

U.C. COOPERATIVE EXTENSION

SAMPLE COSTS TO ESTABLISH A VINEYARD AND PRODUCE WINE GRAPES IN SONOMA COUNTY - 1992

by

Rhonda Smith, Farm Advisor, Sonoma County
 Karen Klonsky, Extension Economist, U.C. Davis
 Pete Livingston, Staff Research Associate, U.C. Davis
 and
 Laura Tourte, Post Graduate Researcher, U.C. Davis

The detailed costs for vineyard establishment and wine grape production in Sonoma County are presented in this study. The hypothetical farm used in this report consists of a total of 35 acres, 30 of which are in production each year.

The practices described in this cost study are considered typical for this crop and area. Sample costs given for labor, materials, equipment and contract services are based on current figures. Some costs and practices detailed in this study may not be applicable to your situation. The use of trade names is not an endorsement or a recommendation. A blank Your Cost column is also provided to enter your actual costs on Tables 2 and 3, Costs Per Acre To Produce Wine Grapes and Costs And Returns Per Acre To Produce Wine Grapes. This study is only intended as a guide and can be used in making production decisions, determining potential returns, preparing budgets and evaluating production loans.

This study consists of General Assumptions for Establishing a Vineyard and Producing Wine Grapes and eight tables.

Table 1.	Costs Per Acre To Establish A Vineyard.
Table 2.	Costs Per Acre To Produce Wine Grapes
Table 3.	Costs And Returns Per Acre To Produce Wine Grapes
Table 4.	Monthly Cash Costs Per Acre To Produce Wine Grapes
Table 5.	Whole Farm Annual Equipment, Investment And Business Overhead Costs
Table 6.	Hourly Equipment Costs
Table 7.	Ranging Analysis
Table 8.	Costs And Returns / Breakeven Analysis

For an explanation of calculations used for the study refer to the attached General Assumptions, call the Department of Agricultural Economics, Cooperative Extension, University of California, Davis, California, (916) 752-3589 or call the Sonoma County Viticulture Farm Advisor.

Two companion studies entitled, "Sample Costs to Produce Organic Wine Grapes in The North Coast, With Annually Sown Cover Crop" and "Sample Costs to Produce Organic Wine Grapes in The North Coast, With Resident Vegetation" are available for those interested in organic wine grape production or as a comparison between the two systems.

The University of California Cooperative Extension in compliance with the Civil Rights Act of 1964, Title IX of the Education Amendments of 1972, and the Rehabilitation Act of 1973 does not discriminate on the basis of race, creed, religion, color, national origins, or mental or physical handicaps in any of its programs or activities, or with respect to any of its employment practices or procedures. The University of California does not discriminate on the basis of age, ancestry, sexual orientation, marital status, citizenship, medical condition (as defined in section 12926 of the California Government Code) or because the individuals are disabled or Vietnam era veterans. Inquiries regarding this policy may be directed to the Personnel Studies and Affirmative Action Manager, Agriculture and Natural Resources, 2120 University Avenue, University of California, Berkeley, California 94720, (510) 644-4270.

University of California and the United States Department of Agriculture cooperating.

GENERAL ASSUMPTIONS FOR
ESTABLISHING A VINEYARD AND PRODUCING WINE GRAPES
Sonoma County - 1992
U.C. Cooperative Extension

The following is a description of some general assumptions pertaining to sample costs of vineyard establishment and wine grape production in Sonoma County. The costs are based on typical practices used by many growers in this county, some of which may not be used during every production year. These costs are represented on an annual per acre basis. The use of trade names in this report does not constitute an endorsement or recommendation nor is any criticism implied by omission of other similar products by the University of California.

1. LAND:

The vineyard is owned and not leased. It is managed and operated by the owner except where noted. The vineyard is located on a valley floor with very deep, well drained soil. Land is valued at \$15,000 per acre. The farm is comprised of 35 acres, 30 of which are planted with wine grapes. The other 5 acres are used for the farmstead, roads, reservoir and well. Since only 30 of the 35 total acres are in production, the land value per vineyard acre is shown as \$17,500. Land is not depreciated.

2. VINEYARD CONVERSION:

The land used in this study is assumed to have an existing vineyard on it. The existing grapevines will be removed following the land purchase. After the vines have been removed and burned, the land will be ripped 3 times to a depth of 5 feet by a custom tillage company. The 30 acres used for the vineyard are then fumigated and tarped. This is done under contract by a fumigation company. The reservoir for frost protection will be excavated at this time. The well from the previous vineyard will be refurbished and a new pump and motor will be installed along with the drip irrigation system and the overhead sprinkler frost protection system, before the vineyard is planted.

3. VINES:

Bench grafts of a certified chardonnay clone on a phylloxera resistant rootstock are planted on a 7' x 11' spacing with 566 vines per acre during the first year. In the second year, 2% or 11 vines per acre will be replanted. Vines will be trained to a bilateral cordon at 36 inches and spur pruned. The grapevines are expected to become mature in 3 years and then be productive for an additional 22 years.

4. TRELLIS SYSTEM:

The trellis system is designed to support a bilateral cordon trained and spur pruned vineyard. The trellis system in this study utilizes tomato stakes, metal stakes for the sprinkler system and in-line lodgepole posts. A permanent cordon wire is attached to all stakes and posts and 2 pair of movable wires are hung on J nails attached to the lodgepoles. The trellis system is installed during the first 2 years of the vineyard establishment and is detailed as follows.

First Year: After the previous vineyard has been removed and the ground has been ripped and fumigated, sugar beet lime is applied at rate of 10 tons per acre and incorporated by discing. The entire vineyard is then laid out and the row ends and stake location within the rows are marked. Both the drip irrigation and frost protection systems are installed. Eight foot roll formed metal stakes are set at each sprinkler riser location and 4' tomato stakes are pounded into the ground where remaining grapevines are to be planted. Initially drip irrigation line is laid out on the ground along the vine row and turned on to make the ground soft for digging. After the holes are dug, the vines are then planted.

Second Year: The in-line lodgepoles and end posts are installed. The 4-5 inch diameter, 8 foot in-line posts are spaced 21 feet apart, but are not placed where a vine is sited. The end assembly consists of a 48 inch

long screw anchor with a 6 inch metal plate and a 6-7 inch diameter, 9 foot end post. Ten gauge anchor wires are strung from the screw anchor to the end post. A permanent, 12 gauge, high tensile, cordon wire is attached with a clamp to each tomato and metal stake. It is from this cordon wire that the drip irrigation line is suspended by short lengths of 14 gauge wire. A 14 gauge, high tensile wire is permanently attached to the tops of the in-line posts. Two pairs of movable, 14 gauge, high tensile wires are secured to each end post. J nails are tacked into the lodgepoles, above the cordon wire. The 4 movable wires are moved up the posts and held in position by these J nails.

5. IRRIGATION SYSTEM:

Water for the drip irrigation system is pumped from a depth of 150 feet in a 200 foot well using a 10 horsepower (HP) pump. Pressure at the discharge head is 35 pounds per square inch (psi) and produces a flow of 125 gallons per minute (gpm). The well, 10 HP pump, filtration station, drip line, fertilizer injector system and the labor to install of these components is included in the irrigation system cost. The irrigation system has a 25 year lifespan. The drip irrigation system is installed before the grapevines are planted in the first year, but is not shown as a cash establishment cost. It is instead treated as an improvement to the property and therefore, an investment and can be found in Table 5 under Annual Investment Costs.

Pumping costs for irrigation water vary during the establishment years due to the total volume of water pumped and electrical rates, some of which are flat rate fees. Starting in the fourth year the irrigations begin in May and end in August. An additional postharvest irrigation of 3 acre inches occurs in October. Irrigation rates and pumped water costs for the establishment and production years are shown in Table A.

Table A.

Year	Gal/Vine	Acft/Year	Cost/Acft
1	300	0.51	\$32.04
2	300	0.51	\$32.04
3	200	0.34	\$26.52
4+	100	0.17	\$29.04

6. FROST PROTECTION SYSTEM:

The frost protection system consists of a 12 acre foot reservoir, a 1500 gpm pump powered by a diesel engine, a permanent, underground pipeline and sprinklers. Water for frost protection is pumped from the well into the reservoir and stored there until needed. Though the frost protection system is installed during vineyard conversion and planting in the first year, it is not shown as a cash cost in vineyard establishment, but rather is considered as an improvement to the land. The cost for the frost protection system can be found in Table 5. under Annual Investment Costs. This system has an expected life of 25 years.

In this study, it is assumed that frost protection will be required for 6 hours per night for 6 nights in all years, except the first. Annual use of 9.9 acre feet of water for frost protection is presumed to occur throughout the life of the vineyard. In actual practice the amount of water used to protect the vineyard from frost will vary from year to year. The water for frost protection purposes costs \$17.40 per acre foot in addition to the cost of pumped irrigation water as shown in Table A. The cost difference between water used for irrigation and frost protection purposes, is due to the extra pumping of water required from the reservoir through the overhead sprinklers.

7. ESTABLISHMENT CULTURAL PRACTICES:

The removal of the old vineyard, the planting of the new one and installation of the trellis system occur during the first and second year of vineyard establishment and are described, in the Trellis System section. The practices described below represents only the hypothetical vineyard in this study. These are typical practices for many vineyards in Sonoma County, but may not be appropriate to your circumstance.

A number of similar, but different cultural operations are performed during pruning, training vines and hand vine care operations. In the first year, the pruning operation starts by removing the dirt mounded over the vine and cutting off high rootstock roots. The vine is then pruned to a 2 bud spur, pulled over to the stake and secured. A milk carton is placed over the trunk for protection. All prunings are left in between the vine rows and are chopped by the tractor and mower.

The second year begins with training the vine and tying 1 shoot up the stake. The vine is topped and the lowest laterals are removed. During dormancy weaker vines are cut back while pruning. Any remaining lower laterals would also be pruned off and cordons cut back to the appropriate girth.

Training vines in the third year leads off by extending the cordons along the permanent cordon wire. Spur positions are selected at this time. Slower growing vines continue to be trained; however year 3 is the last year that the vines are trained in this study. Spur position selection may continue with this year's pruning operations. Canes from spurs are pruned appropriately.

After vines are trained, hand vine care activities such as shoot thinning and suckering trunks and cordons start in years 4 and 5. The number of hours per acre needed to prune declines from the previous year, but remains constant in the years thereafter.

The 2 pair of movable wires is not shifted during the first 2 years. Starting in the third year, 3 hours per acre are necessary to move the wires once; however, by the fourth year 9 hours per acre are needed to raise the wires up the lodgepoles on three separate occasions.

Insects and diseases are managed by using several different pesticides and management techniques beginning in the second year. Leafhoppers and mites can be controlled by various insecticides. The insecticide spray used in this study reflects an average of costs for either Provado or a mix of an insecticidal soap and Pyrellin EC (which does not contain piperonyl butoxide).

There are many pathogens that attack grapevines, but the two major diseases that are assumed to occur in this study are botrytis bunch rot and powdery mildew. Bunch rot would be controlled starting in the fourth year solely on the practice of leaf removal in the grape cluster area. A fungicide spray and dusting program for powdery mildew control would begin the second year. Thiolut, or another wettable sulfur, is applied once early in the season, followed by 4 applications of sulfur dust made up until bloom. After that time Rubigan, or another D.M.I. (demethylation inhibiting) fungicide is used to control powdery mildew until fruit ripening begins.

Weeds present in the vine row the year the vines are planted are controlled by a hand hoeing. The row centers between the vine rows are cultivated during spring and summer throughout the establishment years. The vineyard is stripped sprayed with a combination of pre-emergence and/or contact herbicides registered for young vines beginning in the late fall of the second year. Summer weed control from the second year on switches from hand hoeing the weeds in the vine row to spot spraying with Roundup.

A liquid nitrogen fertilizer is applied in all years of vineyard establishment. Both 6-3-9 and 2-4-10 are used in the first 3 years to apply 40 pounds of nitrogen, 35 pounds phosphorus and 95 pounds of potassium per acre through the drip line. Beginning in year 4, 6-3-9 alone is applied to deliver 30 pounds nitrogen, 15 pounds phosphorus and 45 pounds potassium per acre. Pounds of fertilizer are calculated assuming 10 pounds of material per gallon.

An 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. It is used to determine the non-cash overhead expenses, depreciation and interest on investment, during the

production years. The Total Accumulated Net Cash Cost on Table 1, in the third year represents the establishment cost. For this study, this cost is \$11,039 per acre or \$331,170 for the 30 acre vineyard. The establishment cost is spread over the remaining 22 years of the 25 years the vineyard is in production.

8. PRODUCTION CULTURAL PRACTICES:

Pruning is done during the winter months and the prunings are chopped using the mower. Hand vine care activities such as shoot thinning and suckering trunks and cordons continue through all production years. Moving the wire pairs requires 9 hours per acre in order to make 3 relocations a year.

Nitrogen is applied at a rate of 30 pounds per acre during the production years, by injecting a total of 50 gallons of 6-3-9 through the drip irrigation system. Additionally, 15 pounds of phosphorus and 45 pounds of potassium are applied at this fertilization rate.

In practice, herbicide choice is a function of weed pressure which can change over time. In this vineyard, vine row weeds are controlled with a mix of Princep, Goal and Roundup and are applied as a strip spray during December. Resident vegetation in the row centers is managed with 4 mowings per year which includes chopping the prunings. A spot herbicide spray of Roundup is used to treat 5% of the acreage, primarily for field bindweed control.

Pest management techniques used to control insect and disease problems in the last 2 years in establishing the vineyard are the same practices used in the production years. Leafhoppers and mites are controlled by a spray mix of either dimethoate or a mix of an insecticidal soap plus Pyrellin EC. The cost of the insecticide reflects an average of the two different treatments. Powdery mildew is treated in March with an application of Thiolux followed by 4 applications of dusting sulfur starting in April and continuing through mid-May. Rubigan is substituted for sulfur and 4 sprays occur from mid-May through early-July. Botrytis bunch rot is managed only by leaf removal around the grape clusters. Leaf removal usually starts in June.

The pesticides and rates mentioned in this cost study are a few of those that are listed in the UC IPM Grape Pest Management Guidelines. Cultural practices for the production of wine grapes vary from grower to grower and region to region. The practices and inputs used in this cost study serve only as a sample or guide. Variations can be significant. For additional information contact the Sonoma County Viticulture Farm Advisor.

9. YIELDS & RETURNS:

Grapes begin bearing an economic crop in the third year after planting. The annual yields are measured in tons as shown in Table B. These assumed yields are from the third year of vineyard establishment to maturity.

Table B.

Year	Yield (tons/ac)
3	1.5
4	3.5
5	5.0
6+	6.0

An estimated price of a \$1,250 per ton of chardonnay wine grapes is used in this study. Returns will vary and the yields and prices used in this cost study are an estimate taking into consideration current situations.

10. HARVEST:

Harvesting starts in the third year. As the yield increases the cost to harvest also increases until vineyard maturity is reached in the sixth year. In this cost study the vineyard contracts to have the grape crop custom harvested. The harvesting is done by hand. If growers do their own mechanical harvesting, then the equipment

for harvest operations should be inventoried in Investment costs on Table 5, and operation costs would be calculated and placed in Harvesting costs in Table 1 and 2. All custom charges would be subtracted from Harvesting costs in Table 1 and 2.

11. LABOR:

Basic hourly wages for workers are \$8.00 and \$6.00 per hour for machine operators and field workers, respectively. Adding 34% for SDI, FICA, insurance and other benefits increases the labor rates shown to \$10.72 per hour for machine labor and \$8.04 per hour for non-machine labor. The labor hours for operations involving machinery are 20% higher than the operation time to account for extra labor involved in equipment set-up, moving, maintenance and repair. Wages for managers are not included as a cash cost. Any returns above total costs are considered returns to management and investment.

12. INVESTMENT:

The investments shown in Table 7 are those that are allocated to the vineyard. Annual investments shown in Tables 1 and 5 represent depreciation and opportunity cost for each investment on an annual per acre basis.

13. OVERHEAD:

County taxes are calculated as 1.1% of the average value of equipment, buildings, value of the grapevines and improvements. Insurance is charged at 0.5% of the average value of the equipment over its useful life. Office and business costs are estimated at \$180 per acre for the farm. These expenses include, but are not limited to office supplies, telephones, bookkeeping, accounting, legal fees, road preparation and maintenance. Consultant fees for pest, tissue and soil analyses are included at \$20 per acre.

14. INTEREST:

Interest on operating capital is based on a short term interest rate charged against cash costs and is calculated monthly until harvest at the nominal rate of 9% per year. Interest is also charged on investment at a real interest rate of 4% per year to account for income foregone that could be received from an alternative investment (opportunity cost) and is calculated using a long term interest rate charged on the average value of the land, improvements to the property and equipment. A real interest rate indicates the return for the use of capital and does not include any adjustment for inflation. A nominal interest rate would include an inflation factor.

15. EQUIPMENT COSTS:

In allocating the equipment costs per acre, the following calculations were made and shown in Table 7: (a) Original Cost of equipment is the cost of the new equipment plus sales tax. (b) Depreciation is straight line with a 10% salvage value. (c) Interest on investment is calculated as the average value per acre of the equipment during its useful life multiplied by a real interest rate of 4%. Average value equals new cost plus salvage value divided by 2 divided by the number of acres. (d) The Total Investment Costs are calculated as 60% of the depreciation and the interest costs for all new equipment to reflect a mix of the new and used equipment. These values are also used in Tables 1 and 5. All of this equipment is used on the entire 30 acre vineyard.

16. FUEL & REPAIR:

The fuel and repair cost per acre for each operation in Tables 1 and 5 is determined by multiplying the total hourly operating cost for each piece of equipment in Table 8 by the number of hours per acre for that operation. Prices for on-farm delivery of gasoline and diesel are \$0.98 and \$0.71 per gallon, respectively.

17. ACKNOWLEDGEMENT:

Several Sonoma County wine grape producers assisted in furnishing information for this study. Appreciation is expressed to those growers and other individuals who provided assistance.

Table 1.

U.C. COOPERATIVE EXTENSION
COSTS PER ACRE TO ESTABLISH A WINE GRAPE VINEYARD
SONOMA COUNTY - 1992

Labor Rate: \$10.72/Hr. machine labor
\$8.04/Hr. non-machine labor

Interest rate: 9%
Vine Per Acre: 566.00

YEAR	Costs per Vineyard Acre				
	1st	2nd	3rd	4th	5th
YIELD (Tons/acre)			1.5	3.5	6.0

Planting Costs					
Vine Removal and Ripping - Contract	\$550				
Fumigation - Custom Methyl Bromide Application	1,400				
Apply Soil Amendments	406				
Preplant Discing	19				
Mark and Layout Vineyard	150				
Install Tomato Stakes	220				
Trim and Store Vines	80	2			
Plant Vines - 566 Vines (+ 11 replants in year 2)	2313	45			
Layout and Install Trellis System		2,393			
TOTAL PLANTING COSTS	\$5,138	\$2,440			

Cultural Costs:					
Hand Vine Care				\$322	\$322
Pruning	\$150	\$161	\$240	161	161
Train Vines		281	375		
Chop Brush	6	6	6	6	6
Winter Weed Control	95	95	53	53	53
Hand Hoe Weeds	16				
Summer Weed Control on 5% of Acreage		12	12	12	12
Cultivation of Row Centers	38	38	38	38	38
Frost Protection		23	24	25	25
Mildew Control		103	103	103	103
Insect and Mite Management		35	35	35	35
Move Wires			24	72	72
Leaf Removal				217	217
Irrigate	49	49	42	38	38
Fertilize	90	90	90	48	48
Pickup Truck Use	165	165	165	165	165
TOTAL CULTURAL COSTS	\$609	\$1,058	\$1,207	\$1,295	\$1,295
=====					
Harvest Costs:					
Harvest - Custom @ \$120/Ton			180	420	720
TOTAL HARVEST COSTS			\$180	\$420	\$720
=====					
Interest on Operating Capital @ 9%	220	129	47	45	47
=====					
Overhead Costs:					
Office Expense	\$180	\$180	\$180	\$180	\$180
Pest Management Consultant Fees	20	20	20	20	20
Liability Insurance	8	8	8	8	8
Property Taxes	286	286	306	362	382
Equipment Insurance	105	105	105	105	105
Investment Repairs	23	23	23	23	23
TOTAL OVERHEAD COSTS	\$622	\$622	\$642	\$698	\$718
=====					
TOTAL CASH COSTS	\$6,589	\$4,249	\$2,076	\$2,458	\$2,780
=====					
INCOME FROM PRODUCTION			\$1,875	\$4,375	\$7,500

NET CASH COSTS FOR THE YEAR	\$6,589	\$4,249	\$201		

PROFIT ABOVE CASH COSTS				1,917	4,720
=====					
TOTAL ACCUMULATED NET CASH COSTS	\$6,589	\$10,838	\$11,039	\$9,122	\$4,402
=====					
Depreciation:					
Buildings	\$16	\$16	\$16	\$16	\$16
Drip Irrigation System	63	63	63	63	63
Frost Protection System	50	50	50	50	50
Reservoir - 12 Acre Feet	33	33	33	33	33
Pruning Equipment	4	4	4	4	4
ATV	39	39	39	39	39
Shop Tools	20	20	20	20	20
Equipment	118	118	118	118	118
TOTAL DEPRECIATION	\$343	\$343	\$343	\$343	\$343
=====					

U.C. COOPERATIVE EXTENSION
Table 1. continued

YEAR	Costs per Vineyard Acre				
	1st	2nd	3rd	4th	5th
Interest on Investment @ 4%:					
Land @ \$17,500/Acre	\$700	\$700	\$700	\$700	\$700
Buildings	12	12	12	12	12
Drip Irrigation System	38	38	38	38	38
Frost Protection System	31	31	31	31	31
Reservoir - 12 Acre Feet	20	20	20	20	20
Pruning Equipment	1	1	1	1	1
ATV	5	5	5	5	5
Shop Tools	7	7	7	7	7
Equipment	30	30	30	30	30
TOTAL INTEREST ON INVESTMENT	\$844	\$844	\$844	\$844	\$844
TOTAL COST FOR THE YEAR	\$7,776	\$5,436	\$3,263	\$3,645	\$3,967
INCOME FROM PRODUCTION			\$1,875	\$4,375	\$7,500
NET COST FOR THE YEAR	\$7,776	\$5,436	\$1,388		
NET PROFIT FOR THE YEAR				\$730	\$3,533
TOTAL ACCUMULATED NET COST	\$7,776	\$13,212	\$14,600	\$13,870	\$10,337

Table 2.

U.C. COOPERATIVE EXTENSION
COSTS PER ACRE TO PRODUCE WINE GRAPES
SONOMA COUNTY - 1992

Labor Rate: \$10.72/hr. machine labor
\$8.04/hr. non-machine labor

Interest Rate: 9.00%
Yield per Acre: 6.00 ton

Operation	Operation Time (Hrs/A)	Labor Cost	Fuel, Lube & Repairs	Cash and Labor Material Cost	Custom/Rent	Total Cost	Your Cost
Cultural:							
Pruning	20.01	160.88	0.00	0.00	0.00	160.88	
Winter Weed Control	0.15	1.93	0.79	48.07	0.00	50.79	
Chop Brush and Mow Centers	0.65	8.36	3.82	0.00	0.00	12.18	
Frost Protection - 6X	1.20	9.65	0.00	16.48	0.00	26.13	
Mildew Control	2.24	28.82	13.76	56.91	0.00	99.49	
Hand Vine Care	40.00	321.60	0.00	0.00	0.00	321.60	
Move Wires - 3X	9.00	72.36	0.00	0.00	0.00	72.36	
Mow Row Centers - 3X	1.50	19.30	8.82	0.00	0.00	28.11	
Irrigate - 100 Gal/Vine/Year - 5X	4.00	32.16	0.00	2.80	0.00	34.96	
Fertigation - 30 Lbs of N/Acre/Year - 2X	1.60	12.86	0.00	47.40	0.00	60.26	
Leaf Removal	27.00	217.08	0.00	0.00	0.00	217.08	
Summer Weed Control - 5% of Acreage	0.04	0.48	0.20	10.85	0.00	11.53	
Insect/Mite Pest Management	0.50	6.43	3.29	33.50	0.00	43.22	
Pickup Truck Use	9.50	122.21	42.98	0.00	0.00	165.19	
TOTAL CULTURAL COSTS	117.39	1014.12	73.66	216.01	0.00	1303.79	
Harvest:							
Harvest - Contract 6 Tons/Acre	0.00	0.00	0.00	0.00	720.00	720.00	
TOTAL HARVEST COSTS	0.00	0.00	0.00	0.00	720.00	720.00	
Postharvest:							
Irrigate - Postharvest	0.40	3.22	0.00	8.01	0.00	11.23	
TOTAL POSTHARVEST COSTS	0.40	3.22	0.00	8.01	0.00	11.23	
Interest on operating capital @ 9.00%						48.06	
TOTAL OPERATING COSTS/ACRE		1017.33	73.66	224.02	720.00	2083.08	
TOTAL OPERATING COSTS/TON						347.18	
CASH OVERHEAD:							
Office Expense						180.00	
Pest Management Fee						20.00	
Liability Insurance						8.33	
Property Taxes						104.40	
Property Taxes						291.60	
Property Insurance						132.54	
Investment Repairs						24.17	
TOTAL CASH OVERHEAD COSTS						761.04	
TOTAL CASH COSTS/ACRE						2844.11	
TOTAL CASH COSTS/TON						474.02	
NON-CASH OVERHEAD:							
Investment	Per producing Acre	Depreciation	Annual Cost	Interest @ 4.00%			
Land	17500.00			700.00		700.00	
Buildings	525.00	15.75		11.55		27.30	
Drip Irrigation System	1746.67	62.88		38.43		101.31	
Frost Protection System	1343.33	48.36		29.55		77.91	
Pruning Equipment	40.00	3.60		0.88		4.48	
Shop Tools	333.33	20.00		7.33		27.33	
ATV - 4wd	216.67	39.00		4.77		43.77	
Vineyard Establishment	11039.00	501.77		220.78		722.55	
Reservoir - 12 Acre Foot	1000.00	33.33		20.00		53.33	
Equipment	1229.88	105.48		27.06		132.54	
TOTAL NON-CASH OVERHEAD COSTS	34973.88	830.17		1060.35		1890.52	
TOTAL COSTS/ACRE						4734.63	
TOTAL COSTS/TON						789.11	

Table 4.

U.C. COOPERATIVE EXTENSION
MONTHLY CASH COSTS PER ACRE TO PRODUCE WINE GRAPES
SONOMA COUNTY - 1992

Beginning	DEC 91	DEC 91	JAN 92	FEB 92	MAR 92	APR 92	MAY 92	JUN 92	JUL 92	AUG 92	SEP 92	OCT 92	NOV 92	TOTAL
Ending	NOV 92													
Cultural:														
Pruning		53.63	53.63	53.63										160.88
Winter Weed Control		50.79												50.79
Chop Brush and Mow Center				12.18										12.18
Frost Protection - 6X					13.06	13.06								26.13
Mildew Control					11.32	25.59	18.21	28.12	16.25					99.49
Hand Vine Care						53.63	107.17	107.17	53.63					321.60
Move Wires - 3X							48.24	24.12						72.36
Mow Row Centers - 3X							9.37	9.37	9.37					28.11
Irrigate - 5X							6.99	6.99	13.99	6.99				34.96
Fertigation - 2X							30.13	30.13						60.26
Leaf Removal								217.08						217.08
Summer Weed Control								11.53						11.53
Insect/Mite Pest Management								43.22						43.22
Pickup Truck Use	16.52	16.52	16.52	16.52	16.52	16.52	16.52	16.52	16.52	16.52	16.52			165.19
TOTAL CULTURAL COSTS		120.94	70.15	82.33	40.90	108.79	236.64	494.26	109.75	23.51	16.52			1303.79
Harvest:														
Harvest - Contract 6 Tons										720.00				720.00
TOTAL HARVEST COSTS										720.00				720.00
Postharvest:														
Irrigate - Postharvest											11.23			11.23
TOTAL POSTHARVEST COSTS											11.23			11.23
Interest on oper. capital		0.91	1.43	2.05	2.36	3.17	4.95	8.66	9.48	15.05				48.06
TOTAL OPERATING COSTS/ACRE		121.84	71.58	84.38	43.26	111.97	241.59	502.92	119.23	758.57	27.74			2083.08
TOTAL OPERATING COSTS/TON		20.31	11.93	14.06	7.21	18.66	40.26	83.82	19.87	126.43	4.62			347.18
OVERHEAD:														
Office Expense		18.00	18.00	18.00	18.00	18.00	18.00	18.00	18.00	18.00	18.00			180.00
Pest Management Fee		2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00			20.00
Liability Insurance			8.33											8.33
Property Taxes		250.20				145.80								396.00
Property Taxes		250.20				145.80								396.00
Property Insurance			132.54											132.54
Investment Repairs		2.42	2.42	2.42	2.42	2.42	2.42	2.42	2.42	2.42	2.42			24.17
TOTAL CASH OVERHEAD COSTS		272.61	163.29	22.42	22.42	168.21	22.42	22.42	22.42	22.42	22.42			761.04
TOTAL CASH COSTS/ACRE		394.46	234.87	106.80	65.68	280.18	264.00	525.33	141.65	780.98	50.16			2844.11
TOTAL CASH COSTS/TON		65.74	39.14	17.80	10.95	46.70	44.00	87.56	23.61	130.16	8.36			474.02

Table 5.

U.C. COOPERATIVE EXTENSION
WHOLE FARM ANNUAL EQUIPMENT, INVESTMENT, AND BUSINESS OVERHEAD COSTS
SONOMA COUNTY - 1992

ANNUAL EQUIPMENT COSTS

Yr	Description	Price	Yrs Life	- Non-Cash Over. - Depre- ciation	Interest	- Cash Overhead - Insur- ance	Taxes	Total
92	60 hp 4WD Tractor	29900	15	1794.00	657.80	82.23	180.90	2714.93
92	Duster	3035	10	273.20	66.76	8.35	18.36	366.67
92	Flail Mower - 8'	5500	10	495.00	121.00	15.13	33.28	664.41
92	Orchard Sprayer	4560	10	410.40	100.32	12.54	27.59	550.85
92	Pickup Truck - 1/2 Ton	16500	7	2121.43	363.00	45.37	99.82	2629.62
92	Weed Sprayer - 50 Gal	2000	10	180.00	44.00	5.50	12.10	241.60
TOTAL		61495		5274.03	1352.88	169.12	372.05	7168.08
60% of New Cost *		36897		3164.42	811.73	101.47	223.23	4300.85

* Used to reflect a mix of new and used equipment.

ANNUAL INVESTMENT COSTS

Yr	Description	Price	Yrs Life	- Non-Cash Over. - Depre- ciation	Interest	Insur- ance	Taxes	Repairs	Total
INVESTMENT									
	ATV - 4wd	6500	5	1170.00	143.00	17.88	39.33	50.00	1420.21
	Buildings	15750	30	472.50	346.50	43.31	95.29	100.00	1057.60
	Drip Irrigation System	52400	25	1886.40	1152.80	144.10	317.02	300.00	3800.32
	Frost Protection System	40300	25	1450.80	886.60	110.83	243.82	150.00	2842.05
	Land	525000			21000.00	2625.00	5775.00	0.00	29400.00
	Pruning Equipment	1200	10	108.00	26.40	3.30	7.26	25.00	169.96
	Reservoir - 12 Acre Foot	30000	30	1000.00	600.00	75.00	165.00	0.00	1840.00
	Shop Tools	10000	15	600.00	220.00	27.50	60.50	100.00	1008.00
	Vineyard Establishment	331170	22	15053.10	6623.40	827.92	1821.43	0.00	24325.85
TOTAL INVESTMENT		1012320		21740.80	30998.70	3874.84	8524.65	725.00	65863.99

ANNUAL BUSINESS OVERHEAD COSTS

Description	Units/ Farm	Unit	Price/ Unit	Total Cost
Liability Insurance	30.00	acre	8.33	249.90
Office Expense	30.00	acre	180.00	5400.00
Pest Management Fee	30.00	acre	20.00	600.00
Property Taxes	30.00	acre	104.40	3132.00

Table 6.

U.C. COOPERATIVE EXTENSION
HOURLY EQUIPMENT COSTS
SONOMA COUNTY - 1992

Yr	Description	Actual Hours Used	-Non-Cash Over.- Depre- ciation	Interest	- Cash Overhead - Insur- ance	Taxes	Repairs	Operating Fuel & Lube	Total Oper.	Total Costs/Hr.
92	60 hp 4WD Tractor	167.6	6.42	2.36	0.29	0.65	1.49	2.41	3.90	13.63
92	Duster	38.4	4.27	1.04	0.13	0.29	1.52	0.00	1.52	7.25
92	Flail Mower - 8'	64.5	4.60	1.13	0.14	0.31	1.58	0.00	1.58	7.76
92	Orchard Sprayer	43.8	5.62	1.37	0.17	0.38	2.29	0.00	2.29	9.83
92	Pickup Truck - 1/2 Ton	285.0	4.47	0.76	0.10	0.21	2.99	1.53	4.52	10.06
92	Weed Sprayer - 50 Gal	5.6	19.18	4.69	0.59	1.29	1.00	0.00	1.00	26.75

Table 7.

U.C. COOPERATIVE EXTENSION
RANGING ANALYSIS
SONOMA COUNTY - 1992

COSTS PER ACRE AT VARYING YIELDS TO PRODUCE WINE GRAPE

	YIELD (TON/ACRE)						
	3	4	5	6	7	8	9
OPERATING COSTS/ACRE:							
Cultural Cost	1304	1304	1304	1304	1304	1304	1304
Harvest Cost	360	480	600	720	840	960	1080
Postharvest Cost	11	11	11	11	11	11	11
Interest on operating capital	45	46	47	48	49	50	51
TOTAL OPERATING COSTS/ACRE	1720	1841	1962	2083	2204	2325	2446
TOTAL OPERATING COSTS/TON	573	460	392	347	315	291	272
CASH OVERHEAD COSTS/ACRE	761	761	761	761	761	761	761
TOTAL CASH COSTS/ACRE	2481	2602	2723	2844	2965	3086	3207
TOTAL CASH COSTS/TON	827	651	545	474	424	386	356
NON-CASH OVERHEAD COSTS/ACRE	1891	1891	1891	1891	1891	1891	1891
TOTAL COSTS/ACRE	4372	4493	4614	4735	4856	4976	5097
TOTAL COSTS/TON	1457	1123	923	789	694	622	566

NET RETURNS PER ACRE ABOVE OPERATING COSTS FOR WINE GRAPE

PRICE (DOLLARS PER TON)	YIELD (TON/ACRE)						
	3	4	5	6	7	8	9
950.00	1130	1959	2788	3617	4446	5275	6104
1050.00	1430	2359	3288	4217	5146	6075	7004
1150.00	1730	2759	3788	4817	5846	6875	7904
1250.00	2030	3159	4288	5417	6546	7675	8804
1350.00	2330	3559	4788	6017	7246	8475	9704
1450.00	2630	3959	5288	6617	7946	9275	10604
1550.00	2930	4359	5788	7217	8646	10075	11504

NET RETURNS PER ACRE ABOVE CASH COSTS FOR WINE GRAPE

PRICE (DOLLARS PER TON)	YIELD (TON/ACRE)						
	3	4	5	6	7	8	9
950.00	369	1198	2027	2856	3685	4514	5343
1050.00	669	1598	2527	3456	4385	5314	6243
1150.00	969	1998	3027	4056	5085	6114	7143
1250.00	1269	2398	3527	4656	5785	6914	8043
1350.00	1569	2798	4027	5256	6485	7714	8943
1450.00	1869	3198	4527	5856	7185	8514	9843
1550.00	2169	3598	5027	6456	7885	9314	10743

NET RETURNS PER ACRE ABOVE TOTAL COSTS FOR WINE GRAPE

PRICE (DOLLARS PER TON)	YIELD (TON/ACRE)						
	3	4	5	6	7	8	9
950.00	-1522	-693	136	965	1794	2624	3453
1050.00	-1222	-293	636	1565	2494	3424	4353
1150.00	-922	107	1136	2165	3194	4224	5253
1250.00	-622	507	1636	2765	3894	5024	6153
1350.00	-322	907	2136	3365	4594	5824	7053
1450.00	-22	1307	2636	3965	5294	6624	7953
1550.00	278	1707	3136	4565	5994	7424	8853

Table 8.

U.C. COOPERATIVE EXTENSION
 COSTS AND RETURNS / BREAKEVEN ANALYSIS
 SONOMA COUNTY - 1992

COSTS AND RETURNS - PER ACRE BASIS

Crop	1. Gross Returns	2. Operating Costs	3. Net Returns Above Oper. Costs (1-2)	4. Cash Costs	5. Net Returns Above Cash Costs (1-4)	6. Total Costs	7. Net Returns Above Total Costs (1-6)
Wine Grapes	7500	2083	5417	2844	4656	4735	2765

COSTS AND RETURNS - TOTAL ACREAGE

Crop	1. Gross Returns	2. Operating Costs	3. Net Returns Above Oper. Costs (1-2)	4. Cash Costs	5. Net Returns Above Cash Costs (1-4)	6. Total Costs	7. Net Returns Above Total Costs (1-6)
Wine Grapes	225000	62492	162508	85323	139677	142039	82961

BREAKEVEN PRICES PER YIELD UNIT

CROP	Base Yield (Units/Acre)	Yield Units	Operating Costs	Cash Costs	Total Costs
Wine Grapes	6.0	ton	347.18	474.02	789.11

BREAKEVEN YIELDS PER ACRE

CROP	Yield Units	Base Price (\$/Unit)	Operating Costs	Cash Costs	Total Costs
Wine Grapes	ton	1250.00	1.7	2.3	3.8