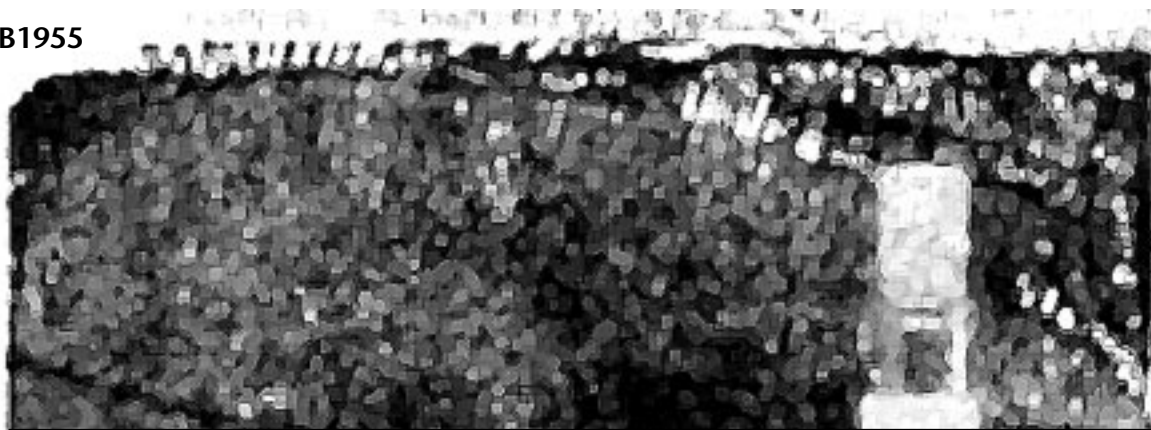


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# **Wine Grape Establishment and Production Costs in Washington, 2003**

By

**Trent Ball & Raymond J. Folwell**





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## Introduction

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The Washington wine grape growing/producing sector is one of the fastest growing industries in the state. Since overtaking New York as the second largest wine producer in 1998, Washington wine acreage has increased from 16,820 total acres to 28,000 in 2002, and there are still intentions to plant even more vinifera wine grapes.<sup>1</sup> In comparing July 1999 with January 2002, the bearing acreage for white varieties has increased 21%, while the red varieties' bearing acreage has increased 74%. Chardonnay continues to be the leading white variety, with Cabernet Sauvignon slightly edging Merlot as the most popular red variety.

Since 1997, wine grape production in Washington has nearly doubled from 62,000 tons to a record high 115,000 tons in 2002. The average price received by growers during 2002 was \$878 per ton, down slightly from the previous year.<sup>2</sup> With the increase in wine grape acreage, record high production can continue to be expected in the next few years.

This study was done to assess the economic costs and profitability of establishing and producing a vineyard based on 2002 prices and current managing and growing practices. The primary objective of this study is to estimate the establishment and production costs of the major red and white varieties grown in Washington, Merlot and Chardonnay. To estimate the economic costs of establishment and production for this study it is necessary to:

1. Specify the practices commonly followed in Washington to establish and maintain a 55-acre vineyard.
2. Estimate the costs of those practices and compare them with possible levels of receipts to establish profitability.

## Budget Assumptions

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

1. A 55-acre vineyard is developed on a 65-acre farm with 5 acres each of headland and homestead. The vineyard is located in Yakima Valley, and has a land value of \$4,000 per acre. A 7% return on the land is desired.
2. The varieties are Merlot and Chardonnay.
3. A trickle, or drip irrigation system with a 29-HP pump is used and purchased at a price of \$1,100 per acre, which includes installation and materials.
4. The grapes are planted with a 5 x 9-foot spacing with 968 plants per acre. During the second year a limited number of vines are replanted (3%). The grapevines are expected to produce a harvestable crop in the third year.
5. Establishment costs are amortized over 16 years at 8.5% interest. The total vineyard life is 20 years.

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<sup>1</sup>Washington Wine Grape Acreage, 2002.

<sup>2</sup>Washington Grape Report, 2003.

6. The water charge is \$80 per acre based upon 2002 Roza Irrigation District water fees, and the per-acre cost for irrigation electricity is \$30, based on the Benton Irrigation District. A holding pond, although required in some areas, is not accounted for in this study.
7. Real estate property taxes are from the Benton County Assessor. The tax rate in 2002 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 included. The values assumed and the corresponding annual taxes are:

Item	Age of Merlot Vineyard	
	1–3 years	4–15 years
Land	\$1,480.00	\$1,480.00
Grapevines	800.00	4,000.00
Trellis	900.00	900.00
Irrigation System	650.00	650.00
Total Value	3,830.00	7,030.00
Per Acre Tax	55.54	101.94

Item	Age of Merlot Vineyard	
	1–3 years	4–15 years
Land	\$1,480.00	\$1,480.00
Grapevines	800.00	2,600.00
Trellis	900.00	900.00
Irrigation System	650.00	650.00
Total Value	3,830.00	5,630.00
Per Acre Tax	55.54	81.64

8. 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 can be seen in Table 7 of the Appendix.
9. The manager of the vineyard is allocated a salary of \$225 per acre for a management fee.

10. All machinery and equipment costs are based on new 2002 purchase prices. The machinery and equipment depreciation, housing, interest and insurance are calculated according to costs of using machinery.<sup>3</sup> A wind machine is implemented in the second year, and runs 50 hours per season.
11. Bird control expense can vary from as low as \$20 per acre, using practices such as owl eyes with balloons and/or a bird distress call, up to \$400 per acre for netting. There is a large variance in managerial practices and prices. The low-end price of \$20 per acre is used for bird control in this study.
12. Pruning is done on a custom basis using the Pellenc mechanical pruner, which removes the excess brush. Pneumatic manual pruners will then follow to touch up the remaining 4–8 inch spurs.
13. A bilateral cordon training system is used with a vertical trellis. The trellis system is installed during the first year.
14. Starting in the fourth year, a \$150 per acre canopy management fee is charged to reduce the fungicide use. The canopy management includes shoot thinning.
15. Harvesting begins in the third year. It is assumed that a custom mechanical harvester is used, at a cost of \$75 per ton. The hauling is done on a custom basis at a rate of \$15 per ton.
16. The interest cost on operating capital is based on a short-term interest rate of 8.5%.
17. Wage rates for the manual laborer is based on the Washington 2003 minimum wage of \$7.01 per hour. The hourly rate is increased by 25% to \$8.76 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.

<sup>3</sup>Pacific Northwest Farm Machinery Costs: 2000.

## Summary of the Budgets and Results

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The economic budgets created in this study provide an exhibit of the full costs a vineyard operation would incur, including both cash and non-cash costs. Examples of non-cash costs include depreciation and opportunity costs. An opportunity cost is an implicit cost that is not reflected as a cash outlay, but rather is the cost associated with foregone opportunities. For instance, farmers who produce a crop on the land they own forego the income that could be attained if the land were rented, minus any cost incurred as the lessor (i.e., real estate taxes). Therefore, the return foregone from the land is an opportunity cost. Since the budget includes full costs (including opportunity costs) and returns over the useful life of the asset, it is referred to as an economic budget.

There are both variable and fixed costs in the budget. A fixed cost, which can be either cash or non-cash, does not vary, even with an increase or decrease in production. Real estate and land tax are fixed cash costs, and remain constant regardless if the crop is produced. The opportunity cost for management is a non-cash fixed cost because it can be either used or not used during the year. Conversely, a variable cost is one that does change with the amount of product produced. Harvesting and labor are examples of costs that vary directly with the level of production.

Table 1 is a summary of the costs and revenues that are received over the establishment years and through the full production years for a Merlot vineyard. The variable costs in the first year of establishment are the major expenses incurred by the operation. Establishing the trellis system in the spring of the first year is the major variable cost. After the expense of the trellis materials and labor, the Merlot nursery stock is the largest expense, followed by the green poly grow tubes in the first year. Training of the vines and minor pruning occur in the second year. By the third year and beyond, the variable costs are composed mostly of routine cultural practices necessary to operate a vineyard, such as applying fungicides, pruning, training and irrigating.

The drip irrigation system is the predominant fixed cost in the first year. By the second year, the investment plus interest is accumulating from the total expenditure in year one at an 8.5% interest rate. The assumption is made that by the fifth year, the vineyard is fully established, with 16 years of productive life remaining. Over the remaining years, the vineyard must pay back the initial establishment expenses incurred by the operation. Amortizing the net establishment cost at 8.5% over the 16-year payback period produces an annual cost of \$1,072.27 per acre in the mature years.

The first two years of the vineyard do not produce a harvestable crop. By the third year of establishment, a yield of 2.5 tons per acre is achieved. A larger crop is produced the following year—4 tons per acre. In order to produce and maintain the highest quality product, the vineyard is controlled to yield 4 tons per acre in the full production years. The price the grower receives is \$1,080 per ton, an average of the past five years for the Merlot variety.

The economic budgets reflect costs and returns for a production year. The budgets are not representative of a particular farm. Rather, they represent costs and revenues under the assumptions of this study. It is recommended that the user modify the assumptions to reflect his/her specific situation.

## Detailed Budget Results

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The complete budget information for the establishment years and for a typical full production year is presented in the Appendix for a Merlot vineyard. Below is an overview of the information included in the itemized costs and schedule of operations Appendix tables for each year. Tables for the Chardonnay variety are not included in the Appendix since for the purpose of this study all cultural and establishment practices remain the same for both varieties. Those items that differ (yield, harvest expense, etc.) are reflected in the total costs and profit that are presented in Table 2.

**Table 1. Summary of Revenue, Costs and Returns per Acre for a Merlot Vineyard**

<b>Revenue/Cost</b>	<b>Years</b>				
	<b>First</b>	<b>Second</b>	<b>Third</b>	<b>Fourth</b>	<b>Full Production</b>
<b>Revenue</b>					
Yield (tons)	0.00	0.00	2.50	4.00	4.00
Price (\$/ton)	1,080.00	1,080.00	1,080.00	1,080.00	1,080.00
Total Revenue (\$)	0.00	0.00	2,700.00	4,320.00	4,320.00
<b>Variable Cost:</b>					
Custom Work/Mech pruning	220.00	–	–	–	45.00
Planting (Rental + Driver)	38.00	–	–	–	–
Grow Tubes	435.60	–	–	–	–
Nursery Stock	677.60	21.00	–	–	–
Rental Equip/Grass Seed	25.90	5.60	–	–	–
Trellis Material/Tying	1,197.34	55.54	60.92	3.99	1.35
Fertilizer	10.00	8.00	8.00	8.00	8.00
Chemicals	45.47	72.75	167.52	177.44	177.44
Custom Harvesting/Hauling	–	–	225.00	360.00	360.00
Canopy Mgmt/Bird Control	–	–	20.00	170.00	170.00
Labor	841.30	914.97	705.54	411.52	411.52
Irrigation/Elect Charge	142.00	142.00	142.00	142.00	142.00
Machinery Cost	298.00	212.03	251.21	246.58	246.57
Overhead	80.00	80.00	80.00	80.00	80.00
Interest	273.16	74.46	60.52	61.01	61.01
Total Variable Costs (\$)	4,284.37	1,586.35	1,720.71	1,660.54	1,702.89
<b>Fixed Costs:</b>					
Irrigation Equipment	1,100.00	–	–	–	–
Management Fee	225.00	225.00	225.00	225.00	225.00
Real Estate Taxes	55.54	55.54	55.54	101.94	101.94
Net Land Rent	280.00	280.00	280.00	280.00	280.00
Tractor & Machine Cost	306.63	313.67	396.08	390.55	390.55
Interest on Investment	0.00	531.38	785.69	850.55	1072.27
Total Fixed Cost (\$)	1,967.17	1,405.59	1,742.31	1,848.04	2,069.76
<b>Total Cost (\$)</b>	<b>6,251.54</b>	<b>2,991.94</b>	<b>3,463.02</b>	<b>3,508.58</b>	<b>3,772.65</b>
<b>Net Return (\$)</b>	<b>-6,251.54</b>	<b>-2,991.94</b>	<b>-763.02</b>	<b>811.42</b>	<b>547.35</b>

## Itemized Costs for Establishing a Merlot Vineyard

These tables itemize the total cost of operations for vineyard development by type of activity and the corresponding per acre costs. Included in the tables is the quantity of units applied or consumed by the activity type.

### Schedule of Operations for Establishing a Merlot Vineyard

Lists of the schedule of operations and inputs used, along with the fixed and variable costs associated with each operation, are presented in the schedule of operations tables. The calendar month in which the operation occurs is included along with the corresponding labor and/or machine hours. The fixed costs in the tables consist of machinery, building, land, establishment costs and management.

Machinery and equipment fixed costs include depreciation, interest, insurance, taxes and housing. The land value is an opportunity cost, equivalent to 7% of the purchase price for the land. While the owner-operator will not have a net land rent cost, it is representative of the income the owner foregoes by producing a crop rather than renting the land. An opportunity cost for management is also included as a fixed cost. The establishment cost is the interest expense on the accumulated vineyard investment at an 8.5% rate, or the foregone returns that could be achieved had the investment (money) been made elsewhere.

## Machinery, Building, and Input Costs

Appendix Table 6a 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 55-Acre Merlot 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 for the establishment years and the first year of full production (year 5).

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

The field preparation for the vineyard land site is done on a custom basis. The ground is ripped, plowed and disced. In March, the acreage is surveyed and marked for planting. A Merlot nursery stock is planted during that same time, at a total cost of \$802.52 per acre. A drip irrigation system is installed after the grapevines are planted. Using the drip system, 50 pounds per acre of nitrogen fertilizer are added. To aid in weed control and provide plant protection, green poly grow tubes are installed. Weed control is done in April with Surflan and in May using Roundup.

The trellis system is installed in the first year. Wood end posts and steel line posts are used. The wire is strung using #13 gauge wire. Total outlay in establishing the trellis is the largest variable cost in the first year. The Merlot nursery stock is the second largest variable cost in year one. Installation of the drip irrigation system, a net land rent of \$280, and the management fee are the major fixed costs. The total cost in the first year is \$6,251.54. The grapes are not harvested until the third year, so there is no revenue generated from the operation.

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

The drip system is moved up to the catch wire early in the second year, and some hand pruning occurs on the young vines. A wind machine is installed and used for 40 hours in the spring and in the fall. It is assumed that 3% of the vines are replanted in April. Hand

suckering is done in May, and by June, summer training is necessary, in addition to spraying fungicide.

The fixed costs decrease from the first year, as do the variable costs. During the second year of establishment, the total annual operating cost is \$2,991.94 per acre. The interest on the establishment costs from year one is incurred in the second year at \$531.38 per acre. The interest is based on the establishment expense of \$6,251.54 at 8.5% interest. The total fixed cost for the second year is \$1,405.59 per acre, while the total variable cost is \$1,586.35 per acre.

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

After pruning in early spring of year three, the last catch wire is added. The crop is fertilized with 40 pounds of nitrogen through the drip system. The control of insects and pests becomes more intense in the third year and Rally and Dimethoate are the main chemicals in use. Additional hand suckering and summer training are involved now that the vines are beginning to mature. After developing strong uniform vines in the first two years, the vines are able to produce a limited crop in the third year. Bird control is now necessary to prevent crop damage.

The harvested crop yields 2.5 tons of grapes in the third year. Harvesting cost is \$187.50 per acre and the hauling cost is \$37.50 per acre. The interest on the investment from the first two years of establishment is \$785.69 per acre. Total cost incurred during the year is \$3,463.02 per acre, while the revenue generated from the harvest is \$2,700.00, leaving a net loss of \$763.02 per acre for the third year.

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

In the fourth year of establishment, insect and fungi control become even more intense. For this reason, a canopy management cost of \$150.00 per acre is added to account for the expense and time entailed in developing and managing a healthy canopy. This practice includes the shoot thinning and allows for the reduction of fungicide use throughout the vineyard. Weed control is maintained by

making several sprays, including a spot spray of Roundup in June. Real estate taxes increase, as the vineyard is viewed as being in full production, for tax purposes.

The harvesting cost and hauling expense of \$370.20 becomes the largest variable cost, as production increases to maturity and a 4-ton per acre crop is harvested. The total cost per acre is \$3,508.58, with a variable cost of \$1,660.54 per acre. Revenue generated from the harvest in the fourth year is \$4,320.00 per acre, providing a net positive return for the year of \$811.42 per acre.

### **Production Costs and Profit Levels for a Merlot Vineyard in Full Production (Appendix Tables 5a, 5b)**

In the fifth year, the vineyard is considered in its first full year of production. Operations in the full year of production include routine cultural practices. The practices consist of pruning in early spring, fertilizing, weed control, irrigation for the year, and fungicide treatment during the summer.

The net investment cost is amortized over the remaining 16 years of the vineyard's life at an 8.5% interest rate, for a net establishment cost of \$1,072.27 per acre. The net investment cost is the summation of the net costs and returns for year one through four, for a total of \$9,195.08 per acre. Amortizing the net investment cost at the 8.5% rate provides for the establishment cost. Total variable cost for the full production years is \$1,702.89 and the total fixed cost is \$2,069.76 per acre. A net return of \$547.35 per acre is received over the full production year period.

### **Annual Establishment Costs for 55-Acre Chardonnay Vineyard**

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In general, the operations described for the Merlot vineyard are the same as those for a Chardonnay vineyard. It is assumed for the purposes of this study that all cultural practices and establishment practices remain the same. Aspects that differ for a Chardonnay vineyard compared with Merlot include lower



real estate taxes in the productive years and a different price and yield. The higher yield for Chardonnay results in an increased expense for harvesting cost and hauling, which varies with the production level. These changes in the costing structure will also alter the investment costs and the amortized net establishment cost. A summary of the costs and revenues for the entire establishment period and full production year for the Chardonnay vineyard are presented in Table 2.

A harvestable crop is not received in the first two years of production. A yield of 3.5 tons per acre is received in the third year. However, the revenue for that year is not sufficient to cover the total costs, resulting in a net return of a negative \$615.57 per acre. By the fourth year, the vineyard produces a yield of 5 tons per acre, which generates the first annual positive net return. The net return per acre in full production is \$351.48, which is lower than the amount received from the Merlot variety, primarily because of lower Chardonnay prices.

## Conclusions

A large initial investment is required to establish a vineyard in the first year. The first generation of revenue occurs in the end of the third year, but does not entirely offset the total costs. The annual costs are covered in the fourth year of establishment and a positive cash flow starts for both Merlot and Chardonnay varieties. At the price and yield levels used in this study a positive profit is received in mature vineyards.

This analysis is based on a set of the assumptions and conditions established for this study. Expenses, cultural practices, and other conditions can affect the farm-to-farm costs. Growers should recognize that the bulletin uses assumptions such as new machinery cost, and economic costs in the generation of the budgets. Nonetheless, it does provide a basis for analyzing the economic implications of establishing and producing a Merlot and Chardonnay wine grape vineyard.

**Table 2. Overall Production, Revenue and Costs Per Acre for a Chardonnay Vineyard**

Revenue/Cost Category	Year				
	1	2	3	4	Mature
Production (tons)	0.00	0.00	3.50	5.00	5.00
Price (\$/ton)	840.00	840.00	840.00	840.00	840.00
Total Revenue (\$)	0.00	0.00	2,940.00	4,200.00	4,200.00
Total Variable Costs (\$)	4,284.37	1,586.35	1,813.26	1,753.08	1,795.44
Total Fixed Costs (\$)	1,967.17	1,405.59	1,742.31	1,815.20	2,053.08
Total Costs (\$)	6,251.54	2,991.94	3,555.57	3,568.28	3,848.52
Net Returns (\$)	(6,251.54)	(2,991.94)	(615.57)	631.72	351.48
Accumulated Net Cost (\$)	6,251.54	9,243.48	9,859.05	9,227.33	



# Appendix

**APPENDIX TABLE 1A. Year One Itemized Cost Per Acre for Merlot**

	<b>UNIT</b>	<b>PRICE OR COST/UNIT</b>	<b>QUANTITY</b>	<b>VALUE OR COST</b>	<b>YOUR VINEYARD</b>
<b>VARIABLE COSTS</b>					
CUSTOM WORK	ACRE	\$200.00	1.00	\$200.00	_____
SURVEY STAKES	EACH	.07	15.00	1.05	_____
END POST	EACH	4.19	16.00	67.04	_____
UNSPADED STAKE	EACH	2.20	484.00	1064.80	_____
#11 WIRE HT	FOOT	.02	230.00	4.14	_____
TRACT. & DRIVER	ACRE	30.00	1.00	30.00	_____
PLANTER RENTAL	ACRE	8.00	1.00	8.00	_____
GRAPE PLANTS	EACH	.70	968.00	677.60	_____
WIRE CRIMPER	ACRE	5.00	1.00	5.00	_____
#13 WIRE HT	FOOT	.01	5030.00	55.33	_____
SURFLAN AS	GAL.	93.00	.40	37.20	_____
GROW TUBES	EACH	.45	968.00	435.60	_____
NITROGEN	POUN	.20	50.00	10.00	_____
CUSTOM DISCING	ACRE	20.00	1.00	20.00	_____
ROUNDUP	GAL.	33.06	.25	8.27	_____
GRASS SEEDER RT	ACRE	10.00	1.00	10.00	_____
CRSTD WHEAT GRS	POUN	1.06	15.00	15.90	_____
LABOR	HOURL	8.76	57.19	500.99	_____
LABOR(TRACT/MACH)	ACRE	340.31	1.00	340.31	_____
IRR. ELECT. CHG	ACRE	30.00	1.00	30.00	_____
IRR. WATER CHRCH	ACRE	80.00	1.00	80.00	_____
IRR. REPAIRS	ACRE	32.00	1.00	32.00	_____
TRACTOR REPAIR	ACRE	71.87	1.00	71.87	_____
TRACTOR FUEL/LUBE	ACRE	161.25	1.00	161.25	_____
MACHINERY REPAIRS	ACRE	34.83	1.00	34.83	_____
MACHINE FUEL/LUBE	ACRE	30.05	1.00	30.05	_____
INTEREST ON OP. CAP.	ACRE	273.16	1.00	273.16	_____
OVERHEAD	ACRE	80.00	1.00	80.00	_____
TOTAL VARIABLE COST				4284.37	_____
<b>FIXED COSTS</b>					
TRACTOR DEPRECIATION	ACRE	\$78.73	1.00	\$78.73	_____
TRACTOR INTEREST	ACRE	70.86	1.00	70.86	_____
TRACTOR INSURANCE	ACRE	4.72	1.00	4.72	_____
TRACTOR TAXES	ACRE	11.02	1.00	11.02	_____
TRACTOR HOUSING	ACRE	7.87	1.00	7.87	_____
MACHINE DEPRECIATION	ACRE	64.59	1.00	64.59	_____
MACHINE INTEREST	ACRE	51.62	1.00	51.62	_____
MACHINE INSURANCE	ACRE	3.44	1.00	3.44	_____
MACHINE TAXES	ACRE	8.03	1.00	8.03	_____
MACHINE HOUSING	ACRE	5.74	1.00	5.74	_____
IRR. EQUIP	ACRE	1100.00	1.00	1100.00	_____
ESTATE TX (1-3)	ACRE	55.54	1.00	55.54	_____
LAND VALUE	ACRE	280.00	1.00	280.00	_____
MANAGEMENT FEE	ACRE	225.00	1.00	225.00	_____
TOTAL FIXED COST				1967.17	_____
<b>TOTAL COST</b>				<b>6251.54</b>	_____

APPENDIX TABLE 1B. Year One Schedule of Operations and Estimated Costs Per Acre for Merlot

OPERATION	TOOLING	MTH	YEAR	MACH	LABOR	VARIABLE COST					TOTAL FUEL, LUBE, & REPAIRS	TOTAL		
						HOURS	COST	FIXED COST	LABOR	SERVICE	MATER.	INTER.	VARIABLE	TOTAL COST
CUSTOM WORK	SITE PREPARATION(RIP,PLOW,ETC)	FEB	1	.00	.00	.00	\$ .00	\$ .00	\$ .00	\$ 200.00	\$ .00	\$ .00	\$ 200.00	\$ 200.00
INSTALL IRR SYST	CUSTOM HIRE, DRIP IRRIGATION	MAR	1	.00	.00	.00	1100.00	.00	.00	.00	.00	.00	.00	1100.00
SURVEY & MARK	60 HP, STAKES, LABOR	MAR	1	.46	3.70	3.09	4.15	33.39	.00	1.05	3.01	41.60	44.68	
PLANT VINES	100 HP AND VINE PLANTER RENTAL	MAR	1	.00	3.30	.00	.00	28.91	38.00	677.60	58.01	802.52	802.52	
SPREAD POSTS	60 HP, TRAILER, END/LINE POSTS	MAR	1	.46	2.55	6.43	5.07	23.30	.00	1131.84	90.40	1250.61	1257.04	
INSTALL POSTS	60 HP, DIGGER/AUGER, WIRE	MAR	1	2.25	4.97	20.80	23.79	48.27	.00	4.14	5.94	82.14	102.95	
SET END POSTS	60 HP, POST DRIVER, LABOR	MAR	1	4.75	10.00	54.46	53.85	96.74	.00	.00	11.73	162.32	216.78	
STRING WIRE	60 HP, TRAILER, WIRE, LABOR	MAR	1	.46	6.55	6.43	5.07	58.34	5.00	55.33	9.64	133.38	139.81	
SET LINE POSTS	60 HP, POST DRIVER, LABOR	MAR	1	12.00	21.00	137.57	136.05	206.58	.00	.00	26.70	369.32	506.90	
IRRIGATION	SYSTEM START-UP	APR	1	.00	.50	.00	.00	4.38	0.00	.00	.31	4.69	4.69	
WEED CONTROL	60 HP, 100 GAL. SPRAYER	APR	1	.46	.55	10.43	4.95	5.78	.00	37.20	3.39	51.31	61.74	
GROW TUBES	INSTALL GREEN POLY GROW TUBES	APR	1	.00	16.00	.00	.00	140.16	.00	435.60	40.78	616.54	616.54	
FERTILIZE	AQUA THRU TRICKLE SYSTEM	APR	1	.00	.00	.00	.00	.00	.00	10.00	.71	10.71	10.71	
DISC	CUSTOM DISCING	APR	1	.00	.00	.00	.00	.00	.00	20.00	.00	21.42	21.42	
SPRAY WEEDS	60 HP, 100 GAL SPRAYER	JUL	1	.15	.18	3.40	1.61	1.89	.00	8.27	.58	12.35	15.75	
DISC	60 HP, DISC	AUG	1	2.00	2.20	19.17	22.66	23.10	.00	.00	1.95	47.71	66.88	
PLANT COVER	60 HP, RENTED GRASS SEEDER	SEP	1	.57	.69	3.82	5.15	7.24	10.00	15.90	1.36	39.65	43.47	
IRRIGATION	EQUIPMENT SHUT-DOWN	OCT	1	.00	.25	.00	.00	2.19	.00	.00	.06	2.25	2.25	
RAISE GROW TUBES	RAISE GROW TUBES BEFORE WINTER	OCT	1	.00	5.00	.00	.00	43.80	.00	.00	1.24	45.04	45.04	
IRRIGATION	IRRIGATE APRIL-OCTOBER	SEA	1	.00	6.00	.00	.00	52.56	142.00	.00	8.27	202.83	202.83	
MANAGEMENT FEE	COST OF MANAGEMENT	ANN	1	.00	.00	225.00	.00	.00	.00	.00	.00	.00	225.00	
PICKUP	MISC. USE	ANN	1	5.60	6.16	33.20	28.46	64.68	.00	.00	3.96	97.10	130.29	
4-WHEEL CYCLE	MISC. USE	ANN	1	3.42	.00	7.82	7.18	.00	.00	.00	.31	7.49	15.31	
LAND	NET LAND RENT	ANN	1	.00	.00	280.00	.00	.00	.00	.00	.00	.00	280.00	
TAXES	REAL ESTATE	ANN	1	.00	.00	55.54	.00	.00	.00	.00	.00	.00	55.54	
OVERHEAD	UTILITIES, LEGAL, ACCTNG, ETC.	ANN	1	.00	.00	.00	.00	.00	.00	80.00	.00	83.40	83.40	
TOTAL PER ACRE				32.58	89.60	1967.17	298.00	841.30	495.00	2376.93	273.16	4284.37	6251.54	

**APPENDIX TABLE 2A. Year Two Itemized Cost Per Acre for Merlot**

	<b>UNIT</b>	<b>PRICE OR COST/UNIT</b>	<b>QUANTITY</b>	<b>VALUE OR COST</b>	<b>YOUR VINEYARD</b>
<b>VARIABLE COSTS</b>					
WIRE CLIPS	EACH	\$.04	1089.00	\$43.56	_____
NITROGEN	POUN	.20	40.00	8.00	_____
SURFLAN AS	GAL.	93.00	.40	37.20	_____
AUGER RENT(PLT)	ACRE	5.60	1.00	5.60	_____
GRAPE PLANTS	EACH	.70	30.00	21.00	_____
RALLY	POUN	88.00	.31	27.28	_____
ROUNDUP	GAL.	33.06	.25	8.27	_____
PLASTIC RIBBON	FOOT	.003	4792.00	11.98	_____
LABOR	HOOR	8.76	92.75	812.49	_____
LABOR (TRAC/MACH)	ACRE	102.48	1.00	102.48	_____
IRR. ELECT. CHG	ACRE	30.00	1.00	30.00	_____
IRR. WATER CHRG	ACRE	80.00	1.00	80.00	_____
IRR. REPAIRS	ACRE	32.00	1.00	32.00	_____
TRACTOR REPAIR	ACRE	9.19	1.00	9.19	_____
TRACTOR FUEL/LUBE	ACRE	20.61	1.00	20.61	_____
MACHINERY REPAIRS	ACRE	48.34	1.00	48.34	_____
MACHINE FUEL/LUBE	ACRE	133.89	1.00	133.89	_____
INTEREST ON OP. CAP.	ACRE	74.46	1.00	74.46	_____
OVERHEAD	ACRE	80.00	1.00	80.00	_____
TOTAL VARIABLE COST				1586.35	_____
<b>FIXED COSTS</b>					
TRACTOR DEPRECIATION	ACRE	\$10.07	1.00	\$10.07	_____
TRACTOR INTEREST	ACRE	9.06	1.00	9.06	_____
TRACTOR INSURANCE	ACRE	.60	1.00	.60	_____
TRACTOR TAXES	ACRE	1.41	1.00	1.41	_____
TRACTOR HOUSING	ACRE	1.01	1.00	1.01	_____
MACHINE DEPRECIATION	ACRE	105.19	1.00	105.19	_____
MACHINE INTEREST	ACRE	139.75	1.00	139.75	_____
MACHINE INSURANCE	ACRE	9.32	1.00	9.32	_____
MACHINE TAXES	ACRE	21.74	1.00	21.74	_____
MACHINE HOUSING	ACRE	15.53	1.00	15.53	_____
ESTATE TX (1-3)	ACRE	55.54	1.00	55.54	_____
INT ON INV (YR2)	ACRE	531.38	1.00	531.38	_____
LAND VALUE	ACRE	280.00	1.00	280.00	_____
MANAGEMENT FEE	ACRE	225.00	1.00	225.00	_____
TOTAL FIXED COST				1405.59	_____
<b>TOTAL COST</b>				<b>2991.94</b>	_____

APPENDIX TABLE 2B. Year Two Schedule of Operations and Estimated Costs Per Acre for Merlot

OPERATION	TOOLING	MTH	YEAR	MACH	LABOR	VARIABLE COST							TOTAL FIXED COST	FUEL, LUBE, & REPAIRS	LABOR	SERVICE	MATER.	INTER.	TOTAL	
						HOURS	HOURS	HOURS	HOURS	HOURS	HOURS	HOURS							VARIABLE COST	TOTAL COST
MOVING TRICKLE	LABOR, CLIPS	FEB	2	.00		9.00							\$ .00	\$ .00	\$78.84	\$ .00	\$43.56	\$ .00	\$122.40	\$122.40
PRUNE VINES	HAND PRUNE AND TOUCH UP	MAR	2	.00		14.00							.00	.00	122.64	.00	.00	9.56	132.20	132.20
REPLANT	60 HP, TRAILER, AUGER, PLANTS	APR	2	.46		4.55							6.43	5.07	40.82	5.60	21.00	5.13	77.62	84.05
FERTILIZE	AQUA THROUGH TRICKLE SYSTEM	APR	2	.00		.00							.00	.00	.00	.00	8.00	.57	8.57	8.57
LOWER GROW TUBES	LOWER GROW TUBES/2ND SEASON	APR	2	.00		5.00							.00	.00	43.80	.00	.00	3.10	46.90	46.90
WEED CONTROL	60 HP, 100 GAL. SPRAYER	APR	2	.46		.55							10.43	4.95	5.78	.00	37.20	3.39	51.31	61.74
IRRIGATION	EQUIPMENT START-UP	APR	2	.00		.50							.00	.00	4.38	.00	.00	.31	4.69	4.69
MOW COVER CROP	60 HP, MOWER	MAY	2	.49		.59							4.70	5.72	6.19	.00	.00	.76	12.67	17.38
TRAINING	HAND SUCKERING	MAY	2	.00		5.00							.00	.00	43.80	.00	.00	2.79	46.59	46.59
MOW COVER CROP	60 HP, MOWER	JUN	2	.49		.59							4.70	5.72	6.19	.00	.00	.68	12.59	17.29
FUNGICIDE	60 HP, 400 GAL. SPRAYER	JUN	2	.46		.55							20.28	8.77	5.78	.00	27.28	2.37	44.19	64.47
SPRAY WEEDS	60 HP, 100 GAL SPRAYER	JUN	2	.15		.18							3.40	1.61	1.89	.00	8.27	.67	12.43	15.84
SUMMER TRAINING	LABOR & RIBBON	JUN	2	.00		25.00							.00	.00	219.00	.00	11.98	13.09	244.07	244.07
SUMMER TRAINING	LABOR	JUL	2	.00		10.00							.00	.00	87.60	.00	.00	4.34	91.94	91.94
MOW COVER CROP	60 HP, MOWER	JUL	2	.49		.59							4.70	5.72	6.19	.00	.00	.59	12.50	17.21
SUMMER TRAINING	LABOR	AUG	2	.00		10.00							.00	.00	87.60	.00	.00	3.72	91.32	91.32
IRRIGATION	EQUIPMENT SHUT-DOWN	OCT	2	.00		.25							.00	.00	2.19	.00	.00	.06	2.25	2.25
FROST PROTECTION	WIND MACHINE-SPRING AND FALL	SEA	2	.00		4.00							218.00	138.85	35.04	.00	.00	7.39	181.28	399.28
IRRIGATION	IRRIGATE APRIL-OCTOBER	SEA	2	.00		6.00							.00	.00	52.56	142.00	.00	8.27	202.83	202.83
MANAGEMENT FEE	COST OF MANAGEMENT	ANN	2	.00		.00							225.00	.00	.00	.00	.00	.00	.00	225.00
PICKUP	MISC. USE	ANN	2	5.60		6.16							33.20	28.46	64.68	.00	.00	3.96	97.10	130.29
4-WHEEL CYCLE	MISC. USE	ANN	2	3.42		.00							7.82	7.18	.00	.00	.00	.31	7.49	15.31
ESTB. COST	INTEREST ON ESTABLISHMENT COST	ANN	2	.00		.00							531.38	.00	.00	.00	.00	.00	.00	531.38
LAND RENT	NET LAND RENT	ANN	2	.00		.00							280.00	.00	.00	.00	.00	.00	.00	280.00
TAXES	REAL ESTATE	ANN	2	.00		.00							55.54	.00	.00	.00	.00	.00	.00	55.54
OVERHEAD	UTILITIES, LEGAL, ACCTNG, ETC.	ANN	2	.00		.00							.00	.00	.00	80.00	.00	3.40	83.40	83.40
TOTAL PER ACRE				12.02		102.51							1405.59	212.04	914.97	227.60	157.29	74.46	1586.35	2991.94

**APPENDIX TABLE 3A. Year Three Itemized Cost Per Acre for Merlot**

	<b>UNIT</b>	<b>PRICE OR COST/UNIT</b>	<b>QUANTITY</b>	<b>VALUE OR COST</b>	<b>YOUR VINEYARD</b>
<b>VARIABLE COSTS</b>					
PLASTIC RIBBON	FOOT	\$.003	2236.00	\$5.59	_____
#13 WIRE HT	FOOT	.01	5030.00	55.33	_____
SURFLAN AS	GAL.	93.00	.40	37.20	_____
NITROGEN	POUN	.20	40.00	8.00	_____
RALLY	POUN	88.00	.93	81.84	_____
DIMETHOATE	POUN	4.04	12.00	48.48	_____
BIRD CONTROL	ACRE	10.00	2.00	20.00	_____
CUSTOM HARVEST	TON	75.00	2.50	187.50	_____
CUSTOM HAULING	TON	15.00	2.50	37.50	_____
LABOR	HOOR	8.76	65.75	575.97	_____
LABOR (TRAC/MACH)	ACRE	129.57	1.00	129.57	_____
IRR. ELECT. CHG	ACRE	30.00	1.00	30.00	_____
IRR. WATER CHRQ	ACRE	80.00	1.00	80.00	_____
IRR. REPAIRS	ACRE	32.00	1.00	32.00	_____
TRACTOR REPAIR	ACRE	15.86	1.00	15.86	_____
TRACTOR FUEL/LUBE	ACRE	35.60	1.00	35.60	_____
MACHINERY REPAIRS	ACRE	65.86	1.00	65.86	_____
MACHINE FUEL/LUBE	ACRE	133.89	1.00	133.89	_____
INTEREST ON OP. CAP.	ACRE	60.52	1.00	60.52	_____
OVERHEAD	ACRE	80.00	1.00	80.00	_____
TOTAL VARIABLE COST				1720.71	_____
<b>FIXED COSTS</b>					
TRACTOR DEPRECIATION	ACRE	17.38	1.00	17.38	_____
TRACTOR INTEREST	ACRE	15.64	1.00	15.64	_____
TRACTOR INSURANCE	ACRE	1.04	1.00	1.04	_____
TRACTOR TAXES	ACRE	2.43	1.00	2.43	_____
TRACTOR HOUSING	ACRE	1.74	1.00	1.74	_____
MACHINE DEPRECIATION	ACRE	140.89	1.00	140.89	_____
MACHINE INTEREST	ACRE	162.72	1.00	162.72	_____
MACHINE INSURANCE	ACRE	10.85	1.00	10.85	_____
MACHINE TAXES	ACRE	25.31	1.00	25.31	_____
MACHINE HOUSING	ACRE	18.08	1.00	18.08	_____
ESTATE TX (1-3)	ACRE	55.54	1.00	55.54	_____
INT ON INV (YR3)	ACRE	785.69	1.00	785.69	_____
LAND VALUE	ACRE	280.00	1.00	280.00	_____
MANAGEMENT FEE	ACRE	225.00	1.00	225.00	_____
TOTAL FIXED COST				1742.31	_____
<b>TOTAL COST</b>				<b>3463.02</b>	_____



APPENDIX TABLE 3B. Year Three Schedule of Operations and Estimated Costs Per Acre for Merlot

OPERATION	TOOLING	MTH	YEAR	MACH	LABOR HOURS	LABOR HOURS	TOTAL		VARIABLE COST									
							FIXED COST	FUEL, LUBE, & REPAIRS	LABOR	SERVICE	MATER.	INTER.	TOTAL VARIABLE COST	TOTAL COST				
PRUNE	HAND PRUNE AND TOUCH UP	FEB	3	.00	17.00		\$0.00	\$0.00	\$148.92	\$0.00	\$0.00	\$0.00	\$148.92	\$148.92	\$148.92			
MOW PRUNINGS	60 HP, MOWER	FEB	3	.49	.59		4.70	5.72	6.19	.00	.00	.00	11.91	16.62	16.62			
CATCH WIRE	60 HP, TRAILER, #13 WIRE	FEB	3	.46	6.55		6.43	5.07	58.34	.00	55.33	.00	118.74	125.17	125.17			
TIE	LABOR & RIBBON	FEB	3	.00	8.00		.00	.00	70.08	.00	5.59	.00	75.67	75.67	75.67			
WEED CONTROL	60 HP, 100 GAL. SPRAYER	APR	3	.46	.55		10.43	4.95	5.78	.00	37.20	3.39	51.31	61.74	61.74			
FERTILIZE	AQUA THROUGH TRICKLE SYSTEM	APR	3	.00	.00		.00	.00	.00	.00	8.00	.57	8.57	8.57	8.57			
IRRIGATION	EQUIPMENT START-UP	APR	3	.00	.50		.00	.00	4.38	.00	.00	.31	4.69	4.69	4.69			
FUNGICIDE	60 HP, 400 GAL. SPRAYER	MAY	3	.46	.55		20.28	8.77	5.78	.00	27.28	2.67	44.49	64.77	64.77			
SUCKERING	HAND SUCKERING	MAY	3	.00	5.00		.00	.00	43.80	.00	.00	2.79	46.59	46.59	46.59			
MOW COVER CROP	60 HP, MOWER	MAY	3	.49	.59		4.70	5.72	6.19	.00	.00	.76	12.67	17.38	17.38			
SUMMER TRAINING	LABOR	MAY	3	.00	10.00		.00	.00	87.60	.00	.00	5.58	93.18	93.18	93.18			
MOW COVER CROP	60 HP, MOWER	JUN	3	.49	.59		4.70	5.72	6.19	.00	.00	.68	12.59	17.29	17.29			
INSECT CONTROL	60 HP, 400 GAL. SPRAYER	JUN	3	.46	.55		20.28	8.77	5.78	.00	24.24	2.20	40.98	61.26	61.26			
FUNGICIDE	60 HP, 400 GAL. SPRAYER	JUN	3	.46	.55		20.28	8.77	5.78	.00	27.28	2.37	44.19	64.47	64.47			
SUCKERING	HAND SUCKERING	JUN	3	.00	5.00		.00	.00	43.80	.00	.00	2.48	46.28	46.28	46.28			
MOW COVER CROP	60 HP, MOWER	JUL	3	.49	.56		4.70	5.72	5.88	.00	.00	.58	12.17	16.88	16.88			
INSECT CONTROL	60 HP, 400 GAL. SPRAYER	JUL	3	.46	.55		20.28	8.77	5.78	.00	24.24	1.92	40.70	60.98	60.98			
SUMMER TRAINING	LABOR	JUL	3	.00	2.00		.00	.00	17.52	.00	.00	.87	18.39	18.39	18.39			
FUNGICIDE	60 HP, 400 GAL. SPRAYER	JUL	3	.46	.55		20.28	8.77	5.78	.00	27.28	2.07	43.90	64.17	64.17			
SUMMER TRAINING	LABOR	AUG	3	.00	2.00		.00	.00	17.52	.00	.00	.74	18.26	18.26	18.26			
BIRD CONTROL	LABOR AND MATERIALS	AUG	3	.00	.00		.00	.00	.00	10.00	.00	.43	10.42	10.42	10.42			
BIRD CONTROL	LABOR AND MATERIALS	SEP	3	.00	.00		.00	.00	.00	10.00	.00	.35	10.35	10.35	10.35			
HARVEST	CUSTOM HARVESTING	OCT	3	.00	.00		.00	.00	.00	225.00	.00	6.38	231.37	231.37	231.37			
IRRIGATION	EQUIPMENT SHUT-DOWN	OCT	3	.00	.25		.00	.00	2.19	.00	.00	.06	2.25	2.25	2.25			
FROST PROTECTION	WIND MACHINE-SPRING AND FALL	SEA	2	.00	4.00		218.00	138.85	35.04	.00	.00	7.39	181.28	399.28	399.28			
IRRIGATION	IRRIGATE APRIL-OCTOBER	SEA	3	.00	6.00		.00	.00	52.56	142.00	.00	8.27	202.83	202.83	202.83			
MANAGEMENT FEE	COST OF MANAGEMENT	ANN	3	.00	.00		225.00	.00	.00	.00	.00	.00	.00	225.00	225.00			
PICKUP	MISC. USE	ANN	3	5.60	6.16		33.20	28.46	64.68	.00	.00	3.96	97.10	130.29	130.29			
4-WHEEL CYCLE	MISC. USE	ANN	3	3.42	.00		7.82	7.18	.00	.00	.00	.31	7.49	15.31	15.31			
ESTB. COST	INTEREST ON ESTABLISHMENT COST	ANN	3	.00	.00		785.69	.00	.00	.00	.00	.00	.00	785.69	785.69			
LAND	NET LAND RENT	ANN	3	.00	.00		280.00	.00	.00	.00	.00	.00	.00	280.00	280.00			
TAXES	REAL ESTATE	ANN	3	.00	.00		55.54	.00	.00	.00	.00	.00	.00	55.54	55.54			
OVERHEAD	UTILITIES, LEGAL, ACCTNG, ETC.	ANN	3	.00	.00		.00	.00	.00	80.00	.00	3.40	83.40	83.40	83.40			
TOTAL PER ACRE				14.20	78.09		1742.31	251.21	705.54	467.00	236.44	60.52	1720.71	3463.02	3463.02			

**APPENDIX TABLE 4A. Year Four Itemized Cost Per Acre for Merlot**

	<b>UNIT</b>	<b>PRICE OR COST/UNIT</b>	<b>QUANTITY</b>	<b>VALUE OR COST</b>	<b>YOUR VINEYARD</b>
<b>VARIABLE COSTS</b>					
PLASTIC RIBBON	FOOT	\$.003	1597.00	\$3.99	_____
NITROGEN	POUN	.20	40.00	8.00	_____
SURFLAN AS	GAL.	93.00	.40	37.20	_____
RALLY	POUN	88.00	.93	81.84	_____
ROUNDUP	GAL.	33.06	.30	9.92	_____
DIMETHOATE	POUN	4.04	12.00	48.48	_____
CANOPY MANAGE	ACRE	150.00	1.00	150.00	_____
BIRD CONTROL	ACRE	10.00	2.00	20.00	_____
CUSTOM HARVEST	TON	75.00	4.00	300.00	_____
CUSTOM HAULING	TON	15.00	4.00	60.00	_____
LABOR	HOURL	8.76	32.75	286.89	_____
LABOR (TRAC/MACH)	ACRE	124.63	1.00	124.63	_____
IRR. ELECT. CHG	ACRE	30.00	1.00	30.00	_____
IRR. WATER CHRG	ACRE	80.00	1.00	80.00	_____
IRR. REPAIRS	ACRE	32.00	1.00	32.00	_____
TRACTOR REPAIR	ACRE	14.58	1.00	14.58	_____
TRACTOR FUEL/LUBE	ACRE	32.71	1.00	32.71	_____
MACHINERY REPAIRS	ACRE	65.39	1.00	65.39	_____
MACHINE FUEL/LUBE	ACRE	133.89	1.00	133.89	_____
INTEREST ON OP. CAP.	ACRE	61.01	1.00	61.01	_____
OVERHEAD	ACRE	80.00	1.00	80.00	_____
TOTAL VARIABLE COST				1660.53	_____
<b>FIXED COSTS</b>					
TRACTOR DEPRECIATION	ACRE	\$15.97	1.00	\$15.97	_____
TRACTOR INTEREST	ACRE	14.37	1.00	14.37	_____
TRACTOR INSURANCE	ACRE	.96	1.00	.96	_____
TRACTOR TAXES	ACRE	2.24	1.00	2.24	_____
TRACTOR HOUSING	ACRE	1.60	1.00	1.60	_____
MACHINE DEPRECIATION	ACRE	139.84	1.00	139.84	_____
MACHINE INTEREST	ACRE	161.69	1.00	161.69	_____
MACHINE INSURANCE	ACRE	10.78	1.00	10.78	_____
MACHINE TAXES	ACRE	25.15	1.00	25.15	_____
MACHINE HOUSING	ACRE	17.97	1.00	17.97	_____
ESTATE TX (3+)	ACRE	101.94	1.00	101.94	_____
INT ON INV (YR4)	ACRE	850.55	1.00	850.55	_____
LAND VALUE	ACRE	280.00	1.00	280.00	_____
MANAGEMENT FEE	ACRE	225.00	1.00	225.00	_____
TOTAL FIXED COST				1848.04	_____
<b>TOTAL COST</b>				<b>3508.58</b>	_____

APPENDIX TABLE 4B. Year Four Schedule of Operations and Estimated Costs Per Acre for Merlot

OPERATION	TOOLING	MTH	YEAR	MACH	LABOR	VARIABLE COST					TOTAL		
						HOURS	FUEL, LUBE, & REPAIRS	LABOR	SERVICE	MATER.	INTER.	VARIABLE	TOTAL
												COST	COST
PRUNE	HAND PRUNE AND HAND TOUCH UP	FEB	4	.00	17.00	.00	.00	148.92	.00	.00	.00	148.92	148.92
MOW PRUNINGS	60 HP, MOWER	FEB	4	.49	.59	4.70	5.72	6.19	.00	.00	.00	11.91	16.62
TIE	LABOR, RIBBON	FEB	4	.00	5.00	.00	.00	43.80	.00	3.99	.00	47.79	47.79
FERTILIZE	AQUA THRU TRICKLE SYSTEM	APR	4	.00	.00	.00	.00	.00	.00	8.00	.57	8.57	8.57
WEED CONTROL	60 HP, 100 GAL. SPRAYER	APR	4	.46	.55	10.43	4.95	5.78	.00	37.20	3.39	51.31	61.74
IRRIGATION	EQUIPMENT START-UP	APR	4	.00	.50	.00	.00	4.38	.00	.00	.31	4.69	4.69
MOW COVER CROP	60 HP, MOWER	MAY	4	.49	.59	4.70	5.72	6.19	.00	.00	.76	12.67	17.38
FUNGICIDE	60 HP, 400 GAL. SPRAYER	MAY	4	.46	.55	20.28	8.77	5.78	.00	27.28	2.67	44.49	64.77
SPOT WEED CTRL.	60 HP, 100 GAL. SPRAYER	JUN	4	.04	.05	.91	.43	.53	.00	9.92	.62	11.49	12.40
INSECT CONTROL	60 HP, 400 GAL. SPRAYER	JUN	4	.46	.55	20.28	8.77	5.78	.00	24.24	2.20	40.98	61.26
MOW COVER CROP	60 HP, MOWER	JUN	4	.49	.59	4.70	5.72	6.19	.00	.00	.68	12.59	17.29
CANOPY MANAGE	CANOPY MANAGEMENT	JUN	4	.00	.00	.00	.00	.00	150.00	.00	8.50	158.50	158.50
FUNGICIDE	60 HP, 400 GAL. SPRAYER	JUN	4	.46	.55	20.28	8.77	5.78	.00	27.28	2.37	44.19	64.47
FUNGICIDE	60 HP, 400 GAL. SPRAYER	JUL	4	.46	.55	20.28	8.77	5.78	.00	27.28	2.07	43.90	64.17
INSECT CONTROL	60 HP, 400 GAL. SPRAYER	JUL	4	.46	.55	20.28	8.77	5.78	.00	24.24	1.92	40.70	60.98
MOW COVER CROP	60 HP, MOWER	JUL	4	.49	.59	4.70	5.72	6.19	.00	.00	.59	12.50	17.21
BIRD CONTROL	LABOR AND MATERIALS	AUG	4	.00	.00	.00	.00	.00	10.00	.00	.43	10.42	10.42
BIRD CONTROL	LABOR AND MATERIALS	SEP	4	.00	.00	.00	.00	.00	10.00	.00	.35	10.35	10.35
IRRIGATION	EQUIPMENT SHUTDOWN	OCT	4	.00	.25	.00	.00	2.19	.00	.00	.06	2.25	2.25
HARVEST	CUSTOM HARVESTING AND HAULING	OCT	4	.00	.00	.00	.00	.00	360.00	.00	10.20	370.20	370.20
FROST PROTECTION	WIND MACHINE-SPRING AND FALL	SEA	2	.00	4.00	218.00	138.85	35.04	.00	.00	7.39	181.28	399.28
IRRIGATION	IRRIGATE APRIL-OCTOBER	SEA	4	.00	6.00	.00	.00	52.56	142.00	.00	8.27	202.83	202.83
MANAGEMENT FEE	COST OF MANAGEMENT	ANN	4	.00	.00	225.00	.00	.00	.00	.00	.00	.00	225.00
PICKUP	MISC. USE	ANN	4	5.60	6.16	33.20	28.46	64.68	.00	.00	3.96	97.10	130.29
4-WHEEL CYCLE	MISC. USE	ANN	4	3.42	.00	7.82	7.18	.00	.00	.00	.31	7.49	15.31
ESTB. COST	INTEREST ON ESTABLISHMENT COST	ANN	4	.00	.00	850.55	.00	.00	.00	.00	.00	.00	850.55
LAND	NET LAND RENT	ANN	4	.00	.00	280.00	.00	.00	.00	.00	.00	.00	280.00
TAXES	REAL ESTATE	ANN	4	.00	.00	101.94	.00	.00	.00	.00	.00	.00	101.94
OVERHEAD	UTILITIES, LEGAL, ACCTNG, ETC.	ANN	4	.00	.00	.00	.00	.00	80.00	.00	3.40	83.40	83.40
<b>TOTAL PER ACRE</b>				<b>13.78</b>	<b>44.62</b>	<b>1848.04</b>	<b>246.57</b>	<b>411.52</b>	<b>752.00</b>	<b>189.43</b>	<b>61.01</b>	<b>1660.53</b>	<b>3508.58</b>

**APPENDIX TABLE 5A. Full Production Itemized Cost Per Acre for Merlot**

	<b>UNIT</b>	<b>PRICE OR COST/UNIT</b>	<b>QUANTITY</b>	<b>VALUE OR COST</b>	<b>YOUR VINEYARD</b>
<b>VARIABLE COSTS</b>					
MECH PRUNING	ACRE	\$45.00	1.00	\$45.00	_____
PLASTIC RIBBON	FOOT	.003	540.00	1.35	_____
NITROGEN	POUN	.20	40.00	8.00	_____
SURFLAN AS	GAL.	93.00	.40	37.20	_____
RALLY	POUN	88.00	.93	81.84	_____
ROUNDUP	GAL.	33.06	.30	9.92	_____
DIMETHOATE	POUN	4.04	12.00	48.48	_____
CANOPY MANAGE	ACRE	150.00	1.00	150.00	_____
BIRD CONTROL	ACRE	10.00	2.00	20.00	_____
CUSTOM HARVEST	TON	75.00	4.00	300.00	_____
CUSTOM HAULING	TON	15.00	4.00	60.00	_____
LABOR	HOUR	8.76	32.75	286.89	_____
LABOR (TRAC/MACH)	ACRE	124.63	1.00	124.63	_____
IRR. ELECT. CHG	ACRE	30.00	1.00	30.00	_____
IRR. WATER CHRG	ACRE	80.00	1.00	80.00	_____
IRR. REPAIRS	ACRE	32.00	1.00	32.00	_____
TRACTOR REPAIR	ACRE	14.58	1.00	14.58	_____
TRACTOR FUEL/LUBE	ACRE	32.71	1.00	32.71	_____
MACHINERY REPAIRS	ACRE	65.39	1.00	65.39	_____
MACHINE FUEL/LUBE	ACRE	133.89	1.00	133.89	_____
INTEREST ON OP. CAP.	ACRE	61.01	1.00	61.01	_____
OVERHEAD	ACRE	80.00	1.00	80.00	_____
TOTAL VARIABLE COST				1702.89	_____
<b>FIXED COSTS</b>					
TRACTOR DEPRECIATION	ACRE	\$15.97	1.00	\$15.97	_____
TRACTOR INTEREST	ACRE	14.37	1.00	14.37	_____
TRACTOR INSURANCE	ACRE	.96	1.00	.96	_____
TRACTOR TAXES	ACRE	2.24	1.00	2.24	_____
TRACTOR HOUSING	ACRE	1.60	1.00	1.60	_____
MACHINE DEPRECIATION	ACRE	139.84	1.00	139.84	_____
MACHINE INTEREST	ACRE	161.69	1.00	161.69	_____
MACHINE INSURANCE	ACRE	10.78	1.00	10.78	_____
MACHINE TAXES	ACRE	25.15	1.00	25.15	_____
MACHINE HOUSING	ACRE	17.97	1.00	17.97	_____
ESTATE TX (3+)	ACRE	101.94	1.00	101.94	_____
INT ON INV (YR5)	ACRE	1072.27	1.00	1072.27	_____
LAND VALUE	ACRE	280.00	1.00	280.00	_____
MANAGEMENT FEE	ACRE	225.00	1.00	225.00	_____
TOTAL FIXED COST				2069.76	_____
<b>TOTAL COST</b>				<b>3772.65</b>	_____

APPENDIX TABLE 5B. Full Production Schedule of Operations and Estimated Costs Per Acre for Merlot

OPERATION	TOOLING	MTH	YEAR	MACH	LABOR HOURS	TOTAL FIXED COST	FUEL, LUBE, & REPAIRS	VARIABLE COST					TOTAL VARIABLE TOTAL COST	
								LABOR	SERVICE	MATER.	INTER.	COST		
PRUNE	CUSTOM PRUNE & HAND TOUCH UP	FEB	5	.00	17.00	.00	.00	148.92	45.00	.00	.00	193.92	193.92	
TIE	LABOR, RIBBON	FEB	5	.00	5.00	.00	.00	43.80	.00	1.35	.00	45.15	45.15	
MOW PRUNINGS	60 HP, MOWER	FEB	5	.49	.59	4.70	5.72	6.19	.00	.00	.00	11.91	16.62	
FERTILIZE	AQUA THRU TRICKLE SYSTEM	APR	5	.00	.00	.00	.00	.00	.00	8.00	.57	8.57	8.57	
WEED CONTROL	60 HP, 100 GAL. SPRAYER	APR	5	.46	.55	10.43	4.95	5.78	.00	37.20	3.39	51.31	61.74	
IRRIGATION	EQUIPMENT START-UP	APR	5	.00	.50	.00	.00	4.38	.00	.00	.31	4.69	4.69	
MOW COVER CROP	60 HP, MOWER	MAY	5	.49	.59	4.70	5.72	6.19	.00	.00	.76	12.67	17.38	
FUNGICIDE	60 HP, 400 GAL. SPRAYER	MAY	5	.46	.55	20.28	8.77	5.78	.00	27.28	2.67	44.49	64.77	
SPOT WEED CTRL.	50 HP, 100 GAL. SPRAYER	JUN	5	.04	.05	.91	.43	.53	.00	9.92	.62	11.49	12.40	
INSECT CONTROL	60 HP, 400 GAL. SPRAYER	JUN	5	.46	.55	20.28	8.77	5.78	.00	24.24	2.20	40.98	61.26	
MOW COVER CROP	60 HP, MOWER	JUN	5	.49	.59	4.70	5.72	6.19	.00	.00	.68	12.59	17.29	
CANOPY MANAGE	CANOPY MANAGEMENT	JUN	5	.00	.00	.00	.00	.00	150.00	.00	8.50	158.50	158.50	
FUNGICIDE	60 HP, 400 GAL. SPRAYER	JUN	5	.46	.55	20.28	8.77	5.78	.00	27.28	2.37	44.19	64.47	
FUNGICIDE	60 HP, 400 GAL. SPRAYER	JUL	5	.46	.55	20.28	8.77	5.78	.00	27.28	2.07	43.90	64.17	
INSECT CONTROL	60 HP, 400 GAL. SPRAYER	JUL	5	.46	.55	20.28	8.77	5.78	.00	24.24	1.92	40.70	60.98	
MOW COVER CROP	60 HP, MOWER	JUL	5	.49	.59	4.70	5.72	6.19	.00	.00	.59	12.50	17.21	
BIRD CONTROL	LABOR AND MATERIALS	AUG	5	.00	.00	.00	.00	.00	10.00	.00	.43	10.42	10.42	
BIRD CONTROL	LABOR AND MATERIALS	SEP	5	.00	.00	.00	.00	.00	10.00	.00	.35	10.35	10.35	
IRRIGATION	LABOR	OCT	5	.00	.25	.00	.00	2.19	.00	.00	.06	2.25	2.25	
HARVEST	CUSTOM HARVESTING	OCT	5	.00	.00	.00	.00	.00	360.00	.00	10.20	370.20	370.20	
FROST PROTECTION	WIND MACHINE-SPRING AND FALL	SEA	2	.00	4.00	218.00	138.85	35.04	.00	.00	7.39	181.28	399.28	
IRRIGATION	IRRIGATE APRIL-OCTOBER	SEA	5	.00	6.00	.00	.00	56.56	142.00	.00	8.27	202.83	202.83	
MANAGEMENT FEE	COST OF MANAGEMENT	ANN	5	.00	.00	225.00	.00	.00	.00	.00	.00	.00	225.00	
PICKUP	MISC. USE	ANN	5	5.60	6.16	33.20	28.46	64.68	.00	.00	3.96	97.10	130.29	
4-WHEEL CYCLE	MISC. USE	ANN	5	3.42	.00	7.82	7.18	.00	.00	.00	.31	7.49	15.31	
ESTB. COST	INTEREST ON ESTABLISHMENT COST	ANN	5	.00	.00	1072.27	.00	.00	.00	.00	.00	.00	1072.27	
LAND	NET LAND RENT	ANN	5	.00	.00	280.00	.00	.00	.00	.00	.00	.00	280.00	
TAXES	REAL ESTATE	ANN	5	.00	.00	101.94	.00	.00	.00	.00	.00	.00	101.94	
OVERHEAD	UTILITIES, LEGAL, ACCTNG, ETC.	ANN	5	.00	.00	.00	.00	.00	80.00	.00	3.40	83.40	83.40	
TOTAL PER ACRE					21.78	44.62	2069.76	246.57	411.52	797.00	186.79	61.01	1702.89	3772.65

APPENDIX TABLE 6A. Hourly Machinery Costs for a 55-Acre Merlot 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
\$ COST PER HOUR													
60 HP TRACTOR	30,500.00	20	500	3.05	2.75	.18	.43	.31	6.71	2.78	6.25	9.03	15.74
3/4 TON PICKUP	26,000.00	10	650	2.82	2.33	.16	.36	.26	5.93	.77	4.31	5.08	11.01
100 GAL SPRAYER	2,500.00	10	25	8.23	5.30	.35	.82	.59	15.29	.82	.00	.82	16.11
400 GAL SPRAYER	18,000.00	10	75	19.75	12.71	.85	1.98	1.41	36.70	9.12	.00	9.12	45.82
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	1.73	2.10	4.39
MOWER	2,900.00	10	200	1.19	.77	.05	.12	.09	2.22	1.74	.00	1.74	3.95
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	50	1.95	1.60	.11	.25	.18	4.08	1.40	.00	1.40	5.49
POST AUGER	740.00	15	50	.89	.73	.05	.11	.08	1.87	.64	.00	.64	2.51
WIND MACHINE	21,000.00	25	50	13.60	22.50	1.50	3.50	2.50	43.60	7.00	20.77	27.77	71.37

**APPENDIX TABLE 7. Prices of the materials and services**

<b>Items</b>	<b>Units</b>	<b>Price(\$)/Unit</b>
<b>Materials:</b>		
Gasoline	gal	1.50
Diesel	gal	1.56
Propane	gal	1.29
Nitrogen	lb	0.20
Surflan	gal	93.00
Roundup	gal	33.06
Rally	lb	88.00
Dimethoate	lb	4.00
Crst Wheat Grass	lb	1.06
Plastic ribbon	foot	0.003
#11 Wire HT	foot	0.02
#13 Wire HT	foot	0.01
Wire clips	each	0.20
Unspaded stake	each	2.20
Trellis Post 5" x 8" (wood)	each	4.19
Nursery Stock	each	0.70
<b>Services:</b>		
Labor–Manual	hour	8.76
Labor–Tractor	hour	10.50
Overhead	acre	80.00
Irrigation Water Charge	acre	80.00
Irrigation Energy Charge	acre	30.00
Real estate taxes (1–3)	acre	55.54
Real estate taxes (4+)	acre	101.94
Canopy manage	acre	150.00



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