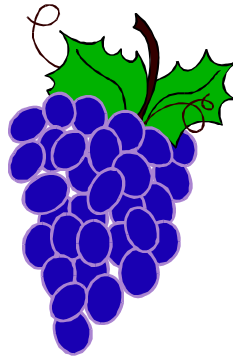

1996

UNIVERSITY OF CALIFORNIA - COOPERATIVE EXTENSION

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



Zinfandel Variety on a 28 acre planting in the
SIERRA NEVADA FOOTHILLS

Prepared by:

Karen Klonsky, Extension Economist, U.C. Davis
Donna Hirschfeld, Farm Advisor, Amador County
Mario Moratorio, Farm Advisor, El Dorado County
Pete Livingston, Staff Research Associate, U.C. Davis

Cooperators:

Frank Alviso, Grower, Amador County
Kenneth Deaver, Grower, Amador County

UNIVERSITY OF CALIFORNIA - COOPERATIVE EXTENSION

GENERAL INFORMATION FOR ESTABLISHING A VINEYARD AND PRODUCING WINE GRAPES *Zinfandel Variety on a 28 acre planting* Sierra Nevada Foothills - 1996

The detailed costs for vineyard establishment and wine grape production in the Sierra Nevada foothills are presented in this study. The hypothetical farm used in this report consists of a total of 40 acres, 28 of which are being established, 12 acres are in forest, farmstead, roads, and pumping stations.

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

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

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

For an explanation of calculations used for the study refer to the attached General Assumptions, call the Department of Agricultural and Resource Economics, Cooperative Extension, University of California, Davis, California, (530) 752-3589 or call the Amador County farm advisor Donna Hirschfelt (209) 223-3279 or El Dorado County farm advisor Mario Moratorio, (530) 621-5505.

This and other cost of production studies can be ordered from the Department of Agricultural and Resource Economics, U.C. Davis, or from selected county Cooperative Extension offices.

The University of California is an affirmative action/equal opportunity employer

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

UNIVERSITY OF CALIFORNIA - COOPERATIVE EXTENSION

GENERAL ASSUMPTIONS FOR ESTABLISHING A VINEYARD AND PRODUCING WINE GRAPES *Zinfandel Variety on a 28 acre planting* Sierra Nevada Foothills - 1996

The following is a description of some general assumptions pertaining to sample costs to establish a vineyard and produce wine grapes in the Sierra Nevada foothills. Practices described should not be considered recommendations by the University of California, but rather represent production procedures considered typical for this crop and area. Some of these costs and practices may not be applicable to your situation nor used during every production year. Additional ones not indicated may be needed. Establishment and cultural practices for the production of wine grapes vary by grower and region. Variations can be significant. The practices and inputs used in this cost study serve only as a sample or guide. These costs are represented on an annual, per acre basis. **The use of trade names in this report does not constitute an endorsement or recommendation 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 vineyard is located in the Sierra Nevada foothills and is situated on previously unfarmed land. The farm is comprised of 40 acres, 28 of which are planted with wine grapes. The other 12 acres are occupied by forest, roads, irrigation systems, fencing, and farmstead. Land is valued at \$8,000 per acre. This study assumes the land was purchased for planting a vineyard. Because only 28 of the 40 acres are planted to grapes, land is valued at \$11,429 per plantable acre.

Vines. Zinfandel vines are planted on a 8' x 10' spacing with 545 vines per acre during the first spring. In the second year 2% or 11 vines per acre are replanted for those lost in the first year. Vines will be trained to up the six foot t-post during the second and third years. The grapevines are expected to begin yielding fruit in three years and then be productive for an additional 22 years.

Trellis System. The trellis system consist of a 6 foot metal t-post at each vine, a 14 gauge drip line clipped to each post and anchored at the end of each row with a screw anchor. The vines are head pruned in this system. Installation of the trellis system is performed by the owner and hired workers in the first year. 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.

Irrigation System. Since the vineyard is established on raw forest land, a well is drilled and a pump, motor, and filtration station will be installed along with the drip irrigation system during planting. The well, 5 hp motor, pump, filtration station, drip lines, and the labor to install 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. Therefore, it is not found in preplant operations in Table 1. establishment costs, rather it is shown in the non-cash overhead sections as capital recovery cost of various tables and the Investments portion of Table 5.

Pumped water plus labor constitute the irrigation cost. The cost is based on using 5 hp motor to pump 3.6 to 4.8 acre-inches from 300 feet deep over 28 acres. Price 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, the calculated water cost ranges from \$20.43 per acre-inch in the first year to \$17.61 per acre-inch at maturity and is due to the minor quantity of water pumped from the well. The small amount of water applied to the grapes helps offset the high water cost. No assumption is made about effective rainfall. Irrigations occur from May through August in the first two years and June through August in the third year. Nitrogen and phosphorus fertilizers are injected into the drip system starting in the second year. The amount of water applied to the vines varies and are shown in Table A.

Table A. Applied Irrigation Water

Year	Number of Weeks	AcIn/Year
1-2	13	3.6
3+	10	4.8

ESTABLISHMENT CULTURAL PRACTICES

This vineyard is established on ground that had previously been forest/brush land. The land is assumed to be on rocky, brushy and/or timbered slopes. The practices described below represents only the hypothetical vineyard in this study and may not be appropriate to your circumstance.

Site Preparation. Any trees at the site are cut down and brush is cleared by a bulldozer, stacked into piles and burned. Rocks are pushed out both above and underground to ease planting and cultural practices. Afterwards the ground is disced several times to break up large clods of soil. Grading the site is done to remove some of the high and low spots. A company is contracted to do all of the site preparation. The following spring the trellis system is built and the irrigation system is installed. All 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.

Planting. Planting the vineyard starts by laying out and marking vine sites in early spring. The 6 foot t-post is pounded into the ground, one strand of 14 gauge wire is strung on the t-posts and attached to screw anchors that have been augered in at the end of each row. The drip line is clip to the wire and water is turned on to ease digging by hand. Holes are dug, vines are planted, and a milk carton is placed around the vine. In the second year, 2% of the vines or 11 vines per acre are replaced after dying during the first season.

Pruning, Training, and Crop Thinning. A number of similar, but different cultural operations are performed during pruning and training. Not all of the same practices are used for other varieties or trellis systems.

The second year begins with a dormant pruning during the winter. Training and pruning will produce a head-pruned vine. Training includes suckering, selecting, and tying. Suckering is the removal of sprouts from the rootstock that could compete with the main trunk and cordons for water and nutrients. Vines are trained by selecting and tying one shoot up the t-post to become the main trunk.

Training continues in the third year but requires less labor-hours to complete. Suckering and retying require the majority of the time involved and continues throughout the life of the vineyard.

Insect and Arthropod Management. Insects and mites are managed by using different pesticides and management techniques beginning the first year. Pest populations are monitored to determine when an economically damaging level will occur and which control method to use. From the fourth year on an application of a miticide in July is made to control Willamette mite.

Disease Management. There are many pathogens that attack grapevines, but the only major disease that is assumed to occur in this study is powdery mildew. A spraying program for powdery mildew control begins the third year with one wettable sulfur application and increases to three sprays in the fourth year. A copper fungicide is mixed with two of the seven sulfur application beginning in the fifth year for additional mildew control. All applications are made using a rented 75 HP tractor and an orchard sprayer.

Vineyard Floor Management. Weed control in the vine row and middles are managed with several discings and herbicides. A cover crop, consisting of a winter annual legume mix, is planted each fall in the row centers. The cover crop is disced down in April. The middles are disced two more times in May and in November prior to seeding the cover crop. The vine rows are stripped sprayed with different herbicides during winter each year. A spot spray of a contact herbicide is made during the summer.

Fertilization. Nitrogen is injected into the drip irrigation system beginning in the second year at 15 pounds of N per acre. Thereafter, 20 pounds of N per acre are applied through the drip system. Phosphorus is also injected into the drip system starting the fifth year.

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. It is used to determine the non-cash overhead expense, capital recovery cost, 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 \$8,180 per acre or \$229,040 for the 28 acre vineyard. The establishment cost is spread over the remaining 22 years of the 25 years the vineyard is in production.

PRODUCTION CULTURAL PRACTICES

Pruning and Retying. Pruning is done during the winter months and the prunings are disced in the row middles. Vines are retied every three years, but one-third of the cost of retying is shown in the production costs of Tables 2. through 4. Suckers are removed from the trunks each year.

Vineyard Floor Management. Cover crops, herbicides, and cultivation are use to manage the vineyard floor and control weeds. As in the establishment years, the cover crop is seeded into the floor middles after a discing in November. In April the cover crop is disced under. One additional discing is performed in May. In practice, herbicide choice is a function of weed pressure which can change over time. Vine row weeds are controlled with a pre-emergent herbicide applied as a strip spray during December and escaped weeds are controlled with a summer application of a contact herbicide.

Insect And Arthropod Management. Pest management techniques used to control insect and disease problems in the last year of vineyard establishment are the same practices used in the production years.

Disease Management. Powdery mildew is treated beginning in May with an application of wettable sulfur and a copper fungicide. This is followed by eight additional applications of the wettable sulfur through August. Copper is mixed with one of the final eight fungicide applications. All of the insect and fungicide sprays are made using the rented 75 HP tractor and orchard sprayer.

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. For additional production information contact the Sierra Nevada foothills viticulture farm advisors.

Harvest. Harvesting starts in the third year. In this cost study the vineyard contracts to have the grape crop custom harvested by hand and is charged on a per ton basis. The third year the contract rate is \$100 per ton because of the small tonnage, but falls to \$85 per ton in the fourth year. It is assumed in this study that the grower rents a forklift and 30 half-ton 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 outside of the county and the cost would be approximately \$25 per ton; in-county hauls may see rates around \$15 per ton.

Yields. Wine grapes begin bearing an economic crop in the third year after planting. Yield maturity is reached in the sixth year. An assumed yield of 5 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 Zinfandel in the Sierra Nevada Foothills (District 10)

Year	3	4	5	6+
Tons Per Acre	2.0	3.0	4.0	5.0

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 \$135 per ton while the high was at \$1,300; the average 1995 price for Zinfandel was \$539 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. An estimated price of a \$800 per ton of Zinfandel wine grapes is used in this study.

Table C. Annual Prices Received by Sierra Foothill (District 10) Growers for Zinfandel Over the Previous Five Harvests¹

Year	\$/Ton		Weighted Average
	Range		
	Low	High	
1991	135	750	446
1992	150	750	531
1993	300	750	533
1994	200	850	510
1995	450	1,300	675
Average	223	880	539

¹ Data compiled from the Final Grape Crush Report, 1991-1995 Crops.

Risk. Risk is caused by various sources of uncertainty including production, price, and financial. Examples of these are disease damage, a decrease in price, and increase in interest rates. The risks associated with producing wine grapes in the Sierra Nevada foothills 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.

Labor. Hourly wages for workers are \$9.00 and \$5.25 per hour for machine and non-machine workers, respectively. Adding 34% for Workers Compensation, Social Security, Medicare, insurance, and other possible benefits gives the labor rates shown of \$12.06 and \$7.04 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. Wages for a manager are not included as cost. Returns above total costs is considered a return to management and risk.

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 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 10.46% 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 \$365 for the entire farm.

Office Expense. Office and business expenses for 30 acres are estimated at \$3,000 annually or \$107 per planted acre. These expenses include office supplies, telephones, bookkeeping, accounting, legal fees, road maintenance, etc.

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 the Sierra Nevada foothills may be purchased new or used, this study shows the current purchase price for new equipment. The new purchase price is adjusted to 50% to indicate a mix of new and used equipment. Annual ownership costs (Equipment and Investments) are shown in Tables 1 through 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.

The calculation for 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 (e.g., tractors and implements) the remaining value is a percentage of the new cost of the investment. Salvage value is calculated as

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

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. Salvage value for investments can vary. The purchase price and salvage value for certain equipment and investments are shown in Table 5.

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 7.55% used to calculate capital recovery cost is the USDA-ERS's ten year average of California's agricultural sector longrun 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. In other words, the next best alternative use for these resources is in another agricultural enterprise.

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 \$1.09 and \$1.47 per gallon, respectively.

Acknowledgment. Appreciation is expressed to those growers and other cooperators who provided support for this study.

REFERENCES

- American Society of Agricultural Engineers. (ASAE). 1994. *American Society of Agricultural Engineers Standards Yearbook*. St. Joseph, Missouri.
- Boelje, Michael D., and Vernon R. Eidman. 1984. *Farm Management*. John Wiley and Sons. New York, New York
- California Department of Food and Agriculture. 1991. Final Grape Crush Report 1991 Crop. California Agricultural Statistics Service and Federal State Market News Service. Sacramento, California.
- California Department of Food and Agriculture. 1992. Final Grape Crush Report 1992 Crop. California Agricultural Statistics Service and Federal State Market News Service. Sacramento, California.
- California Department of Food and Agriculture. 1993. Final Grape Crush Report 1993 Crop. California Agricultural Statistics Service and Federal-State Market News Service. Sacramento, California.
- California Department of Food and Agriculture. 1994. Final Grape Crush Report 1994 Crop. California Agricultural Statistics Service and Federal State Market News Service. Sacramento, California.
- California Department of Food and Agriculture. 1995. Final Grape Crush Report 1995 Crop. California Agricultural Statistics Service and Federal State Market News Service. Sacramento, California.
- Integrated Pest Management Education and Publications. 1990. *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.
- University of California Publications. 1992. *Grape Pest Management*. Second Edition. Division of Agriculture and Natural Resources. Oakland, California. Publication 3343.

Table 1.

U.C. COOPERATIVE EXTENSION
 SAMPLE COSTS PER ACRE TO ESTABLISH A VINEYARD
 SIERRA NEVADA FOOTHILLS - 1996
 28 ACRE PLANTING

Labor Rate: \$12.06/hr. machine labor
 \$7.04/hr. non-machine labor

Vines Per Acre: 545
 Interest Rate: 10.46%

Year	Cost Per Acre				
	1st	2nd	3rd	4th	5th
Tons Per Acre			2.0	3.0	4.0
Planting Costs:					
Land Preparation - Tree & Brush Removal	\$1,000				
Land Preparation - Rock Removal	\$1,000				
Land Preparation - Discing & Grading	\$150				
Survey & Layout Vineyard	\$76				
Install Stakes & Drip Wire	\$1,075				
Dig & Plant Vines, Cover Trunks	\$470	8			
Vines: 545 Per Acre (2% Replant In 2nd Year)	\$1,842	37			
TOTAL PLANTING COSTS	\$5,613	\$45	\$0	\$0	\$0
Cultural Costs:					
Prune - Dormant		\$24	\$80	\$96	\$96
Irrigate & Fertilize	\$86	102	118	118	121
Pest Control - Gophers	\$9	9	9	9	9
Select & Tie Vines (Retie 50% Of Vines Year 3+)		\$385	68		
Weed Control - Hand Hoe	\$80	241			
Weed Control - Disc Middles 3X	\$16	16	16	16	16
Remove Suckers			\$96	96	96
Weed Control - Summer Spot Spray			\$6	6	6
Insect Control - Willamette Mite				\$45	45
Disease Control - Mildew - (1X in 3rd Year, 3X in 4th & 7X in 5th)			\$17	52	157
Plant Cover Crop	\$15	15	22	22	22
Weed Control - Winter Strip Spray	\$28	28	15	15	15
Miscellaneous Costs	\$80	80	80	80	80
Pickup Truck Use	\$129	129	129	129	129
TOTAL CULTURAL COSTS	\$443	\$1,029	\$656	\$684	\$792
Harvest Costs:					
Pick Fruit			\$253	\$353	\$453
Haul To Crusher			\$50	75	100
TOTAL HARVEST COSTS	\$0	\$0	\$303	\$428	\$553
Interest On Operating Capital @ 10.46%	\$474	\$48	\$25	\$27	\$32
TOTAL OPERATING COSTS/ACRE	\$6,530	\$1,122	\$984	\$1,139	\$1,377

U.C. COOPERATIVE EXTENSION

Table 1. continued

Year	Cost Per Acre				
	1st	2nd	3rd	4th	5th
Tons Per Acre			2.0	3.0	4.0
Cash Overhead Costs:					
Office Expense	\$107	\$107	\$108	\$109	\$110
Liability Insurance	\$13	13	13	13	13
Property Taxes	\$130	130	130	130	130
Property Insurance	\$93	93	93	93	93
Investment Repairs	\$38	38	38	38	38
TOTAL CASH OVERHEAD COSTS	\$381	\$381	\$382	\$383	\$384
TOTAL CASH COSTS/ACRE	\$6,911	\$1,503	\$1,366	\$1,522	\$1,761
INCOME/ACRE FROM PRODUCTION	\$0	\$0	\$1,600	\$2,400	\$3,200
NET CASH COSTS/ACRE FOR THE YEAR	\$6,911	\$1,503	\$0	\$0	\$0
PROFIT/ACRE ABOVE CASH COSTS	\$0	\$0	\$234	\$878	\$1,439
ACCUMULATED NET CASH COSTS/ACRE	\$6,911	\$8,414	\$8,180	\$7,302	\$6,741
Capital Recovery Cost:					
Shop Building	\$43	\$43	\$43	\$43	\$43
Shop Tools	\$16	16	16	16	16
Drip Irrigation System	\$113	113	113	113	113
Land @ \$8,000/Acre	\$863	863	863	863	863
Equipment	\$126	126	154	152	152
TOTAL CAPITAL RECOVERY COST	\$1,161	\$1,161	\$1,189	\$1,187	\$1,187
TOTAL COST/ACRE FOR THE YEAR	\$8,072	\$2,664	\$2,555	\$2,709	\$2,948
INCOME/ACRE FROM PRODUCTION	\$0	\$0	\$1,600	\$2,400	\$3,200
TOTAL NET COST/ACRE FOR THE YEAR	\$8,072	\$2,664	\$955	\$309	\$0
NET PROFIT/ACRE ABOVE TOTAL COST	\$0	\$0	\$0	\$0	\$252
TOTAL ACCUMULATED NET COST/ACRE	\$8,072	\$10,736	\$11,691	\$12,000	\$11,748

Table 2.

U.C. COOPERATIVE EXTENSION
 COSTS PER ACRE TO PRODUCE WINE GRAPE
 SIERRA NEVADA FOOTHILLS - 1996
 28 ACRE PLANTING

Labor Rate: \$12.06/hr. machine labor
 \$7.04/hr. non-machine labor

Interest Rate: 7.55%
 Yield per Acre: 4.0 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 :								
Retie Vines - 50% Of Acreage	3.00	24	0	10	0	34		
Prune - Dormant	12.00	96	0	0	0	96		
Weed Control - Disc Middles 3X	0.86	11	5	0	0	16		
Pest Control - Gophers	0.20	3	1	5	1	9		
Disease Control - Mildew 9X	3.21	41	3	62	50	157		
Remove Suckers	12.00	96	0	0	0	96		
Irrigate	1.50	12	0	109	0	121		
Insect Control - Mites	0.46	6	0	32	7	45		
Weed Control - Spot Spray	0.25	3	1	1	0	6		
Plant Cover Crop	0.21	3	1	19	0	22		
Weed Control - Strip Spray	0.25	3	1	11	0	15		
Miscellaneous Costs	0.00	0	0	0	80	80		
Pickup Truck Use	7.14	92	37	0	0	129		
TOTAL CULTURAL COSTS	41.07	391	50	248	138	827		
Harvest:								
Harvest - Contract	2.00	26	8	0	525	559		
Haul To Winery - Contract	0.00	0	0	0	125	125		
TOTAL HARVEST COSTS	2.00	26	8	0	650	684		
Interest on operating capital @ 10.46%						33		
TOTAL OPERATING COSTS/ACRE		417	59	247	788	1543		
CASH OVERHEAD:								
Office Expense						107		
Liability Insurance						13		
Property Taxes						172		
Property Insurance						123		
Investment Repairs						38		
TOTAL CASH OVERHEAD COSTS						453		
TOTAL CASH COSTS/ACRE						1997		

U.C. COOPERATIVE EXTENSION

Table 2. Continued

NON-CASH OVERHEAD:			
Investment	Per producing Acre	-- Annual Cost --	
-----	-----	Capital Recovery	
		-----	-----
Land - 30 Acres	11429	863	863
Drip Irrigation System	1250	113	113
Buildings	500	43	43
Shop Tools	143	16	16
Vineyard Establishment	8180	774	774
Equipment	1279	152	152
	-----	-----	-----
TOTAL NON-CASH OVERHEAD COSTS	22781	1960	1960
TOTAL COSTS/ACRE			3956

Table 3.

U.C. COOPERATIVE EXTENSION
 COSTS AND RETURNS PER ACRE TO PRODUCE WINE GRAPE
 SIERRA NEVADA FOOTHILLS - 1996
 28 ACRE PLANTING

Labor Rate: \$12.06/hr. machine labor		Interest Rate: 7.55%			
\$7.04/hr. non-machine labor					
=====					
	Quantity/Acre	Unit	Price or Cost/Unit	Value or Cost/Acre	Your Cost

GROSS RETURNS					
Wine Grape	5.00	Ton	800.00	4000	

TOTAL GROSS RETURNS FOR YEAR 5				4000	
OPERATING COSTS					
Misc.:					
Green Tape - 1"	1226.00	Foot	0.008	10	
Rent:					
Bait Machine	1.00	Acre	0.71	1	
Tractor Rent-75 HP	8.00	Acre	7.15	57	
Bin Rentals	1.00	Acre	10.00	10	
Forklift - Rental	0.04	Week	230.00	9	
Tractor Rental - 3	0.04	Week	135.00	5	
Misc. & Rental Cost	1.00	Acre	80.00	80	
Rodenticide:					
Rodent Bait	5.00	Lb	0.90	5	
Fungicide:					
Microthial	35.00	Lb	0.75	26	
Kocide	16.00	Lb	2.24	36	
Irrigation:					
Water - Pumped	4.80	AcIn	17.61	85	
Fertilizer:					
16-20-0	20.00	Lb N	1.063	21	
Sulfate of Potash	55.00	Lb	0.187	10	
Miticide:					
Omite 30W	5.00	Lb	6.38	32	
Herbicide:					
Roundup	0.60	Pint	6.29	4	
Goal 1.6E	0.80	Pint	9.50	8	
Princep 4L	0.20	Pint	2.35	0	
Contract:					
Harvest - 30 Acre	5.00	Ton	100.00	500	
Hauling - 30 Acre	5.00	Ton	25.00	125	
Cover Crop:					
Clover Seed Mix	7.50	Lb	1.50	11	
Labor (machine)	17.49	Hrs	10.72	187	

Table 3. Continued

U.C. COOPERATIVE EXTENSION
 COSTS AND RETURNS PER ACRE TO PRODUCE WINE GRAPE
 SIERRA NEVADA FOOTHILLS - 1996
 28 ACRE PLANTING

			Price or Cost/Unit	Value or Cost/Acre	Your Cost
=====					
Labor Rate: \$12.06/hr. machine labor					
\$7.04/hr. non-machine labor					
=====					
	Quantity/Acre	Unit			

Labor (non-machine)	28.50	Hrs	8.04	229	
Fuel - Gas	17.83	Gal	1.47	26	
Fuel - Diesel	9.17	Gal	1.09	10	
Lube				5	
Machinery repair				17	
Interest on operating capital @ 10.46%				33	

TOTAL OPERATING COSTS/ACRE				1543	

NET RETURNS ABOVE OPERATING COSTS				2457	

CASH OVERHEAD COSTS:					
Office Expense				107	
Liability Insurance				13	
Property Taxes				172	
Property Insurance				123	
Investment Repairs				38	

TOTAL CASH OVERHEAD COSTS/ACRE				453	

TOTAL CASH COSTS/ACRE				1997	

NON-CASH OVERHEAD COSTS (CAPITAL RECOVERY):					
Land - 30 Acres				863	
Drip Irrigation System				113	
Buildings				43	
Shop Tools				16	
Vineyard Establishment				774	
Equipment				152	

TOTAL NON-CASH OVERHEAD COSTS/ACRE				1960	

TOTAL COSTS/ACRE				3956	

NET RETURNS ABOVE TOTAL COSTS				44	
=====					

Table 4.

U.C. COOPERATIVE EXTENSION
 MONTHLY CASH COSTS PER ACRE TO PRODUCE WINE GRAPE
 SIERRA NEVADA FOOTHILLS - 1996
 28 ACRE PLANTING

Beginning JAN 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	TOTAL
Ending DEC 96													

Cultural :													
Retie Vines - 50% Of Acreage			34										34
Prune - Dormant			96										96
Weed Control - Disc Middles 3X				5	5					5			16
Pest Control - Gophers				9									9
Disease Control - Mildew 9X					52	52	35	17					157
Remove Suckers						96							96
Irrigate						40	41	41					121
Insect Control - Mites							45						45
Weed Control - Spot Spray							6						6
Plant Cover Crop										22			22
Weed Control - Strip Spray												15	15
Miscellaneous Costs	7	7	7	7	7	7	7	7	7	7	7	7	80
Pickup Truck Use	11	11	11	11	11	11	11	11	11	11	11	11	129

TOTAL CULTURAL COSTS	17	17	182	31	75	206	144	75	17	17	45	32	860

Harvest:													
Harvest - Contract									559				559
Haul To Winery - Contract									125				125

TOTAL HARVEST COSTS									684				684

Interest on oper. capital	0	0	2	2	3	4	6	6	12	-1	-1	-1	33

TOTAL OPERATING COSTS/ACRE	18	18	149	33	78	210	149	82	713	17	44	32	1543

OVERHEAD:													
Office Expense	9	9	9	9	9	9	9	9	9	9	9	9	107
Liability Insurance	13												13
Property Taxes	86						86						172
Property Insurance	61						61						123
Investment Repairs	3	3	3	3	3	3	3	3	3	3	3	3	38

TOTAL CASH OVERHEAD COSTS	173	12	12	12	12	12	160	12	12	12	12	12	453

TOTAL CASH COSTS/ACRE	190	30	162	45	90	222	309	94	726	29	56	44	1997
=====													

Table 5.

U.C. COOPERATIVE EXTENSION
 WHOLE FARM ANNUAL EQUIPMENT, INVESTMENT, AND BUSINESS OVERHEAD COSTS
 SIERRA NEVADA FOOTHILLS - 1996
 28 ACRE PLANTING

ANNUAL EQUIPMENT COSTS

=====								
- Cash Overhead -								
Yr	Description	Price	Yrs Life	Salvage Value	Capital Recovery	Insur- ance	Taxes	Total

96	3 Point Forks	506	15	49	56	2	3	60
96	45 HP 2WD Tractor	27885	15	5429	2962	119	167	3247
96	Disc - Offset 8'	8713	10	1541	1164	37	51	1251
96	Orchard Sprayer - 300 Gal	10589	10	1873	1414	44	62	1521
96	Pickup Truck - 1/2 Ton	17160	10	5069	2148	79	111	2339
96	Seeder - Cover Crop	3389	20	177	330	13	18	360
96	Weed Sprayer - 100 Gal	3404	10	602	455	14	20	489

TOTAL		71646		14740	8528	308	432	9267
=====								
50% of New Cost *		35823		7370	4264	154	216	4634

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

ANNUAL INVESTMENT COSTS

=====								
----- Cash Overhead -----								
Description	Price	Yrs Life	Salvage Value	Capital Recovery	Insur- ance	Taxes	Repairs	Total

INVESTMENT								
Buildings	14000	30		1191	50	70	280	1591
Drip Irrigation System	35000	25		3154	125	175	700	4153
Land - 30 Acres	320000	25	320000	24160	2282	3200	0	29642
Shop Tools	4000	15	400	439	16	22	75	552
Vineyard Establishment	229040	22		21660	817	1145	0	23622

TOTAL INVESTMENT	602040		320400	50604	3289	4612	1055	59560
=====								

U.C. COOPERATIVE EXTENSION

Table 5. Continued

ANNUAL BUSINESS OVERHEAD COSTS				
Description	Units/ Farm	Unit	Price/ Unit	Total Cost
Liability Insurance	30.00	Acre	12.23	367
Office Expense	30.00	Acre	100.00	3000

Table 6.

HOURLY EQUIPMENT COSTS
SIERRA NEVADA FOOTHILLS - 1996

Yr Description	Actual Hours Used	COSTS PER HOUR						Total Oper.	Total Costs/Hr.
		Capital Recovery	Cash Overhead Insur- ance	Taxes	Repairs	Operating Fuel & Lube			
96 3 Point Forks	56.0	0.50	0.02	0.02	0.06	0.00	0.06	0.60	
96 45 HP 2WD Tractor	116.1	12.76	0.51	0.72	0.97	2.77	3.74	17.72	
96 Disc - Offset 8'	24.0	24.21	0.76	1.07	1.16	0.00	1.16	27.19	
96 Orchard Sprayer - 300 Gal	102.6	6.89	0.22	0.30	1.08	0.00	1.08	8.50	
96 Pickup Truck - 1/2 Ton	200.0	5.37	0.20	0.28	1.02	4.23	5.25	11.10	
96 Seeder - Cover Crop	5.9	27.98	1.08	1.51	0.50	0.00	0.50	31.07	
96 Weed Sprayer - 100 Gal	14.0	16.24	0.51	0.72	0.70	0.00	0.70	18.16	

Table 7.

U.C. COOPERATIVE EXTENSION
RANGING ANALYSIS
SIERRA NEVADA FOOTHILLS - 1996
28 ACRE PLANTING

COSTS PER ACRE AT VARYING YIELDS TO PRODUCE WINE GRAPE

	YIELD (TON/ACRE)						
	3.5	4.0	4.5	5.0	5.5	6.0	6.5
OPERATING COSTS/ACRE:							
Cultural Cost	34	34	34	34	34	34	34
Cultural Cost	793	793	793	793	793	793	793
Harvest Cost	479	547	615	684	752	820	889
Interest on operating capital	31	32	32	33	34	34	35
TOTAL OPERATING COSTS/ACRE	1336	1405	1474	1543	1612	1681	1750
TOTAL OPERATING COSTS/TON	382	351	328	309	293	280	269
CASH OVERHEAD COSTS/ACRE	453	453	453	453	453	453	453
TOTAL CASH COSTS/ACRE	1790	1859	1928	1997	2065	2134	2203
TOTAL CASH COSTS/TON	511	465	428	399	376	356	339
NON-CASH OVERHEAD COSTS/ACRE	1960	1960	1960	1960	1960	1960	1960
TOTAL COSTS/ACRE	3749	3818	3887	3956	4025	4094	4163
TOTAL COSTS/TON	1071	955	864	791	732	682	640

NET RETURNS PER ACRE ABOVE OPERATING COSTS FOR WINE GRAPE

PRICE (DOLLARS/TON)	YIELD (TON/ACRE)						
Wine Grape	3.5	4.0	4.5	5.0	5.5	6.0	6.5
650.00	939	1195	1451	1707	1963	2219	2475
700.00	1114	1395	1676	1957	2238	2519	2800
750.00	1289	1595	1901	2207	2513	2819	3125
800.00	1464	1795	2126	2457	2788	3119	3450
850.00	1639	1995	2351	2707	3063	3419	3775
900.00	1814	2195	2576	2957	3338	3719	4100
950.00	1989	2395	2801	3207	3613	4019	4425

U.C. COOPERATIVE EXTENSION

Table 7. Continued

NET RETURNS PER ACRE ABOVE CASH COSTS FOR WINE GRAPE

PRICE (DOLLARS/TON)	YIELD (TON/ACRE)						
Wine Grape	3.5	4.0	4.5	5.0	5.5	6.0	6.5
650.00	485	741	997	1253	1510	1766	2022
700.00	660	941	1222	1503	1785	2066	2347
750.00	835	1141	1447	1753	2060	2366	2672
800.00	1010	1341	1672	2003	2335	2666	2997
850.00	1185	1541	1897	2253	2610	2966	3322
900.00	1360	1741	2122	2503	2885	3266	3647
950.00	1535	1941	2347	2753	3160	3566	3972

NET RETURNS PER ACRE ABOVE TOTAL COSTS FOR WINE GRAPE

PRICE (DOLLARS/TON)	YIELD (TON/ACRE)						
Wine Grape	3.5	4.0	4.5	5.0	5.5	6.0	6.5
650.00	-1474	-1218	-962	-706	-450	-194	62
700.00	-1299	-1018	-737	-456	-175	106	387
750.00	-1124	-818	-512	-206	100	406	712
800.00	-949	-618	-287	44	375	706	1037
850.00	-774	-418	-62	294	650	1006	1362
900.00	-599	-218	163	544	925	1306	1687
950.00	-424	-18	388	794	1200	1606	2012

Table 8.

UC COOPERATIVE EXTENSION
 COSTS AND RETURNS / BREAKEVEN ANALYSIS
 SIERRA NEVADA FOOTHILLS - 1996
 28 CARE PLANTING

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	4000	1543	2457	1997	2003	3956	44

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	112000	43210	68790	55902	56098	110770	1230
TOTAL	112000	43210	68790	55902	56098	110770	1230

BREAKEVEN PRICES PER YIELD UNIT

CROP	Base Yield (Units/Acre)	Yield Units	----- Breakeven Price To Cover -----		
			Operating Costs	Cash Costs	Total Costs
Wine Grape	5.0	Ton	308.64	399.30	791.21

BREAKEVEN YIELDS PER ACRE

CROP	Yield Units	Base Price (\$/Unit)	----- Breakeven Yield To Cover -----		
			Operating Costs	Cash Costs	Total Costs
Wine Grape	Ton	800.00	1.9	2.5	4.9