
UNIVERSITY OF CALIFORNIA COOPERATIVE EXTENSION

2013

**SAMPLE COSTS
TO ESTABLISH A VINEYARD AND PRODUCE
*WINE GRAPES***

Chardonnay Variety



Sacramento Valley
SACRAMENTO RIVER DELTA
Sacramento and Yolo Counties – Crush District 17

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Sacramento Valley, Sacramento River Delta of
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INTRODUCTION

Sample costs to establish a vineyard and produce wine grapes under drip irrigation in the Sacramento Valley – Sacramento River Delta (Sacramento and Yolo counties) are presented in this study. This study is intended as a guide only, and can be used to make production decisions, determine potential returns, prepare budgets and evaluate production loans. Practices described are based on production practices considered typical for the crop and area, but these same practices will not apply to every situation. The sample costs for labor, materials, equipment and custom services are based on current figures. A blank column, “*Your Costs*”, in Tables 2 and 3 is provided for entering your costs.

The hypothetical farm operation, production practices, overhead, and calculations are described under the assumptions. For additional information or an explanation of the calculations used in the study call the Department of Agricultural and Resource Economics, University of California, Davis, (530) 752-3589 or your local UC Cooperative Extension office.

Sample Cost of Production Studies are available for many commodities. Current and archived studies can be downloaded from the Agricultural and Resource Economics website at UC Davis <http://coststudies.ucdavis.edu>. These studies as well as other archived studies not on the website can be requested through the department by calling (530) 752-6887.

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ASSUMPTIONS

The assumptions refer to Tables 1 to 8 and pertain to sample costs to establish a vineyard and produce wine grapes in the Sacramento River Delta of the Sacramento Valley – Sacramento and Yolo counties (California Crush District 17). The cultural practices described represent production operations and materials considered typical on a well-managed vineyard in the region. Costs, materials, and practices in this study will not apply to all farms. Timing and types of cultural practices will vary among growers within the region and from season to season due to variables such as weather, soil, and insect and disease pressure. The study does not represent a single farm and is intended as a guide only. **The use of trade names and cultural practices in this report does not constitute an endorsement or recommendation by the University of California nor is any criticism implied by omission of other similar products or cultural practices.**

Farm. The hypothetical farm located on the valley floor in the Sacramento River Delta of Sacramento and Yolo Counties is managed and operated by the owner. The 200 contiguous acre farm consists of 135 acres of producing vineyards, 60 acres of wine grapes being established that are the basis of this study, and five acres occupied by roads, irrigation systems, and farmstead. **Operations are based on a calendar year.**

Establishment Operating Costs

(Table 1.)

Vineyard Conversion and Site Preparation. The new vineyard is being planted on land that had an existing vineyard. The old grapevines are removed in the fall. After the vines have been pushed out and burned, the land is ripped twice; 24 to 30 inches deep, to break up hardpan, improve root and water penetration and also pull up additional roots remaining from the previous vines. Afterwards, the ground is disced two times. The field is laser leveled, then in a single operation disced and cultipacked. In the spring, the ground is cultivated (disced) two times. Operations done in the year prior to planting are shown in the first year. Vineyard removal and ripping are done by contract or custom operators.

Vines. Potted benchgraft vines, Chardonnay variety, are planted on 7 x 10 foot spacing at 622 vines per acre. Chardonnay is the predominant wine variety in the area. The Merlot variety, also planted in the area, has similar cultural practices. Vines are trained to a bilateral cordon at 42 - 44 inches and spur pruned. Cordons are the horizontal branches and the spurs or shoots are the bearing units on the cordon. The grapevines are assumed to begin yielding fruit in three years and produce for an additional 20 years.

Planting. Planting starts in early spring by laying out the vineyard and marking vine sites. The drip line is laid on top of the ground. If the ground is dry, water may be applied to ease digging by hand. The potted plants are placed in the planting hole and covered with soil. The following year an average of 2% or 15 vines per acre will be replanted.

Trellis System. The trellis system is designed to support a bilateral cordon trained and spur pruned vineyard. The system in this study utilizes metal T posts at each vine with end posts at row ends to anchor the wires. Six permanent wires are secured to the end posts and attached to the metal T posts – one drip wire, one cordon wire, two middle wires, and two upper tees (wires). The owner and hired workers install the “modified vertical trellis” system. The system is considered part of the vineyard since it will be removed when the vines are removed. Therefore it is included in the establishment cost. The trellis system is installed during the first two years.

First Year. In the fall of the first year or spring of the second (second year in this study), T posts and end posts are installed. Eight-foot metal T posts are set at the first and last vine in each row and at every third vine down the row; six-foot T posts are set at first and second vine locations after the initial eight-foot post. End stakes are pounded into the soil at the row ends.

Second Year. Twenty-four inch cross arms are attached to the eight-foot posts with ten-inch cross arms attached below the larger crossarms. The wires are strung from end post to end post. Five 12 gauge, high tensile, cordon and catch (top) wires are attached to the cross arms. The bottom strand is 14 gauge, high tensile wire permanently attached to the end and T posts. The drip irrigation line is suspended from this bottom strand with drip clips.

Training/Pruning. Training and pruning establish the vine framework and these techniques will vary with variety and trellis system. Training during the establishment years includes pruning, tying, suckering, shoot positioning, and thinning. All operations are not done each year, nor are all the operations used for other training methods or trellis systems. The prunings are placed in between the vine rows and chopped during the first discing.

First Year. The vines are allowed to grow freely with no attempt at training.

Second Year. During dormancy (February), vines are pruned back to two bud spurs to provide shoots of which one will be selected for trunk development. The vines are green tied in May, June and July, which includes suckering, tying, and vine training. Suckering is the removal of sprouts from the rootstock that compete with the main trunk and cordons for water and nutrients. Vines are trained by tying one shoot up the T post to become the main trunk. Later in the season this shoot is topped at or slightly below the cordon wire. Two lateral shoots are selected from the trunk as the bilateral cordons. Any remaining lower laterals are also pruned and the cordons cut back to the appropriate length as determined by girth. Green tying is done from May through July.

Third Year. Training vines continues by extending the cordons along the permanent cordon wire and selecting spur positions. Canes from spurs are pruned appropriately. Slower growing vines continue to be trained; however, year three is the last year that the vines are trained in this study. After vines are trained, canopy management including shoot positioning, thinning, and suckering trunks and cordons will also start. Vine trimming to reduce pruning costs begins in the fall of the third year.

Irrigation. Growers in the area have riparian rights and therefore do not have water costs. Irrigation is the pumping and labor costs. The pumping costs are assumed to be \$2.65 per acre inch. The local reclamation district charges a fee of \$20 per acre for drainage and system maintenance including the levees. (see overhead). No assumption is made about effective rainfall.

During the first two years, irrigations begin in May and end around September. In the third year, additional irrigations are made postharvest. The amount of water applied to the vineyard varies each year as shown in Table A.

Year	Acln/Year		Total
	Preharvest	Postharvest	
1	6	0	6
2	6	0	6
3+	13	3	16

Pest Management. The pesticides and rates mentioned in this cost study as well as other materials available are listed in *UC Integrated Pest Management Guidelines, Grapes*. Pesticides mentioned in the study are commonly used, but other materials may be available.

Insects. Insect management begins in the third year. Mites can cause serious problems and are controlled with Agri-Mek. The material is applied in June with the grower’s tractor and vineyard sprayer.

Diseases. Many pathogens attack grapevines, but the major disease assumed in this study is powdery mildew (*Uncinula necator*). Powdery mildew control begins the third year at bloom with micronized sulfur, followed with Sovran and Quintec at bunch closure. Sulfur dust is applied eight times to alternate rows every other week until mid-July or veraison.

Weeds. The row centers are cultivated (disced) three to five times per season during the establishment years. The vine rows are strip sprayed with a residual herbicide such as Prowl in late fall or winter during the first two years and with Surflan in the third year. Summer weed control along the vine row begins in the second year with applications of Roundup, a foliar herbicide.

Vertebrate. Jackrabbits (*Lepus californicus*) are the major pest, although cottontails (*Sylvilagus audubonii*), and brush rabbits (*S. bachmani*) can also cause damage. Milk cartons placed around the young vines at planting protect the vines from rabbit damage. Another method is to build a fence around the vineyard.

Fertilization. From May to September of the first two years, 8-8-8 fertilizer at 62.50 pounds per acre is applied monthly through the irrigation system. Beginning in the third year, UN-32 and potassium sulfate are applied through the drip system as in the production year.

Harvesting. Harvest begins in the third year and the crop is hand harvested. Hauling to the crusher is contracted and paid by the grower.

Table B. Chardonnay		
Annual Yields		
Year:	3	4+
Tons Per Acre:	4.0	7.0

Yield. Typical annual yields for Chardonnay in the Sacramento River Delta (District 17) are shown in Table B.

Production Operating Costs (Tables 2 – 8)

Canopy Management/Pruning. Pruning is done during the winter months (January). The prunings are placed in the vine centers and chopped in March during the first discing. Winter tying, where cordons are tied to the cordon wire with twine at the trunk and at each end of the cordons is done in March. Subsequently, trunk suckering is done in April, shoot removal in May, and leaf removal in June. Suckering is the removal of water sprouts from the trunk and below the soil surface. Shoot removal is the operation whereby the weak shoots, which lack vigor and do not originate from the fruiting spur buds, are removed. In some varieties such as Zinfandel, the clusters are thinned later (cluster thinning) in the season to reduce crop load or remove clusters that may be delayed in maturity or potential rot sites due to compactness. During leaf removal the basal leaves are removed in and around the fruit zone to allow for exposure and better air movement. Shoot positioning, thinning, and suckering trunks and cordons continue through the production years. Positioning and thinning shoots allows vines space to develop good fruit clusters, and opens the canopy to allow greater air movement through the vines and around the clusters. Pruning costs in this study are based on an hourly rate, although much of the pruning in the region is done by piecework. Mechanical vine trimming is done in June to open up the canopy and again post-harvest (September/October) to reduce pruning costs.

Irrigation. Irrigation is the pumping cost (assumed cost of \$2.65 per acre inch) and irrigation labor. Growers in the area have riparian rights and do not have water costs. The local reclamation district charges a fee of \$20 per acre for maintenance. No assumption is made about effective rainfall. Irrigation begins in May and ends with one irrigation after harvest (October).

Fertilization/Soil Amendments. From May (leafout) through September and post harvest in October, UN-32 is applied each month through the irrigation system. The amount of N applied is increased each month from May for a seasonal total of 20 pounds. Potassium Sulfate (K) is also applied through the system in four equal amounts from May through August at 50 pounds per application. Gypsum at 1,000 pounds per acre is custom spread in the fall after harvest.

Pest Management. The pesticides and rates mentioned in this cost study are listed in *UC Integrated Pest Management Guidelines, Grapes*. **Pesticides mentioned in the study are not recommendations, but those commonly used in the region.** For information on other pesticides available, pest identification, monitoring, and management visit the UC IPM website at www.ipm.ucdavis.edu. For information and pesticide use permits, contact the local county agricultural commissioner's office.

Pest Control Adviser (PCA). Written recommendations are required for many pesticides and are made by licensed pest control advisers. In addition the PCA will monitor the field for agronomic problems including pests and nutrition. Growers may hire private PCAs or receive the service as part of a service agreement with an agricultural chemical and fertilizer company. The private PCA in this study monitors the field for agronomic problems, pest, and diseases. For an additional fee, the PCA installs irrigation monitoring equipment at 4 sites and does soil moisture modeling.

Weeds. Herbicide choice is a function of weed pressure which can change over time. In this vineyard, vine row weeds are controlled with a tank mix of Surflan applied as a strip spray during January. Resident vegetation in the row centers is managed with four discings per season. Roundup, a foliar herbicide, is applied 3 times over the spring and summer in the vine row.

Insects. Leafhoppers and mites are important pests, but will usually not occur in the same year. In this study, mites are controlled in June with Agri-Mek.

Diseases. Micronized sulfur (Thiolux) and copper spray (Champ) are applied in March at budbreak for powdery mildew, phomopsis, and mite control. Powdery mildew treatments continue in April on an 8 to 10 day schedule, then beginning in late May on a 14 to 21 day schedule with the last application being in August. Rotation of different fungicides is necessary to prevent disease resistance. Quintec in April and June and Sovran in May and July are interspersed with the ten dusting sulfur applications.

Harvest. Chardonnay harvest begins in early September, whereas Merlot harvest begins at the end of September. The crop is machine harvested by a custom operator. Hauling to the crusher is contracted and the grower pays \$18 per ton for local hauls (within 20 miles of field) which includes a fuel surcharge. Additional charges will apply for hauls considered being out of the local area.

Yields. Yield maturity is reached in the fourth year. An assumed average yield of 7 tons per acre over the remaining life of the vineyard is used to calculate returns in the production years. Typical yield range for Chardonnay in the Sacramento River Delta is 6.5 to 7.5 tons per acre.

Returns. Return prices per ton for wine grapes are determined by variety and percent sugar (Brix). The effect of sugar percentages on prices (low and high) is shown in Table C for District 17 growers. The lowest price in the last five years is \$150 per ton while the high is \$5,000; the average weighted price for Chardonnay is \$553 per ton. Use of return prices for grapes is for calculating net returns to growers at different yields and prices as shown in Table 5. A return of \$550 per ton based on 2008-12 District 17 prices for Chardonnay wine grapes is used in this study.

Assessments. The Clarksburg Wine Grape Growers Association is a voluntary association with dues of \$6 per acre for growers and wineries not affected by the minimum and maximum dues. Grower participation is rated at 90%, and is included as a cost in this study. The program supports advertisement and promotion of district wines. California Department of Food and Ag assesses growers \$0.001 on the gross value (yields x returns) for the Glassy Winged Sharpshooter Insect program.

Pickup/ATV. The grower uses the pickup for business and personal use. The assumed business use is 12,000 miles per year for the ranch. The All Terrain Vehicle (ATV) is used on the ranch for checking the vineyard, irrigating, and weed spraying and is included in that cost.

Labor, Equipment, Interest and Risk

Labor. Hourly wages for workers are \$11.50 for machine operators and \$9.00 per hour non-machine labor. Adding 34% for the employer's share of federal and state payroll taxes, insurance, and other possible benefits gives the labor rates shown of \$15.41 and \$12.06 per hour for machine labor and non-machine labor, respectively. Workers' compensation costs will vary among growers, but for this study the cost is based upon the average industry final rate as of January 1, 2012 (personal email from California Department of Insurance, May 2012, unreferenced). Labor for operations involving machinery are 20% higher than the operation time given in Table 2 to account for the extra labor involved in equipment set up, moving, maintenance, work breaks, and field repair.

Equipment Operating Costs. Repair costs are based on purchase price, annual hours of use, total hours of life, and repair coefficients formulated by American Society of Agricultural and Biological Engineers (ASABE). Fuel and lubrication costs are also determined by ASABE equations based on maximum power takeoff (PTO) horsepower, and fuel type. Prices for on-farm delivery of diesel and gasoline are \$3.84 and \$4.07 per gallon, respectively. Fuel costs are derived from Energy Information Administration monthly data. The cost includes a 7.5% local sales tax on diesel fuel and 7.5% sales tax on gasoline. Gasoline also includes federal and state excise tax, which are refundable for on-farm use when filing your income tax. The fuel, lube, and repair costs per acre for each operation in Table 2 are determined by multiplying the total hourly operating cost in Table 7 for each piece of equipment used for the selected operation by the hours per acre. Tractor time is 10% higher than implement time for a given operation to account for setup, travel and down time.

Table C. Annual Returns for Chardonnay, District 17

Year	\$/Ton Base Price*		
	Range		Weighted Average
	Low	High	
2008	425	1,000	571
2009	150	915	497
2010	220	800	514
2011	400	800	568
2012**	325	5,000	613
Average	304	1,703	553

*Final Grape Crush Report 2008-2011 **Preliminary Report

Interest on Operating Capital. Interest on operating capital is based on cash operating costs and is calculated monthly until harvest at a nominal rate of 5.75% per year. A nominal interest rate is the typical market cost of borrowed funds. The interest cost of post harvest operations is discounted back to the last harvest month using a negative interest charge. The interest rate is the basic rate provided by a farm lending agency as of January, 2013.

Risk. The risks associated with crop production should not be minimized. While this study makes every effort to model a production system based on typical, real world practices, it cannot fully represent financial, agronomic and market risks, which affect profitability and economic viability.

Cash Overhead Costs

Cash overhead consists of various cash expenses paid out during the year that are assigned to the whole farm and not to a particular operation.

Property Taxes. Counties charge a base property tax rate of 1% on the assessed value of the property. In some counties special assessment districts exist and charge additional taxes on property including equipment, buildings, and improvements. For this study, county taxes are calculated as 1% of the average value of the property. Average value equals new cost plus salvage value divided by two on a per acre basis.

Insurance. Insurance for farm investments varies depending on the assets included and the amount of coverage. For this study, property insurance provides coverage for property loss and is charged at 0.817% of the average value of the assets over their useful life. Liability insurance covers accidents on the farm and costs \$856 for the entire farm.

Office Expense. Office and business expenses are not based on collected data, but are estimated at \$155 per acre. These expenses include office supplies, telephones, bookkeeping, accounting, legal fees, shop and office utilities, and miscellaneous administrative charges.

Reclamation Fee. See Drainage System.

Sanitation Services. Sanitation services provide two portable toilets for the vineyard and cost the farm \$4,248 annually. The cost includes two double toilets units with wash basins, delivery and 9 months of weekly service.

Crop Insurance. The insurance protects the farmer from crop loss at levels purchased by the grower. In this study, the insurance is based on a 90% level and is an average of fees paid by participating growers. Costs are \$25 per acre at the 90% level.

Investment Repairs. Annual maintenance is calculated as 2% of the purchase price, except for vineyard maintenance (see Vineyard Establishment).

Non-Cash Overhead Costs (Investments)

Non-cash overhead is calculated as the capital recovery cost for equipment and other farm investments.

Capital Recovery Costs. Capital recovery cost is the annual depreciation and interest costs for a capital investment. It is the amount of money required each year to recover the difference between the purchase price and salvage value (unrecovered capital). It is equivalent to the annual payment on a loan for the investment with the down payment equal to the discounted salvage value. This is a more complex method of calculating ownership costs than straight-line depreciation and opportunity costs, but more accurately represents the annual costs of ownership because it takes the time value of money into account (Boehlje and Eidman). The formula for the calculation of the annual capital recovery costs is $((\text{Purchase Price} - \text{Salvage Value}) \times \text{Capital Recovery Factor}) + (\text{Salvage Value} \times \text{Interest Rate})$.

Salvage Value. Salvage value is an estimate of the remaining value of an investment at the end of its useful life. For farm machinery (tractors and implements) the remaining value is a percentage of the new cost of the investment (Boehlje and Eidman). The percent remaining value is calculated from equations developed by the American Society of Agricultural Engineers (ASABE) based on equipment type and years of life. The life in years is estimated by dividing the wear out life, as given by ASABE by the annual hours of use in this operation. For other investments including irrigation systems, buildings, and miscellaneous equipment, the value at the end of its useful life is zero. The salvage value for land is the purchase price because land does not depreciate. The purchase price and salvage value for equipment and investments are shown in Table 6.

Capital Recovery Factor. Capital recovery factor is the amortization factor or annual payment whose present value at compound interest is 1. The amortization factor is a table value that corresponds to the interest rate used and the life of the machine.

Interest Rate. The interest rate of 4.75% used to calculate capital recovery cost is the effective long term interest rate as of January 2013. The interest rate is provided by a local farm lending agency and will vary according to risk and amount of loan.

Establishment Cost. Costs to establish the vineyard are used to determine capital recovery expenses, depreciation, and interest on investment for the production years. Establishment cost is the sum of the costs for land preparation, trellis system, planting, vines, cash overhead and production expenses for growing the vines through the first year that grapes are harvested minus any returns from production. The Total Accumulated Net Cash Cost on Table 1, in the third year represents the establishment cost. For this study the cost is \$12,807 per acre or \$768,420 for the 60-acre vineyard. The establishment cost is spread over the remaining 20 years of the 23 years the vineyard is in production. Annual vineyard maintenance (trellis and vine repair) is assumed to be 0.10% of the establishment cost or approximately \$13 per acre per year and is included in investment repairs in the tables.

Irrigation System. The previous vineyard is assumed to have an irrigation system that has been refurbished. A new pump, motor, and filtration/injector station is being installed along with the drip irrigation system during planting. The 2-15 hp ditch pumps, filtration station, fertilizer injector system, drip lines and the labor to install the components are included in the irrigation system cost. Water is pumped from a 25-foot depth. The irrigation system is considered an improvement to the property and has a 20-year life.

Drainage System. Tile drains are installed underground in the fields prior to planting. In addition, the reclamation district manages the main drainage canals, general and levee maintenance and charges a \$20 per acre fee.

Land. Bare land available for vineyards based on grower input is valued at \$10,000 - \$12,000 per acre. The land in this study is valued at \$11,000 per acre or \$11,282 per net plantable (195) acre.

Building. The metal buildings are on a cement slab and comprise 2,400 square feet.

Tools. This includes shop tools, hand tools, and miscellaneous field tools such as pruning tools.

Fuel Tanks. Two 500-gallon fuel tanks using gravity feed are on metal stands. The tanks are setup in a cement containment pad that meets federal, state, and county regulations.

Equipment. Farm equipment is purchased new or used, but the study shows the current purchase price for new equipment. The new purchase price is adjusted to 60% to indicate a mix of new and used equipment. Annual ownership costs for equipment and other investments are shown in Table 6. Equipment costs are composed of three parts: non-cash overhead, cash overhead, and operating costs. Both of the overhead factors have been discussed in previous sections. The operating costs consist of repairs, fuel, and lubrication and are discussed under operating costs.

Table Values. Due to rounding, the totals may be slightly different from the sum of the components.

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For information concerning the above or other University of California publications, contact UC DANR Communications Services at 1-800-994-8849, online at www.ucop.edu, or your local county UC Cooperative Extension office.

UC COOPERATIVE EXTENSION
Table 1. SAMPLE COSTS PER ACRE TO ESTABLISH A VINEYARD
 SACRAMENTO VALLEY - Sacramento River Delta, Sacramento & Yolo Counties 2013

	Cost Per Acre			
	Year:	1st	2nd	3rd
Tons Per Acre:				4
Planting Costs:				
Land Prep: Vineyard Removal		750		
Land Prep: Rip 2X (custom)		200		
Land Prep: Disc 2X (custom)		80		
Land Prep: Disk + Cultipacker (custom)		43		
Land Prep: Laser Level (custom)		200		
Plant: Mark, Layout vineyard		116		
Plant: Dig holes, plant, place carton over vines		380	26	
Vines: 622 per acre (replant in 2d year)		1,866	45	
Trellis: Materials plus labor (grower installed)			5,529	
TOTAL PLANTING COSTS		3,635	5,600	
Cultural Costs:				
Irrigate: pumping, labor.		82	74	122
Fertilize: through drip (Yrs 1-2, 8-8-8. Yr 3 UN32 + Potassium Sulfate, UN32 only)		59	59	123
Weed: Disk Middles (Yr 1, 3X. Yr 2+, 5X)		48	77	77
Weed: Hand (vine row)		160	141	
Weed: Winter Strip Spray (Yrs 1-2, Prowl. Yr 3, Surflan)		39	39	44
Weed: Spot Spray (Roundup)			17	17
Prune: Dormant (hand)			139	200
Train: Sucker, Green Tie, Train			934	535
Train: Shoot Position/Thin				199
Insects: Mites (Agri-Mek)				40
Disease: Mildew (Sovran)				35
Disease: Mildew (Sulfur Dust) 8X				77
Disease: Mildew (Quintec)				46
Disease: Mildew (Thiolux)				15
Prune/Train: Trim Vines				14
Pickup Farm Use		27	27	66
ATV Farm Use		19	19	17
TOTAL CULTURAL COSTS		434	1,526	1,627
Harvest Costs:				
Hand Harvest Grapes				400
Haul to Crusher				72
Assessments/Dues				8
TOTAL HARVEST COSTS				480
Interest On Operating Capital @ 5.75%		187	312	38
TOTAL OPERATING COSTS/ACRE		4,256	7,438	2,145

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Table 1. continued

	Cost Per Acre			
	Year:	1st	2nd	3rd
Tons Per Acre				4
Cash Overhead Costs:				
Office Expense		155	155	155
Liability Insurance		4	3	4
Sanitation Costs (Portable Toilets)		22	22	22
Reclamation Fee		20	20	20
Property Taxes		126	126	127
Property Insurance		11	11	12
Investment Repairs		51	51	51
TOTAL CASH OVERHEAD COSTS		389	388	391
TOTAL CASH COSTS/ACRE		4,645	7,827	2,536
INCOME/ACRE FROM PRODUCTION				2,200
NET CASH COSTS/ACRE FOR THE YEAR		4,645	7,827	336
PROFIT/ACRE ABOVE CASH COSTS				
ACCUMULATED NET CASH COSTS/ACRE		4,645	12,471	12,807
Non-Cash Overhead (Capital Recovery):				
Buildings		34	34	34
Fuel Tanks		2	2	2
Tools: Shop/Field		6	6	6
Drip Irrigation System		138	138	138
Land		536	536	536
Equipment		28	56	77
TOTAL INTEREST ON INVESTMENT		744	772	793
TOTAL COST/ACRE FOR THE YEAR		5,389	8,599	3,329
INCOME/ACRE FROM PRODUCTION				2,200
TOTAL NET COST/ACRE FOR THE YEAR		5,389	8,599	1,129
NET PROFIT/ACRE ABOVE TOTAL COST				
TOTAL ACCUMULATED NET COST/ACRE		5,389	13,987	15,116

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Table 2. COSTS PER ACRE TO PRODUCE WINE GRAPES

Operation	Operation Time (Hrs/A)	Cash and Labor Costs per Acre					Total Cost	Your Cost
		Labor Cost	Fuel	Lube & Repairs	Material Cost	Custom/ Rent		
Cultural:								
Weed-Winter Strip (Surflan)	0.47	9	1	1	33	0	44	
Prune	16.58	200	0	0	0	0	200	
Weed - Disc 4X	1.59	29	23	10	0	0	62	
Winter Tie	8.83	106	0	0	45	0	151	
Disease-Mildew/Phomopsis (Thiolux Champ)	0.39	7	7	3	21	0	38	
Disease-Mildew Sulfur 10X	1.47	27	21	6	39	0	94	
Disease-Mildew (Quintec) 2X	0.78	15	13	6	62	0	95	
Trunk Suckering	5.50	66	0	0	0	0	66	
Shoot Removal/Positioning	16.50	199	0	0	0	0	199	
Irrigate	5.50	66	0	0	34	0	101	
Fertilize N w/irrigation 5X	0.00	0	0	0	32	0	32	
Weed-Spray25%VineRows3X Rndup	1.42	26	4	2	19	0	51	
Fertilize K w/irrigation 4X	0.00	0	0	0	90	0	90	
Disease-Mildew (Sovran) 2X	0.78	15	13	6	48	0	81	
Green Tie(Sucker Tie Train)2X	8.00	96	0	0	90	0	186	
Leaf Removal (hand)	16.50	176	0	0	0	0	176	
Trim Vines (mechanical)	0.69	13	10	6	0	0	28	
Pest - Mites (AgriMek)	0.29	5	5	2	24	0	36	
Irrigate	1.10	13	0	0	8	0	21	
PCA/Irrigation Monitoring Fees	0.00	0	0	0	0	55	55	
Fertilize - Gypsum	0.00	0	0	0	33	0	33	
Pickup Truck Use	2.05	38	21	7	0	0	66	
ATV Use	0.86	16	2	1	0	0	19	
TOTAL Cultural COSTS	89.30	1,123	120	48	578	55	1,924	
Harvest:								
Machine Harvest Fruit	0.00	0	0	0	0	320	320	
Haul To Crusher	0.00	0	0	0	0	126	126	
Assessments	0.00	0	0	0	10	0	10	
TOTAL Harvest COSTS	0.00	0	0	0	10	446	456	
Interest on Operating Capital @ 5.75%							48	
TOTAL OPERATING COSTS/ACRE	89.00	1,123	120	48	588	501	2,428	
CASH OVERHEAD:								
Crop Insurance							81	
Liability Insurance							4	
Office Expense							155	
Reclamation Fee							20	
Sanitation Fees							71	
Property Taxes							191	
Property Insurance							64	
Investment Repairs							63	
TOTAL CASH OVERHEAD COSTS/ACRE							650	
TOTAL CASH COSTS/ACRE							3,078	
NON-CASH OVERHEAD:								
		Per producing Acre		Annual Cost Capital Recovery				
Building 40'X60'		431		34			34	
Drip Irrigation Sy (60ac)		2,000		138			138	
Fuel Tanks 2X500ga		23		2			2	
Land - Clarksburg (200ac)		11,282		536			536	
Tools-Shop/Field		77		6			6	
Vineyard Establishment		12,807		1,006			1,006	
Equipment		843		87			87	
TOTAL NON-CASH OVERHEAD COSTS		27,463		1,809			1,809	
TOTAL COSTS/ACRE							4,887	

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Table 3. COSTS AND RETURNS PER ACRE TO PRODUCE WINE GRAPES

	Quantity/ Acre	Unit	Price or Cost/Unit	Value or Cost/Acre	Your Costs
GROSS RETURNS					
WINE GRAPES	7.00	ton	550.00	3,850	
TOTAL GROSS RETURNS	7.00	ton		3,850	
OPERATING COSTS					
Herbicide:					52
Surflan 4 AS	4.80	pint	6.86	33	
Roundup Ultra	6.00	pint	3.10	19	
Insecticide:					24
Agri-Mek 0.15	16.00	floz	1.50	24	
Fungicide:					170
Champ 2 Flowable	2.00	pint	5.48	11	
Thiolux Micro Sul	8.00	lb	1.31	10	
Sulfur Dust	150.00	lb	0.26	39	
Quintec	12.00	floz	5.15	62	
Sovran	8.00	oz	5.98	48	
Fertilizer:					155
UN 32	40.00	lb N	0.81	32	
Potassium Sulfate	200.00	lb	0.45	90	
Gypsum Haul Spread	0.50	ton	65.00	33	
Water:					42
Water – Pumped (electrical cost)	16.00	acin	2.65	42	
Contract:					501
Machine Harvest	1.00	acre	320.00	320	
Haul to Crusher	7.00	ton	18.00	126	
PCA Fee	1.00	acre	35.00	35	
Irrigation Monitor Fee	1.00	acre	20.00	20	
Vine Aids:					135
Tying Materials	3.00	acre	45.00	135	
Assessment:					10
Clarksburg Wine Growers	1.00	acre	6.00	6	
Sharpshooter (\$0.001 per ton)	3,850.00	ton	0.00	4	
Labor:					1,123
Equipment Operator Labor	12.95	hrs	15.41	200	
Non-Machine Labor	78.51	hrs	12.06	923	
Machinery:					169
Fuel-Gas	6.96	gal	4.07	28	
Fuel-Diesel	23.87	gal	3.84	92	
Lube				18	
Machinery Repair				31	
Interest on Operating Capital (5.75%)				48	
TOTAL OPERATING COSTS/ACRE				2,428	
NET RETURNS ABOVE OPERATING COSTS				1,422	
CASH OVERHEAD COSTS					
Crop Insurance				81	
Liability Insurance				4	
Office Expense				155	
Reclamation Fee				20	
Sanitation Fees				71	
Property Taxes				191	
Property Insurance				64	
Investment Repairs				63	
TOTAL CASH OVERHEAD COSTS/ACRE				650	
TOTAL CASH COSTS/ACRE				3,078	

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Table 3. Continued

	Quantity/ Acre	Unit	Price or Cost/Unit	Value or Cost/Acre	Your Costs
NON-CASH OVERHEAD COSTS (Capital Recovery)					
Building 40'X60'				34	
Drip Irrigation Sy (60ac)				138	
Fuel Tanks 2X500ga				2	
Land - Clarksburg (200ac)				536	
Tools-Shop/Field				6	
Vineyard Establishment				1,006	
Equipment				87	
TOTAL NON-CASH OVERHEAD COSTS				1,809	
TOTAL COST/ACRE				4,887	
NET RETURNS ABOVE TOTAL COST				-1,037	

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Table 4. MONTHLY CASH COSTS PER ACRE TO PRODUCE WINE GRAPES

Beginning 01-13	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	TOTAL
Ending 10-13	13	13	13	13	13	13	13	13	13	13	
Cultural:											
Weed-Winter Strip (Surflan)	44										44
Prune	200										200
Weed - Disc 4X				15	15	15	15				62
Winter Tie			151								151
Disease-Mildew/Phomopsis (Thiolux Champ)			38								38
Disease-Mildew Sulfur 10X				19	19	19	19	19			93
Disease-Mildew (Quintec) 2X				48		47					95
Trunk Suckering				66							66
Shoot Removal/Positioning					199						199
Irrigate					20	20	21	21	20		101
Fertilize N w/irrigation 5X					3	5	6	8		10	32
Weed-Spray25%VineRows3X Rndup					17	17	17				51
Fertilize K w/irrigation 4X					23	23	23	23			90
Disease-Mildew (Sovran) 2X					41		40				81
Green Tie(Sucker Tie Train) 2X					93	93					186
Leaf Removal (hand)						176					176
Trim Vines (mechanical)						14			14		28
Pest - Mites (AgriMek)						36					36
Irrigate										21	21
PCA/Irrigation Monitoring Fees	6	6	6	6	6	6	6	6	6	6	55
Fertilize - Gypsum										33	33
Pickup Truck Use	7	7	7	7	7	7	7	7	7	7	66
ATV Use	2	2	2	2	2	2	2	2	2	2	19
TOTAL Cultural COSTS	258	14	219	162	443	479	140	84	48	77	1,924
Harvest:											
Machine Harvest Fruit									320		320
Haul To Crusher									126		126
Assessments									10		10
TOTAL Harvest COSTS	0	0	0	0	0	0	0	0	456	0	456
Interest on Operating Capital (5.75%)	1	1	2	3	5	8	8	9	11	0	48
TOTAL OPERATING COSTS/ACRE	259	15	221	165	449	486	148	92	515	77	2,428
CASH OVERHEAD											
Crop Insurance	81										81
Liability Insurance	0	0	0	0	0	0	0	0	0	0	4
Office Expense	13	13	13	13	13	13	13	13	13	13	155
Reclamation Fee					20						20
Sanitation Fees					71						71
Property Taxes		96					96				192
Property Insurance		64									64
Investment Repairs	6	6	6	6	6	6	6	6	6	6	63
TOTAL CASH OVERHEAD COSTS	101	179	20	20	110	20	115	20	20	20	650
TOTAL CASH COSTS/ACRE	360	194	241	185	559	506	263	112	535	97	3,078

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Table 5. RANGING ANALYSIS

COSTS PER ACRE AT VARYING YIELD TO PRODUCE WINE GRAPES

	YIELD (tons/acre)						
	4.00	5.00	6.00	4.00	8.00	9.00	10.00
OPERATING COSTS:							
Cultural	1,924	1,924	1,924	1,924	1,924	1,924	1,924
Harvest	398	417	436	456	475	495	514
Interest on operating capital @ 5.75%	48	48	48	48	48	48	49
TOTAL OPERATING COSTS/ACRE	2,369	2,389	2,408	2,428	2,447	2,467	2,486
Total Operating Costs/Ton	592	478	401	347	306	274	249
CASH OVERHEAD COSTS/ACRE	650	650	650	650	650	650	650
TOTAL CASH COSTS/ACRE	3,019	3,039	3,058	3,078	3,097	3,117	3,136
Total Cash Costs/Ton	755	608	510	440	387	346	314
NON-CASH OVERHEAD COSTS/ACRE	1,809	1,809	1,809	1,809	1,809	1,809	1,809
TOTAL COSTS/ACRE	4,828	4,848	4,867	4,887	4,906	4,926	4,945

NET RETURNS PER ACRE ABOVE OPERATING COSTS FOR WINE GRAPES

PRICE \$/ton	YIELD (ton/acre)						
	4.00	5.00	6.00	4.00	8.00	9.00	10.00
400	-769	-389	-8	-828	753	1,133	1,514
450	-569	-139	292	-628	1,153	1,583	2,014
500	-369	111	592	-428	1,553	2,033	2,514
550	-169	361	892	-228	1,953	2,483	3,014
600	31	611	1,192	-28	2,353	2,933	3,514
650	231	861	1,492	172	2,753	3,383	4,014
700	431	1,111	1,792	372	3,153	3,833	4,514

NET RETURN PER ACRE ABOVE CASH COST FOR WINE GRAPES

PRICE \$/ton	YIELD (ton/acre)						
	4.00	5.00	6.00	4.00	8.00	9.00	10.00
400	-1,419	-1,039	-658	-1,478	103	483	864
450	-1,219	-789	-358	-1,278	503	933	1,364
500	-1,019	-539	-58	-1,078	903	1,383	1,864
550	-819	-289	242	-878	1,303	1,833	2,364
600	-619	-39	542	-678	1,703	2,283	2,864
650	-419	211	842	-478	2,103	2,733	3,364
700	-219	461	1,142	-278	2,503	3,183	3,864

NET RETURNS PER ACRE ABOVE TOTAL COST FOR WINE GRAPES

PRICE \$/ton	YIELD (ton/acre)						
	4.00	5.00	6.00	4.00	8.00	9.00	10.00
400	-3,228	-2,848	-2,467	-3,287	-1,706	-1,326	-945
450	-3,028	-2,598	-2,167	-3,087	-1,306	-876	-445
500	-2,828	-2,348	-1,867	-2,887	-906	-426	55
550	-2,628	-2,098	-1,567	-2,687	-506	24	555
600	-2,428	-1,848	-1,267	-2,487	-106	474	1,055
650	-2,228	-1,598	-967	-2,287	294	924	1,555
700	-2,028	-1,348	-667	-2,087	694	1,374	2,055

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Table 6. WHOLE FARM ANNUAL EQUIPMENT, INVESTMENT, AND BUSINESS OVERHEAD COSTS

ANNUAL EQUIPMENT COSTS

Yr	Description	Price	Yrs Life	Salvage Value	Capital Recovery	Cash Overhead		
						Insur- ance	Taxes	Total
13	ATV 4WD	7,700	5	3,451	1,139	46	56	1,240
13	Disc - Tandem 7'	8,500	8	1,919	1,099	43	52	1,194
13	Duster - 3 Pt	6,000	10	1,061	682	29	35	746
13	Orchard/Vine Sprayer 500 gal	24,000	10	4,244	2,729	115	141	2,986
13	Pickup Truck 1/2 T	28,000	7	10,621	3,481	158	193	3,832
13	Vine Trimmer -	12,000	10	228	1,517	50	61	1,628
13	Weed Sprayer 200 gal	5,000	10	884	569	24	29	622
13	70HP Vineyard Tractor 4WD	45,446	20	5,831	3,389	209	256	3,855
13	80HP Vineyard Trac 4WD	48,191	20	6,183	3,593	222	272	4,087
TOTAL		184,837		34,424	18,197	896	1,096	20,189
60% of new cost*		110,902		20,654	10,918	537	658	12,114

*Used to reflect a mix of new and used equipment

ANNUAL INVESTMENT COSTS

Description	Price	Yrs Life	Salvage Value	Capital Recovery	Cash Overhead			Total
					Insur- ance	Taxes	Repairs	
Building 2,400 sqft	84,000	20		6,598	343	420	1,680	9,041
Drip Irrigation System (60 acres)	120,000	25		8,302	490	600	2,400	11,792
Fuel Tanks 2-500 gallon	4,500	20		353	18	23	90	484
Land	2,200,000	20	2,200,000	104,500	0	22,000	0	126,500
Tools-Shop/Field	15,000	20		1,178	61	75	300	1,614
Vineyard Establishment	768,439	20		60,361	3,139	3,842	768	68,110
TOTAL INVESTMENT	3,191,939		2,200,000	181,292	4,051	26,960	5,238	217,541

ANNUAL BUSINESS OVERHEAD COSTS

Description	Units/ Farm	Unit	Price/ Unit	Total Cost
Crop Insurance	195	acre	25.00	4,875
Liability Insurance	195	acre	4.39	856
Office Expense	195	acre	155.00	30,225
Reclamation Fee	195	acre	20.00	3,900
Sanitation Fees	195	acre	21.78	4,247

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Table 7. HOURLY EQUIPMENT COSTS

Description	COSTS PER HOUR								
	Grape Hours Used	Actual Hours Used	Cash Overhead			Operating			Total Costs/Hr.
			Capital Recovery	Insur- ance	Taxes	Repairs	Fuel & Lube	Total Oper.	
13 ATV 4WD	165.00	430.00	1.59	0.06	0.08	0.94	2.71	3.65	5.38
13 Disc - Tandem 7'	95.00	309.00	2.13	0.08	0.10	2.94	0.00	2.94	5.26
13 Duster - 3 Pt	88.00	120.00	3.41	0.14	0.18	0.85	0.00	0.85	4.58
13 Orch/VineSpray500G	135.00	135.00	12.15	0.51	0.63	3.05	0.00	3.05	16.34
13 Pickup Truck 1/2 T	123.00	275.00	7.59	0.34	0.42	3.67	10.18	13.85	22.21
13 Vine Trimmer -	41.00	200.00	4.55	0.15	0.18	5.05	0.00	5.05	9.93
13 Weed Sprayer 200 G	113.00	120.00	2.84	0.12	0.15	0.71	0.00	0.71	3.82
13 70HP Vineyard Tract 4WD	247.00	600.00	3.39	0.21	0.26	2.81	13.20	16.01	19.87
13 80HP Vineyard Trac 4WD	148.00	600.00	3.59	0.22	0.27	3.15	15.09	18.23	22.32

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Table 8. OPERATIONS WITH EQUIPMENT and MATERIALS

Operation	Operation Month	Tractor	Implement	Labor Type/ Material	Rate/ acre	Unit
Weed-Winter Strip (Surflan)	Jan		ATV 4WD	Equipment Operator Labor	0.57	hour
			Weed Sprayer 200 G	Surflan 4 AS	4.80	pint
Prune	Jan			Non-Machine Labor	16.58	hours
Weed - Disc 4X	Mar	70HP Vineyard Tract 4WD	Disc - Tandem 7'	Equipment Operator Labor	0.48	hour
	Apr	70HP Vineyard Tract 4WD	Disc - Tandem 7'	Equipment Operator Labor	0.48	hour
	May	70HP Vineyard Tract 4WD	Disc - Tandem 7'	Equipment Operator Labor	0.48	hour
	June	70HP Vineyard Tract 4WD	Disc - Tandem 7'	Equipment Operator Labor	0.48	hour
Winter Tie	Mar			Non-Machine Labor	8.83	hours
				Tying Materials	1.00	acre
Disease-Mildew/Phomopsis (ThioChmp)	Mar	80HP Vineyard Tract 4WD	Orch/VineSpray500G	Equipment Operator Labor	0.47	hour
				Champ 2 Flowable	2.00	pint
				Thiolux Micro Sul	8.00	lb
Disease-Mildew Sulfur 10X	Apr	70HP Vineyard Tract 4WD	Duster - 3 Pt	Equipment Operator Labor	0.35	hour
				Sulfur Dust	30.00	lb
	May	70HP Vineyard Tract 4WD	Duster - 3 Pt	Equipment Operator Labor	0.35	hour
				Sulfur Dust	30.00	lb
	June	70HP Vineyard Tract 4WD	Duster - 3 Pt	Equipment Operator Labor	0.35	hour
				Sulfur Dust	30.00	lb
	July	70HP Vineyard Tract 4WD	Duster - 3 Pt	Equipment Operator Labor	0.35	hour
				Sulfur Dust	30.00	lb
	Aug	70HP Vineyard Tract 4WD	Duster - 3 Pt	Equipment Operator Labor	0.35	hour
				Sulfur Dust	30.00	lb
Disease-Mildew (Quintec) 2X	Apr	80HP Vineyard Tract 4WD	Orch/VineSpray500G	Equipment Operator Labor	0.47	hour
				Quintec	6.00	floz
	June	80HP Vineyard Tract 4WD	Orch/VineSpray500G	Equipment Operator Labor	0.47	hour
				Quintec	6.00	floz
Trunk Suckering	Apr			Non-Machine Labor	5.50	hours
Shoot Removal/Positioning	May			Non-Machine Labor	16.50	hours
Irrigate	May			Non-Machine Labor	1.10	hours
				Water - Pumped	2.50	acin
	June			Non-Machine Labor	1.10	hours
				Water - Pumped	2.50	acin
	July			Non-Machine Labor	1.10	hours
				Water - Pumped	2.75	acin
	Aug			Non-Machine Labor	1.10	hours
				Water - Pumped	2.75	acin
	Sept			Non-Machine Labor	1.10	hours
				Water - Pumped	2.50	acin
Fertilize N w/irrigation 5X	May			UN 32	4.00	lb N
	June			UN 32	6.00	lb N
	July			UN 32	8.00	lb N
	Aug			UN 32	10.00	lb N
	Oct			UN 32	12.00	lb N
Weed-Spray25%VineRows3X Rndup	May		ATV 4WD	Non-Machine Labor		
			Weed Sprayer 200 G	Roundup Ultra	2.00	pint
	June		ATV 4WD	Non-Machine Labor		
			Weed Sprayer 200 G	Roundup Ultra	2.00	pint
	July		ATV 4WD	Non-Machine Labor		
			Weed Sprayer 200 G	Roundup Ultra	2.00	pint
Fertilize K w/irrigation 4X	May			Potassium Sulfate	50.00	lb
	June			Potassium Sulfate	50.00	lb
	July			Potassium Sulfate	50.00	lb
	Aug			Potassium Sulfate	50.00	lb
Disease-Mildew (Sovran) 2X	May	80HP Vineyard Tract 4WD	Orch/VineSpray500G	Equipment Operator Labor	0.47	hour
				Sovran	4.00	oz
	July	80HP Vineyard Tract 4WD	Orch/VineSpray500G	Equipment Operator Labor	0.47	hour
				Sovran	4.00	oz
Green Tie(Sucker Tie Train)2X	May			Non-Machine Labor	4.00	hours
				Tying Materials	1.00	acre
	June			Non-Machine Labor	4.00	hours
				Tying Materials	1.00	acre

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Table 8. Continued

Operation	Operation Month	Tractor	Implement	Labor Type/ Material	Rate/ acre	Unit
Leaf Removal (hand)	June			Non-Machine Labor	16.50	hours
Trim Vines (mechanical)	June	70HP Vineyrd Tract 4WD	Vine Trimmer -	Equipment Operator Labor	0.41	hour
	Sept	70HP Vineyrd Tract 4WD	Vine Trimmer -	Equipment Operator Labor	0.41	hour
Pest - Mites (AgriMek)	June	80HP Vineyrd Tract 4WD	Orch/VineSpray500G	Equipment Operator Labor	0.34	hour
				Agri-Mek 0.15	16.00	floz
Irrigate	Oct			Non-Machine Labor	1.10	hours
				Water - Pumped	3.00	acin
PCA/Irrigation Monitoring Fees	Oct			PCA Fee	1.00	acre
				IrrigateMonitorFee	1.00	acre
Fertilize - Gypsum	Oct			Gypsum Haul Spread	0.50	ton
Pickup Truck Use	Oct		Pickup Truck 1/2 T	Equipment Operator Labor	2.46	hours
ATV Use	Oct		ATV 4WD	Equipment Operator Labor	1.04	hours
Machine Harvest Fruit	Sept			Machine Harvest	1.00	acre
Haul To Crusher	Sept			Haul to Crusher	7.00	ton
Assessments	Sept			Clarksburg Wine Gr		acre
				Sharpshooter		ton