
1999

UNIVERSITY OF CALIFORNIA - COOPERATIVE EXTENSION

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



CHARDONNAY
SONOMA COUNTY

Prepared by:

Rhonda Smith
Karen Klonsky

U.C. Cooperative Extension Farm Advisor, Sonoma County
U.C. Cooperative Extension Economist, Department of Agricultural and Resource
Economics, U.C. Davis

Pete Livingston

U.C. Cooperative Extension Staff Research Associate, Department of Agricultural
and Resource Economics, U.C. Davis

Cooperators:

Chris Bowen, Grower, Sonoma Valley
Steve Dutton, Grower, Russian River Valley

Peter Opatz, Grower, Alexander Valley
Ann Kraemer, Consultant, North Coast

INTRODUCTION

The detailed costs for vineyard establishment and wine grape production in Sonoma County are presented in this study. The hypothetical vineyard used in this report consists of a total of 35 acres, 30 of which are being established, 5 acres are in farmstead, roads, reservoir and pumping stations.

This study is intended as a guide only. It can be used to make production decisions, determine potential returns, prepare budgets and evaluate production loans. Sample costs given for labor, materials, equipment and contract services are based on current figures. Costs and practices detailed in this study will not be applicable to every situation. A blank column titled, *Your Cost*, is provided to enter your actual costs.

List of 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.	Cost and Returns/Breakeven Analysis

For an explanation of calculations used for the study refer to the attached Assumptions. For more information call the Department of Agricultural and Resource Economics, Cooperative Extension, University of California, Davis, California, (530) 752-3589 or call U.C. Cooperative Extension Sonoma County Farm Advisor Rhonda Smith (707) 565-2621.

This and other cost of production studies can be ordered from the Department of Agricultural and Resource Economics, U.C. Davis, (530-752-1515) or from many county Cooperative Extension offices.

The University of California, in accordance with applicable Federal and State law and University policy, does not discriminate on the basis of race, color, national origin, religion, sex, disability, age, medical condition (cancer-related), ancestry, marital status, citizenship, sexual orientation, or status as a Vietnam-era veteran or special disabled veteran.

Inquiries regarding the University's nondiscrimination policies may be directed to the Affirmative Action Director, University of California, Agriculture and Natural Resources, 1111 Franklin, 6th Floor, Oakland, CA 94607-5200 (510) 987-0096.

ASSUMPTIONS

The following assumptions pertain to the sample costs to establish a vineyard and produce wine grapes in Sonoma County. These costs are on an annual per acre basis. Practices described are not recommendations by the University of California, but represent production procedures and materials considered typical of a well managed vineyard in Sonoma County. However, some of the practices and costs described are not representative of all vineyard sites located in the county. Site characteristics that will have the greatest impact on farming practices and thus establishment and production costs include the following: slope, rocky, very clayey or shallow soils, soil chemistry characteristics that affect nutrient uptake, poor drainage, excessive wind and soil pests and diseases such as nematodes and oak root fungus.

In this study, the first crop is harvested in the second leaf because vine growth is assumed to be exceptionally uniform due to an early spring planting date and excellent growing conditions. In the real world, these factors do not always occur. In many instances, it is more appropriate to take the first crop off in the third year in order to adequately develop the permanent structural parts of the vine.

The use of trade names 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

Land. The vineyard is owned, managed, and operated by the grower. The site has less than a 5% average slope and it was previously planted to grapevines. The farm is comprised of 35 acres, 30 of which are planted with wine grapes. The other 5 acres are occupied by roads, irrigation systems, reservoir and farmstead. Land is valued at \$30,000 per acre. This study assumes the land was purchased for planting a vineyard. Because only 30 of the 35 acres are planted to grapes, land is valued at \$35,000 per plantable acre.

Labor. Hourly wages for workers are \$10.00 and \$7.00 per hour for machine and non-machine workers, respectively. Adding 34% for Workers Compensation, Social Security, Medicare, insurance, and other selected benefits gives the labor rates shown of \$13.40 and \$9.38 per hour for machine labor and non-machine labor, respectively. Labor time 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. Returns above total costs is considered a return to management.

Vines. Dormant bench grafted Chardonnay vines are planted in the early spring on a 6' X 8' spacing (vine-by-row) resulting in a planting density of 908 vines per acre. In the second year 4% or 36 vines per acre are replanted for those lost in the first and second years. Vines will be trained during the first and second years and are expected to begin yielding harvestable fruit in two years (second leaf). They will be productive for an additional 23 years.

Vineyard Design. The vineyard is laid out in five blocks with 42 rows in each block. There are 130 vines in each row with the exception of 10 rows that contain 124 vines each.

Trellis System. The trellis system is designed to support a unilateral cordon trained and spur pruned vineyard. The trellis system in this study utilizes a rebar or rolled edge, pre-notched metal highway stake at each planting position and drill pipe for end posts. A single permanent cordon wire is attached to all stakes at a 36 inch height and posts and 2 pair of movable wires are hung on notches in the highway stakes. The trellis system is considered part of the vineyard since it would be removed at the time of vine removal and is shown in the vineyard establishment costs in Table 1. The following details the trellis system installation.

First Year. Once the vineyard is laid out in the spring, a t-post is installed as a temporary end post at the end of each row. In between the end posts, 3/8 inch, five-foot rebar stakes are hammered into the ground on six foot centers leaving every third position for an in-line, rolled edge metal highway stake. Thus, 13 gauge, nine-foot highway stakes are driven three feet into the ground on 18 inch centers. The 14 gauge wire for supporting

the drip lateral is clipped to each highway stake and anchored at the end of each row. The drip irrigation lateral is attached to the drip wire with 14 gauge U-ties.

Second Year. A nine-foot drill pipe with a single spade is set as the end post, three feet into the ground at the end of each row and a four-foot screw anchor is augered into the ground. A ten gauge anchor wire is strung from the screw anchor to the end post to keep it upright against tension. A permanent, 12 gauge, high tensile, cordon wire is attached to each rebar and highway stake 36 inches above the ground. Two pairs of movable, 14 gauge, high tensile fruiting wires are secured to each end post and strung on the in-line highway stakes in the row. The 4 movable wires are moved up the stakes during the season as shoot growth occurs and are held in position by notches in the highway stakes. There are two wire gripples for each end assembly – one each for the anchor and cordon wires.

Frost Protection System. The frost protection system consists of a 12 acre-foot reservoir, a motor and pump, and permanent, overhead sprinklers. The reservoir is designed to hold enough water to protect the vineyard during the frost season. Water is pumped from the reservoir by the 1,650 gpm booster pump to the overhead sprinklers. Sprinkler risers are spaced 36 by 48 feet throughout the vineyard on highway stakes. It is assumed that the vineyard will need frost protection for a total of 6 nights during the months of March through May and the system will run for 6 hours per night. After each frost protection event the reservoir is filled with water from the well which is pumped during the day. The reservoir, pump, and sprinklers are an investment, separate from the vineyard, and their costs are found in Table 5, Annual Equipment, Investment, and Overhead Costs. The cost of water used for frost protection is the cost of water pumped from the irrigation well to the reservoir and the cost to operate the booster pump during freezing periods.

Irrigation System. Since the vineyard is established on land previously planted to grapevines it is assumed to have an existing well and an adequate water supply. A new pump, motor, filter system, and fertilizer injector will be installed along with the drip irrigation system prior to planting. The well, 15 hp motor, pump, filtration station, fertilizer injector system, drip lines and the labor to install all of these components is included in the irrigation system cost. Water and fertilizers are pumped to the vineyard through a filtration station into the drip laterals along the vine rows. In-line $\frac{1}{2}$ gallon per minute emitters are spread 36.25 inches apart so that each vine is centered between two emitters. The irrigation system is considered an improvement to the property and has a 25 year life, therefore, it is not found in preplant operations in Table 1 establishment costs. Instead it is shown in the capital recovery costs section of various tables and the Investments portion of Table 5.

Pumped water plus labor constitute the irrigation/frost protection cost. The cost is based on using 15 hp motor to pump from 150 feet deep over 30 acres. Price per acre-foot of water will vary by grower in this region depending on quantity pumped, power cost, various well characteristics, and other irrigation factors. In this study pumped irrigation water is calculated to cost \$6.03 per acre-inch. Water costs for frost protection cost \$7.18 per acre-inch because of the extra pumping from the reservoir during freezing temperatures. No assumption is made about effective rainfall. Irrigation occurs May through August in the first year and May through September beginning the second year. A post-harvest irrigation is applied with the overhead sprinklers during the production years. The amount of irrigation water applied varies as shown in Table A.

Applied irrigation water – drip		
Year	Number of months	AcIn/year
1	4	2.68
2-3	5	4.35
4+	5	8.00
Applied irrigation water – sprinkler		
4+	Once – post harvest	2.00

ESTABLISHMENT CULTURAL PRACTICES AND MATERIAL INPUTS

This model vineyard is established on ground that is planted to an older vineyard. The entire site has less than a 5% average slope. These are typical practices for many vineyards in Sonoma County, but may not be appropriate to individual circumstances.

Site Preparation. The removal of the old vineyard, and all of the land preparation, up to, but not including vineyard layout occur in the Fall prior to planting. Most operations that prepare the vineyard for planting are done in the year prior to planting, but costs are shown in the first year in Table 1.

The older vineyard located at the site is removed in the fall of the year prior to planting. Removal costs include separation and proper disposal of plastic, metal, and pressure treated wood that composed the old trellis and irrigation systems. Vines are pushed into a pile and burned. Lime is spread at 10 tons per acre over the cleared ground to adjust soil acidity to a desirable range. The ground is ripped twice then slip plowed to break up any underlying hardpan and improve rooting depth and water penetration. This is followed by two passes of a stubble disc. Old vine roots are then removed by hand. Afterwards the ground is disced twice with a vineyard disc to break up large clods of soil thus smoothing the ground prior to grading. Grading removes high and low spots created by discing.

A cover crop seed mix that maximizes biomass production is drilled in the fall over the entire 30 acre site. Planting the cover crop is hired out. In the spring of the following year, the cover crop is mowed once and disced four times by the owner before laying out the vineyard. Removal of the old vineyard and land preparations except for mowing the cover crop are contracted out to commercial companies.

Planting. The vineyard is planted during the first two years and the practices are detailed below.

First Year. After the site is mowed then disced in the spring, each planting spot is marked with a plastic picnic knife. The first year's component of the trellis system is installed. Holes are dug by hand and 908 dormant benchgrafted vines per acre are planted in May. Soil is mounded over each vine after planting to protect it against drying and sunburn and is removed approximately three weeks later after shoots have emerged from the mound. Three days after unmounting the soil, all but one shoot is removed and a grow tube is placed over each vine.

Second Year. Early in the growing season growth tubes are removed and vines are pruned. Four percent of the vines or 36 vines per acre are replaced in the second year after dying during the first and second seasons.

Pruning, Training, and Suckering. Not all of the same practices that follow are used for other varieties or trellis systems. Also the experienced vineyard owner or manager will modify these practices and still successfully develop the vineyard.

First Year. The training operation starts in the first growing season after the shoot extends beyond the top of the grow tube. This shoot is loosely wrapped onto the cordon wire in one pass.

Second Year. The pruning operation starts in the first winter by removing the grow tube and pruning off all but the primary shoot. The shoot is then tied to the rebar stake, pulled over to one side and tied to the cordon wire. All laterals would be pruned off and the cordon cut back to the appropriate girth. Weaker vines are pruned back to two buds. Vine training in the second year commences by wrapping the cordon's extension

shoot along the cordon wire as needed in three passes. All shoots emerging from the 8-10 node cordon are stuffed between the lower pair of moveable wires that are positioned 18" above the cordon wire.

Third Year. Pruning the vines in the second winter involves pruning back the cordon extensions to the appropriate girth and selecting spur positions on the original cordon. Spurs are created by pruning selected current-season shoots to one bud and removing growth at other positions. The cordon is secured to the cordon wire with no more than one full wrap and tied in two locations.

By the third growing season, the vast majority of vines are fully trained as unilateral cordons. The two pairs of moveable wires will be moved a total of three times in order to position shoots vertically. A light leaf removal will occur in late June. Slower growing vines and those that were replanted in year 2 continue to be trained; however, year 3 is the last year that vines are trained in this study. In practice, training continues on these younger vines during pruning in the third winter (fourth year); however, pruning costs during the production years in this study are only presented for activities directed to fully trained vines.

Trunk suckering during the establishment years is the removal of rootstock and scion shoots during the growing season that emerge from below the graft union or along the trunk respectively. The removal of rootstock suckers from below the union may be done every year beginning in the second. Trunk nodes are often "de-eyed" with shears in the second growing season to remove scion shoots.

Canopy Management. In the second year, shoots from the cordon are stuffed in between the lower pair of moveable wires in one pass. In the third year, the two pairs of moveable wires are lifted three times to vertically position shoots growing from the cordon.

Insect and Mite Management. Insect and mite pest and beneficial populations are monitored by a pest control adviser (PCA) beginning in the first year to determine if an economically damaging level will occur and which control method to use. In this vineyard, only thrips require chemical control in the establishment years. Worm pests are uncommon in the North Coast and are not controlled in this study.

Disease Management. There are a few foliar pathogens that can cause disease in grapevines, but control actions for only the two major diseases - powdery mildew and Botrytis bunch rot - are addressed in this study. Powdery mildew disease pressure is closely related to temperature and leaf wetness in the spring and temperature alone in early summer; therefore, to some extent, weather conditions determine spray intervals and hence total number of fungicide applications per year. Weather will also play a role in the choice of materials used to control powdery mildew.

In this study, a spray and dusting program for powdery mildew control begins in the second year. The first two applications occur before bloom. Both consist of a micronized sulfur product tank mixed with a copper product. These are followed by about five applications of sulfur dust at 10 day intervals until bunch closure. At bunch closure in early July, a dimethylation inhibitor (DMI) is tank mixed with a material that controls Botrytis bunch rot. Incidence of Botrytis bunch rot is also reduced by removing leaves or lateral shoots from around the clusters in late June on one side of the row. Two strobilurin treatments are made before veraison. The last application of a DMI is made during the first week of August. Just prior to full bloom in the third year, a DMI material will be substituted for one of the sulfur dust applications and tank mixed with a material that controls botrytis bunch rot. All pesticide applications are made using a 60 HP tractor and a vineyard duster or sprayer.

Vineyard Floor Management. A "wall to wall" cover crop is planted after the site is prepared in the Fall. The following Spring, the site is mowed once and disced four times before laying out and planting the vineyard in May. In the fall of the year that the vines are planted and in each of the successive two years, no cover crop is seeded in the row middles (centers). Instead, resident vegetation is allowed to grow until late spring.

First Year. After the vines are planted in the spring, the centers are mowed once. Between April and July, the centers are disced once and cultivated three times. Vine row weeds are controlled by one pass of hand hoeing and one application of a contact herbicide in the summer.

Second Year. In the winter, vine row weeds are controlled with one application of a pre-emergent herbicide mix. In the spring, the centers are mowed once with a flail mower and this single pass also chops the prunings. Centers are disced and cultivated in the same manner as they were in the previous year. During the growing season, one application of a contact herbicide is applied to the vine rows.

Third Year. To control vine row weeds in the winter, the same pre-emergent herbicide mix is applied as in the previous winter. Centers are mowed/chopped once in the spring. During the remainder of the year, they are disced twice and cultivated twice. One application of a contact herbicide is applied in June as a summer strip spray.

Fertilization. Beginning in the third year, boron and zinc foliar materials are tank mixed with the powdery mildew fungicide application that occurs just prior to full bloom. Fertilizer is applied through the drip irrigation system in all years of vineyard establishment. Highly soluble dry and liquid formulations are injected into the irrigation system with the use of an electric fertilizer injector. The dry material 12-26-26 is applied twice in the first year of establishment for a total of 14 pounds nitrogen and 30 pounds each of phosphorus and potassium. The same material is applied three times during the second and third years of establishment for an annual total of 30 pounds nitrogen and 44 pounds each of phosphorus and potassium.

Establishment Cost. 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. The vineyard establishment cost is used to determine the capital recovery cost, during the production years. The Total Accumulated Net Cash Cost on Table 1 in the second year represents the establishment cost. For this study the cost is \$13,369 per acre or \$401,070 for the 30 acre vineyard. The establishment cost is amortized over the remaining 23 years the vineyard is in production.

PRODUCTION CULTURAL PRACTICES AND MATERIAL INPUTS

Pruning, Tying, and Suckering. Pruning and tying are done during the winter months and the prunings are chopped with a flail mower. Cordon shoot removal is performed twice each year, once in April and again in May. Trunk suckering occurs once a year in May.

Canopy Management. Wires are moved a total of three times during each growing season in order to vertically position the canopy. Leaves or lateral shoots are removed by hand from the fruiting zone once in either June or July from the side of the row that receives the morning sun. Shoots are hedged once by a custom operator at veraison just above the top trellis wire.

Fertilization. During the production years, fertilizers are injected into the drip system annually and applied as foliar sprays in two out of every three years. In addition, every fourth year, 4 pounds of potassium sulfate and 1 pound of triple super phosphate are banded by hand adjacent to each vine in the fall. The liquid fertilizer 0-8-16 is injected three times during the season for a total of about 18 pounds of phosphorus and 36 pounds of potassium. CAN 17 is injected twice for a total of 15 pounds of nitrogen per year. In two out of

three years, a pre-bloom foliar application of both zinc and boron are added to the micronized sulfur spray application. Two pounds actual zinc and one pound actual boron are applied. Every third year, opposite cluster petioles are collected at bloom for tissue nutrient analyses.

Vineyard Floor Management. Mowing and cultivation are used to manage vegetation in the centers and herbicides are used to control weeds in the vine rows. Beginning in the fall of the fourth year, two different cover crops are planted in the vineyard on a four-year cycle. A perennial grass mix will be seeded in alternate centers and a mix consisting of legumes and annual grasses will be planted in the adjacent centers. Prunings are only placed in the centers containing the annual cover crop and chopped once in March. Those centers will be mowed once again then cultivated twice between May and July each year. The centers containing the perennial grass cover crop will only be mowed twice during this period. After four years, the vineyard is re-seeded to the two cover crop types in different centers.

Vine row weeds are controlled with a winter dormant pre-emergent herbicide mix applied as a strip spray. Escaped and perennial weeds are controlled with one summer application of a contact herbicide.

Insect And Mite Management. A PCA monitors the vineyard weekly. It is assumed that it is necessary to treat grape leafhoppers every third year and mites two years out of every three during the production years. For insect control, the insecticide used in this study reflects an average cost of available insecticides. The miticide used is Omite.

Disease Management. The first powdery mildew preventative fungicide application is made at budbreak in early March with a micronized sulfur product tank mixed with a copper product. There is one additional application 10 days later in March. In late March, through April and into May, there are a total of five applications of dusting sulfur. Just prior to full bloom in May, a DMI material is tank mixed with a material that controls Botrytis bunch rot. Mildew control in June occurs with dusting sulfur at 10 day intervals. Just before bunch closure in early July, an application of a mix of DMI – Botrytis control materials is made. For the remainder of July, sulfur dust plus two consecutive applications of a stobilurin are made with the final spray application occurring during the first week of August. All pesticide applications are made using a 60 HP tractor and a vineyard duster or sprayer.

Hand leaf removal occurs during June or July on one side of the canopy in order to reduce the incidence of Botrytis bunch rot and powdery mildew.

There are no costs assigned to control Pierce's disease in this study. The incidence of this disease in Sonoma County vineyards is quite variable; however control measures and annual replanting costs can be significant in "hot spots."

Pesticides, rates, and cultural practices mentioned in this cost study are a few of those listed in the *UC IPM Pest Management Guidelines: Grapes and Grape Pest Management*. Written recommendations are required for many pesticides and are made by licensed pest control advisers. For information and pesticide use permits, contact the local county Agricultural Commissioner's office. For additional production information contact the U.C. Cooperative Extension Sonoma County Viticulture Farm Advisor.

Equipment Cash Costs. Equipment costs are composed of three parts; capital recovery, cash overhead, and operating costs. The operating costs consist of fuel, lubrication, and repairs.

Repair costs are based on purchase price, annual hours of use, total hours of life, and repair coefficients formulated by the American Society of Agricultural Engineers (ASAE). Fuel and lubrication costs are also determined by ASAE equations based on maximum PTO horsepower (hp) and type of fuel used. The fuel and repair cost per acre for each operation in Table 2 is determined by multiplying the total hourly operating cost in *1999 Chardonnay Cost and Return Study Sonoma County*

Table 6 for each piece of equipment used for the cultural practice by the number of hours per acre for that operation. Tractor time is 10% higher than implement time for a given operation to account for setup time. Prices for on-farm delivery of diesel and gasoline are \$0.62 and \$1.02 per gallon, respectively.

Harvest. Harvesting starts in the second year. In this cost study the vineyard contracts to have the grape crop custom harvested by hand in both the second and third years and is charged on a per ton basis. The fifth year the contract rate is \$110 per ton and the fruit is mechanically harvested. It is assumed in this study that the grower rents a forklift, several tractors, and 12 gondolas with bins to manage an efficient harvest. Hauling to the crusher is also contracted for and paid by the grower. It is assumed that the grower is hauling to a winery inside of the county and the cost is approximately \$15 per ton.

Yields. Wine grapes, in this study, begin bearing an economic crop the second year after planting. Yield maturity is reached in the fifth year. An assumed yield of 7 tons per acre is used to calculate cost per ton in production years. The annual yields are measured in tons as shown in Table B.

Table B. Annual yields for Chardonnay in Sonoma County (District 3)

Year	Tons Per Acre
2	0.5
3	2.0
4	4.0
5	7.0

Returns. Return prices per ton for wine grapes are determined by variety and percent sugar. The effect of sugar percentages on prices is indicated in Table C by the low and high returns received. The lowest price in the last four years was \$120 per ton while the high was at \$3,000; the weighted average price for Chardonnay from 1994 to 1998 was \$1,424 per ton. Use of return prices for grapes is for calculating net returns to growers at different yields and price. Returns, shown in Table 7 will vary and the yields and prices used in this cost study are an estimate taking into consideration variety produced, fruit quality, and current market conditions. This study uses an estimated price of a \$1,747 per ton of Chardonnay wine grapes.

Table C. Annual prices received by Sonoma County (District 3) growers for Chardonnay¹

Crop Year	----- Range -----		Weighted Average
	Low	High	
	----- \$/Ton -----		
1994	300	1,800	1,075
1995	550	1,800	1,193
1996	894	2,500	1,456
1997	120	2,600	1,647
1998	801	3,000	1,747
Average	474	2,340	1,424

¹ Data compiled from the Final Grape Crush Report, Table 8, 1994-1998 Crops. Published by California Agricultural Statistics Service.

Risk. The risks associated with producing and marketing wine grapes are significant. 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 the profitability and economic viability of winegrape production. A market channel should be determined before the vineyard is planted and brought into production. Though, not used in this study, crop insurance is a risk management tool available to growers.

OVERHEAD COSTS

Cash Overhead. Cash overhead consists of various cash expenses paid out during the year that are assigned to the whole farm, not to a particular operation. These costs include property taxes, interest on operating capital, office expense, liability and property insurance, and equipment repairs.

Property Taxes. Counties in California 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 2 on a per acre basis. The salvage value for land is equal to the purchase price because land does not depreciate from use.

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 9.69% per year. A nominal interest rate is the going market cost of borrowed funds.

Insurance. Insurance for farm investments vary depending on the assets included and the amount of coverage. Property insurance provides coverage for property loss and is charged at 0.713% of the average value of the assets over their useful life. Liability insurance covers accidents on the farm and costs \$455 for the entire farm.

Office Expense. Office and business expenses for 30 acres are estimated at \$6,500 annually or \$217 per planted acre. These expenses include office supplies, telephones, bookkeeping, accounting, legal fees, road maintenance, etc.

Foreman Salary. The vineyard employs a single foreman to supervise work crews and production practices. Because the small acreage the vineyard employs the foreman 25% of the time and pays one quarter of the annual salary of \$40,000 plus 40% for payroll taxes and benefits.

Non-cash Overhead. Non-cash overhead is calculated as the capital recovery cost for equipment and other farm investments. Although farm equipment used on farms in Sonoma County may be purchased new or used, this 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 (Equipment and Investments) are shown in Tables 1-3 and 5. They represent the capital recovery cost for investments on an annual per acre basis.

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). Put another way, it is equivalent to the annual payment on a loan for the investment with the downpayment 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 calculation for the annual capital recovery costs is as follows.). The calculation for the annual capital recovery costs is as follows.

$$\frac{\text{Purchase Price} - \text{Salvage Value}}{\text{Capital Recovery Factor}} + \frac{\text{Salvage Value} \times \text{Interest Rate}}$$

Salvage Value: Salvage value is an estimate of the remaining market value of an investment at the end of its useful life. It is calculated differently for different investments. For farm machinery (i.e., tractors and implements) the remaining value is a percentage of the new cost of the investment. The calculation for the annual capital recovery costs is as follows.

$$\text{New Price} \times \% \text{Remaining Value}$$

Salvage value for other investments including irrigation systems, buildings, and miscellaneous equipment is zero. The salvage value for land is equal to the purchase price because land does not depreciate from use. The purchase price and salvage value for certain equipment and investments are shown in Table 4.

Capital Recovery Factor. Capital recovery factor is the amortization factor or annual payment whose present value at compound interest is 1. It is the function of the interest rate and years of life of the equipment.

Interest Rate. The interest rate of 7.40% used to calculate capital recovery cost is the United States Department of Agriculture-Economic Reporting Service's (USDA-ERS) ten year average of California's agricultural sector long-run real rate of return to production assets from current income. It is used to reflect the long-term realized rate of return to these specialized resources that can only be used effectively in the agricultural sector, not including inflation. In other words, the next best alternative use for these resources is in another agricultural enterprise.

Acknowledgment. Appreciation is expressed to Bartley Pump, Santa Rosa, CA., Growers Supply and Irrigation Inc., Windsor, CA., Ag-Technical Services Inc., Saint Helena, CA., and other cooperators who provided information for this study.

REFERENCES

- American Society of Agricultural Engineers. 1994. *American Society of Agricultural Engineers Standards Yearbook*. Russell H. Hahn and Evelyn E. Rosentreter (ed.) St. Joseph, Missouri. 41st edition.
- Boelje, Michael D., and Vernon R. Eidman. 1984. *Farm Management*. John Wiley and Sons. New York, New York
- California Department of Food and Agriculture. 1995. *Final Grape Crush Report 1994 Crop*. California Agricultural Statistics Service and Federal State Market News Service. Sacramento, California.
- California Department of Food and Agriculture. 1996. *Final Grape Crush Report 1995 Crop*. California Agricultural Statistics Service and Federal-State Market News Service. Sacramento, California.
- California Department of Food and Agriculture. 1997. *Final Grape Crush Report 1996 Crop*. California Agricultural Statistics Service and Federal State Market News Service. Sacramento, California.
- California Department of Food and Agriculture. 1998. *Final Grape Crush Report 1997 Crop*. California Agricultural Statistics Service and Federal State Market News Service. Sacramento, California.
- California Department of Food and Agriculture. 1999. *Final Grape Crush Report 1998 Crop*. California Agricultural Statistics Service and Federal State Market News Service. Sacramento, California.
- Integrated Pest Management Education and Publications. 1999. *U.C. Pest Management Guidelines, Grapes*. In M. L. Flint (ed.) UC IPM pest management guidelines. University of California. Division of Agriculture and Natural Resources. Oakland, California. Publication 3339.
- Smith, Rhonda, Karen Klonsky, Pete Livingston, and Laura Tourte. 1992. *Sample Costs to Establish A Vineyard And Produce Wine Grapes In Sonoma County – 1992*. University of California, Cooperative Extension. Department of Agricultural and Resource Economics. Davis, CA.
- University of California, Division of Agriculture and Natural Resources. 1992. *Grape Pest Management*. Donald L. Flaherty, et. al. (ed.) Second Edition. University of California, Division of Agriculture and Natural Resources. Oakland, California. Publication 3343.

Table 1.

U.C. COOPERATIVE EXTENSION
 SAMPLE COSTS PER ACRE TO ESTABLISH A VINEYARD
 SONOMA COUNTY - 1999
 CHARDONNAY

Labor Rate: \$13.40/hr. machine labor
 \$9.38/hr. non-machine labor

Vines Per Acre: 908
 Interest Rate: 9.69%

Year	Cost Per Acre		
	1st	2nd	3rd
Tons Per Acre		0.5	2.0
Planting Costs:			
Land Preparation - Vineyard Removal	\$240		
Land Preparation - Apply Lime	274		
Land Preparation - Rip & Slip Plow	424		
Land Preparation - Stubble Disc 3X	75		
Land Preparation - Grading	65		
Land Preparation - Seed Cover Crop	78		
Land Preparation - Mow Cover Crop	9		
Land Preparation - Disc 3X	45		
Survey & Layout Vineyard	319		
Dig & Plant Vines, Mound Over	783	\$9	
Vines: 908 Per Acre (4% Replant In 2nd Year)	2,588	103	
Install Trellis System	1,775	743	
TOTAL PLANTING COSTS	6,675	855	0
Cultural Costs:			
Unmound and Install Grow Tubes	530	16	
Training (Wrap Cordon Extensions) - In-season	56	169	6
Remove Trunk Suckers - In-season		188	84
Centers Floor Management - Chop/Mow Middles	7	7	7
Frost Protection - 6 days		42	42
Centers Floor Management - Disc Middles (1X Yrs 1 & 2, 2X Yr 3)	7	7	13
Centers Floor Management - Cultivate Middles (3X Yrs 1 & 2, 1X Yr 3)	20	20	13
Stuff Shoots		28	
Move Wires 3X			281
Irrigate 16X	70	83	83
Hand Hoe	249		
Fertilize 2-3X	65	140	140
Disease Control - Mildew Prebloom Spray 2X		29	49
Disease Control - Mildew/Botrytis Bloom Spray			70
Disease Control - Mildew Sulfur Dust 5X (4X in Year 3)		41	33
Weed Control - Summer Strip Spray	13	13	13
Leaf Removal			122
Disease Control - Mildew/Botrytis Bunch Close Spray		54	54
Insect Control - Thrips		23	23
Disease Control - Mildew Post Bunch Close Spray 3X		99	99
Weed Control - Winter Strip Spray	42	42	42
Remove Grow Tubes & Prune - Dormant		253	10
Training (Tie Vines) - Dormant		141	12
Prune - Dormant		216	281
Pickup Truck Use	187	187	187
TOTAL CULTURAL COSTS	1,246	1,798	1,664
Harvest Costs:			
Pick Fruit		105	352
TOTAL HARVEST COSTS		105	352
Interest On Operating Capital @ 9.69%	399	122	73
TOTAL OPERATING COSTS/ACRE	8,320	2,880	2,089

U.C. COOPERATIVE EXTENSION
Table 1. Continued

Year	Cost Per Acre		
	1st	2nd	3rd
Tons Per Acre		0.5	2.0
Cash Overhead Costs:			
Office Expense	217	217	217
Liability Insurance	15	15	15
Pest Management Fee	20	20	20
Foreman Salary - 25% Of Full Time	467	467	467
Property Taxes	439	450	441
Property Insurance	285	292	286
Investment Repairs	69	69	69
TOTAL CASH OVERHEAD COSTS	1,512	1,530	1,515
TOTAL CASH COSTS/ACRE	9,832	4,410	3,604
INCOME/ACRE FROM PRODUCTION	0	874	3,494
NET CASH COSTS/ACRE FOR THE YEAR	9,832	3,537	110
ACCUMULATED NET CASH COSTS/ACRE	9,832	13,369	13,479
Capital Recovery Cost:			
Land @ \$30,000 Per Acre	2,590	2,590	2,590
Shop Building	52	52	52
Drip Irrigation System	142	142	142
Frost Protection System	184	184	184
Pruning Equipment	7	7	7
Shop Tools	38	38	38
Reservoir - 12 Acre-feet	207	207	207
Equipment	177	217	217
TOTAL CAPITAL RECOVERY COST	3,397	3,437	3,437
TOTAL COST/ACRE FOR THE YEAR	13,229	7,847	7,041
INCOME/ACRE FROM PRODUCTION		874	3,494
TOTAL NET COST/ACRE FOR THE YEAR	13,229	6,974	3,547
TOTAL ACCUMULATED NET COST/ACRE	13,229	20,203	23,750

Table 2.

U.C. COOPERATIVE EXTENSION
 COSTS PER ACRE TO PRODUCE WINE GRAPES
 SONOMA COUNTY - 1999
 CHARDONNAY

Labor Rate: \$13.40/hr. machine labor
 \$9.38/hr. non-machine labor

Interest Rate: 9.69%
 Yield per Acre: 7.0 Ton

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 Control - Winter Strip Spray	0.33	5	1	19	0	26	
Prune - Dormant	41.00	385	0	0	0	385	
Chop Prunings - 0.5X	0.50	8	3	0	0	11	
Frost Protection - 6X	3.00	28	0	31	0	59	
Disease Control - Mildew Prebloom Spray 2X	1.00	16	6	19	0	41	
Centers Floor Management - Mow 1.5X	1.50	24	8	0	0	32	
Remove Trunk Suckers - In Season	4.00	38	0	0	0	38	
Cordon Shoot Removal 2X	15.00	141	0	0	0	141	
Disease Control - Sulfur Dust 9X	3.00	48	11	14	0	74	
Move Wires 3X	36.00	338	0	0	0	338	
Irrigate 40X	10.00	94	0	48	0	142	
Fertilize - Injected 3X	0.40	4	0	116	0	120	
Centers Floor Management - Disc 2X	0.33	5	1	0	0	7	
Disease Control - Mildew Bloom Spray	0.50	8	3	43	0	54	
Leaf Removal	21.50	202	0	0	0	202	
Weed Control - Summer Spray	0.33	5	1	6	0	13	
Hedge Rows	0.00	0	0	0	90	90	
Disease Control - Mildew Close Bunch Spray	0.50	8	3	43	0	54	
Insect Control - Leafhopper/Mite Spray <i>- Leafhoppers are sprayed once in 3 years & mites are sprayed twice in 3 years</i>	0.33	5	2	30	0	37	
Disease Control - Mildew Post 2X Bunch Close Spray	1.00	16	6	51	0	73	
Pickup Truck Use <i>Phosphorus & potassium application occurs 1 in 4 years</i>	9.50	153	34	0	0	187	
- Fertilize - Banded By Hand	0.32	14	1	192	0	207	
Post-harvest Irrigation <i>Cover crop operations occur 1 in 4 years</i>	0.50	5	0	14	0	19	
- Disc Old Cover Crop - Alternate Centers	0.09	1	0	0	0	2	
- Plant Cover Crop - Alternate Centers	0.00	0	0	44	0	44	
TOTAL CULTURAL COSTS	150.64	1,551	80	670	90	2,391	
Harvest:							
Harvest - Mechanical	0.00	0	0	0	313	313	
Hauling	0.00	0	0	0	105	105	
TOTAL HARVEST COSTS	0.00	0	0	0	418	418	
Interest on operating capital @ 9.69%						91	
TOTAL OPERATING COSTS/ACRE		1,505	85	727	1,006	2,899	
CASH OVERHEAD:							
Office Expense						217	
Liability Insurance						15	
Pest Management Fee						20	
Foreman Salary - 25% Of Full Time						467	
Property Taxes						514	
Property Insurance						333	
Investment Repairs						68	
TOTAL CASH OVERHEAD COSTS						1,635	
TOTAL CASH COSTS/ACRE						4,533	

U.C. COOPERATIVE EXTENSION
Table 2. continued

CAPITAL RECOVERY COSTS (7.4% Interest Rate):			
	Per producing	Annual Cost	
	Acre	Capital Recovery	
Investment			
Land	35,000	2,590	2,590
Buildings	624	52	52
Drip Irrigation System	1,620	142	142
Frost Protection System	2,100	184	184
Pruning Equipment	48	7	7
Shop Tools	396	38	38
Reservoir - 12 AcreFoot	2,500	207	207
Vineyard Establishment Cost	13,369	1,227	1,227
Equipment	1,756	215	215
TOTAL NON-CASH OVERHEAD COSTS	57,413	4,660	4,660
TOTAL COSTS/ACRE			9,194

U.C. COOPERATIVE EXTENSION
Table 3. continued

CAPITAL RECOVERY COSTS	
Land	2,590
Buildings	52
Drip Irrigation System	142
Frost Protection System	184
Pruning Equipment	7
Shop Tools	38
Reservoir - 12 Acre-Foot	207
Vineyard Establishment	1,227
Equipment	215
TOTAL NON-CASH OVERHEAD COSTS/ACRE	4,660
TOTAL COSTS/ACRE	9,194
NET RETURNS ABOVE TOTAL COSTS	3,035

Table 4.

U.C. COOPERATIVE EXTENSION
MONTHLY CASH COSTS PER ACRE TO PRODUCE WINE GRAPES
SONOMA COUNTY - 1999
CHARDONNAY

Beginning DEC 98 Ending NOV 99	DEC 98	JAN 99	FEB 99	MAR 99	APR 99	MAY 99	JUN 99	JUL 99	AUG 99	SEP 99	OCT 99	NOV 99	TOTAL
Cultural:													
Weed Control - Winter Strip Spray	26												26
Prune - Dormant		192	192										385
Chop Prunings - 0.5X			11										11
Frost Protection - 6X				59									59
Disease Control - Mildew Prebloom Spray 2X				41									41
Centers Floor Management - Mow 1.5X					11	21							32
Remove Trunk Suckers - Inseason					38								38
Cordon Shoot Removal 2X					70	70							141
Disease Control - Sulfur Dust 9X					25	16	16	16					74
Move Wires 3X					113	113	113						338
Irrigate 40X						28	28	28	28	28			142
Fertilize - Injected 3X						42	42		36				120
Centers Floor Management - Disc 2X						3	3						7
Disease Control - Mildew Bloom Spray						54							54
Leaf Removal							202						202
Weed Control - Summer Spray							13						13
Hedge Rows								90					90
Disease Control - Mildew Close Bunch Spray							54						54
Insect Control - Leafhopper/Mite Spray - Leafhoppers are sprayed once in 3 years & mites are sprayed twice in 3 years									37				37
Disease Control - Mildew Post Bunch Close								36	36				73
Pickup Truck Use	16	16	16	16	16	16	16	16	16	16	16	16	187
Phosphorus & potassium application occurs 1 in 4 - Fertilize - Banded By Hand											207		207
Post-harvest Irrigation											19		19
Cover crop operations occur 1 in 4 years - Disc Old Cover Crop - Alternate Centers - Plant Cover Crop-Alternate Centers											2		2
											44		44
TOTAL CULTURAL COSTS	41	208	219	115	271	363	486	187	153	44	287	16	2,391
Harvest:										313			313
Harvest - Mechanical										105			105
Hauling													
TOTAL HARVEST COSTS										418			418
Interest on operating capital 9.69%	0	2	4	5	7	10	14	15	17	20	-2	0	91
TOTAL OPERATING COSTS/ACRE	41	210	222	120	278	373	500	202	170	482	285	15	2,899
OVERHEAD:													
Office Expense	18	18	18	18	18	18	18	18	18	18	18	18	217
Liability Insurance			15										15
Pest Management Fee	2	2	2	2	2	2	2	2	2	2	2	2	20
Foreman Salary 25% Of Full Salary	39	39	39	39	39	39	39	39	39	39	39	39	467
Property Taxes		257						257					514
Property Insurance		167						167					333
Investment Repairs	6	6	6	6	6	6	6	6	6	6	6	6	68
TOTAL CASH OVERHEAD COSTS	64	488	80	64	64	64	64	488	64	64	64	63	1,635
TOTAL CASH COSTS/ACRE	106	698	302	184	343	438	564	690	234	546	350	78	4,533

^v Postharvest operation costs are discounted back to the time of the first harvest

Table 5.

U.C. COOPERATIVE EXTENSION
 WHOLE FARM ANNUAL EQUIPMENT, INVESTMENT, AND BUSINESS OVERHEAD COSTS
 SONOMA COUNTY - 1999
 CHARDONNAY

ANNUAL EQUIPMENT COSTS								
Yr	Description	Price	Yrs Life	Salvage Value	Capital Recovery	- Cash Overhead -		Total
						Insur- ance	Taxes	
99	60 HP 4WD Tractor	37,170	16	6,657	3,809	156	241	4,206
99	Trailer	1,287	10	228	170	5	8	184
99	Disc – Offset 5'	5,630	10	996	746	24	36	806
99	Duster – 3 Pt 300# Capacity	2,788	10	493	369	12	18	399
99	Mower – Flail 5.5'	4,713	10	833	624	20	30	675
99	Orchard Sprayer – 300 Gal	13,956	10	2,468	1,849	59	90	1,998
99	Pickup Truck – _ Ton	19,380	7	7,352	2,807	95	147	3,049
99	Weed Sprayer – 50 Gal	2,865	10	507	379	12	19	410
TOTAL		87,789		19,534	10,754	383	590	11,727
60% of New Cost *		52,673		11,720	6,452	230	354	7,036

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

ANNUAL INVESTMENT COSTS								
Description	Price	Yrs Life	Salvage Value	Capital Recover	----- Cash Overhead -----			Total
					Insur- ance	Taxes	Repairs	
INVESTMENT								
Buildings	18,722	30	1,872	1,551	73	113	257	1,995
Drip Irrigation System	48,600	25	4,860	4,249	191	294	534	5,268
Frost Protection System	63,000	25	6,300	5,508	247	381	693	6,829
Land	1,050,000	25	1,050,000	77,700	7,486	11,550	0	96,737
Pruning Equipment	1,425	10	143	197	6	9	20	231
Reservoir – 12 Acre-Foot	75,000	30	7,500	6,215	294	454	413	7,376
Shop Tools	11,887	20	1,189	1,129	47	72	120	1,368
Vineyard Establishment	401,070	23		36,804	1,430	2,206	0	40,440
TOTAL INVESTMENT	1,669,704		1,071,864	133,354	9,774	15,079	2,037	160,243

ANNUAL BUSINESS OVERHEAD COSTS

Description	Units/ Farm	Unit	Price/ Unit	Total Cost
Foreman Salary 25% Of Full Salary	30	Acre	467.00	14,010
Liability Insurance	30	Acre	15.17	455
Office Expense	30	Acre	216.67	6,500
Pest Management Fee	30	Acre	20.00	600

Table 6.

U.C. COOPERATIVE EXTENSION
 HOURLY EQUIPMENT COSTS
 SONOMA COUNTY - 1999
 CHARDONNAY

Yr	Description	Actual Hours Used	----- COSTS PER HOUR -----					Total Oper.	Total Costs/Hr.
			Capital Recovery	Insur- ance	- Cash Overhead - Taxes	Repairs	Operating Fuel & Lube		
99	60 HP 4WD Tractor	321.4	7.11	0.29	0.45	0.87	2.10	2.97	10.82
99	Bin Trailer	9.5	10.81	0.34	0.53	0.19	0.00	0.19	11.87
99	Disc - Offset 5'	12.8	35.07	1.11	1.71	0.90	0.00	0.90	38.79
99	Duster - 3 Pt 300# Capacity	90.0	2.46	0.08	0.12	0.47	0.00	0.47	3.13
99	Mower - Flail 5.5'	60.0	6.24	0.20	0.31	1.92	0.00	1.92	8.67
99	Orchard Sprayer - 300 Gal	100.0	11.09	0.35	0.54	2.33	0.00	2.33	14.31
99	Pickup Truck - 1/2 Ton	285.0	5.91	0.20	0.31	1.41	2.20	3.61	10.03
99	Weed Sprayer - 50 Gal	20.0	11.38	0.36	0.56	0.76	0.00	0.76	13.06

Table 7.

U.C. COOPERATIVE EXTENSION
RANGING ANALYSIS
SONOMA COUNTY - 1999
CHARDONNAY

	YIELD (TONS/ACRE)						
	4	5	6	7	8	9	10
COSTS PER ACRE AT VARYING YIELDS FOR WINE GRAPES							
OPERATING COSTS/ACRE:							
Cultural Cost	2,391	2,391	2,391	2,391	2,391	2,391	2,391
Harvest Cost	239	298	358	418	477	537	596
Interest on operating capital	89	90	90	91	91	92	92
TOTAL OPERATING COSTS/ACRE	2,719	2,779	2,839	2,899	2,959	3,019	3,079
TOTAL OPERATING COSTS/TON	680	556	473	414	370	335	308
CASH OVERHEAD COSTS/ACRE							
CASH OVERHEAD COSTS/ACRE	1,635	1635	1635	1635	1635	1635	1635
TOTAL CASH COSTS/ACRE	4,353	4413	4473	4533	4594	4654	4714
TOTAL CASH COSTS/TON	1,088	883	746	648	574	517	471
CAPITAL RECOVERY COSTS/ACRE							
CAPITAL RECOVERY COSTS/ACRE	4,660	4660	4660	4660	4660	4660	4660
TOTAL COSTS/ACRE	9,013	9,073	9,134	9,194	9,254	9,314	9,374
TOTAL COSTS/TON	2,253	1,815	1,522	1,313	1,157	1,035	937

NET RETURNS PER ACRE ABOVE OPERATING COSTS FOR WINE GRAPE							
PRICE (DOLLARS/TON)	YIELD (TON/ACRE)						
	4	5	6	7	8	9	10
Wine Grape							
1,450	3,081	4,471	5,861	7,251	8,641	10,031	11,421
1,550	3,481	4,971	6,461	7,951	9,441	10,931	12,421
1,650	3,881	5,471	7,061	8,651	10,241	11,831	13,421
1,750	4,281	5,971	7,661	9,351	11,041	12,731	14,421
1,850	4,681	6,471	8,261	10,051	11,841	13,631	15,421
1,950	5,081	6,971	8,861	10,751	12,641	14,531	16,421
2,050	5,481	7,471	9,461	11,451	13,441	15,431	17,421

NET RETURNS PER ACRE ABOVE CASH COSTS FOR WINE GRAPE							
PRICE (DOLLARS/TON)	YIELD (TON/ACRE)						
	4	5	6	7	8	9	10
Wine Grape							
1,450	1,447	2,837	4,227	5,617	7,006	8,396	9,786
1,550	1,847	3,337	4,827	6,317	7,806	9,296	10,786
1,650	2,247	3,837	5,427	7,017	8,606	10,196	11,786
1,750	2,647	4,337	6,027	7,717	9,406	11,096	12,786
1,850	3,047	4,837	6,627	8,417	10,206	11,996	13,786
1,950	3,447	5,337	7,227	9,117	11,006	12,896	14,786
2,050	3,847	5,837	7,827	9,817	11,806	13,796	15,786

NET RETURNS PER ACRE ABOVE TOTAL COSTS FOR WINE GRAPE							
PRICE (DOLLARS/TON)	YIELD (TON/ACRE)						
	4	5	6	7	8	9	10
Wine Grape							
1,450	-3,213	-1,823	-434	956	2,346	3,736	5,126
1,550	-2,813	-1,323	166	1,656	3,146	4,636	6,126
1,650	-2,413	-823	766	2,356	3,946	5,536	7,126
1,750	-2,013	-323	1,366	3,056	4,746	6,436	8,126
1,850	-1,613	177	1,966	3,756	5,546	7,336	9,126
1,950	-1,213	677	2,566	4,456	6,346	8,236	10,126
2,050	-813	1,177	3,166	5,156	7,146	9,136	11,126

Table 8.

U.C. COOPERATIVE EXTENSION
 COSTS AND RETURNS/BREAKEVEN ANALYSIS
 SONOMA COUNTY - 1999
 CHARDONNAY

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 Grape	12,229	2,899	9,330	4,533	7,696	9,194	3,035

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 Grape	366,870	102,853	264,017	151,891	214,979	291,697	75,173

BREAKEVEN PRICES PER YIELD UNIT					
----- Breakeven Price To Cover -----					
CROP	Base Yield (Units/Acre)	Yield Units	Operating Costs	Cash Costs	Total Costs
----- \$ per Yield Unit -----					
Wine Grape	7.0	Ton	414.13	647.64	1,313.38

BREAKEVEN YIELDS PER ACRE					
----- Breakeven Yield To Cover -----					
CROP	Yield Units	Base Price (\$/Unit)	Operating Costs	Cash Costs	Total Costs
----- Yield Units / Acre -----					
Wine Grape	Ton	1,747	1.7	2.6	5.3