
1997

UNIVERSITY OF CALIFORNIA - COOPERATIVE EXTENSION

SAMPLE COSTS
TO ESTABLISH A VINEYARD AND PRODUCE
~RAISINS~



**THOMPSON SEEDLESS
IN THE SAN JOAQUIN VALLEY**

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UNIVERSITY OF CALIFORNIA - COOPERATIVE EXTENSION
GENERAL INFORMATION
FOR ESTABLISHING A VINEYARD AND PRODUCING RAISINS
Thompson Seedless
in the San Joaquin Valley- 1997

The detailed costs for vineyard establishment and raisin production in the San Joaquin Valley are presented in this study. The hypothetical farm used in this report consists of a total of 120 acres, 75 acres of raisin producing acres, 40 acres in raisin establishment, and 5 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 Table 2. Costs Per Acre To Produce Raisins and Table 3. Costs And Returns Per Acre To Produce Raisins. 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 Raisins and eight tables.

Table 1.	Sample Costs Per Acre To Establish A Raisin Vineyard
Table 2.	Costs Per Acre To Produce Raisins
Table 3.	Costs And Returns Per Acre To Produce Raisins
Table 4.	Monthly Cash Costs Per Acre To Produce Raisins
Table 5.	Whole Farm Annual Equipment, Investment And Business Overhead Costs
Table 6.	Hourly Equipment Costs
Table 7.	Ranging Analysis
Table 8.	Costs And Returns/Breakeven 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 farm advisor in your county.

A study entitled *Production Practices and Sample Costs for Organic Raisin Grapes in the Southern San Joaquin Valley - 1997* is available for those interested in organic raisin grape production practices and costs.

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

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UNIVERSITY OF CALIFORNIA - COOPERATIVE EXTENSION

GENERAL ASSUMPTIONS FOR ESTABLISHING A VINEYARD AND PRODUCING RAISINS *Thompson Seedless* in the San Joaquin Valley- 1997

The following is a description of some general assumptions pertaining to sample costs to establish a vineyard and produce raisins in the San Joaquin Valley. 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 raisins 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 raisin vineyard is owned, managed, and operated by the grower. The vineyard is located in the San Joaquin Valley and is situated on previously farmed land. The vineyard is comprised of 120 acres, 75 of which are producing raisins, and 40 acres of raisin grapes being established. The other 5 acres are occupied by roads, irrigation systems, and farmstead. Land is valued at \$4,500 per acre. This study assumes the land was purchased. Because only 115 of the 120 acres are planted to grapes, land is valued at \$4,696 per plantable acre.

Vines. Thompson Seedless vines are planted on a 7' x 12' spacing with 519 vines per acre during the first spring. In the second year 25 vines per acre are replanted for those lost in the first year. Vines will be trained to up the 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 is a two-wire crossarm design and is installed by a custom trellis company in the second 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. The following details the trellis system installation.

Second Year Once the vineyard is laid out an eight-foot wooden end post is placed at each end of the rows. In between the end posts a six-foot steel stake is installed at each vine. Each stake has a single 24 inch crossarm attached to support two 13 gauge fruiting wires.

Irrigation System. Since the vineyard is established on land previously planted to vineyards/orchards, it is assumed to have a well which will be refurbished and a new pump, motor will be installed prior to planting. The well, 40 hp motor, pump, mainlines, valves, and the labor to renovate and install these components are 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, rather it is shown in the non-cash overhead sections as capital recovery cost of various tables and the Investments portion of Table 5.

Water plus labor constitute the irrigation cost. In this study, water is calculated to cost \$3.14 per acre-inch or \$37.68 per acre-foot. The cost results from a mix of pumped and district water. The pumping cost is based on using 40 hp motor to pump from 130 feet deep over 120 acres. District water costs range from \$13 to \$46 per acre-foot or per acre. Price per acre-foot of water will vary by grower in this region depending on quantity used, water district, power cost, various well characteristics, and other irrigation factors.

Irrigations occur during the growing season from March through August and in production years includes a September postharvest irrigation. Furrows are pulled several times during the growing season prior to irrigation. The amount of water applied to the vines varies through the establishment years and are shown in Table A.

Table A. Applied Irrigation Water

Year	Number of Months	AcIn/Year
1	7	12
2	7	24
3+	7	42

ESTABLISHMENT CULTURAL PRACTICES

This vineyard is established on ground that had previously been planted to vineyards or orchards. The land is assumed to be fairly level. The practices described below represents only the hypothetical vineyard in this study and may not be appropriate to your circumstance.

Site Preparation. The land is subsoiled twice to a depth of 2-3 feet, breaking up underlying plowpan or hardpan to improve root and water penetration. Afterwards the ground is disced twice to break up large clods of soil, smoothing the ground in advance of leveling. Leveling consists of three passes with a landplane. The bare ground is fumigated, untarped, to control soil nematodes and pathogens. All of the land preparation operations are contracted out to commercial companies. Most operations that prepare the vineyard for planting are done in the year prior to planting, but costs are shown in the first year of Table 1.

Planting. Planting the vineyard starts by laying out and marking vine sites in late winter. Holes are dug and vines are planted. Following planting, a postplant, pre-emergent, residual herbicide is applied for weed control through most of the first year growing season. In the second year, 25 vines per acre are replaced.

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

Dormant pruning during the winter begins the second year. The young vines are pruned back to a 2-bud spur. Training includes suckering, tying, and training the selected shoots.

Most of the training is completed by the end of the third year. This is also when pruning costs become the same as for mature vineyards. Cane tying and vine suckering are also major winter/spring tasks.

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 second year on an insecticide spray is applied to control omnivorous leaf roller (OLR) and isolated outbreaks of grapeleaf skeletonizer. In the third year another treatment is applied in May or June to control leafhoppers.

Disease Management. There are many pathogens that attack grapevines, but the major disease that is treated in this study is powdery mildew. A dusting and spraying program for powdery mildew control begins the third year with two applications of sulfur dust, increasing to four after the third year. Also in the third year, two wettable sulfur treatments are made with one mixed in the OLR spray. A sterol inhibitor (SI) is applied for additional mildew control (an equivalent fungicide can also be used) in the third year. All applications are made using a 75 HP tractor and an orchard sprayer.

Vineyard Floor Management. Weed control in the vine row and middles are managed with multiple discings and herbicides. The row middles are disced from March through August. A total of four discings per season are included. The vine rows are strip-sprayed with different combinations of pre-emergent herbicides during winter each year. The strip spray is applied on only 30 percent of the acreage.

Fertilization. A liquid nitrogen fertilizer is injected through a tractor-pulled drill shank applicator beginning in the first year at 20 pounds of N per acre. The amount of nitrogen applied each year increases and is shown in Table B.

Year	Pounds of N
1	20
2	20
3	40
4+	50

Establishment Cost. The 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 (year three). It is used to determine the non-cash overhead expense and 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 \$3,704 per acre or \$277,800 for the 75 producing acres. The establishment cost is spread over the remaining 22 years of the 25 years the vineyard is in production.

PRODUCTION CULTURAL PRACTICES

Pruning, Tying, and Suckering. Pruning is done during the winter months and the prunings are first chopped by a contract service then disced into the row middles. Suckers are removed from the trunks each year. Pruning and tying contract rates are for two-wire trellising. Rates for one-wire trellising are typically 25-33% lower.

Vineyard Floor Management. Herbicides and cultivation are used to manage the vineyard floor and control weeds. Four discings are performed in March through August. Vine row weeds are controlled with a contact and pre-emergent herbicide mix applied as a strip spray during the winter.

Fertilization. 50 pounds per acre of a liquid nitrogen fertilizer is injected using a tractor-pulled applicator in May. Neutral zinc is applied to prevent zinc deficiency and is combined with the May mildew control spray.

Insect and Arthropod Management. OLR, leafhoppers, and mites are the three pests treated on mature in this study. OLR is treated for in May when the insecticide is combined with the May SI spray. In June and July, separate mite and leafhopper treatments are made.

Disease Management. Powdery mildew is treated beginning in April with two applications of wettable sulfur. Fixed copper for phomopsis control is mixed with the first wettable sulfur treatment. Four applications of sulfur dust are made in May and June. Two SI treatments are made; one in May and the second in June. The May SI spray is applied with the OLR control and the nutrient neutral zinc is included in this application. At bloom in May, the plant growth regulator gibberellic acid (GA) is applied to reduce fruit set by causing bloom thinning. GA may also serve to reduce bunch rot. All of the insect and fungicide sprays are made using a 75 HP tractor and vineyard 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 one of the San Joaquin Valley viticulture farm advisors.

Harvest. Harvesting begins the third year. In this cost study, the vineyard contracts to have the grape crop custom harvested by hand at a rate of \$0.26 per tray. Harvest consists of hand picking the raisins, setting them on paper trays, placed on terraces in the row middles, to dry. The raisins are turned and rolled once during the drying process to insure evenness in drying the bottom fruit. The service is contracted for \$84 per thousand trays. The raisins are put into bins (boxing) and hauled out of the vineyard to be shaken and boxed. Shaking is performed by the grower to remove sand, leaves, and mold. It is assumed in this study that the grower rents four bins per acre and a forklift for harvest. The raisins are hauled to the packer and sold. Hauling to the packer is also contracted for (\$10 per ton) and paid by the grower.

Packers. Once delivered to a packer, the raisins are inspected by the United States Department of Agriculture (USDA) for maturity, quality, and moisture. Industry standards are set by the Raisin Administrative Committee (RAC), the administrative arm of the federal marketing order for raisins. Fees are associated with both the USDA inspections and RAC administrative responsibilities; tonnage fees are paid for by the packer. Growers receive payment for the free tonnage (commercial sales) portion of their crop from the packer. The reserve tonnage portion (export sales and government purchases) are paid by the RAC. In most cases, the packer retains control of the raisin crop for marketing purposes after inspection. A very small number of growers market their own product.

Yields. Raisin vineyards begin bearing an economic crop in the third year after planting and reach maturity in the fourth year. A yield of 1.5 ton per acre is used in the third year and 2 tons per acre in subsequent

production years using a drying ratio of 4.1 to 4.5:1 (green fruit to raisin grapes). Two tons per acre is the industry average while recognizing that newly established vineyards often yield higher.

Returns. The raisin grape market is regulated by a federal marketing order that is administered by the Raisin Administrative Committee (RAC). Each year, the RAC sets minimum industry standards that the crop must meet. In addition, the RAC regulates, on a percentage basis, the amount of the harvested crop that is offered for immediate sale (free tonnage), and the amount of the harvested crop that is held in reserve for later sale (the reserve pool), to control the overall supply of raisin grapes on the market.

The 1996 Thompson Seedless raisin price received by growers is estimated to be a “constructed” price of \$1,025 per ton. The constructed per price ton on 100% of the crop is based on tonnage percentages and the values for both free tonnage and the reserve pool as announced by the RAC and the Raisin Bargaining Association (RBA). In the past, constructed prices for the raisin crop have ranged from \$800 to \$1,200 per ton. However, the exact price each grower receives will vary. The yields and prices shown in Table 7 are an estimate which depend on crop maturity, quality, and moisture, and on the price negotiated between the grower and packer. Use of return prices for raisins is for calculating net returns to growers at different yields and price.

Risk. Risk is caused by various sources of uncertainty including production, price, and financial. Examples of these are rain damage, decrease in commodity price, and increase in interest rates. The risks associated with producing raisins in the San Joaquin Valley should not be underestimated.

Federal crop insurance is purchased by many growers to reduce the production risk associated with specific natural hazards. Insurance policies vary and range from a basic catastrophic loss policy to one that insures losses for up to 75% of a crop. In addition, some growers also purchase reconditioning insurance, which covers some of the costs for reconditioning raisins (e.g. turning, rolling, washing, and drying) if rains should occur during the harvest period. Insurance costs will depend on the type and level of coverage.

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 raisin 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 raisin production in this region.

Labor. Hourly wages for workers are \$5.75 and \$5.00 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 \$7.71 and \$6.70 per hour for machine labor and non-machine labor, respectively. The percentage charged for benefits varies depending upon whether or not growers utilize labor contractors or hire their own laborers. For those growers hiring their own labor, benefit percentages may be lower than 34% and have been as low as 18% in the past.

On March 1, 1997, the minimum wage increased from \$4.25 per hour to \$5.00 per hour. It will rise to \$5.15 per hour on September 1, 1997 and to \$5.75 per hour by March 1, 1998. The wage rates for non-machine labor used in this study reflects the March 1, 1997 rate. Growers using wage rates different from those shown in this report may adjust their labor costs by subtracting or adding the appropriate amounts.

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 10.00% 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 \$469 for the entire farm.

Office Expense. Office and business expenses for 120 acres are estimated at \$6,000 annually or \$38 per planted acre. These expenses include office supplies, telephones, bookkeeping, accounting, legal fees, road maintenance, etc.

Crop Insurance. This study assumes that the grower pays a total of \$46.70 per ton for crop insurance. This rate includes 65% crop loss coverage under the federal crop insurance program (\$31 per ton) and also a premium for reconditioning insurance (\$15.70 per ton).

Non-cash Overhead. Non-cash overhead is calculated as the capital recovery cost for equipment and other farm investments. Although farm equipment used on vineyards in the San Joaquin Valley may be purchased new or used, this study shows the current purchase price for new equipment. The new purchase price is adjusted to 60% to indicate a mix of new and used equipment. Annual ownership costs (Equipment and Investments) are shown in Tables 1 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. 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 8.25% used to calculate capital recovery cost is the United States Department of Agriculture - Economic Reporting Service's (USDA-ERS) ten year average of California's agricultural sector 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 \$0.97 and \$1.30 per gallon, respectively.

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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

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 RAISIN VINEYARD
 SAN JOAQUIN VALLEY - 1997
 THOMPSON SEEDLESS

Labor Rate: \$7.71/hr. machine labor
 \$6.37/hr. non-machine labor

Vines Per Acre: 519
 Interest Rate: 10%

Year	Cost Per Acre		
	1st	2nd	3rd
Tons Per Acre			1.5
Planting Costs:			
Land Preparation - Subsoil 2X	\$120		
Land Preparation - Disc 2X	\$50		
Land Preparation - Level	\$80		
Land Preparation - Fumigate	\$550		
Survey & Layout Vineyard	\$75		
Dig & Plant Vines	\$93	\$5	
Vines: 519 Per Acre (2% Replant In 2nd Year)	\$362	17	
Install Trellis System		\$1,267	
TOTAL PLANTING COSTS	\$1,330	\$1,289	\$0
Cultural Costs:			
Weed Control - Postplant Spray - 50% Of The Acreage	\$11		
Incorporate Herbicide	\$4		
Prune - Dormant		\$41	126
Pull Borders	\$13	13	13
Furrow Out	\$30	30	30
Fertilize	\$7	13	21
Irrigate	\$66	104	161
Pest Control - Vertebrates	\$25	10	
Training (Sucker, Tie & Train)		\$147	40
Weed Control - Disc Middles 4X	\$27	27	27
Insect & Disease Control - Omnivorous Leaf Roller & Mildew			\$22
Insect Control - Leafhoppers & Mites 2X			\$57
Disease Control - Dust Mildew 2X			\$18
Disease Control - Spray Mildew 2X (Wettable Sulfur & SI)			\$57
Terrace & Pull Back			\$7
Weed Control - Winter Strip Spray		\$32	32
Miscellaneous Costs	\$57	57	57
Pickup Truck Use	\$31	31	31
TOTAL CULTURAL COSTS	\$271	\$505	\$699

U.C. COOPERATIVE EXTENSION
Table 1. Continued

Year	Cost Per Acre		
	1st	2nd	3rd
Tons Per Acre			1.5
Harvest Costs:			
Harvest - Contract			\$210
Turn & Roll - Contract			\$57
Box & Shake			\$81
Haul To Processor - Contract			\$12
TOTAL HARVEST COSTS	\$0	\$0	\$360
Interest On Operating Capital @ 10%	\$64	\$97	\$35
TOTAL OPERATING COSTS/ACRE	\$1,665	\$1,891	\$1,094
Cash Overhead Costs:			
Office Expense	\$38	\$38	\$38
Liability Insurance	\$4	4	4
Sanitation Services	\$1	1	1
Crop Insurance			\$70
Property Taxes	\$51	51	53
Property Insurance	\$37	36	38
Investment Repairs	\$42	42	42
TOTAL CASH OVERHEAD COSTS	\$173	\$172	\$246
TOTAL CASH COSTS/ACRE	\$1,838	\$2,063	\$1,340
INCOME/ACRE FROM PRODUCTION	\$0	\$0	\$1,538
NET CASH COSTS/ACRE FOR THE YEAR	\$1,838	\$2,063	\$0
PROFIT/ACRE ABOVE CASH COSTS	\$0	\$0	\$198
ACCUMULATED NET CASH COSTS/ACRE	\$1,838	\$3,901	\$3,704
Non-Cash Overhead Costs (Capital Recovery):			
Land @ \$4,500	\$371	\$371	\$371
Furrow Irrigation System	\$65	65	65
Shop Building	\$13	13	13
Shop Tools	\$5	5	5
Fuel Tank & Pump	\$5	5	5
ATV	\$13	13	13
Equipment	\$29	27	72
TOTAL NON-CASH OVERHEAD COST	\$501	\$499	\$544
TOTAL COST/ACRE FOR THE YEAR	\$2,339	\$2,562	\$1,884
INCOME/ACRE FROM PRODUCTION	\$0	\$0	\$1,538
TOTAL NET COST/ACRE FOR THE YEAR	\$2,339	\$2,562	\$347
NET PROFIT/ACRE ABOVE TOTAL COST	\$0	\$0	\$0
TOTAL ACCUMULATED NET COST/ACRE	\$2,339	\$4,901	\$5,248

Table 2.

U.C. COOPERATIVE EXTENSION
 COSTS PER ACRE TO PRODUCE RAISIN
 SAN JOAQUIN VALLEY - 1997
 THOMPSON SEEDLESS

Labor Rate: \$7.71/hr. machine labor
 \$6.37/hr. non-machine labor

Interest Rate: 10.00%
 Yield per Acre: 2.0 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:								
Prune Vines	0.00	0	0	0	171	171		
Shred Brush	0.00	0	0	0	7	7		
Weed Control - Winter Strip	0.25	2	1	29	0	32		
Weed Control - Disc Middles 4X	2.22	21	11	0	0	32		
Furrow Out	1.43	20	7	0	0	27		
Mildew Control - SI	1.15	11	9	37	0	57		
OLR & Mildew Control	0.38	4	3	15	0	22		
Sulfur Application 6X	0.72	7	5	7	0	18		
Pull Borders	0.44	11	2	0	0	13		
Irrigate	4.30	29	0	132	0	161		
Fertilize	0.00	0	0	16	5	21		
Tie Vines	0.00	0	0	0	31	31		
Apply Growth Regulator	0.38	4	3	7	0	14		
Mite Control	0.38	4	3	49	0	55		
Insect Control - Leafhopper	0.38	4	3	22	0	29		
Terrace & Pull Back	0.50	5	2	0	0	7		
Trellis System Repair	1.00	7	0	50	0	57		
Pickup Truck Use	2.38	22	9	0	0	31		
TOTAL CULTURAL COSTS	15.91	147	60	365	214	786		
Harvest:								
Harvest - Contract	0.00	0	0	49	234	284		
Turn & Roll - Contract	0.00	0	0	0	76	76		
Box & Shake	0.95	45	7	0	28	81		
Haul To Packer	0.00	0	0	0	20	20		
TOTAL HARVEST COSTS	0.95	45	7	49	358	460		
Interest on operating capital @ 10.00%						40		
TOTAL OPERATING COSTS/ACRE		192	67	414	564	1286		

U.C. COOPERATIVE EXTENSION
Table 2. Continued

CASH OVERHEAD:	
Office Expense	39
Liability Insurance	5
Crop Insurance	37
Sanitation Service	4
Property Taxes	41
Property Insurance	29
Investment Repairs	28

TOTAL CASH OVERHEAD COSTS	184

TOTAL CASH COSTS/ACRE 1469

NON-CASH OVERHEAD:

Investment	Per producing Acre	-- Annual Cost --	
-----	-----	Capital Recovery	-----
Land	1565	129	129
Irrigation System	476	46	46
Buildings	150	13	13
Shop Tools	43	5	5
Fuel Tanks & Pump	52	5	5
ATV - 4wd	57	13	13
Vineyard Establishment	3704	370	370
Equipment	474	63	63
	-----	-----	-----
TOTAL NON-CASH OVERHEAD COSTS	6521	645	645

TOTAL COSTS/ACRE 2114
=====

Table 3.

U.C. COOPERATIVE EXTENSION
 COSTS AND RETURNS PER ACRE TO PRODUCE RAISIN
 SAN JOAQUIN VALLEY - 1997
 THOMPSON SEEDLESS

Labor Rate: \$7.71/hr. machine labor Interest Rate: 10.00%
 \$6.70/hr. non-machine labor

	Quantity/Acre	Unit	Price or Cost/Unit	Value or Cost/Acre	Your Cost
=====					
GROSS RETURNS					
Raisins	2.00	Ton	1025	2050	

TOTAL GROSS RETURNS FOR RAISINS					2050

OPERATING COSTS					
Contract:					
Pruning - Contract	519.00	Vine	0.33	171	
Brush Disposal	1.00	Acre	7.00	7	
Tie Vines	519.00	Vine	0.06	31	
Pick Raisin	900.00	Tray	0.26	234	
Turn & Roll	900.00	Tray	0.084	76	
Haul - Contract	2.00	Ton	10.00	20	
Herbicide:					
Surflan	0.30	Gal	77.75	23	
Roundup	0.90	Pint	5.95	5	
Fungicide:					
Kocide	4.00	Lb	2.24	9	
Rubigan EC	13.00	Oz	2.19	28	
Wettable Sulfur	6.00	Lb	0.56	3	
Dusting Sulfur	32.00	Lb	0.17	5	
Insecticide:					
Cryolite	5.00	Lb	2.68	13	
Provado	0.70	Oz	31.50	22	
Water:					
Water - Raisin	42.00	AcIn	3.14	132	
Custom:					
Fertilizer Applica	1.00	Acre	5.00	5	
Fertilizer:					
UN-32	40.00	Lb N	0.41	16	
Growth Regul:					
Gibberellic Acid	6.00	Gram	1.18	7	
Miticide:					
Vendex 50WP	2.00	Lb	24.40	49	

U.C. COOPERATIVE EXTENSION
Table 3. Continued

Misc.:				
Paper Tray	900.00	Tray	0.055	49
Trellis Materials	1.00	Acre	50.00	50
Rent:				
Forklift - Rental	1.50	Ton	3.90	6
Bin Rentals	3.00	Acre	7.50	23
Labor (machine)	14.47	hrs	7.71	112
Labor (non-machine)	12.05	hrs	6.70	81
Fuel - Gas	4.46	gal	1.30	6
Fuel - Diesel	29.72	gal	0.97	29
Lube				5
Machinery repair				27
Interest on operating capital @ 10.00%				<u>40</u>
TOTAL OPERATING COSTS/ACRE				1286

NET RETURNS ABOVE OPERATING COSTS				764

CASH OVERHEAD COSTS:				
Office Expense-Rai				39
Liability Ins-Rais				5
Crop Insurance				37
Sanitation Service				4
Property Taxes				41
Property Insurance				29
Investment Repairs				<u>28</u>
TOTAL CASH OVERHEAD COSTS/ACRE				184

TOTAL CASH COSTS/ACRE				1469

NON-CASH OVERHEAD COSTS (CAPITAL RECOVERY):				
Land				129
Irrigation System				46
Buildings				13
Shop Tools				5
Fuel Tanks & Pump				5
ATV - 4wd				13
Vineyard Establishment				370
Equipment				<u>63</u>
TOTAL NON-CASH OVERHEAD COSTS/ACRE				645

TOTAL COSTS/ACRE				2114

NET RETURNS ABOVE TOTAL COSTS				-64
=====				

Table 4.

U.C. COOPERATIVE EXTENSION
MONTHLY CASH COSTS PER ACRE TO PRODUCE RAISIN
SAN JOAQUIN VALLEY - 1997
THOMPSON SEEDLESS

Beginning JAN 97	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	TOTAL
Ending DEC 97	97	97	97	97	97	97	97	97	97	97	97	97	
Cultural:													
Prune Vines	171												171
Shred Brush	7												7
Weed Control - Winter Strip	32												32
Weed Control - Disc Middles 4X			6	6		6		6	6				32
Furrow Out			9	9		9							27
Mildew Control - SI				24	15	18							57
OLR & Mildew Control				22									22
Sulfur Application 6X				8	5	5							18
Pull Borders				13									13
Irrigate				27	27	27	27	27	27				161
Fertilize				21									21
Tie Vines					31								31
Apply Growth Regulator					14								14
Mite Control					55								55
Leafhopper Control						29							29
Terrace & Pull Back								4	4				7
Trellis System Repair	5	5	5	5	5	5	5	5	5	5	5	5	57
Pickup Truck Use	3	3	3	3	3	3	3	3	3	3	3	3	31
TOTAL CULTURAL COSTS	218	7	23	138	155	101	34	44	44	7	7	7	786
Harvest:													
Harvest - Contract									284				284
Turn & Roll - Contract									76				76
Box & Shake									81				81
Haul To Packer									20				20
TOTAL HARVEST COSTS									460				460
Interest on oper. capital	2	2	2	3	5	5	6	6	10	-0	-0	-0	40
TOTAL OPERATING COSTS/ACRE	220	9	25	141	159	106	40	50	514	7	7	7	1286
OVERHEAD:													
Office Expense	3	3	3	3	3	3	3	3	3	3	3	3	39
Liability Insurance	5												5
Crop Insurance	37												37
Sanitation Service	0	0	0	0	0	0	0	0	0				4
Property Taxes	21						21						41
Property Insurance	15						15						29
Investment Repairs	2	2	2	2	2	2	2	2	2	2	2	2	28
TOTAL CASH OVERHEAD COSTS	83	6	6	6	6	6	41	6	6	6	6	6	184
TOTAL CASH COSTS/ACRE	303	15	31	147	166	112	81	56	520	13	13	13	1469

Table 5.

U.C. COOPERATIVE EXTENSION
 WHOLE FARM ANNUAL EQUIPMENT, INVESTMENT, AND BUSINESS OVERHEAD COSTS
 SAN JOAQUIN VALLEY - 1997
 THOMPSON SEEDLESS

ANNUAL EQUIPMENT COSTS

Yr	Description	Price	Yrs Life	Salvage Value	Capital Recovery	- Cash Overhead -		Total
						Insur- ance	Taxes	
97	50 HP 2WD Tractor	29923	12	7481	3634	133	187	3954
97	75 HP 2WD Tractor	33247	12	8312	4037	148	208	4393
97	Bin Trailer	1287	10	228	178	5	8	191
97	Bin Trailer	1287	10	228	178	5	8	191
97	Disc - Border	2876	10	509	399	12	17	428
97	Disc - Tandem 7'	3729	13	457	457	15	21	493
97	Duster - 3 Pt	2520	16	214	282	10	14	306
97	Flat Furrower	1494	10	264	207	6	9	222
97	Orchard Sprayer - 500 Gal	17746	10	3138	2461	74	104	2639
97	Pickup Truck - 1/2 Ton	16226	7	6155	2459	80	112	2650
97	Shaker & Bin Dumper	12870	10	2276	1784	54	76	1914
97	Terracer	2465	10	31	369	9	12	391
97	Weed Sprayer - 100 Gal	2339	10	436	323	10	14	347
TOTAL		128009		29729	16770	562	789	18121
60% of New Cost *		76805		17837	10062	337	473	10872

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

ANNUAL INVESTMENT COSTS

Yr	Description	Price	Yrs Life	Salvage Value	Capital Recovery	----- Cash Overhead -----			Total
						Insur- ance	Taxes	Repairs	
INVESTMENT									
	ATV - 4wd	6500	5	650	1528	25	36	50	1640
	Buildings	17200	30	1720	1550	67	95	344	2056
	Fuel Tanks & Pump	5985	25	599	565	23	33	60	681
	Irrigation System	54700	25		5234	195	274	2735	8438
	Land	180000	25	180000	14850	1283	1800	0	17933
	Shop Tools	5000	15	500	575	20	28	50	672
	Vineyard Establishment	277800	22		27774	990	1389	0	30153
TOTAL INVESTMENT		547185		183469	52076	2605	3653	3239	61573

U.C. COOPERATIVE EXTENSION
Table 5. Continued

ANNUAL BUSINESS OVERHEAD COSTS

Description	Units/ Farm	Unit	Price/ Unit	Total Cost
Crop Insurance	60.00	Ton	46.70	2802
Liability Insurance	120.00	Acre	4.38	526
Office Expense	120.00	Acre	37.50	4500
Sanitation Service	120.00	Acre	3.67	440

Table 6.

UC COOPERATIVE EXTENSION
HOURLY EQUIPMENT COSTS
SAN JOAQUIN VALLEY - 1997
THOMPSON SEEDLESS

Yr Description	Actual† Hours Used	----- COSTS PER HOUR -----					Operating Fuel & Lube	Total Oper.	Total Costs/Hr.
		Capital Recovery	- Cash Overhead - Insur- ance	Taxes	Repairs				
97 50 HP 2WD Tractor	999.4	2.18	0.08	0.11	1.27	2.74	4.01	6.39	
97 75 HP 2WD Tractor	999.4	2.42	0.09	0.12	1.42	4.11	5.53	8.16	
97 Bin Trailer	249.5	0.43	0.01	0.02	0.19	0.00	0.19	0.65	
97 Bin Trailer	249.5	0.43	0.01	0.02	0.19	0.00	0.19	0.65	
97 Disc - Border	199.3	1.20	0.04	0.05	0.46	0.00	0.46	1.74	
97 Disc - Tandem 7'	166.6	1.65	0.05	0.08	0.56	0.00	0.56	2.33	
97 Duster - 3 Pt	120.0	1.41	0.05	0.07	0.38	0.00	0.38	1.91	
97 Flat Furrower	199.1	0.62	0.02	0.03	0.30	0.00	0.30	0.97	
97 Orchard Sprayer - 500 Gal	229.2	6.44	0.19	0.27	2.16	0.00	2.16	9.07	
97 Pickup Truck - 1/2 Ton	284.1	5.19	0.17	0.24	1.18	2.80	3.98	9.57	
97 Shaker & Bin Dumper	199.6	5.36	0.16	0.23	3.86	0.00	3.86	9.61	
97 Terracer	199.5	1.11	0.03	0.04	0.49	0.00	0.49	1.67	
97 Weed Sprayer - 100 Gal	119.8	1.62	0.05	0.07	0.58	0.00	0.58	2.31	

† Actual hours used equals the combined hours equipment is used for raisins and other farm enterprises.

Table 7.

U.C. COOPERATIVE EXTENSION
RANGING ANALYSIS
SAN JOAQUIN VALLEY - 1997

COSTS PER ACRE AT VARYING YIELDS TO PRODUCE THOMPSON SEEDLESS RAISINS

	YIELD (TON/ACRE)						
	1.40	1.60	1.80	2.00	2.20	2.40	2.60

OPERATING COSTS/ACRE:							
Cultural Cost	786	786	786	786	786	786	786
Harvest Cost	319	366	413	460	507	553	600
Interest on operating capital	39	40	40	40	41	41	41
TOTAL OPERATING COSTS/ACRE	1144	1192	1239	1286	1333	1380	1428
TOTAL OPERATING COSTS/TON	817	745	688	643	606	575	549
CASH OVERHEAD COSTS/ACRE	183	183	183	184	184	184	184
TOTAL CASH COSTS/ACRE	1328	1375	1422	1469	1517	1564	1611
TOTAL CASH COSTS/TON	948	859	790	735	689	652	620
NON-CASH OVERHEAD COSTS/ACRE	644	644	644	645	645	646	646
TOTAL COSTS/ACRE	1971	2019	2067	2114	2162	2209	2257
TOTAL COSTS/TON	1408	1262	1148	1057	983	921	868

NET RETURNS PER ACRE ABOVE OPERATING COSTS FOR THOMPSON SEEDLESS RAISINS

PRICE (DOLLARS/TON)	YIELD (TON/ACRE)						
Raisins	1.40	1.60	1.80	2.00	2.20	2.40	2.60
700.00	-164	-72	21	114	207	300	392
800.00	-24	88	201	314	427	540	652
900.00	116	248	381	514	647	780	912
1025.00	291	448	606	764	922	1080	1237
1100.00	396	568	741	914	1087	1260	1432
1200.00	536	728	921	1114	1307	1500	1692
1300.00	676	888	1101	1314	1527	1740	1952

U.C. COOPERATIVE EXTENSION
Table 7. Continued

NET RETURNS PER ACRE ABOVE CASH COSTS FOR THOMPSON SEEDLESS RAISINS

PRICE (DOLLARS/TON)	YIELD (TON/ACRE)						
Raisins	1.40	1.60	1.80	2.00	2.20	2.40	2.60
700.00	-348	-255	-162	-69	23	116	209
800.00	-208	-95	18	131	243	356	469
900.00	-68	65	198	331	463	596	729
1025.00	107	265	423	581	738	896	1054
1100.00	212	385	558	731	903	1076	1249
1200.00	352	545	738	931	1123	1316	1509
1300.00	492	705	918	1131	1343	1556	1769

NET RETURNS PER ACRE ABOVE TOTAL COSTS FOR THOMPSON SEEDLESS RAISINS

PRICE (DOLLARS/TON)	YIELD (TON/ACRE)						
Raisins	1.40	1.60	1.80	2.00	2.20	2.40	2.60
700.00	-991	-899	-807	-714	-622	-529	-437
800.00	-851	-739	-627	-514	-402	-289	-177
900.00	-711	-579	-447	-314	-182	-49	83
1025.00	-536	-379	-222	-64	93	251	408
1100.00	-431	-259	-87	86	258	431	603
1200.00	-291	-99	93	286	478	671	863
1300.00	-151	61	273	486	698	911	1123

Table 8.

UC COOPERATIVE EXTENSION
 COSTS AND RETURNS / BREAKEVEN ANALYSIS
 SAN JOAQUIN VALLEY - 1997
 THOMPSON SEEDLESS

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)
Raisins	2050	1286	764	1469	581	2114	-64

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)
Raisins	153750	96448	57302	110212	43538	158569	-4819

BREAKEVEN PRICES PER YIELD UNIT

CROP	Base Yield (Units/Acre)	Yield Units	Breakeven Price To Cover		
			Operating Costs	Cash Costs	Total Costs
Raisins	2.0	Ton	642.99	734.75	1057.13

BREAKEVEN YIELDS PER ACRE

CROP	Yield Units	Base Price (\$/Unit)	Breakeven Yield To Cover		
			Operating Costs	Cash Costs	Total Costs
Raisins	Ton	1025	1.3	1.4	2.1