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1996

**University of California Cooperative Extension**

**Sample Costs**  
**To Establish A Vineyard And Produce**  
***~Wine Grapes~***



*Drip Irrigated Chardonnay Variety*

**Santa Maria Valley**  
**Santa Barbara County**

By  
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## U.C. Cooperative Extension

### Costs For Establishing A Vineyard And Producing Wine Grapes

#### *Drip Irrigated Chardonnay Variety*

#### Santa Barbara County - 1996

Detailed costs for vineyard establishment and wine grape production in the Santa Maria Valley of Santa Barbara County for 1996 are presented in this study. The hypothetical vineyard used in this report consists of a total of 100 acres, 95 of which are being either established or “redeveloped,” and the remaining five acres are in farmstead buildings, a reservoir and roads.

This study consists of General Assumptions we used for establishing and producing Chardonnay wine grapes along with seven tables of cost analysis. The practices described in this cost study are considered typical for wine grape production in the Santa Maria Valley of Santa Barbara County. They do not reflect the exact values or practices of any grower or shipper, but rather an amalgamation of costs and practices in the region. Sample costs given for labor, materials, equipment and contract services are based on 1996 prices. Some costs and practices detailed in this study may not be applicable to your situation. *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.* This study is only intended as a guide, it can be used in making production decisions, determining potential returns, preparing budgets and evaluating production loans.

Costs are presented in seven 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**

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.**

For an explanation of calculations used for the study refer to the attached General Assumptions, call Etaferahu Takele, the Area Farm Management Economics Advisor, University of California Cooperative Extension, Moreno Valley, California, (909) 683-6491 ext. 243 or call the Santa Barbara County Farm Advisor, Mary Bianchi, (805) 781-5940.

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## ASSUMPTIONS USED IN THIS STUDY

The following is a description of the assumptions used in this study to develop costs to establish a vineyard and produce Chardonnay wine grapes in the Santa Maria Valley of Santa Barbara County in 1996.

### 1. LAND

The vineyard is owned by an absentee landlord. Management and operation is performed by a local vineyard management company. The vineyard is located in the Santa Maria Valley of Santa Barbara County and is situated at the eastern end of the valley. The vineyard is comprised of 100 acres, 95 of which are planted to wine grapes. Land is valued at \$10,000 per acre. Because only 95 of the 100 acres are planted to wine grapes, land is valued at \$10,526 per plantable acre.

### 2. VINES

Dormant bench grafts, scions of certified Chardonnay on phylloxera resistant rootstocks, are planted on a 5'x8' spacing with 1,089 vines per acre during the spring following land preparation in the previous year. In the first year following planting, grow tubes are placed around vines. In the second year 5% or 54 vines per acre will be replanted. Vines are trained as unilateral cordons spur pruned. The grapevines are expected to begin yielding fruit in three years and then be productive for an additional 22 years. Costs of vines and tubes are \$3.50 and \$0.75 each, respectively.

### 3. IRRIGATION & FROST PROTECTION SYSTEMS

**Irrigation System:** A new 10" well is drilled 300' deep, followed by an installation of a new 50 hp submersible pump and motor, and filtration/injector station. The underground portion of the drip irrigation system is installed in the fall prior to planting. Just prior to planting, the above-ground portion of the drip system (polyethylene laterals and a single 1.0 gph emitters) is installed. However, on sandy soils, two 0.5 gph emitters may be installed to increase the root zone wetted area. The well, motor, pump, filtration station, fertilizer injector system, drip lines and the labor to install each of these components is included in the irrigation system cost. The irrigation system is considered an improvement to the property and has a 25 year life span. Therefore, it is not found in preplant operations in **Table 1**, rather it is shown in the non-cash overhead sections as depreciation and interest on investment of various tables and the Investments portion of **Table 5**. However, since the irrigation system is purchased and installed during the first year, growers may prefer to consider this as a cash cost and add about \$3,400/acre to the first year establishment cost.

Pumped water plus labor is the irrigation cost. The cost is based on using the motor to pump 6 acre-inches from 200 feet deep and pressurized to 30 psi to supply one of five irrigated sets among the 100 planted 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, water is calculated to cost \$50 per acre-foot. No assumption is made about effective rainfall. Irrigations begin in April and end in September during the first two years. By the third year additional water is applied during one postharvest irrigation in October.

**Frost Protection System:** The frost protection system consists of a 20 acre-foot reservoir, two diesel engine powered pumps, screen/strainer, specialty control valves and a permanent underground pipeline with overhead sprinklers. The pumping capacity of the system is 5,000 gpm at approximately 175 TDH. Water for frost protection is pumped from the well into the reservoir and stored until needed. Although the frost protection system is installed during the vineyard conversion and prior to 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 8 nights per year. Annual use of 6 acre inches of water per acre for frost protection is presumed to occur from the third year of establishment 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 \$87.48 per acre foot and reflects both the initial pumping from the well and the additional pumping and pressurization of the sprinkler system.

Year	Applied Irrigation Water Acre Inches			
	April - May	July - August	September	Total
1	1	2	1	4
2	2	4	1	7
3	6*	8	4	18

\*/ Frost Protection

#### 4. TRELLIS SYSTEM

The trellis system is designed to support a cordon trained spur pruned vineyard. The trellis equipment for this vineyard include T-stakes, rebar support stakes, wooden endposts and foliage support wires. Seven foot metal stakes are put at every third vine. These stakes are notched to support the pairs moveable foliage wires. The trunks of the two vines between these stakes are trained up rebar stakes. Pressure-treated Douglas Fir end posts and six inch augers at row ends anchor the wires. High tensile 13 gauge wires are used for the trellis. The trellis wires are as follows: one wire at 18" to hold the drip lateral, one permanent wire for tying canes, two pair of moveable foliage support wires and one stabilizer wire. Installation of the trellis system is performed as a custom operation and occurs in the fall and winter prior to planting. It 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 trellis system costs are broken down as follows: T-stakes at every third vine (363 stakes per acre) at \$1.56 each; rebar support stakes at the remaining two-thirds of the vines (726 rebar support stakes per acre) at \$1.30 each; two wooden endposts per row (14 endposts per acre) at \$15.43 per endpost; and wires to support foliage at \$70 per row. Labor to install T-stakes and rebar stakes is estimated at two acres per hour. The total cost for the complete trellis system installation is \$2,220 per acre or \$2.04 per vine.

## 5. ESTABLISHMENT CULTURAL PRACTICES

This vineyard is established on ground that is currently planted to wine grapes, which are to be removed. The land is assumed to be on relatively flat alluvial soils that are adequately drained and moderately fertile. The practices described below represent only the hypothetical vineyard in this study. These are typical practices for many vineyards in the Santa Maria Valley, but may not be appropriate to every situation.

### **Vineyard Conversion And Site Preparation:**

The existing grapevines are removed in the fall. Infestation of the previous vines by phylloxera and nematodes is assumed to be significant. After the vines have been pushed out and burned, gypsum is applied at a rate of four to five tons per acre. The site is then slip plowed twice to a depth of 5 to 6 feet. Slip plowing is effective at breaking up underlying soil layers, which aids root and water penetration, and also pulls up roots from the previous vines which can harbor disease. After slip plowing, the ground is disced twice to break up large clods and smooth the soil. The vineyard site is *not* fumigated. Vineyard removal and slip plowing are performed by contract or custom operators. All operations that prepare the vineyard for planting are done in the year prior to planting, but costs are shown in the first year. Windbreaks are established by planting *Casuarina cunninghamiana* (River She Oak) during year one.

**Planting:** Planting the vineyard starts by laying out and marking vine sites in late fall following the last discing, usually September or October. The initial survey operation is contracted to a professional survey crew that lays out a 100' by 100' grid. The underground portion of the drip irrigation system (mains and risers) is installed before substantial rainfall. Individual vine sites are marked in the vineyard by a labor crew. A post-emergent herbicide "strip-spray" is applied on a four-foot band to the vine rows. This operation takes place in late January or early February.

In March or early April, following sufficient rainfall to soften the soil for digging, dormant bench grafts of Chardonnay headed back to two buds, are hand-planted by labor crews. At this time, a vine sleeve is also installed around each vine to aid in growth. Just prior to planting, the above ground portion of the irrigation system (drip hose laterals and emitters) is installed.

In the second year, 5% of the vines or 54 vines per acre are lost and are replaced. This involves planting new dormant or green bench grafts.

**Pruning and Training:** Activities include pruning, training, tying, suckering vines, shoot positioning and thinning operations. Not all operations are practiced each year, nor are all the same practices used for other training methods or trellis systems.

In the first year, the vine trunk is established. The second year training completes cordon and begins to define spur positions. Budbreak, typically occurring in mid-March, signals the onset of vine training which can run from May through August or even September, and can require six or more passes through the vineyard. Training of the vine includes suckering, tying, and establishing the trunk and spurs of the vine. Suckering is the removal of shoots from the rootstock and along the trunk that could compete with the main trunk and head for water and nutrients. Vine trunks are established by tying one shoot up the stake. This operation takes place at two week intervals requiring several trips through the vineyard. Once this shoot has extended 18 inches above the cordon wire it is topped slightly below the wire, such that training of the head can begin. Two to four auxiliary shoots are selected for the spurs for the following years. Any remaining lower shoots that were not removed during earlier suckering or training

operations would also be pruned off at this time. All prunings are left in between the vine rows to be chopped by the tractor and mower. Pruning costs increase from year two through year five and remain constant there afterwards.

Training vines is assumed to be completed by the third year, but spur positions that were selected during dormant pruning may be reassessed during the spring. Slower growing vines continue to be trained; however, year three is the last year that the vines are trained in this study. Suckering of the vines, which begins in year two increases in cost up to the fourth year and remains constant through the production years.

After vines are trained, canopy management activities such as shoot positioning, thinning, leaf removal start in year four. The number of hours per acre needed for shoot positioning increases each year up to year six and remains constant in the years thereafter. Mechanical hedging begins in year four. Its primary function is for disease management but it also facilitates harvesting and dormant pruning.

**Insect, Mite and Disease Management:** Few insects pests need management in the Santa Maria Valley, although orange tortrix, leafhoppers, mites and mealybugs may be a problem.

There are many pathogens that attack grapevines, but the only major disease that is assumed to occur in this study is powdery mildew (*Uncinula necator*). Powdery mildew control begins the second year with an application of wettable sulfur at 2 to 4 inches of shoot growth. Also six sulfur dustings are done beginning in early May through mid-June. Sulfur dustings are applied at a rate of 10 pounds per acre to every row on seven day intervals. From third year on, sterol inhibitor products are used. Equipment for spraying and dusting comprises a tractor, a pull type sprayer and a 3-point duster.

**Vineyard Floor Management:** Weeds present in the vine row the year the vines are planted are controlled with two hand hoeing passes and a post-emergent herbicide. The row centers between the vine rows are mowed three to five times. Discing is avoided to reduce erosion potential and provide habitat for beneficial insects. Some vineyards are disced every other row, every other year. During vineyard establishment, a non-native cover crop consisting of Zorro fescue and Blando brome is used for erosion control as well. Summer weed control along the vine row begins in the second year with spot spraying, being sure to protect vine trunks with vine grow tubes.

**Fertilization:** Nitrogen fertilizer is applied in all years of vineyard establishment. A liquid formulation of nitrogen (17%) is used at a rate of 6.25 pounds of N per acre through the drip line in two split applications in May and October, totaling 12.5 pounds N for the season.

**Vertebrate Pest Management:** Few vertebrate pests require control in Santa Maria vineyards: principally rabbits, gophers and sometimes squirrels. Damage by rabbits is managed by vine grow tubes placed around the young vines during the first year after the vines are planted and pruned to two buds. This prevents rabbits from feeding on those portions of the young vines within the sleeve. Gopher control is critical for many sites and often entails a combination of mechanical and hand baiting together with trapping.

**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 from the first year till grapes are harvested in this case, the third year. 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 the cost is \$11,985 per acre or \$1,138,575 for the 95 acre vineyard. The establishment cost is spread over the remaining 22 years of the 25 years the vineyard is in production.

## 6. PRODUCTION CULTURAL PRACTICES

**Pruning:** Pruning is done during the winter months, November through February, and comprises the removal of old fruit wood and selecting fruiting spurs for the coming season. The prunings are placed in the row middles where they are chopped using the mower. Canopy management activities such as shoot positioning, thinning, and suckering trunks continue through all production years. Positioning and thinning of shoots and leaf removal opposite clusters allows vines adequate space to develop better fruit by opening the canopy to allow higher sunlight and greater air movement through the vines and around the clusters. Consequently, growth of fruit fungal diseases is lessened.

**Fertilization:** Nitrogen is applied at a rate of 25 pounds of N per acre during the production years by injecting liquid nitrogen through the drip irrigation system. Additionally, liquid potassium is applied in two applications, 15 gallons per acre in June at about full bloom and 25 gallons per acre in October after harvest. Fertility management is monitored by annual bloom-time leaf petiole sampling and tissue analysis for content of major and minor nutrients, primarily N, P, K, and Zn.

**Vineyard Floor Management:** In this vineyard, row weeds are controlled with a mix of pre-emergent herbicides applied as a strip spray during November and spot sprays of Roundup. Cover crops in the row middles are maintained and managed with three mowings per season. The first pass of the season also chops prunings. A spot herbicide spray of Roundup is used to treat 10% of the acreage, primarily for field bindweed or bermudagrass control.

**Insect, Mite and Disease Management:** Few insects pests need management in the Santa Maria Valley, although orange tortrix, leafhoppers, mites and mealybugs may be a problem. Treatments occur on as needed basis.

Powdery mildew is the principle disease of the region and control is begun in April at 2 to 4" shoot growth with an application of wettable sulfur. It is followed by two more applications of wettable sulfur on a 7 to 10 day cycle. Following bloom, dusting sulfur is applied on a 7 day cycle to every row continuing through mid-June. Then sterol inhibitor sprays are begun at this time and continue through July or until fruit attains about 14 to 15 Brix.

Control of botrytis bunch rot (*Botrytis cinerea*) is effected through the use of canopy management practices of shoot positioning and leaf removal. In some years, growers may be faced with environmental conditions that could require chemical control practices.

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 advisors (PCA). In this study no pesticides are used because there are no persistent pests. Pesticide application is on as needed basis.

For pesticide regulatory information and pesticide use permits, contact the local county Agricultural Commissioner's office in Santa Barbara. For additional production information contact the Santa Barbara County viticulture farm advisor.

## 7. HARVEST

Harvesting starts in the third year. In this cost study the vineyard contracts to have the grape crop harvested by labor crews and is charged on a per ton basis. Hauling to a local winery is also contracted for and paid by the grower. Hauling expenses can be significant for growers selling to wineries in the North Coast.

## 8. YIELDS & RETURNS

Grapes begin bearing in the third year after planting. Yield maturity is reached in the sixth year. An assumed yield of 5.5 tons per acre is used to calculate cost per ton in production years. The desired yield range for Chardonnay in the Santa Maria Valley is 5.0 to 6.0 tons per acre. The California Agricultural Statistics Service data for 1994 for District 8, which includes San Luis Obispo, Santa Barbara and Ventura Counties, shows the average yield per acre at 4.2 tons for 1994. Yields for 1995 were significantly lower because of heavy early season rains. The expected annual yields in tons are shown in **Table B**.

**Table B. Expected Annual Yields for Chardonnay**

Year After Planting	3	4	5	6+
Expected Tons Per Acre	1.65	3.30	4.68	5.50

**Returns:** Prices per ton for wine grapes are determined by variety and quality, often defined as percent sugar or Brix. The lowest price in the last four years was \$500 per ton while the high was at \$2,000; the 1995 weighted average price for Chardonnay was \$1,110 per ton. Prices for Santa Barbara County Chardonnay are generally higher than San Luis Obispo County. Santa Barbara County Agricultural Commissioner Reports do not show wine grape data by variety. **Table C** shows the average annual yields and prices for Chardonnay in Santa Maria Valley. In this study an expected price of a \$1,200 per ton is used for Chardonnay wine grapes.

**Table C. Annual Prices Received By Santa Maria Valley (District 8) Growers For Chardonnay, 1991 to 1995**

Year	Range (\$ / Ton)		Weighted Average
	Low	High	
1991	624	1995	1248
1992	600	2000	1220
1993	400	2000	979
1994	500	1700	1028
1995	725	2000	1110
Average	570	1939	1117

## 9. RISK

Risk is caused by various sources of uncertainty including production, price, and financial. Examples of these are frost damage, rain during bloom or just prior to harvest, a decrease in price, and increase in interest rates. The risks associated with producing wine grapes in the Santa Maria Valley of Santa Barbara County should not be underestimated. While this study makes every effort to model a production system based on typical, real world practices, it cannot fully represent agronomic, market, and financial risks which affect the profitability and economic viability of wine grape production. Additionally, establishment of vineyards and the equipment required to properly handle the fruit is very capital intensive. Growers should consider all of the agronomic and economic risks before committing resources to establishing a vineyard and wine grape production in this region.

## 10. LABOR

Hourly wages for workers are \$8.00 and \$6.50 per hour for machine and non-machine workers, respectively. This is based on wages paid by the growers in this study. Adding 34% for Workers Compensation, Social Security, Medicare, insurance, and other possible benefits gives the labor rates shown of \$10.72 and \$8.71 per hour for machine labor and non-machine labor, respectively. 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. Management cost by independent vineyard management company are included as a cash overhead cost. Any return above total costs is considered a return to management and risk.

## 11. 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, sanitation services, and equipment repairs.

**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, property taxes are calculated at 1% of the average value. Average value equals new cost plus salvage value divided by 2 on a per acre basis.

**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 7.89% 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 \$600 for the entire farm.

**Office Expense:** Office and business expenses are estimated at \$24 per acre. These expenses include office supplies, telephone, computer, fax, copier, bookkeeping, accounting, legal fees, etc.

**Sanitation Services:** Sanitation services provide two portable toilets for the vineyard and cost \$2 per acre per month. The cost for this includes delivery and regular servicing of toilets.

**Management Fee:** A fee for management is included to indicate that a cash cost for professional supervision of the vineyard is incurred. If the manager is also the owner a salary would be paid regardless of any profits received from vineyard production. An expense of \$175 per acre per year for a professional manager's time is used. Cash overhead costs are found in **Tables 1, 2, 3, 4, and 5.**

## 12. NON-CASH OVERHEAD

Non-cash overhead is comprised of depreciation and interest charged on equipment and other investments. Farm equipment on typical vineyard in the Santa Maria Valley may be purchased used. This study shows the current purchase price for new equipment adjusted to 60% of new value to indicate a mix of new and used equipment. Annual equipment and investment costs are shown in **Tables 1, 2, 3, and 5.** They represent depreciation and opportunity cost for each investment on an annual per acre basis.

Depreciation is a reduction in market value of investments due to wear, obsolescence, and age estimated on a straight line basis. Annual depreciation is calculated as purchase price minus salvage value divided by years the investment is held. Purchase price and years of life are shown in **Table 5.**

Interest is charged on investments to account for income foregone (opportunity cost) that could be received from an alternative investment. The investments are assumed to be owned outright. Therefore, interest on investments is a non-cash cost. Investments include land, vineyard establishment, irrigation system, buildings, and equipment. Interest is calculated as the average value of the investment during its useful life, multiplied by 3.72% per year. Average value for equipment and buildings equals new cost plus salvage value divided by 2 on a per acre basis.

The average value for land is equal to the purchase price because land does not depreciate. The interest rate used to calculate opportunity cost is estimated as a ten year average of the agricultural sector long run 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.

## 13. EQUIPMENT CASH COSTS

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 fuel, lubrication, and repairs.

In allocating the equipment costs on a per acre basis, the hourly charges are calculated first and shown in **Table 6.** 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 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 **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 \$1.15 and \$1.20 per gallon, respectively.

## 14. ADDENDUM

1. Due to rounding, totals may be slightly different from the sum of components.
2. The per acre equipment costs in Table 1 reflect both the value and the level of use (hours and years of use) of the machinery complement. Therefore this cost could be different from the per acre value of the machinery complement in Table 4.

## 15. ACKNOWLEDGMENT

Appreciation is expressed to Paul Zellman, Staff Research Associate, who was involved at the initial stage of the development of this cost study and Delos Walton, Staff Research Associate, for assisting in the development of the final report. We also express our appreciation to those growers and other cooperators who provided data for the development of this cost study.

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Table 1.

U.C. COOPERATIVE EXTENSION  
 SAMPLE COSTS PER ACRE TO ESTABLISH A VINEYARD  
 SANTA MARIA VALLEY: SANTA BARBARA COUNTY - 1996

Year	Labor Rate: \$10.72/hr. machine labor \$8.71/hr. non-machine labor		Vines Per Acre: 1,089 Short Term Interest Rate: 7.89%	
	Cost Per Acre			
	1st	2nd	3rd	
Tons Per Acre				2
<b>Planting Costs:</b>				
Vine Removal	250			
Land Preparation: Gyp, Plow, Disc 2x	500			
Mark & Layout Vineyard	213			
Plant Vines & Install Grow Tubes	544			
Vines & Grow Tubes - 1089 / Acre	4,628			
Vines @ \$3.50/Each & Grow Tubes @ \$0.75/Each				
Train Vines: Unilateral Cordon	450	345		
Plant Windbreak Trees	130			
Pre-Emergent Herbicide	74			
<b>Total Planting Costs</b>	<b>6,789</b>	<b>345</b>		
<b>Replanting Costs:</b>				
Replant Vines (@ 5%)		27		
Vines & Grow Tubes - 54 / Acre		229		
<b>Total Replanting Costs:</b>		<b>256</b>		
<b>Trellis System Costs:</b>				
Install T-Stakes & Rebar Stakes	1,514			
Install End Posts & Anchors	216			
Install Wires	490			
Trellis Repair				5
<b>Total Trellis System Costs:</b>	<b>2,220</b>			<b>5</b>
<b>Cultural Costs:</b>				
Irrigate	47	60		70
Fertilizer - Nitrogen	11	11		11
Prune Vines		70		160
Suckering		50		65
Weed Control - Planting	24			
Weed Control - Hand Hoe	100	80		80
Weed Control - Mow	6	6		6
Weed Control - Winter Strip	29	29		29
Weed Control - Spot Spray		3		3
Cover Crop Planting	31			
Vertebrate Control	24	24		24
Frost Control				54
Mildew Control - Wettable		33		97
Mildew Control - Dust		16		16
Mildew Control - SI				63
Pickup Truck Use	17	17		17
ATV Use	13	13		13
<b>Total Cultural Costs:</b>	<b>302</b>	<b>412</b>		<b>708</b>
<b>Harvest Costs:</b>				
Hand Harvest @ \$110/Ton				182
Harvest Rental Equipment @ \$40/Ton				66
Haul to Crusher @ \$40/Ton				66
<b>Total Harvest Costs:</b>				<b>314</b>
Interest on Operating Capital @ 7.89%	653	33		26
<b>TOTAL OPERATING COSTS/ACRE</b>	<b>9,964</b>	<b>1,046</b>		<b>1,053</b>

U.C. COOPERATIVE EXTENSION  
Table 1. continued

Year	Cost Per Acre		
	1st	2nd	3rd
Tons Per Acre			2
<b>Cash Overhead Costs:</b>			
Office Expense	24	24	24
Liability Insurance	6	6	6
Sanitation	23	23	23
Manager Salary	175	175	175
Property Taxes	130	130	130
Property Insurance	93	93	93
Investment Repairs	183	183	183
<b>TOTAL CASH OVERHEAD COSTS</b>	<b>634</b>	<b>634</b>	<b>634</b>
<b>TOTAL CASH COSTS/ACRE</b>	<b>10,598</b>	<b>1,680</b>	<b>1,687</b>
<b>INCOME/ACRE FROM PRODUCTION</b>			<b>1,980</b>
<b>NET CASH COSTS/ACRE FOR THE YEAR</b>	<b>10,598</b>	<b>1,680</b>	
<b>PROFIT/ACRE ABOVE CASH COSTS</b>			<b>293</b>
<b>ACCUMULATED NET CASH COSTS/ACRE</b>	<b>10,598</b>	<b>12,278</b>	<b>11,985</b>
<b>Depreciation:</b>			
Buildings	18	18	18
Fuel Tanks & Pumps	8	8	8
Shop Tools	6	6	6
Drip Irrigation System	65	65	65
Pruning Equipment	0	0	0
Sprinkler Irrigation Equipment	88	88	88
	42	50	50
<b>TOTAL DEPRECIATION</b>	<b>227</b>	<b>235</b>	<b>235</b>
<b>Interest on Investment @ 3.72%</b>			
Buildings	8	8	8
Fuel Tanks & Pumps	3	3	3
Shop Tools	3	3	3
Drip Irrigation System	30	30	30
Pruning Equipment	0	0	0
Land - Santa Maria Valley	392	392	392
Sprinkler Irrigation Equipment	40	40	40
	8	10	10
<b>TOTAL INTEREST ON INVESTMENT</b>	<b>484</b>	<b>486</b>	<b>486</b>
<b>TOTAL COST/ACRE FOR THE YEAR</b>	<b>11,309</b>	<b>2,401</b>	<b>2,408</b>
<b>INCOME/ACRE FROM PRODUCTION</b>			<b>1,980</b>
<b>TOTAL NET COST/ACRE FOR THE YEAR</b>	<b>11,309</b>	<b>2,401</b>	
<b>NET PROFIT/ACRE ABOVE TOTAL COST</b>			<b>-428</b>
<b>TOTAL ACCUMULATED NET COST/ACRE</b>	<b>11,309</b>	<b>13,710</b>	<b>14,138</b>

Table 2.

U.C. COOPERATIVE EXTENSION  
 COSTS PER ACRE TO PRODUCE WINE GRAPE  
 SANTA MARIA VALLEY: SANTA BARBARA COUNTY - 1996

Labor Rate: \$10.72/hr. machine labor  
 \$8.71/hr. non-machine labor

Vines Per Acre: 1,089  
 Short Term Interest Rate: 7.89%

Operation	Cash and Labor Costs per Acre						
	Operation Time (Hrs/A)	Labor Cost	Fuel,Lube & Repairs	Material Cost	Custom/ Rent	Total Cost	Your Cost
<b>Trellis System:</b>							
Trellis Repair	0.00	2	0	3	0	5	
<b>TOTAL TRELLIS SYSTEM COSTS</b>	<b>0.00</b>	<b>2</b>	<b>0</b>	<b>3</b>	<b>0</b>	<b>5</b>	
<b>Cultural:</b>							
Prune	0.00	0	0	0	240	240	
Mechanical Hedging	1.00	13	8	0	0	21	
Suckering	0.00	0	0	0	90	90	
Canopy Management	0.00	0	0	0	150	150	
Fertilize - Nitrogen	0.10	1	0	9	0	10	
Fertilize - Potassium	0.10	1	0	15	0	16	
Fertilize - Zinc	0.41	5	6	11	0	22	
Vertebrate Control	0.75	14	4	13	0	31	
Weed Control - Mowing Middles	1.20	15	10	0	0	26	
Frost Control	0.01	10	0	44	0	54	
Mildew Control - Wettable Sulfur	1.39	18	19	37	0	73	
Mildew Control - SI	0.82	11	11	41	0	63	
Mildew Control - Sulfur Dust	0.40	5	3	8	0	17	
Botrytis Control - Rovral	0.41	5	6	38	0	49	
Irrigate	0.30	29	1	48	0	78	
Weed Control - Spot Spray	0.08	1	0	1	0	3	
Pickup Truck Use	0.86	11	6	0	0	17	
ATV Use	0.86	11	2	0	0	13	
<b>TOTAL CULTURAL COSTS</b>	<b>8.70</b>	<b>151</b>	<b>75</b>	<b>266</b>	<b>480</b>	<b>971</b>	
<b>Harvest:</b>							
Harvest Equipment Rental	0.00	0	0	0	220	220	
Harvest Fruit - Hand	0.00	0	0	0	605	605	
Haul To Crusher	0.00	0	0	0	220	220	
<b>TOTAL HARVEST COSTS</b>	<b>0.00</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>1045</b>	<b>1045</b>	
<b>Postharvest:</b>							
Irrigate	0.10	6	0	2	0	8	
Fertilize - Potassium	0.10	1	0	45	0	46	
Fertilize - Nitrogen	0.00	0	0	9	0	9	
Weed Control - Winter Strip	0.30	4	3	51	0	58	
<b>TOTAL POSTHARVEST COSTS</b>	<b>0.50</b>	<b>11</b>	<b>3</b>	<b>107</b>	<b>0</b>	<b>121</b>	
Interest on operating capital @ 7.89%	0.08					42	
<b>TOTAL OPERATING COSTS/ACRE</b>		<b>164</b>	<b>78</b>	<b>376</b>	<b>1525</b>	<b>2184</b>	
<b>TOTAL OPERATING COSTS/TON</b>						<b>397.07</b>	
<b>CASH OVERHEAD:</b>							
Office Expense						24	
Liability Insurance						6	
Sanitation Fees						23	
Manager Salary						175	
Property Taxes						196	
Property Insurance						140	
Investment Repairs						184	
<b>TOTAL CASH OVERHEAD COSTS</b>						<b>749</b>	
<b>TOTAL CASH COSTS/ACRE</b>						<b>2933</b>	
<b>TOTAL CASH COSTS/TON</b>						<b>533.31</b>	

U.C. COOPERATIVE EXTENSION  
Table 2. continued

NON-CASH OVERHEAD:				
Investment	Per producing	Annual Cost		Total
	Acre	Depreciation	Interest @ 3.72%	
Buildings	401	18	8	26
Fuel Tanks & Pumps	132	8	3	11
Shop Tools	132	6	3	9
Drip Irrigation System	1,449	65	30	95
Pruning Equipment	5	0	0	0
Land	10,526		392	392
Vineyard Establishment	11,985	490	245	736
Chemical Shed	32	1	1	2
Sprinkler Irrigation	1,949	88	40	128
Equipment	505	51	10	61
<b>TOTAL NON-CASH OVERHEAD COSTS</b>	<b>27,115</b>	<b>727</b>	<b>731</b>	<b>1,458</b>
<b>TOTAL COSTS/ACRE</b>				<b>4,392</b>
<b>TOTAL COSTS/TON</b>				<b>798</b>



U.C. COOPERATIVE EXTENSION  
Table 3. continued

<b>CASH OVERHEAD COSTS:</b>	
Office Expense	24
Liability Insurance	6
Sanitation Fees	23
Manager Salary	175
Property Taxes	196
Property Insurance	140
Investment Repairs	184
<b>TOTAL CASH OVERHEAD COSTS/ACRE</b>	<b>749</b>
<b>TOTAL CASH COSTS/ACRE</b>	<b>2,933</b>
<b>TOTAL CASH COSTS/TON</b>	<b>533</b>
<b>NON-CASH OVERHEAD COSTS (DEPRECIATION &amp; INTEREST):</b>	
Buildings	26
Fuel Tanks & Pumps	11
Shop Tools	9
Drip Irrigation System	95
Pruning Equipment	0
Land - Santa Maria	392
Vineyard Establishment	736
Chemical Shed	2
Sprinkler Irrigation	128
Equipment	61
<b>TOTAL NON-CASH OVERHEAD COSTS/ACRE</b>	<b>1,458</b>
<b>TOTAL COSTS/ACRE</b>	<b>4,392</b>
<b>TOTAL COSTS/TON</b>	<b>798</b>
<b>NET RETURNS ABOVE TOTAL COSTS</b>	<b>2,208</b>

Table 4.

U.C. COOPERATIVE EXTENSION  
MONTHLY CASH COSTS PER ACRE TO PRODUCE WINE GRAPE  
SANTA MARIA VALLEY: SANTA BARBARA COUNTY - 1996

Beginning JAN 96	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	TOTAL
Ending DEC 96	96	96	96	96	96	96	96	96	96	96	96	96	
Trellis System:													
Trellis Repair			5										5
<b>TOTAL TRELLIS SYSTEM COSTS</b>			5										5
Cultural:													
Prune	120	120											240
Mechanical Hedging									21				21
Suckering				30	30	30							90
Canopy Management					50	50	50						150
Fertilize - Nitrogen				10									10
Fertilize - Potassium						16							16
Fertilize - Zinc						22							22
Verbrate Control				17			15						31
Weed Control - Mowing Middles			9	9	9								26
Frost Control			27	27									54
Mildew Control - Wettable Sulfur				73									73
Mildew Control - SI						32	32						63
Mildew Control - Sulfur Dust					9	7							17
Mildew Control - Fungicide						49							49
Irrigate					15	15	16	16	16				78
Weed Control - Spot Spray						3							3
Pickup Truck Use	1	1	1	1	1	1	1	1	1	1	1	1	17
ATV Use	1	1	1	1	1	1	1	1	1	1	1	1	13
<b>TOTAL CULTURAL COSTS</b>	122	122	38	168	115	225	115	19	39	2	2	2	971
Harvest:													
Harvest Equipment Rental									220				220
Harvest Fruit - Hand									605				605
Haul To Crusher									220				220
<b>TOTAL HARVEST COSTS</b>									1,045				1,045
Postharvest:													
Irrigate										8			8
Fertilize - Potassium										46			46
Fertilize - Nitrogen										9			9
Weed Control - Winter Strip											58		58
<b>TOTAL POSTHARVEST COSTS</b>										63	58		121
Interest on oper. capital	1	2	2	3	4	5	6	6	13				42
<b>TOTAL OPERATING COSTS/ACRE</b>	123	124	45	171	119	230	121	25	1,097	66	60	2	2,184
<b>TOTAL OPERATING COSTS/TON</b>	22.40	22.50	8.16	31.15	21.57	41.90	21.96	4.50	199.55	11.99	10.96	0.45	397.07
OVERHEAD:													
Office Expense	2	2	2	2	2	2	2	2	2	2	2	2	24
Liability Insurance	6												6
Sanitation Fees	2	2	2	2	2	2	2	2	2	2	2	2	23
Manager Salary	15	15	15	15	15	15	15	15	15	15	15	15	175
Property Taxes	196												196
Property Insurance	70						70						140
Investment Repairs	15	15	15	15	15	15	15	15	15	15	15	15	184
<b>TOTAL CASH OVERHEAD COSTS</b>	307	34	34	34	34	34	104	34	34	34	34	34	749
<b>TOTAL CASH COSTS/ACRE</b>	430	158	79	205	152	264	225	59	1,131	100	94	36	2,933
<b>TOTAL CASH COSTS/TON</b>	78.16	28.66	14.31	37.31	27.73	48.06	40.85	10.66	205.70	18.14	17.12	6.61	533.31

Table 5. U.C. COOPERATIVE EXTENSION  
 WHOLE FARM ANNUAL EQUIPMENT, INVESTMENT, AND BUSINESS OVERHEAD COSTS  
 SANTA MARIA VALLEY: SANTA BARBARA COUNTY - 1996

ANNUAL EQUIPMENT COSTS

Description	Price	Yrs Life	- Non-Cash Over. -		- Cash Overhead -		Total
			Depre- ciation	Interest	Insur- ance	Taxes	
9670 HP 2WD Tractor	28,850	12	2,164	590	113	159	3,026
96ATV 4WD	6,000	7	771	123	24	33	951
96Bait Applicator	1,046	10	94	21	4	6	125
96Duster - 3 Pt	3,093	10	278	63	12	17	371
96Mower - Rotary 5'	5,000	5	900	102	20	28	1,049
96Pickup Truck - 1/2 Ton	17,160	7	2,206	351	67	94	2,719
96Vine Trimmer	2,282	15	137	47	9	13	205
96Vineyard Sprayer - 400 Gal	13,266	10	1,194	271	52	73	1,590
96Weed Sprayer - 200 Gal	3,282	10	295	67	13	18	393
<b>TOTAL</b>	<b>79,979</b>		<b>8,040</b>	<b>1,636</b>	<b>314</b>	<b>440</b>	<b>10,430</b>
60% of New Cost *	47,987		4,824	982	188	264	6,258

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

ANNUAL INVESTMENT COSTS

Description	Price	Yrs Life	- Non-Cash Over. -		----- Cash Overhead -----			Total
			Depre- ciation	Interest	Insur- ance	Taxes	Repairs	
<b>INVESTMENT</b>								
Buildings	38,100	20	1,715	780	149	210	762	3,615
Chemical Shed	3,000	20	135	61	12	16	60	285
Drip Irrigation System	137,625	20	6,193	2,816	540	757	6,881	17,187
Fuel Tanks & Pumps	12,500	15	750	256	49	69	250	1,374
Land	1,000,000			37,200	7,130	10,000	0	54,330
Pruning Equipment	500	20	23	10	2	3	10	47
Shop Tools	12,500	20	563	256	49	69	250	1,186
Sprinkler Irrigation	185,110	20	8,330	3,787	726	1,018	9,256	23,117
Vineyard Establishment	1,138,575	22	46,578	23,295	4,465	6,262	0	80,600
<b>TOTAL INVESTMENT</b>	<b>2,527,910</b>		<b>64,286</b>	<b>68,461</b>	<b>13,122</b>	<b>18,404</b>	<b>17,469</b>	<b>181,741</b>

ANNUAL BUSINESS OVERHEAD COSTS

Description	Units/		Price/	Total
	Farm	Unit	Unit	Cost
Liability Insurance	1.00	Each	600.00	600
Manager Salary	95.00	Acre	175.00	16,625
Office Expense	95.00	Acre	24.00	2,280
Sanitation Fees	2.00	Each	1,116.00	2,232

Table 6.

U.C. COOPERATIVE EXTENSION  
 HOURLY EQUIPMENT COSTS TO PRODUCE WINE GRAPE  
 SANTA MARIA VALLEY: SANTA BARBARA COUNTY - 1996

Description	----- COSTS PER HOUR -----								
	Actual Hours Used	-Non-Cash Over- Depre- ciation	Interest	- Cash Overhead - Insur- ance	Taxes	Repairs	Operating Fuel & Lube	Total Oper.	Total Costs/Hr.
70 HP 2WD Tractor	671.5	1.93	0.53	0.10	0.14	1.73	4.55	6.28	8.99
ATV 4WD	152.9	3.03	0.48	0.09	0.13	1.09	0.92	2.01	5.74
Bait Applicator	47.5	1.19	0.27	0.05	0.07	0.63	0.00	0.63	2.21
Duster - 3 Pt	38.0	4.40	1.00	0.19	0.27	1.55	0.00	1.55	7.41
Mower - Rotary 5'	114.0	4.74	0.54	0.10	0.14	1.80	0.00	1.80	7.32
Pickup Truck - 1/2 Ton	82.1	16.12	2.57	0.49	0.69	3.11	3.45	6.56	26.43
Vine Trimmer	95.0	0.86	0.29	0.06	0.08	0.82	0.00	0.82	2.12
Vineyard Sprayer - 400 Gal	287.5	2.49	0.57	0.11	0.15	6.65	0.00	6.65	9.97
Weed Sprayer - 200 Gal	28.5	6.22	1.41	0.27	0.38	1.64	0.00	1.64	9.93

Table 7.

RANGING ANALYSIS TO PRODUCE WINE GRAPES  
 SANTA MARIA VALLEY: SANTA BARBARA COUNTY - 1996

COSTS PER ACRE AT VARYING YIELDS TO PRODUCE WINE GRAPES

	YIELD (TON/ACRE)						
	4.0	4.5	5.0	5.5	6.0	6.5	7.0
OPERATING COSTS/ACRE:							
Trellis System Cost	5	5	5	5	5	5	5
Cultural Cost	971	971	971	971	971	971	971
Harvest Cost	760	855	950	1,045	1,140	1,235	1,330
Postharvest Cost	121	121	121	121	121	121	121
Interest on operating capital	40	40	41	42	42	43	43
TOTAL OPERATING COSTS/ACRE	1,897	1,993	2,088	2,184	2,280	2,375	2,471
TOTAL OPERATING COSTS/TON	474.00	443.00	418.00	397.00	380.00	365.00	353.00
CASH OVERHEAD COSTS/ACRE							
	749	749	749	749	749	749	749
TOTAL CASH COSTS/ACRE	2,646	2,742	2,838	2,933	3,029	3,124	3,220
TOTAL CASH COSTS/TON	662.00	609.00	568.00	533.00	505.00	481.00	460.00
NON-CASH OVERHEAD COSTS/ACRE							
	1,458	1,458	1,458	1,458	1,458	1,458	1,458
TOTAL COSTS/ACRE	4,105	4,200	4,296	4,392	4,487	4,583	4,679
TOTAL COSTS/TON	1,026.00	933.00	859.00	798.00	748.00	705.00	668.00

U.C. COOPERATIVE EXTENSION  
Table 7. Continued

NET RETURNS PER ACRE ABOVE OPERATING COSTS FOR WINE GRAPES

PRICE (DOLLARS PER TON)	YIELD (TON/ACRE)						
	4.0	4.5	5.0	5.5	6.0	6.5	7.0
900	1,703	2,057	2,412	2,766	3,120	3,475	3,829
1,000	2,103	2,507	2,912	3,316	3,720	4,125	4,529
1,100	2,503	2,957	3,412	3,866	4,320	4,775	5,229
1,200	2,903	3,407	3,912	4,416	4,920	5,425	5,929
1,300	3,303	3,857	4,412	4,966	5,520	6,075	6,629
1,400	3,703	4,307	4,912	5,516	6,120	6,725	7,329
1,500	4,103	4,757	5,412	6,066	6,720	7,375	8,029

NET RETURNS PER ACRE ABOVE CASH COSTS FOR WINE GRAPES

PRICE (DOLLARS PER TON)	YIELD (TON/ACRE)						
	4.0	4.5	5.0	5.5	6.0	6.5	7.0
900	954	1,308	1,662	2,017	2,371	2,726	3,080
1,000	1,354	1,758	2,162	2,567	2,971	3,376	3,780
1,100	1,754	2,208	2,662	3,117	3,571	4,026	4,480
1,200	2,154	2,658	3,162	3,667	4,171	4,676	5,180
1,300	2,554	3,108	3,662	4,217	4,771	5,326	5,880
1,400	2,954	3,558	4,162	4,767	5,371	5,976	6,580
1,500	3,354	4,008	4,662	5,317	5,971	6,626	7,280

NET RETURNS PER ACRE ABOVE TOTAL COSTS FOR WINE GRAPES

PRICE (DOLLARS PER TON)	YIELD (TON/ACRE)						
	4.0	4.5	5.0	5.5	6.0	6.5	7.0
900	-505	-150	204	558	913	1,267	1,621
1,000	-105	300	704	1,108	1,513	1,917	2,321
1,100	295	750	1,204	1,658	2,113	2,567	3,021
1,200	695	1,200	1,704	2,208	2,713	3,217	3,721
1,300	1,095	1,650	2,204	2,758	3,313	3,867	4,421
1,400	1,495	2,100	2,704	3,308	3,913	4,517	5,121
1,500	1,895	2,550	3,204	3,858	4,513	5,167	5,821