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Blueberry Economics:

The Costs of Establishing and Producing Organic 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 harvested blueberry acreage 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 has varied 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% for fresh and processed fruit, respectively, compared to 2009.

The demand for fresh and processed organic blueberry fruit has been strong. Organic blueberry acreage in the USA has more than doubled, increasing from about 545 acres in 2003 to 1,950 in 2008. 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. Grower prices for organic blueberry fruit have historically been 20 to 100% higher than for conventional fruit. 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 organic 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 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 experience gained from a six-year-old organic research study at OSU, the shared experience of established organic blueberry growers, field representatives, researchers, and farm suppliers. It is known that the risks in organic blueberry production are greater than in conventional production; for example, a disease infestation such as mummy berry is much more difficult to control in organic production than in conventional, and can have major negative impacts on yield. Growers are encouraged to substitute their own costs and yield information to get an accurate accounting for their farm.

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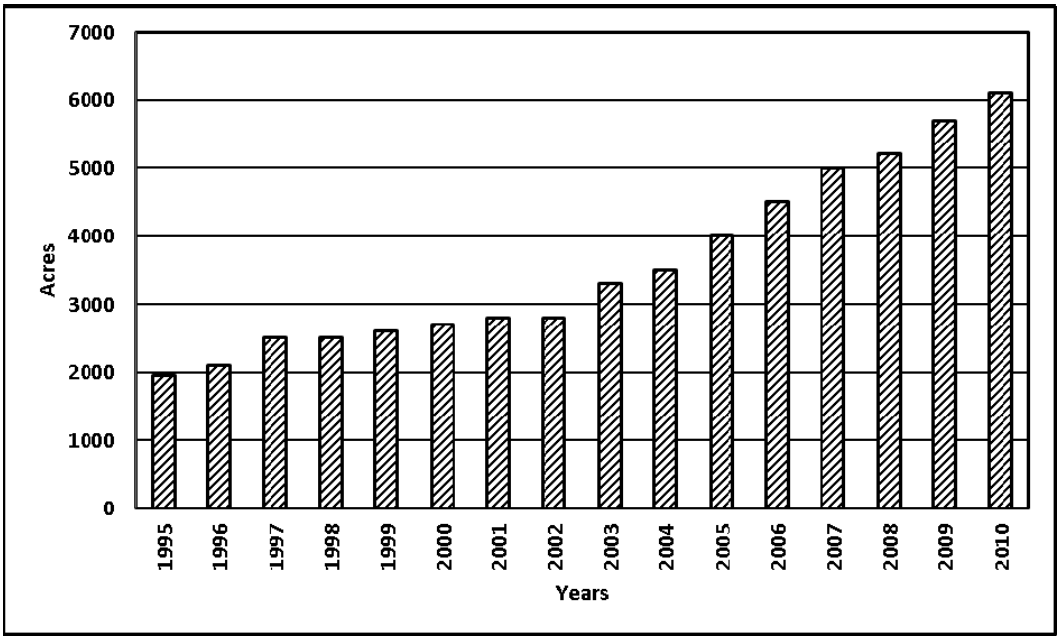

Figure 1. Harvested acres of blueberries in Oregon, 1995–2010.
Source: USDA/NASS Fr Nt 1-3 (96 to 11).

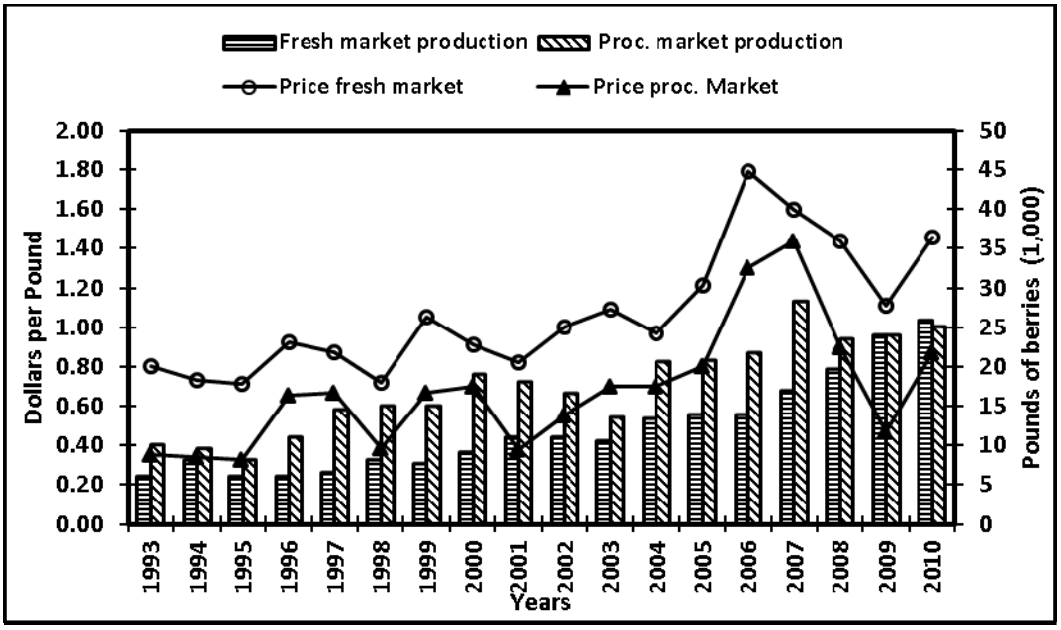

Figure 2. Oregon fresh and processed market blueberry production and prices, 1993–2010.
Source: USDA/NASS Fr Nt 1-3 (94 to 11).

ASSUMPTIONS

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 organic blueberries in the Willamette Valley raises 20 acres of blueberries on a 100-acre farm.
2) The plant spacing is 3ft x 10ft (1452 plants/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) 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.
6) In organic production systems, proper management of the soil and weeds prior to planting is essential, as options are limited after planting. This study assumes the field is ready for planting with no weed or soil amendment issues. Ideally, the field would have been seeded with a cover crop about one-year before planting (generally a legume and grain mix) with the cover crop mowed and incorporated in the summer of year 0.
7) Pre-planting land preparation (plowing, disking, etc.) is contracted with custom farming providers.
8) Sawdust and chicken compost are incorporated prior to forming raised beds and planting blueberries. Raised beds are established just prior to planting to ensure they are weed free.
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. Pumping cost estimates are in Table 4. Repairs and maintenance for the system costs one percent of the purchase price per year.
10) Weed mat (landscape fabric) is used for weed management. The 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. The weed mat has a life of five years; note that the life of weed mat varies with manufacturer. 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.
11) An organic grass cover crop is established between the rows. A string trimmer is used to keep the edges of the cover crop from encroaching on the weed mat.
12) 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. Every two years, starting in the fall of year 3, 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.
13) Commercial production begins in year 2 with typical yields of 1,500 lbs./acre. Full production begins in year 7 with typical yields of 16,000 to 18,000 lbs./acre depending upon harvest method. All blueberries n years 2 – 6

will be hand harvested for the fresh market. Our research to date shows well-managed organic blueberry plantings can produce yields similar to those of conventional blueberry production systems. However, organic production systems may take longer to reach full production. If plant vigor is poor in the early years, plants should be pruned to reduce yields – over-cropped young plants will not achieve their full potential at maturity, especially in an organic production system.

14) Various types of scare devices are used to reduce bird depredation. Note that there are more effective methods to control birds (e.g. netting, falcons), but they are more expensive than the $50 per acre allocated in this study.
15) Berries are hand harvested through year 6 of establishment and can be either machine or hand harvested at full production. The hand harvest full production budget assumes that growers will machine pick a final "clean-up" pass at the end of the harvest season for the process market.
16) This study assumes the organic blueberry fresh market price is $1.75 per lb. and the processed market price is $1.00 per lb. (based on typical prices in the past three years). We assume that all machine harvested berries are sold to berry processers.
17) A machine shed and all farm equipment are owned by the operator.
18) 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.
19) Gasoline and diesel costs per gallon are $3.50 and $3.75, respectively.
20) 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.
21) 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.
22) 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.
23) 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.
24) 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 and included as a fixed cost in the full production budget.
25) Additional assumptions are listed for variable, fixed cash, and fixed non-cash costs in Table 4.
26) Price inflation for the time period of this study was ignored.
27) 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	191	20	$ 3,849
Mower, selfprop.	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	1,248
Mower, Flail	5' unit	6,000	6	15	576
Planter	6' unit	5,000	8	15	480
Fertilizer spreader	Broadcast bander	3,000	14	15	288
Pickup*	1/2 ton 4x4, gas, 12 mpg	22,000	*12,000*	10	8,319
ATV*	4 wheeler, new, 30 mpg	5,500	*3,000*	5	2,465
Portable toilets	Rental units and servicing	1,000	N/A	N/A	0
Weed Mat	per acre	1,200	N/A	5	0
Irrigation system	Pump, filter, injector, manifold, lines, and emitters	50,000	N/A	15	0
Trellis system, per acre	Two wire, metal posts	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

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

Table 2. Machinery Cost Calculations in dollars.

		--- Variable costs ---		------ Fixed costs ------		
Machine	Size or Description	Fuel & Lube	Repairs & Maint.	Depr. & Interest	Insurance	Total
		----- Costs per hour -----				
Tractor	4 wheel dr 35hp, new	12.94	0.34	14.36	0.80	28.44
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	6.19	12.63	0.39	19.21
Mower, Flail	5' unit	0.00	0.26	99.09	3.05	102.39
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, 12 mpg	0.34	0.01	0.14	0.01	0.50
ATV*	4 wheeler, new, 30 mpg	0.13	0.01	0.22	0.02	0.38
		----- Costs per acre -----				
Portable toilets	Rental units and servicing	0.00	0.00	0.00	0.00	50.00
Weed Mat	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	308.33	0.00	333.33
Trellis system, per acre	Two wire, metal posts	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

* Pickup 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	$10.71	$15.49	$36.65
Mower, Flail	3.00	3.09	6.15	4.38	37.94	48.47
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	7.84	5.93	33.78	47.55
Fertilizer spreader	3.00	2.91	6.53	4.83	13.47	24.83

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	$1.75	$1.75	$1.75	$1.75	$1.75	$1.75	$0.00
Prices per lb, processed market	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$1.00	$1.00
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	$0	$200	$200	$400	$800	$1,000	$1,000	$1,000	$1,000
Cost of string trimmer supplies	$0	$5	$15	$15	$15	$15	$15	$15	$15
Cost of pest/disease control materials	$0	$0	$600	$600	$600	$600	$600	$600	$600
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	$3.5	$3.5	$0	$0	$0	$0	$0	$0	$0
Cost of hand-harvest labor, per lb	$0	$0	$0.55	$0.55	$0.55	$0.55	$0.55	$0.55	$0.55
Cost of machine harvest, per lb	$0	$0	$0	$0	$0	$0	$0	$0.12	$0.12
Cost of irrigation water and power	$50	$50	$50	$50	$50	$50	$50	$50	$50
Cost of organic grass seed	$130	$0	$0	$0	$0	$0	$0	$0	$0
Cost of sawdust, per unit	$90	$90	$0	$0	$0	$0	$0	$0	$0
Cost of loader rental	$1,600	$0	$0	$1,600	$0	$1,600	$0	$800	$800
Cost of chicken compost, per ton	$100	$0	$0	$100	$0	$100	$0	$100	$100
Organic certification, Oregon Tilth	$0	$31	$24.95	$26.70	$28.65	$31.55	$35.40	$35.40	$31.55
Tons of chicken compost	5.0	0.0	0.0	5.0	0.0	5.0	0.0	2.5	2.5
Units of sawdust	18	0.2	0	0	0	0	0	0	0
Hours of labor, pruning	0	0	15	30	50	70	85	85	60
Hours of labor, install/open & close weed mat	50	0	0	35	0	35	0	17	17
Hours of labor to rake compost/mulch	0	0	0	10	0	10	0	5	5
Hours of labor, hand weeding	0	18	10	10	10	10	10	10	10
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 flail mow	0	0	2	2	2	2	2	2	2
Times to string trim edges	0	1	3	3	3	3	3	3	3
Times to fertilize, broadcast app.	0	0	0	1	0	1	0	0.5	0.5
Times to apply disease & pest materials	0	2	10	10	10	10	10	10	10
Times to mow, selfprop.	0	3	10	10	10	10	10	10	10
Property taxes	$30	$30	$30.0	$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 gal/hr for tractor	3	3	3	3	3	3	3	3	3
Gas gal/hr for mower	1	1	1	1	1	1	1	1	1
Gasoline price	$3.50	$3.50	$3.50	$3.50	$3.50	$3.50	$3.50	$3.50	$3.50
Diesel fuel price	$3.75	$3.75	$3.75	$3.75	$3.75	$3.75	$3.75	$3.75	$3.75
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 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. Cash costs include: labor, plants, trellis, irrigation system, fertilizer, chemicals, machinery repairs, fuel, lube and oil, operating interest (short-term), 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 an organic blueberry planting. In this scenario, production begins in year two with 1,500 pounds of berries per acre and increases to between16,000 and 18,000 pounds at full production, year seven, depending upon method of harvest; machine harvest only (MH) or hand harvest with a machine harvest clean-up pass (HH), respectively. Total variable costs are $14,238 per acre in year zero (the planting year) with an additional $66 of fixed cash costs for a total cash cost of $14,304 per acre. A positive cash flow begins in year four with gross income exceeding total cash costs by $4,455 per acre. The planting returns sufficient gross income to pay all previous years' cash costs in year 6 with a projected cash surplus of $2,866 per acre.

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 43 percent of the total cash costs. Hired labor, excluding harvest, is next with 16 percent, followed by fertilizers and chemicals at 10 percent of cash costs. Plants account for 7 percent and irrigation 4 percent of cash costs per acre. Trellising and operating interest each account for 2 percent. The remaining cost items account for 16 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 37 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 less per acre in the processed market, machine harvest production system than in the hand harvested system (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. Total economic costs in year zero are projected to be $12,535. The difference between cash and economic costs being the true cash out-lay versus an accrual expensing of costs. Gross income exceeds variable costs beginning in year four with a $4,455 per acre return to the grower. Estimated gross income for hand-harvested blueberries exceeds annual economic costs in year 5 by $2,063 per acre and is projected to exceed all cumulative economic costs in year 8 (Figure 4). Under the assumptions specified for this study, machine harvested blueberries require 11 years to repay all cumulative economic costs, approximately 3 years longer than hand-harvested blueberries (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 34 percent of the total establishment costs. Interest costs are

next at 20 percent (which include interest on establishment costs) followed by hired labor at 12 percent and fertilizer and chemicals at 8. Machine and plant costs each account for 5 percent of economic costs and irrigation 3 percent of total economic costs. The remaining cost items account for 13 percent of the total economic costs.

Figure 4 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 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, 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 planting size. Given the assumptions in this study, fresh market organic blueberry plantings of most any size will generate sufficient gross revenue to eventually recover economic costs of production. In this study a five acre planting would cover all economic costs in 13 years, and a 10 acre planting in 9 years. It is interesting to note that as plantings increase in size beyond 20 acres, increases in returns per acre to the grower diminish. Specifically, the projected net returns per acre over 25 years for the 40 acre planting was $203,206 while the 80 acre planting returned $212,448; a difference of $9,241 per acre. The diminishing returns are due to the optimization of the equipment and infrastructure, as the planting size increases 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 understand the impact of different yields and prices on the returns of these production systems. Remember that while the returns for organic blueberry production may be high if the price is high (Tables 7 to 10), there are disease and insect pests that might be more difficult to control in organic production systems that may reduce yield relative to conventional systems.

Table 5. Cash costs and returns of establishing and producing organic 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
Yield (lbs/acre), processed	0	0	0	0	0	0	0	1,800	16,000
Price (dollars/lb), fresh	0.00	0.00	1.75	1.75	1.75	1.75	1.75	1.75	0.00
Price (dollars/lb), processed	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.00	1.00
Gross Income(dollars/acre)	0	0	2,625	6,300	12,600	18,900	25,200	30,150	16,000
Variable Costs (per acre):									
Custom work/Rental equip.	830.00	0.00	0.00	80.00	0.00	80.00	0.00	40.00	40.00
Blueberry plants	5,082.00	122.50	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Fertilizer	0.00	200.00	200.00	400.00	800.00	1,000.00	1,000.00	1,000.00	1,000.00
Soil test	8.00	0.00	0.00	0.00	8.00	0.00	0.00	2.00	2.00
Chemicals	0.00	0.00	600.00	600.00	600.00	600.00	600.00	600.00	600.00
Sawdust/chicken compost	2,120.00	18.00	0.00	500.00	0.00	500.00	0.00	250.00	250.00
Weed mat	1,200.00	12.00	12.00	12.00	12.00	1,200.00	12.00	252.00	252.00
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	1,823.37	445.98	986.30	1,215.36	594.80	1,213.66	594.80	897.48	897.48
Machine costs	56.53	49.28	173.03	182.69	173.03	177.86	173.03	175.44	175.44
Irrigation	2,500.00	75.00	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
Organic certification	0.00	31.25	24.95	26.70	28.65	31.55	35.40	35.40	31.55
Shop and machine shed	53.00	53.00	53.00	53.00	53.00	53.00	53.00	53.00	53.00
Miscellaneous & overhead	340.00	255.00	265.00	265.00	265.00	265.00	265.00	265.00	265.00
Interest: operating capital	225.35	26.56	79.30	133.32	169.31	252.37	278.60	322.27	158.92
Total **variable** costs	14,238.25	1,288.57	5,511.08	6,407.07	8,144.79	13,316.44	13,389.34	15,728.10	7,877.39
Gross Income - Variable Cost	-14,238.25	-1,288.57	-2,886.08	-107.07	4,455.21	5,583.56	11,810.66	14,421.90	8,122.61
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**	14,304.36	1,354.67	5,577.19	6,473.17	8,210.89	13,382.54	13,455.44	15,794.20	7,943.50
Net projected returns	-14,304.36	-1,354.67	-2,952.19	-173.17	4,389.11	5,517.46	11,744.56	14,355.80	8,056.50
Cumulative returns	-14,304.36	-15,659.03	-18,611.22	-18,784.39	-14,395.28	-8,877.82	2,866.74	17,222.54	10,923.24

Table 6. Economic costs and returns of establishing and producing organic 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
Yield (lbs/acre), 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	1.75	1.75	1.75	1.75	1.75	1.75	0.00
Price (dollars/lb), processed	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.00	1.00
Gross Income(dollars/acre)	0.00	0.00	2,625.00	6,300.00	12,600.00	18,900.00	25,200.00	30,150.00	16,000.00
Variable Costs (per acre):									
Custom work/Rental equip.	830.00	0.00	0.00	80.00	0.00	80.00	0.00	40.00	40.00
Blueberry plants	5,082.00	122.50	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Fertilizer	0.00	200.00	200.00	400.00	800.00	1,000.00	1,000.00	1,000.00	1,000.00
Soil test	8.00	0.00	0.00	0.00	8.00	0.00	0.00	2.00	2.00
Chemicals	0.00	0.00	600.00	600.00	600.00	600.00	600.00	600.00	600.00
Sawdust/chicken compost	2,120.00	18.00	0.00	500.00	0.00	500.00	0.00	250.00	250.00
Weed mat	0.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
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	1,823.37	445.98	986.30	1,215.36	594.80	1,213.66	594.80	897.48	897.48
Machine costs	56.53	49.28	173.03	182.69	173.03	177.86	173.03	175.44	175.44
Irrigation	50.00	75.00	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
Organic certification	0.00	31.25	24.95	26.70	28.65	31.55	35.40	35.40	31.55
Shop and machine shed	53.00	53.00	53.00	53.00	53.00	53.00	53.00	53.00	53.00
Miscellaneous & overhead	340.00	255.00	265.00	265.00	265.00	265.00	265.00	265.00	265.00
Interest: operating capital	225.35	26.56	79.30	133.32	169.31	252.37	278.60	322.27	158.92
Total variable costs	10,588.25	1,288.57	3,811.08	6,407.07	8,144.79	12,128.44	13,389.34	15,488.10	7,637.39
Gross revenue - Variable costs	-10,588.25	-1,288.57	-1,186.08	-107.07	4,455.21	6,771.56	11,810.66	14,661.90	8,362.61
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	10,654.36	1,354.67	3,877.19	6,473.17	8,210.89	12,194.54	13,455.44	15,554.20	7,703.50
FIXED NON-CASH COSTS									
Mach. & equip. - dep., & int.	38.57	395.50	550.43	577.36	550.43	577.36	550.43	563.89	563.89
Pickup - dep. & int	115.02	115.02	115.02	115.02	115.02	115.02	115.02	115.02	115.02
Irrig., weed mat, & trellis - dep. & in	558.53	558.53	647.15	647.15	647.15	647.15	647.15	647.15	647.15
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	1,253.32	1,687.69	2,179.60	2,615.50	2,636.06	2,429.74	0.00	0.00
Amortized establishment costs	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2,027.74	2,027.74
Total **fixed non-cash** costs	1,379	2,989	3,667	4,186	4,595	4,642	4,409	4,020	4,020
Total **fixed** costs	12,033	4,344	7,544	10,659	12,806	16,837	17,864	19,575	11,724
Net projected returns	-12,533	-4,344	-4,919	-4,359	-206	2,063	7,336	10,575	4,276
Cumulative returns	-12,533	-16,877	-21,796	-26,155	-26,361	-24,297	-16,962	-6,387	-12,686

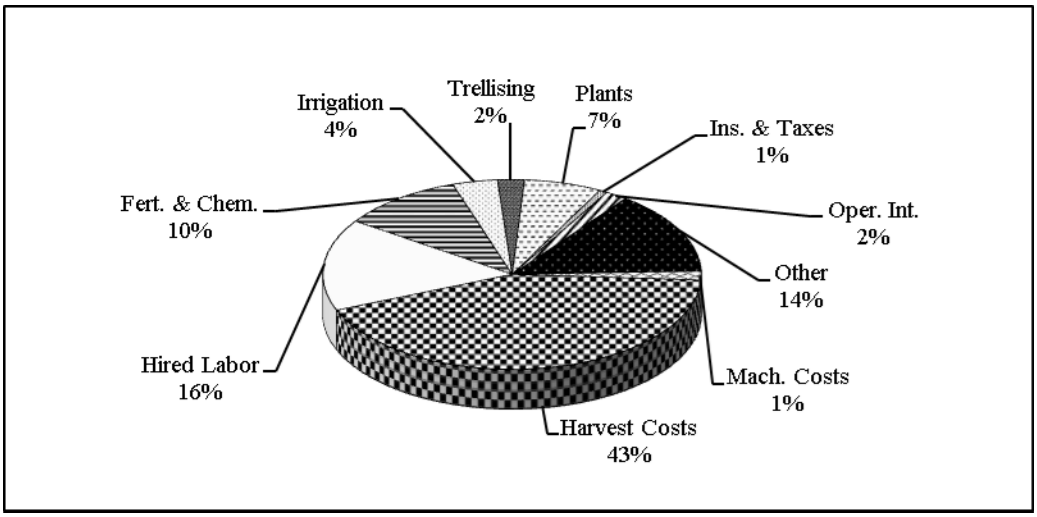

Figure 3. Cash costs per acre from year 0 through year 7, the first year of full production, to establish fresh market organic blueberries in Oregon's Willamette Valley, by percent of total.

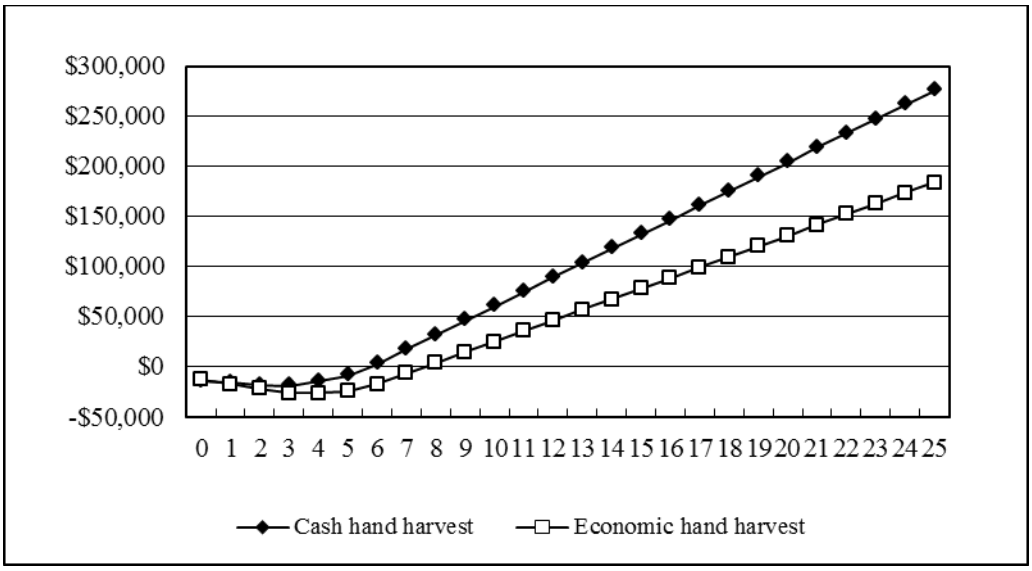

Figure 4. Comparison of cash and economic net returns per acre for establishment and production of fresh market organic blueberries in Oregon's Willamette Valley over 25 years.

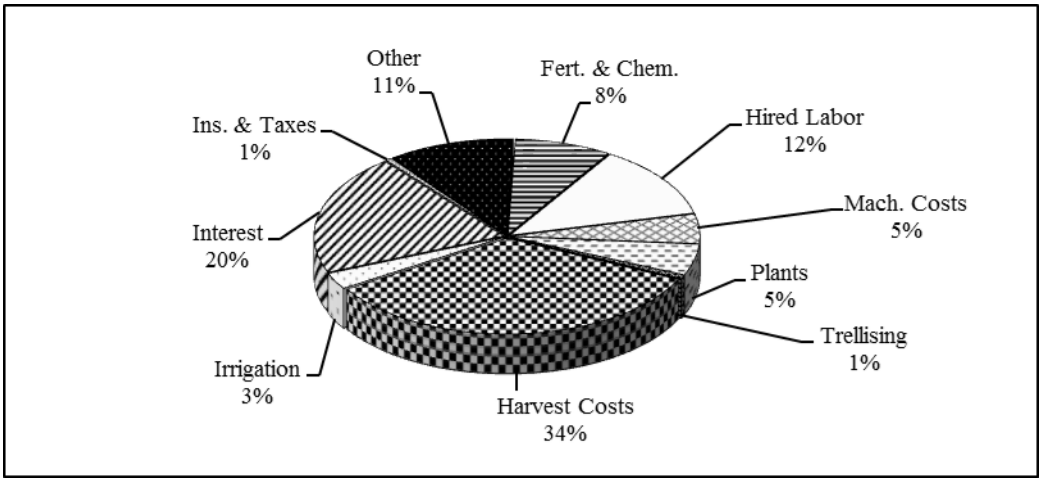

Figure 5. Economic costs per acre from year 0 through year 7, the first year of full production, to establish fresh market organic blueberries in Oregon's Willamette Valley, by percent of total.

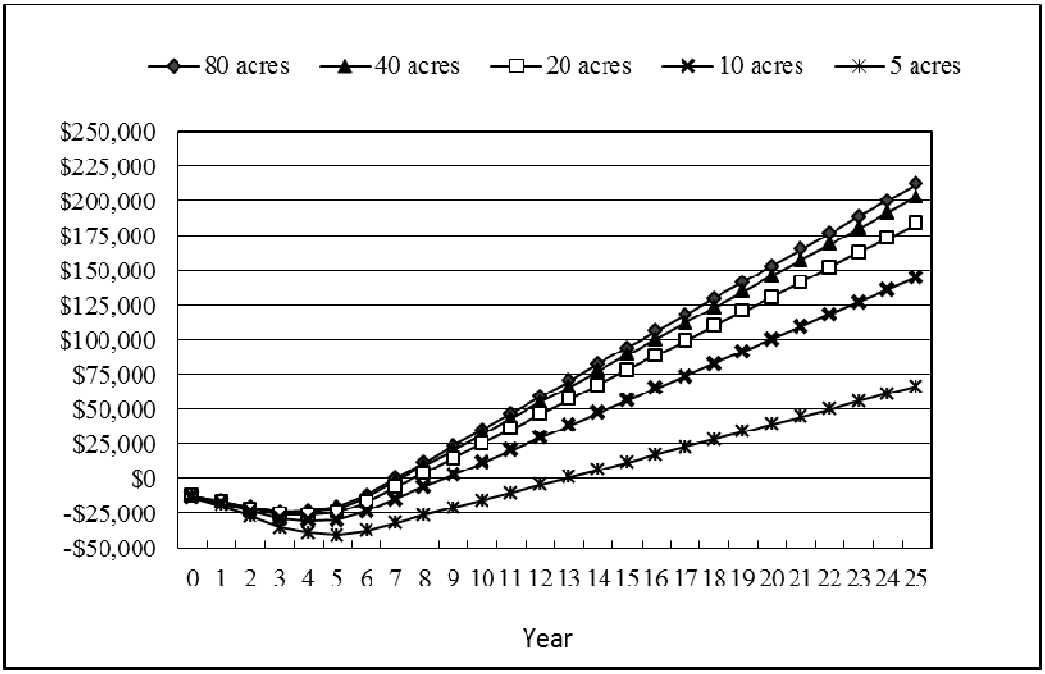

Figure 6. Projected cumulative economic returns per acre by farm size for hand harvested organic blueberries, over 25 years of establishment and production.

Table 7. Estimated annual per acre returns over cash costs for mature fresh market organic blueberry plantings at varying yields and prices.

		---------- lbs per Acre ----------						
Price per lb		**13,000**	**14,000**	**15,000**	**16,000**	**17,000**	**18,000**	**19,000**
$	**0.75**	(5,804)	(5,054)	(4,304)	(3,554)	(2,804)	(2,054)	(1,304)
$	**1.00**	(2,554)	(1,554)	(554)	446	1,446	2,446	3,446
$	**1.25**	696	1,946	3,196	4,446	5,696	6,946	8,196
$	**1.50**	3,946	5,446	6,946	8,446	9,946	11,446	12,946
$	**1.75**	7,196	8,946	10,696	12,446	14,196	15,946	17,696
$	**2.00**	10,446	12,446	14,446	16,446	18,446	20,446	22,446
$	**2.25**	13,696	15,946	18,196	20,446	22,696	24,946	27,196

Table 8. Estimated annual per acre returns over total economic costs for mature fresh market organic blueberry plantings at varying yields and prices.

		---------- lbs per Acre ----------						
Price per lb		**13,000**	**14,000**	**15,000**	**16,000**	**17,000**	**18,000**	**19,000**
$	**0.75**	$ (9,825)	$ (9,075)	$ (8,325)	$ (7,575)	$ (6,825)	$ (6,075)	$ (5,325)
$	**1.00**	$ (6,575)	$ (5,575)	$ (4,575)	$ (3,575)	$ (2,575)	$ (1,575)	$ (575)
$	**1.25**	$ (3,325)	$ (2,075)	$ (825)	$ 425	$ 1,675	$ 2,925	$ 4,175
$	**1.50**	$ (75)	$ 1,425	$ 2,925	$ 4,425	$ 5,925	$ 7,425	$ 8,925
$	**1.75**	$ 3,175	$ 4,925	$ 6,675	$ 8,425	$ 10,175	$ 11,925	$ 13,675
$	**2.00**	$ 6,425	$ 8,425	$ 10,425	$ 12,425	$ 14,425	$ 16,425	$ 18,425
$	**2.25**	$ 9,675	$ 11,925	$ 14,175	$ 16,425	$ 18,675	$ 20,925	$ 23,175

Table 9. Estimated annual per acre returns over cash costs for mature processed market organic blueberry plantings at varying yields and price.

		---------- lbs per Acre ----------						
Price per lb		**13,000**	**14,000**	**15,000**	**16,000**	**17,000**	**18,000**	**19,000**
$	**0.60**	97	697	1,297	1,897	2,497	3,097	3,697
$	**0.70**	1,397	2,097	2,797	3,497	4,197	4,897	5,597
$	**0.80**	2,697	3,497	4,297	5,097	5,897	6,697	7,497
$	**0.90**	3,997	4,897	5,797	6,697	7,597	8,497	9,397
$	**1.00**	5,297	6,297	7,297	8,297	9,297	10,297	11,297
$	**1.10**	6,597	7,697	8,797	9,897	10,997	12,097	13,197
$	**1.20**	7,897	9,097	10,297	11,497	12,697	13,897	15,097

Table 10. Estimated annual per acre returns over total economic costs for mature processed market organic blueberry plantings at varying yields and price.

		---------- lbs per Acre ----------						
Price per lb		**13,000**	**14,000**	**15,000**	**16,000**	**17,000**	**18,000**	**19,000**
$	**0.60**	$ (3,924)	$ (3,324)	$ (2,724)	$ (2,124)	$ (1,524)	$ (924)	$ (324)
$	**0.70**	$ (2,624)	$ (1,924)	$ (1,224)	$ (524)	$ 176	$ 876	$ 1,576
$	**0.80**	$ (1,324)	$ (524)	$ 276	$ 1,076	$ 1,876	$ 2,676	$ 3,476
$	**0.90**	$ (24)	$ 876	$ 1,776	$ 2,676	$ 3,576	$ 4,476	$ 5,376
$	**1.00**	$ 1,276	$ 2,276	$ 3,276	$ 4,276	$ 5,276	$ 6,276	$ 7,276
$	**1.10**	$ 2,576	$ 3,676	$ 4,776	$ 5,876	$ 6,976	$ 8,076	$ 9,176
$	**1.20**	$ 3,876	$ 5,076	$ 6,276	$ 7,476	$ 8,676	$ 9,876	$ 11,076

Conclusions

This cost of establishment study is meant to provide useful information to fresh and processed market organic 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™. AgProfit™ 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 an organic 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 Organic Blueberry Establishment and Production in the Willamette Valley, Oregon

Table 11. Year 0, organic blueberry establishment economic costs and returns, dollars per acre.

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.					1,930.00
Sawdust	15 units @ $90 / unit			1,350.00	
Chicken compost	5 tons @ $100 / units			500.00	
Equipmet rental	$1600 / 20 acre farm			80.00	
Mark field	2 hrs / acre @ $13.5 / hr	27.00		10.00	37.00
Shape beds, custom	1 x / acre			500.00	500.00
Weed Mat					1445.00
Installation labor	50 hrs / acre @ $13.5 / hr	675.00			
Sawdust	3 units @ $90 / unit			270.00	
Chicken compost	5 tons / acre @ $100 / ton			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	4.83		11.36
Seed grass between rows	1 x / acre	7.84	5.93		143.77
Grass seed, organic	$130 / acre			130.00	
Irrigation					482.00
Labor, installation	32 hrs / acre @ $13.5 / hr	432.00			
Power	$50 / acre			50.00	
Pickup			41.45		41.45
ATV			4.32		4.32
Shop and machine shed				53.00	53.00
Miscellaneous and overhead				200.00	200.00
Interest: operating capital	6 months			225.35	225.35
Total **variable** costs		1,823.37	56.53	9,208.35	11,088.25

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	38.57
Pickup & ATV - dep. & int		acre	115.02
Irrig. & weed mat - dep. & int.		acre	558.53
Shop & machine shed		acre	166.67
Land interest charge		acre	500.00
Total **fixed non-cash** costs			1,378.79
Total **fixed** costs			1,444.90
Total of all costs per acre			**$12,533**
Projected Net Returns			**-$12,533**

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

VARIABLE CASH COSTS	Description	Labor	Machinery	Materials	Total
Weed Control					$303.08
Weed mat Repair/maint.	$12 / acre			12.00	
Hand weeding	18 hrs / acre @ $13.5 / hr	243.00			
String trimmer	1 x / acre	42.18	0.90	5.00	
Fertilization					240.50
Fertigation labor	3 hrs / acre @ $13.5 / hr	40.50			
Fertilizer	$200 / acre			200.00	
Irrigation					115.50
Labor	3 hrs / acre @ $13.5 / hr	40.50			
Repairs & maint.	$25 / acre			25.00	
Water and power	$50 / acre			50.00	
Plant bushes					208.00
Blueberry bush	$3.5 / plant @ 35 plants / acre			122.50	
Sawdust	0.2 units @ $90 / unit			18.00	
Labor	5 hrs / acre @ $13.5 / hr	67.50			
Mowing between rows	3 x / acre	12.29	2.61		14.90
Portable toilet	1 unit / acre			50.00	50.00
Oregon Tilth Organic Cert., per acre				31.25	31.25
Pickup			41.45		41.45
ATV			4.32		4.32
Shop and machine shed				53.00	53.00
Miscellaneous and overhead				200.00	200.00
Interest: operating capital	6 months			26.56	26.56
Total **variable** costs		445.98	49.28	781.31	1,288.57

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	395.50
Pickup & ATV - dep. & int	acre	115.02
Irrig. & weed mat - dep. & int.	acre	558.53
Shop & machine shed	acre	166.67
Land interest charge	acre	500.00
Int. on prior year's establishment costs	acre	1,253.32
Total **fixed non-cash** costs		2,989.04
Total **fixed** costs		3,055.14
Total of all costs per acre		**$4,343.71**
Projected Net Returns		**-$4,343.71**

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

TOTAL GROSS INCOME		Quantity	Unit	$/Unit	Total	
Blue berries, fresh market		1,500	lbs	1.75	$2,625	
Total **gross** income					$2,625	
VARIABLE CASH COSTS	**Description**	**Labor**	**Machinery**	**Materials**	**Total**	**Cost $/lb**
Pruning and brush mgmt					223.55	0.15
Pruning labor	15 hrs / acre @ $13.5 / hr	202.50				
Flail mow	2 x / acre	12.29	8.76			
Weed Control					$291.25	0.19
Weed mat Repair/maint.	$12 / acre			12.00		
Hand weeding	10 hrs / acre @ $13.5 / hr	135.00				
String trimmer	3 x / acre	126.55	2.70	15.00		
Disease and insect control					811.59	0.54
Applications	10 x / acre	104.49	107.10			
Pest/disease materials	$600 / acre			600.00		
Fertilization					240.50	0.16
Fertigation labor	3 hrs / acre @ $13.5 / hr	40.50				
Fertilizer	$200 / acre			200.00		
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	40.98	8.69		49.67	0.03
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
Oregon Tilth Organic Cert., per acre				24.95	24.95	0.02
Pickup			41.45		41.45	0.03
ATV			4.32		4.32	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			79.30	79.30	0.05
Total **variable** costs		1,188.80	173.03	2,449.25	3,811.08	2.54
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	550.43	0.37
Pickup & ATV insurance				acre	115.02	0.08
Irrig., weed mat, & trellis - dep. & int.				acre	647.15	0.43
Shop & machine shed				acre	166.67	0.11
Land interest charge				acre	500.00	0.33
Int. on prior year's establishment costs				acre	1,687.69	1.13
Total **fixed non-cash** costs					3,666.95	2.44
Total **fixed** costs					3,733.05	2.49
Total of all costs per acre					**$7,544**	5.03
Net projected returns					**-$4,919**	-3.28

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

TOTAL GROSS INCOME		Quantity	Unit	$/Unit	Total	
Blue berries, fresh market		3,600	lbs	1.75	$6,300	
Total **gross** income					$6,300	
VARIABLE CASH COSTS	**Description**	**Labor**	**Machinery**	**Materials**	**Total**	**Cost/lb**
Pruning and brush mgmt					426.05	0.12
Pruning labor	30 hrs / acre @ $13.5 / hr	405.00				
Flail mow	2 x / acre	12.29	8.76			
Weed Control					$291.25	0.08
Weed mat Repair/maint.	$12 / acre			12.00		
Hand weeding	10 hrs / acre @ $13.5 / hr	135.00				
String trimmer	3 x / acre	126.55	2.70	15.00		
Disease and insect control					811.59	0.23
Applications	10 x / acre	104.49	107.10			
Pest/disease materials	$600 / acre			600.00		
Fertilization					1,650.72	0.46
Compost appliation	1 x / acre	6.53	4.83			
Open/close weed mat	35 hrs / acre @ $13.5 / hr	472.50				
Raking mulch/compost	10 hrs / acre @ $13.5 / hr	135.00				
Loader rental	$1600 / 20 acre farm			80.00		
Chicken compost	5 tons @ $100 / ton			500.00		
Broadcast Application	1 x / acre	6.53	4.83			
Fertigation labor	3 hrs / acre @ $13.5 / hr	40.50				
Fertilizer	$400 / acre			400.00		
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 hr / 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
Mow between rows	10 x / acre	40.98	8.69		49.67	0.01
Portable toilet	1 unit / acre			50.00	50.00	0.01
Oregon Tilth Organic Cert., per acre				26.70	26.70	0.01
Pickup			41.45		41.45	0.01
ATV			4.32		4.32	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			133.32	133.32	0.04
Total **variable** costs		1,620.36	182.69	4,604.02	6,407.07	1.78
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	577.36	0.16
Pickup & ATV - dep. & int				acre	115.02	0.03
Irrig., weed mat, & trellis - dep. & int.				acre	647.15	0.18
Shop & machine shed				acre	166.67	0.05
Land interest charge				acre	500.00	0.14
Int. on prior year's establishment costs				acre	2,179.60	0.61
Total **fixed non-cash** costs					4,185.80	1.16
Total **fixed** costs					4,251.90	1.18
Total of all costs per acre					**$10,659**	2.96
Net projected returns					**-$4,359**	-1.21

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

TOTAL GROSS INCOME		Quantity	Unit	$/Unit	Total	
Blue berries, fresh market		7,200	lbs	1.75	12,600	
Total **gross** income					12,600	
VARIABLE CASH COSTS	**Description**	**Labor**	**Machinery**	**Materials**	**Total**	**Cost/lb**
Soil sample	0.2 x / acre			8.00	8.00	0.00
Pruning and brush mgmt					696.05	0.10
Pruning labor	50 hrs / acre @ $13.5 / hr	675.00				
Flail mow	2 x / acre	12.29	8.76			
Weed Control					$291.25	0.04
Weed mat Repair/maint.	$12 / acre			12.00		
Hand weeding	10 hrs / acre @ $13.5 / hr	135.00				
String trimmer	3 x / acre	126.55	2.70	15.00		
Disease and insect control					811.59	0.11
Applications	10 x / acre	104.49	107.10			
Pest/disease materials	$600 / acre			600.00		
Fertilization					840.50	0.12
Fertigation labor	3 hrs / acre @ $13.5 / hr	40.50				
Fertilizer	$800 / acre			800.00		
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
Mow between rows	10 x / acre	40.98	8.69		49.67	0.01
Portable toilet	1 unit / acre			50.00	50.00	0.01
Oregon Tilth Organic Cert., per acre				28.65	28.65	0.00
Pickup			41.45		41.45	0.01
ATV			4.32		4.32	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			169.31	169.31	0.02
Total **variable** costs		1,269.80	173.03	6,701.96	8,144.79	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	550.43	0.08
Pickup & ATV - dep. & int				acre	115.02	0.02
Irrig., weed mat, & trellis - dep. & int.				acre	647.15	0.09
Shop & machine shed				acre	166.67	0.02
Land interest charge				acre	500.00	0.07
Int. on prior year's establishment costs				acre	2,615.50	0.36
Total **fixed non-cash** costs					4,594.76	0.64
Total **fixed** costs					4,660.86	0.65
Total of all costs per acre					**$12,806**	1.78
Net projected returns					**-$206**	-0.03

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

TOTAL GROSS INCOME		Quantity	Unit	$/Unit	Total	
Blue berries, fresh market		10,800	lbs	1.75	18,900	
Total **gross** income					18,900	
VARIABLE CASH COSTS	**Description**	**Labor**	**Machinery**	**Materials**	**Total**	**Cost/lb**
Pruning and brush mgmt					966.05	0.09
Pruning labor	70 hrs / acre @ $13.5 / hr	945.00				
Flail mow	2 x / acre	12.29	8.76			0.00
Weed Control					$291.25	
Weed mat Repair/maint.	$12 / acre			12.00		
Hand weeding	10 hrs / acre @ $13.5 / hr	135.00				
String trimmer	3 x / acre	126.55	2.70	15.00		
Disease and insect control					811.59	0.08
Applications	10 x / acre	104.49	107.10			
Pest/disease materials	$600 / acre			600.00		
Fertilization					2,244.19	0.21
Compost appliation	1 x / acre	6.53	4.83			
Open/close weed mat	35 hrs / acre @ $13.5 / hr	472.50				
Raking mulch/compost	10 hrs / acre @ $13.5 / hr	135.00				
Loader rental	$1600 / 20 acre farm			80.00		
Chicken compost	5 tons @ $100 / ton			500.00		
Broadcast Application	1 x / acre 6.53	4.83				
Fertigation labor	3 hrs / acre @ $13.5 / hr	40.50				
Fertilizer	$1000 / acre			1,000.00		
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
Mow between rows	10 x / acre	40.98	8.69		49.67	0.00
Oregon Tilth Organic Cert., per acre				31.55	31.55	0.00
Portable toilet	1 unit / acre			50.00	50.00	0.00
Pickup			41.45		41.45	0.00
ATV			4.32		4.32	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			252.37	252.37	0.02
Total **variable** costs		2,158.66	177.86	9,791.92	12,128.44	1.12

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	577.36	0.05
Pickup & ATV - dep. & int	acre	115.02	0.01
Irrig., weed mat, & trellis - dep. & int.	acre	647.15	0.06
Shop & machine shed	acre	166.67	0.02
Land interest charge	acre	500.00	0.05
Int. on prior year's establishment costs	acre	2,636.06	0.24
Total **fixed non-cash** costs		4,642.26	0.43
Total **fixed** costs		4,708.36	0.44
Total of all costs per acre		**$16,837**	1.56
Net projected returns		**$2,063**	0.19

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

TOTAL GROSS INCOME		Quantity	Unit	$/Unit	Total	
Blue berries, fresh market		14,400	lbs	1.75	25,200	
Total **gross** income					25,200	
VARIABLE CASH COSTS	**Description**	**Labor**	**Machinery**	**Materials**	**Total**	**Cost/lb**
Pruning and brush mgmt					1,168.55	0.08
Pruning labor	85 hrs / acre @ $13.5 / hr	1,147.50				
Flail mow	2 x / acre	12.29	8.76			
Weed Control					$291.25	0.02
Weed mat Repair/maint.	$12 / acre			12.00		
Hand weeding	10 hrs / acre @ $13.5 / hr	135.00				
String trimmer	3 x / acre	126.55	2.70	15.00		
Disease and insect control					811.59	0.06
Applications	10 x / acre	104.49	107.10			
Pest/disease materials	$600 / acre			600.00		
Fertilization					1,040.50	0.07
Fertigation labor	3 hrs / acre @ $13.5 / hr	40.50				
Fertilizer	$1000 / acre			1,000.00		
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
Mow between rows	10 x / acre	40.98	8.69		49.67	0.00
Oregon Tilth Organic Cert., per acre				35.40	35.40	0.00
Portable toilet	1 unit / acre			50.00	50.00	0.00
Pickup			41.45		41.45	0.00
ATV			4.32		4.32	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			278.60	278.60	0.02
Total **variable** costs		1,742.30	173.03	11,474.00	13,389.34	0.93
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	550.43	0.04
Pickup & ATV - dep. & int				acre	115.02	0.01
Irrig., weed mat, & trellis - dep. & int.				acre	647.15	0.04
Shop & machine shed				acre	166.67	0.01
Land interest charge				acre	500.00	0.03
Int. on prior year's establishment costs				acre	2,429.74	0.17
Total **fixed non-cash** costs					4,409.00	0.31
Total **fixed** costs					4,475.11	0.31
Total of all costs per acre					**$17,864**	1.24
Net projected returns					**$7,336**	0.51

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

TOTAL GROSS INCOME		Quantity	Unit	$/Unit	Total	
Blueberries, fresh market		16,200	lbs	1.75	28,350	
Blueberries, processed market		1,800	lbs	1.00	1,800	
Total **gross** income		18,000			30,150	
VARIABLE CASH COSTS	**Description**	**Labor**	**Machinery**	**Materials**	**Total**	**Cost/lb**
Soil sample (every 4th yr)	0.2 x / acre			2.00	2.00	0.00
Pruning and brush mgmt					1,168.55	0.06
Pruning labor	85 hrs / acre @ $13.5 / hr	1,147.50				
Flail mow	2 x / acre	12.29	8.76			
Weed Control					$291.25	0.02
Weed mat Repair/maint.	$12 / acre			12.00		
Hand weeding	10 hrs / acre @ $13.5 / hr	135.00				
String trimmer	3 x / acre	126.55	2.70	15.00		
Disease and insect control					811.59	0.05
Applications	10 x / acre	104.49	107.10			
Pest/disease materials	$600 / acre			600.00		
Fertilization (Every 2nd Yr)					1,635.59	0.09
Compost	0.5 x / acre	3.27	2.41			
Open/close weed mat	17 hrs / acre @ $13.5 / hr	229.50				
Raking mulch/compost	5 hrs / acre @ $13.5 / hr	67.50				
Loader rental	$800 / 20 acre farm			40.00		
Chicken compost	2.5 tons @ $100 / ton			250.00		
Broadcast Application	0.5 x / acre 3.27	2.41				
Fertigation labor	3 hrs / acre @ $13.5 / hr	40.50				
Fertilizer	$1000 / acre			1,000.00		
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
Mow between rows	10 x / acre	40.98	8.69		49.67	0.00
Oregon Tilth Organic Cert., per acre				35.40	35.40	0.00
Portable toilet	1 unit / acre			50.00	50.00	0.00
Pickup			41.45		41.45	0.00
ATV			4.32		4.32	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			322.27	322.27	0.02
Total **variable** costs		2,044.98	175.44	13,267.67	15,488.10	0.86
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	563.89	0.03
Pickup & ATV - dep. & int				acre	115.02	0.01
Irrig., weed mat, & trellis - dep. & int.				acre	647.15	0.04
Shop & machine shed				acre	166.67	0.01
Land interest charge				acre	500.00	0.03
Amortized establishment costs				acre	2,027.74	0.11
Total **fixed non-cash** costs					4,020.47	0.22
Total **fixed** costs					4,086.57	0.23
Total of all costs per acre					**$19,575**	1.09
Net projected returns					**$10,575**	0.59

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

TOTAL GROSS INCOME		Quantity	Unit	$/Unit	Total	
Blueberries, processed market		16,000	lbs	1.00	16,000	
Total **gross** income					16,000	
VARIABLE CASH COSTS	**Description**	**Labor**	**Machinery**	**Materials**	**Total**	**Cost/lb**
Soil sample (every 4th yr)	0.2 x / acre			2.00	2.00	0.00
Pruning and brush mgmt					831.05	0.05
Pruning labor	60 hrs / acre @ $13.5 / hr	810.00				
Flail mow	2 x / acre	12.29	8.76			
Weed Control					$291.25	0.02
Weed mat repair/maint.	$12 / acre			12.00		
Hand weeding	10 hrs / acre @ $13.5 / hr	135.00				
String trimmer	3 x / acre	126.55	2.70	15.00		
Disease and insect control					811.59	0.05
Applications	10 x / acre	104.49	107.10			
Pest/disease materials	$600 / acre			600.00		
Fertilization (Every 2nd Yr)					1,635.59	0.10
Compost appliation	0.5 x / acre	3.27	2.41			
Open/close weed mat	17 hrs / acre @ $13.5 / hr	229.50				
Raking mulch/compost	5 hrs / acre @ $13.5 / hr	67.50				
Loader rental	$800 / 20 acre farm			40.00		
Chicken compost	2.5 tons @ $100 / ton			250.00		
Broadcast application	0.5 x / acre 3.27	2.41				
Fertigation labor	3 hrs / acre @ $13.5 / hr	40.50				
Fertilizer	$1000 / acre			1,000.00		
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
Mow between rows	10 x / acre	40.98	8.69		49.67	0.00
Portable toilet	1 unit / acre			50.00	50.00	0.00
Oregon Tilth Organic Cert., per acre				31.55	31.55	0.00
Pickup			41.45		41.45	0.00
ATV			4.32		4.32	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			158.92	158.92	0.01
Total **variable** costs		1,707.48	175.44	5,754.47	7,637.39	0.48
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	563.89	0.04
Pickup & ATV - dep. & int				acre	115.02	0.01
Irrig., weed mat, & trellis - dep. & int.				acre	647.15	0.04
Shop & machine shed				acre	166.67	0.01
Land interest charge				acre	500.00	0.03
Amortized establishment costs				acre	2,027.74	0.13
Total **fixed non-cash** costs					4,020.47	0.25
Total **fixed** costs					4,086.57	0.26
Total of all costs per acre					**$11,724**	**$0.73**
Net projected returns					**$4,276**	**$0.27**