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	<p>ESTABLISHMENT AND ANNUAL PRODUCTION COSTS FOR WASHINGTON WINE GRAPES</p>	
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ESTABLISHMENT AND ANNUAL PRODUCTION COSTS FOR WASHINGTON WINE GRAPES

by

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Introduction

There has been a noticeable increase in the wine grape acreage in Washington in recent years. As an example, during 1996-97, 3,502 acres of new wine grape vineyards were planted. This represented a 30% increase over 1994 acreage. In 2000, there is an estimated 27,156 acres with intentions to plant even more vinifera wine grapes. Merlot was the major variety planted, followed by Chardonnay and Cabernet Sauvignon. The increase in total vinifera wine grape acreage in Washington will firmly establish Washington as the second most important state in the production of vinifera wine grapes as well as all grapes.

In 1999, wine grape production in Washington State reached a record 70,000 tons, with an average price of \$910 per ton. This crop almost doubled the crop harvested in 1996.

The primary objective of this study is to estimate the establishment and production costs for the major red and white wine grape varieties (Merlot and Chardonnay) grown in Washington.

The specific objectives are to:

1. Formulate the common viticulture practices and inputs utilized for establishing a 55-acre vineyard in Washington; and
2. Estimate the establishment and production costs for both varieties.

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General Budget Assumption

The major assumptions used to calculate the establishment costs are:

1. A 55-acre wine grape vineyard was developed on a 65-acre farm with 5 acres each of headland and homestead. The vineyard is located in Yakima Valley. The value of the land is \$4,500 per acre.
2. The varieties used in this research are Merlot and Chardonnay.
3. The manager of the vineyard received a salary equivalent to 7% of average gross receipts for an established vineyard. This is referred to as the management fee.
4. The grapes were planted with a 5 x 9 foot spacing with 968 plants per acre. The grapevines were expected to be productive in 3 years. During the second year there is a limited amount of replanting of vines.
5. Establishment costs were amortized over 16 years at 9% interest. The total vineyard life was 20 years.
6. A trickle, or drip irrigation system with a 29-HP pump, was purchased. The entire system was depreciated over a 20-year period, with zero salvage value at the end of the period.
7. The water charge was \$40 per acre based on 1999 Roza Irrigation District water fees.
8. The per acre cost for electricity for irrigation was \$20. This is for the Benton Irrigation District.
9. The real estate tax was based on Benton and Yakima counties for 1999. The value changes according to the age of the trellis system and grape plants. The value of the

first 2 years was \$4,000; for the remaining years it was \$4,500. The real estate tax rate used was \$15.16/\$1,000 of assessed value.

10. It was assumed that the operator owns all the land. The land rent is considered as an opportunity cost to the owner in the amount of \$125 per acre.
11. It was assumed that machine and equipment were purchased at current market prices. The machine value, amortization, repair and insurance quotes were based on information from Smathers and Willet.
12. All pruning and tying were done on a custom basis (\$0.39 per vine).
13. A bilateral cordon training system was used with a vertical trellis. The trellis system was installed during the first two years.
14. Starting in Year 4, a \$75 per acre canopy management fee was charged to reduce the amount of fungicide used.
15. Harvesting begins in the third year. When the vineyard reaches maturity the harvesting cost becomes constant. It was assumed that a mechanical harvester was used. The cost of harvesting was \$75 per ton.
16. The interest cost on operating capital were based on a short-term interest rate of 9%.

In Table 1, the prices for the selected items used during the establishment and production time periods are reported (sales tax included). These costs were assembled from industry sources for 1999.

TABLE 1. Vineyard Production Input Items and Prices, 1999

Factor	Prices (\$)	Unit
Labor	6.00	Hour
Gasoline	1.05	Gallon
Diesel	1.00	Gallon
Surflan AS	79.50	Gallon
Roundup	37.00	Gallon
Nitrogen	0.10	Pound
Dimethoate	2.70	Pound
Rally	88.00	Pound
Plastic Ribbon	0.0025	Foot
#9 Wire HT	0.026	Foot
#11 Wire HT	0.017	Foot
#13 Wire HT	0.01	Foot
Wire Clips	0.20	Each
End Post 5" x 8"	3.70	Each
Unspaded Stake	0.07	Each
Vines	0.60	Each

Annual Establishment Costs

Basic budgets were constructed for Merlot and Chardonnay. The following sections contain the establishment costs for both varieties under the assumptions stated above. Variable costs such as labor, machinery rental, fertilizer and chemicals are listed separately from the fixed costs such as depreciation, taxes, and the amortized establishment costs.

First-Year Establishment Cost for Merlot Vineyard

The vineyard land was prepared by plowing and discing. Both of these operations were custom-hired (Tables 2 and 3). At the same time, operations such as installing and setting the end posts were performed. The acreage was surveyed and marked for planting. The plants were planted in March. Fertilizing with 50 pounds of nitrogen were performed using the irrigation system. During the first year the irrigation system was placed on the ground. Weed control was completed in April by using Surflan; hoeing practices were performed during the summer. The total cost in the first year was \$2,525.52.

Second-Year Establishment Costs for Merlot Vineyard

In the second year of establishment most of the expenses occur at the beginning of the year (Tables 4 and 5). It is during this period that the line posts have to be set, and the drip irrigation system has to be moved up to the drip or catch wire. It was assumed that 3% of the vines had to be replanted. Common agronomic practices such as fertilization and weed control were applied. The interest on establishment costs for the first year added \$227.25 per acre to the total costs in the second year. The total cost in the second year was \$3,907.72 per acre. The variable costs were \$3,262.92, while the fixed costs were \$644.80.

Table 2. First-Year Itemized Costs per Acre for Merlot

		Price or		Value or	Your
		Unit Cost/unit	Quantity	Cost	Farm

Variable Costs		\$		\$	
Custom Plowing	Acre	75.00	1.00	75.00	_____
Custom Discing	Acre	65.00	1.00	65.00	_____
Labor	Hour	6.00	27.69	166.14	_____
Survey Stakes	Each	.07	15.00	1.05	_____
Tract. & Driver	Acre	25.00	1.00	25.00	_____
Planter Rental	Acre	5.00	1.00	5.00	_____
Grape Plants	Each	.60	968.00	580.80	_____
Surflan	Gal.	79.50	.40	31.80	_____
Nitrogen	Pound	.10	50.00	5.00	_____
Custom Discing	Acre	65.00	1.00	65.00	_____
Grass Seeder Rt	Acre	5.00	1.00	5.00	_____
Crstd Wheat Grs	Pound	.81	15.00	12.15	_____
Post Auger Rent	Acre	2.80	1.00	2.80	_____
#9 Wire Ht	Foot	.03	230.00	5.98	_____
Post Driver	Acre	7.00	1.00	7.00	_____
End Posts	Each	3.70	16.00	59.20	_____
Management Fee	Acre	423.50	1.00	423.50	_____
Miscellaneous	Acre	60.00	1.00	60.00	_____
Labor	Hour	6.00	6.00	36.00	_____
Irr. Elect. Chrg	Acre	20.00	1.00	20.00	_____
Irr. Water Chrg	Acre	40.00	1.00	40.00	_____
Irr. Repairs	Acre	30.00	1.00	30.00	_____
Interest on Op. Cap.	Acre	84.25	1.00	84.25	_____
Tractor Repair	Acre	19.20	1.00	19.20	_____
Tractor Fuel/lube	Acre	33.64	1.00	33.64	_____
Machinery Repairs	Acre	19.74	1.00	19.74	_____
Machine Fuel/lube	Acre	107.62	1.00	107.62	_____
Labor(trac/mach)	Acre	124.68	1.00	124.68	_____

Total Variable Cost				2074.56	_____
Fixed Costs		\$		\$	
Tractor Depreciation	Acre	50.05	1.00	50.05	_____
Tractor Interest	Acre	40.88	1.00	40.88	_____
Tractor Insurance	Acre	2.73	1.00	2.73	_____
Tractor Taxes	Acre	6.36	1.00	6.36	_____
Tractor Housing	Acre	4.54	1.00	4.54	_____
Machine Depreciation	Acre	25.87	1.00	25.87	_____
Machine Interest	Acre	20.29	1.00	20.29	_____
Machine Insurance	Acre	1.35	1.00	1.35	_____
Machine Taxes	Acre	3.16	1.00	3.16	_____
Machine Housing	Acre	2.25	1.00	2.25	_____
Estate Tx (Yr.1)	Acre	60.64	1.00	60.64	_____
Value Land	Acre	125.00	1.00	125.00	_____
Irr. Equip	Acre	107.84	1.00	107.84	_____

Total Fixed Cost				450.96	_____
Total Cost				2525.52	_____

Table 3. First-Year Schedule of Operation and Estimated Costs per Acre for Merlot

		Variable Cost											
Operation	Tooling	Mth	Year	Mach Hours	Labor Hours	Total Fixed Cost	Fuel, Lube, & Repairs	Mach Labor	Service	Mater.	Inter.	Total Variable Cost	Total Cost
						\$	\$	\$	\$	\$	\$	\$	\$
Custom Plow	Custom Plowing	Feb	1	.00	.00	.00	.00	.00	75.00	.00	4.50	79.50	79.50
Custom Discing	Custom Discing	Feb	1	.00	.00	.00	.00	.00	65.00	.00	3.90	68.90	68.90
Survey & Mark	50 Hp, Rental, Labor	Mar	1	.46	.56	3.58	1.81	3.36	18.84	1.05	1.32	26.37	29.95
Plant Vines	100 Hp, Vine Planter, Labor	Mar	1	.00	.00	.00	.00	.00	49.80	580.80	33.11	663.71	63.71
Weed Control	50 Hp, 100 Gal. Sprayer	Apr	1	.46	.55	11.25	2.38	3.30	.00	31.80	1.69	39.17	50.42
Irrigation	System Start-up	Apr	1	.00	.00	.00	.00	.00	6.00	.00	.27	6.27	6.27
Fertilize	Aqua thru Trickle System	Apr	1	.00	.00	.00	.00	.00	.00	5.00	.23	5.23	5.23
Disc	Custom Discing	Apr	1	.00	.00	.00	.00	.00	65.00	.00	2.93	67.93	67.93
Hoeing	Hand Hoeing	Jun	1	.00	.00	.00	.00	.00	18.00	.00	.54	18.54	18.54
Disc	50 Hp, Disc	Jul	1	2.00	2.00	26.56	14.64	12.00	.00	.00	.60	27.24	53.80
Hoeing	Hand Hoeing	Jul	1	.00	.00	.00	.00	.00	18.00	.00	.41	18.41	18.41
Disc	50 Hp, Disc	Aug	1	2.00	2.00	26.56	14.64	12.00	.00	.00	.40	27.04	53.60
Plant Cover	50 Hp, Rented Grass Seeder	Sep	1	.57	.69	4.43	2.24	4.14	5.00	12.15	.18	23.71	28.14
Install Posts	50 Hp, Rent Digger/Auger Lab	Oct	1	2.25	2.72	17.50	8.85	16.32	16.30	5.98	.00	47.45	64.95
Set Posts	50 Hp, Rented Driver, Labor	Oct	1	4.75	5.75	36.95	18.67	34.50	35.50	.00	.00	88.67	25.62
Spread Posts	50 Hp, Trailer, Labor	Oct	1	.46	.55	5.96	2.32	3.30	6.00	59.20	.00	70.82	76.78
Irrigation	Equipment Shut-down	Oct	1	.00	.00	.00	.00	.00	1.50	.00	.00	1.50	1.50
Taxes	Real Estate	Ann	1	.00	.00	60.64	.00	.00	.00	.00	.00	.00	60.64
Management Fee	7% of Gross Returns	Ann	1	.00	.00	.00	.00	.00	423.50	.00	19.06	442.56	42.56
Land	Net Land Rent	Sea	1	.00	.00	125.00	.00	.00	.00	.00	.00	.00	125.00
Miscellaneous	Utilities, Legal, Actg, Etc.	Sea	1	.00	.00	.00	.00	.00	60.00	.00	2.70	62.70	62.70
4-wheel Cycle	Misc. Use	Sea	1	1.82	2.00	4.16	5.74	12.00	.00	.00	.80	18.54	22.70
Pickup	Misc. Use	Sea	1	3.60	3.96	20.52	108.92	23.76	.00	.00	5.97	138.65	159.17
Irrigation	Irrigation April-October	Sea	1	.00	.00	107.84	.00	.00	126.00	.00	5.67	131.67	239.51
Total per Acre				18.37	20.78	450.96	180.22	124.68	989.44	695.98	84.25	2074.56	2525.52

Table 4. Second-Year Itemized Costs per Acre for Merlot

		PRICE OR		VALUE OR	YOUR
	UNIT	COST/UNIT	QUANTITY	COST	FARM

Variable Costs		\$		\$	
Post Driver	Acre	7.00	1.00	7.00	_____
Labor	Hour	6.00	71.25	427.5	_____
Unspaded Stake	Each	1.70	484.00	822.80	_____
Wire Crimper	Acre	5.00	1.00	5.00	_____
#11 Wire Ht	Foot	.02	5030.00	85.51	_____
Wire Clips	Each	.20	2057.00	411.40	_____
Custom Pruning	Acre	383.72	1.00	383.72	_____
Auger Rent (plt)	Acre	5.60	1.00	5.60	_____
Grape Plants	Each	.60	30.00	18.00	_____
Nitrogen	Pound	.10	40.00	4.00	_____
Surflan	Gal.	79.50	.40	31.80	_____
Plastic Ribbon	Foot	.0025	1080.00	2.70	_____
Rally	Pound	88.00	.31	27.28	_____
Management Fee	Acre	423.50	1.00	423.50	_____
Miscellaneous	Acre	60.00	1.00	60.00	_____
Irr. Elect. Chrg	Acre	20.00	1.00	20.00	_____
Irr. Water Chrg	Acre	40.00	1.00	40.00	_____
Irr. Repairs	Acre	30.00	1.00	30.00	_____
Irr. Labor	Hour	7.00	6.00	42.00	_____
Interest on Op. Cap.	Acre	159.85	1.00	159.85	_____
Tractor Repair	Acre	12.35	1.00	12.35	_____
Tractor Fuel/lube	Acre	21.63	1.00	21.63	_____
Machinery Repairs	Acre	17.78	1.00	17.78	_____
Machine Fuel/lube	Acre	107.62	1.00	107.62	_____
Labor (trac/mach)	Acre	95.88	1.00	95.88	_____
Total Variable Cost				3262.92	_____

Fixed Costs		\$		\$	
Tractor Depreciation	Acre	32.17	1.00	32.17	_____
Tractor Interest	Acre	26.28	1.00	26.28	_____
Tractor Insurance	Acre	1.75	1.00	1.75	_____
Tractor Taxes	Acre	4.09	1.00	4.09	_____
Tractor Housing	Acre	2.92	1.00	2.92	_____
Machine Depreciation	Acre	28.95	1.00	28.95	_____
Machine Interest	Acre	20.93	1.00	20.93	_____
Machine Insurance	Acre	1.40	1.00	1.40	_____
Machine Taxes	Acre	3.26	1.00	3.26	_____
Machine Housing	Acre	2.33	1.00	2.33	_____
Int on Inv (Yr.2)	Acre	227.25	1.00	227.25	_____
Value Land	Acre	125.00	1.00	125.00	_____
Irr. Equip	Acre	107.84	1.00	107.84	_____
Estate Tx (Yr.2)	Acre	60.64	1.00	60.64	_____
Total Fixed Cost				644.80	_____

Total Cost				3907.72	_____

Table 5. Second-Year Schedule of Operation and Estimated Costs per Acre for Merlot

Operation	Tooling	Mth	Year	Mach Hours	Labor Hours	Total Fixed Cost	Variable Cost					Total Variable Cost	Total Cost
							Fuel, Lube, & Repairs	Mach Labor	Service	Mater.	Inter.		
						\$	\$	\$	\$	\$	\$	\$	
Set Line Posts	50 Hp, Driver, Labor	Feb	2	5.00	6.05	38.89	19.66	36.30	67.00	822.80	56.75	1002.50	1041.39
Crimp/string Wir	50 Hp, Trailer, Crimper, Labor	Feb	2	.46	.55	5.96	2.32	3.30	41.00	279.11	19.54	345.28	351.24
Moving Trickle	Labor, Clips	Feb	2	.00	.00	.00	.00	.00	54.00	217.80	16.31	288.11	288.11
Prune Vines	Custom Pruning	Mar	2	.00	.00	.00	.00	.00	383.72	.00	20.15	403.87	403.87
Replant	50 Hp, Trler, Auger, Lab, Plts	Apr	2	.46	.55	5.96	2.32	3.30	29.60	18.00	2.40	55.62	61.58
Fertilize	Aqua Through Trickle System	Apr	2	.00	.00	.00	.00	.00	.00	4.00	.18	4.18	4.18
Weed Control	50 Hp, 100 Gal. Sprayer	Apr	2	.46	.55	11.25	2.38	3.30	.00	31.80	1.69	39.17	50.42
Irrigation	Equipment Start-up	Apr	2	.00	.00	.00	.00	.00	6.00	.00	.27	6.27	6.27
Training	Hand Suckering	May	2	.00	.00	.00	.00	.00	30.00	.00	1.13	31.13	31.13
Mow Cover Crop	50 Hp, Mower	May	2	.49	.59	7.00	4.32	3.54	.00	.00	.29	8.16	15.16
Hoeing	Hand Hoeing	Jun	2	.00	.00	.00	.00	.00	36.00	.00	1.08	37.08	37.08
Summer Training	Labor & Ribbon	Jun	2	.00	.00	.00	.00	.00	60.00	2.70	1.88	64.58	64.58
Mow Cover Crop	50 Hp, Mower	Jun	2	.49	.59	7.00	4.32	3.54	.00	.00	.24	8.10	15.10
Fungicide	50 Hp, 400 Gal. Sprayer	Jun	2	.46	.55	16.32	5.07	3.30	.00	27.28	1.07	36.72	53.03
Summer Training	Labor	Jul	2	.00	.00	.00	.00	.00	60.00	.00	1.35	61.35	61.35
Mow Cover Crop	50 Hp, Mower	Jul	2	.49	.59	7.00	4.32	3.54	.00	.00	.18	8.04	15.04
Summer Training	Labor	Aug	2	.00	.00	.00	.00	.00	60.00	.00	.90	60.90	60.90
Irrigation	Equipment Shut-down	Oct	2	.00	.00	.00	.00	.00	1.50	.00	.00	1.50	1.50
Management Fee	7% of Gross Returns	Ann	2	.00	.00	.00	.00	.00	423.50	.00	19.06	442.56	442.56
Estb. Cost	Interest on Establishment Cost	Sea	2	.00	.00	227.25	.00	.00	.00	.00	.00	.00	227.25
Land Rent	Net Land Rent	Sea	2	.00	.00	125.00	.00	.00	.00	.00	.00	.00	125.00
4-wheel Cycle	Misc. Use	Sea	2	1.82	2.00	4.16	5.74	12.00	.00	.00	.80	18.54	22.70
Pickup	Misc. Use	Sea	2	3.60	3.96	20.52	108.92	23.76	.00	.00	5.97	138.65	159.17
Miscellaneous	Utilities, Legal, Acctng, Etc.	Sea	2	.00	.00	.00	.00	.00	60.00	.00	2.70	62.70	62.70
Irrigation	Irrigate April-October	Sea	2	.00	.00	107.84	.00	.00	132.00	.00	5.94	137.94	245.78
Taxes	Real Estate	Ann	2	.00	.00	60.64	.00	.00	.00	.00	.00	.00	60.64
Total per Acre				13.73	15.98	644.80	159.38	95.88	1444.32	1403.49	159.85	3262.92	3907.72

Third-Year Establishment Costs for Merlot Vineyard

Pruning was performed in February and 40 pounds of nitrogen were added during the third year. The control of insects and pests became more intense. Rally and Dimethoate were the main chemicals used.

During the third year, 2.5 tons of grapes were harvested. Harvesting costs were \$187.50 per acre (Tables 6 and 7). The interest on the investment was \$578.94 per acre. Total costs during the third year were \$3,209.84 per acre. Total revenues during the third year were \$2,750 per acre, leaving a net establishment cost for the third year of \$459.84 per acre.

Fourth-Year Establishment Costs for Merlot Vineyard

In the fourth year of establishment, insect and fungi control became even more intense. For this reason, a canopy management cost was introduced, accounting for \$77.25 per acre (Tables 9 and 10). This practice allows for the reduction in the use of fungicides throughout the vineyard. The harvesting costs were \$300 per acre because the production increases to four tons. The total per acre cost was \$3,021.70, with \$1,904.82 being variable costs and \$1,116.88 being fixed costs. Total revenues during the fourth year were \$4,400 per acre, providing a net positive return for the year of \$1,378.30 per acre.

Table 6. Third-Year Itemized Costs per Acre for Merlot

		Price or	Quantity	Value or	Your
	Unit	Cost/unit		Cost	Farm

Variable Costs		\$		\$	
Custom Pruning	Acre	383.72	1.00	383.72	_____
Labor	Hour	6.00	33.15	198.90	_____
Plastic Ribbon	Foot	.0025	540.00	1.35	_____
#13 Wire Ht	Foot	.01	5030.00	50.30	_____
Wire Clips	Each	.20	968.00	193.60	_____
Surflan	Gal.	79.50	.40	31.80	_____
Nitrogen	Pound	.10	40.00	4.00	_____
Rally	Pound	88.00	.31	27.28	_____
Dimethoate	Pound	2.70	6.00	16.20	_____
Rally	Pound	88.00	.31	27.28	_____
Dimethoate	Pound	2.70	6.00	16.20	_____
Rally	Pound	88.00	.31	27.28	_____
Custom Harvest	Ton	75.00	2.50	187.50	_____
Management Fee	Acre	423.50	1.00	423.50	_____
Irr. Elect. Chg	Acre	20.00	1.00	20.00	_____
Irr. Water Chrg	Acre	40.00	1.00	40.00	_____
Irr. Repairs	Acre	30.00	1.00	30.00	_____
Irr. Labor	Hour	7.00	6.00	42.00	_____
Miscellaneous	Acre	60.00	1.00	60.00	_____
Labor	Hour	6.00	2.00	12.00	_____
Interest on Op. Cap.	Acre	88.57	1.00	88.57	_____
Tractor Repair	Acre	10.31	1.00	10.31	_____
Tractor Fuel/lube	Acre	18.06	1.00	18.06	_____
Machinery Repairs	Acre	41.19	1.00	41.19	_____
Machine Fuel/lube	Acre	107.62	1.00	107.62	_____
Labor(trac/mach)	Acre	82.74	1.00	82.74	_____

Total Variable Cost				2129.41	_____
Fixed Costs		\$		\$	
Tractor Depreciation	Acre	26.87	1.00	26.87	_____
Tractor Interest	Acre	21.94	1.00	21.94	_____
Tractor Insurance	Acre	1.46	1.00	1.46	_____
Tractor Taxes	Acre	3.41	1.00	3.41	_____
Tractor Housing	Acre	2.44	1.00	2.44	_____
Machine Depreciation	Acre	76.19	1.00	76.19	_____
Machine Interest	Acre	51.09	1.00	51.09	_____
Machine Insurance	Acre	3.41	1.00	3.41	_____
Machine Taxes	Acre	7.95	1.00	7.95	_____
Machine Housing	Acre	5.68	1.00	5.68	_____
Estate Tx (Yr.3)	Acre	68.22	1.00	68.22	_____
Int on Inv.(Yr.3)	Acre	578.94	1.00	578.94	_____
Value Land	Acre	125.00	1.00	125.00	_____
Irr. Equip	Acre	107.84	1.00	107.84	_____

Total Fixed Cost				1080.43	_____
Total Cost				3209.84	_____

Table 7. Third-Year Schedule of Operation and Estimated Costs per Acre for Merlot

Operation	Tooling	Mth	Year	Mach Hours	Labor Hours	Variable Cost						Total Variable Cost	Total Cost
						Total Fixed Cost	Fuel, Lube, & Repairs	Mach Labor	Service	Mater.	Inter.		
						\$	\$	\$	\$	\$	\$		
Prune	Custom Pruning	Feb	3	.00	.00	.00	.00	.00	383.72	.00	23.02	406.74	406.74
Tie	Labor & Ribbon	Feb	3	.00	.00	.00	.00	.00	30.00	1.35	1.88	33.23	33.23
Catch Wire	50 Hp, Trailer, Labor	Feb	3	.46	.55	5.96	2.32	3.30	36.00	243.90	17.13	302.66	308.62
Mow Prunings	50 Hp, Mower	Feb	3	.49	.59	7.00	4.32	3.54	.00	.00	.47	8.33	15.33
Weed Control	50 Hp, 100 Gal. Sprayer	Apr	3	.46	.55	11.25	2.38	3.30	.00	31.80	1.69	39.17	50.42
Fertilize	Aqua Through Trickle System	Apr	3	.00	.00	.00	.00	.00	.00	4.00	.18	4.18	4.18
Irrigation	Equipment Start-up	Apr	3	.00	.00	.00	.00	.00	6.00	.00	.27	6.27	6.27
Fungicide	50 Hp, 400 Gal. Sprayer	May	3	.46	.55	16.32	5.07	3.30	.00	27.28	1.34	36.98	53.30
Suckering	Hand Suckering	May	3	.00	.00	.00	.00	.00	30.00	.00	1.13	31.13	31.13
Mow Cover Crop	50 Hp, Mower	May	3	.49	.59	7.00	4.32	3.54	.00	.00	.29	8.16	15.16
Summer Training	Labor	May	3	.00	.00	.00	.00	.00	36.00	.00	1.35	37.35	37.35
Mow Cover Crop	50 Hp, Mower	Jun	3	.49	.59	7.00	4.32	3.54	.00	.00	.24	8.10	15.10
Insect Control	50 Hp, 400 Gal. Sprayer	Jun	3	.46	.55	16.32	5.07	3.30	.00	16.20	.74	25.30	41.62
Fungicide	50 Hp, 400 Gal. Sprayer	Jun	3	.46	.55	16.32	5.07	3.30	.00	27.28	1.07	36.72	53.03
Suckering	Hand Suckering	Jun	3	.00	.00	.00	.00	.00	30.00	.00	.90	30.90	30.90
Mow Cover Crop	50 Hp, Mower	Jul	3	.49	.56	7.00	4.32	3.36	.00	.00	.17	7.85	14.86
Bunchrot Control	50 Hp, 400 Gal. Sprayer	Jul	3	.46	.55	16.32	5.07	3.30	.00	.00	.19	8.56	24.87
Insect Control	50 Hp, 400 Gal. Sprayer	Jul	3	.46	.55	16.32	5.07	3.30	.00	16.20	.55	25.12	41.44
Summer Training	Labor	Jul	3	.00	.00	.00	.00	.00	12.00	.00	.27	12.27	12.27
Fungicide	50 Hp, 400 Gal. Sprayer	Jul	3	.46	.55	16.32	5.07	3.30	.00	27.28	.80	36.45	52.77
Bird Control	Labor	Aug	3	.00	.00	.00	.00	.00	2.70	.00	.04	2.74	2.74
Bunchrot Control	50 Hp, 400 Gal. Sprayer	Aug	3	.46	.55	16.32	5.07	3.30	.00	.00	.13	8.49	24.81
Bird Control	Labor	Sep	3	.00	.00	.00	.00	.00	2.70	.00	.02	2.72	2.72
Bunchrot Control	50 Hp, 400 Gal. Sprayer	Sep	3	.46	.55	16.32	5.07	3.30	.00	.00	.06	8.43	24.75
Irrigation	Equipment Shut-down	Oct	3	.00	.00	.00	.00	.00	1.50	.00	.00	1.50	1.50
Harvest	Custom Harvesting	Oct	3	.00	.00	.00	.00	.00	187.50	.00	.00	187.50	187.50
Taxes	Real Estate	Ann	3	.00	.00	68.22	.00	.00	.00	.00	.00	.00	68.22
Management Fee	7% of Gross Returns	Ann	3	.00	.00	.00	.00	.00	423.50	.00	19.06	442.56	442.56
Estb. Cost	Interest on Establishment Cost	Sea	3	.00	.00	578.94	.00	.00	.00	.00	.00	.00	578.94
Land	Net Land Rent	Sea	3	.00	.00	125.00	.00	.00	.00	.00	.00	.00	125.00
4-wheel Cycle	Misc. Use	Sea	3	1.82	2.00	4.16	5.74	12.00	.00	.00	.80	18.54	22.70
Pickup	Misc. Use	Sea	3	3.60	3.96	20.52	108.92	23.76	.00	.00	5.97	138.65	159.17
Irrigation	Irrigate April-October	Sea	3	.00	.00	107.84	.00	.00	132.00	.00	5.94	137.94	245.78
Miscellaneous	Utilities, Legal, Acctng, Etc.	Sea	3	.00	.00	.00	.00	.00	60.00	.00	2.70	62.70	62.70
Summer Training	Labor	Aug	3	.00	.00	.00	.00	.00	12.00	.00	.18	12.18	12.18
Total per Acre				11.98	13.79	1080.43	177.19	82.74	1385.62	395.29	88.57	2129.41	3209.84

Production Costs for Merlot Vineyard in Full Production

The cost per acre for an established Merlot vineyard in full production is reported in Tables 11 and 12. The cultural practices that were performed remain the same throughout vineyard life. The practices consist of pruning and tying operations in February, fertilizing, weed control, and irrigation practices in April, and finally fungicide treatment during the summer.

The amortization on investment capital was calculated for the remaining 16 years and accounted for \$662.00 per acre. The interest rate utilized for amortizing the establishment cost was 9%. The total cost of production in the fifth year or for an established Merlot vineyard was \$3,175.83 per acre. The variable costs per acre per year for the remaining 16 years was \$2,017.32, while the fixed costs was \$1,158.51. Table 13 summarizes the overall production, revenues, variable and fixed costs per acre for a Merlot vineyard. Accumulated establishment costs per acre were \$2,525.51, \$6,433.23, \$6,893.07, \$5,514.77, from the first to the fourth year. The net establishment cost per acre is \$5,514.77. The total costs per acre from the fifth year on are estimated at \$3,175.83 per acre.

Table 9. Fourth-Year Itemized Costs per Acre for Merlot

		Price or Unit Cost/unit	Quantity	Value or Cost	Your Farm

Variable Costs		\$		\$	
Custom Pruning	Acre	383.72	1.00	383.72	_____
Labor	Hour	6.00	7.15	42.90	_____
Plastic Ribbon	Foot	.00	540.00	1.35	_____
Nitrogen	Pound	.10	40.00	4.00	_____
Surflan	Gal.	79.50	.40	31.80	_____
Rally	Pound	88.00	.31	27.28	_____
Roundup	Gal.	37.00	.30	11.10	_____
Canopy Manage	Acre	75.00	1.00	75.00	_____
Rally	Pound	88.00	.31	27.28	_____
Dimethoate	Pound	2.70	6.00	16.20	_____
Rally	Pound	88.00	.31	27.28	_____
Dimethoate	Pound	2.70	6.00	16.20	_____
Custom Harvest	Ton	75.00	4.00	300.00	_____
Management Fee	Acre	423.50	1.00	423.50	_____
Miscellaneous	Acre	60.00	1.00	60.00	_____
Irr. Elect. Chrg.	Acre	20.00	1.00	20.00	_____
Irr. Water Chrg	Acre	40.00	1.00	40.00	_____
Irr. Repairs	Acre	30.00	1.00	30.00	_____
Irr. Labor	Hour	7.00	6.00	42.00	_____
Interest on Op. Cap.	Acre	70.22	1.00	70.22	_____
Tractor Repair	Acre	9.65	1.00	9.65	_____
Tractor Fuel/lube	Acre	16.90	1.00	16.90	_____
Machinery Repairs	Acre	40.89	1.00	40.89	_____
Machine Fuel/lube	Acre	107.62	1.00	107.62	_____
Labor(trac/mach)	Acre	79.92	1.00	79.92	_____

Total Variable Cost				1904.82	_____
Fixed Costs		\$		\$	
Tractor Depreciation	Acre	25.15	1.00	25.15	_____
Tractor Interest	Acre	20.54	1.00	20.54	_____
Tractor Insurance	Acre	1.37	1.00	1.37	_____
Tractor Taxes	Acre	3.19	1.00	3.19	_____
Tractor Housing	Acre	2.28	1.00	2.28	_____
Machine Depreciation	Acre	75.61	1.00	75.61	_____
Machine Interest	Acre	50.48	1.00	50.48	_____
Machine Insurance	Acre	3.37	1.00	3.37	_____
Machine Taxes	Acre	7.85	1.00	7.85	_____
Machine Housing	Acre	5.61	1.00	5.61	_____
Estate Tx (Yr.4)	Acre	68.22	1.00	68.22	_____
Value Land	Acre	125.00	1.00	125.00	_____
Int on Inv(Yr.4)	Acre	620.37	1.00	620.37	_____
Irr. Equip	Acre	107.84	1.00	107.84	_____

Total Fixed Cost				1116.88	_____
Total Cost				3021.70	_____

Table 10. Fourth-Year Schedule of Operation and Estimated Costs per Acre for Merlot

Operation	Tooling	Mth	Year	Mach Hours	Labor Hours	Total Fixed Cost	Variable Cost					Total Variable Cost	Total Cost
							Fuel, Lube, & Repairs	Mach Labor	Service	Mater.	Inter.		
						\$	\$	\$	\$	\$	\$	\$	
Prune	Custom Pruning	Feb	4	.00	.00	.00	.00	.00	383.72	.00	23.02	406.74	406.74
Tie	Labor, Ribbon	Feb	4	.00	.00	.00	.00	.00	30.00	1.35	1.88	33.23	33.23
Mow Prunings	50 Hp, Mower	Feb	4	.49	.59	7.00	4.32	3.54	.00	.00	.47	8.33	15.33
Fertilize	Aqua thru Trickle System	Apr	4	.00	.00	.00	.00	.00	.00	4.00	.18	4.18	4.18
Weed Control	50 Hp, 100 Gal. Sprayer	Apr	4	.46	.55	11.25	2.38	3.30	.00	31.80	1.69	39.17	50.42
Irrigation	Equipment Start-up	Apr	4	.00	.00	.00	.00	.00	6.00	.00	.27	6.27	6.27
Mow Cover Crop	50 Hp, Mower	May	4	.49	.59	7.00	4.32	3.54	.00	.00	.29	8.16	15.16
Fungicide	50 Hp, 400 Gal. Sprayer	May	4	.46	.55	16.32	5.07	3.30	.00	27.28	1.34	36.98	53.30
Spot Weed Ctrl.	50 Hp, 100 Gal. Sprayer	Jun	4	.04	.05	.98	.21	.30	.00	11.10	.35	11.96	12.93
Canopy Manage	Canopy Management	Jun	4	.00	.00	.00	.00	.00	75.00	.00	2.25	77.25	77.25
Fungicide	50 Hp, 400 Gal. Sprayer	Jun	4	.46	.55	16.32	5.07	3.30	.00	27.28	1.07	36.72	53.03
Insect Control	50 Hp, 400 Gal. Sprayer	Jun	4	.46	.55	16.32	5.07	3.30	.00	16.20	.74	25.30	41.62
Mow Cover Crop	50 Hp, Mower	Jun	4	.49	.59	7.00	4.32	3.54	.00	.00	.24	8.10	15.10
Mow Cover Crop	50 Hp, Mower	Jul	4	.49	.59	7.00	4.32	3.54	.00	.00	.18	8.04	15.04
Fungicide	50 Hp, 400 Gal. Sprayer	Jul	4	.46	.55	16.32	5.07	3.30	.00	27.28	.80	36.45	52.77
Insect Control	50 Hp, 400 Gal. Sprayer	Jul	4	.46	.55	16.32	5.07	3.30	.00	16.20	.55	25.12	41.44
Bunchrot Control	50 Hp, 400 Gal. Sprayer	Jul	4	.46	.55	16.32	5.07	3.30	.00	.00	.19	8.56	24.87
Bird Control	Labor	Aug	4	.00	.00	.00	.00	.00	2.70	.00	.04	2.74	2.74
Bunchrot Control	50 Hp, 400 Gal. Sprayer	Aug	4	.46	.55	16.32	5.07	3.30	.00	.00	.13	8.49	24.81
Bunchrot Control	50 Hp, 400 Gal. Sprayer	Sep	4	.46	.55	16.32	5.07	3.30	.00	.00	.06	8.43	24.75
Bird Control	Labor	Sep	4	.00	.00	.00	.00	.00	2.70	.00	.02	2.72	2.72
Irrigation	Labor	Oct	4	.00	.00	.00	.00	.00	1.50	.00	.00	1.50	1.50
Harvest	Custom Harvesting	Oct	4	.00	.00	.00	.00	.00	300.00	.00	.00	300.00	300.00
Management Fee	7% of Gross Returns	Ann	4	.00	.00	.00	.00	.00	423.50	.00	19.06	442.56	442.56
Taxes	Real Estate	Ann	4	.00	.00	68.22	.00	.00	.00	.00	.00	.00	68.22
4-wheel Cycle	Misc. Use	Sea	4	1.82	2.00	4.16	5.74	12.00	.00	.00	.80	18.54	22.70
Land	Net Land Rent	Sea	4	.00	.00	125.00	.00	.00	.00	.00	.00	.00	125.00
Estb. Cost	Interest on Establishment Cost	Sea	4	.00	.00	620.37	.00	.00	.00	.00	.00	.00	620.37
Pickup	Misc. Use	Sea	4	3.60	3.96	20.52	108.92	23.76	.00	.00	5.97	138.65	159.17
Miscellaneous	Utilities, Legal, Acctng, Etc.	Sea	4	.00	.00	.00	.00	.00	60.00	.00	2.70	62.70	62.70
Irrigation	Irrigate April-October	Sea	4	.00	.00	107.84	.00	.00	132.00	.00	5.94	137.94	245.78
Total per Acre				11.56	13.32	1116.88	175.07	79.92	1417.12	162.49	70.22	1904.82	3021.70

Table 11. Itemized Costs per Acre for Merlot in Full Production

		Price or		Value or	Your
	Unit	Cost/unit	Quantity	Cost	Farm

Variable Costs		\$		\$	
Custom Pruning	Acre	383.72	1.00	383.72	_____
Labor	Hour	6.00	7.15	42.90	_____
Plastic Ribbon	Foot	.0025	540.00	1.35	_____
Nitrogen	Pound	.10	40.00	4.00	_____
Surflan	Gal.	79.50	.40	31.80	_____
Rally	Pound	88.00	.31	27.28	_____
Roundup	Gal.	37.00	.30	11.10	_____
Canopy Manage	Acre	75.00	1.00	75.00	_____
Rally	Pound	88.00	.31	27.28	_____
Dimethoate	Pound	2.70	6.00	16.20	_____
Rally	Pound	88.00	.31	27.28	_____
Dimethoate	Pound	2.70	6.00	16.20	_____
Custom Harvest	Ton	75.00	5.50	412.50	_____
Management Fee	Acre	423.50	1.00	423.50	_____
Miscellaneous	Acre	60.00	1.00	60.00	_____
Irr. Elect. Chrg	Acre	20.00	1.00	20.00	_____
Irr. Water Chrg	Acre	40.00	1.00	40.00	_____
Irr. Repairs	Acre	30.00	1.00	30.00	_____
Irr. Labor	Hour	7.00	6.00	42.00	_____
Interest on Op. Cap.	Acre	70.22	1.00	70.22	_____
Tractor Repair	Acre	9.65	1.00	9.65	_____
Tractor Fuel/lube	Acre	16.90	1.00	16.90	_____
Machinery Repairs	Acre	40.89	1.00	40.89	_____
Machine Fuel/lube	Acre	107.62	1.00	107.62	_____
Labor(trac/mach)	Acre	79.92	1.00	79.92	_____

Total Variable Cost				2017.32	_____
Fixed Costs		\$		\$	
Tractor Depreciation	Acre	25.15	1.00	25.15	_____
Tractor Interest	Acre	20.54	1.00	20.54	_____
Tractor Insurance	Acre	1.37	1.00	1.37	_____
Tractor Taxes	Acre	3.19	1.00	3.19	_____
Tractor Housing	Acre	2.28	1.00	2.28	_____
Machine Depreciation	Acre	75.61	1.00	75.61	_____
Machine Interest	Acre	50.48	1.00	50.48	_____
Machine Insurance	Acre	3.37	1.00	3.37	_____
Machine Taxes	Acre	7.85	1.00	7.85	_____
Machine Housing	Acre	5.61	1.00	5.61	_____
Estate Tx (3-)	Acre	68.22	1.00	68.22	_____
Value Land	Acre	125.00	1.00	125.00	_____
Int on Inv (Yr.5)	Acre	662.00	1.00	662.00	_____
Irr. Equip	Acre	107.84	1.00	107.84	_____

Total Fixed Cost				1158.51	_____
Total Cost				3175.83	_____

Table 12. Schedule of Operation and Estimated Costs per Acre for Merlot in Full Production

Operation	Tooling	Mth	Year	Mach Hours	Labor Hours	Total Fixed Cost	Variable Cost					Total Variable Cost	Total Cost
							Fuel, Lube, & Repairs	Mach Labor	Service	Mater.	Inter.		
						\$	\$	\$	\$	\$	\$	\$	
Prune	Custom Pruning	Feb	5	.00	.00	.00	.00	.00	383.72	.00	23.02	406.74	406.74
Tie	Labor, Ribbon	Feb	5	.00	.00	.00	.00	.00	30.00	1.35	1.88	33.23	33.23
Mow Prunings	50 Hp, Mower	Feb	5	.49	.59	7.00	4.32	3.54	.00	.00	.47	8.33	15.33
Fertilize	Aqua thru Trickle System	Apr	5	.00	.00	.00	.00	.00	.00	4.00	.18	4.18	4.18
Weed Control	50 Hp, 100 Gal. Sprayer	Apr	5	.46	.55	11.25	2.38	3.30	.00	31.80	1.69	39.17	50.42
Irrigation	Equipment Start-up	Apr	5	.00	.00	.00	.00	.00	6.00	.00	.27	6.27	6.27
Mow Cover Crop	50 Hp, Mower	May	5	.49	.59	7.00	4.32	3.54	.00	.00	.29	8.16	15.16
Fungicide	50 Hp, 400 Gal. Sprayer	May	5	.46	.55	16.32	5.07	3.30	.00	27.28	1.34	36.98	53.30
Spot Weed Ctrl.	50 Hp, 100 Gal. Sprayer	Jun	5	.04	.05	.98	.21	.30	.00	11.10	.35	11.96	12.93
Canopy Manage	Canopy Management	Jun	5	.00	.00	.00	.00	.00	75.00	.00	2.25	77.25	77.25
Fungicide	50 Hp, 400 Gal. Sprayer	Jun	5	.46	.55	16.32	5.07	3.30	.00	27.28	1.07	36.72	53.03
Insect Control	50 Hp, 400 Gal. Sprayer	Jun	5	.46	.55	16.32	5.07	3.30	.00	16.20	.74	25.30	41.62
Mow Cover Crop	50 Hp, Mower	Jun	5	.49	.59	7.00	4.32	3.54	.00	.00	.24	8.10	15.10
Mow Cover Crop	50 Hp, Mower	Jul	5	.49	.59	7.00	4.32	3.54	.00	.00	.18	8.04	15.04
Fungicide	50 Hp, 400 Gal. Sprayer	Jul	5	.46	.55	16.32	5.07	3.30	.00	27.28	.80	36.45	52.77
Insect Control	50 Hp, 400 Gal. Sprayer	Jul	5	.46	.55	16.32	5.07	3.30	.00	16.20	.55	25.12	41.44
Bunchrot Control	50 Hp, 400 Gal. Sprayer	Jul	5	.46	.55	16.32	5.07	3.30	.00	.00	.19	8.56	24.87
Bird Control	Labor	Aug	5	.00	.00	.00	.00	.00	2.70	.00	.04	2.74	2.74
Bunchrot Control	50 Hp, 400 Gal. Sprayer	Aug	5	.46	.55	16.32	5.07	3.30	.00	.00	.13	8.49	24.81
Bunchrot Control	50 Hp, 400 Gal. Sprayer	Sep	5	.46	.55	16.32	5.07	3.30	.00	.00	.06	8.43	24.75
Bird Control	Labor	Sep	5	.00	.00	.00	.00	.00	2.70	.00	.02	2.72	2.72
Irrigation	Labor	Oct	5	.00	.00	.00	.00	.00	1.50	.00	.00	1.50	1.50
Harvest	Custom Harvesting	Oct	5	.00	.00	.00	.00	.00	412.50	.00	.00	412.50	412.50
Management Fee	7% of Gross Returns	Ann	5	.00	.00	.00	.00	.00	423.50	.00	19.06	442.56	442.56
Taxes	Real Estate	Ann	5	.00	.00	68.22	.00	.00	.00	.00	.00	68.22	68.22
4-wheel Cycyle	Misc. Use	Sea	5	1.82	2.00	4.16	5.74	12.00	.00	.00	.80	18.54	22.70
Land	Net Land Rent	Sea	5	.00	.00	125.00	.00	.00	.00	.00	.00	125.00	125.00
Estb. Cost	Interest on Establishment Cost	Sea	5	.00	.00	662.00	.00	.00	.00	.00	.00	662.00	662.00
Pickup	Misc. Use	Sea	5	3.60	3.96	20.52	108.92	23.76	.00	.00	5.97	138.65	159.17
Miscellaneous	Utilities, Legal, Acctng, Etc.	Sea	5	.00	.00	.00	.00	.00	60.00	.00	2.70	62.70	62.70
Irrigation	Irrigate April-October	Sea	5	.00	.00	107.84	.00	.00	132.00	.00	5.94	137.94	245.78
Total per Acre				11.56	13.32	1158.51	175.07	79.92	1529.62	162.49	70.22	2017.32	3175.83

Table 8. Overall Production, Revenue, and Costs Per Acre for Merlot Vineyard

Revenue/Cost Category	Year				
	1	2	3	4	Mature
Production (tons)	0.00	0.00	2.50	4.00	5.50
Price (\$/tons)	1,100.00	1,100.00	1,100.00	1,100.00	1,100.00
Total Revenue (\$/Ac)	0.00	0.00	2,750.00	4,400.00	6,050.00
Total Variable Cost (\$/Ac)	2,074.55	3,262.92	2,129.40	1,904.82	2,017.32
Total Fixed Cost (\$/Ac)	450.96	644.80	1,080.44	1,116.88	1,158.51
Total Costs (\$/Ac)	2,525.51	3,907.72	3,209.84	3,021.70	3,175.83
Net Returns (\$/Ac)	-2,525.51	-3,907.72	-459.84	1,378.30	2,874.17
Accumulated Net Cost	2,525.51	6,433.23	6,893.07	5,514.77	

Chardonnay Vineyard

Several operations described for the Chardonnay vineyard are the same as those described for the Merlot vineyard. Details for the establishment costs for the Chardonnay vineyard are presented in the following sections.

First-Year Establishment Costs for Chardonnay Vineyard

Before planting the vines, customized operations such as discing and plowing were performed. The area was surveyed and marked to prepare for planting. The planting operation occurred in March. During the first year the irrigation system was installed and laid on the ground. About 50 pounds of nitrogen were applied using the irrigation system. Weed control was performed during April; hoeing in June and July. During the first year, the variable costs totaled \$2,034.27 per acre, while the fixed costs were \$397.83 per acre (Tables 14 and 15).

Second-Year Establishment Costs for Chardonnay Vineyard

One of the major costs that occurred in the second year is setting of line posts (Tables 16 and 17). This amounts to more than \$1,000 per acre. Three percent of the vines were replanted. Pruning costs were \$402.75 per acre with \$383.72 being the amount contracted out. Before the plants started the vegetative growth phase, nitrogen was added to the vineyard. This was done by using the irrigation system. The quantity used was 40 pounds. A fungicide such as Rally was applied during the month of June to prevent disease. Year Two of establishment costs totaled \$3,909.07 per acre.

Table 14. First-Year Itemized Costs per Acre for Chardonnay

		Price or Unit Cost/unit	Quantity	Value or Cost	Your Farm

Variable Costs		\$		\$	
Custom Plowing	Acre	75.00	1.00	75.00	_____
Custom Discing	Acre	65.00	1.00	65.00	_____
Labor	Hour	6.00	24.39	146.34	_____
Survey Stakes	Each	.07	15.00	1.05	_____
Tract. & Driver	Acre	25.00	1.00	25.00	_____
Planter Rental	Acre	5.00	1.00	5.00	_____
Grape Plants	Each	.60	968.00	580.80	_____
Surflan	Gal.	79.50	.40	31.80	_____
Nitrogen	Pound	.10	50.00	5.00	_____
Custom Discing	Acre	65.00	1.00	65.00	_____
Grass Seeder Rt	Acre	5.00	1.00	5.00	_____
Crstd Wheat Grs	Pound	.81	15.00	12.15	_____
Post Driver	Acre	7.00	1.00	7.00	_____
Post Auger Rent	Acre	2.80	1.00	2.80	_____
#9 Wire Ht	Foot	.03	230.00	5.98	_____
End Post	Each	3.70	16.00	59.20	_____
Management Fee	Acre	441.35	1.00	441.35	_____
Miscellaneous	Acre	60.00	1.00	60.00	_____
Irr. Elect. Chrg	Acre	20.00	1.00	20.00	_____
Irr. Water Chrg	Acre	40.00	1.00	40.00	_____
Irr. Repairs	Acre	30.00	1.00	30.00	_____
Interest on Op. Cap.	Acre	79.38	1.00	79.38	_____
Tractor Repair	Acre	12.92	1.00	12.92	_____
Tractor Fuel/lube	Acre	22.63	1.00	22.63	_____
Machinery Repairs	Acre	7.76	1.00	7.76	_____
Machine Fuel/lube	Acre	107.62	1.00	107.62	_____
Labor(trac/mach)	Acre	100.68	1.00	100.68	_____

Total Variable Cost				2034.27	_____
Fixed Costs		\$		\$	
Tractor Depreciation	Acre	33.67	1.00	33.67	_____
Tractor Interest	Acre	27.50	1.00	27.50	_____
Tractor Insurance	Acre	1.83	1.00	1.83	_____
Tractor Taxes	Acre	4.28	1.00	4.28	_____
Tractor Housing	Acre	3.06	1.00	3.06	_____
Machine Depreciation	Acre	16.83	1.00	16.83	_____
Machine Interest	Acre	12.89	1.00	12.89	_____
Machine Insurance	Acre	.86	1.00	.86	_____
Machine Taxes	Acre	2.01	1.00	2.01	_____
Machine Housing	Acre	1.43	1.00	1.43	_____
Estate Tx (Yr.1)	Acre	60.64	1.00	60.64	_____
Value Land	Acre	125.00	1.00	125.00	_____
Irr. Equip	Acre	107.84	1.00	107.84	_____

Total Fixed Cost				397.83	_____
Total Cost				2432.10	_____

Table 15. First-Year Schedule of Operation and Estimated Costs per Acre for Chardonnay

Operation	Tooling	Mth	Year	Mach Hours	Labor Hours	Total Fixed Cost	Variable Cost					Total Variable Cost	Total Cost
							Fuel, Lube, & Repairs	Mach Labor	Service	Mater.	Inter.		
						\$	\$	\$	\$	\$	\$	\$	
Custom Plow	Custom Plowing	Feb	1	.00	.00	.00	.00	.00	75.00	.00	4.25	79.25	79.25
Custom Discing	Custom Discing	Feb	1	.00	.00	.00	.00	.00	65.00	.00	3.68	68.68	68.68
Survey & Mark	50 Hp, Rental, Labor	Mar	1	.46	.56	3.58	1.81	3.36	18.84	1.05	1.24	26.30	29.88
Plant Vines	100 Hp, Vine Planter, Labor	Mar	1	.00	.00	.00	.00	.00	49.80	580.80	31.27	661.87	661.87
Weed Control	50 Hp, 100 Gal. Sprayer	Apr	1	.46	.55	11.25	2.38	3.30	.00	31.80	1.59	39.07	50.32
Irrigation	System Start-up	Apr	1	.00	.00	.00	.00	.00	6.00	.00	.26	6.25	6.25
Fertilize	Aqua thru Trickle System	Apr	1	.00	.00	.00	.00	.00	.00	5.00	.21	5.21	5.21
Disc	Custom Discing	Apr	1	.00	.00	.00	.00	.00	65.00	.00	2.76	67.76	67.76
Hoeing	Hand Hoeing	Jun	1	.00	.00	.00	.00	.00	18.00	.00	.51	18.51	18.51
Hoeing	Hand Hoeing	Jul	1	.00	.00	.00	.00	.00	18.00	.00	.38	18.38	18.38
Plant Cover	50 Hp, Rented Grass Seeder	Sep	1	.57	.69	4.43	2.24	4.14	5.00	12.15	.17	23.70	28.13
Set Posts	50 Hp, Rented Driver, Labor	Oct	1	4.75	5.75	36.95	18.67	34.50	35.50	.00	.00	88.67	125.62
Install Posts	50 Hp, Rent Digger/Auger Lab	Oct	1	2.25	2.72	17.50	8.85	16.32	16.30	5.98	.00	47.45	64.95
Spread Posts	50 Hp, Trailer, Labor	Oct	1	.46	.55	5.96	2.32	3.30	6.00	59.20	.00	70.82	76.78
Irrigation	Equipment Shut-down	Oct	1	.00	.00	.00	.00	.00	1.50	.00	.00	1.50	1.50
Taxes	Real Estate	Ann	1	.00	.00	60.64	.00	.00	.00	.00	.00	.00	60.64
Management Fee	7% of Gross Returns	Ann	1	.00	.00	.00	.00	.00	441.35	.00	18.76	460.11	460.11
4-wheel Cycle	Misc. Use	Sea	1	1.82	2.00	4.16	5.74	12.00	.00	.00	.75	18.50	22.66
Miscellaneous	Utilities, Legal, Acctng, Etc.	Sea	1	.00	.00	.00	.00	.00	60.00	.00	2.55	62.55	62.55
Land	Net Land Rent	Sea	1	.00	.00	125.00	.00	.00	.00	.00	.00	.00	125.00
Pickup	Misc. Use	Sea	1	3.60	3.96	20.52	108.92	23.76	.00	.00	5.64	138.32	158.84
Irrigation	Irrigate April-October	Sea	1	.00	.00	107.84	.00	.00	126.00	.00	5.36	131.36	239.20
Total per Acre				14.37	16.78	397.83	150.93	100.68	1007.29	695.98	79.38	2034.27	2432.10

Table 16. Second - Year Itemized Costs per Acre for Chardonnay

		Price or Unit Cost/unit	Quantity	Value or Cost	Your Farm

Variable Costs		\$		\$	
Post Driver	Acre	7.00	1.00	7.00	_____
Labor	Hour	6.00	71.25	427.50	_____
Unspaded Stake	Each	1.70	484.00	822.80	_____
Wire Crimper	Acre	5.00	1.00	5.00	_____
#11 Wire Ht	Foot	.02	5030.00	85.51	_____
Wire Clips	Each	.20	2057.00	411.40	_____
Custom Pruning	Acre	383.72	1.00	383.72	_____
Auger Rent (Plt)	Acre	5.60	1.00	5.60	_____
Grape Plants	Each	.60	30.00	18.00	_____
Nitrogen	Pound	.10	40.00	4.00	_____
Surflan	Gal.	79.50	.40	31.80	_____
Rally	Pound	88.00	.31	27.28	_____
Plastic Ribbon	Foot	.0025	1080.00	2.70	_____
Management Fee	Acre	441.35	1.00	441.35	_____
Miscellaneous	Acre	60.00	1.00	60.00	_____
Irr. Elect. Chg	Acre	20.00	1.00	20.00	_____
Irr. Water Chrg	Acre	40.00	1.00	40.00	_____
Irr. Repairs	Acre	30.00	1.00	30.00	_____
Irr. Labor	Hour	7.00	6.00	42.00	_____
Interest on Op. Cap.	Dol.	151.73	1.00	151.73	_____
Tractor Repair	Acre	12.35	1.00	12.35	_____
Tractor Fuel/lube	Acre	21.63	1.00	21.63	_____
Machinery Repairs	Acre	17.78	1.00	17.78	_____
Machine Fuel/lube	Acre	107.62	1.00	107.62	_____
Labor(trac/mach)	Acre	95.88	1.00	95.88	_____

Total Variable Cost				3272.65	_____
Fixed Costs		\$		\$	
Tractor Depreciation	Acre	32.17	1.00	32.17	_____
Tractor Interest	Acre	26.28	1.00	26.28	_____
Tractor Insurance	Acre	1.75	1.00	1.75	_____
Tractor Taxes	Acre	4.09	1.00	4.09	_____
Tractor Housing	Acre	2.92	1.00	2.92	_____
Machine Depreciation	Acre	28.95	1.00	28.95	_____
Machine Interest	Acre	20.93	1.00	20.93	_____
Machine Insurance	Acre	1.40	1.00	1.40	_____
Machine Taxes	Acre	3.26	1.00	3.26	_____
Machine Housing	Acre	2.33	1.00	2.33	_____
Estate Tx (Yr.2)	Acre	60.64	1.00	60.64	_____
Int on Inv(Yr.2)	Acre	218.88	1.00	218.88	_____
Value Land	Acre	125.00	1.00	125.00	_____
Irr. Equip	Acre	107.84	1.00	107.84	_____

Total Fixed Cost				636.43	_____
Total Cost				3909.07	_____

Table 17. Second-Year Schedule of Operation and Estimated Costs per Acre for Chardonnay

Operation	Tooling	Mth	Year	Mach Hours	Labor Hours	Total Fixed Cost	Variable Cost					Total Variable Cost	Total Cost
							Fuel, Lube, & Repairs	Mach Labor	Service	Mater.	Inter.		
						\$	\$	\$	\$	\$	\$	\$	
Set Line Posts	50 Hp, Driver, Labor	Feb	2	5.00	6.05	38.89	19.66	36.30	67.00	822.80	53.59	999.35	1038.24
Crimp/string Wir	50 Hp, Trailer, Crimper, Labor	Feb	2	.46	.55	5.96	2.32	3.30	41.00	279.11	18.46	344.19	350.15
Moving Trickle	Labor, Clips	Feb	2	.00	.00	.00	.00	.00	54.00	217.80	15.40	287.20	287.20
Prune Vines	Custom Pruning	Mar	2	.00	.00	.00	.00	.00	383.72	.00	19.03	402.75	402.75
Replant	50 Hp, Trler, Auger, Lab, Plts	Apr	2	.46	.55	5.96	2.32	3.30	29.60	18.00	2.26	55.49	61.45
Fertilize	Aqua Through Trickle System	Apr	2	.00	.00	.00	.00	.00	.00	4.00	.17	4.17	4.17
Weed Control	50 Hp, 100 Gal. Sprayer	Apr	2	.46	.55	11.25	2.38	3.30	.00	31.80	1.59	39.07	50.32
Irrigation	Equipment Start-up	Apr	2	.00	.00	.00	.00	.00	6.00	.00	.26	6.25	6.25
Training	Hand Suckering	May	2	.00	.00	.00	.00	.00	30.00	.00	1.06	31.06	31.06
Mow Cover Crop	50 Hp, Mower	May	2	.49	.59	7.00	4.32	3.54	.00	.00	.28	8.14	15.14
Fungicide	50 Hp, 400 Gal. Sprayer	Jun	2	.46	.55	16.32	5.07	3.30	.00	27.28	1.01	36.66	52.97
Summer Training	Labor & Ribbon	Jun	2	.00	.00	.00	.00	.00	60.00	2.70	1.78	64.48	64.48
Hoeing	Hand Hoeing	Jun	2	.00	.00	.00	.00	.00	36.00	.00	1.02	37.02	37.02
Mow Cover Crop	50 Hp, Mower	Jun	2	.49	.59	7.00	4.32	3.54	.00	.00	.22	8.08	15.09
Mow Cover Crop	50 Hp, Mower	Jul	2	.49	.59	7.00	4.32	3.54	.00	.00	.17	8.03	15.03
Summer Training	Labor	Jul	2	.00	.00	.00	.00	.00	60.00	.00	1.28	61.28	61.28
Summer Training	Labor	Aug	2	.00	.00	.00	.00	.00	60.00	.00	.85	60.85	60.85
Irrigation	Equipment Shut-down	Oct	2	.00	.00	.00	.00	.00	1.50	.00	.00	1.50	1.50
Management Fee	7% of Gross Returns	Ann	2	.00	.00	.00	.00	.00	441.35	.00	18.76	460.11	460.11
Taxes	Real Estate	Ann	2	.00	.00	60.64	.00	.00	.00	.00	.00	.00	60.64
Estb. Cost	Interest on Establishment Cost	Sea	2	.00	.00	218.88	.00	.00	.00	.00	.00	.00	218.88
Land Rent	Net Land Rent	Sea	2	.00	.00	125.00	.00	.00	.00	.00	.00	.00	125.00
4-wheel Cycle	Misc. Use	Sea	2	1.82	2.00	4.16	5.74	12.00	.00	.00	.75	18.50	22.66
Pickup	Misc. Use	Sea	2	3.60	3.96	20.52	108.92	23.76	.00	.00	5.64	138.32	158.84
Miscellaneous	Utilities, Legal, Acctng, Etc.	Sea	2	.00	.00	.00	.00	.00	60.00	.00	2.55	62.55	62.55
Irrigation	Irrigation April-October	Sea	2	.00	.00	107.84	.00	.00	132.00	.00	5.61	137.61	245.45
Total per Acre				13.73	15.98	636.43	159.38	95.88	1462.17	1403.49	151.73	3272.65	3909.07

Third-Year Establishment Costs for Chardonnay Vineyard

During February of the third year, the catch wire was installed, finishing the construction of the trellis system (Tables 18 and 19). Starting in May and through the entire summer, several fungicide applications were applied. The number of applications are related to weather conditions that might be different every year. Nitrogen fertilizer was applied at a rate of 40 pounds per acre. The vineyard's first crop was harvested in Year Three. The production was 2.5 tons. Harvesting costs were \$187.50 per acre. The total cost per acre was \$3,107.12. Total revenue during the third year was \$2,425 per acre, resulting in a net establishment cost for the third year of \$682.11 per acre.

Fourth-Year Establishment Costs for Chardonnay Vineyard

The last year of establishment is Year Four. From February through June, several cultural operations such as pruning, irrigation, fertilization, and bird control were performed. Harvesting costs accounted for \$375.00 per acre and the interest on established costs were equal to \$632.09 per acre (Tables 20 and 21). The variable costs were \$1,862.63 per acre and the fixed costs were \$1,047.02 per acre, for a total of \$2,909.65 per acre. Total revenue during the fourth year was \$4,850 per acres, providing a net positive return for the year of \$1,940.33.

Table 18. Third-Year Itemized Costs per Acre for Chardonnay

		Price or		Value or	Your
	Unit	Cost/unit	Quantity	Cost	Farm

Variable Costs		\$		\$	
Custom Pruning	Acre	383.72	1.00	383.72	_____
Labor	Hour	6.00	28.15	168.90	_____
#13 Wire Ht	Foot	.01	5030.00	50.30	_____
Wire Clips	Each	.20	968.00	193.60	_____
Surflan	Gal.	79.50	.40	31.80	_____
Nitrogen	Pound	.10	40.00	4.00	_____
Rally	Pound	88.00	.31	27.28	_____
Dimethoate	Pound	2.70	6.00	16.20	_____
Rally	Pound	88.00	.31	27.28	_____
Dimethoate	Pound	2.70	6.00	16.20	_____
Rally	Pound	88.00	.31	27.28	_____
Custom Harvest	Ton	75.00	2.50	187.50	_____
Management Fee	Acre	441.35	1.00	441.35	_____
Irr. Elect. Chrg	Acre	20.00	1.00	20.00	_____
Irr. Water Chrg	Acre	40.00	1.00	40.00	_____
Irr. Repairs	Acre	30.00	1.00	30.00	_____
Irr. Labor	Hour	7.00	6.00	42.00	_____
Miscellaneous	Acre	60.00	1.00	60.00	_____
Interest on Op. Cap.	Acre	82.28	1.00	82.28	_____
Tractor Repair	Acre	8.14	1.00	8.14	_____
Tractor Fuel/lube	Acre	14.26	1.00	14.26	_____
Machinery Repairs	Acre	31.96	1.00	31.96	_____
Machine Fuel/lube	Acre	107.62	1.00	107.62	_____
Labor(trac/mach)	Acre	72.84	1.00	72.84	_____

Total Variable Cost				2084.51	_____
Fixed Costs		\$		\$	
Tractor Depreciation	Acre	21.22	1.00	21.22	_____
Tractor Interest	Acre	17.33	1.00	17.33	_____
Tractor Insurance	Acre	1.16	1.00	1.16	_____
Tractor Taxes	Acre	2.70	1.00	2.70	_____
Tractor Housing	Acre	1.93	1.00	1.93	_____
Machine Depreciation	Acre	56.20	1.00	56.20	_____
Machine Interest	Acre	38.22	1.00	38.22	_____
Machine Insurance	Acre	2.55	1.00	2.55	_____
Machine Taxes	Acre	5.95	1.00	5.95	_____
Machine Housing	Acre	4.25	1.00	4.25	_____
Estate Tx (3-)	Acre	68.22	1.00	68.22	_____
Int on Inv(Yr.3)	Acre	570.06	1.00	570.06	_____
Value Land	Acre	125.00	1.00	125.00	_____
Irr. Equip	Acre	107.84	1.00	107.84	_____

Total Fixed Cost				1022.60	_____
Total Cost				3107.12	_____

Table 19. Third-Year Schedule of Operation and Estimated Costs per Acre for Chardonnay

Operation	Tooling	Mth Year	Mach Hours	Labor Hours	Total Fixed Cost	Variable Cost					Total Variable Cost	Total Cost
						Fuel, Lube, & Repairs	Mach Labor	Service Mater.	Inter.			
						\$	\$	\$	\$	\$	\$	\$
Prune	Custom Pruning	Feb 3	.00	.00	.00	.00	.00	383.72	.00	21.74	405.46	405.46
Catch Wire	50 Hp, Trailer, Labor	Feb 3	.46	.55	5.96	2.32	3.30	36.00	243.90	16.18	301.70	307.66
Mow Prunings	50 Hp, Mower	Feb 3	.49	.59	7.00	4.32	3.54	.00	.00	.45	8.31	15.31
Weed Control	50 Hp, 100 Gal. Sprayer	Apr 3	.46	.55	11.25	2.38	3.30	.00	31.80	1.59	39.07	50.32
Fertilize	Aqua Through Trickle System	Apr 3	.00	.00	.00	.00	.00	.00	4.00	.17	4.17	4.17
Irrigation	Equipment Start-up	Apr 3	.00	.00	.00	.00	.00	6.00	.00	.26	6.25	6.25
Fungicide	50 Hp, 400 Gal. Sprayer	May 3	.46	.55	16.32	5.07	3.30	.00	27.28	1.26	36.91	53.23
Suckering	Hand Suckering	May 3	.00	.00	.00	.00	.00	30.00	.00	1.06	31.06	31.06
Mow Cover Crop	50 Hp, Mower	May 3	.49	.59	7.00	4.32	3.54	.00	.00	.28	8.14	15.14
Summer Training	Labor	May 3	.00	.00	.00	.00	.00	36.00	.00	1.28	37.27	37.27
Mow Cover Crop	50 Hp, Mower	Jun 3	.49	.59	7.00	4.32	3.54	.00	.00	.22	8.08	15.09
Insect Control	50 Hp, 400 Gal. Sprayer	Jun 3	.46	.55	16.32	5.07	3.30	.00	16.20	.70	25.26	41.58
Fungicide	50 Hp, 400 Gal. Sprayer	Jun 3	.46	.55	16.32	5.07	3.30	.00	27.28	1.01	36.66	52.97
Suckering	Hand Suckering	Jun 3	.00	.00	.00	.00	.00	30.00	.00	.85	30.85	30.85
Mow Cover Crop	50 Hp, Mower	Jul 3	.49	.56	7.00	4.32	3.36	.00	.00	.16	7.84	14.85
Insect Control	50 Hp, 400 Gal. Sprayer	Jul 3	.46	.55	16.32	5.07	3.30	.00	16.20	.52	25.09	41.41
Summer Training	Labor	Jul 3	.00	.00	.00	.00	.00	12.00	.00	.26	12.26	12.26
Fungicide	50 Hp, 400 Gal. Sprayer	Jul 3	.46	.55	16.32	5.07	3.30	.00	27.28	.76	36.40	52.72
Bird Control	Labor	Aug 3	.00	.00	.00	.00	.00	2.70	.00	.04	2.74	2.74
Summer Training	Labor	Aug 3	.00	.00	.00	.00	.00	12.00	.00	.17	12.17	12.17
Bird Control	Labor	Sep 3	.00	.00	.00	.00	.00	2.70	.00	.02	2.72	2.72
Harvest	Custom Harvesting	Oct 3	.00	.00	.00	.00	.00	187.50	.00	.00	187.50	187.50
Irrigation	Equipment Shut-down	Oct 3	.00	.00	.00	.00	.00	1.50	.00	.00	1.50	1.50
Taxes	Real Estate	Ann 3	.00	.00	68.22	.00	.00	.00	.00	.00	.00	68.22
Management Fee	7% of Gross Returns	Ann 3	.00	.00	.00	.00	.00	441.35	.00	18.76	460.11	460.11
Estb. Cost	Interest on Establishment Cost	Sea 3	.00	.00	570.06	.00	.00	.00	.00	.00	.00	570.06
Land	Net Land Rent	Sea 3	.00	.00	125.00	.00	.00	.00	.00	.00	.00	125.00
4-wheel Cycle	Misc. Use	Sea 3	1.82	2.00	4.16	5.74	12.00	.00	.00	.75	18.50	22.66
Pickup	Misc. Use	Sea 3	3.60	3.96	20.52	108.92	23.76	.00	.00	5.64	138.32	158.84
Irrigation	Irrigate April-October	Sea 3	.00	.00	107.84	.00	.00	132.00	.00	5.61	137.61	245.45
Miscellaneous	Utilities, Legal, Acctng, Etc.	Sea 3	.00	.00	.00	.00	.00	60.00	.00	2.55	62.55	62.55
Total per Acre			10.60	12.14	1022.60	161.98	72.84	1373.47	393.94	82.28	2084.51	3107.12

Production Costs for Chardonnay Vineyard in Full Production

The cultural practices in a mature vineyard do not change much from Year Four. Operations such as pruning, irrigation, fertilizing, and insect controls were performed as in Year Four. The amortization of net establishment cost per acre for the remaining 16 years was \$611.05 per acre (Tables 22 and 23). This amount remains constant for the rest of the vineyard's life. To amortize the invested capital for establishment costs to the end of the 20th year, a 9% rate was used. The variable costs per acre throughout these years were \$1,975.13, while the fixed costs were \$1,025.98. The total cost was \$3,001.11 per acre when in full production and throughout the rest of the vineyard's life. The net return per acre in full production was \$3,303.89, which is similar to the profit level obtained with the Merlot variety.

Table 24 is a summary of the costs and revenues for the entire establishment period and the full production year for the Chardonnay vineyard. The accumulated net establishment costs per year per acre for Chardonnay were \$2,432.10, \$6,341.17, \$7,023.28, \$5,082.96, from the first to the fourth year. The net establishment cost per acre is \$5,082.95.

Table 20. Fourth-Year Itemized Costs per Acre for Chardonnay

		Price or		Value or	Your
	Unit	Cost/unit	Quantity	Cost	Farm

Variable Costs		\$		\$	
Custom Pruning	Acre	383.72	1.00	383.72	_____
Labor	Hour	6.00	2.15	12.90	_____
Nitrogen	Pound	.10	40.00	4.00	_____
Surflan	Gal.	79.50	.40	31.80	_____
Roundup	Gal.	37.00	.30	11.10	_____
Dimethoate	Pound	2.70	6.00	16.20	_____
Rally	Pound	88.00	.31	27.28	_____
Canopy Manage	Acre	75.00	1.00	75.00	_____
Dimethoate	Pound	2.70	6.00	16.20	_____
Custom Harvest	Ton	75.00	5.00	375.00	_____
Management Fee	Acre	441.35	1.00	441.35	_____
Irr. Elect. Chg	Acre	20.00	1.00	20.00	_____
Irr. Water Chrg	Acre	40.00	1.00	40.00	_____
Irr. Repairs	Acre	30.00	1.00	30.00	_____
Irr. Labor	Hour	7.00	6.00	42.00	_____
Miscellaneous	Acre	60.00	1.00	60.00	_____
Interest on Op. Cap.	Acre	62.93	1.00	62.93	_____
Tractor Repair	Acre	6.03	1.00	6.03	_____
Tractor Fuel/lube	Acre	10.57	1.00	10.57	_____
Machinery Repairs	Acre	25.50	1.00	25.50	_____
Machine Fuel/lube	Acre	107.62	1.00	107.62	_____
Labor(trac/mach)	Acre	63.42	1.00	63.42	_____

Total Variable Cost				1862.63	_____
Fixed Costs		\$		\$	
Tractor Depreciation	Acre	15.73	1.00	15.73	_____
Tractor Interest	Acre	12.85	1.00	12.85	_____
Tractor Insurance	Acre	.86	1.00	.86	_____
Tractor Taxes	Acre	2.00	1.00	2.00	_____
Tractor Housing	Acre	1.43	1.00	1.43	_____
Machine Depreciation	Acre	42.29	1.00	42.29	_____
Machine Interest	Acre	29.04	1.00	29.04	_____
Machine Insurance	Acre	1.94	1.00	1.94	_____
Machine Taxes	Acre	4.52	1.00	4.52	_____
Machine Housing	Acre	3.23	1.00	3.23	_____
Estate Tx (Yr.4)	Acre	68.22	1.00	68.22	_____
Int on Inv(Yr.4)	Acre	632.09	1.00	632.09	_____
Value Land	Acre	125.00	1.00	125.00	_____
Irr. Equip	Acre	107.84	1.00	107.84	_____

Total Fixed Cost				1047.02	_____
Total Cost				2909.65	_____

Table 21. Fourth-Year Schedule of Operation and Estimated Costs per Acre for Chardonnay

Operation	Tooling	Mth	Year	Mach Hours	Labor Hours	Total Fixed Cost	Variable Cost					Total Variable Cost	Total Cost
							Fuel, Lube, & Repairs	Mach Labor	Service	Mater.	Inter.		

<div style="display: flex; justify-content: space-between;"> \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ </div>													
Prune	Custom Pruning	Feb	4	.00	.00	.00	.00	.00	383.72	.00	21.74	405.46	405.46
Mow Prunings	50 Hp, Mower	Feb	4	.49	.59	7.00	4.32	3.54	.00	.00	.45	8.31	15.31
Irrigation	Equipment Start-up	Apr	4	.00	.00	.00	.00	.00	6.00	.00	.26	6.25	6.25
Fertilize	Aqua thru Trickle System	Apr	4	.00	.00	.00	.00	.00	.00	4.00	.17	4.17	4.17
Weed Control	50 Hp, 100 Gal. Sprayer	Apr	4	.46	.55	11.25	2.38	3.30	.00	31.80	1.59	39.07	50.32
Mow Cover Crop	50 Hp, Mower	May	4	.49	.59	7.00	4.32	3.54	.00	.00	.28	8.14	15.14
Spot Weed Ctrl.	50 Hp, 100 Gal. Sprayer	Jun	4	.04	.05	.98	.21	.30	.00	11.10	.33	11.94	12.91
Insect Control	50 Hp, 400 Gal. Sprayer	Jun	4	.46	.55	16.32	5.07	3.30	.00	16.20	.70	25.26	41.58
Fungicide	50 Hp, 400 Gal. Sprayer	Jun	4	.46	.55	16.32	5.07	3.30	.00	27.28	1.01	36.66	52.97
Canopy Manage	Canopy Management	Jun	4	.00	.00	.00	.00	.00	75.00	.00	2.13	77.12	77.12
Mow Cover Crop	50 Hp, Mower	Jun	4	.49	.59	7.00	4.32	3.54	.00	.00	.22	8.08	15.09
Mow Cover Crop	50 Hp, Mower	Jul	4	.49	.59	7.00	4.32	3.54	.00	.00	.17	8.03	15.03
Insect Control	50 Hp, 400 Gal. Sprayer	Jul	4	.46	.55	16.32	5.07	3.30	.00	16.20	.52	25.09	41.41
Bird Control	Labor	Aug	4	.00	.00	.00	.00	.00	2.70	.00	.04	2.74	2.74
Bird Control	Labor	Sep	4	.00	.00	.00	.00	.00	2.70	.00	.02	2.72	2.72
Harvest	Custom Harvesting	Oct	4	.00	.00	.00	.00	.00	375.00	.00	.00	375.00	375.00
Irrigation	Labor	Oct	4	.00	.00	.00	.00	.00	1.50	.00	.00	1.50	1.50
Management Fee	7% of Gross Returns	Ann	4	.00	.00	.00	.00	.00	441.35	.00	18.76	460.11	460.11
Taxes	Real Estate	Ann	4	.00	.00	68.22	.00	.00	.00	.00	.00	.00	68.22
Estb. Cost	Interest on Establishment Cost	Sea	4	.00	.00	632.09	.00	.00	.00	.00	.00	.00	632.09
Land	Net Land Rent	Sea	4	.00	.00	125.00	.00	.00	.00	.00	.00	.00	125.00
4-wheel Cycle	Misc. Use	Sea	4	1.82	2.00	4.16	5.74	12.00	.00	.00	.75	18.50	22.66
Pickup	Misc. Use	Sea	4	3.60	3.96	20.52	108.92	23.76	.00	.00	5.64	138.32	158.84
Irrigation	Irrigation April-October	Sea	4	.00	.00	107.84	.00	.00	132.00	.00	5.61	137.61	245.45
Miscellaneous	Utilities, Legal, Acctng, Etc.	Sea	4	.00	.00	.00	.00	.00	60.00	.00	2.55	62.55	62.55

Total per Acre				9.26	10.57	1047.02	149.73	63.42	1479.97	106.58	62.93	1862.63	2909.65

Table 22. Itemized Costs per Acre for Chardonnay in Full Production

		Price or		Value or	Your
	Unit	Cost/unit	Quantity	Cost	Farm

Variable Costs		\$		\$	
Custom Pruning	Acre	383.72	1.00	383.72	_____
Labor	Hour	6.00	2.15	12.90	_____
Nitrogen	Pound	.10	40.00	4.00	_____
Surflan	Gal.	79.50	.40	31.80	_____
Roundup	Gal.	37.00	.30	11.10	_____
Dimethoate	Pound	2.70	6.00	16.20	_____
Rally	Pound	88.00	.31	27.28	_____
Canopy Manage	Acre	75.00	1.00	75.00	_____
Dimethoate	Pound	2.70	6.00	16.20	_____
Custom Harvest	Ton	75.00	6.50	487.50	_____
Management Fee	Acre	441.35	1.00	441.35	_____
Irr. Elect. Chrg	Acre	20.00	1.00	20.00	_____
Irr. Water Chrg	Acre	40.00	1.00	40.00	_____
Irr. Repairs	Acre	30.00	1.00	30.00	_____
Irr. Labor	Hour	7.00	6.00	42.00	_____
Miscellaneous	Acre	60.00	1.00	60.00	_____
Interest on Op. Cap.	Acre	62.93	1.00	62.93	_____
Tractor Repair	Acre	6.03	1.00	6.03	_____
Tractor Fuel/lube	Acre	10.57	1.00	10.57	_____
Machinery Repairs	Acre	25.50	1.00	25.50	_____
Machine Fuel/lube	Acre	107.62	1.00	107.62	_____
Labor(trac/mach)	Acre	63.42	1.00	63.42	_____

Total Variable Cost				1975.13	_____
Fixed Costs		\$		\$	
Tractor Depreciation	Acre	15.73	1.00	15.73	_____
Tractor Interest	Acre	12.85	1.00	12.85	_____
Tractor Insurance	Acre	.86	1.00	.86	_____
Tractor Taxes	Acre	2.00	1.00	2.00	_____
Tractor Housing	Acre	1.43	1.00	1.43	_____
Machine Depreciation	Acre	42.29	1.00	42.29	_____
Machine Interest	Acre	29.04	1.00	29.04	_____
Machine Insurance	Acre	1.94	1.00	1.94	_____
Machine Taxes	Acre	4.52	1.00	4.52	_____
Machine Housing	Acre	3.23	1.00	3.23	_____
Estate Tx (Yr.5)	Acre	68.22	1.00	68.22	_____
Int on Inv(Yr.5)	Acre	611.05	1.00	611.05	_____
Value Land	Acre	125.00	1.00	125.00	_____
Irr. Equip	Acre	107.84	1.00	107.84	_____

Total Fixed Cost				1025.98	_____
Total Cost				3001.11	_____

Table 23. Schedule of Operation and Estimated Costs per Acre for Chardonnay in Full Production

Operation	Tooling	Mth	Year	Mach Hours	Labor Hours	Total Fixed Cost	Variable Cost					Total Variable Cost	Total Cost
							Fuel, Lube, & Repairs	Mach Labor	Service	Mater.	Inter.		
						\$	\$	\$	\$	\$	\$	\$	
Prune	Custom Pruning	Feb	5	.00	.00	.00	.00	.00	383.72	.00	21.74	405.46	405.46
Mow Pruning	50 Hp, Mower	Feb	5	.49	.59	7.00	4.32	3.54	.00	.00	.45	8.31	15.31
Irrigation	Equipment Start-up	Apr	5	.00	.00	.00	.00	.00	6.00	.00	.26	6.25	6.25
Fertilize	Aqua thru Trickle System	Apr	5	.00	.00	.00	.00	.00	.00	4.00	.17	4.17	4.17
Weed Control	50 Hp, 100 Gal. Sprayer	Apr	5	.46	.55	11.25	2.38	3.30	.00	31.80	1.59	39.07	50.32
Mow Cover Crop	50 Hp, Mower	May	5	.49	.59	7.00	4.32	3.54	.00	.00	.28	8.14	15.14
Spot Weed Ctrl.	50 Hp, 100 Gal. Sprayer	Jun	5	.04	.05	.98	.21	.30	.00	11.10	.33	11.94	12.91
Insect Control	50 Hp, 400 Gal. Sprayer	Jun	5	.46	.55	16.32	5.07	3.30	.00	16.20	.70	25.26	41.58
Fungicide	50 Hp, 400 Gal. Sprayer	Jun	5	.46	.55	16.32	5.07	3.30	.00	27.28	1.01	36.66	52.97
Canopy Manage	Canopy Management	Jun	5	.00	.00	.00	.00	.00	75.00	.00	2.13	77.12	77.12
Mow Cover Crop	50 Hp, Mower	Jun	5	.49	.59	7.00	4.32	3.54	.00	.00	.22	8.08	15.09
Mow Cover Crop	50 Hp, Mower	Jul	5	.49	.59	7.00	4.32	3.54	.00	.00	.17	8.03	15.03
Insect Control	50 Hp, 400 Gal. Sprayer	Jul	5	.46	.55	16.32	5.07	3.30	.00	16.20	.52	25.09	41.41
Bird Control	Labor	Aug	5	.00	.00	.00	.00	.00	2.70	.00	.04	2.74	2.74
Bird Control	Labor	Sep	5	.00	.00	.00	.00	.00	2.70	.00	.02	2.72	2.72
Harvest	Custom Harvesting	Oct	5	.00	.00	.00	.00	.00	487.50	.00	.00	487.50	487.50
Irrigation	Labor	Oct	5	.00	.00	.00	.00	.00	1.50	.00	.00	1.50	1.50
Management Fee	7% of Gross Returns	Ann	5	.00	.00	.00	.00	.00	441.35	.00	18.76	460.11	460.11
Taxes	Real Estate	Ann	5	.00	.00	68.22	.00	.00	.00	.00	.00	.00	68.22
Estb. Cost	Interest on Establishment Cost	Sea	5	.00	.00	611.05	.00	.00	.00	.00	.00	.00	611.05
Land	Net Land Rent	Sea	5	.00	.00	125.00	.00	.00	.00	.00	.00	.00	125.00
4-wheel Cycle	Misc. Use	Sea	5	1.82	2.00	4.16	5.74	12.00	.00	.00	.75	18.50	22.66
Pickup	Misc. Use	Sea	5	3.60	3.96	20.52	108.92	23.76	.00	.00	5.64	138.32	158.84
Irrigation	Irrigation April-October	Sea	5	.00	.00	107.84	.00	.00	132.00	.00	5.61	137.61	245.45
Miscellaneous	Utilities, Legal, Acctng, Etc.	Sea	5	.00	.00	.00	.00	.00	60.00	.00	2.55	62.55	62.55
Total per Acre				9.26	10.57	1025.98	149.73	63.42	1592.47	106.58	62.93	1975.13	3001.11

Table 24. Overall Production, Revenue, and Costs per Acre for Chardonnay Vineyard

Revenue/Cost Category	Year				
	1	2	3	4	Mature
Production (tons)	0.00	0.00	2.50	5.00	6.50
Price (\$/ton)	970.00	970.00	970.00	970.00	970.00
Total Revenue (\$/Ac)	0.00	0.00	2,425.00	4,850.00	6,305.00
Total Variable Costs (\$/Ac)	2,034.26	3,272.65	2,084.51	1,862.63	1,975.13
Total Fixed Costs (\$/Ac)	397.83	636.43	1,022.60	1,047.04	1,025.98
Total Costs (\$/Ac)	2,432.10	3,909.07	3,107.11	2,909.67	3,001.11
Net Return	-2,432.10	-3,909.07	-682.12	1,940.33	3,303.89
Accumulated Net Cost	2,432.10	6,341.17	7,023.28	5,082.95	

Conclusion

The establishment cost per acre for a vineyard is characterized by many costs before a crop is produced. The annual costs are covered in the fourth year of establishment and a positive cash flow starts for both Merlot and Chardonnay varieties. Given the current price level per ton and the yield per acre in mature vineyards the profit levels are positive.

It is recognized that costs vary from farm to farm. Growers should realize that this bulletin used several assumptions such as new machinery cost, and economic cost standards such as opportunity cost. This study should not be generalized to vineyard practices outside the assumptions applied in the study. It does provide a benchmark for analyzing the economic implications of establishing and producing Merlot and Chardonnay wine grapes in Washington State.

Appendix A. Equipment Complement for a 55-acre Vineyard

MACHINERY	PURCHASE PRICE	YEARS TO TRADE	ANNUAL HOURS	DEPREC- IATION	INTER- EST	INSUR- ANCE	TAXES	HOUSING	TOTAL FIXED COST	REPAIR	FUEL AND LUBE	TOTAL VARIABLE COST	TOTAL COST
	\$								COST PER HOUR				
50 HP TRACTOR	21,600.00	15	350	3.72	3.04	.20	.47	.34	7.78	1.43	2.50	3.93	11.71
3/4 TON PICKUP	25,000.00	10	650	2.71	2.24	.15	.35	.25	5.70	1.27	28.98	30.25	35.95
150 GAL SPRAYER	2,600.00	10	25	8.56	5.51	.37	.86	.61	15.90	.85	.00	.85	16.75
400 GAL SPRAYER	13,200.00	10	75	14.48	9.32	.62	1.45	1.04	26.91	6.69	.00	6.69	33.60
TRAILER	2,000.00	20	50	2.00	1.80	.12	.28	.20	4.40	.73	.00	.73	5.13
4-WHEEL CYCLE	6,000.00	10	400	1.22	.80	.05	.12	.09	2.29	1.34	1.81	3.16	5.44
MOWER	7,500.00	10	200	3.09	1.99	.13	.31	.22	5.73	4.49	.00	4.49	10.23

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 violation of 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.

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