

---

---

**UNIVERSITY OF CALIFORNIA COOPERATIVE EXTENSION**

**2003**

**SAMPLE COSTS TO ESTABLISH A VINEYARD  
AND PRODUCE DRIED-ON-VINE**

**RAISINS**

*Early Maturing Varieties*



**OPEN GABLE TRELLIS SYSTEM  
SAN JOAQUIN VALLEY**

Stephen J. Vasquez

George M. Leavitt

William L. Peacock

L. Peter Christensen

Stephen R. Sutter

Kurt J. Hembree

Karen L. Klonsky

UCCE Farm Advisor, Fresno County

UCCE Farm Advisor, Madera County

UCCE Farm Advisor, Tulare County

UCCE Specialist Emeritus

UCCE Farm Advisor, Fresno County

UCCE Farm Advisor, Fresno County

UCCE Extension Specialist, Department of Agricultural and Resource Economics, UC Davis

Donald G. Katayama

Richard L. De Moura

Staff Research Associate, Kearney Agricultural Center

Research Associate, Department of Agricultural and Resource Economics, UC Davis

---

---

## UC COOPERATIVE EXTENSION

### **SAMPLE COST TO ESTABLISH A VINEYARD AND PRODUCE RAISINS Dried-On-Vine (DOV) on an Open Gable Trellis San Joaquin Valley**

#### **CONTENTS**

INTRODUCTION.....	2
ASSUMPTIONS.....	3
Establishment Operating Costs.....	3
Production Operating Costs.....	5
Cash Overhead Costs.....	7
Non-cash Overhead Costs.....	8
REFERENCES.....	10
Table 1. SAMPLE COSTS PER ACRE TO ESTABLISH A DOV VINEYARD.....	11
Table 2. COSTS PER ACRE TO PRODUCE DOV RAISINS.....	13
Table 3. COSTS AND RETURNS PER ACRE TO PRODUCE DOV RAISINS.....	14
Table 4. MONTHLY CASH COSTS – DOV RAISINS.....	15
Table 5. WHOLE FARM EQUIPMENT, INVESTMENT, AND BUSINESS OVERHEAD COSTS.....	16
Table 6. HOURLY EQUIPMENT COSTS.....	17
Table 7. RANGING ANALYSIS.....	18

#### **INTRODUCTION**

Sample costs to establish a vineyard with an open gable trellis system to produce dried-on-the-vine (DOV) raisins are presented in this study. This study is intended as a guide only, and can be used to make production decisions, determine potential returns, prepare budgets and evaluate production loans. Practices described are based on production practices considered typical for the crop and area, but these same practices will not apply to every farming operation. The sample costs for labor, materials, equipment and custom services are based on current figures. A blank column, “*Your Costs*”, in Tables 2 and 3 is provided for entering your costs.

The hypothetical farm operation, production practices, overhead, and calculations are described under the assumptions. For additional information or an explanation of the calculations used in the study call the Department of Agricultural and Resource Economics, University of California, Davis, (530) 752-3589 or your local UC Cooperative Extension office.

Sample Cost of Production Studies for many commodities are available and can be requested through the Department of Agricultural and Resource Economics, UC Davis, (530) 752-3589. Current studies can be downloaded from the department website at <http://coststudies.ucdavis.edu> or obtained from selected county UC Cooperative Extension offices.

The University of California, Cooperative Extension in compliance with Titles VI and VII of the Civil Rights Act of 1964, Title IX of the Education Amendments of 1972, Sections 503 and 504 of the Rehabilitation Act of 1973 does not discriminate on the basis of race, religion, color, national origins, sex, mental or physical handicaps or age in any of its programs or activities, or with respect to any of its employment policies, practices or procedures. Nor does the University of California does not discriminate on the basis of ancestry, sexual orientation, marital status, citizenship, medical condition (as defined in section 12926 of the California Government Code) or because the individuals are disabled or Vietnam era veterans (as defined in the Vietnam Era Veterans Readjustment Act of 1974 and Section of the California Government Code). Inquiries regarding this policy may be directed to the Affirmative Action Director, University of California, Agriculture and Natural Resources, 300 Lakeside Drive, Oakland, California 94612-3560, (510) 987-0097.

## ASSUMPTIONS

The assumptions refer to Tables 1 to 7 and pertain to sample costs to establish a vineyard and produce dried-on-the-vine raisins using an open gable trellis system in the San Joaquin Valley. The described practices are not University of California recommendations, but represent operations and materials considered typical of a well-managed vineyard in the region. The costs, materials, and practices shown in this study are based on the assumptions and are not applicable to all farms. Establishment and cultural practices vary by farm and the differences can be significant. *The use of trade names in this report does not constitute an endorsement or recommendation by the University of California.*

**Land.** The vineyard, owned and operated by the grower, is located on previously farmed land in the San Joaquin Valley. The farm is comprised of 160 acres, 75 of which are producing raisins, and 80 acres of raisin grapes being established on an open gable trellis system. Roads, irrigation systems, and farmstead occupy the remaining 5 acres.

### Establishment Operating Costs

**Site Preparation.** This vineyard is established on ground previously planted to vineyards or orchards. Land coming from trees or vines should be fallowed for two years except for a possible grain crop. The land is assumed to be fairly level. A custom operator chisels the ground twice to a depth of 2-3 feet. The grower floats the land to smooth and level the surface. Afterwards the ground is disced twice to apply and incorporate preplant herbicide. Nematode samples should be taken from land formerly in trees or vines and fumigated if necessary. Most operations that prepare the vineyard for planting are done in the year prior to planting, but costs are shown in the first year.

**Trellis System.** A commercial company installs the trellis system in December of the first year or January of the second year (January in this study). The open gable trellis is a balanced system with fruiting canes placed on both sides of the gable. A vertical extension with a catch wire placed 84-inches high in the middle of the gable supports renewal shoots and canes. Materials for the open gable trellis are as follows: (1) Stakes with V structure are placed every 24-feet down the row. Metal stakes (2 lbs/ft) are 8.5-foot long and placed in the ground 3-feet. The V structure consists of a 7-foot “T” post bent to a 33-degree angle and uses a 44-inch horizontal cross arm. The open gable is 72-inches wide from tip to tip. (2) End assemblies consist of 9.5-foot metal post (4 lb/ft) with a V that matches those within the row and with 10-inch helix anchor. (3) Eight wires, 12.5 gauge high tensile, are used for fruit and canopy support, and two wires, 14 gauge high tensile, are used for the catch wire and drip hose support.

**Planting.** Planting starts by laying out and marking vine sites in late winter. In the spring, holes are dug and the vines are planted and protected with an open carton placed over the vine. In the second year 2% or 12 vines per acre are replanted for those lost in the first year.

**Vines.** Early maturing varieties such as Selma Pete, DOVine, or Fiesta are planted on a 6 x 12-foot spacing at 605 vines per acre. They are purchased as dormant vines that have been bench grafted or field budded onto nematode/phylloxera resistant rootstock. The life of the vineyard at planting is expected to be 30 years and the grapevines are expected to begin yielding fruit in three years.

**Training/Pruning.** Training and pruning to establish the vine framework will vary with variety and trellis system. Training to establish the vine framework includes tying, shoot thinning, shoot positioning and pruning. In this study, the vines are trained as quadrilateral cordons with fruiting canes and renewal spurs on both sides. Dormant pruning begins in January of the second year. The young vines are pruned back to a 2-bud spur. Shoot thinning is done twice a month in April and May, shoot thinning and cordon training twice a month in June and July. In the third year, shoot thinning is done in April and shoot positioning in May.

**Irrigation.** In this study, the pumped water is calculated to cost \$3.36 per acre-inch or \$40.32 per acre-foot. Water pumping costs plus labor constitute the irrigation cost. The pumping cost is based on a 40 horsepower motor to pump from 130 feet deep. Price per acre-foot of water will vary, depending on quantity used, water district, power cost, well characteristics, and other irrigation factors. Irrigations occur during the growing season from April through early October. No assumption is made about effective rainfall or runoff. The amount of water applied to the vines during the establishment years is shown in Table A.

Year	AcIn/Year
1	12
2	24
3+	36

**Pest Management.** The pesticides and rates mentioned in this cost study as well as other materials available are listed in *UC Integrated Pest Management Guidelines, Grapes*. Pesticides mentioned in the study are commonly used, but are not recommendations.

**Insects.** Beginning in the third year, Cryolite insecticide is applied in early May at bloom (combined with Rubigan and zinc) to control worms (grape leaffolder, omnivorous leafroller, western grapeleaf skeletonizer). Provado insecticide is applied in July to control leafhoppers.

**Diseases.** Many pathogens attack grapevines, but the major diseases treated in this study are powdery mildew, and phomopsis cane and leaf spot. A dusting and spraying program for these diseases begins the third year with a wettable sulfur application soon after budbreak in late March or early April. Dusting sulfur is applied twice in April and once in June. A sterol inhibitor (SI) - Rubigan in this study - is applied in May during early bloom (combined with worm and zinc spray) and once in June, two weeks after bloom. In some years, in addition to wettable sulfur, a spring foliar application of an appropriate fungicide such as Ziram may be advisable at budbreak or prior to spring rains for Phomopsis control when the disease pressure is high. A strobilurin fungicide may be used for longer residual effect during extended rain events.

**Weeds.** Vineyard floor management begins in late winter, February of the second year, with a strip spray in the vine row (4-foot) with Roundup, Surflan, and Goal. The row middles are disced in February and May. The vine rows are spot treated with Roundup in late April and early August.

**Fertilization.** Liquid nitrogen fertilizer – UN32 - is applied in equal amounts through the drip system in April and September. Fifteen pounds of N is applied in the first year and 25 pounds in the following years. Zinc as neutral zinc is applied with the bloom spray (Cryolite and Rubigan).

**Harvest.** Harvest begins the third year. In this cost study, the grower contracts to have the fresh grape crop custom harvested by hand and hauled to the winery or dehydrator for \$45 per ton. Harvest consists of hand picking the grapes into bins, furnished by the contractor, and delivery to the winery or dehydrator. In this

system, it is not possible to make DOV raisins in the third year; therefore grapes must be hauled to a winery or dehydrator.

**Yields.** The vineyard yields approximately 9-tons of fresh grapes per acre (equivalent to 2-tons of raisins).

**Returns.** In this study, the fresh fruit is sold to a winery for which the grower receives \$75 per ton, the current estimated market price.

### **Production Operating Costs**

**Pruning.** Pruning is done during the winter months. The prunings, placed in row middles are shredded and disced (see weeds). The vines are cane pruned with renewal spurs in January, canes tied in February, shoot thinned in April, shoot positioning in May, and fruit or flower cluster removal in late May. The canes are severed in August in preparation for harvest. The severed canes are removed post-harvest in October and placed in alternate row middles and shredded.

**Fertilization.** Twenty-five pounds per acre of nitrogen (N) as UN-32 is divided and applied in equal amounts in April and September. Neutral zinc at five pounds of material per acre is applied with the May mildew management application.

**Irrigation.** Water pumping costs plus labor, which includes checking the drip lines, constitute the irrigation cost. In this study, water is calculated to cost \$3.36 per acre-inch or \$40.32 per acre-foot. The pumping cost is based on using 40 horsepower motor to pump from 130 feet deep over 80 acres. District water will have additional costs. Price per acre-foot of water will depend on quantity used, water district, power cost, various well characteristics, and other irrigation factors. Thirty-six acre-inches are applied during the growing season from April through early October. No assumption is made about effective rainfall and runoff.

**Pest Management.** The pesticides and rates mentioned in this cost study are listed in *UC Integrated Pest Management Guidelines, Grapes*. **Pesticides mentioned in the study are not recommendations, but those commonly used in the region.** For information on other pesticides available, pest identification, monitoring, and management visit the UC IPM website at [www.ipm.ucdavis.edu](http://www.ipm.ucdavis.edu). For information and pesticide use permits, contact the local county agricultural commissioner's office.

*Pest Control Advisor (PCA).* Written recommendations are required for many pesticides and are made by licensed pest control advisors. In addition the PCA will monitor the field for agronomic problems including pests and nutrition. Growers may hire private PCA's or receive the service as part of a service agreement with an agricultural chemical and fertilizer company. No costs for a PCA are included in this study.

*Weeds.* Shading from open gable trellising in mature vineyards, reduces weed germination. The row middles are disced twice – February and May. Vine row weeds are controlled with three Roundup spot sprays – February, May and August.

**Insects.** Cryolite insecticide is applied in early May at bloom with a powdery mildew spray to control worms (grape leaffolder, omnivorous leafroller, western grapeleaf skeletonizer). Provado Insecticide is applied in July to control leafhoppers.

**Disease Management.** Many pathogens attack grapevines, but the major diseases considered in this study are powdery mildew, and Phomopsis cane and leaf spot. A dusting and spraying program for these diseases begins with an application of wettable sulfur soon after budbreak in late March or early April. Dusting sulfur is applied twice in April and once in June. A sterol inhibitor (SI) - Rubigan in this study - is applied in May at early bloom (with the worm and zinc spray) and once in June, two weeks after bloom. In some years, in addition to wettable sulfur, a spring foliar application of an appropriate fungicide such as Ziram may be advisable at budbreak or prior to spring rains for Phomopsis control when disease pressure is high. A strobilurin fungicide may be used for longer residual effect during extended rain events.

**Harvest.** Canes bearing fruit are cut by hand in August to allow the fruit to dry on the vine. The grower owns a pull-type raisin harvester, two bin trailers, two tractors and one flatbed truck. The grower rents a tractor and a forklift for two weeks. The harvester, pulled by a grower tractor, picks one side of the vine per pass and makes two passes per vine row. The crop is harvested into one-half ton (which hold 1,000 to 1,200 pounds) bins rented from the packer at \$21 per ton. At 4.25 tons per acre, approximately 8 bins per acre are needed. Labor costs include a driver for each tractor (3) and forklift operator. The grower owned tractors pull one bin trailer and the rented tractor pulls the other bin trailer. One bin trailer driver follows the harvester while the other bin driver delivers the raisins to the staging area. The forklift operator works in the staging area unloading and loading bins. It is assumed that all drivers and operators work hours equivalent to the harvest time. The filled bins, after a few days, are hauled to the packer on the flatbed truck and the costs are included in hauling. The truck holds 16-bins (fruit from approximately two acres) and it is assumed that each round-trip to the packer takes one-hour

**Yields.** Raisin vineyards reach maturity in the fourth year and over years will average 4.25 tons per acre. The drying ratio of green fruit to raisins is 4.1 to 4.5:1.

**Returns.** The estimated return for this study based on current raisin markets is \$600 per ton. The raisin grape market is regulated by a federal marketing order administered by the Raisin Administrative Committee (RAC). Each year, the RAC sets minimum crop standards. 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.

**Assessments.** The California Raisin Marketing Board assesses a \$17.50 per ton fee to support and promote use of California grown raisins.

**Packers.** Packing costs are not included in this study. The United States Department of Agriculture (USDA) inspects the raisins for maturity, quality, and moisture. The Raisin Administrative Committee (RAC), the administrative arm of the federal marketing order for raisins, sets industry standards. Fees are associated with both the USDA inspections and RAC administrative responsibilities; the packer pays for tonnage fees. 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) is paid by the RAC. In most cases, the packer retains control of the raisin crop for marketing purposes after inspection.

**Pickup/ATV.** The grower uses the pickup for business and personal use. The assumed business use is 5,700 miles per year for the ranch. In addition to spot spraying for weed control, the All Terrain Vehicle (ATV) is used on the ranch for checking the vineyard and irrigating.

**Labor.** Hourly wages for workers are \$9.51 for machine operators and \$8.23 per hour non-machine labor. Adding 34% for the employers share of federal and state payroll taxes, insurance, and other possible benefits gives the labor rates shown of \$12.74 and \$11.02 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.

**Equipment Operating Costs.** Repair costs are based on purchase price, annual hours of use, total hours of life, and repair coefficients formulated by ASAE. Fuel and lubrication costs are also determined by ASAE equations based on maximum PTO horsepower, and fuel type. Prices for on-farm delivery of diesel and gasoline are \$1.11 and \$1.58 per gallon, respectively. The cost includes a 2.25% sales tax (effective September 2001) on diesel fuel and 7.25% sales tax on gasoline. Gasoline also includes federal and state excise tax, which can be refunded for on-farm use when filing your income tax. The fuel, lube, 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 selected operation by the hours per acre. Tractor time is 10% higher than implement time for a given operation to account for setup, travel and down time.

**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 7.14% per year. A nominal interest rate is the typical market cost of borrowed funds. The interest cost of post harvest operations is discounted back to the last harvest month using a negative interest charge.

**Risk.** The risks associated with crop production should not be minimized. While this study makes every effort to model a production system based on typical, real world practices, it cannot fully represent financial, agronomic and market risks, which affect profitability and economic viability. Growers may purchase Federal crop insurance 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. Insurance costs will depend on the type and level of coverage.

### **Cash Overhead Costs**

Cash overhead consists of various cash expenses paid out during the year that are assigned to the whole farm and not to a particular operation. These costs include property taxes, interest on operating capital, office expense, liability and property insurance, sanitation services, equipment repairs, and management.

**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.

**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 0.676% of the average value of the assets over their useful life. Liability insurance covers accidents on the farm and costs \$715 for the entire farm.

**Office Expense.** Office and business expenses are estimated at \$75 per acre. These expenses include office supplies, telephones, bookkeeping, accounting, legal fees, shop and office utilities, and miscellaneous administrative charges.

**Sanitation Services.** Sanitation services provide portable toilets for the vineyard and cost the farm \$1,900 annually. The cost includes two double toilet units with washbasins, delivery and pickup, and five months of weekly servicing. Costs also include soap or other suitable cleansing agent, and single use towers. Separate potable water and single-use drinking cups are also supplied.

**Management/Supervisor Wages.** Salary is not included. Returns above costs are considered a return to management

**Investment Repairs.** Annual maintenance is calculated as 2 percent of the purchase price.

### **Non-Cash Overhead Costs**

Non-cash overhead is calculated as the capital recovery cost for equipment and other farm investments.

**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). It is equivalent to the annual payment on a loan for the investment with the down payment 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 (Boehlje and Eidman). The formula for the calculation of the annual capital recovery costs is  $((\text{Purchase Price} - \text{Salvage Value}) \times \text{Capital Recovery Factor}) + (\text{Salvage Value} \times \text{Interest Rate})$ .

*Salvage Value.* Salvage value is an estimate of the remaining value of an investment at the end of its useful life. For farm machinery (tractors and implements) the remaining value is a percentage of the new cost of the investment (Boehlje and Eidman). The percent remaining value is calculated from equations developed by the American Society of Agricultural Engineers (ASAE) based on equipment type and years of life. The life in years is estimated by dividing the wear out life, as given by ASAE by the annual hours of use in this operation. For other investments including irrigation systems, buildings, and miscellaneous equipment, the value at the end of its useful life is zero. The salvage value for land is the purchase price because land does not depreciate. The purchase price and salvage value for 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. The amortization factor is a table value that corresponds to the interest rate used and the life of the machine.



**Interest Rate.** The interest rate of 6.25% used to calculate capital recovery cost is the USDA-ERS's ten-year average of California's 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. In other words, the next best alternative use for these resources is in another agricultural enterprise.

**Establishment Cost.** Costs to establish the vineyard are used to determine capital recovery expenses, depreciation, and interest on investment for the production years. 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 minus any returns from production. The Total Accumulated Net Cash Cost on Table 1, in the third year represents the establishment cost. For this study the cost is \$7,142 per acre or \$571,360 for the 80-acre vineyard. The establishment cost is spread over the remaining 27 years of the 30 years the vineyard is in production.

**Irrigation System.** The previous vineyard is assumed to have an irrigation system that has been refurbished. A new pump, motor, and filtration/injector station is being installed along with the drip irrigation system during planting. The filtration station, fertilizer injector system, drip lines and the labor to install the components are included in the irrigation system cost. Water is pumped from a 130-foot depth with a 40 horsepower pump and supplies water to the 80 acres. Another 40 horsepower pump and irrigation set-up supplies the rest of the ranch, but is not included. The irrigation system is considered an improvement to the property and has a 30-year life.

**Land.** The land was formerly a vineyard, but has been out of production for two years. The open land was planted to grain crops. Land for raisin production is valued at \$5,800 per acre. This study assumes the land was purchased. Because only 155 of the 160 acres are planted to grapes, land is valued at \$5,987 per planted acre.

**Building.** The metal buildings are on a cement slab and comprise 2,400 square feet.

**Tools.** This includes shop tools, hand tools, and miscellaneous field tools such as pruning tools.

**Fuel Tanks.** Two 250-gallon fuel tanks using gravity feed are on metal stands. The tanks are setup in a cement containment pad that meets federal, state, and county regulations.

**Equipment.** Farm equipment is purchased new or used, but the 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 for equipment and other investments are shown in Tables 3 and 8. 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 repairs, fuel, and lubrication and are discussed under operating costs.

**Table Values.** Due to rounding, the totals may be slightly different from the sum of the components.

**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
- Christensen, L. Peter (Ed.). 2000. *Raisin Production Manual*. University of California Agriculture and Natural Resources. Oakland, CA. Publication 3393.
- Klonsky, Karen, Peter Christensen, Michael Costello, George Leavitt, Don Luvisi, Bill Peacock, Laura Tourte, and Pete Livingston. 1997. *Sample Costs to Establish a vineyard and Produce Raisins in the San Joaquin Valley*. University of California Cooperative Extension. Department of Agricultural and Resource Economics. Davis, CA.
- Statewide IPM Project. 2000. "UC Pest Management Guidelines, Grapes". In M. L. Flint (ed.) *UC IPM Pest Management Guidelines*. Pub. 3339. IPM Education and Publication. University of California, Division of Agriculture and Natural Resources. Oakland, CA.
- United States Department of Agriculture-Economic Reporting Service. *Farm Financial Ratios Indicating Solvency and Profitability 1960 – 99, California*. 2001. Internet; accessed January 4, 2003. [www.ers.usda.gov/data/farbalancesheet/fbsdmu.htm](http://www.ers.usda.gov/data/farbalancesheet/fbsdmu.htm).
- Verdegaal, Paul S., Karen M. Klonsky. Richard L. De Moura, *Sample Costs to Establish a Vineyard and Produce Wine Grape, Lodi Appellation*. 2001. University of California Cooperative Extension. Department of Agricultural and Resource Economics. Davis, CA.

For information concerning the DANR publications contact UC DANR Communications Services at 1-800-994-8849, online at <http://anrcatalog.ucdavis.edu> or your local county UC Cooperative Extension office. For information on Sample Cost of Production studies, contact UC Department of Agricultural and Resource Economics at 530-752-3589, online at <http://coststudies.ucdavis.edu> .

UC COOPERATIVE EXTENSION  
**Table 1. SAMPLE COSTS PER ACRE TO ESTABLISH A DOV RAISIN VINEYARD**  
 SAN JOAQUIN VALLEY - 2003

	Year:	Cost Per Acre		
		1st	2nd	3rd
Tons Per Acre: Fresh Grapes		0.0	0.0	9.0
<b>Planting Costs:</b>				
Land Preparation - Chisel 2X (Custom)		120		
Land Preparation - Float		7		
Land Preparation - Disc/Apply Herbicide		8		
Land Preparation - Disc (Incorporate Herbicide)		5		
Survey & Layout Vineyard		82		
Dig, Plant, Cover Vines		182	2	
Vines: 605 Per Acre (2% Replant In 2nd Year)		1,724	34	
Install Trellis System			2,800	
<b>TOTAL PLANTING COSTS</b>		<b>2,127</b>	<b>2,836</b>	<b>0</b>
<b>Cultural Costs:</b>				
Prune - Dormant			55	132
Training (Sucker, Tie & Train)			441	66
Fertilize		6	9	9
Irrigate		79	112	152
Weed Control - Winter Strip Spray			54	54
Weed Control - Disc Middle			10	10
Weed Control - Spot Spray		18	12	12
Insect Control - Leafhoppers				28
Disease Control - Mildew				43
Insect (Worms)/Disease (Mildew)/Fertilize (Zinc)				30
ATV Use		27	27	27
Pickup Truck Use		51	51	51
<b>TOTAL CULTURAL COSTS</b>		<b>181</b>	<b>771</b>	<b>614</b>
<b>Harvest Costs:</b>				
Harvest/Haul - Contract Hand				405
<b>TOTAL HARVEST COSTS</b>		<b>0</b>	<b>0</b>	<b>405</b>
<b>Interest On Operating Capital @ 7.14%</b>		<b>111</b>	<b>174</b>	<b>21</b>
<b>TOTAL OPERATING COSTS/ACRE</b>		<b>2,419</b>	<b>3,781</b>	<b>1,040</b>
<b>Cash Overhead Costs:</b>				
Office Expense		75	75	75
Liability Insurance		5	5	5
Sanitation Services		12	12	12
Property Taxes		68	68	69
Property Insurance		6	6	6
Investment Repairs		26	26	26
<b>TOTAL CASH OVERHEAD COSTS</b>		<b>192</b>	<b>192</b>	<b>193</b>
<b>TOTAL CASH COSTS/ACRE</b>		<b>2,611</b>	<b>3,973</b>	<b>1,233</b>
<b>INCOME/ACRE FROM PRODUCTION</b>		<b>0</b>	<b>0</b>	<b>675</b>
<b>NET CASH COSTS/ACRE FOR THE YEAR</b>		<b>2,611</b>	<b>3,973</b>	<b>558</b>
<b>PROFIT/ACRE ABOVE CASH COSTS</b>		<b>0</b>	<b>0</b>	<b>0</b>
<b>ACCUMULATED NET CASH COSTS/ACRE</b>		<b>2,611</b>	<b>6,584</b>	<b>7,142</b>

UC COOPERATIVE EXTENSION

Table 1. continued

	Cost Per Acre			
	Year:	1st	2nd	3rd
Tons Per Acre: Fresh Grapes		0	0	9.0
<b>Capital Recovery Cost:</b>				
Land		374	374	374
Drip Irrigation System		60	60	60
Shop Building		34	34	34
Shop Tools		8	8	8
Fuel Tank		2	2	2
Equipment		31	35	56
<b>TOTAL CAPITAL RECOVERY COST</b>		<b>509</b>	<b>513</b>	<b>534</b>
<b>TOTAL COST/ACRE FOR THE YEAR</b>		<b>3,120</b>	<b>4,486</b>	<b>1,767</b>
<b>INCOME/ACRE FROM PRODUCTION</b>		<b>0</b>	<b>0</b>	<b>675</b>
<b>TOTAL NET COST/ACRE FOR THE YEAR</b>		<b>3,120</b>	<b>4,486</b>	<b>1,092</b>
<b>NET PROFIT/ACRE ABOVE TOTAL COST</b>		<b>0</b>	<b>0</b>	<b>0</b>
<b>TOTAL ACCUMULATED NET COST/ACRE</b>		<b>3,120</b>	<b>7,606</b>	<b>8,698</b>

UC COOPERATIVE EXTENSION  
**Table 2. COSTS PER ACRE TO PRODUCE DOV RAISINS**  
 SAN JOAQUIN VALLEY - 2003

Operation	Operation Time (Hrs/A)	Cash and Labor Cost per acre					Total Cost	Your Cost
		Labor Cost	Fuel, Lube & Repairs	Material Cost	Custom/ Rent			
<b>Cultural:</b>								
Prune-Cut Back	11.00	121	0	0	0	121		
Tie Canes	5.50	61	0	0	0	61		
Shoot Thin/Trunk Sucker	3.00	33	0	0	0	33		
Renewal Fruit Removal	4.50	50	0	0	0	50		
Shoot Positioning	3.00	33	0	0	0	33		
Irrigate	2.82	31	0	121	0	152		
Fertilize	0.10	1	0	8	0	9		
Weed-Spot Spray 20% acres	0.49	7	1	9	0	17		
Weed-Disc	0.43	7	3	0	0	10		
Insect(worm)/Disease(mildew)/Fertilize(Zn)	0.20	3	2	25	0	30		
Insect-Leaf Hopper	0.20	3	2	23	0	28		
Disease-Mildew	1.13	17	9	16	0	43		
Pickup Truck Use	2.38	36	15	0	0	52		
ATV 4WD	1.56	24	3	0	0	27		
<b>TOTAL CULTURAL COSTS</b>	<b>36.31</b>	<b>427</b>	<b>36</b>	<b>203</b>	<b>0</b>	<b>665</b>		
<b>Harvest:</b>								
Harvest-Severe Canes	7.00	77	0	0	0	77		
Harvest- Mechanical	1.41	22	22	0	0	44		
Bin Handling	4.23	59	7	0	107	173		
Haul	0.53	8	3	0	0	11		
<b>TOTAL HARVEST COSTS</b>	<b>13.17</b>	<b>166</b>	<b>32</b>	<b>0</b>	<b>107</b>	<b>305</b>		
<b>Postharvest:</b>								
Severed Cane Removal	5.00	55	0	0	0	55		
Shred Canes	0.17	3	2	0	0	4		
<b>TOTAL POSTHARVEST COSTS</b>	<b>5.17</b>	<b>58</b>	<b>2</b>	<b>0</b>	<b>0</b>	<b>60</b>		
<b>Assessment:</b>								
Assessments	0.00	0	0	74	0	74		
<b>TOTAL ASSESSMENT COSTS</b>	<b>0.00</b>	<b>0</b>	<b>0</b>	<b>74</b>	<b>0</b>	<b>74</b>		
Interest on operating capital @ 7.14%						23		
<b>TOTAL OPERATING COSTS/ACRE</b>		<b>650</b>	<b>70</b>	<b>277</b>	<b>107</b>	<b>1,128</b>		
<b>CASH OVERHEAD:</b>								
Office Expense						75		
Liability Insurance						5		
Sanitation						12		
Property Taxes						110		
Property Insurance						34		
Investment Repairs						26		
<b>TOTAL CASH OVERHEAD COSTS</b>						<b>262</b>		
<b>TOTAL CASH COSTS/ACRE</b>						<b>1,390</b>		
<b>NON-CASH OVERHEAD:</b>								
		Per producing Acres		Annual Cost Capital Recovery				
Land		5,987		374		374		
Drip Irrigation System		800		60		60		
Building		387		34		34		
Tools-Shop/Field		77		8		8		
Fuel Tanks		23		2		2		
Vineyard Establishment		7,142		554		554		
Equipment		1,305		160		160		
<b>TOTAL NON-CASH OVERHEAD COSTS</b>		<b>15,722</b>		<b>1,191</b>		<b>1,191</b>		
<b>TOTAL COSTS/ACRE</b>						<b>2,581</b>		

UC COOPERATIVE EXTENSION  
**Table 3. COSTS AND RETURNS to PRODUCE DOV RAISINS**  
 SAN JOAQUIN VALLEY - 2003

	Quantity/ Acre	Unit	Price or Cost/Unit	Value or Cost/Acre	Your Cost
<b>GROSS RETURNS</b>					
Raisins	4.25	ton	600.00	2,550	
<b>OPERATING COSTS</b>					
<b>Water:</b>					
Water Pumped	36.00	acin	3.36	121	
<b>Fertilizer:</b>					
UN 32	25.00	lb N	0.31	8	
Neutral Zinc 52%	5.00	lb	0.80	4	
<b>Herbicide:</b>					
Roundup Ultra Max	1.50	pint	6.06	9	
<b>Insecticide:</b>					
Cryolite	6.00	lb	2.00	12	
Provado Solupak	0.75	oz	31.25	23	
<b>Fungicide:</b>					
Rubigan EC	8.00	fl oz	2.34	19	
Wettable Sulfur	3.00	lb	0.75	2	
Sulfur Dust	30.00	lb	0.16	5	
<b>Rent:</b>					
Bin Rental	4.26	ton	21.00	89	
Forklift Rental	2.00	wk/ac	4.68	9	
Tractor Rental	2.00	wk/ac	4.06	8	
<b>Assessment:</b>					
Raisin Marketing Board	4.25	ton	17.50	74	
Labor (machine)	13.57	hrs	12.74	173	
Labor (non-machine)	43.33	hrs	11.02	477	
Fuel - Gas	7.30	gal	1.58	12	
Fuel - Diesel	18.07	gal	1.11	20	
Lube				5	
Machinery repair				33	
Interest on operating capital @ 7.14%				23	
<b>TOTAL OPERATING COSTS/ACRE</b>				1,128	
<b>NET RETURNS ABOVE OPERATING COSTS</b>				1,422	
<b>CASH OVERHEAD COSTS:</b>					
Office Expense				75	
Liability Insurance				5	
Sanitation				12	
Property Taxes				110	
Property Insurance				34	
Investment Repairs				26	
<b>TOTAL CASH OVERHEAD COSTS/ACRE</b>				262	
<b>TOTAL CASH COSTS/ACRE</b>				1,390	
<b>NON-CASH OVERHEAD COSTS (Capital Recovery)</b>					
Land				374	
Drip Irrigation System				60	
Building				34	
Tools-Shop/Field				8	
Fuel Tanks				2	
Vineyard Establishment				554	
Equipment				160	
<b>TOTAL NON-CASH OVERHEAD COSTS/ACRE</b>				1,191	
<b>TOTAL COSTS/ACRE</b>				2,581	
<b>NET RETURNS ABOVE TOTAL COSTS</b>				-31	

UC COOPERATIVE EXTENSION  
**Table 4. MONTHLY CASH to PRODUCE DOV RAISINS**  
 SAN JOAQUIN VALLEY - 2003

Beginning JAN 03	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	TOTAL
Ending DEC 03	03	03	03	03	03	03	03	03	03	03	03	03	
<b>Cultural:</b>													
Prune-Cut Back	121												121
Tie Canes		61											61
Shoot Thin/Trunk Sucker				33									33
Renewal Fruit Removal					33								33
Shoot Positioning					50								50
Irrigate				12	15	29	36	29	19	13			152
Fertilize				4					4				9
Weed-Spot Spray 20% acres			6	6				6					17
Weed-Disc			5		5								10
Insect/Disease/Fertilizer					30								30
Insect-Leaf Hopper							28						28
Disease-Mildew				21		21							43
Pickup Truck Use	4	4	4	4	4	4	4	4	4	4	4	4	52
ATV 4WD	2	2	2	2	2	2	2	2	2	2	2	2	27
<b>TOTAL CULTURAL COSTS</b>	<b>127</b>	<b>78</b>	<b>6</b>	<b>80</b>	<b>139</b>	<b>56</b>	<b>70</b>	<b>41</b>	<b>29</b>	<b>19</b>	<b>6</b>	<b>6</b>	<b>665</b>
<b>Harvest:</b>													
Harvest-Cut Canes								77					77
Harvest- Mechanical									44				44
Bin Handling									173				173
Haul									11				11
<b>TOTAL HARVEST COSTS</b>								<b>77</b>	<b>228</b>				<b>305</b>
<b>Postharvest:</b>													
Severed Cane Removal										55			55
Shred Canes										4			4
<b>TOTAL POSTHARVEST COSTS</b>										<b>60</b>			<b>60</b>
<b>Assessment:</b>													
Assessments									74				74
<b>TOTAL ASSESSMENT COSTS</b>									<b>74</b>				<b>74</b>
Interest on operating capital	1	1	1	2	3	3	3	4	6	0	0	0	23
<b>TOTAL OPERATING COSTS/ACRE</b>	<b>128</b>	<b>79</b>	<b>8</b>	<b>85</b>	<b>142</b>	<b>59</b>	<b>74</b>	<b>123</b>	<b>338</b>	<b>79</b>	<b>6</b>	<b>6</b>	<b>1,128</b>
<b>OVERHEAD:</b>													
Office Expense	6	6	6	6	6	6	6	6	6	6	6	6	75
Liability Insurance	5												5
Sanitation	1	1	1	1	1	1	1	1	1	1			12
Property Taxes	55						55						110
Property Insurance	17						17						34
Investment Repairs	2	2	2	2	2	2	2	2	2	2	2	2	26
<b>TOTAL CASH OVERHEAD COSTS</b>	<b>86</b>	<b>10</b>	<b>10</b>	<b>10</b>	<b>10</b>	<b>10</b>	<b>81</b>	<b>10</b>	<b>10</b>	<b>10</b>	<b>8</b>	<b>8</b>	<b>262</b>
<b>TOTAL CASH COSTS/ACRE</b>	<b>215</b>	<b>89</b>	<b>17</b>	<b>94</b>	<b>152</b>	<b>69</b>	<b>156</b>	<b>132</b>	<b>348</b>	<b>88</b>	<b>15</b>	<b>15</b>	<b>1,390</b>

UC COOPERATIVE EXTENSION  
**Table 5. WHOLE FARM ANNUAL EQUIPMENT, INVESTMENT,**  
 SAN JOAQUIN VALLEY - 2003

ANNUAL EQUIPMENT COSTS

YrDescription	Price	Yrs Life	Salvage Value	Capital Recovery	Cash Overhead		Total
					Insur- ance	Taxes	
0350HP 2WD Tractor	26,000	15	5,062	2,508	105	155	2,768
0372HP 2WD JD6210L Tractor	33,265	15	6,476	3,208	134	199	3,541
03ATV 4WD	6,700	5	3,003	1,071	33	49	1,153
03Bin Trailer #1	2,100	10	371	261	8	12	282
03Bin Trailer #2	2,100	10	371	261	8	12	282
03Brush Shredder 6'	9,000	15	864	905	33	49	988
03Disc - Tandem 8'	6,800	10	1,203	845	27	40	912
03Duster - 3 Pt	5,000	5	1,629	908	22	33	963
03Harvester AgRight Pull	58,988	10	11,127	7,275	237	351	7,863
03Orchard/VineSprayer 500 Gal	20,378	5	6,638	3,699	91	135	3,925
03Pickup Truck 1/2 Ton	26,000	7	9,863	3,533	121	179	3,833
03Sprayer for ATV 20 gal	350	10	62	43	1	2	47
03Truck Flatbed 20' 2-Ton	49,803	10	14,711	5,744	218	323	6,285
<b>TOTAL</b>	<b>246,484</b>		<b>61,380</b>	<b>30,261</b>	<b>1,041</b>	<b>1,539</b>	<b>32,842</b>
60% of New Cost *	147,890		36,828	18,157	624	924	19,705

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

ANNUAL INVESTMENT COSTS

Description	Price	Yrs Life	Salvage Value	Capital Recovery	Cash Overhead			Total
					Insur- ance	Taxes	Repairs	
Building 2,400 sqft	60,000	20		5,338	203	300	1,200	7,041
Drip Irrigation System	64,000	30		4,775	216	320	1,280	6,591
Vineyard Establishment	571,360	27		44,338	1,931	2,857	0	49,126
Fuel Tanks 2-250 Gal	3,500	30	350	257	13	19	70	359
Land	928,000	30	928,000	58,000	0	9,280	0	67,280
Tools-Shop/Field	12,000	15	1,133	1,208	44	66	240	1,558
<b>TOTAL INVESTMENT</b>	<b>1,638,860</b>		<b>929,483</b>	<b>113,916</b>	<b>2,407</b>	<b>12,842</b>	<b>2,790</b>	<b>131,955</b>

ANNUAL BUSINESS OVERHEAD COSTS

Description	Units/ Farm	Unit	Price/ Unit	Total Cost
Liability Insurance	155	acre	4.61	715
Office Expense	160	acre	75.00	12,000
Sanitation Fee	155	acre	12.25	1,900



UC COOPERATIVE EXTENSION  
**Table 6. HOURLY EQUIPMENT COSTS**  
 SAN JOAQUIN VALLEY - 2003

YrDescription	COSTS PER HOUR							
	Actual Hours Used	Capital Recovery	Cash Overhead			Operating		Total Costs/Hr.
			Insur- ance	Taxes	Repairs	Fuel & Lube	Total Oper.	
0350HP 2WD Tractor	277.10	5.43	0.23	0.34	1.12	3.13	4.25	10.24
0372HP 2WD JD6210L Tractor	651.00	2.96	0.12	0.18	1.43	4.51	5.94	9.20
03ATV 4WD	328.10	1.96	0.06	0.09	0.50	1.21	1.71	3.82
03Bin Trailer #1	225.80	0.69	0.02	0.03	0.32	0.00	0.32	1.07
03Bin Trailer #2	225.80	0.69	0.02	0.03	0.32	0.00	0.32	1.07
03Brush Shredder 6'	27.80	19.57	0.72	1.07	4.03	0.00	4.03	25.39
03Disc - Tandem 8'	68.40	7.41	0.24	0.35	1.10	0.00	1.10	9.10
03Duster - 3 Pt	119.00	4.57	0.11	0.17	0.73	0.00	0.73	5.58
03Harvester AG Right	112.80	38.70	1.26	1.86	9.23	0.00	9.23	51.06
03Orchard/VineSprayer 500 Gal	125.70	17.65	0.44	0.64	2.95	0.00	2.95	21.69
03Pickup Truck 1/2 Ton	380.00	5.58	0.19	0.28	1.91	4.54	6.45	12.50
03Sprayer ATV 20 gal	91.10	0.29	0.01	0.01	0.10	0.00	0.10	0.40
03Truck Flatbed 20' 2-Ton	42.40	81.28	3.09	4.45	4.75	1.28	6.03	94.96

UC COOPERATIVE EXTENSION  
**Table 7. RANGING ANALYSIS**  
 SAN JOAQUIN VALLEY - 2003

COSTS PER ACRE AT VARYING YIELD TO PRODUCE DOV RAISINS

	YIELD in Tons/Acre							
	3.50	4.00	<b>4.25</b>	4.50	5.00	5.50	6.00	6.50
<b>OPERATING COSTS:</b>								
Cultural Cost	665	665	<b>665</b>	665	665	665	665	665
Harvest Cost	271	294	<b>305</b>	317	340	363	386	409
Assessment Cost	61	70	<b>74</b>	79	88	96	105	114
Postharvest Cost	60	60	<b>60</b>	60	60	60	60	60
Interest on operating capital	23	23	<b>23</b>	23	24	24	24	24
<b>TOTAL OPERATING COSTS/ACRE</b>	<b>1,080</b>	<b>1,112</b>	<b>1,127</b>	1,144	1,177	1,208	1,240	1,272
<b>Total Operating Costs/ton</b>	<b>309</b>	<b>278</b>	<b>265</b>	254	235	220	207	196
<b>CASH OVERHEAD COSTS/ACRE</b>	<b>262</b>	<b>262</b>	<b>262</b>	262	262	262	262	262
<b>TOTAL CASH COSTS/ACRE</b>	<b>1,342</b>	<b>1,374</b>	<b>1,389</b>	1,406	1,439	1,470	1,502	1,534
<b>Total Cash Costs/ton</b>	<b>383</b>	<b>344</b>	<b>327</b>	312	288	267	250	236
<b>NON-CASH OVERHEAD COSTS/ACRE</b>	<b>1,190</b>	<b>1,191</b>	<b>1,191</b>	1,192	1,193	1,193	1,194	1,195
<b>TOTAL COSTS/ACRE</b>	<b>2,532</b>	<b>2,565</b>	<b>2,580</b>	2,598	2,632	2,663	2,696	2,729
<b>Total Costs/ton</b>	<b>723</b>	<b>641</b>	<b>607</b>	577	526	484	449	420

NET RETURNS PER ACRE ABOVE OPERATING COSTS FOR DOV RAISINS

PRICE \$/ton	YIELD (ton/acre)							
	3.50	4.00	<b>4.25</b>	4.50	5.00	5.50	6.00	6.50
<b>600.00</b>	1,020	1,288	<b>1,423</b>	1,556	1,824	2,092	2,360	2,628
700.00	1,370	1,688	1,848	2,006	2,324	2,642	2,960	3,278
800.00	1,720	2,088	2,273	2,456	2,824	3,192	3,560	3,928
900.00	2,070	2,488	2,698	2,906	3,324	3,742	4,160	4,578
1,000.00	2,420	2,888	3,123	3,356	3,824	4,292	4,760	5,228
1,100.00	2,770	3,288	3,548	3,806	4,324	4,842	5,360	5,878
1,200.00	3,120	3,688	3,973	4,256	4,824	5,392	5,960	6,528

NET RETURN PER ACRE ABOVE CASH COST FOR DOV RAISINS

PRICE \$/ton	YIELD (ton/acre)							
	3.50	4.00	<b>4.25</b>	4.50	5.00	5.50	6.00	6.50
<b>600.00</b>	758	1,026	<b>1,161</b>	1,294	1,562	1,830	2,098	2,366
700.00	1,108	1,426	1,586	1,744	2,062	2,380	2,698	3,016
800.00	1,458	1,826	2,011	2,194	2,562	2,930	3,298	3,666
900.00	1,808	2,226	2,436	2,644	3,062	3,480	3,898	4,316
1,000.00	2,158	2,626	2,861	3,094	3,562	4,030	4,498	4,966
1,100.00	2,508	3,026	3,286	3,544	4,062	4,580	5,098	5,616
1,200.00	2,858	3,426	3,711	3,994	4,562	5,130	5,698	6,266

NET RETURNS PER ACRE ABOVE TOTAL COST FOR DOV RAISINS

PRICE \$/ton	YIELD (ton/acre)							
	3.50	4.00	<b>4.25</b>	4.50	5.00	5.50	6.00	6.50
<b>600.00</b>	-432	-165	<b>-30</b>	102	369	637	904	1,171
700.00	-82	235	395	552	869	1,187	1,504	1,821
800.00	268	635	820	1,002	1,369	1,737	2,104	2,471
900.00	618	1,035	1,245	1,452	1,869	2,287	2,704	3,121
1,000.00	968	1,435	1,670	1,902	2,369	2,837	3,304	3,771
1,100.00	1,318	1,835	2,095	2,352	2,869	3,387	3,904	4,421
1,200.00	1,668	2,235	2,520	2,802	3,369	3,937	4,504	5,071

**Bold = Yields and Price used in study**