AEB 0022
April 2011

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

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Oregon State University | Extension Service

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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 2010, the acreage of harvested blueberries had increased to 6,100. This represents a 213 percent increase in acreage over a 15-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 varies substantially from year to year, often related to national supply and demand for fruit. While prices reached record highs from 2003 to 2006, prices declined from 2007-2009. In 2010, the price for fresh and processed blueberries improved 32 and 85%, respectively, compared to 2009. It is important to understand that returns for blueberries are variable from year to year and to plan for this when developing your own budgets for a farm.

This study estimates costs for a well-managed, newly established, 20-acre blueberry planting in the Willamette Valley.

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 selected growers, field representatives, researchers, and farm suppliers. The study provides typical costs and returns to a well managed 20-acre blueberry farm in the Willamette Valley of Oregon. Growers are encouraged to substitute their own costs to get an accurate analysis for their farm.

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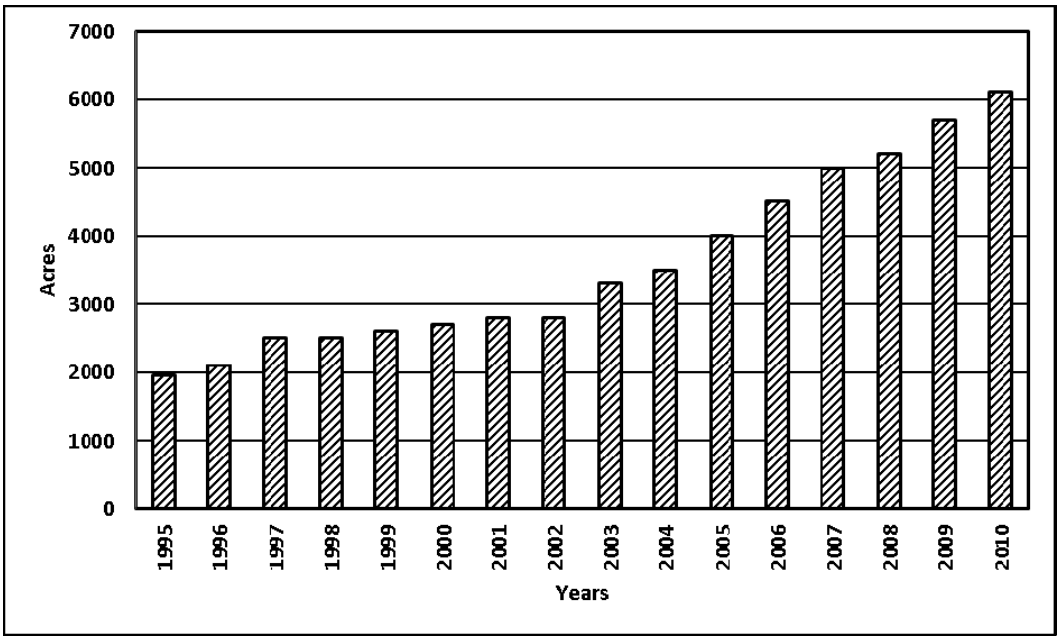

Figure 1. Harvested acres of blueberries in Oregon, 1995–2010.
Source: USDA/NASS Fr Nt 1-3 (96 to 11).

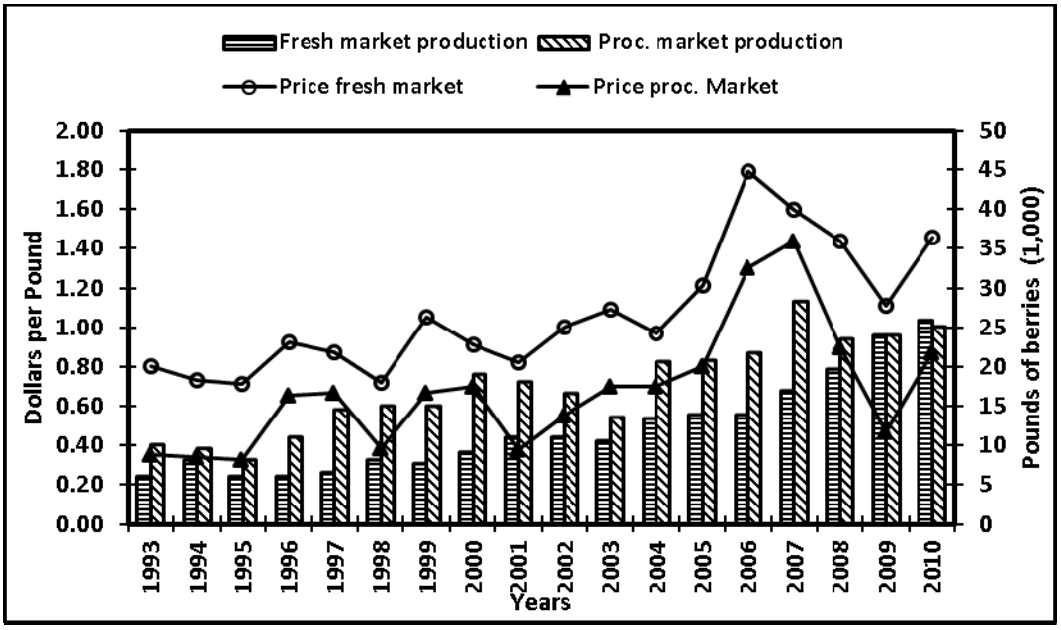

Figure 2. Oregon fresh and processed market blueberry production and prices, 1993–2010.
Source: USDA/NASS Fr Nt 1-3 (94 to 11).

ASSUMPTIONS

Assumptions
Many individuals were involved in this study including growers, university researchers, and Extension faculty. In the preparation of this publication the following assumptions were made that provided a basis for this analysis.

1) A typical producer of blueberries in the Willamette Valley raises 20 acres of blueberries on a 100-acre farm.
2) Plant spacing is 3ft x 10ft (1,452 plants per acre). Plants cost $3.50 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 is incorporated prior to forming raised beds and planting blueberries
7) Sawdust mulch is used and replenished every three years during planting life. If weed mat is used, production costs (materials and weed management costs) would change.
8) Commercial production begins in year 2 with typical yields of 1,500 lbs./acre. Yields increase as presented in table 4 until full production at year 7. Full production yields are assumed to be 16,000 to 18,000 lbs. per acre, depending upon harvest method.
9) Various visual and auditory deterrents can be used to reduce bird depredation. This analysis allocates $1,000 per year across for this task. Netting is also an option but at a great expense.
10) Berries are hand harvested through year 6 of establishment to minimize damage to the plants. Growers can either machine or hand harvested at the full production stage. The hand harvest full production budget assumes that grower will machine pick a final "clean-up" pass at the end of the harvest season for the process market.
11) Full production pruning labor hours for hand harvested production is 85 hrs while it is only 60 hrs in machine harvested systems.
12) Blueberry fresh market price is $1.34 per lb. and the processed market price is $0.75 per lb. (three year average price, 2008 to 2010. USDA/NASS Oregon Berries, Jan 2011 press release).
13) A machine shed and all farm equipment are owned by the operator.
14) 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.
15) Gasoline and diesel costs per gallon are $3.00 and $3.25, respectively.
16) General labor is valued at $13.50 per hour and equipment operator labor is valued at $19.00 per hour, which includes worker's compensation, unemployment insurance, and other labor overhead expenses.
17) During field preparation the field is watered with hand lines. The permanent irrigation system is installed

in early spring of year 1, after planting, 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. Pumping cost estimates are in Table 4. Repairs and maintenance for the system costs one percent of the purchase price per year.

18) 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.
19) 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.
20) 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 $10,000 per acre. The 5 percent return on land is equivalent to the current rate land owners could charge for rent to other growers.
21) 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. Unrecovered establishment costs are amortized over the remaining 18 years of assumed field life at a 10 percent rate of interest and included as a fixed cost in the full production budget.
22) Additional assumptions are listed for variable, fixed cash, and fixed non-cash costs in Table 4.
23) No adjustments were made to account for year to year fluctuations in yields and prices
24) Price inflation for the time period of this study was ignored.
25) Owner management, family living, State and Federal income tax consequences were 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	$ 30,000	180	20	$ 3,849
Air-blast sprayer	200 gallon unit, PTO, new	13,000	99	15	1,248
Mower	Flail, 5' unit	6,000	6	15	576
Weed sprayer	3 point, 200 gallon unit	6,000	22	15	576
Cultivator	6' unit disk/ripper	3,500	31	15	336
Planter	6' unit	5,000	8	15	480
Fertilizer spreader	Broadcast bander	3,000	14	15	288
Pickup*	1/2 ton 4x4, gas, new	22,000	*12,000*	10	8,319
ATV*	4 wheeler, new	5,500	*3,000*	5	2,465
Potable toilets	Rental units and servicing	1,000	N/A	N/A	0
Irrigation system	Pump, filter, injector, manifold, lines, and emitters	50,000	N/A	15	0
Trellis system, per acre	Two wire, wooden end post, metal in-row post	1,700	N/A	20	0
Shop and machine shed	40ft x 80ft Pole barn with partial slab floor	40,000	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 --- Fuel & Lube	Repairs & Maint.	------ Fixed costs ------ Depr. & Interest	Insurance	Total
		----- Costs per hour -----				
Tractor	4 wheel dr 35hp, new	$11.21	$0.32	$15.23	$0.84	$27.62
Air-blast sprayer	200 gallon unit, PTO, new	0.00	6.00	14.03	0.43	20.46
Mower	Flail, 5' unit	0.00	0.26	99.09	3.05	102.39
Weed sprayer	3 point, 200 gallon unit	0.00	1.76	29.47	0.91	32.13
Cultivator	6' unit disk/ripper	0.00	1.14	12.04	0.37	13.55
Planter	6' unit	0.00	1.10	64.76	1.99	67.85
Fertilizer spreader	Broadcast bander	0.00	0.77	23.31	0.72	24.80
		----- Costs per mile -----				
Pickup*	1/2 ton 4x4, gas, new	$0.06	$0.01	$0.14	$0.01	$0.22
ATV*	4 wheeler, new	$0.02	$0.01	$0.22	$0.02	$0.27
		----- Costs per acre -----				
Potable toilets	Rental units and servicing	0.00	0.00	0.00	0.00	50.00
Irrigation system	Pump, filter, injector, manifold, lines, and emitters	0.00	25.00	308.33	0.00	333.33
Trellis system, per acre	Two wire, wooden end post, metal in-row post	0.00	17.00	88.61	0.00	105.61
Shop and machine shed	40ft x 80ft Pole barn with partial slab floor	0.00	53.00	166.67	0.00	219.67

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

Table 3. Estimated cost of each operation with power-unit for a 10' between row spacing.

Operation	Miles per hour	Acres per hour	Labor cost per acre	-- Machine costs -- Variable cost per acre	Fixed cost per acre	Total cost per acre
Air-blast sprayer	3.00	1.82	$10.45	$9.64	$16.80	$36.89
Mower	3.00	3.09	6.15	3.81	38.24	48.20
Weed sprayer	3.50	2.76	6.89	4.82	16.84	28.55
Cultivator	2.50	2.58	7.38	4.92	18.03	30.33
Planter	2.50	2.42	7.84	5.23	19.16	32.23
Fertilizer spreader	3.00	2.91	6.53	4.23	13.79	24.55

Table 4. 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)	Full (mh)
Prices per lb, fresh market	$0.00	$0.00	$1.34	$1.34	$1.34	$1.34	$1.34	$1.34	$0.00
Prices per lb, processed market	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.75	$0.75
Lbs per acre, fresh market	0	0	1,500	3,600	7,200	10,800	14,400	16,200	0
Lbs per acre, processed market	0	0	0	0	0	0	0	1,800	16,000
Cost of general farm labor, per hour	$13.50	$13.50	$13.50	$13.50	$13.50	$13.50	$13.50	$13.50	$13.50
Cost of tractor driver, per hour	$19.00	$19.00	$19.00	$19.00	$19.00	$19.00	$19.00	$19.00	$19.00
Cost to load & haul berries, per lb	$0.00	$0.00	$0.03	$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	$0.04
Cost of fertilizer	$100	$150	$150	$150	$150	$150	$150	$150	$150
Cost of herbicide	$100	$100	$100	$100	$100	$100	$100	$100	$100
Cost of insecticide	$0	$0	$100	$100	$100	$100	$100	$100	$100
Cost of fungicides	$0	$0	$50	$250	$250	$250	$250	$250	$250
Cost of tissue analysis, per acre	$0	$0	$10	$10	$10	$10	$10	$10	$10
Cost of soil analysis, per acre	$8	$0	$0	$0	$8	$0	$0	$2	$2
Cost of bird control	$0	$0	$50	$50	$50	$50	$50	$50	$50
Cost of bee hives	$0	$0	$50	$50	$50	$50	$50	$50	$50
Cost of plants	$4	$4	$0	$0	$0	$0	$0	$0	$0
Cost of hand-harvest labor, per lb	$0.00	$0.00	$0.55	$0.55	$0.55	$0.55	$0.55	$0.55	$0.55
Cost of machine harvest, per lb	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.12	$0.12
Cost of irrigation water and power	$50	$50	$50	$50	$50	$50	$50	$50	$50
Cost of cover crop seed	$25	$0	$0	$0	$0	$0	$0	$0	$0
Cost of sawdust, per unit	$90	$90	$0	$0	$90	$0	$0	$90	$90
Cost of loader rental	$1,000	$1,000	$0.00	$0.00	$1,000	$0	$0	$334	$334
Units of sawdust	19.00	11.00	0.00	0.00	11.00	0.00	0.00	3.67	3.67
Hours of labor, pruning	0	0	15	30	50	70	85	85	60
Hours of labor, spot spray herbicide	0	2	2	2	2	2	2	2	2
Hours of labor, hand weeding	0	13	13	0	0	0	0	0	0
Hours of irrigating labor	32	3	3	3	3	3	3	3	3
Hours of fertigation labor	0	3	3	3	3	3	3	3	3
Hours of labor to plant	50	5	0	0	0	0	0	0	0
Hours of trellis labor	0	0	30	1	1	1	1	1	1
Hours of IPM scouting	0	0	5	5	5	5	5	5	5
Hours of bird control	0	0	1	1	1	1	1	1	1
Hives per acre	0	0	3	3	3	3	3	3	3
Portable toilets per acre	0	1	1	1	1	1	1	1	1
Times to herbicide spot spray	0	2	2	2	2	2	2	2	2
Times to herbicide strip spray	1	2	2	2	2	2	2	2	2
Times to fertilize	1	1	1	1	1	1	1	1	1
Times to apply fungicides&insecticide	2	2	10	10	10	10	10	10	10
Times to mow	0	3	10	10	10	10	10	10	10
Property taxes	$30	$30	$30	$30	$30	$30	$30	$30	$30
Property insurance	$25	$25	$25	$25	$25	$25	$25	$25	$25
Land values	$10,000	$10,000	$10,000	$10,000	$10,000	$10,000	$10,000	$10,000	$10,000
Miscellaneous & overhead	$200	$200	$200	$200	$200	$200	$200	$200	$200
Fuel use gal/hr for tractor	3	3	3	3	3	3	3	3	3
Gasoline price	$3.00	$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	$3.25
Operating interest rate	8.5%	8.5%	8.5%	8.5%	8.5%	8.5%	8.5%	8.5%	8.5%
Machinery interest rate	8.5%	8.5%	8.5%	8.5%	8.5%	8.5%	8.5%	8.5%	8.5%
Land interest rate	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%	5.0%
Establishment interest rate	10.0%	10.0%	10.0%	10.0%	10.0%	10.0%	10.0%	10.0%	10.0%
% of operating capital borrowed	50.0%	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	6
Planted bushes	1452	35	0	0	0	0	0	0	0

Results of establishing and producing 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. Cash costs include: labor, plants, trellis, irrigation system, fertilizer, chemicals, machinery repairs, fuel, lube, and oil, operating (short-term) interest, machinery insurance, and property taxes. The income, variable costs and cash fixed costs are shown for establishment through full production years.

Table 5 contains a cash flow analysis for establishing a blueberry planting. In this scenario, production begins in year two with 1,500 pounds of berries per acre and increases to 16,000 to 18,000 pounds at full production, year seven, depending upon method of harvest; hand harvest with a machine harvest clean-up pass (HH) or machine harvest only (MH) . Total variable costs are $9,107 per acre in year zero (the planting year) with an additional $66 of fixed cash costs for a total cash cost of $9,173 per acre. A positive cash flow begins in year three with gross income exceeding total cash costs by $213 per acre. The planting returns sufficient gross income to pay all previous years' cash costs in year 7, the first year of full production, with a projected cash surplus of $5,206 per acre for HH and $1,834 per acre for MH.

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 49 percent of the total cash costs. Hired labor, excluding harvest, is next with 13 percent. Plants account for 8 percent followed by fertilizers and chemicals at 6 percent of the cash costs. Irrigation, trellising, and machine costs account for 4, 3, and 2 percent of the total cash costs, respectively. The remaining cost items account for 15 percent of the total cash costs.

The cash costs for a processed market planting are similar to the fresh market planting, except, machine harvesting reduces the harvest costs to 36 percent of total cash cost of establishment (data not shown). The fresh and processed market full production budgets in Appendix A reveal that harvest costs for a hand-harvested blueberry planting are estimated to be $10,396 per acre. In the processed market production system harvest costs are estimated to be $3,050. Thus harvest expenses are $7,346 per acre less in the processed market, machine harvest production system than in hand harvested systems (Tables 18 and 19).

Economic costs and returns

This section presents the economic analyses of establishing a fresh market blueberry planting. Economic costs include all the cash costs listed in Table 6 along with the ownership costs that are either an opportunity cost to the owner or interest paid on funds borrowed from a financial institution. These ownership costs include the principal and interest payments or a return on investment to the grower, or both, for machinery, land, and funds to pay for previous years' establishment costs.

Table 6 details the economic costs and returns for the establishment of a fresh market blueberry planting. Gross income exceeds variable costs beginning in year three with a $279 per acre return to the grower. Estimated gross income for hand-harvested blueberries exceeds annual economic costs in year 5 by $340 per acre and is projected to exceed all cumulative economic costs in year 11 (Figure 4). Under the assumptions specified for this study,

machine harvested plantings require 24 years to repay all cumulative economic costs, approximately 13 years longer than hand-harvested plantings (data not shown). 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 37 percent of the total establishment costs. Interest costs are next at 22 percent (which include interest on establishment costs) followed by labor at 10 percent. Machine costs account for 6 percent of costs and plants 5 percent. Fertilizer and chemicals, and irrigation account for 4, and 3 percent of total economic costs, respectively. The remaining cost items account for 12 percent of the total economic costs.

Figure 4 shows economic returns from a fresh market production system by planting size over twenty 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 establishes a level of fixed costs that burdens the farm regardless of production and requires a fixed amount of revenue to meet financial obligations. However, looked at on a per acre basis, this burden decreases with farm size. 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 planting size. Given the assumptions in this study, fresh market blueberry plantings of less than 5 acres don't generate sufficient gross revenue to recover economic costs of production, leaving the grower with a deficit over $46,000 per acre after 25 years. However, a 10 acre planting has a surplus just over $28,000 per acre after covering all economic costs over that same period. It is interesting to note that as plantings increase in size beyond 20 acres, increases in returns per acre to the grower diminishing. Specifically, the projected net returns per acre over 25 years for the 40 acre planting was $84,214 while the 80 acre planting returned $92,898; a difference of $8,684 per acre. The diminishing returns are due to the optimization of the equipment and infrastructure, as the planting increases in size the equipment becomes fully utilized. The reader should keep in mind that for this study, the minimum size threshold is more critical than the upper bounds because as plantings increase in size there are other equipment and infrastructure options that could impact fixed costs.

Price and Yield Sensitivity Analysis

Also included in this study are Tables 7, 8, 9, and 10 showing price and yield sensitivity analyses. Table 7 shows the impact of changes in price and yield on returns over cash costs for fresh market production. Table 8 shows the impact of changes in price and yield on returns over economic costs of fresh market production. . Table 9 shows the impact of changes in price and yield on returns over cash costs for processed market production. Table 10 shows the impact of changes in price and yield on returns over economic costs of processed market production. Please review these tables to see the impact of varying yield and price on the returns of these production systems.

Table 5. Cash costs and returns of establishing and producing blueberries in Oregon's Willamette Valley.

Income:	**Year 0**	**Year 1**	**Year 2**	**Year 3**	**Year 4**	**Year 5**	**Year 6**	**Full Prod HH**	**Full Prod MH**
Yield (lbs/acre) fresh	0	0	1,500	3,600	7,200	10,800	14,400	16,200	0
Processed	0	0	0	0	0	0	0	1,800	16,000
Price (dollars/lb) Fresh	0	0	1.34	1.34	1.34	1.34	1.34	1.34	0
Price (dollars/lb) Processed	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.75	0.75
Gross Income(dollars/acre)	0	0	2,010	4,824	9,648	14,472	19,296	23,058	12,000
Variable Costs (per acre):									
Custom work/Rental equipt.	760.00	50.00	0.00	0.00	50.00	0.00	0.00	16.70	16.70
Blue berry bushes	5,082.00	122.50	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Fertilizer	100.00	150.00	150.00	150.00	150.00	150.00	150.00	150.00	150.00
Soil test	8.00	0.00	0.00	0.00	8.00	0.00	0.00	2.00	2.00
Chemicals	100.00	100.00	250.00	450.00	450.00	450.00	450.00	450.00	450.00
Sawdust	1,710.00	990.00	0.00	0.00	990.00	0.00	0.00	330.30	330.30
Cover crop seed	25.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Harvest costs	0.00	0.00	940.00	2,242.00	4,474.00	6,706.00	8,938.00	10,396.00	3,050.00
Pruning Labor	0.00	0.00	202.50	405.00	675.00	945.00	1,147.50	1,147.50	810.00
General labor	750.66	808.25	982.76	415.76	415.76	415.76	415.76	415.76	415.76
Machine costs	67.73	69.61	192.77	192.77	192.77	192.77	192.77	192.77	192.77
Irrigation	55.00	2,500.00	75.00	75.00	75.00	75.00	75.00	75.00	75.00
Trellis	0.00	0.00	1,700.00	17.00	17.00	17.00	17.00	17.00	17.00
Bee hives	0.00	0.00	150.00	150.00	150.00	150.00	150.00	150.00	150.00
Bird Control	0.00	0.00	50.00	50.00	50.00	50.00	50.00	50.00	50.00
Portable toilets	0.00	50.00	50.00	50.00	50.00	50.00	50.00	50.00	50.00
Shop and machine shed	53.00	53.00	53.00	53.00	53.00	53.00	53.00	53.00	53.00
Miscellaneous & overhead	210.00	200.00	200.00	200.00	200.00	200.00	200.00	200.00	200.00
Interest: operating capital	185.16	56.17	70.04	94.57	170.01	200.91	252.64	42.69	39.77
Total **variable** costs	9,106.55	5,149.53	5,066.07	4,545.10	8,170.54	9,655.44	12,141.67	13,738.72	6,052.30
Gross Income - Variable Cost	-9,106.55	-5,149.53	-3,056.07	278.90	1,477.46	4,816.56	7,154.33	9,319.28	5,947.70
Fixed cash costs (per acre):									
Insurance	36.10	36.10	36.10	36.10	36.10	36.10	36.10	36.10	36.10
Property taxes	30.00	30.00	30.00	30.00	30.00	30.00	30.00	30.00	30.00
Total **fixed** cash cost	66.10	66.10	66.10	66.10	66.10	66.10	66.10	66.10	66.10
Total cash **cost**	9,172.65	5,215.64	5,132.17	4,611.20	8,236.64	9,721.54	12,207.77	13,804.82	6,118.40
Net projected returns	-9,172.65	-5,215.64	-3,122.17	212.80	1,411.36	4,750.46	7,088.23	9,253.18	5,881.60
Cumulative returns	-9,172.65	-14,388.29	-17,510.46	-17,297.66	-15,886.30	-11,135.84	-4,047.61	5,205.57 *	1,833.99 *

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

Table 6. Economic costs and returns of establishing and producing blueberries in Oregon's Willamette Valley.

Income:	**Year 0**	**Year 1**	**Year 2**	**Year 3**	**Year 4**	**Year 5**	**Year 6**	**Full Prod HH**	**Full Prod MH**
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	0.00
Processed	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1,800.00	16,000.00
Price (dollars/lb) Fresh	0.00	0.00	1.34	1.34	1.34	1.34	1.34	1.34	0.00
Price (dollars/lb) Processed	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.75	0.75
Gross Income(dollars/acre)	0.00	0.00	2,010.00	4,824.00	9,648.00	14,472.00	19,296.00	23,058.00	12,000.00
Variable Costs (per acre):									
Custom work/Rental equipt.	760.00	50.00	0.00	0.00	50.00	0.00	0.00	16.70	16.70
Blue berry bushes	5,082.00	122.50	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Fertilizer	100.00	150.00	150.00	150.00	150.00	150.00	150.00	150.00	150.00
Soil test	8.00	0.00	0.00	0.00	8.00	0.00	0.00	2.00	2.00
Chemicals	100.00	100.00	250.00	450.00	450.00	450.00	450.00	450.00	450.00
Sawdust	1,710.00	990.00	0.00	0.00	990.00	0.00	0.00	330.30	330.30
Cover crop seed	25.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Harvest costs	0.00	0.00	940.00	2,242.00	4,474.00	6,706.00	8,938.00	10,396.00	3,050.00
Pruning Labor	0.00	0.00	202.50	405.00	675.00	945.00	1,147.50	1,147.50	810.00
General labor	750.66	808.25	982.76	415.76	415.76	415.76	415.76	415.76	415.76
Machine costs	67.73	69.61	192.77	192.77	192.77	192.77	192.77	192.77	192.77
Irrigation	55.00	50.00	75.00	75.00	75.00	75.00	75.00	75.00	75.00
Trellis	0.00	0.00	0.00	17.00	17.00	17.00	17.00	17.00	17.00
Bee hives	0.00	0.00	150.00	150.00	150.00	150.00	150.00	150.00	150.00
Bird Control	0.00	0.00	50.00	50.00	50.00	50.00	50.00	50.00	50.00
Portable toilets	0.00	50.00	50.00	50.00	50.00	50.00	50.00	50.00	50.00
Shop and machine shed	53.00	53.00	53.00	53.00	53.00	53.00	53.00	53.00	53.00
Miscellaneous & overhead	210.00	200.00	200.00	200.00	200.00	200.00	200.00	200.00	200.00
Interest: operating capital	185.16	56.17	70.04	94.57	170.01	200.91	252.64	42.69	39.77
Total variable costs	9,106.55	2,699.53	3,366.07	4,545.10	8,170.54	9,655.44	12,141.67	13,738.72	6,052.30
Gross revenue - Variable costs	-9,106.55	-2,699.53	-1,356.07	278.90	1,477.46	4,816.56	7,154.33	9,319.28	5,947.70
Fixed cash costs (per acre):									
Insurance	36.10	36.10	36.10	36.10	36.10	36.10	36.10	36.10	36.10
Property taxes	30.00	30.00	30.00	30.00	30.00	30.00	30.00	30.00	30.00
Total fixed cash cost	66.10	66.10	66.10	66.10	66.10	66.10	66.10	66.10	66.10
Total cash cost	9,172.65	2,765.64	3,432.17	4,611.20	8,236.64	9,721.54	12,207.77	13,804.82	6,118.40
FIXED NON-CASH COSTS									
Mach. & equip. - dep., & int.	72.90	429.89	597.85	597.85	597.85	597.85	597.85	597.85	597.85
Pickup - dep. & int	115.02	115.02	115.02	115.02	115.02	115.02	115.02	115.02	115.02
Irrig. and Trellis - dep. & int.	0.00	308.33	396.95	396.95	396.95	396.95	396.95	396.95	396.95
Shop & machine shed	166.67	166.67	166.67	166.67	166.67	166.67	166.67	166.67	166.67
Land interest charge	500.00	500.00	500.00	500.00	500.00	500.00	500.00	500.00	500.00
Int. on prior year's est. costs	0.00	1,002.72	1,531.55	2,004.57	2,361.40	2,634.05	2,600.06	0.00	0.00
Amortized establishment costs	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2,784.12	2,784.12
Total **fixed non-cash** costs	855	2,523	3,308	3,781	4,138	4,411	4,377	4,561	4,561
Total **fixed** costs	10,027	5,288	6,740	8,392	12,375	14,132	16,584	18,365	10,679
Net projected returns	-10,027	-5,288	-4,730	-3,568	-2,727	340	2,712	4,693	1,321
Cumulative returns	-10,027	-15,316	-20,046	-23,614	-26,341	-26,001	-23,289	-18,596 *	-21,968 *

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

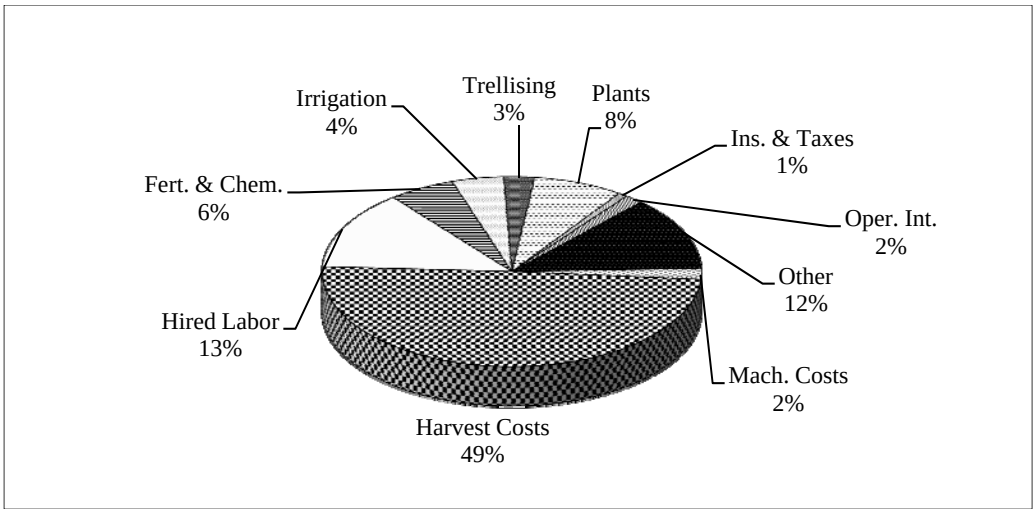

Figure 3. Cash costs per acre from year 0 through year 7, the first year of full production, to establish fresh market blueberries in Oregon's Willamette Valley, by percent of total.

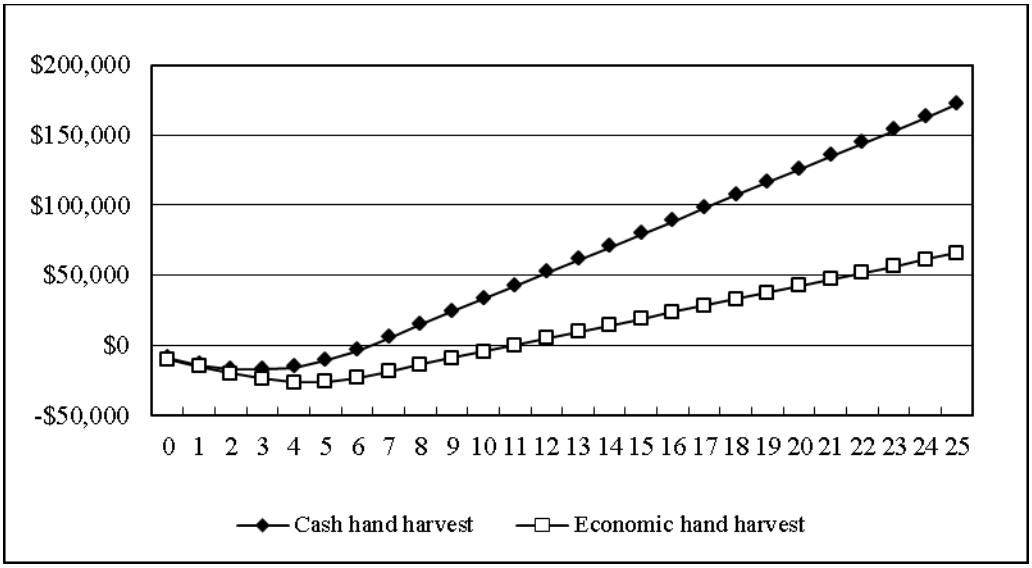

Figure 4. Comparison of cash and economic net returns per acre for establishment and production of fresh market blueberries in Oregon's Willamette Valley over 25 years.

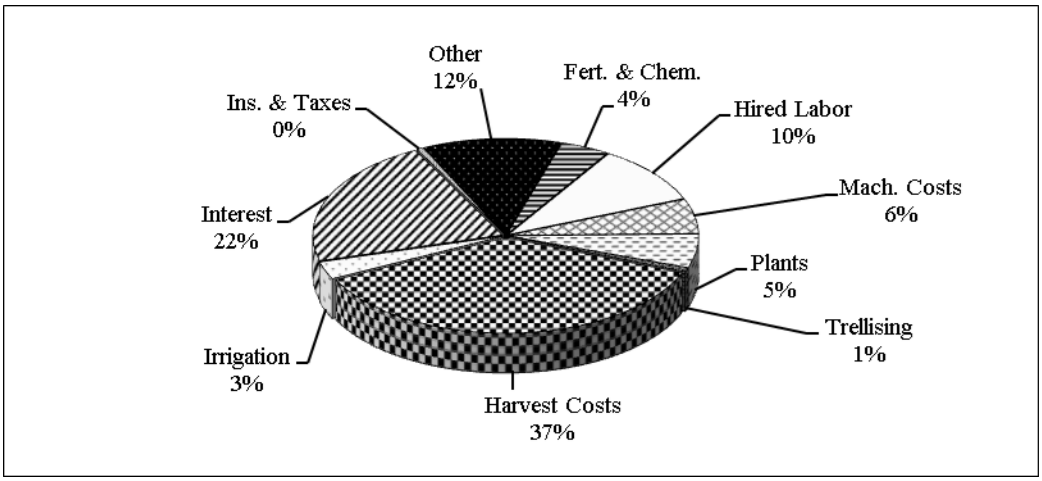

Figure 5. Economic costs per acre from year 0 through year 7, the first year of full production, to establish fresh market blueberries in Oregon's Willamette Valley, by percent of total.

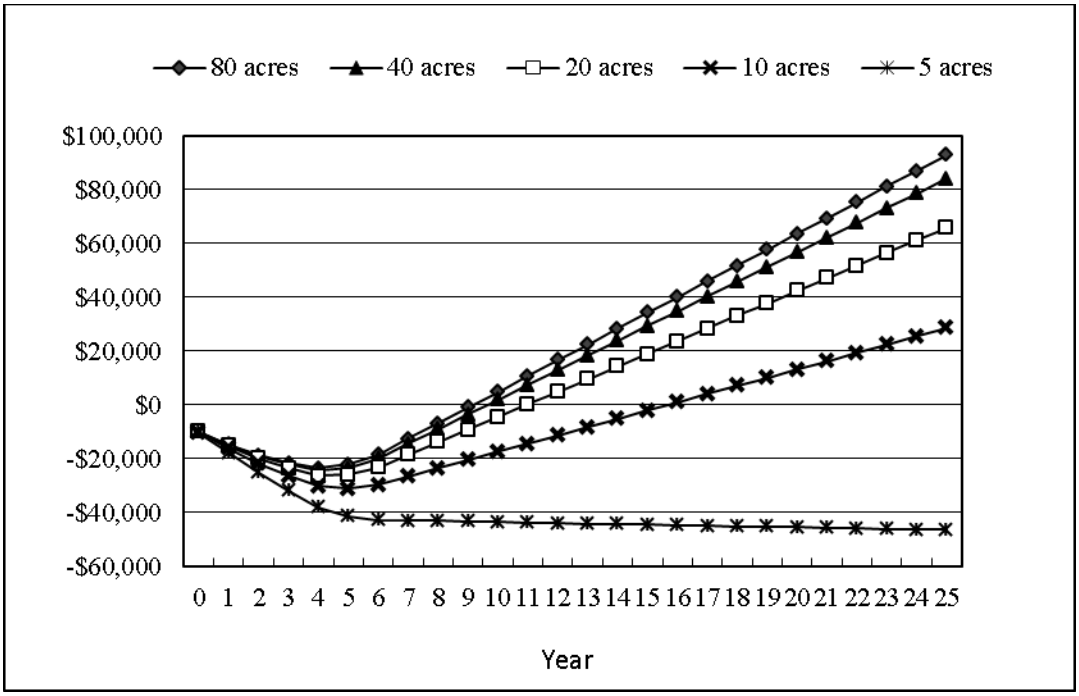

Figure 6. Projected cumulative economic returns per acre by farm size for hand harvested blueberries, over 25 years of establishment and production.

Table 7. Estimated Annual Per Acre Returns Over Full Production Cash Costs at Varying Yields and Prices for Fresh Market Blueberries.

	---------- lbs per Acre ----------						
Price per lb	**13,000**	**14,000**	**15,000**	**16,000**	**17,000**	**18,000**	**19,000**
$ 0.90	$ (2,105)	$ (1,205)	$ (305)	$ 595	$ 1,495	$ 2,395	$ 3,295
$ 1.00	$ (805)	$ 195	$ 1,195	$ 2,195	$ 3,195	$ 4,195	$ 5,195
$ 1.10	$ 495	$ 1,595	$ 2,695	$ 3,795	$ 4,895	$ 5,995	$ 7,095
$ 1.20	$ 1,795	$ 2,995	$ 4,195	$ 5,395	$ 6,595	$ 7,795	$ 8,995
$ 1.30	$ 3,095	$ 4,395	$ 5,695	$ 6,995	$ 8,295	$ 9,595	$ 10,895
$ 1.40	$ 4,395	$ 5,795	$ 7,195	$ 8,595	$ 9,995	$ 11,395	$ 12,795
$ 1.50	$ 5,695	$ 7,195	$ 8,695	$ 10,195	$ 11,695	$ 13,195	$ 14,695

Table 8. Estimated Annual Per Acre Returns Over Full Production Total Economic Costs at Varying Yields and Prices for Fresh Market Blueberries.

	---------- lbs per Acre ----------						
Price per lb	**13,000**	**14,000**	**15,000**	**16,000**	**17,000**	**18,000**	**19,000**
$ 0.90	$ (6,914)	$ (6,014)	$ (5,114)	$ (4,214)	$ (3,314)	$ (2,414)	$ (1,514)
$ 1.00	$ (5,614)	$ (4,614)	$ (3,614)	$ (2,614)	$ (1,614)	$ (614)	$ 386
$ 1.10	$ (4,314)	$ (3,214)	$ (2,114)	$ (1,014)	$ 86	$ 1,186	$ 2,286
$ 1.20	$ (3,014)	$ (1,814)	$ (614)	$ 586	$ 1,786	$ 2,986	$ 4,186
$ 1.30	$ (1,714)	$ (414)	$ 886	$ 2,186	$ 3,486	$ 4,786	$ 6,086
$ 1.40	$ (414)	$ 986	$ 2,386	$ 3,786	$ 5,186	$ 6,586	$ 7,986
$ 1.50	$ 886	$ 2,386	$ 3,886	$ 5,386	$ 6,886	$ 8,386	$ 9,886

Table 9. Estimated Annual Per Acre Returns Over Full Production Cash Costs at Varying Yields and Prices for Processed Market Blueberries.

	---------- lbs per Acre ----------						
Price per lb	**13,000**	**14,000**	**15,000**	**16,000**	**17,000**	**18,000**	**19,000**
$ 0.30	$ (2,306)	$ (2,006)	$ (1,706)	$ (1,406)	$ (1,106)	$ (806)	$ (506)
$ 0.40	$ (1,006)	$ (606)	$ (206)	$ 194	$ 594	$ 994	$ 1,394
$ 0.50	$ 294	$ 794	$ 1,294	$ 1,794	$ 2,294	$ 2,794	$ 3,294
$ 0.60	$ 1,594	$ 2,194	$ 2,794	$ 3,394	$ 3,994	$ 4,594	$ 5,194
$ 0.70	$ 2,894	$ 3,594	$ 4,294	$ 4,994	$ 5,694	$ 6,394	$ 7,094
$ 0.80	$ 4,194	$ 4,994	$ 5,794	$ 6,594	$ 7,394	$ 8,194	$ 8,994
$ 0.90	$ 5,494	$ 6,394	$ 7,294	$ 8,194	$ 9,094	$ 9,994	$ 10,894

Table 10. Estimated Annual Per Acre Returns Over Full Production Total Economic Costs at Varying Yields and Prices for Processed Market Blueberries.

	---------- lbs per Acre ----------						
Price per lb	**13,000**	**14,000**	**15,000**	**16,000**	**17,000**	**18,000**	**19,000**
$ 0.30	$ (6,867)	$ (6,567)	$ (6,267)	$ (5,967)	$ (5,667)	$ (5,367)	$ (5,067)
$ 0.40	$ (5,567)	$ (5,167)	$ (4,767)	$ (4,367)	$ (3,967)	$ (3,567)	$ (3,167)
$ 0.50	$ (4,267)	$ (3,767)	$ (3,267)	$ (2,767)	$ (2,267)	$ (1,767)	$ (1,267)
$ 0.60	$ (2,967)	$ (2,367)	$ (1,767)	$ (1,167)	$ (567)	$ 33	$ 633
$ 0.70	$ (1,667)	$ (967)	$ (267)	$ 433	$ 1,133	$ 1,833	$ 2,533
$ 0.80	$ (367)	$ 433	$ 1,233	$ 2,033	$ 2,833	$ 3,633	$ 4,433
$ 0.90	$ 933	$ 1,833	$ 2,733	$ 3,633	$ 4,533	$ 5,433	$ 6,333

Conclusions

This cost of establishment study is meant to provide useful information to fresh and processed market blueberry producers and investors who are considering planting blueberries. However, like any other enterprise budget, putting your own current costs in the budget will make it more meaningful. Many tools are available to assist in budgeting such as templates from university farm management specialists and computer software programs such as AgProfit™. This program is available as a download for free at (www.agtools.org). Talk with your local Extension Agent to find the latest in tools and budget information.

In addition, growers must not forget 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 your farm profitable.

APPENDIX A

Enterprise Budgets for Blueberry Establishment and Production in the Willamette Valley, Oregon

Table 11. Year 0, blueberry establishment, dollars per 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					200.00
Rip, plow, drag and roll	1 x / acre			200.00	
Weed Control					$111.71
Herbicide spray application	1 x / acre	$6.89	$4.82		
Herbicide	$100 / acre			$100.00	
Sawdust application					1,760.00
Sawdust	19 units @ $90 / unit			1,710.00	
Loader rental	$1000 / 20 acre farm			50.00	
Fertilizer, preplant application	1 x / acre	6.53	4.23		110.76
Fertilizer	$100 / acre			100.00	
Incorporate fert.	1 x / acre	7.38	4.92		22.30
Rototiller, rental	$200 / 20 acre farm			10.00	
Mark field	2 hrs / acre @ $13.5 / hr	27.00		10.00	37.00
Shape beds, custom	1 x / acre			500.00	500.00
Plant bushes					5,757.00
Plant material	$3.5 / plant @ 1452 plants / acre			5,082.00	
Labor	50 hrs / acre @ $13.5 / hr	675.00			
Drag field	1 x / acre	6.53	4.23		10.76
Seed cover crop between rows	1 x / acre	7.84	5.23		38.07
Seed	$25 / acre			25.00	
Irrigation					68.50
Handline labor, preplant	1 hr / acre @ $13.5 / hr	13.50			
Handline rental				5.00	
Power	$50 / acre			50.00	
Pickup			40.50		40.50
ATV			3.80		3.80
Shop and machine shed				53.00	53.00
Miscellaneous and overhead				200.00	200.00
Interest: operating capital	6 months			185.16	185.16
Total **variable** costs		750.66	67.73	8,288.16	9,106.55
FIXED CASH COSTS				**Unit**	**Total**
Pickup & ATV insurance				acre	11.10
Property insurance				acre	25.00
Property taxes				acre	30.00
Total **fixed cash** costs					66.10
FIXED NON-CASH COSTS				**Unit**	**Total**
Mach. & equip. - dep., & int.				acre	72.90
Pickup & ATV - dep. & int				acre	115.02
Shop & machine shed				acre	166.67
Land interest charge				acre	500.00
Total **fixed non-cash** costs					854.59
Total **fixed** costs					920.69
Total of all costs per acre					**$10,027**
Projected Net Returns					**-$10,027**

Table 12. Year 1, blueberry establishment, dollars per acre economic costs and returns.

VARIABLE CASH COSTS	Description	Labor	Machinery	Materials	Total
Weed Control					$352.92
Herbicide sprayer	2 x / acre	13.78	9.64		
Spot spray	2 x / acre	54.00			
Spot spray labor	2 hrs / acre @ $13.5 / hr				
Hand weeding	13 hrs / acre @ $13.5 / hr	175.50			
Herbicide	$100 / acre			100.00	
Sawdust application					1,040.00
Sawdust	11 units @ $90 / farm			990.00	
Loader rental	$1000 / 20 acre farm			50.00	
Fertilization					201.26
Spreader appliation	1 x / acre	6.53	4.23		
Fertigation labor	3 hrs / acre @ $13.5 / hr	40.50			
Fertilizer	$150 / acre			150.00	
Irrigation					482.00
Labor, installation	32 hrs / acre @ $13.5 / hr	432.00			
Water and power	$50 / acre			50.00	
Plant bushes					190.00
Blueberry bush	$3.5 / plant @ 35 plants / acre			122.50	
Labor	5 hrs / acre @ $13.5 / hr	67.50			
Mowing between rows	3 x / acre	18.44	11.44		29.88
Portable toilet	1 unit / acre			50.00	50.00
Pickup			40.50		40.50
ATV			3.80		3.80
Shop and machine shed				53.00	53.00
Miscellaneous and overhead				200.00	200.00
Interest: operating capital	6 months			56.17	56.17
Total **variable** costs		808.25	69.61	1,821.67	2,699.53

FIXED CASH COSTS	Unit	Total
Pickup & ATV insurance	acre	11.10
Property insurance	acre	25.00
Property taxes	acre	30.00
Total **fixed cash** costs		66.10

FIXED NON-CASH COSTS	Unit	Total
Mach. & equip. - dep., & int.	acre	429.89
Pickup & ATV - dep. & int	acre	115.02
Irrig. - dep. & int.	acre	308.33
Shop & machine shed	acre	166.67
Land interest charge	acre	500.00
Int. on prior year's establishment costs	acre	1,002.72
Total **fixed non-cash** costs		2,522.64
Total **fixed** costs		2,588.74
Total of all costs per acre		**$5,288.28**
Projected Net Returns		**-$5,288.28**

Table 13. Year 2, blueberry establishment, hand harvested, dollars per acre economic costs and returns.

TOTAL GROSS INCOME		Quantity	Unit	$/Unit	Total	
Blue berries, fresh market		1,500	lbs	1.34	$2,010	
Total **gross** income					$2,010	
VARIABLE CASH COSTS	**Description**	**Labor**	**Machinery**	**Materials**	**Total**	**Cost $/lb**
Pruning and brush mgmt	15 hr / acre @ $13.5 / hr	202.50			202.50	0.14
Weed Control					$352.92	0.24
Herbicide sprayer	2 x / acre	13.78	9.64			
Spot spray	2 x / acre	54.00				
Spot spray labor	2 hrs / acre @ $13.5 / hr					
Hand weeding	13 hrs / acre @ $13.5 / hr	175.50				
Herbicide	$100 / acre			100.00		
Disease and insect control					350.93	0.23
Pesticide applications	10 x / acre	104.49	96.45			
Fungicide	$50 / acre			50.00		
Insecticide	$100 / acre			100.00		
Fertilization					201.26	0.13
Spreader appliation	1 x / acre	6.53	4.23			
Fertigation labor	3 hrs / acre @ $13.5 / hr	40.50				
Fertilizer	$150 / acre			150.00		
Bird control					63.50	0.04
Labor	1 hr / acre @ $13.5 / hr	13.50				
Equipment	$50 / acre			50.00		
Harvest					940.00	0.63
Contract laborers	$0.55 / lb.			825.00		
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					115.50	0.08
Labor	3 hrs / acre @ $13.5 / hr	40.50				
Repairs & maint.	$25 / acre			25.00		
Water and power	$50 / acre			50.00		
Trellis					405.00	0.27
Installation labor	30 hrs / acre @ $13.5 / hr	405.00				
Mow between rows	10 x / acre	61.46	38.15		99.61	0.07
Bee hives	3 hives @ $50 / hive			150.00	150.00	0.10
IPM scouting	5 hrs / acre @ $13.5 / hr	67.50			67.50	0.05
Portable toilet	1 unit / acre			50.00	50.00	0.03
Pickup			40.50		40.50	0.03
ATV			3.80		3.80	0.00
Shop and machine shed				53.00	53.00	0.04
Miscellaneous and overhead				200.00	200.00	0.13
Interest: operating capital	6 months			70.04	70.04	0.05
Total **variable** costs		1,185.26	192.77	1,988.04	3,366.07	2.24
FIXED CASH COSTS				**Unit**	**Total**	**Cost $/lb**
Pickup & ATV insurance				acre	11.10	0.01
Property insurance				acre	25.00	0.02
Property taxes				acre	30.00	0.02
Total **fixed cash** costs					66.10	0.04
FIXED NON-CASH COSTS				**Unit**	**Total**	**Cost $/lb**
Mach. & equip. - dep., & int.				acre	597.85	0.40
Pickup & ATV insurance				acre	115.02	0.08
Irrig. & trellis - dep. & int.				acre	396.95	0.26
Shop & machine shed				acre	166.67	0.11
Land interest charge				acre	500.00	0.33
Int. on prior year's establishment costs				acre	1,531.55	1.02
Total **fixed non-cash** costs					3,308.04	2.21
Total **fixed** costs					3,374.14	2.25
Total of all costs per acre					**$6,740**	4.49
Net projected returns					**-$4,730**	-3.15

Table 14. Year 3, blueberry establishment, hand harvested, dollars per acre economic costs and returns.

TOTAL GROSS INCOME		Quantity	Unit	$/Unit	Total	
Blue berries, fresh market		3,600	lbs	1.34	$4,824	
Total **gross** income					$4,824	
VARIABLE CASH COSTS	**Description**	**Labor**	**Machinery**	**Materials**	**Total**	**Cost/lb**
Pruning and brush mgmt	30 hr / acre @ $13.5 / hr	405.00			405.00	0.11
Weed Control					$177.42	0.05
Herbicide sprayer	2 x / acre	13.78	9.64			
Spot spray	2 x / acre	54.00				
Spot spray labor	2 hrs / acre @ $13.5 / hr					
Herbicide	$100 / acre			100.00		
Disease and insect control					550.93	0.15
Pesticide applications	10 x / acre	104.49	96.45			
Fungicide	$250 / acre			250.00		
Insecticide	$100 / acre			100.00		
Fertilization					201.26	0.06
Spreader appliation	1 x / acre	6.53	4.23			
Fertigation labor	3 hrs / acre @ $13.5 / hr	40.50				
Fertilizer	$150 / acre			150.00		
Bird control					63.50	0.02
Labor	1 hr / acre @ $13.5 / hr	13.50				
Equipment	$50 / acre			50.00		
Harvest					2,242.00	
Contract harvest	$0.55 / lb.			1,980.00		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					115.50	0.03
Labor	3 hrs / acre @ $13.5 / hr	40.50				
Repairs & maint.	$25 / acre			25.00		
Water and power	$50 / acre			50.00		
Trellis					30.50	0.01
Repair & maint.	$17 / acre			17.00		
Labor	1 hrs / acre @ $13.5 / hr	13.50				
Bee hives	3 hives @ $50 / hive			150.00	150.00	0.04
IPM scouting	5 hrs / acre @ $13.5 / hr	67.50			67.50	0.02
Flail mow	10 x / acre	61.46	38.15		99.61	0.03
Portable toilet	1 unit / acre			50.00	50.00	0.01
Pickup			40.50		40.50	0.01
ATV			3.80		3.80	0.00
Shop and machine shed				53.00	53.00	0.01
Miscellaneous and overhead				200.00	200.00	0.06
Interest: operating capital	6 months			94.57	94.57	0.03
Total **variable** costs		820.76	192.77	3,531.57	4,545.10	1.26
FIXED CASH COSTS				**Unit**	**Total**	**Cost/lb**
Pickup & ATV insurance				acre	11.10	0.00
Property insurance				acre	25.00	0.01
Property taxes				acre	30.00	0.01
Total **fixed cash** costs					66.10	0.02
FIXED NON-CASH COSTS				**Unit**	**Total**	**Cost/lb**
Mach. & equip. - dep., & int.				acre	597.85	0.17
Pickup & ATV - dep. & int				acre	115.02	0.03
Irrig. & trellis - dep. & int.				acre	396.95	0.11
Shop & machine shed				acre	166.67	0.05
Land interest charge				acre	500.00	0.14
Int. on prior year's establishment costs				acre	2,004.57	0.56
Total **fixed non-cash** costs					3,781.06	1.05
Total **fixed** costs					3,847.17	1.07
Total of all costs per acre					**$8,392**	2.33
Net projected returns					**-$3,568**	-0.99

Table 15. Year 4, blueberry establishment, hand harvested, dollars per acre economic costs and returns.

TOTAL GROSS INCOME		Quantity	Unit	$/Unit	Total	
Blue berries, fresh market		7,200	lbs	1.34	9,648	
Total **gross** income					9,648	
VARIABLE CASH COSTS	**Description**	**Labor**	**Machinery**	**Materials**	**Total**	**Cost/lb**
Pruning and brush mgmt	50 hr / acre @ $13.5 / hr	675.00			675.00	0.09
Soil sample	0.2 x / acre			8.00	8.00	0.00
Weed Control					$177.42	0.02
Herbicide sprayer	2 x / acre	13.78	9.64			
Spot spray	2 x / acre	54.00				
Spot spray labor	2 hrs / acre @ $13.5 / hr					
Herbicide	$100 / acre			100.00		
Sawdust application					1,040.00	0.14
Sawdust	11 units @ $90 / unit			990.00		
Loader rental	$1000 / 20 acre farm			50.00		
Disease and insect control					550.93	0.08
Pesticide applications	10 x / acre	104.49	96.45			
Fungicide	$250 / acre			250.00		
Insecticide	$100 / acre			100.00		
Fertilization					201.26	0.03
Spreader appliation	1 x / acre	6.53	4.23			
Fertigation labor	3 hrs / acre @ $13.5 / hr	40.50				
Fertilizer	$150 / acre			150.00		
Bird control					63.50	0.01
Labor	1 hr / acre @ $13.5 / hr	13.50				
Equipment	$50 / acre			50.00		
Harvest					4,474.00	0.62
Contract harvest	$0.55 / lb.			3,960.00		
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					115.50	0.02
Labor	3 hrs / acre @ $13.5 / hr	40.50				
Repairs & maint.	$25 / acre			25.00		
Water and power	$50 / acre			50.00		
Trellis					30.50	0.00
Repair & maint.	$17 / acre			17.00		
Labor	1 hrs / acre @ $13.5 / hr	13.50				
Bee hives	3 hives @ $50 / hive			150.00	150.00	0.02
IPM scouting	5 hrs / acre @ $13.5 / hr	67.50			67.50	0.01
Flail mow	10 x / acre	61.46	38.15		99.61	0.01
Portable toilet	1 unit / acre			50.00	50.00	0.01
Pickup			40.50		40.50	0.01
ATV			3.80		3.80	0.00
Shop and machine shed				53.00	53.00	0.01
Miscellaneous and overhead				200.00	200.00	0.03
Interest: operating capital	6 months			170.01	170.01	0.02
Total **variable** costs		1,090.76	192.77	6,887.01	8,170.54	1.13
FIXED CASH COSTS				**Unit**	**Total**	**Cost/lb**
Pickup & ATV insurance				acre	11.10	0.00
Property insurance				acre	25.00	0.00
Property taxes				acre	30.00	0.00
Total **fixed cash** costs					66.10	0.01
FIXED NON-CASH COSTS				**Unit**	**Total**	**Cost/lb**
Mach. & equip. - dep., & int.				acre	597.85	0.08
Pickup & ATV - dep. & int				acre	115.02	0.02
Irrig. & trellis - dep. & int.				acre	396.95	0.06
Shop & machine shed				acre	166.67	0.02
Land interest charge				acre	500.00	0.07
Int. on prior year's establishment costs				acre	2,361.40	0.33
Total **fixed non-cash** costs					4,137.89	0.57
Total **fixed** costs					4,203.99	0.58
Total of all costs per acre					**$12,375**	1.72
Net projected returns					**-$2,727**	-0.38

Table 16. Year 5, blueberry establishment, hand harvested, dollars per acre economic costs and returns.

TOTAL GROSS INCOME		Quantity	Unit	$/Unit	Total	
Blue berries, fresh market		10,800	lbs	1.34	14,472	
Total **gross** income					14,472	
VARIABLE CASH COSTS	**Description**	**Labor**	**Machinery**	**Materials**	**Total**	**Cost/lb**
Pruning and brush mgmt	70 hr / acre @ $13.5 / hr	945.00			945.00	0.09
Weed Control					$177.42	0.02
Herbicide sprayer	2 x / acre	13.78	9.64			
Spot spray	2 x / acre	54.00				
Spot spray labor	2 hrs / acre @ $13.5 / hr					
Herbicide	$100 / acre			100.00		
Disease and insect control					550.93	0.05
Pesticide applications	10 x / acre	104.49	96.45			
Fungicide	$250 / acre			250.00		
Insecticide	$100 / acre			100.00		
Fertilization					201.26	0.02
Spreader appliation	1 x / acre	6.53	4.23			
Fertigation labor	3 hrs / acre @ $13.5 / hr	40.50				
Fertilizer	$150 / acre			150.00		
Bird control					63.50	0.01
Labor	1 hr / acre @ $13.5 / hr	13.50				
Equipment	$50 / acre			50.00		
Harvest					6,706.00	0.62
Contract harvest	$0.55 / lb.			5,940.00		
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					115.50	0.01
Labor	3 hrs / acre @ $13.5 / hr	40.50				
Repairs & maint.	$25 / acre			25.00		
Water and power	$50 / acre			50.00		
Trellis					30.50	0.00
Repair & maint.	$17 / acre			17.00		
Labor	1 hrs / acre @ $13.5 / hr	13.50				
Bee hives	3 hives @ $50 / hive			150.00	150.00	0.01
IPM scouting	5 hrs / acre @ $13.5 / hr	67.50			67.50	0.01
Flail mow	10 x / acre	61.46	38.15		99.61	0.01
Portable toilet	1 unit / acre			50.00	50.00	0.00
Pickup			40.50		40.50	0.00
ATV			3.80		3.80	0.00
Shop and machine shed				53.00	53.00	0.00
Miscellaneous and overhead				200.00	200.00	0.02
Interest: operating capital	6 months			200.91	200.91	0.02
Total **variable** costs		1,360.76	192.77	8,101.91	9,655.44	0.89
FIXED CASH COSTS				**Unit**	**Total**	**Cost/lb**
Pickup & ATV insurance				acre	11.10	0.00
Property insurance				acre	25.00	0.00
Property taxes				acre	30.00	0.00
Total **fixed cash** costs					66.10	0.01
FIXED NON-CASH COSTS				**Unit**	**Total**	**Cost/lb**
Mach. & equip. - dep., & int.				acre	597.85	0.06
Pickup & ATV - dep. & int				acre	115.02	0.01
Irrig. & trellis - dep. & int.				acre	396.95	0.04
Shop & machine shed				acre	166.67	0.02
Land interest charge				acre	500.00	0.05
Int. on prior year's establishment costs				acre	2,634.05	0.24
Total **fixed non-cash** costs					4,410.54	0.41
Total **fixed** costs					4,476.65	0.41
Total of all costs per acre					**$14,132**	1.31
Net projected returns					**$340**	0.03

Table 17. Year 6, blueberry establishment, hand harvested, dollars per acre economic costs and returns.

TOTAL GROSS INCOME		Quantity	Unit	$/Unit	Total	
Blue berries, fresh market		14,400	lbs	1.34	19,296	
Total **gross** income					19,296	
VARIABLE CASH COSTS	**Description**	**Labor**	**Machinery**	**Materials**	**Total**	**Cost/lb**
Pruning and brush mgmt	85 hr / acre @ $13.5 / hr	1,147.50			1,147.50	0.08
Weed Control					$177.42	0.01
Herbicide sprayer	2 x / acre	13.78	9.64			
Spot spray	2 x / acre	54.00				
Spot spray labor	2 hrs / acre @ $13.5 / hr					
Herbicide	$100 / acre			100.00		
Disease and insect control					550.93	0.04
Pesticide applications	10 x / acre	104.49	96.45			
Fungicide	$250 / acre			250.00		
Insecticide	$100 / acre			100.00		
Fertilization					201.26	0.01
Spreader appliation	1 x / acre	6.53	4.23			
Fertigation labor	3 hrs / acre @ $13.5 / hr	40.50				
Fertilizer	$150 / acre			150.00		
Bird control					63.50	0.00
Labor	1 hr / acre @ $13.5 / hr	13.50				
Equipment	$50 / acre			50.00		
Harvest					8,938.00	0.62
Contract harvest	$0.55 / lb.			7,920.00		
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					115.50	0.01
Labor	3 hrs / acre @ $13.5 / hr	40.50				
Repairs & maint.	$25 / acre			25.00		
Water and power	$50 / acre			50.00		
Trellis					30.50	0.00
Repair & maint.	$17 / acre			17.00		
Labor	1 hrs / acre @ $13.5 / hr	13.50				
Bee hives	3 hives @ $50 / hive			150.00	150.00	0.01
IPM scouting	5 hrs / acre @ $13.5 / hr	67.50			67.50	0.00
Flail mow	10 x / acre	61.46	38.15		99.61	0.01
Portable toilet	1 unit / acre			50.00	50.00	0.00
Pickup			40.50	0.00	40.50	0.00
ATV			3.80	0.00	3.80	0.00
Shop and machine shed				53.00	53.00	0.00
Miscellaneous and overhead				200.00	200.00	0.01
Interest: operating capital	6 months			252.64	252.64	0.02
Total **variable** costs		1,563.26	192.77	10,385.64	12,141.67	0.84
FIXED CASH COSTS				**Unit**	**Total**	**Cost/lb**
Pickup & ATV insurance				acre	11.10	0.00
Property insurance				acre	25.00	0.00
Property taxes				acre	30.00	0.00
Total **fixed cash** costs					66.10	0.00
FIXED NON-CASH COSTS				**Unit**	**Total**	**Cost/lb**
Mach. & equip. - dep., & int.				acre	597.85	0.04
Pickup & ATV - dep. & int				acre	115.02	0.01
Irrig. & trellis - dep. & int.				acre	396.95	0.03
Shop & machine shed				acre	166.67	0.01
Land interest charge				acre	500.00	0.03
Int. on prior year's establishment costs				acre	2,600.06	0.18
Total **fixed non-cash** costs					4,376.55	0.30
Total **fixed** costs					4,442.65	0.31
Total of all costs per acre					**$16,584**	1.15
Net projected returns					**$2,712**	0.19

Table 18. Full production, blueberries, hand harvested, dollars per acre economic costs and returns.

TOTAL GROSS INCOME		Quantity	Unit	$/Unit	Total	
Blue berries, fresh market		16,200	lbs	1.34	21,708	
Blue berries, processed market		1,800	lbs	0.75	1,350	
Total **gross** income		18,000			23,058	
VARIABLE CASH COSTS	**Description**	**Labor**	**Machinery**	**Materials**	**Total**	**Cost/lb**
Pruning and brush mgmt	85 hr / acre @ $13.5 / hr	1,147.50			1,147.50	0.06
Soil sample (every 4th yr)	0.2 x / acre			2.00	2.00	
Sawdust ap. (every 3rd yr)					347.00	
Sawdust	3.67 units @ $90 / unit			330.30		
Loader rental	$334 / 20 acre farm			16.70		
Weed Control					$177.42	0.01
Herbicide sprayer	2 x / acre	13.78	9.64			
Spot spray	2 x / acre	54.00				
Spot spray labor	2 hrs / acre @ $13.5 / hr					
Herbicide	$100 / acre			100.00		
Disease and insect control					550.93	0.03
Pesticide applications	10 x / acre	104.49	96.45			
Fungicide	$250 / acre			250.00		
Insecticide	$100 / acre			100.00		
Fertilization					201.26	0.01
Spreader appliation	1 x / acre	6.53	4.23			
Fertigation labor	3 hrs / acre @ $13.5 / hr	40.50				
Fertilizer	$150 / acre			150.00		
Bird control					63.50	0.00
Labor	1 hr / acre @ $13.5 / hr	13.50				
Equipment	$50 / acre			50.00		
Harvest					10,396.00	0.58
Contract hand harvest	$0.55 / lb.			8,910.00		
Contract machine harvest	$0.12 / lb.			216.00		
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					115.50	0.01
Labor	3 hrs / acre @ $13.5 / hr	40.50				
Repairs & maint.	$25 / acre			25.00		
Water and power	$50 / acre			50.00		
Trellis					30.50	0.00
Repair & maint.	$17 / acre			17.00		
Labor	1 hrs / acre @ $13.5 / hr	13.50				
Bee hives	3 hives @ $50 / hive			150.00	150.00	0.01
IPM scouting	5 hrs / acre @ $13.5 / hr	67.50			67.50	0.00
Flail mow	10 x / acre	61.46	38.15		99.61	0.01
Portable toilet	1 unit / acre			50.00	50.00	0.00
Pickup			40.50		40.50	0.00
ATV			3.80		3.80	0.00
Shop and machine shed				53.00	53.00	0.00
Miscellaneous and overhead				200.00	200.00	0.01
Interest: operating capital	6 months			42.69	42.69	0.00
Total **variable** costs		1,563.26	192.77	11,982.69	13,738.72	0.76
FIXED CASH COSTS				**Unit**	**Total**	**Cost/lb**
Pickup & ATV insurance				acre	11.10	0.00
Property insurance				acre	25.00	0.00
Property taxes				acre	30.00	0.00
Total **fixed cash** costs					66.10	0.00
FIXED NON-CASH COSTS				**Unit**	**Total**	**Cost/lb**
Mach. & equip. - dep., & int.				acre	597.85	0.03
Pickup & ATV - dep. & int				acre	115.02	0.01
Irrig. & trellis - dep. & int.				acre	396.95	0.02
Shop & machine shed				acre	166.67	0.01
Land interest charge				acre	500.00	0.03
Amortized establishment costs				acre	2,784.12	0.15
Total **fixed non-cash** costs					4,560.61	0.25
Total **fixed** costs					4,626.71	0.26
Total of all costs per acre					**$18,365**	1.02
Net projected returns					**$4,693**	0.26

Table 19. Full production, blueberries, machine harvested, dollars per acre economic costs and returns.

TOTAL GROSS INCOME		Quantity	Unit	$/Unit	Total	
Blue berries, processed market		16,000	lbs	0.75	12,000	
Total **gross** income					12,000	
VARIABLE CASH COSTS	**Description**	**Labor**	**Machinery**	**Materials**	**Total**	**Cost/lb**
Pruning and brush mgmt	60 hr / acre @ $13.5 / hr	810.00			810.00	0.05
Soil sample (every 4th yr)	0.2 x / acre			2.00	2.00	0.00
Sawdust ap. (every 3rd yr)					347.00	0.02
Sawdust	3.67 units @ $90 / unit			330.30		
Loader rental	$334 / 20 acre farm			16.70		
Weed Control					$177.42	0.01
Herbicide sprayer	2 x / acre	13.78	9.64			
Spot spray	2 x / acre	54.00				
Spot spray labor	2 hrs / acre @ $13.5 / hr					
Herbicide	$100 / acre			100.00		
Disease and insect control					550.93	0.03
Pesticide applications	10 x / acre	104.49	96.45			
Fungicide	$250 / acre			250.00		
Insecticide	$100 / acre			100.00		
Fertilization					201.26	0.01
Spreader appliation	1 x / acre	6.53	4.23			
Fertigation labor	3 hrs / acre @ $13.5 / hr	40.50				
Fertilizer	$150 / acre			150.00		
Bird control					63.50	0.00
Labor	1 hr / acre @ $13.5 / hr	13.50				
Equipment	$50 / acre			50.00		
Harvest					3,050.00	0.19
Contract machine harvest	$0.12 / lb.			1,920.00		
Load & haul berries	$0.03 / lb.			480.00		
Berry commission fee	$0.04 / lb.			640.00		
Tissue analysis	0.2 x / acre			10.00		
Irrigation					115.50	0.01
Labor	3 hrs / acre @ $13.5 / hr	40.50				
Repairs & maint.	$25 / acre			25.00		
Water and power	$50 / acre			50.00		
Trellis					30.50	0.00
Repair & maint.	$17 / acre			17.00		
Labor	1 hrs / acre @ $13.5 / hr	13.50				
Bee hives	3 hives @ $50 / hive			150.00	150.00	0.01
IPM scouting	5 hrs / acre @ $13.5 / hr	67.50			67.50	0.00
Flail mow	10 x / acre	61.46	38.15		99.61	0.01
Portable toilet	1 unit / acre			50.00	50.00	0.00
Pickup			40.50		40.50	0.00
ATV			3.80		3.80	0.00
Shop and machine shed				53.00	53.00	0.00
Miscellaneous and overhead				200.00	200.00	0.01
Interest: operating capital	6 months			39.77	39.77	0.00
Total **variable** costs		1,225.76	192.77	4,633.77	6,052.30	0.38
FIXED CASH COSTS				**Unit**	**Total**	**Cost/lb**
Pickup & ATV insurance				acre	11.10	0.00
Property insurance				acre	25.00	0.00
Property taxes				acre	30.00	0.00
Total **fixed cash** costs					66.10	0.00
FIXED NON-CASH COSTS				**Unit**	**Total**	**Cost/lb**
Mach. & equip. - dep., & int.				acre	597.85	0.04
Pickup & ATV - dep. & int				acre	115.02	0.01
Irrig. & trellis - dep. & int.				acre	396.95	0.02
Shop & machine shed				acre	166.67	0.01
Land interest charge				acre	500.00	0.03
Amortized establishment costs				acre	2,784.12	0.17
Total **fixed non-cash** costs					4,560.61	0.29
Total **fixed** costs					4,626.71	0.29
Total of all costs per acre					**$10,679**	**$0.67**
Net projected returns					**$1,321**	**$0.08**