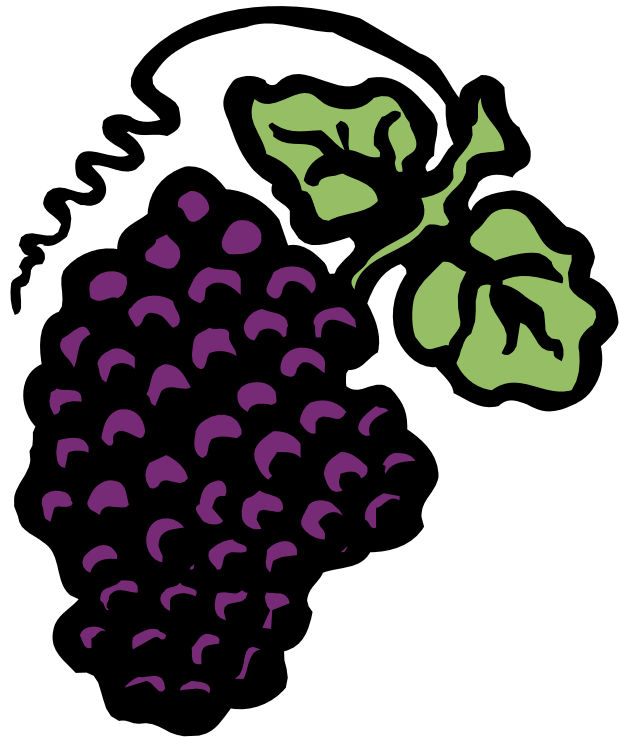


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Introduction

Eastern Oregon has the ideal climate, soils and edaphics for producing wines of superlative quality. These have become the hallmark of the unique terroir that is symbolic of the Walla Walla Valley American Viticultural Area (AVA) which spans the border of eastern Oregon and Washington. This region's unique soil and climatic characteristics play a role in producing high quality grapes with complex color, flavor, and aroma volatiles: sandy loess, rocky soils, long day length in summer, hot days and cool nights during late summer and early fall, and low rainfall throughout the growing season. The

relatively dry climate and accompanying low humidity of the region result in low incidence of insect pests and diseases; however, with increased acreages and monoculture, this situation may change in the future. The main cultivars produced in this area include 'Cabernet Sauvignon', 'Merlot' and 'Syrah', but many other cultivars can be found as experimental plantings throughout the Valley. Although the Walla Walla Valley currently produces high quality wines; other areas of eastern Oregon may not be as successful at wine grape production and should be tested on an experimental basis first.

Assumptions

In the preparation of this publication, the following assumptions were made to provide a basis for the wine grape vineyard analysis.

1. Typical acreage for a vineyard in eastern Oregon is 10 acres of irrigated land.
2. 1,210 own-rooted vines are planted per acre (4' x 9') spacing with a productive life of 25 years, once full production of 3.5 ton per acre is reached.
3. The wine grape vineyard is trained to a vertically shoot positioned system.
4. Wine grape prices are \$2,000 per ton.
5. Commercial yields begin in year 3 and full production is reached in 5 years after planting with yields of 1.5, 3.0, and 3.5 tons per acre, respectively.
6. General labor is hired at a rate of \$13.00 per hour and machine labor at \$15.00 per hour, which includes worker's compensation, unemployment insurance, and other labor overhead expenses. Harvest labor costs are custom hired at a cost of \$170 per ton. All labor is treated as a cash variable expense.
7. The machinery and equipment used in the

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budget reflects the typical machinery complement of a small eastern Oregon vineyard. A detailed breakdown of machinery values is shown in Table 1. Table 2 provides estimated machinery costs from the American Society of Agricultural Engineers. The 70-hp tractor is used for flailing, shredding brush, pulling an air-blast sprayer, and during harvest. The front-end loader is used to assist in harvest, and as a general utility tractor. Table 3 lists the estimated cost of each operation with a 9' vine row spacing. Gasoline and diesel costs per gallon are \$3.50 and \$4.00, respectively.

8. 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.
9. Machinery, housing facilities, and land are owned by the operator and assessed 8.5, 8.5, and 8 percent interest rates, respectively, as opportunity costs. Land is valued at \$5,000 per acre.
10. Previous year's establishment costs are funded by the operator at a charge of 10 percent interest and are considered an opportunity cost.
11. Herbicides used for strip maintenance are applied to 30 percent of each acre.
12. A drip irrigation system is used at an estimated cost of \$3,000 per acre, custom installed. Repairs and maintenance for the system costs one percent of the purchase price per year.
13. The trellis system is custom installed at a cost of \$3,750 per acre. Repairs and maintenance for the system costs one percent of the purchase price per year.
14. Additional assumptions are listed for variable, fixed cash, and fixed non-cash costs in Table 4.
15. Price inflation for the time period of this study was ignored.
16. Income tax consequences are also ignored for this study.

Table 1. Machinery cost assumptions for Cabernet Sauvignon vineyard in eastern Oregon.

| Machine | Size or description | Market value | Hours or miles of annual use | Expected life (years) | Salvage value |
|---------------------------------|----------------------------|---------------------|---|----------------------------------|--------------------------|
| Tractor | 4 wheel dr 70hp, new | \$ 50,000 | 159 | 20 | \$ 6,416 |
| Air-blast sprayer | 100 gallon unit, PTO, new | 8,000 | 51 | 20 | 417 |
| Mower | 6' unit | 6,000 | 9 | 20 | 313 |
| Weed sprayer | 100 gallon unit | 2,000 | 7 | 15 | 192 |
| Compost Spreader | 4.5 ton capacity | 8,000 | 7 | 15 | 768 |
| In-Row Cultivator | | 3,500 | 14 | 15 | 336 |
| Pickup | 1/2 ton 4x4, gas, new | 22,000 | 12,000 | 10 | 8,319 |
| Truck | 2 Ton, used | 12,000 | 4,000 | 15 | 2,863 |
| ATV | 4 wheeler, new | 5,500 | 3,000 | 5 | 2,465 |
| Front-end loader | | 5,800 | 20 | 20 | 302 |
| Bin trailer | | 5,000 | 20 | 20 | 261 |
| Wind machine | 1 unit, gasoline | 20,000 | 35 | 25 | 962 |
| Smudge pot | 3 units per acre | 30 | 15 | 10 | 5 |
| Picking buckets for wine grapes | | 500 | N/A | 5 | 0 |
| Irrigation system | Drip system, per acre | 3,000 | N/A | 10 | 0 |
| Trellis system | per acre | 3,750 | N/A | 25 | 0 |
| Shop and Machine Shed | 1 unit | 25,000 | N/A | 30 | 0 |

Table 2. Machinery cost calculations for Cabernet Sauvignon vineyard in eastern Oregon..

| Machine | Size or description | --- Variable costs --- | | ----- Fixed costs ----- | | Total cost |
|---------------------------------|----------------------------|-------------------------------|---------------------------------|---------------------------------|------------------|-------------------|
| | | Fuel & Lube | Repairs & Maint. | Depr. & Interest | Insurance | |
| ---- Costs per hour ---- | | | | | | |
| Tractor | 4 wheel dr 70hp, new | \$13.80 | \$0.48 | \$28.76 | \$1.60 | \$44.64 |
| Air-blast sprayer | 100 gallon unit, PTO, new | 0.00 | 3.31 | 14.36 | 0.49 | 18.15 |
| Mower | 6' unit | 0.00 | 0.49 | 59.79 | 2.05 | 62.33 |
| Weed sprayer | 100 gallon unit | 0.00 | 0.42 | 30.60 | 0.94 | 31.96 |
| Compost Spreader | 4.5 ton capacity | 0.00 | 1.68 | 118.91 | 1.27 | 121.86 |
| In-Row Cultivator | | 0.00 | 0.91 | 26.01 | 0.42 | 27.34 |
| ---- Costs per mile ---- | | | | | | |
| Pickup | 1/2 ton 4x4, gas, new | \$0.34 | \$0.05 | \$0.22 | \$0.07 | \$0.68 |
| Truck | 2 Ton, used | \$0.38 | \$0.08 | \$0.31 | \$0.11 | \$0.88 |
| ATV | 4 wheeler, new | 0.09 | 0.05 | 0.32 | 0.08 | 0.53 |
| ---- Costs per acre ---- | | | | | | |
| Front-end loader | | \$0.00 | \$17.40 | \$21.46 | \$0.00 | \$38.86 |
| Bin trailer | | 0.00 | 15.00 | 18.50 | 0.00 | 33.50 |
| Wind machine | | 105.66 | 60.00 | 66.00 | 0.00 | 231.66 |
| Smudge pot | | 26.25 | 0.18 | 0.17 | 0.00 | 26.60 |
| Picking buckets for wine grapes | | 0.00 | 3.00 | 4.85 | 0.00 | 7.85 |
| Irrigation system | Drip system, per acre | 0.00 | 30.00 | 427.50 | 0.00 | 457.50 |
| Trellis system | per acre | 0.00 | 37.50 | 309.38 | 0.00 | 346.88 |
| Shop and Machine Shed | 1 unit | 0.00 | 66.25 | 283.33 | 0.00 | 349.58 |

Table 3. Estimated cost of vineyard operation, including power-unit, for Cabernet Sauvignon vineyard with 9' row spacing in eastern Oregon.

| Operation | Miles per hour | Acres per hour | -- Machine costs -- | | | Total cost per acre |
|-------------------|-----------------------|-----------------------|----------------------------|-------------------------------|----------------------------|----------------------------|
| | | | Labor cost per acre | Variable cost per acre | Fixed cost per acre | |
| Air-blast sprayer | 2.50 | 1.36 | \$11.00 | \$12.89 | \$33.15 | \$57.04 |
| Mower | 3.50 | 3.25 | 4.62 | 4.55 | 28.41 | 37.58 |
| Weed sprayer | 3.50 | 1.43 | 10.47 | 10.26 | 43.23 | 63.96 |
| Compost Spreader | 3.00 | 1.39 | 10.78 | 11.47 | 108.21 | 130.47 |
| In-Row Cultivator | 3.00 | 1.39 | 10.78 | 10.91 | 40.82 | 62.52 |

Table 4. Input assumptions to establishing a Cabernet Sauvignon vineyard in eastern Oregon, per acre.

| | Year 1 | Year 2 | Year 3 | Year 4 | Full Prod. |
|--|---------------|---------------|---------------|---------------|-------------------|
| Prices per ton | \$2,000.00 | \$2,000.00 | \$2,000.00 | \$2,000.00 | \$2,000.00 |
| Tons per acre | 0.00 | 0.00 | 1.50 | 3.00 | 3.50 |
| Cost of general vineyard labor, per hour | \$13.00 | \$13.00 | \$13.00 | \$13.00 | \$13.00 |
| Cost of tractor driver, per hour | \$15.00 | \$15.00 | \$15.00 | \$15.00 | \$15.00 |
| Cost of harvest labor, per ton | \$0.00 | \$170.00 | \$170.00 | \$170.00 | \$170.00 |
| Hours of dormant pruning labor | 0.00 | 4.00 | 20.00 | 20.00 | 20.00 |
| Hours of labor to tie canes | 0.00 | 0.00 | 21.00 | 6.00 | 6.00 |
| Hours of irrigating labor | 8.00 | 8.00 | 8.00 | 8.00 | 8.00 |
| Hours to remove &/or plant vine labor | 20.00 | 2.50 | 2.50 | 2.50 | 2.50 |
| Hours to maintain trellis labor | 0.00 | 2.00 | 2.00 | 2.00 | 2.00 |
| Hours for frost protection labor | 0.50 | 0.50 | 0.50 | 0.50 | 0.50 |
| Hours for shoot positioning | 1.00 | 2.00 | 10.00 | 10.00 | 10.00 |
| Hours for sucker removal | 0.00 | 0.00 | 10.00 | 10.00 | 10.00 |
| Hours for cluster thinning | 0.00 | 0.00 | 12.00 | 16.00 | 16.00 |
| Hours for leaf pulling | 0.00 | 0.00 | 3.00 | 6.00 | 6.00 |
| Hours for bird control | 0.00 | 0.00 | 20.00 | 20.00 | 20.00 |
| Cost of fertilizer - foliar applied | \$0.00 | \$0.00 | \$62.50 | \$62.50 | \$62.50 |
| Cost of fertilizer - soil applied | \$50.00 | \$60.00 | \$80.00 | \$80.00 | \$80.00 |
| Cost of compost mulch | \$200.00 | \$200.00 | \$200.00 | \$200.00 | \$200.00 |
| Cost of herbicide strip maintenance | \$25.00 | \$50.00 | \$50.00 | \$50.00 | \$50.00 |
| Cost of fungicides | \$0.00 | \$0.00 | \$200.00 | \$200.00 | \$200.00 |
| Cost of rodent materials | \$20.00 | \$20.00 | \$20.00 | \$20.00 | \$20.00 |
| Cost of ties for canes | \$4.00 | \$4.00 | \$4.00 | \$4.00 | \$4.00 |
| Cost for bird control & clip netting | \$0.00 | \$800.00 | \$0.00 | \$0.00 | \$0.00 |
| Times for herbicide strip spray | 3.00 | 3.00 | 3.00 | 3.00 | 3.00 |
| Times for in-row cultivator | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 |
| Times for fungicides | 4.00 | 4.00 | 4.00 | 4.00 | 4.00 |
| Times for mowing vineyard floor | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 |
| Property taxes | \$30.00 | \$30.00 | \$30.00 | \$30.00 | \$30.00 |
| Property insurance | \$50.00 | \$50.00 | \$50.00 | \$50.00 | \$50.00 |
| Fruit insurance | \$150.00 | \$150.00 | \$150.00 | \$150.00 | \$150.00 |
| Land values | \$5,000 | \$5,000 | \$5,000 | \$5,000 | \$5,000 |
| Foreman housing (per month) | \$600.00 | \$600.00 | \$600.00 | \$600.00 | \$600.00 |
| Irrigation assessment | \$75.00 | \$75.00 | \$75.00 | \$75.00 | \$75.00 |
| Miscellaneous & overhead | \$75.00 | \$75.00 | \$75.00 | \$75.00 | \$75.00 |
| Vine cost | \$1.25 | \$1.25 | \$1.25 | \$1.25 | \$1.25 |
| Vine grow tubes | \$0.75 | \$0.75 | \$0.75 | \$0.75 | \$0.75 |
| Fuel use/gal for tractor | 3.00 | 3.00 | 3.00 | 3.00 | 3.00 |
| Gasoline price | \$3.50 | \$3.50 | \$3.50 | \$3.50 | \$3.50 |
| Diesel fuel price | \$4.00 | \$4.00 | \$4.00 | \$4.00 | \$4.00 |
| Operating interest rate | 8.50% | 8.50% | 8.50% | 8.50% | 8.50% |
| Machinery interest rate | 8.50% | 8.50% | 8.50% | 8.50% | 8.50% |
| Land interest rate | 8.00% | 8.00% | 8.00% | 8.00% | 8.00% |
| Establishment interest rate | 10.00% | 10.00% | 10.00% | 10.00% | 10.00% |
| % of operating capital borrowed | 50.00% | 50.00% | 50.00% | 50.00% | 50.00% |
| Months to borrow operating capital | 6.0 | 6.0 | 6.0 | 6.0 | 6.0 |
| Planted vines | 1,210 | 20 | 20 | 20 | 20 |

Results of establishing a Cabernet Sauvignon vineyard in eastern Oregon

Cash flow analysis

Table 5 contains a cash flow analysis for establishing a wine grape vineyard planting. A cash flow analysis shows the cash costs required to establish a vineyard. Cash costs include labor, vines, trellis, fertilizer, chemicals, machinery repairs, fuel, lube, and oil, labor housing repairs and maintenance, operating (short-term) interest, machinery and housing insurance, irrigation water assessments, and property taxes. The income, variable costs and cash fixed costs are shown for each of the four establishment years and at full production. Production begins in year 3 with 1.5 tons of wine grapes per acre and increases to 3.5 tons at full production. Total variable costs are \$11,761 in the first year with an additional \$436 of cash fixed costs for a total cash cost of \$12,198 per acre.

A positive cash flow begins in year 4 with gross income exceeding total cash costs by \$1,970 per acre. At full production, or in five years, the vineyard does not return a sufficient amount of gross income to pay all previous years' costs. There is an accumulated \$12,543 per acre of prior costs remaining following the fifth year.

Figure 1 shows the major cost components in relation to total cash costs. Hired labor represents 25 percent of the total cash costs to establish this vineyard. Machine costs, which include fuel, oil, and repairs, are next with 19 percent. The trellis system is third with 13 percent of the cash costs. The irrigation system accounts for 11 percent of cash costs. Fertilizer and chemicals and vines are both 9 percent of the total cash costs. The remaining cost

items account for 14 percent of the total cash costs.

Economic costs and returns

Table 6 details the economic costs and returns for the establishment of a wine grape vineyard. Economic costs include all the cash costs listed in Table 5, except irrigations and trellis systems are accounted for as depreciation rather than a cash payment. The ownership costs that are either an opportunity cost to the owner or dollars borrowed from a financial institution are also included in Table 6. These ownership costs include the principal and interest payments or a return on investment to the grower, or both, for machinery, housing, land, and funds to pay for previous year's establishment costs.

Gross income exceeds variable costs beginning in Year 4 with a \$1970 per acre return to the grower. Gross income, however, never exceeds total economic costs. This vineyard has an annual deficit of \$3,505 per acre at full production when establishment costs are included. At the end of the establishment period \$28,538 per acre remains to repay all previous establishment costs. This cost is amortized over a 25-year period as an annual payment of \$2,758 per acre, as shown in Table 11. The amortized establishment costs accounts for 79 percent of the annual deficit.

Figure 2 shows the cost components in relation to total economic costs. When all economic costs are included, interest costs and machine costs (fuel, oil, repairs, depreciation, and interest charges) become the largest cost item at 22 percent of the total costs for the first five years of establishment. Labor costs are the next highest cost item at 16 percent of the total economic costs. The vines and fertilizer/chemicals each accounted for 6%

of the total costs. Trellising, the irrigation system, and Ins/taxes account for 12 percent of economic costs when combined. The remaining cost items account for 16 percent of the total economic costs.

The net projected economic returns for establishing a wine grape vineyard are shown in Figure 3. Both the cumulative cash and economic cost and returns are represented. The projected returns for this vineyard will cover all cash costs of establishment in 11 years. With the assumptions in this study, however, this vineyard will not generate sufficient gross incomes to cover all economic costs for the 25-year period. In fact, even if the owner's rate of return on invested capital is zero, this vineyard is \$14,949 short of breaking even over the 25-year investment period (Figure 4). A sensitivity analysis of the change in price or yield necessary to make this vineyard a prudent business investment indicates profitability could be achieved by doing one of the following:

- a) increasing the wine grape prices by 56 percent from \$2,000 to \$3,110 per ton, or
- b) increasing anticipated yield by 63 percent (to 2.45, 4.90, 5.70 tons per acre for years 3, 4, and 5, respectively). However, it must be realized that by increasing yields, quality may decrease leading to lower prices per ton, depending on the crop load, climate and vine capacity to ripen fruit.

The results of these adjustments are shown in Figure 4. It should be noted that increasing grape prices or yield reduces the amount of money required for vineyard establishment in year 5 by \$9,640 per acre.

Growers often focus on reducing vine costs, fertilizers, and chemicals as a means of reducing costs. In order to increase the chances of financial success, more emphasis should be placed on varieties and practices that optimize yields and fruit quality for a particular location or increasing crop yield and income.

Table 5. Cash costs and returns of establishing a Cabernet Sauvignon vineyard in eastern Oregon.

| Income: | Year 1 | Year 2 | Year 3 | Year 4 | Full Prod |
|-------------------------------------|-----------------|-----------------|-----------------|-----------------|------------------|
| Yield (tons/acre) | 0.00 | 0.00 | 1.50 | 3.00 | 3.50 |
| Price (dollars/ton) | <u>2,000.00</u> | <u>2,000.00</u> | <u>2,000.00</u> | <u>2,000.00</u> | <u>2,000.00</u> |
| Gross Income(dollars/acre) | 0.00 | 0.00 | 3,000.00 | 6,000.00 | 7,000.00 |
| Variable Costs (per acre): | | | | | |
| Field preparation materials | 42.50 | 0.00 | 0.00 | 0.00 | 0.00 |
| Vines and tubes | 2,424.00 | 40.00 | 40.00 | 40.00 | 40.00 |
| Irrigation installation | 3,000.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Trellis installation | 3,750.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Tie for canes | 0.00 | 4.00 | 4.00 | 4.00 | 4.00 |
| Fertilizer | 250.00 | 260.00 | 342.50 | 342.50 | 342.50 |
| Chemicals | 45.00 | 70.00 | 270.00 | 270.00 | 270.00 |
| Harvest labor | 0.00 | 0.00 | 300.00 | 600.00 | 700.00 |
| General labor | 906.80 | 331.14 | 1,544.52 | 1,440.52 | 1,440.52 |
| Bird netting | 0.00 | 800.00 | 0.00 | 0.00 | 0.00 |
| Machine costs | 1,097.68 | 936.78 | 1,065.28 | 1,108.11 | 1,122.39 |
| Shop and machine shed | 66.25 | 66.25 | 66.25 | 66.25 | 66.25 |
| Miscellaneous & overhead | 75.00 | 75.00 | 75.00 | 75.00 | 75.00 |
| Interest: operating capital | <u>104.28</u> | <u>54.89</u> | <u>78.79</u> | <u>83.86</u> | <u>86.29</u> |
| Total variable costs | 11,761.51 | 2,638.06 | 3,786.33 | 4,030.24 | 4,146.94 |
| Gross Income - variable cost | -11,761.51 | -2,638.06 | -786.33 | 1,969.76 | 2,853.06 |
| Fixed cash costs (per acre): | | | | | |
| Insurance | 331.03 | 331.03 | 331.03 | 331.03 | 331.03 |
| Water assessment | 75.00 | 75.00 | 75.00 | 75.00 | 75.00 |
| Property taxes | <u>30.00</u> | <u>30.00</u> | <u>30.00</u> | <u>30.00</u> | <u>30.00</u> |
| Total fixed cash cost | 436.03 | 436.03 | 436.03 | 436.03 | 436.03 |
| Total cost | 12,197.54 | 3,074.09 | 4,222.36 | 4,466.27 | 4,582.97 |
| Net projected returns | -12,197.54 | -3,074.09 | -1,222.36 | 1,533.73 | 2,417.03 |
| Cumulative returns | -12,197.54 | -15,271.63 | -16,493.99 | -14,960.26 | -12,543.23 |

Table 6. Economic costs and returns of establishing a Cabernet Sauvignon vineyard in eastern Oregon.

| Income: | Year 1 | Year 2 | Year 3 | Year 4 | Full Prod |
|-------------------------------------|-----------------|-----------------|-----------------|-----------------|------------------|
| Yield (tons/acre) | 0.00 | 0.00 | 1.50 | 3.00 | 3.50 |
| Price (dollars/ton) | <u>2,000.00</u> | <u>2,000.00</u> | <u>2,000.00</u> | <u>2,000.00</u> | <u>2,000.00</u> |
| Gross Income(dollars/acre) | 0.00 | 0.00 | 3,000.00 | 6,000.00 | 7,000.00 |
| Variable Costs (per acre): | | | | | |
| Field preparation materials | 42.50 | 0.00 | 0.00 | 0.00 | 0.00 |
| Vines and tubes | 2424.00 | 40.00 | 40.00 | 40.00 | 40.00 |
| Tie for canes | 0.00 | 4.00 | 4.00 | 4.00 | 4.00 |
| Fertilizer | 250.00 | 260.00 | 342.50 | 342.50 | 342.50 |
| Chemicals | 45.00 | 70.00 | 270.00 | 270.00 | 270.00 |
| Harvest labor | 0.00 | 0.00 | 300.00 | 600.00 | 700.00 |
| General labor | 906.80 | 331.14 | 1544.52 | 1440.52 | 1440.52 |
| Bird netting | 0.00 | 800.00 | 0.00 | 0.00 | 0.00 |
| Machine costs | 1097.68 | 936.78 | 1065.28 | 1108.11 | 1122.39 |
| Shop and machine shed | 66.25 | 66.25 | 66.25 | 66.25 | 66.25 |
| Miscellaneous & overhead | 75.00 | 75.00 | 75.00 | 75.00 | 75.00 |
| Interest: operating capital | 104.28 | 54.89 | 78.79 | 83.86 | 86.29 |
| Total variable costs | 5011.51 | 2638.06 | 3786.33 | 4030.24 | 4146.94 |
| Gross Income - variable cost | -5,011.51 | -2,638.06 | -786.33 | 1,969.76 | 2,853.06 |
| Fixed costs (per acre): | | | | | |
| Insurance | 331.03 | 331.03 | 331.03 | 331.03 | 331.03 |
| Water assessment | 75.00 | 75.00 | 75.00 | 75.00 | 75.00 |
| Property taxes | 30.00 | 30.00 | 30.00 | 30.00 | 30.00 |
| Machine costs | 818.44 | 891.66 | 1,024.25 | 1,024.25 | 1,024.25 |
| Irrigation dep & int | 427.50 | 427.50 | 427.50 | 427.50 | 427.50 |
| Trellis dep & int. | 309.38 | 309.38 | 309.38 | 309.38 | 309.38 |
| Foreman housing | 720.00 | 720.00 | 720.00 | 720.00 | 720.00 |
| Shop and Machine Shed | 283.33 | 283.33 | 283.33 | 283.33 | 283.33 |
| Land interest cost | 400.00 | 400.00 | 400.00 | 400.00 | 400.00 |
| Interest on establishment costs | <u>0.00</u> | <u>840.62</u> | <u>1,535.28</u> | <u>2,127.49</u> | <u>2,757.85</u> |
| Total fixed cost | 3,394.68 | 4,308.51 | 5,135.76 | 5,727.97 | 6,358.33 |
| Total cost | 8,406.19 | 6,946.58 | 8,922.09 | 9,758.21 | 10,505.28 |
| Net projected returns | -8,406.19 | -6,946.58 | -5,922.09 | -3,758.21 | -3,505.28 |
| Cumulative returns | -8,406.19 | -15,352.76 | -21,274.86 | -25,033.07 | -28,538.35 |

Figure 1. Cash costs to establish a Cabernet Sauvignon vineyard in eastern Oregon, the first five years of establishment

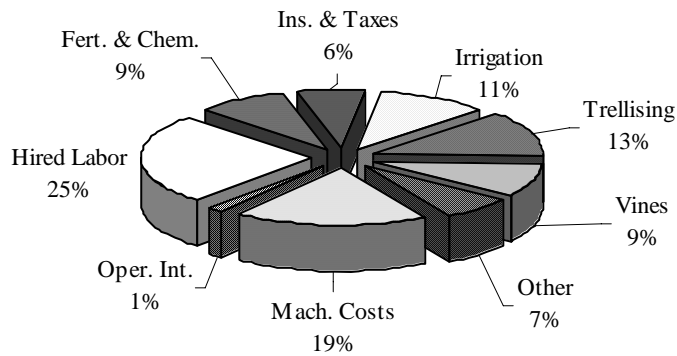


Figure 2. Economic costs to establish a Cabernet Sauvignon vineyard in eastern Oregon, the first five years of establishment

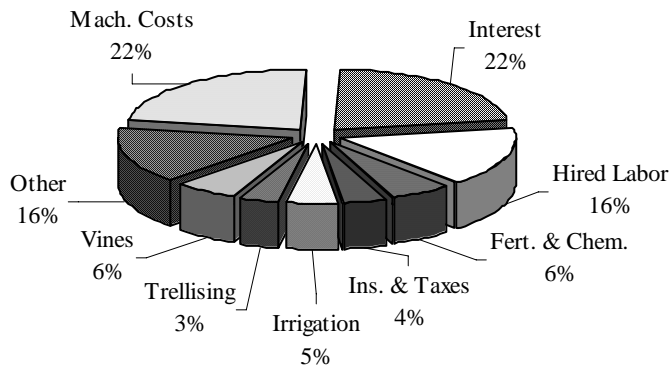


Figure 3. Comparing cash and economic net returns to establish a Cabernet Sauvignon vineyard in eastern Oregon, per acre.

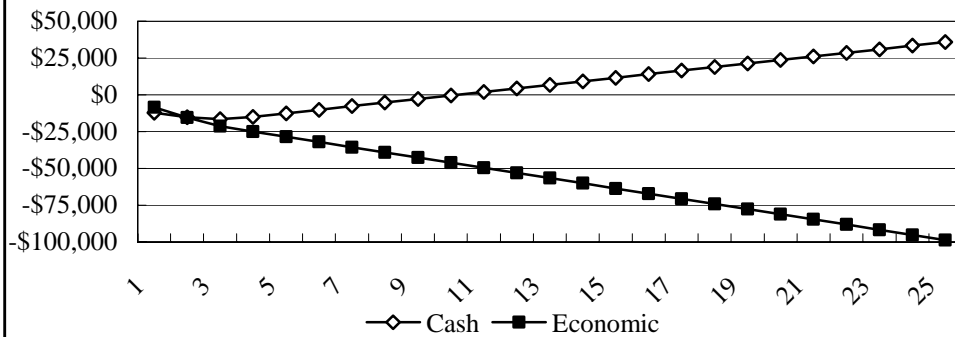
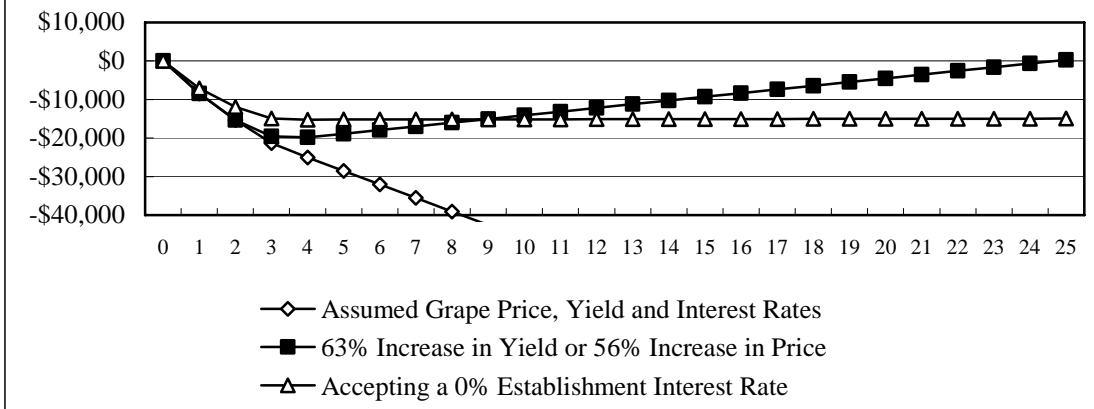


Figure 4. Projected net returns per acre with changes to grape prices, yields, and interest rates assumed in this study, over 25 years



Discussion

The results of the sensitivity analysis indicated that profitability could be achieved by increasing fruit prices by 56 percent or increasing yield by 63 percent. Of course, a combination of increased prices, yield, or lower rates of return on investment, is also a possibility. Achieving any of these outcomes generally depends on careful attention to detail in vineyard establishment and management practices.

In many grape growing areas, the regional climate (macroclimate) may be well suited to the production of high quality wine grapes. Many potential vineyard sites, however, may be unsuitable for the successful production due to limitations of the site climate (mesoclimate). Vineyard mesoclimate is affected by several factors that must be considered during vineyard site selection. One must be aware that not all land in a given region will be conducive to grape production

Moderately productive, well-drained soils are often favored over deep, fertile, highly productive soils in order to balance vegetative growth and fruit quality. On more productive sites, growers must carefully manage this balance to avoid

overly vegetative vines that may produce lower quality fruit. Canopy management, crop load management and other practices are critical to achieving vine balance. Eastern Oregon vineyard managers have the ability to fine tune canopy development and vine balance by managing irrigation in this dry region with sandy, light textured soils. Because the region is dry, access to water and water availability are critical factors to consider in vineyard establishment.

Choosing vineyard sites on southern or southwestern slopes contributes to good air drainage for avoiding frost, high interception of solar radiation for photosynthetic activity, berry ripening, and enhanced accumulation of heat units. Vineyards in the Walla Walla AVA can experience late spring and early season frosts that can damage vines, so very low elevations may need to be avoided to prevent frost pockets or air settling that may damage vines.

Some winters in the Walla Walla Valley have been observed to fall between -10°F and -30°F, posing a threat to the survival of *Vitis vinifera* vines. This requires growers to understand that *Vitis vinifera* vineyards

may suffer vine losses in some years and/or require different management methods. These include modified training systems, burying vines during the dormant period and growing own-rooted vines for retraining in the event of vine death to the soil level. Planting interspecific hybrid wine grape cultivars is also an option as they have a higher cold hardiness than *Vitis vinifera* cultivars. However, producing hybrid grapes may not be marketable to other wineries in the area, and if you direct market wine produced from hybrids, customers may not be familiar with these varieties, making it difficult to market. On the other hand, a special niche market may be created for the consumer who desires something different.

The choice of grape cultivar is a critical factor in successful wine grape production. Grape cultivars have different requirements for accumulated heat units to ripen during the growing season. The cultivar choice must match the site potential for heat units over the course of the growing season to achieve optimum fruit maturity. The relatively warm summers of the Walla Walla Valley of eastern Oregon allows the accumulation of heat units of more than 3000 growing degree days. This makes these locations suitable for ripening warm climate cultivars including 'Merlot', 'Cabernet Sauvignon', 'Syrah', which are the three most popular cultivars currently produced in the area.

Many agricultural products have a value added component which increases profitability to the producer. If grape growers are able to share in the value-added process of winemaking, they may be more

likely to profit financially.

This cost of establishment study is meant to provide useful information to wine grape producers and investors who are considering planting a new vineyard. However, as with all enterprise budgets, 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 "*A Grower's Technology Profitability Assessment Model*". This program is free for download at the Oregon Agriculture Information Network website (oain.oregonstate.edu) under the *Agtools* for managing risk menu link. Talk with your local Extension Agent to find the latest in vineyard replacement tools and budget information.

Growers must not forget the importance that a particular enterprise such as a vineyard can have in the overall financial stability of the farm business. Financial managers can recommend planting a new vineyard or planting one grape cultivar 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 and vineyard investments feasible.

APPENDIX A

Enterprise Budgets for 'Cabernet Sauvignon' vineyard in eastern Oregon

Table 7. Year 1, Cabernet Sauvignon wine grape establishment, \$/acre economic costs and returns.

| VARIABLE CASH COSTS | Description | Labor | Machinery | Materials | Total |
|--|------------------|---------------|-----------------|-----------------|--------------------------|
| Soil sample | 1.0 x/acre | \$0.00 | \$0.00 | \$5.00 | \$5.00 |
| Disc & cultivate | 2.0 applications | 30.00 | 14.76 | 0.00 | 44.76 |
| Mark rows | 10.0 hours | 130.00 | 0.00 | 1.20 | 131.20 |
| Rototill strips | 1.0 applications | 10.78 | 10.91 | 0.00 | 21.70 |
| Mark plants | 20.0 hours | 260.00 | 0.00 | 36.30 | 296.30 |
| Plant vines with grow tubes | 20.0 hours | 260.00 | 142.77 | 2,420.00 | 2,822.77 |
| Tie vines | 1.0 hour | 13.00 | 0.00 | 4.00 | 17.00 |
| Compost & fertilizer application | 1.0 applications | 10.78 | 11.47 | 250.00 | 272.26 |
| Herbicide strip maintenance | 3.0 applications | 31.42 | 30.78 | 25.00 | 87.21 |
| In-row cultivator for weed control | 2.0 appl. | 21.57 | 21.83 | 0.00 | 43.40 |
| Rodent control | 0.5 hours | 6.50 | 0.00 | 20.00 | 26.50 |
| Vine training | 1.0 hours | 13.00 | 0.00 | 0.00 | 13.00 |
| Mowing vineyard floor | 2.0 times | 9.24 | 9.10 | 0.00 | 18.34 |
| Frost protection | 0.5 hours | 6.50 | 165.66 | 0.00 | 172.16 |
| Irrigation | 8.0 hours | 104.00 | 0.00 | 0.00 | 104.00 |
| Pickup | 1.0 x/acre | 0.00 | 462.50 | 0.00 | 462.50 |
| Truck | 1.0 x/acre | 0.00 | 186.06 | 0.00 | 186.06 |
| ATV | 1.0 x/acre | 0.00 | 41.83 | 0.00 | 41.83 |
| Shop and machine shed | 1.0 x/acre | 0.00 | 0.00 | 66.25 | 66.25 |
| Miscellaneous and overhead | 1.0 x/acre | 0.00 | 0.00 | 75.00 | 75.00 |
| Interest: operating capital | 6.0 month | 0.00 | 0.00 | 104.28 | 104.28 |
| Total variable costs | | 906.80 | 1,097.68 | 3,007.03 | 5,011.51 |
| FIXED CASH COSTS | | | | Unit | Total |
| Pickup, truck & ATV insurance | | | | ac re | 131.03 |
| Water assessment | | | | ac re | 75.00 |
| Fruit insurance | | | | ac re | 150.00 |
| Property insurance | | | | ac re | 50.00 |
| Property taxes | | | | ac re | 30.00 |
| Total fixed cash costs | | | | | 436.03 |
| FIXED NON-CASH COSTS | | | | Unit | Total |
| Machinery and equipment insurance, depreciation & interest | | | | ac re | 334.14 |
| Irrigation depreciation & interest | | | | ac re | 427.50 |
| Trellis depreciation & interest | | | | ac re | 309.38 |
| Pickup, truck & ATV - depreciation & interest | | | | ac re | 484.30 |
| Foreman housing | | | | ac re | 720.00 |
| Shop and Machine Shed | | | | ac re | 283.33 |
| Land interest charge | | | | ac re | <u>400.00</u> |
| Total fixed non-cash costs | | | | | 2,958.65 |
| Total fixed costs | | | | | 3,394.68 |
| Total of all costs per acre | | | | | <u>\$8,406.19</u> |

Table 8. Year 2, Cabernet Sauvignon wine grape establishment, \$/acre economic costs and returns.

| TOTAL GROSS INCOME | | Quantity | Unit | \$/Unit | Total | |
|--|--|------------------|-------------|-------------|--------------------|--------------|
| Cabernet Sauvignon grapes | | 0.00 | Tons | 2,000 | 0.00 | |
| Total gross income | | | | | 0.00 | |
| VARIABLE CASH COSTS | | Description | Labor | Machinery | Materials | Total |
| Dormant prune | | 4.0 hours | \$52.00 | \$0.00 | \$0.00 | \$52.00 |
| Tie canes | | 0.0 hours | 0.00 | 0.00 | 4.00 | 4.00 |
| Vine replacement with grow tubes | | 2.5 hours | 32.50 | 0.00 | 40.00 | 72.50 |
| Shredding brush | | 1.0 x/acre | 4.62 | 4.55 | 0.00 | 9.17 |
| Compost & fertilizer application | | 1.0 x/acre | 10.78 | 11.47 | 260.00 | 282.26 |
| Herbicide strip maintenance | | 3.0 applications | 31.42 | 30.78 | 50.00 | 112.21 |
| In-row cultivator for weed control | | 2.0 appl. | 21.57 | 21.83 | 0.00 | 43.40 |
| Vine training | | 2.0 hours | 26.00 | 0.00 | 0.00 | 26.00 |
| Mowing vineyard floor | | 2.0 times | 9.24 | 9.10 | 0.00 | 18.34 |
| Bird control & clipping net | | 0.0 hours | 0.00 | 0.00 | 800.00 | 800.00 |
| Irrigation maintenance | | 8.0 hours | 104.00 | 0.00 | 0.00 | 104.00 |
| Trellis maintenance | | 2.0 hours | 26.00 | 0.00 | 0.00 | 26.00 |
| Frost protection | | 0.5 hours | 6.50 | 165.66 | 0.00 | 172.16 |
| Rodent control | | 0.5 hours | 6.50 | 0.00 | 20.00 | 26.50 |
| Picking equipment | | 1.0 x/acre | 0.00 | 3.00 | 0.00 | 3.00 |
| Pickup | | 1.0 x/acre | 0.00 | 462.50 | 0.00 | 462.50 |
| Truck | | 1.0 x/acre | 0.00 | 186.06 | 0.00 | 186.06 |
| ATV | | 1.0 x/acre | 0.00 | 41.83 | 0.00 | 41.83 |
| Shop and machine shed | | 1.0 x/acre | 0.00 | 0.00 | 66.25 | 66.25 |
| Miscellaneous and overhead | | 1.0 x/acre | 0.00 | 0.00 | 75.00 | 75.00 |
| Interest: operating capital | | 6.0 months | <u>0.00</u> | <u>0.00</u> | <u>54.89</u> | <u>54.89</u> |
| Total variable costs | | | 331.14 | 936.78 | 1,370.14 | 2,638.06 |
| FIXED CASH COSTS | | | | Unit | Total | |
| Pickup, truck & ATV insurance | | | | acre | 131.03 | |
| Water assessment | | | | acre | 75.00 | |
| Fruit insurance | | | | acre | 150.00 | |
| Property insurance | | | | acre | 50.00 | |
| Property taxes | | | | acre | 30.00 | |
| Total fixed cash costs | | | | | 436.03 | |
| FIXED NON-CASH COSTS | | | | Unit | Total | |
| Machinery and equipment insurance, depreciation & interest | | | | acre | 407.36 | |
| Irrigation depreciation & interest | | | | acre | 427.50 | |
| Trellis depreciation & interest | | | | acre | 309.38 | |
| Pickup, truck & ATV - depreciation & interest | | | | acre | 484.30 | |
| Foreman housing | | | | acre | 720.00 | |
| Shop and Machine Shed | | | | acre | 283.33 | |
| Land interest charge | | | | acre | 400.00 | |
| Prior year's establishment costs | | | | acre | 840.62 | |
| Total fixed non-cash costs | | | | | 3,872.48 | |
| Total fixed costs | | | | | 4,308.51 | |
| Total of all costs per acre | | | | | \$6,946.58 | |
| Net projected returns | | | | | -\$6,946.58 | |

Table 9. Year 3, Cabernet Sauvignon wine grape establishment, \$/acre economic costs and returns.

| TOTAL GROSS INCOME | | | | | | |
|--|--------------------|--------------|------------------|------------------|--------------------|--------------------|
| | Quantity | Unit | \$/Unit | Total | Price/ton | |
| Cabernet Sauvignon grapes | 1.50 | Tons | 2,000 | 3,000 | 2,000 | |
| Total gross income | | | | 3,000 | 2,000 | |
| VARIABLE CASH COSTS | | | | | | |
| | Description | Labor | Machinery | Materials | Total | Cost/ton |
| Prune | 20.0 hours | \$260.00 | \$0.00 | \$0.00 | \$260.00 | \$173.33 |
| Tie canes | 21.0 hours | 273.00 | 0.00 | 4.00 | 277.00 | 184.67 |
| Vine replacement with grow tubes | 2.5 hours | 32.50 | 0.00 | 40.00 | 72.50 | 48.33 |
| Trellis system & maintenance | 2.0 hours | 26.00 | 0.00 | 0.00 | 26.00 | 17.33 |
| Shredding brush | 1.0 x/acre | 4.62 | 4.55 | 0.00 | 9.17 | 6.11 |
| Fertilizer - foliar applied | 1.0 x/acre | 0.00 | 0.00 | 62.50 | 62.50 | 41.67 |
| Compost & fertilizer application | 1.0 x/acre | 10.78 | 11.47 | 280.00 | 302.26 | 201.50 |
| Herbicide strip maintenance | 3.0 applications | 31.42 | 30.78 | 50.00 | 112.21 | 74.81 |
| In-row cultivator for weed control | 2.0 appl. | 20.95 | 20.52 | 0.00 | 41.47 | 27.65 |
| Fungicides | 4.0 applications | 43.99 | 51.57 | 200.00 | 295.57 | 197.04 |
| Vine training | 10.0 hours | 130.00 | 0.00 | 0.00 | 130.00 | 86.67 |
| Sucker removal | 10.0 hours | 130.00 | 0.00 | 0.00 | 130.00 | 86.67 |
| Cluster thinning | 12.0 hours | 156.00 | 0.00 | 0.00 | 156.00 | 104.00 |
| Leaf pulling | 3.0 hours | 39.00 | 0.00 | 0.00 | 39.00 | 26.00 |
| Mowing vineyard floor | 2.0 times | 9.24 | 9.10 | 0.00 | 18.34 | 12.23 |
| Bird control & clipping net | 20.0 hours | 260.00 | 0.00 | 0.00 | 260.00 | 173.33 |
| Irrigation | 8.0 hours | 104.00 | 0.00 | 0.00 | 104.00 | 69.33 |
| Frost protection | 0.5 hours | 6.50 | 165.66 | 0.00 | 172.16 | 114.77 |
| Rodent control | 0.5 hours | 6.50 | 0.00 | 20.00 | 26.50 | 17.67 |
| Picking equipment | 1.0 x/acre | 0.00 | 3.00 | 0.00 | 3.00 | 2.00 |
| Harvesting costs | 1.5 tons | 300.00 | 78.23 | 0.00 | 378.23 | 252.15 |
| Pickup | 1.0 x/acre | 0.00 | 462.50 | 0.00 | 462.50 | 308.33 |
| Truck | 1.0 x/acre | 0.00 | 186.06 | 0.00 | 186.06 | 124.04 |
| ATV | 1.0 x/acre | 0.00 | 41.83 | 0.00 | 41.83 | 27.89 |
| Shop and machine shed | 1.0 x/acre | 0.00 | 0.00 | 66.25 | 66.25 | 44.17 |
| Miscellaneous and overhead | 1.0 x/acre | 0.00 | 0.00 | 75.00 | 75.00 | 50.00 |
| Interest: operating capital | 6.0 months | 0.00 | 0.00 | 78.79 | 78.79 | 52.52 |
| Total variable costs | | 1,844.52 | 1,065.28 | 876.54 | 3,786.33 | 2,524.22 |
| FIXED CASH COSTS | | | | | | |
| | | | | Unit | Total | Cost/ton |
| Pickup, truck & ATV insurance | | | | acre | 131.03 | 87.35 |
| Water assessment | | | | acre | 75.00 | 50.00 |
| Fruit insurance | | | | acre | 150.00 | 100.00 |
| Property insurance | | | | acre | 50.00 | 33.33 |
| Property taxes | | | | acre | 30.00 | 20.00 |
| Total fixed cash costs | | | | | 436.03 | 290.69 |
| FIXED NON-CASH COSTS | | | | | | |
| | | | | Unit | Total | Cost/ton |
| Machinery and equipment insurance, depreciation & interest | | | | acre | 539.95 | 359.97 |
| Irrigation depreciation & interest | | | | acre | 427.50 | 285.00 |
| Trellis depreciation & interest | | | | acre | 309.38 | 206.25 |
| Pickup, truck & ATV - depreciation & interest | | | | acre | 484.30 | 322.86 |
| Foreman housing | | | | acre | 720.00 | 480.00 |
| Shop and Machine Shed | | | | acre | 283.33 | 188.89 |
| Land interest charge | | | | acre | 400.00 | 266.67 |
| Prior year's establishment costs | | | | acre | <u>1,535.28</u> | <u>1,023.52</u> |
| Total fixed non-cash costs | | | | | 4,699.73 | 3,133.16 |
| Total fixed costs | | | | | 5,135.76 | 3,423.84 |
| Total of all costs per acre | | | | | \$8,922.09 | \$5,948.06 |
| Net projected returns | | | | | -\$9,922.09 | -\$3,948.06 |

Table 10. Year 4, Cabernet Sauvignon wine grape establishment, \$/acre economic costs and returns.

| Table 10. Year 4, Cabernet Sauvignon wine grape establishment, \$/acre economic costs and returns. | | | | | | |
|---|--------------------|--------------|------------------|------------------|--------------------|--------------------|
| TOTAL GROSS INCOME | | | | | | |
| | Quantity | Unit | \$/Unit | Total | Price/ton | |
| Cabernet Sauvignon grapes | 3.00 | Tons | 2,000 | 6,000 | 2,000 | |
| Total gross income | | | | 6,000 | 2,000 | |
| VARIABLE CASH COSTS | | | | | | |
| | Description | Labor | Machinery | Materials | Total | Cost/ton |
| Prune | 20.0 hours | \$260.00 | \$0.00 | \$0.00 | \$260.00 | \$86.67 |
| Tie canes | 6.0 hours | 78.00 | 0.00 | 4.00 | 82.00 | 27.33 |
| Vine replacement with grow tubes | 2.5 hours | 32.50 | 0.00 | 40.00 | 72.50 | 24.17 |
| Trellis system & maintenance | 2.0 hours | 26.00 | 0.00 | 0.00 | 26.00 | 8.67 |
| Shredding brush | 1.0 x/acre | 4.62 | 4.55 | 0.00 | 9.17 | 3.06 |
| Fertilizer - foliar applied | 1.0 x/acre | 0.00 | 0.00 | 62.50 | 62.50 | 20.83 |
| Compost & fertilizer application | 1.0 x/acre | 10.78 | 11.47 | 280.00 | 302.26 | 100.75 |
| Herbicide strip maintenance | 3.0 applications | 31.42 | 30.78 | 50.00 | 112.21 | 37.40 |
| In-row cultivator for weed control | 2.0 appl. | 20.95 | 20.52 | 0.00 | 41.47 | 13.82 |
| Fungicides | 4.0 applications | 43.99 | 51.57 | 200.00 | 295.57 | 98.52 |
| Vine training | 10.0 hours | 130.00 | 0.00 | 0.00 | 130.00 | 43.33 |
| Sucker removal | 10.0 hours | 130.00 | 0.00 | 0.00 | 130.00 | 43.33 |
| Cluster thinning | 16.0 hours | 208.00 | 0.00 | 0.00 | 208.00 | 69.33 |
| Leaf pulling | 6.0 hours | 78.00 | 0.00 | 0.00 | 78.00 | 26.00 |
| Mowing vineyard floor | 2.0 times | 9.24 | 9.10 | 0.00 | 18.34 | 6.11 |
| Bird control & clipping net | 20.0 hours | 260.00 | 0.00 | 0.00 | 260.00 | 86.67 |
| Irrigation | 8.0 hours | 104.00 | 0.00 | 0.00 | 104.00 | 34.67 |
| Frost protection | 0.5 hours | 6.50 | 165.66 | 0.00 | 172.16 | 57.39 |
| Rodent control | 0.5 hours | 6.50 | 0.00 | 20.00 | 26.50 | 8.83 |
| Picking equipment | 1.0 x/acre | 0.00 | 3.00 | 0.00 | 3.00 | 1.00 |
| Harvesting costs | 3.0 tons | 600.00 | 121.06 | 0.00 | 721.06 | 240.35 |
| Pickup | 1.0 x/acre | 0.00 | 462.50 | 0.00 | 462.50 | 154.17 |
| Truck | 1.0 x/acre | 0.00 | 186.06 | 0.00 | 186.06 | 62.02 |
| ATV | 1.0 x/acre | 0.00 | 41.83 | 0.00 | 41.83 | 13.94 |
| Shop and machine shed | 1.0 x/acre | 0.00 | 0.00 | 66.25 | 66.25 | 22.08 |
| Miscellaneous and overhead | 1.0 x/acre | 0.00 | 0.00 | 75.00 | 75.00 | 25.00 |
| Interest: operating capital | 6.0 mons | 0.00 | 0.00 | 83.86 | 83.86 | 27.95 |
| Total variable costs | | 2,040.52 | 1,108.11 | 881.61 | 4,030.24 | 1,343.41 |
| FIXED CASH COSTS | | | | | | |
| | | | | Unit | Total | Cost/ton |
| Pickup, truck & ATV insurance | | | | acre | 131.03 | 43.68 |
| Water assessment | | | | acre | 75.00 | 25.00 |
| Fruit insurance | | | | acre | 150.00 | 50.00 |
| Property insurance | | | | acre | 50.00 | 16.67 |
| Property taxes | | | | acre | 30.00 | 10.00 |
| Total fixed cash costs | | | | | 436.03 | 145.34 |
| FIXED NON-CASH COSTS | | | | | | |
| | | | | Unit | Total | Cost/ton |
| Machinery and equipment insurance, depreciation & interest | | | | acre | 539.95 | 179.98 |
| Irrigation depreciation & interest | | | | acre | 427.50 | 142.50 |
| Trellis depreciation & interest | | | | acre | 309.38 | 103.13 |
| Pickup, truck & ATV - depreciation & interest | | | | acre | 484.30 | 161.43 |
| Foreman housing | | | | acre | 720.00 | 240.00 |
| Shop and Machine Shed | | | | acre | 283.33 | 94.44 |
| Land interest charge | | | | acre | 400.00 | 133.33 |
| Amortized establishment costs | | | | acre | <u>2,127.49</u> | <u>709.16</u> |
| Total fixed non-cash costs | | | | | 5,291.94 | 1,763.98 |
| Total fixed costs | | | | | 5,727.97 | 1,909.32 |
| Total of all costs per acre | | | | | \$9,758.21 | \$3,252.74 |
| Net projected returns | | | | | -\$3,758.21 | -\$1,252.74 |

Table 11. Full production, Cabernet Sauvignon wine grape establishment, \$/acre economic costs and returns.

| TOTAL GROSS INCOME | | | | | | |
|--|--------------------|--------------|------------------|--------------------|--------------------|-----------------|
| | Quantity | Unit | \$/Unit | Total | Price/ton | |
| Cabernet Sauvignon grapes | 3.50 | Tons | 2,000 | 7,000 | 2,000 | |
| Total gross income | | | | 7,000 | 2,000 | |
| VARIABLE CASH COSTS | | | | | | |
| | Description | Labor | Machinery | Materials | Total | Cost/ton |
| Prune | 20.0 hours | \$260.00 | \$0.00 | \$0.00 | \$260.00 | \$74.29 |
| Tie canes | 6.0 hours | 78.00 | 0.00 | 4.00 | 82.00 | 23.43 |
| Vine replacement with grow tubes | 2.5 hours | 32.50 | 0.00 | 40.00 | 72.50 | 20.71 |
| Trellis system & maintenance | 2.0 hours | 26.00 | 0.00 | 0.00 | 26.00 | 7.43 |
| Shredding brush | 1.0 x/acre | 4.62 | 4.55 | 0.00 | 9.17 | 2.62 |
| Fertilizer - foliar applied | 1.0 x/acre | 0.00 | 0.00 | 62.50 | 62.50 | 17.86 |
| Compost & fertilizer application | 1.0 x/acre | 10.78 | 11.47 | 280.00 | 302.26 | 86.36 |
| Herbicide strip maintenance | 3.0 applications | 31.42 | 30.78 | 50.00 | 112.21 | 32.06 |
| In-row cultivator for weed control | 2.0 appl. | 20.95 | 20.52 | 0.00 | 41.47 | 11.85 |
| Fungicides | 4.0 applications | 43.99 | 51.57 | 200.00 | 295.57 | 84.45 |
| Vine training | 10.0 hours | 130.00 | 0.00 | 0.00 | 130.00 | 37.14 |
| Sucker removal | 10.0 hours | 130.00 | 0.00 | 0.00 | 130.00 | 37.14 |
| Cluster thinning | 16.0 hours | 208.00 | 0.00 | 0.00 | 208.00 | 59.43 |
| Leaf pulling | 6.0 hours | 78.00 | 0.00 | 0.00 | 78.00 | 22.29 |
| Mowing vineyard floor | 2.0 times | 9.24 | 9.10 | 0.00 | 18.34 | 5.24 |
| Bird control & clipping net | 20.0 hours | 260.00 | 0.00 | 0.00 | 260.00 | 74.29 |
| Irrigation | 8.0 hours | 104.00 | 0.00 | 0.00 | 104.00 | 29.71 |
| Frost protection | 0.5 hours | 6.50 | 165.66 | 0.00 | 172.16 | 49.19 |
| Rodent control | 0.5 hours | 6.50 | 0.00 | 20.00 | 26.50 | 7.57 |
| Picking equipment | 1.0 x/acre | 0.00 | 3.00 | 0.00 | 3.00 | 0.86 |
| Harvesting costs | 3.5 tons | 700.00 | 135.34 | 0.00 | 835.34 | 238.67 |
| Pickup | 1.0 x/acre | 0.00 | 462.50 | 0.00 | 462.50 | 132.14 |
| Truck | 1.0 x/acre | 0.00 | 186.06 | 0.00 | 186.06 | 53.16 |
| ATV | 1.0 x/acre | 0.00 | 41.83 | 0.00 | 41.83 | 11.95 |
| Shop and machine shed | 1.0 x/acre | 0.00 | 0.00 | 66.25 | 66.25 | 18.93 |
| Miscellaneous and overhead | 1.0 x/acre | 0.00 | 0.00 | 75.00 | 75.00 | 21.43 |
| Interest: operating capital | 6.0 mons | 0.00 | 0.00 | 86.29 | 86.29 | 24.65 |
| Total variable costs | | 2,140.52 | 1,122.39 | 884.04 | 4,146.94 | 1,184.84 |
| FIXED CASH COSTS | | | | | | |
| | | | Unit | Total | Cost/ton | |
| Pickup, truck & ATV insurance | | | acre | 131.03 | 37.44 | |
| Water assessment | | | acre | 75.00 | 21.43 | |
| Fruit insurance | | | acre | 150.00 | 42.86 | |
| Property insurance | | | acre | 50.00 | 14.29 | |
| Property taxes | | | acre | 30.00 | 8.57 | |
| Total fixed cash costs | | | | 436.03 | 124.58 | |
| FIXED NON-CASH COSTS | | | | | | |
| | | | Unit | Total | Cost/ton | |
| Machinery and equipment insurance, depreciation & interest | | | acre | 539.95 | 154.27 | |
| Irrigation depreciation & interest | | | acre | 427.50 | 122.14 | |
| Trellis depreciation & interest | | | acre | 309.38 | 88.39 | |
| Pickup, truck & ATV - depreciation & interest | | | acre | 484.30 | 138.37 | |
| Foreman housing | | | acre | 720.00 | 205.71 | |
| Shop and Machine Shed | | | acre | 283.33 | 80.95 | |
| Land interest charge | | | acre | 400.00 | 114.29 | |
| Amortized establishment costs | | | acre | 2,757.85 | 787.96 | |
| Total fixed non-cash costs | | | | 5,922.30 | 1,692.09 | |
| Total fixed costs | | | | 6,358.33 | 1,816.67 | |
| Total of all costs per acre | | | | \$10,505.28 | \$3,001.51 | |
| Net projected returns | | | | -\$3,505.28 | -\$1,001.51 | |