total	Cost/lb		
Compliance			acre	57.00	0.01		
Pickup & ATV insurance			acre	68.81	0.01		
Property insurance			acre	25.00	0.00		
Property taxes			acre	30.00	0.00		
Total fixed cash costs				180.81	0.03		
FIXED NON-CASH COSTS			Unit	Total	Cost/lb		
Mach. & equip. - dep., & int.			acre	211.27	0.03		
Pickup & ATV - dep. & int			acre	49.65	0.01		
Irrig. & trellis - dep. & int.			acre	354.22	0.05		
Shop & machine shed			acre	198.95	0.03		
Land interest charge			acre	900.00	0.13		
Int. on prior year's establishment costs			acre	1,460.00	0.20		
Total fixed non-cash costs				3,174.08	0.44		
Total fixed costs				3,354.89	0.47		
Total of all costs per acre				\$12,841	1.78		
Net projected returns				\$2,279	0.32		

**Table 13. Year 5, Blueberry Establishment, Hand Harvested, \$/acre economic costs and returns.**

TOTAL GROSS INCOME		Quantity	Unit	\$/Unit	Total		
Blue berries, fresh market		10,800	lbs	2.10	22,680		
Total gross income					22,680		
VARIABLE CASH COSTS		Description	Labor	Machinery	Materials	Total	Cost/lb
Pruning and brush mgmt						1,311.12	0.12
	Pruning Labor	70 hr / acre @ \$18.3566265099805 / hr	1,284.96				
	Flail Mower	2x / acre	17.40	8.76			
Weed Control						\$239.40	0.02
	Weed mat repair/maintenance	12 / acre			12.00		
	Hand weeding	10 hrs / acre @ 18.36 / hour	183.60				
	String Trimmer	3x / acre	26.10	2.70	15.00		
Disease and insect control						249.34	0.02
	Applications	10 x / acre	147.86	101.48			
	Materials	\$600/acre			600.00		
Fertilization						1,770.41	0.16
	Compost application	1 x / acre	9.24	4.70			
	Open/close weed map	35 hrs / acre @ 17.302881053/hr	605.60				
	Ranking map/compost	10 hrs / acre @ 17.302881053/hr	173.03				
	Loader rental	1250/ 20 acre farm			62.50		
	Chicken Compost	5 tons @ \$100 / ton			500.00		
	Broadcast application	1 x / acre	8.73	4.70			
	Fertigation labor	3 hrs / acre @ \$17.3028810538038 / hr	51.91				
	Fertilizer	\$350 / acre			350.00		
Bird control						68.36	0.01
	Labor	1 hr / acre @ \$18.3566265099805 / hr	18.36				
	Equipment	\$50 / acre			50.00		
Harvest						8,866.00	0.82
	Contract harvest	0.75			8,100.00		
	Load & haul berries	\$0.03 / lb.			324.00		
	Berry commission fee	\$0.04 / lb.			432.00		
	Tissue analysis	0.2 x / acre			10.00		
Irrigation						130.07	0.01
	Labor	3 hrs / acre @ \$18.3566265099805 / hr	55.07				
	Repairs & maint.	\$25 / acre			25.00		
	Water and power	\$50 / acre			50.00		
Trellis						35.36	0.00
	Repair & maint.	\$17 / acre			17.00		
	Labor	1 hrs / acre @ \$18.3566265099805 / hr	18.36				
Bee hives						240.00	0.02
	IPM scouting	5 hrs / acre @ \$18.3566265099805 / hr	91.78			91.78	0.01
	Flail mow	10 x / acre	86.98	49.21		136.19	0.01
	Portable toilet	0.75 unit / acre			37.50	37.50	0.00
	Pickup			42.12		42.12	0.00
	ATV			3.93		3.93	0.00
	Shop and machine shed				56.49	56.49	0.01
	Miscellaneous and overhead				200.00	200.00	0.02
	Interest: operating capital	6 months			211.17	211.17	0.02
Total variable costs			2,778.97	217.60	11,292.66	13,689.23	1.27
FIXED CASH COSTS			Unit	Total	Cost/lb		
Compliance cost			acre	57.00	0.01		
Pickup & ATV insurance			acre	68.81	0.01		
Property insurance			acre	25.00	0.00		
Property taxes			acre	30.00	0.00		
Total fixed cash costs				180.81	0.02		
FIXED NON-CASH COSTS			Unit	Total	Cost/lb		
Mach. & equip. - dep., & int.			acre	229.63	0.02		
Pickup & ATV - dep. & int			acre	49.65	0.00		
Irrig. & trellis - dep. & int.			acre	354.22	0.03		
Shop & machine shed			acre	198.95	0.02		
Land interest charge			acre	900.00	0.08		
Int. on prior year's establishment costs			acre	1,645.40	0.15		
Total fixed non-cash costs				3,377.85	0.31		
Total fixed costs				3,558.66	0.33		
Total of all costs per acre				\$17,248	1.60		
Net projected returns				\$5,432	0.50		

**Table 14. Year 6, Blueberry Establishment, Hand Harvested, \$/acre economic costs and returns.**

TOTAL GROSS INCOME		Quantity	Unit	\$/Unit	Total		
Blue berries, fresh market		14,400	lbs	2.10	30,240		
Total gross income					30,240		
VARIABLE CASH COSTS		Description	Labor	Machinery	Materials	Total	Cost/lb
Pruning and brush mgmt						1,624.52	0.11
Pruning Labor		85 hr / acre @ \$18.9073253052799 / hr	1,607.12				
Flail Mow		2x / acre	17.40				
Weed Control						\$246.42	0.02
Weed mat repair/maintenance		12 / acre			12.00		
Hand weeding		10 hrs / acre @ 18.9 / hour	189.00				
String Trimmer		3x / acre	27.72	2.70	15.00		
Disease and insect control						849.34	0.06
Applications		10 x / acre	147.86	101.48			
Materials		\$600/acre			600.00		
Fertilization						406.72	0.03
Fertigation labor		3 hrs / acre @ \$18.9073253052799 / hr	56.72				
Fertilizer		350 / acre			350.00		
Bird control						68.91	0.00
Labor		1 hr / acre @ \$18.9073253052799 / hr	18.91				
Equipment		\$50 / acre			50.00		
Harvest						11,818.00	0.82
Contract harvest		0.75 / lb.			10,800.00		
Load & haul berries		\$0.03 / lb.			432.00		
Berry commission fee		\$0.04 / lb.			576.00		
Tissue analysis		0.2 x / acre			10.00		
Irrigation						131.72	0.01
Labor		3 hrs / acre @ \$18.9073253052799 / hr	56.72				
Repairs & maint.		\$25 / acre			25.00		
Water and power		\$50 / acre			50.00		
Trellis						35.91	0.00
Repair & maint.		\$17 / acre			17.00		
Labor		1 hrs / acre @ \$18.9073253052799 / hr	18.91				
Bee hives		3 hives @ \$80 / hive			240.00	240.00	0.02
IPM scouting		5 hrs / acre @ \$18.9073253052799 / hr	94.54			94.54	0.01
Flail mow		10 x / acre	86.98	49.21		136.19	0.01
Portable toilet		0.75 unit / acre			37.50	37.50	0.00
Pickup				42.12	0.00	42.12	0.00
ATV				3.93	0.00	3.93	0.00
Shop and machine shed					56.49	56.49	0.00
Miscellaneous and overhead					200.00	200.00	0.01
Interest: operating capital		6 months			239.88	239.88	0.02
Total variable costs			2,321.87	199.44	13,710.87	16,232.18	1.13
FIXED CASH COSTS			Unit	Total	Cost/lb		
Compliance			acre	57.00	0.00		
Pickup & ATV insurance			acre	68.81	0.00		
Property insurance			acre	25.00	0.00		
Property taxes			acre	30.00	0.00		
Total fixed cash costs				180.81	0.01		
FIXED NON-CASH COSTS			Unit	Total	Cost/lb		
Mach. & equip. - dep., & int.			acre	229.63	0.02		
Pickup & ATV - dep. & int			acre	49.65	0.00		
Irrig. & trellis - dep. & int.			acre	354.22	0.02		
Shop & machine shed			acre	198.95	0.01		
Land interest charge			acre	900	0.0625		
Int. on prior year's establishment costs			acre	1925.59	0.13		
Total fixed non-cash costs				3658.04	0.25		
Total fixed costs				3,838.85	0.27		
Total of all costs per acre				\$20,071	1.39		
Net projected returns				\$10,169	0.71		

**Table 15. Full production, Blueberry Establishment, Machine Harvested, \$/acre economic costs and returns.**

TOTAL GROSS INCOME						
	Quantity	Unit	\$/Unit	Total		
Blueberries, fresh market	16,200	lbs	2.10	34020		
Blueberries, processed market	1,800	lbs	1.20	2,160		
<b>Total gross income</b>				<b>36,180</b>		
VARIABLE CASH COSTS						
	Description	Labor	Machinery	Materials	Total	Cost/lb
Soil Sample	0.2 x /acre			2.00	2.00	0.00
Pruning and brush mgmt					1,730.92	0.05
Pruning Labor	85 hrs / acre @ 20.056	1,704.76				
Flail Mow	2x / acre	17.40	8.76			
Weed Control					\$361.01	0.01
Weed mat repair/maintenance	12 / acre			12.00		
Hand weeding	10 hrs / acre @ 20.056 / hour	200.56				
String Trimmer	3x / acre	130.75	2.70	15.00		
Disease and insect control					827.10	0.46
Applications	10 x / acre	120.00	107.10			
Materials	\$600/acre			600.00		
Fertilization					2,022.47	1.12
Compost application	0.5x / acre	9.24	4.70			
Open/close weed map	17 hrs / acre @ 20.056/hr	294.17				
Ranking map/compost	5 hrs / acre @ 20.056/hr	86.52				
Loader rental	1250/ 20 acre farm			62.50		
Chicken Compost	2.5 tons @ \$100 / ton			500.00		
Broadcast application	0.5 x / acre	8.73	4.70			
Fertigation labor	3 hrs / acre @ \$20.0587814163	51.91				
Fertilizer	\$1000 / acre			1,000.00		
Bird control					170.06	0.09
Labor	1 hr / acre @ \$20.05878141637	20.06				
Equipment	150/acre			150.00		
Harvest					14,770.00	8.21
Contract Hand Harvest	0.75 / lb.			13,500.00		
Load & haul berries	\$0.03 / lb.			540.00		
Berry commission fee	\$0.04 / lb.			720.00		
Tissue analysis	0.2 x / acre			10.00		
Irrigation					135.18	0.08
Labor	3 hrs / acre @ \$20.0587814163	60.18				
Repairs & maint.	\$25 / acre			25.00		
Water and power	\$50 / acre			50.00		
Trellis					37.06	0.02
Repair & maint.	\$17 / acre			17.00		
Labor	1 hrs / acre @ \$20.0587814163	20.06				
Bee hives	3 hives @ \$80 / hive			240.00	240.00	0.13
IPM scouting	5 hrs / acre @ \$20.0587814163	97.37			97.37	0.05
Flail mow	10 x / acre	86.98	49.21		136.19	0.08
Portable toilet	0.75 unit / acre			37.50	37.50	0.02
Pickup			42.12		42.12	0.02
ATV			3.93		3.93	0.00
Shop and machine shed				56.49	56.49	0.03
Miscellaneous and overhead				200.00	200.00	0.11
Interest: operating capital	6 months			313.01	313.01	0.17
<b>Total variable costs</b>		<b>2,908.68</b>	<b>223.22</b>	<b>18,048.50</b>	<b>21,180.40</b>	<b>11.77</b>
FIXED CASH COSTS						
			Unit	Total	Cost/lb	
Compliance			acre	57.00	0.03	
Pickup & ATV insurance			acre	68.81	0.04	
Property insurance			acre	25.00	0.01	
Property taxes			acre	30.00	0.02	
<b>Total fixed cash costs</b>				<b>180.81</b>	<b>0.10</b>	
FIXED NON-CASH COSTS						
			Unit	Total	Cost/lb	
Mach. & equip. - dep., & int.			acre	229.63	0.13	
Pickup & ATV - dep. & int			acre	49.65	0.03	
Irrig. & trellis - dep. & int.			acre	354.22	0.20	
Shop & machine shed			acre	198.95	0.11	
Land interest charge			acre	900.00	0.50	
Amortized establishment costs			acre	2,535.73	1.41	
<b>Total fixed non-cash costs</b>				<b>4,268.18</b>	<b>2.37</b>	
<b>Total fixed costs</b>				<b>4,448.99</b>	<b>2.47</b>	
<b>Total of all costs per acre</b>				<b>\$25,629</b>	<b>\$14.24</b>	
<b>Net projected returns</b>				<b>\$10,551</b>	<b>\$5.86</b>	



# Appendix B

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## A look at the Oregon Organic Blueberry Industry

Data from the USDA National Agriculture Statistics Service

Certified Organic Production Survey – Published in 2008, 2011, 2014, 2015, 2016

2008 Survey	
<b>Farms</b>	44
<b>Acres</b>	470
<b>Quantity* (lbs.)</b>	1,388,368
<b>Value of sales (dollars)</b>	2,747,064

2015 Survey	
<b>Farms</b>	48
<b>Acres</b>	475
<b>Quantity* (lbs.)</b>	4,501,403
<b>Value of sales (dollars)</b>	9,176,430

2011 Survey	
<b>Farms</b>	37
<b>Acres</b>	392
<b>Quantity* (lbs.)</b>	2,000,276
<b>Value of sales (dollars)</b>	5,547,082

2016 Survey	
<b>Farms</b>	67
<b>Acres</b>	823
<b>Quantity* (lbs.)</b>	7,798,375
<b>Value of sales (dollars)</b>	13,220,023

2014 Survey	
<b>Farms</b>	49
<b>Acres</b>	509
<b>Quantity* (lbs.)</b>	808,360
<b>Value of sales (dollars)</b>	2,485,457

\*For the purpose of this appendix, quantity includes cultivated and wild organic blueberries in the state of Oregon

Source: USDA National Agricultural Statistics Service. NASS – Certified Organic Survey. USDA National Agricultural Statistics Service. Retrieved from [https://www.nass.usda.gov/Surveys/Guide\\_to\\_NASS\\_Surveys/Organic\\_Production/](https://www.nass.usda.gov/Surveys/Guide_to_NASS_Surveys/Organic_Production/)

### Operation Scale

Currently the majority of Oregon blueberry farms are 20 acres or less, but the range of blueberry farm scale is quite broad, stretching from less than 5 acres to over 1500 acres. Further, a bi-modal distribution appears to be emerging – a large number of smaller operations reliant upon hand harvesting and direct-to-consumer marketing such as farm stands and U-pick operations; and then, a large volume of total production coming from much bigger farms reliant on mechanical harvesting and commercial sales to large-scale downstream buyers.

## Organic vs. Conventional

Organic Operations continue to grow. Organic production accounted for about 20 percent of the total crop in 2018. This is compared to about 2 percent in 2008. The Northwest region produces about half of the nation’s organic blueberry crop.

## National Ranking of Oregon Blueberry Production (conventional and organic combined)

Years	Rank	% of US
<b>2017</b>	2	21%
<b>2018</b>	1	24%

Source: USDA/NASS. *Blueberry Harvested Acres, Yield, Production, Price, & Value of Utilized Production, by State.*

## Top 10 Blueberry Producing states: 2016

Rank	State	Pounds (millions of lbs.)
<b>1</b>	Washington	96.1
<b>2</b>	Georgia	92.0
<b>3</b>	Michigan	92.0
<b>4</b>	Oregon	86.1
<b>5</b>	New Jersey	56.68
<b>6</b>	California	53.35
<b>7</b>	North Carolina	48.5
<b>8</b>	Florida	16.0
<b>9</b>	Mississippi	8.55
<b>10</b>	Indiana	2.0

Source: Burton, J. (2017, April). *Top 10 Blueberry Producing States in America.*



Source: Author’s Creation, *Top 10 Blueberry Producing States in 2016.*