1994

U.C. COOPERATIVE EXTENSION

SAMPLE COSTS
TO ESTABLISH A VINEYARD AND PRODUCE

~WINE GRAPES~

Cabernet Sauvignon Variety & Drip Irrigated
IN THE LODI APPELLATION OF
SACRAMENTO AND SAN JOAQUIN COUNTIES

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U.C. COOPERATIVE EXTENSION

GENERAL INFORMATION FOR ESTABLISHING A VINEYARD AND PRODUCING WINE GRAPES

Cabernet Sauvignon Variety and Drip Irrigated

Lodi Appellation of Sacramento and San Joaquin Counties - 1994

The detailed costs for vineyard establishment and wine grape production in the Lodi Appellation of Sacramento and San Joaquin Counties are presented in this study. The hypothetical farm used in this report consists of a total of 200 acres, 60 of which are being established, 135 acres of mature vineyards and the remaining five acres are in 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 **Tables 2** and **3**, **Costs Per Acre To Produce Wine Grapes** and **Costs And Returns Per Acre To Produce Wine Grapes.** This study is only intended as a guide and can be used in making production decisions, determining potential returns, preparing budgets and evaluating production loans.

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

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

For an explanation of calculations used for the study refer to the attached General Assumptions, call the Department of Agricultural Economics, Cooperative Extension, University of California, Davis, California, (916) 752-3589 or call the San Joaquin County viticulture farm advisor, Paul Verdegaal, (209) 468-2085.

The study mentioned above can be requested through the Department of Agricultural Economics, U.C. Davis, or from selected county Cooperative Extension offices.

U.C. COOPERATIVE EXTENSION

GENERAL ASSUMPTIONS FOR ESTABLISHING A VINEYARD AND PRODUCING WINE GRAPES

Cabernet Sauvignon Variety and Drip Irrigated

Lodi Appellation of Sacramento and San Joaquin Counties - 1994

The following is a description of some general assumptions pertaining to sample costs to establish a vineyard and produce wine grapes in the Lodi Appellation. 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 or 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 or the Lodi District Grape Growers Association nor is any criticism implied by omission of other similar products.*

1. LAND:

The vineyard is owned, managed and operated by the owner. The vineyard is located in the Lodi Appellation of San Joaquin County and is situated on the valley floor with deep, well drained soil. The farm is comprised of 200 acres, 195 of which are planted with wine grapes. Of that, 135 acres are mature vineyards in production, 60 acres of grapes are being established, and five acres are occupied by roads, irrigation systems, fencing, and farmstead. Land is valued at $8,000 per acre. Because only 195 of the 200 acres are planted to grapes, land is valued at $8,205 per plantable acre.

2. VINES:

Phylloxera resistant rootstock is planted on a 7' x 10' spacing with 622 vines per acre during the first spring. At planting time rootstocks are trimmed, planted, and covered with soil. Later in the year, the vines are uncovered; field budded with certified Cabernet Sauvignon buds, and covered again. In the second year vines are uncovered, cut off above the bud and milk cartons are placed around them. At the same time 2% or 13 vines per acre will be replanted. Vines will be trained to a bilateral cordon at 44 inches and spur pruned. The grapevines are expected to begin yielding fruit in three years and then be productive for an additional 22 years.

3. IRRIGATION SYSTEM:

Irrigation System: The previous vineyard is assumed to have a well which will be refurbished and a new pump, motor, and filtration/injector station will be installed along with the drip irrigation system during to planting. The well, 15 hp motor, pump, filtration station, fertilizer injector system, drip lines and the labor to install of these components is included in the irrigation system cost. Water is pumped to the vineyard after running through a filtration station into the drip lines along the vine rows. The irrigation system is considered an improvement to the property and has a 25 year lifespan. Therefore, it is not found in preplant operations in **Table 1**, establishment costs, 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**.

Pumped water plus labor is the irrigation cost. The cost is based on using 15 hp motor to pump 16 acre-inches 60 to 90 feet over 195 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 $22.20 per acre-foot. No assumption is made about effective rainfall. Irrigations begin in May and end in July during the first two years. By the third year additional water is applied during August and one postharvest irrigation of three acre-inches in October. The amount of water applied to the vineyard period varies and is shown in **Table A**.

Table A. Applied Irrigation Water

	AcIn/Year		
Year	Preharvest	Postharvest	Total Applied
1	6	0	6
2	6	0	6
3+	13	3	16

4. TRELLIS SYSTEM:

The trellis system is designed to support a bilateral cordon trained and spur pruned vineyard. The system in this study utilizes metal T posts at each vine with end posts at row ends to anchor the wires. Three permanent wires are secured to the end posts and attached to all metal posts. Installation of the trellis system is performed by the owner and hired workers. 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 is installed during the first 2 years and is detailed as follows.

First Year: In the fall of the first year or Spring of the second, after the vines have been planted and the drip lines are laid out on the ground alongside the vines, both T posts and end posts are installed. Seven foot metal T posts are set at each vine location and end stakes are pounded into the soil at the row ends. Initially the drip irrigation line is laid out on the ground along the vine row and turned on to make dry ground soft for speeding post installation.

Second Year: All wires are strung from end post to end post. Two 12 gauge, high tensile, cordon and catch (top) wires are attached with a clip to each metal T post. The bottom strand is a 13 gauge, high tensile wire also permanently attached to end and T posts. It is from this wire that the drip irrigation line is suspended from drip clips.

5. ESTABLISHMENT CULTURAL PRACTICES:

This vineyard is established on ground that had been previously planted to an older vineyard. The land is assumed to be on flat alluvial soils that are well drained and fertile. The practices described below represents only the hypothetical vineyard in this study. These are typical practices for many vineyards in the Lodi Appellation, but may not be appropriate to your circumstance.

Vineyard Conversion And Site Preparation:

The vineyard to be established is assumed to be planted on land with an existing vineyard. The present grapevines are removed in the fall. After the vines have been pushed out and burned, the land slip plowed twice to a depth of 5-6 feet breaking up any underlying hardpan to improve root and water penetration and also pulls up additional roots from the previous vines which can harbor disease. Afterwards the ground is disced three times which helps break up large clods of soil smoothing the ground in advance of fumigation. A company is contracted to fumigate the vineyard site to control soil-borne pathogens and pests; 100% of the ground is treated untarped. A single discing to seal the

fumigant is performed immediately afterward. Subsoiling and discing prior to fumigation opens the soil for better diffusion of the fumigant through a larger area of the soil which provides better control for soil-borne pests. The following spring three cultivations occur before a pre-emergent, residual herbicide (Treflan®) is applied and immediately incorporated with two cultivations for weed control through most of the early growing season. Vineyard removal, slip plowing, and fumigation 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.

Planting And Budding: Planting the vineyard starts by laying out and marking vine sites in early spring. The drip line is laid on top of the ground and turned on to ease digging by hand. Rootstocks are trimmed, planted, and covered with soil. In August of the first year or when the budwood is mature, a commercial budder uncovers each rootstock, buds a certified Cabernet Sauvignon bud onto it, and prunes back rootstock growth.

In the second year, 2% of the vines or 13 vines per acre are lost and are replaced. This involves planting new rootstocks and budding scions again later. Buds that failed on surviving rootstock are rebudded by the commercial budder usually at no charge.

Pruning: A number of similar, but different cultural operations are performed during 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 pruning is done when the rootstock is budded. This involves removing any shoots sprouting from the rootstock so that the scion buds are encouraged to produce the vine structure. All prunings are left in between the vine rows to be chopped by the tractor and disc.

The second year begins by uncovering the budded vine, the rubber band holding the bud is cut off, the vine is topped, and a milk carton is placed around the trunk to protect it from vertebrate damage and sunburn. Green tying includes suckering, tying, and training the vine. 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 tying one shoot up the T post to become the main trunk. Later this shoot is topped at or below the cordon wire and two lateral shoots are selected from the trunk as the bilateral cordons. Any remaining lower laterals would also be pruned off and cordons cut back to the appropriate girth. Green tying continues in the vineyard from May through July.

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

After vines are trained hand vine care activities such as shoot positioning, thinning, and suckering trunks and cordons 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 and Arthropod Management: Insects are managed by using several different pesticides and management techniques beginning in the third year. Various species of leafhoppers (*Erythroneura elegantula* Osborn, and *E. variabilis* Beamer) cause serious problems, but can be controlled by various insecticides. A single application of Pyrenone® in June by tractor and vineyard sprayer is assumed to control leafhoppers through the season.

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 (*Uncinula necator*). A dusting program for powdery mildew control begins the third year. Sulfur dust is applied once early in the season, followed by seven applications of sulfur dust made through mid July. It is applied at a rate of 15 pounds per acre each time using a tractor and 3-point duster.

Vineyard Floor Management: Weeds present in the vine row the year the vines are planted will be controlled with several cultivations and a pre-emergent, residual herbicide applied the year prior to planting. The row centers between the vine rows are cultivated three to five times with a disk during the growing season throughout the establishment years. The vineyard is stripped sprayed with a combination of residual herbicides such as Surflan® and Gramoxone®, 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 using Roundup®.

Fertilization: A nitrogen fertilizer is applied in all years of vineyard establishment. A liquid formulation of UN-32 (32% nitrogen) is used at a rate of 25 pounds of N per acre through the drip line.

Vertebrate Pest Management: One vertebrate pest requires control in vineyards for this region; rabbits. Three species may cause damage; Jackrabbits (*Lepus californicus*), cottontail (*Sylvilagus audubonii*), and brush rabbit (*S. bachmani*), though Jackrabbits are the major pest. Damage by rabbits is managed by milk cartons placed around the young vines when rubber bands are cut in the second year. This prevents rabbits from feeding on young vines. Another method of managing rabbit injury from the first year on is by building a fence around the vineyard and excluding them. Growers may offset their fence investment cost since it would lower losses from rabbit damage and spending for other control measures that would be undertaken if the fence were not in place.

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 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 $5,949 per acre or $1,160,055 for the 195 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 and the prunings are chopped using the mower. Hand vine care activities such as shoot positioning, thinning, and suckering

trunks and cordons continue through all production years. Positioning and thinning shoots allows vines adequate space to develop better fruit clusters, opening the canopy to allow greater air movement through the vines and around the clusters. Consequently, growth of fungal diseases is inhibited and subsequent number of pruning cuts are reduced.

Fertilization: Nitrogen is applied at a rate of 25 pounds of N per acre during the production years by injecting a liquid 5-0-10 through the drip irrigation system. Additionally, 5 pounds of N and 25 pounds of potassium are applied using the same fertilizer after harvest.

Vineyard Floor Management: In practice herbicide choice is a function of weed pressure which can change over time. In this vineyard vine row weeds are controlled with a mix of Princep® and Karmex® applied as a strip spray during November. Resident vegetation in the row centers is managed with five discings per season which also chops prunings. A spot herbicide spray of Roundup is used to treat 25% of the acreage, primarily for field bindweed control.

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. Leafhoppers are managed by a spray mix of Pyrenone®.

Disease Management: Powdery mildew is treated beginning in April with an application of sulfur. It is followed by nine additional applications of dusting sulfur on a 7-10 day cycle continuing through mid-July.

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 San Joaquin County viticulture farm advisor.

7. HARVEST:

Harvesting starts in the third year. In this cost study the vineyard contracts to have the grape crop custom harvested by machine and is charged on a per acre basis. Hauling to the crusher is also contracted for and paid by the grower. If growers do their own mechanical harvesting, then the equipment for harvest operations should be inventoried in Investment costs on **Table 5**, and operation costs would be calculated and placed in Harvesting costs in **Table 1** and **2**. All custom charges would be subtracted from Harvesting costs in **Table 1** and **2**.

8. YIELDS & RETURNS:

Grapes begin bearing an economic crop in the third year after planting. Yield maturity is reached in the fourth year. An assumed yield of 7 tons per acre is used to calculate cost per ton in production years. Typical yield range for Cabernet Sauvignon in the Lodi Appellation is 6.5 to 7.5

Table B. Annual Yields for Cabernet Sauvignon

Year	3	4+
Tons Per Acre	3.0	7.0

tons per acre. The annual yields are measured in tons as shown in **Table B**.

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 $1,041; the average 1993 price for Cabernet Sauvignon was $545 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 $550 per ton of Cabernet Sauvignon wine grapes is used in this study.

Table C. Annual Prices Received By Lodi Appellation (District 11) Growers For Cabernet Sauvignon Over The Previous Four Harvests

	$/Ton		
	Range		Weighted
Year	Low	High	Average
1990	226	706	617
1991	135	1,041	448
1992	250	858	555
1993	400	909	560
Average	253	879	545

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 Lodi Appellation of Sacramento and San Joaquin Counties 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 $5.50 and $4.75 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 $7.15 and $6.18 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. Wages for a half-time manager 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 varies 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 $617 for the entire farm.

Office Expense: Office and business expenses are estimated at $50 per acre. These expenses include office supplies, telephones, bookkeeping, accounting, legal fees, road maintenance, etc.

Sanitation Services: Sanitation services provide portable toilets for the vineyard and cost the farm $2,326 annually. The cost for this includes delivery and regular servicing of toilets.

Managers Salary: A salary for a manager 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 $30,000 per year for a professional manager's time is used in this study. 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 Lodi Appellation 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 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 $0.85 and $1.17 per gallon, respectively.

14. ACKNOWLEDGMENT:

The Lodi District Grape Growers Association provided assistance in furnishing information for this study. Appreciation is expressed to those growers and other cooperators who provided support.

U.C. COOPERATIVE EXTENSION

Table 1. SAMPLE COSTS PER ACRE TO ESTABLISH A VINEYARD
LODI APPELLATION OF SACRAMENTO & SAN JOAQUIN COUNTIES - 1994

Labor Rate: $7.15/hr. machine labor
$6.18/hr. non-machine labor

Vines Per Acre: 622
Long Term Interest Rate: 3.72%

	Cost Per Acre		
Year	1st	2nd	3rd
Tons Per Acre			3.0
Planting Costs:			
Vineyard Removal	$125		
Land Preparation - Slip Plow	$500		
Land Preparation - Disc 3X	$18		
Land Preparation - Fumigate 100%	$1,040		
Land Preparation - Cultivate 3X	$18		
Land Preparation - Apply Herbicide & Incorporate	$41		
Mark & Layout Vineyard	$61		
Dig Hole, Plant & Cover Vines	$44	$1	
Vines: 622 Per Acre (2% Replant In 2nd Year)	$842	18	
Uncover Vines, Field Bud & Prune Tops	$560	12	
TOTAL PLANTING COSTS	$3,249	$31	
Trellis System Costs:			
Install T Posts & End Posts		$1,155	
Spool & Tie Wires		$185	
Stretch Wires		$177	
Hang Drip Line on Bottom Wire		$59	
TOTAL TRELLIS SYSTEM COSTS		$1,576	
Cultural Costs:			
Prune			$56
Irrigate	$21	$21	39
Uncover & Prune Rootstock		$124	
Cut Rubber Bands, Top & Install Milk Carton		$81	
Fertilizer - Nitrogen	$78	78	78
Green Tie (Sucker, Tie & Train)		$450	50
Weed Control - Disc (3X 1st Year, 5X Year 2+)	$18	30	30
Weed Control - Spot Spray (25% Of Acreage)		$26	26
Insect Control - Leafhoppers			$73
Shoot Positioning/Thin			$74
Disease Control - Mildew - 8X			$51
Pickup Truck Use	$12	12	12
ATV Use	$9	9	9
TOTAL CULTURAL COSTS	$138	$831	$498
Harvest Costs:			
Pick Fruit			$210
Haul To Crusher			$30
TOTAL HARVEST COSTS			$240
Postharvest Costs:			
Irrigate			$7
Fertilize - Nitrogen			$15
Weed Control - Winter Strip Spray	$24	24	24
TOTAL POSTHARVEST COSTS	$24	$24	$46
Assessments:			
Lodi-Woodbridge Wine Grape Commission			$7
TOTAL ASSESSMENT COSTS			$7
Interest On Operating Capital @ 7.89%	$184	$93	$18
TOTAL OPERATING COSTS/ACRE	$3,595	$2,555	$809

	Cost Per Acre		
Year	1st	2nd	3rd
Tons Per Acre			3.0
Cash Overhead Costs:			
Office Expense	$43	$43	$43
Liability Insurance	$2	2	2
Sanitation Fees	$6	6	6
Managers Salary	$78	78	78
Property Taxes	$47	46	47
Property Insurance	$34	33	34
Investment Repairs	$4	4	4
TOTAL CASH OVERHEAD COSTS	$214	$212	$214
TOTAL CASH COSTS/ACRE	$3,809	$2,767	$1,023
INCOME/ACRE FROM PRODUCTION			$1,650
NET CASH COSTS/ACRE FOR THE YEAR	$3,809	$2,767	
PROFIT/ACRE ABOVE CASH COSTS			$627
ACCUMULATED NET CASH COSTS/ACRE	$3,809	$6,576	**$5,949**
Depreciation:			
Shop Building	$5	$5	$5
Fuel Tanks & Pumps	$1	1	1
Shop Tools	$2	2	2
Drip Irrigation System	$25	25	25
Pruning Equipment	$1	1	1
Equipment	$24	14	24
TOTAL DEPRECIATION	$58	$48	$58
Interest On Investment @ 3.72%			
Shop Building	$2	$2	$2
Fuel Tanks & Pumps	$1	1	1
Shop Tools	$1	1	1
Drip Irrigation System	$12	12	12
Pruning Equipment	$1	1	1
Land @ $2,940/Acre	$155	155	155
Equipment	$6	3	6
TOTAL INTEREST ON INVESTMENT	$178	175	178
TOTAL COST/ACRE FOR THE YEAR	$4,045	$2,990	$1,259
INCOME/ACRE FROM PRODUCTION			$1,650
TOTAL NET COST/ACRE FOR THE YEAR	$4,045	$2,990	
NET PROFIT/ACRE ABOVE TOTAL COST			$391
TOTAL ACCUMULATED NET COST/ACRE	$4,045	$7,035	$6,644

Table 2. U.C. COOPERATIVE EXTENSION
COSTS PER ACRE TO PRODUCE WINE GRAPE
LODI APPELLATION OF SACRAMENTO & SAN JOAQUIN COUNTIES - 1994

Operation	Operation Time (Hrs/A)	Cash and Labor Costs per Acre: Labor Cost	Fuel,Lube & Repairs	Material Cost	Custom/ Rent	Total Cost	Your Cost
Cultural:							
Prune	30.00	185	0	0	0	185	
Weed Control - Disc 5X	2.10	18	12	0	0	30	
Disease Control - Mildew 10X	1.54	13	6	24	0	44	
Irrigate	2.50	15	0	24	0	40	
Fertilize - Nitrogen	0.00	0	0	31	0	31	
Green Tie (Sucker Tie & Train)	8.00	49	0	0	0	49	
Shoot Positioning/Thinning	16.50	102	0	0	0	102	
Pest Control - Leafhoppers	0.41	4	5	64	0	73	
Weed Control - Spot Spray 25% Of Acreage	0.49	10	2	14	0	26	
Pickup Truck Use	0.86	7	5	0	0	13	
ATV Use	0.86	7	1	0	0	9	
TOTAL CULTURAL COSTS	63.28	412	32	157	0	601	
Harvest:							
Machine Harvest Fruit	0.00	0	0	0	210	210	
Haul To Crusher	0.00	0	0	0	70	70	
TOTAL HARVEST COSTS	0.00	0	0	0	280	280	
Postharvest:							
Trim Vines	0.31	3	2	0	0	4	
Irrigate	0.50	3	0	6	0	9	
Fertilize - Nitrogen	0.00	0	0	6	0	6	
Weed Control - Winter Strip	0.49	4	2	9	0	15	
TOTAL POSTHARVEST COSTS	1.30	10	4	20	0	34	
Assessment:							
Lodi-Woodbridge Wine Grape Commission	0.00	0	0	15	0	15	
TOTAL ASSESSMENT COSTS	0.00	0	0	15	0	15	
Interest on operating capital @ 7.89%						24	
TOTAL OPERATING COSTS/ACRE		422	36	193	280	955	
TOTAL OPERATING COSTS/TON						136.38	
CASH OVERHEAD:							
Office Expense						85	
Liability Insurance						3	
Sanitation Fees						12	
Manager Salary						154	
Property Taxes						121	
Property Insurance						86	
Investment Repairs						8	
TOTAL CASH OVERHEAD COSTS						469	
TOTAL CASH COSTS/ACRE						1424	
TOTAL CASH COSTS/TON						203.41	

NON-CASH OVERHEAD:

Investment	Per producing Acre	Annual Cost: Depreciation	Interest @ 3.72%	
Buildings	195	10	4	13
Fuel Tanks & Pumps	66	2	1	4
Shop Tools	58	3	1	5
Drip Irrigation Sy	1247	50	23	73
Pruning Equipment	7	1	0	1
Land - Lodi	8205		305	305
Vineyard Establish	5949	270	111	381
Equipment	270	24	6	30
TOTAL NON-CASH OVERHEAD COSTS	15998	361	451	812
TOTAL COSTS/ACRE				2235
TOTAL COSTS/TON				319.35

U.C. COOPERATIVE EXTENSION

Table 3. COSTS AND RETURNS PER ACRE TO PRODUCE WINE GRAPE
LODI APPELLATION OF SACRAMENTO & SAN JOAQUIN COUNTIES - 1994

	Quantity/Acre	Unit	Price or Cost/Unit	Value or Cost/Acre	Your Cost
GROSS RETURNS					
Wine Grape	7.00	Ton	550.00	3850	
TOTAL GROSS RETURNS FOR WINE GRAPE				3850	
OPERATING COSTS:					
Fungicide:					
Sulfur Dust	150.00	Lb	0.16	24	
Irrigation:					
Water - Pumped	16.00	Acin	1.85	30	
Fertilizer:					
5-0-12	30.00	Lb N	1.23	37	
Insecticide:					
Pyrenome Crop Spra	1.00	Qt	64.48	64	
Herbicide:					
Roundup	2.00	Pint	6.83	14	
Princep Caliber 90	1.00	Lb	5.31	5	
Karmex DF	0.50	Lb	6.71	3	
Contract:					
Machine Harvest	1.00	Acre	210.00	210	
Haul to Crusher	7.00	Ton	10.00	70	
Assessment:					
LWWGC	3850.00	Gross Value	0.004	15	
Labor (machine)	8.49	Hrs	7.15	61	
Labor (non-machine)	58.40	Hrs	6.18	361	
Fuel - Gas	2.73	Gal	0.98	3	
Fuel - Diesel	14.78	Gal	0.71	10	
Lube				2	
Machinery repair				21	
Interest on operating capital @	7.89%			24	
TOTAL OPERATING COSTS/ACRE				955	
TOTAL OPERATING COSTS/TON				136	
NET RETURNS ABOVE OPERATING COSTS				2895	
CASH OVERHEAD COSTS:					
Office Expense				85	
Liability Insurance				3	
Sanitation Fees				12	
Manager Salary				154	
Property Taxes				121	
Property Insurance				86	
Investment Repairs				8	
TOTAL CASH OVERHEAD COSTS/ACRE				469	
TOTAL CASH COSTS/ACRE				1424	
TOTAL CASH COSTS/TON				203	

Table 4. U.C. COOPERATIVE EXTENSION
MONTHLY CASH COSTS PER ACRE TO PRODUCE WINE GRAPE
LODI APPELLATION OF SACRAMENTO & SAN JOAQUIN COUNTIES - 1994

Beginning JAN 94 Ending DEC 94	JAN 94	FEB 94	MAR 94	APR 94	MAY 94	JUN 94	JUL 94	AUG 94	SEP 94	OCT 94	NOV 94	DEC 94	TOTAL
Cultural:													
Prune	185												185
Weed Control - Disc 5X			6	6	6	6	6						30
Disease Control - Mildew				9	13	13	9						44
Irrigate					15	8	8	8					40
Fertilize - Nitrogen					31								31
Green Tie					25	25							49
Shoot Positioning/Thinning						102							102
Pest Control - Leafhopper						73							73
Weed Control - Spot Spray						26							26
Pickup Truck Use	1	1	1	1	1	1	1	1	1	1	1	1	13
ATV Use	1	1	1	1	1	1	1	1	1	1	1	1	9
TOTAL CULTURAL COSTS	187	2	8	17	92	254	25	10	2	2	2	2	601
Harvest:													
Machine Harvest Fruit									210				210
Haul To Crusher									70				70
TOTAL HARVEST COSTS									280				280
Postharvest:													
Trim Vines									4				4
Irrigate										9			9
Fertilize - Nitrogen										6			6
Weed Control - Winter Strip											15		15
TOTAL POSTHARVEST COSTS									4	15	15		34
Assessment:													
LWWGC									15				15
TOTAL ASSESSMENT COSTS									15				15
Interest on oper. capital	1	1	1	1	2	4	4	4	6				24
TOTAL OPERATING COSTS/ACRE	188	3	9	18	94	257	29	14	308	17	17	2	955
TOTAL OPERATING COSTS/TON	26.91	0.43	1.30	2.57	13.40	36.76	4.08	1.98	43.93	2.37	2.39	0.25	136.38
OVERHEAD:													
Office Expense	7	7	7	7	7	7	7	7	7	7	7	7	85
Liability Insurance	3												3
Sanitation Fees	1	1	1	1	1	1	1	1	1	1	1	1	12
Manager Salary	13	13	13	13	13	13	13	13	13	13	13	13	154
Property Taxes	121												121
Property Insurance	43						43						86
Investment Repairs	1	1	1	1	1	1	1	1	1	1	1	1	8
TOTAL CASH OVERHEAD COSTS	189	22	22	22	22	22	65	22	22	22	22	22	469
TOTAL CASH COSTS/ACRE	378	25	31	39	115	279	93	35	329	38	38	23	1424
TOTAL CASH COSTS/TON	53.93	3.51	4.38	5.64	16.48	39.84	13.33	5.05	47.01	5.44	5.47	3.33	203.41

U.C. COOPERATIVE EXTENSION

Table 5. WHOLE FARM ANNUAL EQUIPMENT, INVESTMENT, AND BUSINESS OVERHEAD COSTS
LODI APPELLATION OF SACRAMENTO & SAN JOAQUIN COUNTIES - 1994

ANNUAL EQUIPMENT COSTS

Yr	Description	Price	Yrs Life	- Non-Cash Over. - Depre-ciation	Interest	- Cash Overhead - Insur-ance	Taxes	Total
94	30 HP 2WD Tractor	19305	12	1448	395	76	106	2025
94	70 HP 2WD Tractor	28850	12	2164	590	113	159	3026
94	ATV 4WD	3861	7	496	79	15	21	612
94	Disc - Tandem 7'	2917	15	175	60	11	16	262
94	Duster - 3 Pt	3093	10	278	63	12	17	371
94	Orch Sprayer - 400 Gal	13266	10	1194	271	52	73	1590
94	Pickup Truck - 1/2 Ton	17160	7	2206	351	67	94	2719
94	Vine Trimmer	2282	15	137	47	9	13	205
94	Weed Sprayer - 200 Gal	3282	10	295	67	13	18	393
TOTAL		94016		8394	1924	369	517	11203
60% of New Cost *		56410		5036	1154	221	310	6722

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

ANNUAL INVESTMENT COSTS

Yr	Description	Price	Yrs Life	- Non-Cash Over. - Depre-ciation	Interest	------ Cash Overhead ------ Insur-ance	Taxes	Repairs	Total
INVESTMENT									
	Buildings	38110	20	1906	709	136	191	762	3703
	Drip Irrigation System	243150	25	9726	4523	867	1216	545	16876
	Fuel Tanks & Pumps	12950	25	466	265	51	71	125	978
	Land	1600000			59520	11408	16000	0	86928
	Pruning Equipment	1287	10	116	26	5	7	25	179
	Shop Tools	11330	15	680	232	44	62	113	1131
	Vineyard Establishment	803115	22	36505	14938	2863	4016	0	58322
TOTAL INVESTMENT		2709942		49399	80212	15374	21563	1570	168117

ANNUAL BUSINESS OVERHEAD COSTS

Description	Units/ Farm	Unit	Price/ Unit	Total Cost
Liability Insurance	330.00	Acre	1.87	617
Manager Salary	1.00	Year	30000.00	30000
Office Expense	200.00	Acre	82.50	16500
Sanitation Fees	200.00	Acre	11.63	2326

U.C. COOPERATIVE EXTENSION

Table 6. HOURLY EQUIPMENT COSTS
LODI APPELLATION OF SACRAMENTO & SAN JOAQUIN COUNTIES - 1994

Yr	Description	Actual Hours Used	COSTS PER HOUR -Non-Cash Over.- Depre-ciation	Interest	- Cash Overhead - Insur-ance	Taxes	Repairs	-------- Operating -------- Fuel & Lube	Total Oper.	Total Costs/Hr.
94	30 HP 2WD Tractor	694.1	1.25	0.34	0.07	0.09	1.16	1.20	2.36	4.11
94	70 HP 2WD Tractor	657.4	1.97	0.54	0.10	0.14	1.73	2.81	4.54	7.31
94	ATV 4WD	190.6	1.56	0.25	0.05	0.07	0.70	0.75	1.45	3.38
94	Disc - Tandem 7'	284.2	0.37	0.13	0.02	0.03	0.84	0.00	0.84	1.39
94	Duster - 3 Pt	207.9	0.80	0.18	0.04	0.05	1.55	0.00	1.55	2.62
94	Orch Sprayer - 400 Gal	74.3	9.63	2.19	0.42	0.59	6.65	0.00	6.65	19.49
94	Pickup Truck - 1/2 Ton	190.6	6.94	1.11	0.21	0.30	3.11	2.82	5.93	14.49
94	Vine Trimmer	98.7	0.83	0.28	0.05	0.08	0.82	0.00	0.82	2.07
94	Weed Sprayer - 200 Gal	133.1	1.33	0.30	0.06	0.08	1.64	0.00	1.64	3.42

Table 7. U.C. COOPERATIVE EXTENSION
RANGING ANALYSIS
LODI APPELLATION OF SACRAMENTO & SAN JOAQUIN COUNTIES - 1994

COSTS PER ACRE AT VARYING YIELDS TO PRODUCE WINE GRAPES

	YIELD (TON/ACRE)						
	5.5	6.0	6.5	7.0	7.5	8.0	8.5
OPERATING COSTS/ACRE:							
Cultural Cost	601	601	601	601	601	601	601
Harvest Cost	265	270	275	280	285	290	295
Postharvest Cost	34	34	34	34	34	34	34
Assessment Cost	15	15	15	15	15	15	15
Interest on operating capital	24	24	24	24	25	25	25
TOTAL OPERATING COSTS/ACRE	940	945	950	955	960	965	970
TOTAL OPERATING COSTS/TON	171	157	146	136	128	121	114
CASH OVERHEAD COSTS/ACRE	469	469	469	469	469	469	469
TOTAL CASH COSTS/ACRE	1409	1414	1419	1424	1429	1434	1439
TOTAL CASH COSTS/TON	256	236	218	203	191	179	169
NON-CASH OVERHEAD COSTS/ACRE	812	812	812	812	812	812	812
TOTAL COSTS/ACRE	2220	2225	2230	2235	2240	2246	2251
TOTAL COSTS/TON	404	371	343	319	299	281	265

NET RETURNS PER ACRE ABOVE OPERATING COSTS FOR WINE GRAPES

PRICE	YIELD (TON/ACRE)						
(DOLLARS PER TON)	5.5	6.0	6.5	7.0	7.5	8.0	8.5
400.00	1260	1455	1650	1845	2040	2235	2430
450.00	1535	1755	1975	2195	2415	2635	2855
500.00	1810	2055	2300	2545	2790	3035	3280
550.00	2085	2355	2625	2895	3165	3435	3705
600.00	2360	2655	2950	3245	3540	3835	4130
650.00	2635	2955	3275	3595	3915	4235	4555
700.00	2910	3255	3600	3945	4290	4635	4980

NET RETURNS PER ACRE ABOVE CASH COSTS FOR WINE GRAPES

PRICE	YIELD (TON/ACRE)						
(DOLLARS PER TON)	5.5	6.0	6.5	7.0	7.5	8.0	8.5
400.00	791	986	1181	1376	1571	1766	1961
450.00	1066	1286	1506	1726	1946	2166	2386
500.00	1341	1586	1831	2076	2321	2566	2811
550.00	1616	1886	2156	2426	2696	2966	3236
600.00	1891	2186	2481	2776	3071	3366	3661
650.00	2166	2486	2806	3126	3446	3766	4086
700.00	2441	2786	3131	3476	3821	4166	4511

NET RETURNS PER ACRE ABOVE TOTAL COSTS FOR WINE GRAPES

PRICE	YIELD (TON/ACRE)						
(DOLLARS PER TON)	5.5	6.0	6.5	7.0	7.5	8.0	8.5
400.00	-20	175	370	565	760	954	1149
450.00	255	475	695	915	1135	1354	1574
500.00	530	775	1020	1265	1510	1754	1999
550.00	805	1075	1345	1615	1885	2154	2424
600.00	1080	1375	1670	1965	2260	2554	2849
650.00	1355	1675	1995	2315	2635	2954	3274
700.00	1630	1975	2320	2665	3010	3354	3699