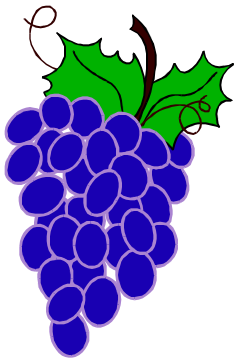
1996

University of California Cooperative Extension

Production And Sample Costs
To Establish A Vineyard And Produce

~ Wine Grapes ~



~ Drip Irrigated Cabernet Sauvignon Variety ~

Paso Robles Region
San Luis Obispo County

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U.C. Cooperative Extension

Costs For Establishing A Vineyard And Producing Wine Grapes
Drip Irrigated Cabernet Sauvignon Variety
San Luis Obispo County - 1996

Detailed costs for vineyard establishment and wine grape production in the Paso Robles Region of San Luis Obisp County for 1996 are presented in this study. The hypothetical vineyard used in this report consists of a total of 20 acres, 18 of which are being established, and the remaining two acres are in farmstead buildings and roads.

This study consists of General Assumptions for producing Cabernet Sauvignon wine grapes along with seven tabl of cost analysis. The practices described in this cost study are considered typical for wine grape production in the Paso Robles region of San Luis Obispo County. They do no reflect the exact values or practices of any grower or shipper, but are rather an amalgamation of Paso Robles Region costs and practices. Sample costs given for labor, materials, equipment and contract services are based on 1996 prices. Some costs and practices detailed in this stuc may not be applicable to your situation. *The use of trade names in this report does not constitute an endorsement 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 return 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. You can also call the Area Farm Management Economics Advisor, Etaferahu Takele at the University of California Cooperative Extension, Riverside County, Moreno Valley, California, (909) 683-6491 ext. 243 or call the San Luis Obispo County Farm Advisor, Mary Bianchi, (805) 781-5940.

ASSUMPTIONS USED IN THIS STUDY

The following is a description of the general assumptions used in this study to develop costs to establish a vineyard and produce Cabernet Sauvignon wine grapes in the Paso Robles Region of San Luis Obispo County in 1996 .

1. LAND:

The vineyard is owned by an absentee landlord. Management and operation is performed by a local vineyard management company. An owner operated vineyard may realize cost differences in comparison to a local vineyard management company. Such cost differences may arise from the use of family labor in production or management.

The vineyard is located in the Paso Robles Region of San Luis Obispo County. The vineyard is comprised of 20 acres, 18 of which are planted to wine grapes, and two acres are used for roads, irrigation system, fencing, and farmstead buildings. The land used in this study is valued at $7,000 per acre. Because only 18 of the 20 acres are planted, land is valued at $7,778 per plantable acre.

2. VINES:

Bench grafts¾ scions of certified Cabernet Sauvignon on phylloxera resistant rootstocks are planted on a 5 10' spacing with 871 vines per acre in the spring following land preparation in the previous year. Then vin are pruned to two buds followed by placing sleeves (milk cartons) around them. Vine replanting during th second year constitute 2% or 17 vines per acre. Vines are trained as head-cane (four spurs and four canes). The grapevines are expected to begin yielding fruit in three years and continue to be productive for an additional 22 years.

3. IRRIGATION SYSTEM:

Irrigation System: The irrigation system consists of drilling a new 6" well 300' deep, installment of nev submersible pump and motor, control valves, electrical panel, filters and an injector capable of delivering both fertilizer and continuous solution grade gypsum. The underground portion of the drip irrigation syste is installed in the fall prior to planting. Immediately after planting, the above-ground portion of the drip system consisting of polyethylene laterals and two 0.5 gph emitters is installed. The cost of the irrigation system in this study includes, the well, 7.5 hp motor, pump, filtration station, fertilizer injection system, emitters, drip lines and labor to install each of these components. Whereas costs of pumping and labor cos are included as operation costs, the irrigation system is considered an improvement to the property and has 25 year life span. Therefore, it is shown in the non-cash overhead sections of the costs of establishment ar production.

Pumping costs are based on using the 7.5 hp motor to pump 20 acre-inches with a lift of 250 feet (include pump to surface and elevation to vineyard) and an operating pressure of 30 psi (70 feet) to the 18 planted acres. Price per acre-foot of water will vary by grower in this region depending on factors such as quantity pumped, power cost, various well characteristics. In this study, water is calculated to cost $60.84 per acre-foot (from the software PPCOST 4.2). No assumption is made about effective rainfall. Irrigation begins in May and end in September during the first two years. In the third year, an additional postharvest irrigation 0.40 acre-inches of water per acre is applied in September or October. Amount of irrigation water applied varies by season and age of vines as shown in **Table A**.

Water Quality: The majority of vineyards in the Paso Robles area are irrigated during the growing season with drip irrigation systems. Irrigation water in many areas is high in bicarbonates (HCO_3 -) which may cause plugging of the drip emitters. Although chemical maintenance may be important in some vineyards, costs may vary widely at individual sites, and have not been included in production costs. In addition, some irrigation waters are high in sodium (Na^+) , chlorides (Cl^-), and/or boron (B),

which may significantly reduce vine growth and fruit quality. If found at high levels prior to planting these constituents should be monitored with laboratory analysis in the irrigation water on a yearly basis.

Table A. Applied Irrigation Water

	AcIn/Year			
Year	April - June	July - August	Sept.-	Total Applied
1	4	6	2	12
2	6	9	3	18
3+	6	10	4	20

Frost Protection: Some areas in the Paso Robles grape growing region experience late spring frosts (after grapevine buds have begun to grow) on a yearly basis. Vineyards in these areas will require the addition of sprinkler systems for frost protection. Based on the costs estimated for a companion study in the Santa Barbara area, addition of a frost protection system and reservoirs will increase establishment costs by $3,500 per acre.

4. TRELLIS SYSTEM:

The trellis system is designed to support a head trained and cane pruned vineyard. The system in this study utilizes roll-formed galvanized steel stakes at each vine¾two consecutive 5' stakes are followed by a third 7' stake. Pressure-treated Douglas Fir end posts anchor the wires at row ends. Two permanent, high tensile wires, 12.5 gauge tying and 14 gauge for foliage or catch wire are secured to the end posts. The upper foliage wire is attached to every third metal stake. A third 14 gauge wire is also installed at about 18" above the ground to support the drip hose lateral. The trellis system is custom installed in fall and winter following 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**.

5. ESTABLISHMENT CULTURAL PRACTICES:

This vineyard is established on a ground that had been previously used for dryland cereals or range. The land is assumed to be on a relatively flat to sloping sedimentary soils that are adequately drained but not highly fertile. The practices described below are typical practices for many vineyards in the Paso Robles Region, but may not be appropriate to every situation.

Site Preparation:

The vineyard is established on dryland pasture or bare land. The initial operation is a deep rip in August. Two shanks (42" to 48") on four-foot center are pulled by a crawler-type of tractor, e.g. D-8, to break up any underlying hardpan. This operation is done to improve root and water penetration. Afterwards the ground is disced two times which helps to break up large clods of soil and somewhat smoothes the ground. These two operations are performed by contract or custom basis. All operations that prepare the vineyard for planting are done in the year prior to planting, but costs are shown in the first year.

Planting: Planting the vineyard starts by laying out and marking vine sites in late fall following the last discing. The initial survey operation involves laying out a 50' by 50' grid and is done on contract by a professional survey crew. Individual vine sites are marked by the crew with white plastic knives. Pre-emergent herbicide, "strip-spray", typically a combination of two complimentary herbicides, is applied on a four-foot band to the vine rows. This operation takes place in late November or early December prior to anticipated rains. The underground portion of the drip irrigation system (mains and riser) is then installed before substantial rainfall.

In January, following rainfall that softens the soil for digging, dormant bench grafts of Cabernet Sauvignon headed back to two buds, are hand-planted by hourly labor crews. Following planting, the above ground portion of the irrigation system (drip hose laterals and emitter) is installed.

In the second year, 2% of the vines or 17 vines per acre are lost and are replaced. This involves planting new bench grafts.

Pruning and Training: A number of pruning and training operations are performed which include 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, no pruning or training is done allowing the vine to put maximum energy into root growth. The second year training begins by heading the vines back to two buds. Placing a sleeve (milk carton) around the trunk offers some protection from deer, rabbit and squirrel damage and sunburn. Budbreak, typically occurring in mid-April, signals the onset of vine training which can run from May through October, 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 that could compete with the main trunk and cordons for water and nutrients. Vine trunks are established by tying one shoot up the stake. The operation takes place at two week intervals requiring several trips through the vineyard. Once the shoot has extended 18 inches above the cordon wire, it is topped slightly below the cordon wire. Four to six auxiliary shoots are selected from near the top of the trunk for the spurs and fruiting canes for the following year. Any remaining lower shoots not removed during earlier training operations would be pruned off at this time. These remaining upper shoots are tied to the trellis wires to prevent them from being broken off at the trunk by wind or other circumstances. All pruning is left in between the vine rows to be chopped by the tractor and flail mower.

Training vines in the third year is comprised of suckering the crown and trunk. Spur positions and fruit cane were selected during dormant pruning and are reassessed during the spring suckering period. Slower growing vines continue to be trained, however, in this study, vines are trained only until the third year. Spur position selection may continue with the third year pruning operations.

After vines are trained, canopy management activities such as shoot positioning, thinning, and suckering trunks and heads start in year three. The number of hours per acre needed to prune declines from the previous year, but remains constant in the years thereafter.

Insect, Mite and Disease Management: Insects are managed by using several different pesticides and management techniques beginning in the third year. Western Grape Leafhopper (*Erythroneura elegantula* Osborn) cause serious problems, but can be controlled by various insecticides. A single application of either *M-Pede* ™ or *Provado* ™ in June using a tractor and vineyard air-blast sprayer is assumed to control the Western Grape Leafhopper throughout the season.

There are many pathogens that attack grapevines, but powdery mildew (*Uncinula necator*) is the only major disease that is assumed to occur in this study. Powdery mildew (PM) control begins the third year with a “clean-up spray” of wettable sulfur at 2 to 4 inches of shoot growth. Two more wettable sulfur sprays are made followed by seven applications of sulfur dust beginning in early June and continuing through mid-July. Sulfur dust is applied at a rate of 10 pounds per acre to every other row on seven to ten day intervals. Equipment for spraying and dusting comprises a 55 hp four-wheel drive tractor, 3-point air-blast sprayer and 3-point duster.

Vineyard Floor Management: Weeds present in the vine row at the time when the vines are planted are controlled with a pre-emergent, residual herbicide applied the year prior to planting and two hand hoeing passes. The row centers between the vine rows are mowed three to five times. Discing is avoided when possible to reduce erosion potential and provide habitat for beneficial insects. The vineyard is stripped sprayed with a combination of residual herbicides registered for young vines beginning in the late fall of the first year. Summer weed control along the vine row begins in the second year with spot spraying, being sure to protect vine trunks with sleeves (milk cartons).

Fertilization: Nitrogen fertilizer is applied in all years of vineyard establishment. A liquid formulation of CAN 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 12.50 pounds N for the season.

Vertebrate Pest Management: Several vertebrate pests require control in Paso Robles vineyards: deer, rabbits, gophers and sometimes squirrels. Depending on the particular site, each of these can be described as the "major pest". Deer damage can only be effectively controlled by exclusion through construction of an eight foot high "deer-proof" fence. Protection from rabbits is done by sleeves (milk cartons) placed around the young vines following the first year pruning of the vines to two buds. This prevents rabbits from feeding on those portions of the young vines within the sleeve (milk carton). The deer fencing will also keep most of the rabbit out of the vineyards and protect the vines from injury. Sleeves (milk cartons) may also protect green trunks from post-emergent herbicide applications. Fencing is expensive. However, it is our assumption that its uses would outweigh the costs. 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 till the beginning of harvest, in this case, the third year. Establishment cost is used to determine the non-cash overhead expenses, depreciation and interest on investment, during the production years. The Total Accumulated Net Cash Cost is shown in the third year (**Table 1.**). For this study the net cost is $9,526 per acre or $171,468 for the 18 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, December through February, and is comprised of removing old fruiting canes, selecting fruiting canes for the coming season and ensuring the renewal spurs are well positioned and vigorous. The pruning is placed in the row middles where it is chopped using the flail mower.

Fertilization: Vine nutritional status can be effectively monitored with bloom time tissue analysis of leaf petioles. Analyses should occur on a yearly basis for the essential minerals phosphorus (P), potassium (K) and zinc (Zn). Deficiencies indicated by plant tissue analysis can be easily corrected with fertilization. Trends in nitrogen status may be followed with tissue analysis, but vine growth and fermentation of the fruit at the winery should also be taken into account when making nitrogen fertilization decisions. Additionally, possible toxic levels of sodium (Na^+), chlorides (Cl^-), and/or boron (B) should also be monitored with tissue analysis where needed.

Nitrogen is typically applied at a rate of 25 pounds of N per acre. Approximately 3 to 4 lbs of N is removed per ton of fruit harvested, and may need replacement. During the production years fertilizer N is applied as CAN-17 through the drip irrigation system. Additionally, liquid potassium is applied in two

applications, 10 gallons per acre in June at about full bloom and 25 gallons per acre in October after the harvest.

Vineyard Floor Management: In this study, row weeds are controlled with a mix of pre-emergent herbicides applied as a strip spray during November and periodic spot sprays of Roundup. Resident vegetation in the row middles is managed with three mowings per season. The first mowing of the season also chops pruning. A spot herbicide spray of Roundup is used to treat 10% of the acreage, primarily for field bindweed control.

Insect, Arthropod and Vertebrate Pest Management: Insect pest management techniques in the production years are the same as the last year of establishment. Western Grape Leafhoppers are managed by a spray of either *M-Pede* ™ or *Provado* ™. Grape leaf skeletonizer is controlled by an application of Kryocide.

Bird damage following bloom and up to harvest can be a severe problem in the Paso Robles area, especially west of Highway 101. While growers have tried a number of auditory and visual repellents for control of bird damage, exclusion via netting of the entire vine row is now widely accepted as the preferred management practice. In this study, non-disposable bird netting is placed over the row in July and removed following harvest by two workers and a tractor equipped with a custom made spool device.

Disease Management: Powdery mildew is the principle disease of the region and control begins 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 10 day cycle to every other row continuing through July. Growers should be aware of the concerns of many wineries regarding late-season applications of sulfur and Kryocide. If powdery mildew control is required after mid-July and prior to harvest, growers often switch to one of the sterol inhibitor types of chemical controls (SI or DMI). The late season switch from sulfur to a DMI product will lessen the potential of wine fermentation problems i.e. the production of hydrogen sulfide (H_2S).

Canopy management activities such as shoot positioning, thinning, and suckering trunks and heads continue through all production years. Positioning and thinning shoots allow vines to have adequate space to develop better fruit clusters and opening the canopy to allow greater air movement through the vines and around the clusters. Consequently, growth of fungal diseases is lessened and pruning requirements may be reduced.

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. For information and pesticide use permits, contact the local county Agricultural Commissioner's office in either Paso Robles or San Luis Obispo. For additional production information contact the San Luis Obispo County viticulture farm advisor.

7. HARVEST:

Harvesting starts in the third year. In this cost study contract labor is paid $100 per ton for harvesting. 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. In this study, hauling charge is $40 per ton to represent sales to a North Coast Winery. Additional harvesting equipment such as tractors, trailers, and gondolas is rented at $50 per ton.

8. YIELDS & RETURNS:

Grapes begin bearing in the third year after planting. Yield maturity is reached in the fifth year. Yield for Cabernet Sauvignon in the Paso Robles Region varies. The County Agricultural Report list the average yield per acre at 4.5 tons for 1994 and 5.1 tons for 1993. In this study a yield level of 7.5 tons per acre is used to calculate cost per ton in production years. **Table B**. shows the expected yield levels at the various years of production.

Table B. Expected Yields For Cabernet Sauvignon, San Luis Obispo County

Year After Planting	3	4	5+
Expected Tons Per Acre	2.5	5.0	7.5

Returns: Prices per ton for Cabernet Sauvignon wine grapes are determined by variety and quality, often defined as percent sugar or Brix. The lowest price in the last five years was $100 per ton while the high was at $1,606. **Table C**. shows the average annual yields and prices for the Paso Robles Region. An expected price of $800 per ton is used in this study.

Table C. Annual Prices Received By Paso Robles (District 8) Growers For Cabernet Sauvignon, 1991 to 1995

	$ / Ton Range		
Year	Low	High	Weighted Average
1991	100	1606	843
1992	325	1234	769
1993	400	1400	738
1994	400	1200	780
1995	450	1400	843
Average	335	1368	795

9. RISK:

Risk is caused by various sources of uncertainty including production, price, and financial. Examples of these are frost damage, a decrease in price, and increase in interest rates. The risks associated with producing wine grapes in the Paso Robles Region of San Luis Obispo 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 the agronomic, market, and financial risks which affect the profitability and economic viability of wine grape production. Growers should consider all of the agronomic and economic risks before committing resources to establishing a vineyard and wine grape production in this region. Establishment of vineyards and the equipment required to properly handle the fruit is very capital intensive.

10. LABOR:

In this study, hourly wages for workers are $7.30 and $6.50 per hour for machine and non-machine workers, respectively. This is based on wages paid by the grower. Adding 34% for Workers Compensation, Social Security, Medicare, insurance, and other possible benefits gives the labor rates shown of $9.78 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 time involved in equipment set up, moving, maintenance, work breaks, and field repair. Costs for management done by independent vineyard management companies 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, 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.

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 $336 for the entire farm.

Office Expense: Office and business expenses are estimated at $45 per acre. These expenses include office supplies, telephones, bookkeeping, accounting, legal fees, etc.

Sanitation Services: Sanitation services provide portable toilets for the vineyard and cost the farm $90 annually. 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. Management fee in this study is estimated at $200 per year per acre. 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. Although farm equipment on typical vineyard in the Paso Robles Region may be purchased used, this study shows the current purchase price for new equipment adjusted to 80% of new value to indicate a mix of new and used equipment. Annual equipment and investments 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. The 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 following 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 $1.40 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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U.C. COOPERATIVE EXTENSION

Table 1. SAMPLE COSTS PER ACRE TO ESTABLISH A VINEYARD
PASO ROBLES REGION: SAN LUIS OBISPO COUNTY - 1996

Labor Rate: $9.78/hr. machine labor
$8.71/hr. non-machine labor

Vines Per Acre: 871
Short Term Interest Rate: 7.89%

	Cost Per Acre		
Year	1st	2nd	3rd
Tons Per Acre			2.5
Planting Costs:			
Land Preparation (Deep Rip, Disc 2x)	180		
Mark & Layout Vineyard	150		
Apply Pre-Emergent Herbicide	75		
Plant Vines & Install Sleeves	218		
Vines & Sleeves (Milk Cartons) - 871 per acre	3,049		
Train Vines: Head & Cane Prune		500	
Total Planting Costs	3,672	500	
Replanting Costs:			
Replant Vines (@ 2%)		5	
Vines & Sleeves (Milk Cartons)		59	5
Total Replanting Costs:		64	5
Trellis System Costs:			
Install Stakes	1,525		
Install End Posts & Anchors	150		
Install Wires	450		
Trellis Repair			
Total Trellis System Costs:	2,125		
Cultural Costs:			
Irrigate	97	151	149
Fertilizer - Nitrogen	11	11	11
Prune Vines		100	392
Suckering, Thinning, Shoot Positioning			285
Weed Control - Hand Hoe	100	80	50
Weed Control - Mow	6	6	6
Weed Control - Winter Strip	65	65	65
Weed Control - Spot Spray		3	3
Vertebrate Control	77	77	24
Insect Control			51
Mildew Control - Wettable			209
Mildew Control - Dust			17
Pickup Truck Use	34	17	17
ATV Use	12	12	12
Total Cultural Costs:	402	522	1,291
Harvest Costs:			
Hand Harvest @ $100/Ton			250
Harvest Equipment Rental @ $50/Ton			125
Haul to Crusher @ $40/Ton			100
Total Harvest Costs:			475
Post Harvest Costs:			
Irrigate			12
Total Post Harvest Costs			12
Interest on Operating Capital @ 7.89%	295	55	47
TOTAL OPERATING COSTS/ACRE	6,494	1,141	1,818

	Cost Per Acre		
Year	1st	2nd	3rd
Tons Per Acre			2.5
Cash Overhead Costs:			
Office Expenses	45	45	45
Liability Insurance	19	19	19
Sanitation	5	5	5
Manager Salary	200	200	200
Property Taxes	125	133	134
Property Insurance	89	95	96
Investment Repairs	194	194	194
TOTAL CASH OVERHEAD COSTS	677	691	693
TOTAL CASH COSTS/ACRE	7,171	1,832	2,511
INCOME/ACRE FROM PRODUCTION			2,000
NET CASH COSTS/ACRE FOR THE YEAR	7,171	1,832	
PROFIT/ACRE ABOVE CASH COSTS			-511
ACCUMULATED NET CASH COSTS/ACRE	7,171	9,003	9,514
Depreciation:			
Buildings	38	38	38
Deer Fence	63	63	63
Fuel Tanks & Pumps	42	42	42
Shop Tools	31	31	31
Drip System	109	109	109
Pruning Equipment	1	1	1
Equipment	260	378	395
TOTAL DEPRECIATION	544	662	679
Interest on Investment @ 3.72%			
Buildings	17	17	17
Deer Fence	28	28	28
Fuel Tanks & Pumps	14	14	14
Shop Tools	14	14	14
Drip System	50	50	50
Pruning Equipment	0	0	0
Land	289	289	289
Equipment	53	81	85
TOTAL INTEREST ON INVESTMENT	465	493	497
TOTAL COST/ACRE FOR THE YEAR	8,180	2,987	3,687
INCOME/ACRE FROM PRODUCTION			2,000
TOTAL NET COST/ACRE FOR THE YEAR	8,180	2,987	
NET PROFIT/ACRE ABOVE TOTAL COST			-1,687
TOTAL ACCUMULATED NET COST/ACRE	8,180	11,167	12,854

Note: (i) Figures in Table 1 include material, labor, equipment and investment costs.
(ii) In this study frost protection is not included. If needed, this will require an investment cost of $3,100 - $3,500 which will increase the establishment cost.

Table 2.

U.C. COOPERATIVE EXTENSION
COSTS PER ACRE TO PRODUCE WINE GRAPES
PASO ROBLES REGION: SAN LUIS OBISPO COUNTY - 1996

Labor Rate: $9.78/hr. machine labor
$8.71/hr. non-machine labor

Vines Per Acre: 871
Short Term Interest Rate: 7.89%

Operation	Operation Time (Hrs/A)	Cash and Labor Costs per Acre: Labor Cost	Fuel,Lube & Repairs	Material Cost	Custom/ Rent	Total Cost	Your Cost
Trellis System:							
Trellis Repair	0.00	2	0	3	0	5	
TOTAL TRELLIS SYSTEM COSTS	0.00	2	0	3	0	5	
Cultural:							
Prune	0.00	0	0	0	392	392	
Suckering	0.00	0	0	0	85	85	
Fertilize - Nitrogen	0.10	1	0	9	0	10	
Fertilize - Potassium	0.10	1	0	15	0	16	
Insect Control	0.40	5	2	49	0	56	
Vertebrate Control	0.50	6	4	7	0	16	
Bird Netting	0.40	5	2	0	75	82	
Weed Control - Mowing Middles	0.90	11	7	0	0	18	
Weed Control - Spot Spray	0.08	1	0	1	0	3	
Mildew Control - Wettable Sulfur	1.20	14	7	37	0	58	
Mildew Control - SI	0.80	9	5	6	0	21	
Mildew Control - Sulfur Dust	0.40	5	3	8	0	16	
Irrigate	0.50	44	1	98	0	143	
Pickup Truck Use	0.86	10	7	0	0	17	
ATV Use	0.86	10	2	0	0	12	
TOTAL CULTURAL COSTS	7.11	121	42	230	552	945	
Harvest:							
Harvest Fruit - Hand	0.00	0	0	0	750	750	
Haul To Crusher	0.00	0	0	0	300	300	
Harvest Equipment Rental	0.00	0	0	0	375	375	
TOTAL HARVEST COSTS	0.00	0	0	0	1,425	1,425	
Postharvest:							
Irrigate	0.10	9	0	2	0	11	
Fertilize - Potassium	0.10	1	0	38	0	38	
Fertilize - Nitrogen	0.10	1	0	9	0	10	
Weed Control - Winter Strip	0.30	4	2	60	0	65	
TOTAL POSTHARVEST COSTS	0.60	14	2	109	0	125	
Interest on operating capital @	0.08					46	
TOTAL OPERATING COSTS/ACRE		137	44	342	1,977	2,546	
TOTAL OPERATING COSTS/TON						339	
CASH OVERHEAD:							
Office						45	
Liability Insurance						19	
Sanitation						5	
Manager Salary						200	
Property Taxes						180	
Property Insurance						128	
Investment Repairs						194	
TOTAL CASH OVERHEAD COSTS						771	
TOTAL CASH COSTS/ACRE						3,317	
TOTAL CASH COSTS/TON						442	

NON-CASH OVERHEAD:				
	Per producing	Annual Cost		
Investment	Acre	Depreciation	Interest @ 3.72%	
Buildings	833	38	17	55
Fuel Tanks & Pumps	694	42	14	56
Shop Tools	694	31	14	45
Drip Irrigation System	2,433	109	50	159
Pruning Equipment	18	1	0	1
Land	7,778		289	289
Vineyard Establishment	9,526	390	195	585
Deer Fence	1,389	63	28	91
Equipment	2,973	306	61	366
TOTAL NON-CASH OVERHEAD	26,340	979	669	1,648
TOTAL COSTS/ACRE				4,964
TOTAL COSTS/TON				662

Table 3.

U.C. COOPERATIVE EXTENSION
COSTS PER ACRE TO PRODUCE WINE GRAPES
PASO ROBLES REGION: SAN LUIS OBISPO 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%

	Quantity/Acre	Unit	Price or Cost/Unit	Value or Cost/Acre	Your Cost
GROSS RETURNS					
Cabernet Sauvignon	7.50	Ton	800.00	6,000	
TOTAL GROSS RETURNS FOR WINE GRAPE				6,000	
OPERATING COSTS					
Contract:					
Prune & Tie	871.00	Vine	0.45	392	
Hand Harvest	7.50	Ton	100.00	750	
Haul to Crusher	7.50	Ton	40.00	300	
Equipment Rental	7.50	Ton	50.00	375	
Custom:					
Sucker	1.00	Acre	85.00	85	
Bird Netting	1.00	Acre	75.00	75	
Trellis System:					
Stakes	1.00	Each	3.00	3	
Fertilizer:					
Liquid N	25.00	Gal	0.75	19	
Liquid K	35.00	Gal	1.50	53	
Insecticide:					
Provado	0.75	Oz	45.00	34	
Kryocide	6.00	Lb	2.50	15	
Rodenticide:					
Rodent Bait	2.00	Lb	3.27	7	
Herbicide:					
Roundup	0.20	Pint	6.83	1	
Goal 1.6E	0.80	Gal	40.00	32	
Surflan 4 AS	0.80	Gal	35.00	28	
Fungicide:					
Sulfur - Wettable	18.00	Lb	2.03	37	
Rally	4.00	Oz	1.58	6	
Sulfur Dust	50.00	Lb	0.16	8	
Water:					
Water	20.00	AcIn	5.00	100	
Labor (machine)	8.77	Hrs	9.78	86	
Labor (non-machine)	5.90	Hrs	8.71	51	
Fuel - Gas	3.19	Gal	1.40	4	
Fuel - Diesel	14.58	Gal	1.15	17	
Lube				3	
Machinery repair				20	
Interest on operating capital @ 7.89%				46	
TOTAL OPERATING COSTS/ACRE				2,546	
TOTAL OPERATING COSTS/TON				339	
NET RETURNS ABOVE OPERATING COSTS				3,454	
CASH OVERHEAD COSTS:					
Office				45	
Liability Insurance				19	
Sanitation				5	
Manager Salary				200	
Property Taxes				180	
Property Insurance				128	
Investment Repairs				194	
TOTAL CASH OVERHEAD				771	
TOTAL CASH COSTS/ACRE				3,317	
TOTAL CASH COSTS/TON				442	

Table 3. continued

NON-CASH OVERHEAD COSTS (DEPRECIATION &	
Buildings	55
Fuel Tanks & Pumps	56
Shop Tools	45
Drip System	159
Pruning Equipment	1
Land	289
Vineyard Establishment	585
Deer Fence	91
Equipment	366
TOTAL NON-CASH OVERHEAD COSTS/ACRE	1,648
TOTAL COSTS/ACRE	4,964
TOTAL COSTS/TON	662
NET RETURNS ABOVE TOTAL	1,036

U.C. COOPERATIVE EXTENSION

Table 4. MONTHLY CASH COSTS PER ACRE TO PRODUCE WINE GRAPES
PASO ROBLES REGION: SAN LUIS OBISPO COUNTY - 1996

Beginning JAN 96 Ending DEC 96	JAN 96	FEB 96	MAR 96	APR 96	MAY 96	JUN 96	JUL 96	AUG 96	SEP 96	OCT 96	NOV 96	DEC 96	TOTA
Trellis System:													
Trellis Repair			5										5
TOTAL TRELLIS SYSTEM			5										5
Cultural:													
Prune	196	196											392
Suckering						85							85
Fertilize - Nitrogen				10									10
Fertilize - Potassium						16							16
Insect Control						56							56
Vertebrate Control				16									16
Bird Netting							82						82
Weed Control - Mowing Middles				6	6	6							18
Weed Control - Spot Spray							3						3
Wettable Sulfur				58									58
Mildew Control - SI					10	10							21
Mildew Control - Sulfur Dust						7	9						16
Irrigate					29	29	29	29	29				143
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	12
TOTAL CULTURAL COSTS	198	199	2	93	47	211	125	31	31	2	2	2	945
Harvest:													
Harvest Fruit - Hand									750				750
Haul To Crusher									300				300
Harvest Equipment Rental									375				375
TOTAL HARVEST COSTS									1425				1,425
Postharvest:													
Irrigate										11			11
Fertilize - Potassium										38			38
Fertilize - Nitrogen										10			10
Weed Control - Winter Strip											65		65
TOTAL POSTHARVEST COSTS										60	65		125
Interest on oper. capital	1	3	3	3	4	5	6	6	16				46
TOTAL OPERATING	200	201	10	96	51	216	130	37	1472	62	68	2	2,546
TOTAL OPERATING	26.60	26.84	1.34	12.78	6.79	28.85	17.40	4.95	196.2	8.29	9.05	0.33	339.44
OVERHEAD:													
Office	4	4	4	4	4	4	4	4	4	4	4	4	45
Liability Insurance	19												19
Sanitation	0	0	0	0	0	0	0	0	0	0	0	0	5
Manager	17	17	17	17	17	17	17	17	17	17	17	17	200
Property Taxes	180												180
Property Insurance	64						64						128
Investment Repairs	16	16	16	16	16	16	16	16	16	16	16	16	194
TOTAL CASH OVERHEAD	300	37	37	37	37	37	101	37	37	37	37	37	771
TOTAL CASH COSTS/ACRE	499	238	47	133	88	253	232	74	1509	99	105	39	3,317
TOTAL CASH COSTS/TON	66.56	31.77	6.28	17.72	11.73	33.78	30.88	9.89	201.1	13.23	13.98	5.26	442.25

U.C. COOPERATIVE EXTENSION

Table 5. WHOLE FARM ANNUAL EQUIPMENT, INVESTMENT, AND BUSINESS OVERHEAD COSTS
PASO ROBLES REGION: SAN LUIS OBISPO COUNTY - 1996

ANNUAL EQUIPMENT COSTS

Yr	Description	Price	Yrs Life	- Non-Cash Over. - Depre-ciation	Interest	- Cash Overhead - Insur-ance	Taxes	Total
96	55 HP 4WD Tractor	31,102	12	2,333	636	122	171	3,262
96	ATV 4WD	6,000	7	771	123	24	33	951
96	Bait Applicator	1,046	10	94	21	4	6	125
96	Duster - 3 Pt	3,093	10	278	63	12	17	371
96	Mower - Flail 6'	3,500	5	630	72	14	19	735
96	Pickup Truck - 1/2 Ton	17,160	7	2,206	351	67	94	2,719
96	Sprayer - Dual Use	5,000	8	563	102	20	28	712
TOTAL		66,901		6,875	1,369	262	368	8,875
80% of New Cost *		53,521		5,500	1,095	210	294	7,100

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

ANNUAL INVESTMENT COSTS

Description	Price	Yrs Life	- Non-Cash Over. - Depre-ciation	Interest	--------- Cash Overhead -------- Insur-ance	Taxes	Repairs	Total
INVESTMENT								
Buildings	15,000	20	675	307	59	83	300	1,423
Deer Fence	25,000	20	1,125	511	98	138	500	2,372
Drip Irrigation System	43,800	20	1,971	896	172	241	2,190	5,470
Fuel Tanks & Pumps	12,500	15	750	256	49	69	250	1,374
Land - Paso Robles	140,000			5,208	998	1,400		7,606
Pruning Equipment	327	20	15	7	1	2	7	31
Shop Tools	12,500	20	563	256	49	69	250	1,186
Vineyard Establishment	171,468	22	7,015	3,508	672	943		12,138
TOTAL INVESTMENT	420,595		12,113	10,949	2,099	2,943	3,497	31,601

ANNUAL BUSINESS OVERHEAD COSTS

Description	Units/ Farm	Unit	Price/ Unit	Total Cost
Liability Insurance	1.00	Year	336.00	336
Manager Salary	18.00	Year	200.00	3,600
Office	18.00	Year	45.00	810
Sanitation	1.00	Mon	90.00	90

U.C. COOPERATIVE EXTENSION

Table 6. HOURLY EQUIPMENT COSTS TO PRODUCE WINE GRAPES

PASO ROBLES REGION: SAN LUIS OBISPO COUNTY - 1996

			COSTS PER HOUR							
		Actual	-Non-Cash Over.-		- Cash Overhead -		Operating			
Yr	Description	Hours Used	Depre-ciation	Interest	Insur-ance	Taxes	Repairs	Fuel & Lube	Total Oper.	Total Costs/Hr.
96	55 HP 4WD Tractor	97.0	19.23	5.25	1.01	1.41	2.07	3.57	5.64	32.54
96	ATV 4WD	27.8	22.17	3.53	0.68	0.95	1.46	1.07	2.53	29.85
96	Bait Applicator	9.0	8.37	1.90	0.36	0.51	0.84	0.00	0.84	11.99
96	Duster - 3 Pt	7.2	30.93	7.03	1.35	1.89	2.07	0.00	2.07	43.27
96	Mower - Flail 6'	16.2	31.11	3.54	0.68	0.95	1.68	0.00	1.68	37.96
96	Pickup Truck - 1/2 Ton	15.6	113.51	18.06	3.46	4.86	4.15	4.03	8.18	148.07
96	Sprayer - Dual Use	48.6	9.26	1.68	0.32	0.45	0.00	0.00	0.00	11.72

U.C. COOPERATIVE EXTENSION

Table 7. RANGING ANALYSIS TO PRODUCE WINE GRAPES
PASO ROBLES REGION: SAN LUIS OBISPO COUNTY - 1996

COSTS PER ACRE AT VARYING YIELDS TO PRODUCE WINE GRAPES

	YIELD (TON/ACRE)						
	6.0	6.5	7.0	7.5	8.0	8.5	9.0
OPERATING COSTS/ACRE:							
Trellis System Cost	5	5	5	5	5	5	5
Cultural Cost	945	945	945	945	945	945	945
Harvest Cost	1,140	1,235	1,330	1,425	1,520	1,615	1,710
Postharvest Cost	125	125	125	125	125	125	125
Interest on operating capital	44	44	45	46	46	47	48
TOTAL OPERATING COSTS/ACRE	2,259	2,355	2,450	2,546	2,641	2,737	2,833
TOTAL OPERATING COSTS/TON	376.00	362.00	350.00	339.00	330.00	322.00	315.00
CASH OVERHEAD COSTS/ACRE	771	771	771	771	771	771	771
TOTAL CASH COSTS/ACRE	3,030	3,126	3,221	3,317	3,412	3,508	3,604
TOTAL CASH COSTS/TON	505.00	481.00	460.00	442.00	427.00	413.00	400.00
NON-CASH OVERHEAD COSTS/ACRE	1,648	1,648	1,648	1,648	1,648	1,648	1,648
TOTAL COSTS/ACRE	4,678	4,773	4,869	4,964	5,060	5,156	5,251
TOTAL COSTS/TON	780.00	734.00	696.00	662.00	633.00	607.00	583.00

NET RETURNS PER ACRE ABOVE OPERATING COSTS FOR WINE GRAPES

PRICE	YIELD(TON/ACRE)						
(DOLLARS PER TON)	6.0	6.5	7.0	7.5	8.0	8.5	9.0
650	1,641	1,870	2,100	2,329	2,559	2,788	3,017
700	1,941	2,195	2,450	2,704	2,959	3,213	3,467
750	2,241	2,520	2,800	3,079	3,359	3,638	3,917
800	2,541	2,845	3,150	3,454	3,759	4,063	4,367
850	2,841	3,170	3,500	3,829	4,159	4,488	4,817
900	3,141	3,495	3,850	4,204	4,559	4,913	5,267
950	3,441	3,820	4,200	4,579	4,959	5,338	5,717

NET RETURNS PER ACRE ABOVE CASH COSTS FOR WINE GRAPES

PRICE	YIELD(TON/ACRE)						
(DOLLARS PER TON)	6.0	6.5	7.0	7.5	8.0	8.5	9.0
650	870	1,099	1,329	1,558	1,788	2,017	2,246
700	1,170	1,424	1,679	1,933	2,188	2,442	2,696
750	1,470	1,749	2,029	2,308	2,588	2,867	3,146
800	1,770	2,074	2,379	2,683	2,988	3,292	3,596
850	2,070	2,399	2,729	3,058	3,388	3,717	4,046
900	2,370	2,724	3,079	3,433	3,788	4,142	4,496
950	2,670	3,049	3,429	3,808	4,188	4,567	4,946

NET RETURNS PER ACRE ABOVE TOTAL COSTS FOR WINE GRAPES

PRICE	YIELD(TON/ACRE)						
(DOLLARS PER TON)	6.0	6.5	7.0	7.5	8.0	8.5	9.0
650	-778	-548	-319	-89	140	369	599
700	-478	-223	31	286	540	794	1,049
750	-178	102	381	661	940	1,219	1,499
800	122	427	731	1,036	1,340	1,644	1,949
850	422	752	1,081	1,411	1,740	2,069	2,399
900	722	1,077	1,431	1,786	2,140	2,494	2,849
950	1,022	1,402	1,781	2,161	2,540	2,919	3,299