

EB1965



Establishment and Annual Production Costs for Washington Concord Grapes

By

Trent Ball, Raymond J. Folwell, Jack Watson, & Markus Keller



Establishment and Annual Production Costs for Washington Concord Grapes

By

Trent Ball, Raymond J. Folwell, Jack Watson, and Markus Keller*

Introduction

Washington is the leading producer of Concord grapes, supplying more than half of the U.S. total. The 2002 production level of 199,000 tons represents the third consecutive year of increase, and the largest total since 1997.¹ Prior to 1997, the largest production was in 1993 (278,300 tons). Since 1997, the Washington Concord grape acreage has remained constant at 24,500 bearing acres until 2002, when acreage increased slightly.

The cash price and production of Concord grapes for Washington from 1979–2002 can be seen in Figure 1. The average cash price for 16 brix Concord grapes reached its highest level in 1998, at \$260 per ton. Since then, the

average cash price has consistently declined while the production has trended upwards. In 2002, the average cash price was only \$155 per ton, the lowest price since 1995, when the second largest Concord grape crop was harvested. The cash price for 2002 was down 30% from the previous year.

This study was done to assess the economic costs and profitability of establishing and producing a Concord grape vineyard based on current managing and growing practices. Planting Concord grapes involves a significant amount of capital, and as a perennial crop, the vineyard does not reach full production until the fourth year after planting. To estimate the economic costs of developing a vineyard it is necessary to:

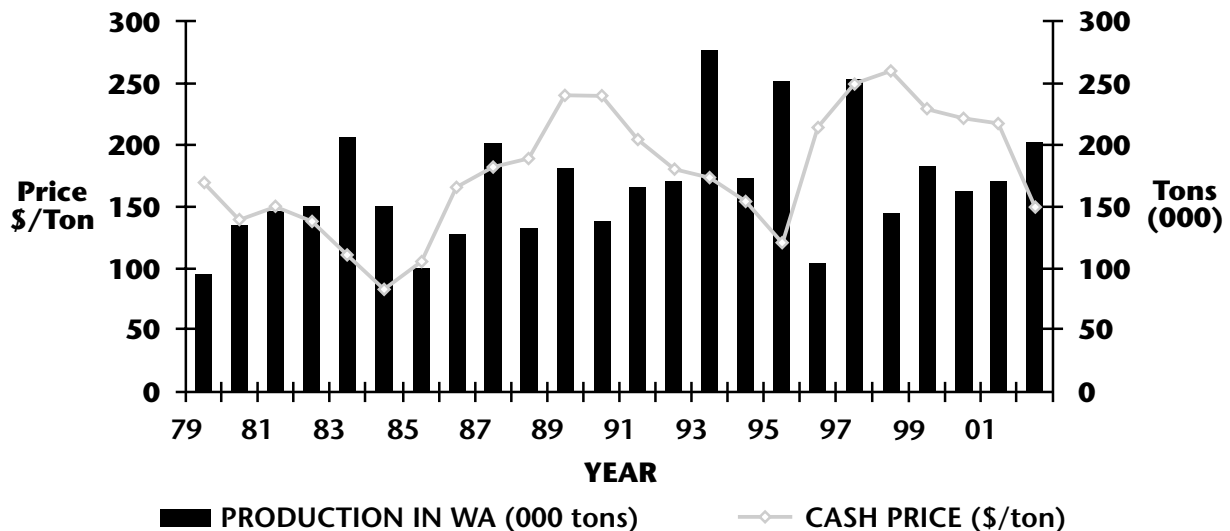


Figure 1. Washington Concord Grape Prices and Production, 1979–2002.

* Associate in Research, Professor of Agricultural and Resource Economics, Benton County Extension Chair, and Associate Horticulturist, Washington State University, respectively.

¹ United States Department of Agriculture, *Washington Grape Report*, 2003, Washington Agricultural Statistics Service, Olympia, WA.

1. Specify the viticultural practices normally followed in Washington to establish and maintain a 50-acre vineyard of Concord grapes.
2. Estimate the costs of those practices and compare them with the possible level of receipts to establish profitability.
7. The water charge is \$80 per acre based upon 2003 Roza Irrigation District water fees, and the per-acre cost for irrigation electricity is \$30, based upon the Benton Irrigation District.
8. The real estate taxes are from the Benton County Assessor. The tax rate in 2003 is 1.45% of the average assessed value (\$14.50 per \$1,000 of value). For tax purposes, real estate tax (land), irrigation system, trellis, and the grapevine assessed values are calculated. The values assumed and the corresponding annual taxes are:

Budget Assumptions

The major assumptions made to calculate the establishment costs of a vineyard include:

1. A 50-acre Concord grape vineyard is developed on 60 acres, with five acres of headland and homestead. The vineyard has a land value of \$3,200 per acre, and a 7% return is desired. The 50-acre vineyard is part of a 200-acre owner-operator farm.
2. The vineyard is planted with No. 1 certified Concord grape nursery stock. The grapes are planted with 691 plants per acre and 9 x 7 foot spacing.
3. A solid-set sprinkler system is used and purchased at a price of \$1,500 per acre, which includes all materials and custom installation.
4. The manager of the vineyard receives a salary of \$225 per acre for a management fee, a representative fee obtained from industry.
5. All harvesting and hauling is done on a custom basis, at a rate of \$35 per ton. Five tons per acre of grapes are harvested in the third year, and 10 tons per acre in the fourth year and each year thereafter. The price received for the grapes is \$190 per ton.
6. Establishment costs are amortized over 16 years at 8.5% interest. They consist of total costs in the four years of establishment minus the receipts from the third and fourth year crops. The total vineyard life is 20 years.
9. The cost of operating capital is based on a short-term interest rate of 8.5%.
10. Prices for materials and services were assembled through growers, field persons, and industry supply firms. The prices used in the study are the average prices of the major suppliers in the region. These prices are listed in Table 7 of the Appendix.
11. A single-wire trellis with non-positioned hanging shoots is used. The trellis is established in the first year.
12. All machinery and equipment costs are based on new 2003 purchase prices. The machinery and equipment depreciation, housing, interest, and insurance are calculated according to costs of using machinery.²
13. The vines are pruned by hand using pneumatic pruners until the fourth year. In year

Item	Age of Concord Vineyard	
	1-3 years	4-15 years
Land	\$1,480.00	\$1,480.00
Grapevines	200.00	600.00
Trellis	900.00	900.00
Irrigation System	750.00	750.00
Total Value	3,330.00	3,730.00
Per-Acre Tax	48.29	54.09

² Smathers, Robert. *The Costs of Owning and Operating Farm Machinery in the Pacific Northwest: 2000*, University of Idaho, PNW 346.

four and beyond, a custom mechanical pruner is used, followed by hand touch-up on the remaining spurs.

14. Wage rates for the manual laborer are based on the Washington 2004 minimum wage of \$7.16 per hour. The hourly rate is increased by 22.5% to \$8.77 to account for all additional expenses incurred by the employer (social security, labor and industries, etc.). The wage rate for machinery work is \$10.50 per hour, which also includes employee expenses.

Summary of Budgets and Results

The budgets generated in this study reflect the full economic costs a Concord grape vineyard would incur, including both cash and non-cash costs. Non-cash costs include depreciation and opportunity costs. An opportunity cost is non-cash since it is not reflective of a cash outlay, but rather represents costs associated with foregone opportunities. For instance, a farmer who produces a crop on land he or she owns is foregoing the income that could be generated from renting the ground, minus costs incurred as the lessor (i.e., real estate taxes). Therefore, the fore-gone land rent is an opportunity cost. Since the budget incorporates full costs (including opportunity costs) and receipts over the useful life of the asset, it is referred to as an economic budget.³

There are both fixed and variable costs included in the budget. A fixed cost does not vary with changes in level of production. Real estate taxes and land rent are fixed costs, and therefore must be paid regardless of the production level. Conversely, a variable cost does change with the amount of production. Harvesting cost and labor are two examples of costs that vary directly with the amount of product produced.

The total cost, total revenue at the assumed price, and the net returns received over the four establishment years and the full production year are summarized in Table 1. In the first two years of operation the primary expenses incurred are variable costs. In the first year of establishment the largest variable cost paid by the operation is for the installation of the solid-set sprinkler system, followed by the trellis material and supplies, and the expense of labor and nursery stock. In year two, labor is greater than 50% of the variable expenses, due largely to the vine training and pruning that is needed to establish a productive vineyard. By the third year, the variable costs are composed of mainly routine cultural practices such as pruning, irrigating, and applying herbicides and pesticides.

In year two, an investment interest of 8.5% begins accumulating on the first year's establishment costs. It is assumed that by year five, the vineyard is at full production, with 16 years of useful life remaining. Over the remaining productive years the vineyard must pay back the initial expenses minus the returns generated in establishment. Amortizing the net establishment costs over 16 years at 8.5% produces an annual accumulated establishment cost of \$1,214.51 per acre. This cost accounts for the foregone returns of the operation by investing in the vineyard and not using the investment elsewhere.

Economic Break-Even Price and Yield Analysis

A harvestable crop is not produced during the first two years of the vineyard's life. By the third year of establishment a yield of 5 tons per acre is achieved, half of the full production level. The fourth year, the Concord grape vineyard produces a yield of 10 tons per acre. Each subsequent year the yield is maintained at 10 tons per acre. The price the grower receives, based on this study's assumptions, is \$190 per ton. However, over the past 5 years the price has ranged from \$150 to

³ In order to get a better understanding of how to read and use crop budgets distributed by Washington State University, we recommend you go to the WSU Farm Management Web site <http://www.farm-mgmt.wsu.edu/> and click on "Publication Links," click on "Unpublished," and then click on the manuscript *Understanding and Using WSU Crop Enterprise Budgets*.

Table 1. Summary of Revenue, Costs, and Returns Per Acre for a Concord Grape Vineyard.

Revenue/Cost	YEARS				
	First	Second	Third	Fourth	Full Production
Revenue					
Yield (tons)	0.00	0.00	5.00	10.00	10.00
Price (\$/ton)	190.00	190.00	190.00	190.00	190.00
Total Revenue (\$)	0.00	0.00	950.00	1,900.00	1,900.00
Variable Costs:					
Irrigation Equipment	1,500.00	–	–	–	–
Custom Work/Mech Pruning	50.00	–	–	45.00	45.00
Planting (Driver and Stakes)	39.92	–	–	–	–
Grow Tubes	310.95	–	–	–	–
Nursery Stock	449.15	45.50	–	–	–
Rental Equip/Grass Seed	38.20	6.00	6.00	6.00	6.00
Trellis Material/Ties	1,482.48	27.59	2.76	2.76	75.42
Fertilizer	10.00	19.50	15.00	29.50	20.00
Chemicals	77.37	45.47	64.92	129.85	129.85
Custom Harvesting/Hauling	–	–	175.00	350.00	350.00
Labor	653.49	714.89	353.73	287.26	267.09
Irrigation/Elect Charge	142.00	142.00	142.00	142.00	142.00
Machinery Cost	301.87	67.17	72.76	78.21	88.76
Miscellaneous	80.00	80.00	80.00	80.00	80.00
Interest	222.77	52.43	33.85	39.96	46.00
Total Variable Costs (\$)	5,358.20	1,200.55	946.02	1,190.54	1,250.12
Fixed Costs:					
Management Fee	225.00	225.00	225.00	225.00	225.00
Real Estate Taxes	48.29	48.29	48.29	54.09	54.09
Net Land Rent	224.00	224.00	224.00	224.00	224.00
Tractor & Machine Cost	263.21	74.77	86.11	90.42	103.29
Interest on Investment*	–	520.09	714.97	824.99	1214.51
Total Fixed Costs (\$)	760.50	1,092.15	1,298.37	1,418.50	1,820.89
Total Costs (\$)	6,118.70	2,292.70	2,244.39	2,609.04	3,071.01
Net Return (\$)	-6,118.70	-2,292.70	-1,294.39	-709.04	-1,171.01

* In the full production year the interest on investment is the amortized establishment cost.

\$260 per ton. Table 2 shows the break-even prices for Concord grapes necessary to cover costs at varying yield levels, considering the costs set forth in this study. The harvesting and hauling costs, which vary with a change in yield, are accounted for in the break-even price calculation. Further, it is assumed that the costs, returns, and yield in years 1–4 remain constant, only the full production yield level varies. At a yield of 10 tons per acre it would require a price to the grower of \$307.10 per ton to break even assuming all economic costs are covered. The break-even selling price for variable costs identifies the price that must be received to cover all short-term costs associated with operating a vineyard. A cash price below the break-even price indicates the vineyard is an uneconomical investment in the short run. The break-even price for variable costs ranges from \$95 to \$335 for yields of 15 tons down to 3 tons per acre, respectively.

For the operation to be in production over the long term it must cover the total cost break-even selling price. In a mature vineyard, approximately 60% of the total costs per acre

are fixed costs, the costs incurred regardless of production. Interest on the establishment years and the amortized establishment costs are a significant portion of the fixed costs. These opportunity costs significantly impact the total cost of the Concord grape operation. If the cash price received is below the break-even price, an alternative investment should be pursued. Any price above the break-even price covers all costs and provides a profit to the operation. At the yield level assumed in the study, 10 tons per acre, the price necessary to break even is \$307.10 per ton, which is \$117.10 more than the cash price assumed in this study.

The economic budgets created for this study reflect costs and returns for a production year (January–December). Although these budgets were created with industry and farmer input, they are not representative of a particular farm. Rather, they represent costs and revenues under the assumptions and conditions of this study. For individual users it is recommended that they modify the assumptions and costs to reflect his or her specific situation.

Table 2. Economic Budget Break-Even Selling Prices of Concord Grapes at Various Yield Levels.

Yield (tons/ac)	Break-Even Price Necessary To Cover Costs (\$/ton)		
	Variable Costs	Fixed Costs	Total Costs
3	335.04	606.96	942.00
4	260.03	455.22	715.25
5	215.02	364.18	579.20
6	185.02	303.48	488.50
7	163.59	260.13	423.72
8	147.52	227.61	375.13
9	135.01	202.32	337.33
10	125.01	182.09	307.10
11	116.83	165.54	282.36
12	110.01	151.74	261.75
13	104.24	140.07	244.31
14	99.29	130.06	229.36
15	95.01	121.39	216.40

Detailed Budget Results

The complete budget information is provided in the tables in the Appendix for the establishment years and the full production year. Below is a general overview of the information included in the Appendix tables.

Itemized Costs for Establishing a Concord Grape Vineyard

These tables itemize the variable and fixed costs associated with the annual operation of a Concord grape vineyard. The items are listed by type of activity and include the corresponding per acre costs and the amount of the item utilized or consumed by the activity type. For example, an itemized category may be labor, which includes all labor that was employed during the production year, and the unit cost (wage rate) associated with the labor.

Schedule of Operations for Establishing a Concord Grape Vineyard

Presented in the schedule of operations tables are the annual field operations that occur by calendar month, and the necessary tooling (equipment) or action required to perform the operation. The tables include the fixed and variable costs by operation. The variable costs can be further divided into the costs associated with consuming fuel, hiring labor and services, purchasing material, and the interest expenses that are incurred under each operation.

The fixed costs consist of machinery, building, management, land, and establishment costs. Machinery and equipment fixed costs include depreciation, interest, insurance, taxes, and housing. The land value charge is representative of a 7% return of the purchase price for the land. It is not an actual expense of the operation; rather it is an opportunity cost that represents the rental income that is foregone by the producer as a result of producing a Concord grape crop. An opportunity cost for management is also included as a fixed cost. Returns foregone by investing in

the Concord grape vineyard are based on an interest rate of 8.5% on the accumulated vineyard investment.

Machinery, Building, and Input Costs

Appendix Table 6 lists the machinery and equipment necessary to maintain the vineyard operation and the associated costs. Included in the table are the machinery and equipment purchase prices, years of life before trade-in, and fixed and variable costs. The fixed costs such as depreciation, interest, insurance, taxes, and housing are reported on a cost per hour basis. Repair and fuel/lube costs are also reported as cost per hour. Annual hours of use for the machinery and equipment are also reported.

Annual Establishment Costs for 50-Acre Concord Grape Vineyard

The first four years of a vineyard are for establishment and preparation for the next 16 years of full production. Soil preparation, planting the vines, pest management and other routine cultural practices are performed. Over the remainder of this section, the annual costs of these activities are presented and discussed for the establishment years and the first year of full production (year 5).

First-Year Establishment Costs (Appendix Tables 1a, 1b)

Custom plowing is done in early March to prepare the ground. The ground is then disced in preparation for surveying and marking the field. After custom listing the nursery stock is planted, at a total cost of \$521.66 per acre. A solid set irrigation system is installed for \$1,500 per acre, which includes the materials and labor.

A single-wire trellis system with non-positioned hanging shoots is installed in year one. Wood end posts and steel line posts are used. The line posts alternate, one wood post for every

two steel T posts. Total outlay in establishing the trellis system is a large expense. The irrigation system installation is the major variable cost and planting of the Concord nursery stock is the second largest variable expense. The largest fixed cost is the management fee followed by land rent. Total cost in year one is \$6,118.70 per acre; no grapes are harvested so there is no revenue generated.

Second-Year Establishment Costs (Appendix Tables 2a, 2b)

At the beginning of year two the young vines are hand pruned. It is assumed that there is a 10% vine kill that occurs over the winter; those vines are replanted in April. During that same month weed control is started using Surflan. Summer training is done June through July, which includes the labor necessary to go through the vineyard three times for tying the main shoot, suckering, and pinching of the shoot. This is necessary to develop and train the vines properly.

Both fixed and variable costs decrease from the first year. The total cost of operation for the second year is \$2,292.69 per acre. An interest on the accumulated investment from the first year of \$520.09 per acre is incurred. It is based on the \$6,118.70 year one establishment expense at 8.5% interest.

Third-Year Establishment Costs (Appendix Tables 3a, 3b)

As the vines begin to mature, more chemical control is needed for insects and diseases. In March, Lorsban 4E is sprayed along with dormant oil to control insects. By April, an application of Surflan is needed for weed control, and in May, Roundup is sprayed on emerging weeds. June through July, more training is done on the Concord grapevines. After developing strong uniform vines the first two years, the vines are able to produce a limited crop in the third year.

The yield is 5 tons per acre. A cost of \$175 per acre to harvest and haul the grapes to the processor is paid. An establishment cost of \$714.97 per acre, the interest on the first two

years of investment, is incurred in year three. The total fixed cost per acre for the year is \$1,298.37, while the total variable cost is \$946.01 per acre. Revenue of \$950 per acre is generated, but there is a net loss in year three of \$1,294.38 per acre.

Fourth-Year Establishment Costs (Appendix Tables 4a, 4b)

The maturing Concord grapevines are established enough at the beginning of the fourth year to custom prune mechanically. Some hand labor is still needed to follow the machine and touch up the vines. Weed control is maintained, as are the early season insect sprays. The fertilizer application this year includes potassium and phosphorus, in addition to the normal use of nitrogen. Real estate taxes increase to \$54.09 per acre, as the vineyard is viewed for tax purposes as being at full production.

As production comes to maturity, a yield of 10 tons per acre are generated from the vineyard. The harvesting and hauling costs increase to \$350 per acre, which is the largest variable cost for the operation. The establishment cost increases to \$824.99, a result of the net investment from years one through three (expenses minus receipts). Total revenue of \$1,900 per acre is generated, while a total cost of \$2,609.04 per acre is incurred during the production year.

Production Costs and Profit Levels for a Concord Grape Vineyard in Full Production (Appendix Tables 5a, 5b)

The Concord grape vineyard is at full production for the first complete season in the fifth year. Activities during the season consist of routine cultural practices such as pruning, insect and weed control in the summer, and irrigation for the year. In February, the trellis system is repaired as a maintenance program to extend the life of the trellis.

Summing the overall gain/loss over the first four years of establishment provides the net investment cost (\$10,414.81). That cost is amortized over the remaining life of the vine-

yard (16 years) at an 8.5% interest rate, for a net amortized establishment cost of \$1,214.51 per acre. The total fixed and variable costs are \$1,820.89 and \$1,250.12 per acre, respectively. A return of \$1,900.00 per acre is received, for a net loss of \$1,171.01 per acre in the full production period.

Creating a Cash Flow Analysis

The economic budgets created in this study are comprised of total or full economic costs, which include opportunity costs. An opportunity cost represents foregone revenue that could have been received under the next best alternative. For example, if a farmer invests \$50,000 in equity into the purchase of new land, the farmer gives up the opportunity of investing the money in another alternative such as the stock market. A return must be received beyond what would be earned in the alternative to achieve an economic profit. For instance, assume the stock market would have generated an annual return of 8%, or a \$4,000 profit. Therefore, the investment in land must have a net return over \$4,000 to obtain an economic profit.

Although enterprise budgets are effective tools in identifying the financial requirements of an operation, a financial budget can be used to evaluate the cash flow of an operation and determine if the operation is generating enough cash to service debt. To provide an analysis of the financial costs and returns of an operation, some economic costs (opportunity costs) are excluded. Assume that a farmer owns the land and provides all the managerial decisions, then the land rent and management fee are not considered cash costs. A cash flow projection was prepared (Table 3) for a Concord grape vineyard. Several assumptions and alterations to the economic budget are necessary for conversion to a cash flow budget.

All equipment listed in Table 6 is purchased new, using 80% financing. The total acreage of the farm is 200 acres, and the loan on the equipment is proportioned across the entire farm to arrive at per-acre costs. The equipment was depreciated using the 7-year Modified

Accelerated Cost Recovery System (MACRS) depreciation schedule, except for the pickup and 4-wheeler, which use 5-year MACRS. As mentioned before, the operation owns debt free all the land, and provides the managerial decisions. An establishment loan is taken out in year one for the development costs, at an 8% interest rate over 10 years. Annual installments of principal and interest are required. Interest on operating capital is not assessed in the first year since it is financed using the establishment loan. It is assumed the owner provides 5% of the routine labor in years one and three, and 10% in years four through five, when most of the manual labor involves tractor work.

A marginal tax rate of 27% is assumed for tax purposes; the income is considered marginal to what is earned on the rest of the farm. The taxable income includes depreciation, which is added back to the after tax gross income since it is a noncash item. The principal is subtracted from the gross income to obtain the net cash flow for the operation; principal is not a deductible expense. Considering the assumptions for the study, a net return is not generated for the Concord grape vineyard operation. A positive return would not be realized until the 11th year, when the establishment loan expires.

Financial Break-Even Price and Yield Analysis

Using the cash flow analysis approach, the variable cost break-even point in the mature years under the scenario created in this study is \$122.34 per ton at a yield of 10 tons per acre (Table 4). Fixed costs are covered at a Concord grape price of \$34.60 at the 10-ton-per-acre yield level. The primary expenses incurred by the operation are variable. To cover total costs, a farmer must receive \$156.94 per ton if a yield of 10 tons per acre is produced. If the harvestable yield is 8 tons per acre, a price of \$187.43 per ton is required to break even.

In the cash flow projection, depreciation is added to the after-tax gross revenue and the principal is subtracted to calculate the operations net cash flow. Therefore, the break-even

Table 3. Annual Projected Net Cash Flow Per Acre for a 50-Acre Concord Grape Vineyard.

Period	1	2	3	4	5
Yield	0.00	0.00	5.00	10.00	10.00
Price	\$190.00	\$190.00	\$190.00	\$190.00	\$190.00
REVENUE:					
Establishment Loan	\$4,000.00	–	–	–	–
Concord Sales	\$0.00	\$0.00	\$950.00	\$1,900.00	\$1,900.00
Total Revenue:	\$4,000.00	\$0.00	950.00	\$1,900.00	\$1,900.00
EXPENSES:					
VARIABLE COSTS:					
Irrigation Equipment	\$1,500.00	–	–	–	–
Custom Work	\$50.00	–	–	–	–
Planting (Driver and stakes)	\$39.92	–	–	–	–
Grow Tubes	\$310.95	–	–	–	–
Nursery Stock	\$449.15	\$45.50	–	–	–
Rental Equip/Grass Seed	\$38.20	\$6.00	\$6.00	\$6.00	\$6.00
Trellis Material/Ties	\$1,482.48	\$27.59	\$2.76	\$2.76	\$75.42
Fertilizer	\$10.00	\$19.50	\$15.00	\$29.50	\$20.00
Chemicals	\$77.37	\$45.47	\$64.92	\$129.85	\$129.85
Custom Mechanical Prune	–	–	–	\$45.00	\$45.00
Custom Harvesting/Hauling	–	–	\$175.00	\$350.00	\$350.00
Labor	\$620.82	\$679.15	\$336.04	\$258.53	\$240.38
Irrigation Electrical Charge	\$30.00	\$30.00	\$30.00	\$30.00	\$30.00
Irrigation Repairs and Water	\$112.00	\$112.00	\$112.00	\$112.00	\$112.00
Miscellaneous	\$80.00	\$80.00	\$80.00	\$80.00	\$80.00
Interest on Op. Cap.	–	\$52.43	\$33.85	\$39.96	\$46.00
Tractor Repair and Fuel/Lube	\$288.59	\$31.97	\$37.15	\$41.82	\$51.36
Mach Repairs and Fuel/Lube	\$13.28	\$35.20	\$35.61	\$36.39	\$37.40
Total Variable Cost:	\$5,102.76	\$1,164.81	\$928.33	\$1,161.81	\$1,223.41
FIXED COSTS:					
Interest—Equipment Loan	\$33.11	\$27.34	\$21.16	\$14.57	\$7.53
Interest—Establishment Loan	\$320.00	\$297.91	\$274.05	\$248.29	\$220.46
Insurance	\$7.05	\$1.91	\$2.19	\$2.30	\$2.65
Depreciation	\$95.48	\$159.98	\$108.41	\$73.78	\$58.10
Taxes	\$16.45	\$4.46	\$5.10	\$5.36	\$3.19
RE Tax	\$48.29	\$48.29	\$48.29	\$54.09	\$54.09
Total Fixed Cost:	\$520.38	\$539.89	\$459.21	\$398.39	\$346.02
Total Cost:	\$5,623.13	\$1,704.70	\$1,387.54	\$1,560.20	\$1,569.43
Taxable Income	(\$1,623.13)	(\$1,704.70)	(\$437.54)	\$339.80	\$330.57
Income Tax (27%)	\$0.00	\$0.00	\$0.00	\$91.74	\$89.25
Gross Cash Flow	(\$1,623.13)	(\$1,704.70)	(\$437.54)	\$248.05	\$241.32
+ Depreciation	\$95.48	\$159.98	\$108.41	\$73.78	\$58.10
– Principal	\$360.42	\$388.29	\$418.31	\$450.67	\$485.54
Net Cash Flow	(\$1,888.08)	(\$1,933.00)	(\$747.45)	(\$128.84)	(\$186.13)

Table 4. Break-Even Selling Prices of Concord Grapes at Various Yield Levels Using the Cash Flow Budget Analysis.

————— Break-Even Price Necessary To Cover Costs (\$/ton) —————				
Yield (tons/ac)	Variable Costs	Fixed Costs	Total Costs	Net Cash Flow
3	326.14	115.34	441.48	636.66
4	253.35	86.51	339.86	486.24
5	209.68	69.20	278.89	395.99
6	180.57	57.67	238.24	335.83
7	159.77	49.43	209.20	292.85
8	144.18	43.25	187.43	260.62
9	132.05	38.45	170.49	235.55
10	122.34	34.60	156.94	215.50
11	114.40	31.46	145.86	199.09
12	107.78	28.84	136.62	185.41
13	102.19	26.62	128.80	173.84
14	97.39	24.72	122.10	163.93
15	93.23	23.07	116.30	155.33

price for the net cash flow is higher than the break-even price necessary to cover total costs. In order to have a net cash flow of zero (break-even point) at the 10-ton-per-acre yield level, a price of \$215.50 per ton must be received. A farmer who receives a price below that would not generate a positive return. A price above \$215.50 would provide positive cash flow to the operation. The break-even price for net cash flow ranges from \$636.66 to \$155.33 per ton at yields of 3 and 15 tons per acre, respectively. At a yield of 8 tons per acre, a price of \$260.62 per ton is necessary to break even.

The total cost break-even price for the economic budget, as discussed in a previous section “Economic Break-Even Price and Yield Analysis” is higher than the total cost break-even price using the cash flow budget analysis. The economic costs, such as management fee, amortized establishment expense, etc., are a significant reason that the break-even price is higher when using an economic budget, which is the appropriate budget to use when contemplating the entry or exit from an activity such as a producing a Concord grape vineyard.

Conclusion

In year one there is a sizable financial investment necessary to establish the Concord grape vineyard. Planting the vines and building the trellis system are expensive, in addition to the cost of installing an irrigation system. Revenue is not generated until the third year. The receipts from harvest do not cover the annual costs in the fourth and fifth year. The opportunity cost of management, land rent, and establishment costs significantly affect the operation’s bottom line. At the price and yield levels used in the study, a Concord grape vineyard does not produce a positive economic profit.

The analysis and results of this study are based upon a set of assumptions and conditions specific to the study. Expenses, cultural practices, and other conditions can affect individual farmers’ costs. Growers should recognize that the study uses assumptions such as new machinery cost and economic costs in the generation of the budgets. This type of study provides a basis for analyzing the long-term economic implications of establishing a Concord grape vineyard.

Appendix

TABLE 1A. YEAR ONE CONCORD GRAPE VINEYARD ITEMIZED COSTS PER ACRE.

	UNIT	PRICE OR COST/UNIT	QUANTITY	VALUE OR COST	YOUR VINEYARD
VARIABLE COSTS		\$		\$	
CUSTOM PLOW	ACRE	40.00	1.00	40.00	_____
SURVEY STAKES	EACH	.08	24.00	1.92	_____
CUSTOM LISTING	ACRE	10.00	1.00	10.00	_____
TRACT. & DRIVER	ACRE	30.00	1.00	30.00	_____
PLANTER RENTAL	ACRE	8.00	1.00	8.00	_____
GRAPE PLANTS	EACH	.65	691.00	449.15	_____
END POST (WOOD)	EACH	4.19	128.00	536.32	_____
STEEL POST	EACH	2.87	224.00	642.88	_____
CONCRETE ANCHOR	EACH	1.00	16.00	16.00	_____
# 11 WIRE HT	POUND	.46	624.53	287.28	_____
GROW TUBES	EACH	.45	691.00	310.95	_____
SURFLAN AS	GAL.	93.00	.40	37.20	_____
ROUNDUP	GAL.	33.06	.50	16.53	_____
GRASS SEEDER RT	ACRE	10.00	1.00	10.00	_____
COMPANION SEED	POUND	1.85	12.00	22.20	_____
FERT SPRDR RENTAL	ACRE	6.00	1.00	6.00	_____
NITROGEN	ACRE	.20	50.00	10.00	_____
PROWL	GAL.	23.64	1.00	23.64	_____
LABOR	HOUR	8.76	32.00	280.32	_____
LABOR(TRAC/MACH)	HOUR	10.50	35.54	373.17	_____
IRR. ELECT. CHG	ACRE	30.00	1.00	30.00	_____
IRR. WATER CHG	ACRE	80.00	1.00	80.00	_____
IRR. REPAIRS	ACRE	32.00	1.00	32.00	_____
TRACTOR REPAIR	ACRE	82.00	1.00	82.00	_____
TRACTOR FUEL/LUBE	ACRE	206.59	1.00	206.59	_____
MACHINERY REPAIRS	ACRE	13.28	1.00	13.28	_____
INTEREST ON OP. CAP.	ACRE	222.77	1.00	222.77	_____
MISCELLANEOUS	ACRE	80.00	1.00	80.00	_____
IRR. EQUIPMENT	ACRE	1500.00	1.00	1500.00	_____
TOTAL VARIABLE COST				5358.20	_____
FIXED COSTS		\$		\$	
TRACTOR DEPRECIATION	ACRE	97.68	1.00	97.68	_____
TRACTOR INTEREST	ACRE	86.90	1.00	86.90	_____
TRACTOR INSURANCE	ACRE	5.79	1.00	5.79	_____
TRACTOR TAXES	ACRE	13.52	1.00	13.52	_____
TRACTOR HOUSING	ACRE	9.66	1.00	9.66	_____
MACHINE DEPRECIATION	ACRE	24.55	1.00	24.55	_____
MACHINE INTEREST	ACRE	18.84	1.00	18.84	_____
MACHINE INSURANCE	ACRE	1.26	1.00	1.26	_____
MACHINE TAXES	ACRE	2.93	1.00	2.93	_____
MACHINE HOUSING	ACRE	2.09	1.00	2.09	_____
ESTATE TX (1-3)	ACRE	48.29	1.00	48.29	_____
LAND VALUE	ACRE	224.00	1.00	224.00	_____
MANAGEMENT FEE	ACRE	225.00	1.00	225.00	_____
TOTAL FIXED COST				760.50	_____
TOTAL COST				6118.70	_____

TABLE 1B. YEAR ONE SCHEDULE OF OPERATIONS AND ESTIMATED COSTS PER ACRE FOR CONCORD GRAPES.

OPERATION	TOOLING	MTH	YEAR	MACH HOURS	LABOR HOURS	TOTAL FIXED COST	VARIABLE COST						TOTAL VARIABLE COST	
							FUEL, LUBE, & REPAIRS	LABOR	SERVICE	MATER.	INTER.	TOTAL COST		
														\$
PLOW	CUSTOM PLOWING	MAR	1	.00	.00	.00	.00	.00	40.00	.00	.00	2.83	42.83	42.83
DISC	60 HP TRACTOR, DISC	MAR	1	.57	.63	5.46	6.71	6.61	.00	.00	.00	.94	14.27	19.73
SURVEY AND MARK	LABOR, STAKES	MAR	1	.00	.40	.00	.00	3.50	.00	1.92	.38	5.81	5.81	5.81
LISTING	CUSTOM LISTING	MAR	1	.00	.00	.00	.00	.00	10.00	.00	.71	10.71	10.71	10.71
PLANT VINES	100 HP, VINE PLANTER, LABOR	MAR	1	.00	.00	.00	.00	.00	38.00	449.15	34.51	521.66	521.66	521.66
FILL-IN	60 HP, DISC (3X)	MAR	1	1.72	1.89	16.49	20.25	19.84	.00	.00	2.84	42.93	59.42	59.42
INSTALL IRR SYST	CUSTOM HIRE, LABOR/MATERIALS	MAR	1	.00	.00	.00	.00	.00	1500.00	.00	.00	.00	1500.00	1500.00
SET ANCHORS	60 HP, ANCHORS, AUGER	APR	1	2.25	2.72	17.45	23.68	28.56	.00	108.00	10.22	170.46	187.90	187.90
SPREAD POSTS	60 HP, TRAILER, END/LINE POSTS	APR	1	.55	.60	7.69	6.31	6.30	.00	1179.20	75.98	1267.78	1275.47	1275.47
SET END POSTS	60 HP, POST DRIVER, LABOR	APR	1	4.75	5.75	38.94	50.84	60.38	.00	.00	7.09	118.31	157.25	157.25
SET LINE POSTS	60 HP, POST DRIVER, LABOR	APR	1	11.40	13.80	93.45	122.02	144.90	.00	.00	17.02	283.94	377.39	377.39
STRING WIRE	60 HP, TRAILER, LABOR, WIRE	APR	1	1.10	15.20	15.38	12.61	135.24	.00	195.28	21.88	365.01	380.39	380.39
GROW TUBES	INSTALL GREEN POLY GROW TUBES	APR	1	.00	10.00	.00	.00	87.60	.00	310.95	25.41	423.96	423.96	423.96
FERTILIZE	60 HP, FERT SPRDR RENTAL	APR	1	.76	.92	5.10	7.17	9.66	6.00	10.00	2.09	34.92	40.02	40.02
IRRIGATION	SYSTEM START-UP	APR	1	.00	.80	.00	.00	7.01	.00	.00	.45	7.45	7.45	7.45
CULTIVATE	60 HP, DISC	JUN	1	.57	.63	5.46	6.71	6.61	.00	.00	.66	13.99	19.45	19.45
WEED CONTROL	60 HP, SPRAYER	JUN	1	.46	.50	10.43	5.15	5.25	.00	37.20	2.36	49.96	60.39	60.39
SPRAY WEEDS	60 HP, 100 GAL SPRAYER	JUL	1	.15	.18	3.40	1.68	1.89	.00	16.53	.85	20.95	24.35	24.35
ROTOVATE	60 HP, ROTOVATOR	JUL	1	.57	.63	6.28	6.87	6.61	.00	.00	.57	14.06	20.34	20.34
PLANT COVER CROP	60 HP, RENTED SEEDER	SEP	1	.57	.63	3.82	5.38	6.61	10.00	22.20	1.25	45.44	49.27	49.27
WEED CONTROL	60 HP, 100 GAL SPRAYER, PROWL	OCT	1	.46	.50	10.43	5.15	5.25	.00	23.64	.72	34.76	45.19	45.19
IRRIGATION	SYSTEM SHUT DOWN	OCT	1	.00	.80	.00	.00	7.01	.00	.00	.15	7.16	7.16	7.16
RAISE GROW TUBES	LABOR	OCT	1	.00	5.00	.00	.00	43.80	.00	.00	.93	44.73	44.73	44.73
IRRIGATION	IRRIGATE APRIL-OCTOBER	SEA	1	.00	1.00	.00	.00	8.76	142.00	.00	6.41	157.17	157.17	157.17
MANAGEMENT FEE	COST OF MANAGEMENT	ANN	1	.00	225.00	.00	.00	.00	.00	.00	.00	.00	225.00	225.00
PICKUP	MISCELLANEOUS USE	ANN	1	3.60	3.96	21.34	19.33	41.58	.00	.00	2.59	63.50	84.84	84.84
4-WHEEL CYCLE	MISCELLANEOUS USE	ANN	1	.91	1.00	2.08	2.02	10.50	.00	.00	.53	13.05	15.13	15.13
LAND	NET LAND RENT	ANN	1	.00	.00	224.00	.00	.00	.00	.00	.00	.00	224.00	224.00
TAXES	REAL ESTATE	ANN	1	.00	.00	48.29	.00	.00	.00	.00	.00	.00	48.29	48.29
MISCELLANEOUS	UTILITIES, TELEPHONE, ETC.	ANN	1	.00	.00	.00	.00	.00	80.00	.00	3.40	83.40	83.40	83.40
TOTAL PER ACRE				30.39	67.54	760.50	301.87	653.49	1826.00	2354.07	222.77	5358.20	6118.70	6118.70

TABLE 2A. YEAR TWO CONCORD GRAPE VINEYARD ITEMIZED COSTS PER ACRE.

	UNIT	PRICE OR COST/UNIT	QUANTITY	VALUE OR COST	YOUR VINEYARD
VARIABLE COSTS		\$		\$	
TIES	FOOT	.01	2758.80	27.59	_____
GRAPE PLANTS	EACH	.65	70.00	45.50	_____
SURFLAN AS	GAL.	93.00	.40	37.20	_____
FERT SPRDR RENT	ACRE	6.00	1.00	6.00	_____
NITROGEN	POUND	.20	50.00	10.00	_____
PHOSPHORUS	POUND	.14	50.00	7.00	_____
POTASSIUM	POUND	.05	50.00	2.50	_____
ROUNDUP	GAL.	33.06	.25	8.27	_____
IRR. ELECT. CHG	ACRE	30.00	1.00	30.00	_____
IRR. WATER CHG	ACRE	80.00	1.00	80.00	_____
IRR. REPAIRS	ACRE	32.00	1.00	32.00	_____
LABOR	HOUR	8.76	71.30	624.59	_____
LABOR (TRAC/MACH)	HOUR	10.50	8.60	90.30	_____
TRACTOR REPAIR	ACRE	9.44	1.00	9.44	_____
TRACTOR FUEL/LUBE	ACRE	22.53	1.00	22.53	_____
MACHINERY REPAIRS	ACRE	8.06	1.00	8.06	_____
MACHINE FUEL/LUBE	ACRE	27.14	1.00	27.14	_____
INTEREST ON OP. CAP.	ACRE	52.43	1.00	52.43	_____
MISCELLANEOUS	ACRE	80.00	1.00	80.00	_____
TOTAL VARIABLE COST				1200.54	_____
FIXED COSTS		\$		\$	
TRACTOR DEPRECIATION	ACRE	10.34	1.00	10.34	_____
TRACTOR INTEREST	ACRE	9.30	1.00	9.30	_____
TRACTOR INSURANCE	ACRE	.62	1.00	.62	_____
TRACTOR TAXES	ACRE	1.45	1.00	1.45	_____
TRACTOR HOUSING	ACRE	1.03	1.00	1.03	_____
MACHINE DEPRECIATION	ACRE	26.25	1.00	26.25	_____
MACHINE INTEREST	ACRE	19.33	1.00	19.33	_____
MACHINE INSURANCE	ACRE	1.29	1.00	1.29	_____
MACHINE TAXES	ACRE	3.01	1.00	3.01	_____
MACHINE HOUSING	ACRE	2.15	1.00	2.15	_____
MANAGEMENT FEE	ACRE	225.00	1.00	225.00	_____
INT. ON INV. (YR1)	ACRE	520.09	1.00	520.09	_____
LAND VALUE	ACRE	224.00	1.00	224.00	_____
ESTATE TX (1-3)	ACRE	48.29	1.00	48.29	_____
TOTAL FIXED COST				1092.15	_____
TOTAL COST				2292.69	_____

TABLE 2B. YEAR TWO SCHEDULE OF OPERATIONS AND ESTIMATED COSTS PER ACRE FOR CONCORD GRAPES.

OPERATION	TOOLING	MTH	YEAR	MACH HOURS	TOTAL FIXED COST	VARIABLE COST					TOTAL VARIABLE COST		
						FUEL, LUBE, & REPAIRS	LABOR	SERVICE	MATER.	INTER.			
						\$	\$	\$	\$	\$			
PRUNING	HAND PRUNING	JAN	2	.00	10.00	.00	87.60	.00	.00	.00	87.60	87.60	
TIES	TIES AND LABOR	MAR	2	.00	5.00	.00	43.80	.00	27.59	5.06	76.44	76.44	
REPLANT (10%)	HAND PLANTING	APR	2	.00	6.80	.00	59.57	.00	45.50	6.70	111.77	111.77	
WEED CONTROL	60 HP, SPRAYER, SURFLAN	APR	2	.46	.50	10.43	5.15	5.25	.00	37.20	3.03	50.63	61.06
FERTILIZE	60 HP, FERT SPRDR RENTAL	APR	2	.76	.92	5.10	7.17	9.66	6.00	19.50	2.70	45.03	50.13
LOWER GROW TUBES	LOWER TUBES/SECOND SEASON	APR	2	.00	5.00	.00	43.80	.00	.00	.00	2.79	46.59	46.59
IRRIGATION	SYSTEM START-UP	APR	2	.00	.80	.00	7.01	.00	.00	.00	.45	7.45	7.45
SPRAY	60 HP, SPRAYER, ROUNDUP	MAY	2	.46	.50	10.43	5.15	5.25	.00	8.27	1.06	19.72	30.15
MOW COVER CROP	60 HP, MOWER	MAY	2	.49	.54	4.70	5.94	5.67	.00	.00	.66	12.26	16.97
SUMMER TRAINING	LABOR	JUN-JUL	2	.00	39.90	.00	349.52	.00	.00	.00	14.85	364.38	364.38
MOW COVER CROP	60 HP, MOWER	JUL	2	.49	.54	4.70	5.94	5.67	.00	.00	.49	12.10	16.80
MOW COVER CROP	60 HP, MOWER	SEP	2	.49	.54	4.70	5.94	5.67	.00	.00	.33	11.93	16.64
IRRIGATION	SYSTEM SHUT DOWN	OCT	2	.00	.80	.00	7.01	.00	.00	.00	.15	7.16	7.16
IRRIGATION	IRRIGATE APRIL-OCTOBER	SEA	2	.00	3.00	.00	26.28	142.00	.00	.00	7.15	175.43	175.43
MANAGEMENT FEE	FEE OF MANAGEMENT	ANN	2	.00	.00	225.00	.00	.00	.00	.00	.00	.00	225.00
PICKUP	MISC. USE	ANN	2	4.60	5.06	27.27	24.70	53.13	.00	.00	3.31	81.14	108.40
4-WHEEL CYCLE	MISC. USE	ANN	2	3.25	.00	7.43	7.20	.00	.00	.00	.31	7.50	14.94
ESTABLISH COST	INTEREST ON ACCUM INVESTMENT	ANN	2	.00	.00	520.09	.00	.00	.00	.00	.00	.00	520.09
LAND	NET LAND RENT	ANN	2	.00	.00	224.00	.00	.00	.00	.00	.00	.00	224.00
TAXES	REAL ESTATE	ANN	2	.00	.00	48.29	.00	.00	.00	.00	.00	.00	48.29
MISCELLANEOUS	UTILITIES, TELEPHONE, ETC.	ANN	2	.00	.00	.00	.00	.00	80.00	.00	3.40	83.40	83.40
TOTAL PER ACRE				11.00	79.90	1092.15	67.17	714.89	228.00	138.05	52.43	1200.54	2292.69

TABLE 3A. YEAR THREE CONCORD GRAPE VINEYARD ITEMIZED COSTS PER ACRE.

	UNIT	PRICE OR COST/UNIT	QUANTITY	VALUE OR COST	YOUR VINEYARD
VARIABLE COSTS		\$		\$	
TIES	FOOT	.01	276.00	2.76	_____
DORMANT OIL	GAL.	2.76	4.00	11.04	_____
LORSBAN 4E	GAL.	33.65	.25	8.41	_____
SURFLAN AS	GAL.	93.00	.40	37.20	_____
FERT SPRDR RENT	ACRE	6.00	1.00	6.00	_____
NITROGEN	POUND	.20	75.00	15.00	_____
ROUNDUP	GAL.	33.06	.25	8.27	_____
CUSTOM HARVEST	TON	35.00	5.00	175.00	_____
IRR. REPAIRS	ACRE	32.00	1.00	32.00	_____
IRR. WATER CHG	ACRE	80.00	1.00	80.00	_____
IRR. ELECT. CHG	ACRE	30.00	1.00	30.00	_____
LABOR	HOUR	8.76	29.40	257.55	_____
LABOR(TRAC/MACH)	HOUR	10.50	9.16	96.18	_____
TRACTOR REPAIR	ACRE	10.97	1.00	10.97	_____
TRACTOR FUEL/LUBE	ACRE	26.18	1.00	26.18	_____
MACHINERY REPAIRS	ACRE	8.47	1.00	8.47	_____
MACHINE FUEL/LUBE	ACRE	27.14	1.00	27.14	_____
INTEREST ON OP. CAP.	ACRE	33.85	1.00	33.85	_____
MISCELLANEOUS	ACRE	80.00	1.00	80.00	_____
TOTAL VARIABLE COST				946.01	_____
FIXED COSTS		\$		\$	
TRACTOR DEPRECIATION	ACRE	12.01	1.00	12.01	_____
TRACTOR INTEREST	ACRE	10.81	1.00	10.81	_____
TRACTOR INSURANCE	ACRE	.72	1.00	.72	_____
TRACTOR TAXES	ACRE	1.68	1.00	1.68	_____
TRACTOR HOUSING	ACRE	1.20	1.00	1.20	_____
MACHINE DEPRECIATION	ACRE	30.37	1.00	30.37	_____
MACHINE INTEREST	ACRE	21.98	1.00	21.98	_____
MACHINE INSURANCE	ACRE	1.47	1.00	1.47	_____
MACHINE TAXES	ACRE	3.42	1.00	3.42	_____
MACHINE HOUSING	ACRE	2.44	1.00	2.44	_____
MANAGEMENT FEE	ACRE	225.00	1.00	225.00	_____
INT. ON INV. (YR2)	ACRE	714.97	1.00	714.97	_____
LAND VALUE	ACRE	224.00	1.00	224.00	_____
ESTATE TX (1-3)	ACRE	48.29	1.00	48.29	_____
TOTAL FIXED COST				1298.37	_____
TOTAL COST				2244.38	_____

TABLE 3B. YEAR THREE SCHEDULE OF OPERATIONS AND ESTIMATED COSTS PER ACRE FOR CONCORD GRAPES.

OPERATION	TOOLING	MTH	YEAR	MACH HOURS	LABOR HOURS	TOTAL FIXED COST	VARIABLE COST					TOTAL VARIABLE COST	TOTAL COST
							FUEL, LUBE, & REPAIRS	LABOR	SERVICE	MATER.	INTER.		
						\$	\$	\$	\$	\$	\$	\$	
PRUNING	HAND PRUNING	JAN	2	.00	14.00	.00	.00	122.64	.00	.00	.00	122.64	122.64
TIES	LABOR AND TIES	MAR	3	.00	4.00	.00	.00	35.04	.00	2.76	2.68	40.48	40.48
INSECT CONTROL	60 HP, SPRAYER, DORMANT OIL	MAR	3	.46	.51	10.43	5.15	5.36	.00	19.45	2.12	32.08	42.51
IRRIGATION	SYSTEM START-UP	APR	3	.00	.80	.00	.00	7.01	.00	.00	.45	7.45	7.45
WEED CONTROL	60 HP, SPRAYER, SURFLAN	APR	3	.46	.50	10.43	5.15	5.25	.00	37.20	3.03	50.63	61.06
FERTILIZE	60 HP, FERT SPRDR RENTAL	APR	3	.76	.92	5.10	7.17	9.66	6.00	15.00	2.41	40.24	45.34
SPRAY	60 HP, SPRAYER, ROUNDUP	MAY	3	.50	.55	11.34	5.60	5.78	.00	8.27	1.11	20.75	32.08
MOW COVER CROP	60 HP, MOWER	MAY	3	.49	.54	4.70	5.94	5.67	.00	.00	.66	12.26	16.97
SUMMER TRAINING	LABOR	JUN-JUL	3	.00	6.80	.00	.00	59.57	.00	.00	2.53	62.10	62.10
MOW COVER CROP	60 HP, MOWER	JUL	3	.49	.54	4.70	5.94	5.67	.00	.00	.49	12.10	16.80
MOW COVER CROP	60 HP, MOWER	SEP	3	.49	.54	4.70	5.94	5.67	.00	.00	.33	11.93	16.64
IRRIGATION	SYSTEM SHUT DOWN	OCT	3	.00	.00	7.01	.00	.00	.00	.00	.15	7.16	7.16
HARVEST	CUSTOM MECH HARVEST	OCT	3	.00	.00	.00	.00	.00	175.00	.00	3.72	178.72	178.72
IRRIGATION	IRRIGATE APRIL-OCTOBER	SEA	3	.00	3.00	.00	.00	26.28	142.00	.00	7.15	175.43	175.43
MANAGEMENT FEE	FEE OF MANAGEMENT	ANN	3	.00	.00	225.00	.00	.00	.00	.00	.00	.00	225.00
PICKUP	MISC. USE	ANN	3	4.60	5.06	27.27	24.70	53.13	.00	.00	3.31	81.14	108.40
4-WHEEL CYCLE	MISC. USE	ANN	3	3.25	.00	7.43	7.20	.00	.00	.00	.31	7.50	14.94
ESTABLISH COST	INTEREST ON ACCUM INVESTMENT	ANN	3	.00	.00	714.97	.00	.00	.00	.00	.00	.00	714.97
LAND	NET LAND RENT	ANN	3	.00	.00	224.00	.00	.00	.00	.00	.00	.00	224.00
TAXES	REAL ESTATE	ANN	3	.00	.00	48.29	.00	.00	.00	.00	.00	.00	48.29
MISCELLANEOUS	UTILITIES, TELEPHONE, ETC.	ANN	3	.00	.00	.00	.00	.00	80.00	.00	3.40	83.40	83.40
TOTAL PER ACRE				11.50	38.56	1298.37	72.76	353.72	403.00	82.68	33.85	946.01	2244.38

TABLE 4A. YEAR FOUR CONCORD GRAPE VINEYARD ITEMIZED COSTS PER ACRE.

	UNIT	PRICE OR COST/UNIT	QUANTITY	VALUE OR COST	YOUR VINEYARD
VARIABLE COSTS					
		\$		\$	
CUSTOM PRUNING	ACRE	45.00	1.00	45.00	_____
TIES	FOOT	.01	276.00	2.76	_____
LORSBAN 4E	GAL.	33.65	.25	8.41	_____
DORMANT OIL	GAL.	2.76	4.00	11.04	_____
FERT. SPRDR. RENT	ACRE	6.00	1.00	6.00	_____
NITROGEN	POUND	.20	100.00	20.00	_____
PHOSPHORUS	POUND	.14	50.00	7.00	_____
POTASSIUM	POUND	.05	50.00	2.50	_____
ROUNDUP	GAL.	33.06	.25	8.27	_____
SURFLAN AS	GAL.	93.00	.40	37.20	_____
GOAL	GAL.	103.89	.63	64.93	_____
CUSTOM HARVEST	TON	35.00	10.00	350.00	_____
IRR. REPAIRS	ACRE	32.00	1.00	32.00	_____
IRR. WATER CHG	ACRE	80.00	1.00	80.00	_____
IRR. ELECT. CHG	ACRE	30.00	1.00	30.00	_____
LABOR	HOUR	8.76	21.20	185.72	_____
LABOR (TRAC/MACH)	HOUR	10.50	9.67	101.54	_____
TRACTOR REPAIR	ACRE	12.35	1.00	12.35	_____
TRACTOR FUEL/LUBE	ACRE	29.47	1.00	29.47	_____
MACHINERY REPAIRS	ACRE	9.25	1.00	9.25	_____
MACHINE FUEL/LUBE	ACRE	27.14	1.00	27.14	_____
INTEREST ON OP. CAP.	ACRE	39.96	1.00	39.96	_____
MISCELLANEOUS	ACRE	80.00	1.00	80.00	_____
TOTAL VARIABLE COST				1190.53	_____
FIXED COSTS					
		\$		\$	
TRACTOR DEPRECIATION	ACRE	13.52	1.00	13.52	_____
TRACTOR INTEREST	ACRE	12.17	1.00	12.17	_____
TRACTOR INSURANCE	ACRE	.81	1.00	.81	_____
TRACTOR TAXES	ACRE	1.89	1.00	1.89	_____
TRACTOR HOUSING	ACRE	1.35	1.00	1.35	_____
MACHINE DEPRECIATION	ACRE	30.90	1.00	30.90	_____
MACHINE INTEREST	ACRE	22.33	1.00	22.33	_____
MACHINE INSURANCE	ACRE	1.49	1.00	1.49	_____
MACHINE TAXES	ACRE	3.47	1.00	3.47	_____
MACHINE HOUSING	ACRE	2.48	1.00	2.48	_____
MANAGEMENT FEE	ACRE	225.00	1.00	225.00	_____
INT. ON INV. (YR3)	ACRE	824.99	1.00	824.99	_____
LAND VALUE	ACRE	224.00	1.00	224.00	_____
ESTATE TX (3+)	ACRE	54.09	1.00	54.09	_____
TOTAL FIXED COST				1418.50	_____
TOTAL COST				2609.04	_____

TABLE 4B. YEAR FOUR SCHEDULE OF OPERATIONS AND ESTIMATED COSTS PER ACRE FOR CONCORD GRAPES.

OPERATION	TOOLING	MTH	YEAR	MACH HOURS	LABOR HOURS	TOTAL FIXED COST	VARIABLE COST							
							FUEL, LUBE, & REPAIRS	LABOR	SERVICE	MATER.	INTER.	TOTAL VARIABLE COST		
							\$	\$	\$	\$	\$	\$		
PRUNING	CUSTOM MECH PRUNE, TOUCHUP	JAN	4	.00	10.00	.00	.00	87.60	45.00	.00	.00	.00	.00	132.60
CHOP PRUNINGS	60 HP, MOWER	FEB	4	.45	.51	4.32	5.45	5.36	.00	.00	.00	.84	11.65	15.97
TIES	LABOR AND TIES	FEB	4	.00	2.00	.00	.00	17.52	.00	2.76	1.58	2.12	21.86	21.86
INSECT CONTROL	60 HP, SPRYR, DRMNT OIL, LORSB	MAR	4	.46	.51	10.43	5.15	5.36	.00	19.45	2.12	32.08	42.51	
IRRIGATION	SYSTEM START-UP	APR	4	.00	.80	.00	.00	7.01	.00	.00	.45	7.45	7.45	
FERTILIZE	60 HP, FERT SPRDR RENTAL	APR	4	.76	.92	5.10	7.17	9.66	6.00	29.50	3.34	55.66	60.76	
SPRAY	60 HP, SPRAYER, ROUNDUP	MAY	4	.50	.55	11.34	5.60	5.78	.00	8.27	1.11	20.75	32.08	
MOW COVER CROP	60 HP, MOWER	MAY	4	.49	.54	4.70	5.94	5.67	.00	.00	.66	12.26	16.97	
WEED CONTROL	60 HP, SPRAYER, SURFLAN, GOAL	JUN	4	.46	.50	10.43	5.15	5.25	.00	102.13	5.58	118.11	128.54	
MOW COVER CROP	60 HP, MOWER	JUL	4	.49	.54	4.70	5.94	5.67	.00	.00	.49	12.10	16.80	
SUMMER TRAINING	LABOR	JUN-JUL	4	.00	4.60	.00	.00	40.30	.00	.00	1.71	42.01	42.01	
MOW COVER CROP	60 HP, MOWER	SEP	4	.49	.54	4.70	5.94	5.67	.00	.00	.33	11.93	16.64	
IRRIGATION	SYSTEM SHUT DOWN	OCT	4	.00	.80	.00	.00	7.01	.00	.00	.15	7.16	7.16	
HARVEST	CUSTOM MECH HARVEST	OCT	4	.00	.00	.00	.00	.00	350.00	.00	7.44	357.44	357.44	
IRRIGATION	IRRIGATE APRIL-OCTOBER	SEA	4	.00	3.00	.00	.00	26.28	142.00	.00	7.15	175.43	175.43	
MANAGEMENT FEE	FEE OF MANAGEMENT	ANN	4	.00	.00	225.00	.00	.00	.00	.00	.00	.00	225.00	
PICKUP	MISC. USE	ANN	4	4.60	5.06	27.27	24.70	53.13	.00	.00	3.31	81.14	108.40	
4-WHEEL CYCLE	MISC. USE	ANN	4	3.25	.00	7.43	7.20	.00	.00	.00	.31	7.50	14.94	
ESTABLISH COST	INTEREST ON ACCUM INVESTMENT	ANN	4	.00	.00	824.99	.00	.00	.00	.00	.00	.00	824.99	
LAND	NET LAND RENT	ANN	4	.00	.00	224.00	.00	.00	.00	.00	.00	.00	224.00	
TAXES	REAL ESTATE	ANN	4	.00	.00	54.09	.00	.00	.00	.00	.00	.00	54.09	
MISCELLANEOUS	UTILITIES, TELEPHONE, ETC.	ANN	4	.00	.00	.00	.00	.00	80.00	.00	3.40	83.40	83.40	
TOTAL PER ACRE				11.95	30.87	1418.50	78.21	287.25	623.00	162.11	39.96	1190.53	2609.04	

TABLE 5A. YEAR FIVE CONCORD GRAPE VINEYARD ITEMIZED COSTS PER ACRE.

	UNIT	PRICE OR COST/UNIT	QUANTITY	VALUE OR COST	YOUR VINEYARD
VARIABLE COSTS		\$		\$	
CUSTOM PRUNING	ACRE	45.00	1.00	45.00	_____
END POST (WOOD)	EACH	4.19	18.00	75.42	_____
FERT. SPRDR. RENT	ACRE	6.00	1.00	6.00	_____
NITROGEN	POUND	.20	100.00	20.00	_____
DORMANT OIL	GAL	2.76	4.00	11.04	_____
LORSBAN 4E	GAL.	33.65	.25	8.41	_____
ROUNDUP	GAL.	33.06	.25	8.27	_____
SURFLAN AS	GAL.	93.00	.40	37.20	_____
GOAL	GAL.	103.89	.63	64.93	_____
CUSTOM HARVEST	TON	35.00	10.00	350.00	_____
IRR. REPAIRS	ACRE	32.00	1.00	32.00	_____
IRR. WATER CHG	ACRE	80.00	1.00	80.00	_____
IRR. ELECT. CHG	ACRE	30.00	1.00	30.00	_____
LABOR	HOUR	8.76	17.70	155.06	_____
LABOR (TRAC/MACH)	HOUR	10.50	10.67	112.03	_____
TRACTOR REPAIR	ACRE	15.16	1.00	15.16	_____
TRACTOR FUEL/LUBE	ACRE	36.20	1.00	36.20	_____
MACHINERY REPAIRS	ACRE	10.26	1.00	10.26	_____
MACHINE FUEL/LUBE	ACRE	27.14	1.00	27.14	_____
INTEREST ON OP. CAP.	ACRE	46.00	1.00	46.00	_____
MISCELLANEOUS	ACRE	80.00	1.00	80.00	_____
TOTAL VARIABLE COST				1250.12	_____
FIXED COSTS		\$		\$	
TRACTOR DEPRECIATION	ACRE	16.61	1.00	16.61	_____
TRACTOR INTEREST	ACRE	14.95	1.00	14.95	_____
TRACTOR INSURANCE	ACRE	1.00	1.00	1.00	_____
TRACTOR TAXES	ACRE	2.33	1.00	2.33	_____
TRACTOR HOUSING	ACRE	1.66	1.00	1.66	_____
MACHINE DEPRECIATION	ACRE	33.66	1.00	33.66	_____
MACHINE INTEREST	ACRE	24.81	1.00	24.81	_____
MACHINE INSURANCE	ACRE	1.65	1.00	1.65	_____
MACHINE TAXES	ACRE	3.86	1.00	3.86	_____
MACHINE HOUSING	ACRE	2.76	1.00	2.76	_____
MANAGEMENT FEE	ACRE	225.00	1.00	225.00	_____
ESTAB. COST INTEREST	ACRE	1214.51	1.00	1214.51	_____
LAND VALUE	ACRE	224.00	1.00	224.00	_____
ESTATE TX (3+)	ACRE	54.09	1.00	54.09	_____
TOTAL FIXED COST				1820.89	_____
TOTAL COST				3071.01	_____

TABLE 6. HOURLY MACHINERY COSTS FOR A 50-ACRE CONCORD GRAPE VINEYARD.

MACHINERY	PURCHASE PRICE	YEARS TO TRADE	ANNUAL HOURS	DEPRECIATION	INTEREST	INSURANCE	TAXES	HOUSING	TOTAL FIXED COST	REPAIR	FUEL AND LUBE	TOTAL VARIABLE COST	TOTAL COST
60 HP TRACTOR	30,500.00	20	500	3.05	2.75	.18	.43	.31	6.71	2.78	6.65	9.43	16.14
3/4 TON PICKUP	26,000.00	10	650	2.82	.33	.16	.36	.26	5.93	.77	4.60	5.37	11.30
100 GAL SPRAYER	2,500.00	10	25	8.23	5.30	.35	.82	.59	15.29	.82	.00	.82	16.11
TRAILER	3,000.00	20	50	3.00	2.70	.18	.42	.30	6.60	1.09	.00	1.09	7.69
4- WHEEL CYCLE	6,000.00	10	400	1.22	.80	.05	.12	.09	2.29	.38	1.84	2.22	4.50
MOWER	2,900.00	10	200	1.19	.77	.05	.12	.09	2.22	1.74	.00	1.74	3.95
ROTOVATOR	6,500.00	12	250	1.87	1.33	.09	.21	.15	3.64	1.68	.00	1.68	5.32
DISC	3,500.00	15	200	1.05	.86	.06	.13	.10	2.21	1.40	.00	1.40	3.60
POST DRIVER	1,620.00	15	250	.39	.32	.02	.05	.04	.82	.33	.00	.33	1.15
POST AUGER	740.00	15	250	.18	.15	.01	.02	.02	.37	.15	.00	.15	.52

Table 7. Prices of the Materials and Services.

Items	Units	Price(\$)/Unit
Materials:		
Gasoline	gal	1.60
Diesel	gal	1.66
Propane	gal	1.29
Nitrogen	lb	0.20
Phosphorus	lb	0.14
Potassium	lb	0.05
Surflan	gal	93.00
Roundup	gal	33.06
Prowl	gal	23.64
Goal	gal	103.89
Lorsban 4E	gal	33.65
Dormant Oil	gal	2.76
Companion Seed	lb	1.85
Tie Tape	foot	0.01
#11 Wire HT	foot	0.02
Steel Post	each	2.87
Trellis Post 5" x 8" (wood)	each	4.19
Nursery Stock	each	0.65
Grow Tubes	each	0.45
Concrete Anchors	each	1.00
Services:		
Custom Harvest and Hauling	ton	35.00
Custom Mechanical Prune	acre	45.00
Irrigation Water Charge	acre	80.00
Irrigation Energy Charge	acre	30.00
Real estate taxes (1-3)	acre	48.29
Real estate taxes (4+)	acre	54.09
Miscellaneous	acre	80.00

WASHINGTON STATE UNIVERSITY



EXTENSION

College of Agricultural, Human, and Natural Resource Sciences

Use pesticides with care. Apply them only to plants, animals, or sites listed on the label. When mixing and applying pesticides, follow all label precautions to protect yourself and others around you. It is a violation of the law to disregard label directions. If pesticides are spilled on skin or clothing, remove clothing and wash skin thoroughly. Store pesticides in their original containers and keep them out of the reach of children, pets, and livestock.

Copyright 2004 Washington State University

WSU Extension bulletins contain material written and produced for public distribution. You may reprint written material, provided you do not use it to endorse a commercial product. Alternate formats of our educational materials are available upon request for persons with disabilities. Please contact the Information Department, Agricultural, Human, and Natural Resource Sciences, Washington State University, for more information.

You may order copies of this and other publications from the WSU Bulletin office, 1-800-723-1763, or online <http://pubs.wsu.edu>

Issued by Washington State University Extension and the U.S. Department of Agriculture in furtherance of the Acts of May 8 and June 30, 1914. WSU Extension programs and policies are consistent with federal and state laws and regulations on nondiscrimination regarding race, sex, religion, age, color, creed, national or ethnic origin; physical, mental or sensory disability; marital status, sexual orientation, and status as a Vietnam-era or disabled veteran. Evidence of noncompliance may be reported through your local Extension office. Trade names have been used to simplify information; no endorsement is intended. Published February 2004. Subject code 233. B. EB1965