
UNIVERSITY OF CALIFORNIA COOPERATIVE EXTENSION

2006

SAMPLE COSTS TO ESTABLISH A VINEYARD
AND PRODUCE GRAPES FOR
RAISINS



TRAY DRIED RAISINS
SAN JOAQUIN VALLEY

William L. Peacock
Stephen J. Vasquez
Jennifer M. Hashim
Matthew W. Fidelibus
George M. Leavitt
Karen M. Klonsky

UCCE Farm Advisor, Tulare County
UCCE Farm Advisor, Fresno County
UCCE Farm Advisor, Kern County
UCCE Assistant Viticulture Specialist, Kearney Agricultural Center, Parlier, CA
UCCE Farm Advisor, Madera County
UCCE Extension Specialist, Department of Agricultural and Resource Economics,
UC Davis
Research Associate, Department of Agricultural and Resource Economics, UC Davis

Richard L. De Moura

UC COOPERATIVE EXTENSION

SAMPLE COST TO ESTABLISH A VINEYARD AND PRODUCE RAISINS San Joaquin Valley - 2006

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INTRODUCTION

Sample costs to establish a vineyard to produce 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 3 and 4 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) 752-4424. Current studies can be downloaded from the department website at <http://coststudies.ucdavis.edu> or obtained from selected county UC Cooperative Extension offices.

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ASSUMPTIONS

The assumptions refer to Tables 1 to 9 and pertain to sample costs to establish the vineyard and produce raisin grapes in the San Joaquin Valley. The cultural practices described represent production operations and materials considered typical on a well-managed vineyard in the region. Costs, materials, and practices in this study will not apply to all farms. Timing of and types of establishment and cultural practices will vary among growers within the region and from season to season due to variables such as weather, soil, and insect and disease pressure. The study does not represent a single farm and is intended as a guide only. **The use of trade names and cultural practices 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 or cultural practices.**

Land. The 120 contiguous acre farm is owned and operated by the grower. Vines for raisin production are being established on 40 acres and 75 acres are mature vines for raisin or wine production. Roads, irrigation systems, and farmstead occupy the remaining five acres. The establishment and production costs in this study are based on the 40 acres.

Establishment Operating Costs

Land/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 to 3 feet. The grower floats the land to smooth and level the surface. Afterwards the ground is disked 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.

Vines. During the first spring following fall land preparation, Thompson Seedless vines are planted on 7 x 12-foot spacing with 519 vines per acre. Plants are dormant Thompson Seedless grafted onto a rootstock like Freedom or Harmony. Fiesta, Selma Pete and DOVine are early ripening cultivars— that can also be used for establishing a new raisin vineyard. Establishment and production costs for Thompson Seedless and the other cultivars are similar when tray drying. Thompson Seedless is used in this study because it is the primary cultivar used for tray dried raisins. Vines will be trained 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 cost is provided by a trellis company and is an approximate estimate for the described trellis system. The trellis system is a two-wire 24-inch crossarm design and is installed by a custom trellis company in the 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 the two 13 gauge fruiting wires. A third wire is added to the lower portion of the trellis to hold the drip lines. 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. Trellis and vine repairs of \$1,332 or \$33 per acre are shown in Table 7 (Annual Investment Costs) and included in Investment Repairs under Cash Overhead in the various tables. A 36-inch crossarm may increase raisin yields, but raisins need to be harvested prior to September 1 to successfully dry with the wider trellis. The larger crossarm may cause some shading in the drying row.

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 10 vines per acre are replanted for those lost in the first year.

Train/Prune. In the first year, the vines are allowed to grow without any training. During the second year (first dormant season), the vines are pruned back to two buds. In the spring, a shoot is selected and trained up the stake to form head trained vines. Additional training plus tying and suckering are done once in April and twice in May. Standard pruning begins in the third year (second dormant season) leaving three canes per vine. In January, the vines are pruned and in January or February, the canes are tied to the wires. The dormant season prunings are shredded beginning in the third year. Mechanical cane cutting or skirting begins and is done in June and August. In the fourth year, the vines are considered mature and pruned to four or more canes per vine. Besides training the selected canes, training also includes suckering and tying canes. Suckering is the removal of water sprouts from the trunk. Selecting and tying canes to the fruiting wires is required each year for the life of the vineyard. Vines that are replanted (replacement vines) show training costs in the third year.

Irrigation. The drip line is laid on the ground prior to planting. After the trellis is installed, the drip line is clipped to the bottom trellis wire. In this study, the pumped water is calculated to cost \$5.67 per acre-inch or \$68.00 per acre-foot. Water pumping costs plus labor constitute the irrigation cost. Price per acre-foot of water will vary, depending on quantity used, water district, power cost, well characteristics, and other irrigation factors. Water is applied immediately after planting and during the growing season from April through September. No assumption is made about effective rainfall or runoff. The amount of water applied to the vines each year is shown in Table A.

Year	AcIn/Year
1	12
2	24
3+	28

Fertilize. Liquid nitrogen fertilizer, UN32, is applied through the irrigation system in April of the first year at five pounds of nitrogen (N) per acre. A single application is made in April of the second year and equally split applications in May and June of the third year. The amount of nitrogen applied each year increases as the vineyard matures and is shown in Table B. It is important to identify sources of nitrogen in order to properly manage the nitrogen budget. Sources of nitrogen such as irrigation well water should be calculated to determine the need to irrigate and fertilize.

Year	Lbs of N
1	5
2	20
3+	40

Pest Management. For pest identification, monitoring, management and pesticide information, visit the UC IPM website at www.ipm.ucdavis.edu. Written recommendations are required for many commercially applied pesticides, and are available from licensed pest control advisers (PCAs). For information on pesticide use permits, contact the local county Agricultural Commissioner's office. **Pesticides mentioned in**

Table A. PESTICIDE PROGRAM- Establishment Years

MONTH	MILDEW	PHOMOP-SIS	LEAF HOPPER	SKELETON-IZER	MEALY BUG	OTHER	YEAR
April	Microthiol			Kryocide			2
March					Lorsban		3
March	Microthiol	Abound					3
April	Dusting Sulfur						3
April	Microthiol + Rally					Zinc	3
May	Microthiol + Flint			Kryocide			3
June	Microthiol + Rally						3
June			Provado				3
June	Dusting Sulfur						3
June	Dusting Sulfur						3

this study are used to calculate rates and costs. Although the pesticides mentioned are commonly used by growers, many other pesticides are available. Check with your PCA and/or the UC IPM website for current recommendations.

Insects. Western grapeleaf skeletonizer (*Harrisina brillians*) is controlled in April of the second and third years with an application of Kryocide insecticide (applied with Microthiol sulfur spray). In the third year, Lorsban is applied in early March to control mealybugs (*Pseudococcus* and *Planococcus spp.*) and Provado insecticide is applied in June to control the grape leafhoppers (*Erythroneura elegantula*).

Diseases. Although many pathogens attack grapevines, phomopsis cane and leafspot (*Phomopsis viticola*) and powdery mildew (*Uncinula necator*) are the two diseases managed in this study. In the second year, Microthiol (micronized sulfur) for mildew is applied (with Kryocide application) in April. In March of the third year, Microthiol plus Abound (strobilurin) are applied for phomopsis and mildew control. Mildew is controlled with various fungicide applications at 7 to 21 day intervals in the third year, depending on the fungicide used. For this study, the grower applies Microthiol and Rally (SI) (with zinc application) in April, Dusting Sulfur in April, Microthiol and Flint (with Kryocide application) in May. Microthiol and Rally in June and two applications of Dusting Sulfur in June. Growers have the option of using sulfur (dust, wettable, flowable or micronized), sterol inhibitors (SIs), or strobilurins, as well as other fungicides to control powdery mildew. Sterol inhibitors and strobilurins are two classes of fungicides with different modes of action than sulfur against powdery mildew. It is recommended that fungicides with different modes of action be used to avoid powdery mildew populations from acquiring fungicide resistance.

Weeds (Vineyard Floor Management). In October of the year prior to planting, Treflan is applied to the vineyard floor and incorporated by disking. After planting, weeds in the vine rows and middles are managed with disking, mowing, and/or herbicides. In the first year, the row middles are disked two times – July, September. The vine rows are hand weeded in May and August. The row middles are disked three times – March, June, September - in the second year and disked two times – March, May - in the third year. (See Terrace for additional disking.) The vine rows are sprayed (strip spray) beginning in January of the second year with Roundup and Surflan. The strip spray is applied to 30% of the acreage. Also beginning in the second year, spot sprays using Roundup are applied to the vine row in April, June, and July. The spot sprays (weedy spots or areas) are applied using an all terrain vehicle (ATV) with a sprayer attached.

Terrace. The middles are disked three times during August and September to form and remove the drying terrace. See related paragraph under Production section.

Harvest. Harvest begins the third year and the fruit is picked for raisins. See harvest in the production section for description

Yields. The vineyard yields approximately 1.5 tons of raisins per acre (equivalent to 6.75-tons of fresh grapes) in year three.

Returns. In this study, the raisins are sold for \$1,150 per ton.

Production Operating Costs

Prune/Tie/Sucker. The vines are pruned during the winter months and the prunings, placed in row middles, are shredded and disked (see weeds). The vines are cane pruned with renewal spurs in January; canes are tied in February to the trellis wire(s) by twisting around the trellis wire and attaching with twist-ems. The canes are mechanically cut (skirted) in June and August to open the canopy and prevent canes from crossing rows.

Irrigation. The vineyard is drip irrigated using 28 acre-inches of applied water during the growing season from April through September. During June, July, and August, irrigations are applied frequently with no more than four days between irrigations. Daily irrigations during this period are preferable. Deficit irrigation (50% ET) is applied during the three week period in late August to mid September when fruit is drying on the trays. Drip irrigation may be withheld completely during this period if there is a risk of dripline hoses rupturing or water running on the trays. After raisins are removed from the field, irrigation resumes at full ET (Evapotranspiration) to replenish the soil profile. Irrigation amounts are based on vineyard ET and can vary from season to season. Water pumping costs plus labor, which includes checking the drip lines, constitute the irrigation cost. In this study, water is calculated to cost \$5.67 per acre-inch or \$68.00 per acre-foot. The pumping cost is based on using 40 horsepower motor to pump from 130 feet deep. Price per acre-foot of water will depend on quantity used, water district, power cost, various well characteristics, and other irrigation factors. No assumption is made about effective rainfall and runoff. In some years frost protection may be required and water applications may be necessary in March.

Fertilize. Nitrogen (N) at 40 pounds per acre as UN32 is applied through the irrigation drip system during April (or can be applied post harvest). Neutral zinc is foliar applied to prevent zinc deficiencies and is combined with the late April mildew (Microthiol, Rally) application.

Pest Management. The pesticides and rates mentioned in this cost study are listed in *UC Integrated Pest Management Guidelines, Grapes*. For information on other pesticides available, pest identification, monitoring, and management visit the UC IPM website at www.ipm.ucdavis.edu. For information and pesticide use permits, contact the local county agricultural commissioner's office. **Pesticides mentioned in this study are used to calculate rates and costs. Although the pesticides mentioned are commonly used by growers, many other pesticides are available. Check with your PCA and/or the UC IPM website for current recommendations.** Adjuvants are recommended for use with many pesticides for effective control, but the adjuvant and their costs are not included in this study. Pesticide costs may vary by location, brand, and grower volume. Pesticide costs in this study are taken from a single dealer and shown as full retail.

Pest Control Adviser (PCA). Written recommendations are required for many commercially applied pesticides and are written by licensed pest control advisers. In addition the PCA will monitor the field for agronomic problems including pests, diseases, and nutritional status. Growers may hire private PCAs or receive the service as part of a service agreement with an agricultural chemical and fertilizer company. Costs for a PCA are not included in this study.

Weeds (Vineyard Floor Management). Vineyard middles are disked two times each season: March and May. (See Terrace for additional disking) Surflan and Roundup herbicides are applied to the vine row in January or early February. Roundup, a contact herbicide, is applied as a spot spray to the vine row in April, June and July.

Insects. Mealybugs (*Pseudococcus and Planococcus spp.*) are treated at delayed dormant with Lorsban insecticide in early March (dormant vines). Western grapeleaf skeletonizer (*Harrisina brillians*) is treated with Kryocide (mixed with a GA and/or sulfur application) during the bloom spray in May. Grape leafhoppers (*Erythroneura elegantula*) are controlled with Provado

MONTH	MILDEW	PHOMOP	LEAF HOPPER	SKELE- TONIZER	MEALY BUG	OTHER
March					Lorsban	
March	Microthiol	Abound				
April	Dusting Sulfur					
April	Microthiol + Rally					Zinc
May	Microthiol + Flint			Kryocide		ProGibb (GA)
June	Microthiol + Rally					
June			Provado			Ethrel
June	Dusting Sulfur					
June	Dusting Sulfur					

insecticide (mixed with Ethrel application) in late June or early July. An effective alternative material for mealybugs is to apply Admire insecticide through the drip system, but at a higher cost than a Lorsban application. It may be necessary to use multiple insecticides to control some mealybug species.

Diseases. Diseases treated in this study are phomopsis cane and leafspot (*Phomopsis viticola*) and powdery mildew (*Uncinula necator*). Phomopsis and powdery mildew are both treated in late March (shoot length 2 inches) with Microthiol (micronized sulfur) and Abound (strobilurin). Mildew is controlled during the season with various fungicide applications at 7 to 21 day intervals, depending on the fungicide used. In this study, Microthiol and Rally, an SI (mixed with zinc application) are applied in late April. Microthiol and Flint (mixed with Kryocide and GA application) are applied with the spray in May. Microthiol and Rally, an SI are applied in June. Dusting Sulfur is applied once in early April and two times in June. Growers have the option of using sterol inhibitors (SI), quinolins, strobilurins, or sulfur (micronized, wettable, dust, flowable), as well as other fungicides to control powdery mildew. Materials that represent classes of fungicides with different modes of action should be incorporated into your powdery mildew program to avoid resistance problems.

Fruit Management (FM). Gibberellic acid (GA), a plant growth regulator, is applied one time in May during bloom for thinning. Ethrel is applied at veraison in late June or early July to accelerate grape maturity. GA is applied with the mildew/skeletonizer spray in May and Ethrel with the leafhopper spray in June.

Terrace. Terraces are formed to provide an angled area facing the sun to dry the grapes. After the last irrigation in July or August, the middles are disked twice. Four to five days prior to harvest, the south facing terraces are formed using a tractor with a rear blade. After the raisins are boxed, a pass is made with the blade reversed (terrace back) to remove the terrace, followed by one disking and an irrigation. Forming the terrace is considered a preharvest operation and some growers will consider the operation as a harvest cost.

Harvest. The grapes are typically picked from mid August through mid September. The grower contracts to have the crop custom hand harvested for raisins at a rate of \$0.35 per tray. Based on a two ton raisin yield, one man can pick approximately one-third acre per 10-hour day or one raisin ton (4.5 tons fresh grapes) per 15 hours. For this study we are assuming a crew of 20. Harvest consists of hand picking the grapes into pans. Paper trays are placed by the picker on the upper one-half of the terrace and the grapes are spread evenly on the paper trays. On average, about 18 to 20 pounds of fresh fruit are placed on each tray. Once dry this will amount to 4.5 pounds of raisins. Raisins are rolled at 16-18% moisture, allowed to equilibrate and then boxed when moisture is 14% or less. The grower rents for two weeks, a tractor to pull the second bin trailer and a forklift for loading and unloading the bins. The crop is dumped into bins that hold 1,000 to 1,200 pounds of raisins, a process referred to as boxing. The bins are furnished free by the packer. At 2.00 tons of raisins per acre, approximately 4 bins per acre are needed. Labor costs include a tractor driver for pulling the bin trailer with 4 bins and one person who rides the bin trailer and removes the paper trays, and two persons to pickup the rolled raisins and throw them into the bins. Papers are burned at the end of the row when weather conditions permit. The forklift operator works in the staging area unloading/loading bins and transporting the loaded and empty bin trailers to and from the boxing crew. Before raisins are delivered to the packer, they are run across the grower owned shaker to remove sand, leaves, and other debris. This is not always required, but is shown as a cost in this study. Shaking operations consist of a forklift operator in the staging area that loads and unloads the bins on the shaker and two men removing debris from the raisins on the shaker. Costs also include renting the forklift for an additional week. Shaking takes about five minutes per bin. It is assumed that all drivers and operators work hour's equivalent to the harvest time. The filled bins are hauled to the packer by a contract trucker. The shaking and transport operations may not occur at the same time as harvest, but at a later date. Depending on the market each year, growers have the option to produce the grapes for raisins or wine.

Yields. Raisin vineyards reach maturity in the fourth year and over the remaining years the vineyard will average 2.00 dry tons per acre based on California Department of Food and Agriculture 1995 to 2004 data. The drying ratio of green fruit to raisins is 4.1 to 4.5:1. Two tons per acre is the industry average for Thompson Seedless; new vineyards planted to new cultivars may have higher yields.

Returns. The estimated return for this study based on current raisin markets gives a final return (free + reserve tonnage) of \$1,150 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 \$16.20 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 5,200 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, Equipment, Interest and Risk

Labor. Hourly wages for workers are \$9.50 for machine operators and \$8.25 per hour non-machine labor. Adding 34% for the employer's share of federal and state payroll taxes, insurance, and other possible benefits gives the labor rates shown of \$12.73 and \$11.05 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 3 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 red dye diesel and gasoline are \$2.00 and \$2.55 per gallon, respectively. The cost includes a 2% local sales tax on diesel fuel, but does not include excise taxes. Gasoline costs include an 8% sales tax plus federal and state excise tax. Some federal and excise tax can be refunded for on-farm use when filing your income tax. The costs are based on 2005 American Automobile Association (AAA) and Department of Energy (DOE) monthly data. The fuel, lube, and repair cost per acre for each operation in Table 3 is determined by multiplying the total hourly operating cost in Table 8 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 9.25% per year. A nominal interest rate is the typical market cost of borrowed funds. Interest in years one and two are calculated for the entire year; beginning in the third year, interest is calculated through harvest. Interest in year one in this study begins with the first operation in the fall of the previous year – total accumulated interest is for 15 months. 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. For raisin growers, income loss from bad weather during field drying is a major risk.

Crop Insurance. Crop insurance is available, but not included in this study. 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. Coverage levels range from 50% to 75%. According to one insurer, premium and fees at the 60% level for 80 acres in Fresno County are \$16.87 per ton for a \$660 per ton guarantee.

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 0.70% of the average value of the assets over their useful life. Liability insurance covers accidents on the farm and costs \$661 for the entire farm.

Office Expense. Office and business expenses are estimated at \$80 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% of the purchase price, except for the vineyard establishment which is calculated as 0.50% to cover vine and trellis repairs and/or replacement.

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 prices 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 7.

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 effective long term interest rate in January 2006. The interest rate is provided by a local farm lending agency and will vary according to risk and amount of loan.

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 \$6,746 per acre or \$269,840 for the 40-acre vineyard. The establishment cost is spread over the remaining 22 years of the 25 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 40 established acres and to other acres on the ranch. 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 25-year life. An alternative is to include the drip system in the establishment costs because it will be removed when the vineyard is removed.

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 \$5,500 per acre. This study assumes the land was purchased. Because only 115 of the 120 acres are planted to grapes, land is valued at \$5,739 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.

Shaker/Screeners. The shaker is located in the harvest staging area on a cement slab and is used for removing debris from the raisins. The machine cost does not include a bin dumper.

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 Table 7. 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.

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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 RAISIN VINEYARD
 SAN JOAQUIN VALLEY - 2006

	Cost Per Acre			
	Year:	1st	2nd	3rd
Raisin Tons Per Acre:				1.5
Planting Costs:				
Land Preparation - Chisel 2X (Custom)		300		
Land Preparation - Float		10		
Land Preparation - Disk/Apply Herbicide (Treflan)		15		
Land Preparation - Disk (Incorporate Herbicide)		10		
Survey & Layout Vineyard		70		
Dig, Plant, Wrap Vines		156	2	
Vines: 519 Per Acre (2% Replant In 2nd Year)		1,479	28	
Install Trellis System			2,700	
TOTAL PLANTING COSTS		2,040	2,730	
Cultural Costs:				
Prune: Prune & Tie Dormant Period			55	141
Prune: Shred Prunings				7
Weed: Winter Strip (Roundup, Surflan)			58	58
Weed: Disk Middles (2X Yr 1 & 3. 3X Yr 2)	14	21		14
Insect: Mealybug (Lorsban)				41
Disease: Phomopsis/Mildew (Microthiol, Abound)				47
Disease: Mildew (Dusting Sulfur) 3X Alternate Rows				21
Irrigate: (water & labor)	96	191		214
Weed: - Spot Spray (Roundup)		40		40
Disease: Mildew (Rally, Microthiol). Fertilizer: (Zinc)				39
Prune: Training (Sucker, Tie & Train) Yr 2. Replacement Vines Yr 3			286	22
Disease: Mildew (Microthiol, Flint). Insect: Skeletonizer (Kryocide).			33	66
Fertilize: (UN32) through drip	3	8		16
Disease: Mildew (Rally, Microthiol)				35
Insect: Leafhopper (Provado).				44
Weed: Hand Hoe	66			
Prune: Skirt Canes (Mechanical)				14
Terrace: Disk Middles 3X				21
Terrace: Terrace Make & Terrace Back				21
ATV Use	26	34		34
Pickup Truck Use	73	73		73
TOTAL CULTURAL COSTS	278	799		968
Harvest Costs:				
Hand Pick				270
Roll Trays				34
Haul/Box				112
Shake				34
Haul to Processor				20
Assessments				24
TOTAL HARVEST COSTS		0	0	494
Interest On Operating Capital @ 9.25%*	186	302		43
TOTAL OPERATING COSTS/ACRE	2,504	3,831		1,505

UC COOPERATIVE EXTENSION

Table 1. continued

	Cost Per Acre			
	Year:	1st	2nd	3rd
Raisin Tons Per Acre:				1.5
Cash Overhead Costs:				
Office Expense		80	80	80
Liability Insurance		6	6	6
Sanitation Services		17	17	17
Property Taxes		67	67	69
Property Insurance		7	7	8
Investment Repairs		33	33	33
TOTAL CASH OVERHEAD COSTS		209	210	213
TOTAL CASH COSTS/ACRE		2,712	4,041	1,718
INCOME/ACRE FROM PRODUCTION		0	0	1,725
NET CASH COSTS/ACRE FOR THE YEAR		2,712	4,041	0
PROFIT/ACRE ABOVE CASH COSTS		0	0	7
ACCUMULATED NET CASH COSTS/ACRE		2,712	6,753	6,746
Non-Cash Overhead (Capital Recovery Cost):				
Land		359	359	359
Drip Irrigation System		64	64	64
Shop Building		52	52	52
Shop Tools		11	11	11
Fuel Tank & Pump		2	2	2
Shaker/Screener				4
Equipment		29	33	68
TOTAL CAPITAL RECOVERY COST		516	521	560
TOTAL COST/ACRE FOR THE YEAR		3,229	4,562	2,277
INCOME/ACRE FROM PRODUCTION		0	0	1,725
TOTAL NET COST/ACRE FOR THE YEAR		3,229	4,562	552
NET PROFIT/ACRE ABOVE TOTAL COST		0	0	0
TOTAL ACCUMULATED NET COST/ACRE		3,229	7,791	8,343

*Interest calculated: Yr. 1 over 15 months, Yr 2 over 12 months, Yr 3 through harvest.

UC COOPERATIVE EXTENSION
Table 2. MATERIAL COSTS TO ESTABLISH RAISIN GRAPES
 SAN JOAQUIN VALLEY 2006

MATERIAL	COST	UNIT	YEAR 1		YEAR 2		YEAR 3	
			RATE	COST	RATE	COST	RATE	COST
Herbicide:								
Treflan HFP	4.74	pint	1.00	5				
Suflan 4AS	16.96	pint			2.40	41	2.40	41
Roundup Ultra Max	8.56	pint			2.10	18	2.10	18
Insecticide:								
Kryocide	3.00	lb			6.00	18	6.00	18
Lorsban 4E	6.86	pint					4.00	27
Provado 1.6 Solupak	43.96	lb					0.70	31
Fungicides:								
Microthiol Special	0.80	lb			2.00	2	7.00	6
Abound	2.70	floz					12.00	32
Dusting Sulfur	0.18	lb					15.00	3
Rally 40W	4.89	oz					8.00	39
Flint	16.49	oz					2.00	33
Fertilizer:								
UN32	0.41	lb N	5.00	2	20.00	8	40.00	16
Neutral Zinc 50%	0.92	lb					5.00	5
Water:								
Water Pumped	5.67	acin	12.00	68	24.00	136	28.00	159
Vine:								
Dormant Bench	2.85	each	519.00	1,479	10.00	29		
Vine Aids:								
Wraps	0.12	each	519.00	62				
Twist-ems	0.00	each			5,100.00	20	2,000.00	8
Trellis System	2,700.00	acre			1.00	2,700		
Trays 20 lb	0.05	each					675.00	34
Rentals:								
Forklift	850.00	week					0.08	68
Tractor	640.00	week					0.05	32
Assessments:								
CA Raisin Marketing Board	16.20	ton					1.50	24
Custom:								
Rip/Subsoil	150.00	acre	2.00	300				
Mark/Stake	0.14	each	519.00	70				
Plant Vines	0.18	each	519.00	93	10.00	2		
Pick Raisin (Hand)	0.35	tray					675.00	236
Roll Raisin (Hand)	0.05	tray					675.00	34
Haul to Processor	13.00	ton					1.50	20
Labor-Machine	12.76	hr	6.91	88	9.37	120	16.68	213
Labor-Non Machine	11.05	hr	8.55	94	34.00	376	21.95	243
Fuel-Gas	2.55	gal	11.41	29	12.08	31	12.08	31
Fuel-Diesel	2.00	gal	5.90	12	5.99	12	25.71	51
Lube				6		6		12
Machinery Repair				9		11		30
Interest				186		302		43
TOTAL COSTS				2,504		3,830		1,505

UC COOPERATIVE EXTENSION
Table 3. COSTS PER ACRE TO PRODUCE TRAY DRIED RAISINS
 SAN JOAQUIN VALLEY - 2006

Operation	Operation Time (Hrs/A)	Cash and Labor Cost per acre					Total Cost	Your Cost
		Labor Cost	Fuel, Lube & Repairs	Material Cost	Custom/ Rent			
Cultural:								
Prune: Vines	24.00	265	0	0	0	265		
Prune: Brush Disposal (Every Middle)	0.26	4	3	0	0	7		
Prune: Tie Canes	4.50	50	0	8	0	58		
Weed: Winter Strip (Surflan, Roundup)	0.49	8	4	46	0	58		
Insect: Mealybugs (Lorsban)	0.50	8	6	27	0	41		
Disease: Phomopsis (Abound)/Mildew (Sulfur)	0.50	8	6	33	0	47		
Weed: Disk Middles 2X	0.57	9	5	0	0	14		
Disease: Mildew (Dusting Sulfur) 3X (alternate rows)	0.75	11	7	3	0	21		
Disease: Mildew (Rally, Sulfur). Fertilize: Foliar Zinc (Neutral Zinc)	0.50	8	6	26	0	39		
Fertilize: N through drip system (UN32)	0.00	0	0	16	0	16		
Irrigate: (Water)	5.50	61	0	159	0	220		
Weed: Spot Spray (Roundup)	1.59	24	3	13	0	40		
Disease: Mildew (Sulfur, Flint). Insect: Skeletonizer (Kryocide). Bloom Thin (GA)	0.50	8	6	63	0	76		
Disease: Mildew (Rally, Sulfur)	0.50	8	6	21	0	35		
Prune: Skirt Canes (Mechanical) 2X	0.57	9	5	0	0	14		
Insect: Leafhopper (Provado). FM*: Fruit Set (Ethrel)	0.50	8	6	51	0	65		
Terrace**: Disk Middles	0.86	13	8	0	0	21		
Terrace**: Build Terrace & Terrace Back	0.88	13	8	0	0	21		
Pickup: Business Use	2.39	36	37	0	0	73		
ATV Use	2.00	31	3	0	0	34		
TOTAL CULTURAL COSTS/ACRE	47.36	580	120	466	0	1,165		
Harvest								
Pick Grapes (contract) (includes trays)	0.00	0	0	45	315	360		
Roll Raisins (contract)	0.00	0	0	0	45	45		
Box Raisins	0.75	45	7	0	75	126		
Shake Raisins (includes forklift rental)	1.00	11	0	0	26	37		
Haul Raisins (contract)	0.00	0	0	0	26	26		
Assessment	0.00	0	0	32	0	32		
TOTAL HARVEST COSTS/ACRE	1.75	56	7	77	486	626		
Interest on operating capital @ 9.25%						56		
TOTAL OPERATING COSTS/ACRE		635	126	543	486	1,846		
CASH OVERHEAD:								
Office Expense						80		
Liability Insurance						6		
Sanitation Fees						17		
Property Taxes						103		
Property Insurance						32		
Investment Repairs						67		
TOTAL CASH OVERHEAD COSTS						304		
TOTAL CASH COSTS/ACRE						2,150		

UC COOPERATIVE EXTENSION
Table 3. continued
 SAN JOAQUIN VALLEY - 2006

Operation	Operation Time (Hrs/A)	Cash and Labor Cost per acre					Total Cost	Your Cost
		Labor Cost	Fuel, Lube & Repairs	Material Cost	Custom/ Rent	Annual Cost Capital Recovery		
NON-CASH OVERHEAD:		Per producing Acre		Annual Cost Capital Recovery				
Land		5,739		359		359		
Drip Irrigation System		800		64		64		
Building		696		52		52		
Tools-Shop/Field		104		11		11		
Fuel Tanks 2-300G		30		2		2		
Vineyard Establishment Costs		6,746		572		572		
Shaker/Screeener		43		4		4		
Equipment		516		67		67		
TOTAL NON-CASH OVERHEAD COSTS		14,675		1,131		1,131		
TOTAL COSTS/ACRE							3,281	

* FM = fruit management.

**May be considered a harvest cost by some growers.

UC COOPERATIVE EXTENSION
Table 4. COSTS AND RETURNS to PRODUCE TRAY DRIED RAISINS
 SAN JOAQUIN VALLEY - 2006

	Quantity/ Acre	Unit	Price or Cost/Unit	Value or Cost/Acre	Your Cost
GROSS RETURNS					
Raisins	2.00	ton	1,150.00	2,300	
OPERATING COSTS					
Vine Aids:					
Twist-ems	2,000.00	each	0.00	8	
Herbicide:					
Surflan 4 AS	2.40	pint	16.96	41	
Roundup Ultra Max	2.10	pint	8.56	18	
Fungicide:					
Abound (Strobilurin)	12.00	floz	2.70	32	
Microthiol Disperss (micronized wettable sulfur)	7.00	lb	0.80	6	
Dusting Sulfur	15.00	lb	0.18	3	
Rally 40W (Sterol Inhibitor)	8.00	oz	4.89	39	
Flint (Strobilurin)	2.00	oz	16.49	33	
Insecticide:					
Lorsban 4E	4.00	pint	6.86	27	
Kryocide	6.00	lb	3.00	18	
Provado 1.6 Solupak	1.00	oz	43.96	44	
Fertilizer:					
Neutral Zinc 50% (foliar)	5.00	lb	0.92	5	
UN 32	40.00	lb N	0.41	16	
Water:					
Water Pumped SJV	28.00	acin	5.67	159	
Growth Regulator:					
Pro-Gibb 4% (Gibberelic Acid) 1oz=1g	6.00	floz	1.67	10	
Ethrel	1.00	Pint	7.00	7	
Rent:					
Tractor	0.05	week	640.00	32	
Forklift (2 wks @ harvest + 1 wk @ shaking)	0.08	week	850.00	68	
Harvest Aids:					
Trays 20 lb	900.00	tray	0.05	45	
Assessment:					
California Raisin Marketing Board	2.00	ton	16.20	32	
Custom/Contract:					
Pick Grapes (hand)	900.00	tray	0.35	315	
Roll Grapes (hand)	900.00	tray	0.05	45	
Haul Raisins to Processor	2.00	ton	13.00	26	
Labor (machine)	16.93	hrs	12.73	216	
Labor (non-machine)	38.00	hrs	11.05	420	
Fuel - Gas	12.14	gal	2.55	31	
Fuel - Diesel	26.35	gal	2.00	53	
Lube				13	
Machinery repair				30	
Interest on operating capital @ 9.25%				56	
TOTAL OPERATING COSTS/ACRE				1,846	
NET RETURNS ABOVE OPERATING COSTS				454	

UC COOPERATIVE EXTENSION
Table 4. continued
 SAN JOAQUIN VALLEY - 2006

	Quantity/ Acre	Unit	Price or Cost/Unit	Value or Cost/Acre	Your Cost
CASH OVERHEAD COSTS:					
Office Expense				80	
Liability Insurance				6	
Sanitation Fees				17	
Property Taxes				103	
Property Insurance				32	
Investment Repairs				67	
TOTAL CASH OVERHEAD COSTS/ACRE				304	
TOTAL CASH COSTS/ACRE				2,150	
NON-CASH OVERHEAD COSTS (Capital Recovery)					
Land				359	
Drip Irrigation System				64	
Building				52	
Tools-Shop/Field				11	
Fuel Tanks 2-300G				2	
Vineyard Establishment Costs				572	
Shaker/Screener				4	
Equipment				67	
TOTAL NON-CASH OVERHEAD COSTS/ACRE				1,131	
TOTAL COSTS/ACRE				3,281	
NET RETURNS ABOVE TOTAL COSTS				-981	

UC COOPERATIVE EXTENSION
Table 5. MONTHLY CASH to PRODUCE TRAY DRIED RAISINS
 SAN JOAQUIN VALLEY - 2006

Beginning JAN 06	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	TOTAL
Ending DEC 06	06	06	06	06	06	06	06	06	06	06	06	06	
Cultural:													
Prune: Vines	265												265
Prune: Brush Disposal (Every Middle)	7												7
Prune: Tie Canes		58											58
Weed: Winter Strip (Surflan, Roundup)		58											58
Insect: Mealybug (Lorsban)			41										41
Disease: Phomopsis (Abound)/Mildew (Sulfur)			47										47
Weed: Disk Middles 2X			7		7								14
Disease: Mildew (Dusting Sulfur) 3X (alternate rows)				7		14							21
Disease: Mildew (Rally, Sulfur). Fertilize: Foliar Zinc (Neutral Zinc)				39									39
Fertilize: N through drip system (UN32)				16									16
Irrigate: (Water)				15	29	43	51	41	40				220
Weed: Spot Spray (Roundup)				13		13	13						40
Disease: Mildew (Sulfur, Flint). Insect: Skeleton (Kryocide). Thin (GA)					76								76
Disease: Mildew (Rally, Sulfur)						35							35
Prune: Skirt Canes (Mechanical)						7		7					14
Insect: Leafhopper (Provado). FM: at Veraison (Ethrel)						65							65
Terrace: Disk Middles								14	7				21
Terrace: Build Terrace & Terrace Back								11	11				21
Pickup: Business Use	6	6	6	6	6	6	6	6	6	6	6	6	73
ATV Use	3	3	3	3	3	3	3	3	3	3	3	3	33
TOTAL CULTURAL COSTS	281	124	104	100	121	186	73	82	67	9	9	9	1,165
Harvest:													
Pick Grapes (contract) (includes trays)									360				360
Roll Raisins (contract)									45				45
Box Raisins									126				126
Shake Raisins (includes forklift rental)									37				37
Haul Raisins (contract)									26				26
Assessment									32				32
TOTAL HARVEST COSTS									626				626
Interest on operating capital @ 9.25%	2	3	4	5	6	7	8	8	14	0	0	0	56
TOTAL OPERATING COSTS/ACRE	283	128	108	104	127	193	81	90	706	9	9	9	1,846

UC COOPERATIVE EXTENSION
Table 5. continued
 SAN JOAQUIN VALLEY - 2006

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	TOTAL
Beginning JAN 06	06	06	06	06	06	06	06	06	06	06	06	06	
Ending DEC 06													
OVERHEAD:													
Office Expense	7	7	7	7	7	7	7	7	7	7	7	7	80
Liability Insurance									6				6
Sanitation Fees	2	2	2	2	2	2	2	2	2				16
Property Taxes	51						51						103
Property Insurance	16						16						32
Investment Repairs	6	6	6	6	6	6	6	6	6	6	6	6	67
TOTAL CASH OVERHEAD COSTS	81	14	14	14	14	14	81	14	20	12	12	12	304
TOTAL CASH COSTS/ACRE	365	142	122	119	141	207	162	104	726	21	21	21	2,150

UC COOPERATIVE EXTENSION
Table 6. RANGING ANALYSIS
 SAN JOAQUIN VALLEY - 2006

COSTS PER ACRE AT VARYING YIELD TO PRODUCE TRAY DRIED RAISINS

	YIELD (tons/acre)						
	1.50	1.75	2.00	2.25	2.50	2.75	3.00
OPERATING COSTS:							
Cultural Cost	1,165	1,165	1,165	1,165	1,165	1,165	1,165
Harvest (pick, roll, box, shake, haul)	464	529	593	658	723	787	852
Assessment	24	28	32	36	41	45	49
Interest on operating capital @ 9.25%	55	55	56	56	57	57	58
TOTAL OPERATING COSTS/ACRE	1,708	1,777	1,846	1,915	1,986	2,054	2,124
Total Operating Costs/ton	1,139	1,015	923	851	794	747	708
CASH OVERHEAD COSTS/ACRE	304	304	304	304	304	304	304
TOTAL CASH COSTS/ACRE	2,012	2,081	2,150	2,219	2,290	2,358	2,428
Total Cash Costs/ton	1,341	1,189	1,075	986	916	857	809
NON-CASH OVERHEAD COSTS/ACRE	1,130	1,130	1,130	1,130	1,130	1,130	1,130
TOTAL COSTS/ACRE	3,142	3,211	3,280	3,349	3,420	3,488	3,558
Total Costs/ton	2,095	1,835	1,640	1,488	1,368	1,268	1,186

NET RETURNS PER ACRE ABOVE OPERATING COSTS

PRICE \$/ton	YIELD (tons/acre)						
	1.50	1.75	2.00	2.25	2.50	2.75	3.00
850	-433	-289	-146	-2	139	284	426
950	-283	-114	54	223	389	559	726
1,050	-133	61	254	448	639	834	1,026
1,150	17	236	454	673	889	1,109	1,326
1,250	167	411	654	898	1,139	1,384	1,626
1,350	317	586	854	1,123	1,389	1,659	1,926
1,450	467	761	1,054	1,348	1,639	1,934	2,226

NET RETURN PER ACRE ABOVE CASH COST

PRICE \$/ton	YIELD (tons/acre)						
	1.50	1.75	2.00	2.25	2.50	2.75	3.00
850	-737	-593	-450	-306	-165	-20	122
950	-587	-418	-250	-81	85	255	422
1,050	-437	-243	-50	144	335	530	722
1,150	-287	-68	150	369	585	805	1,022
1,250	-137	107	350	594	835	1,080	1,322
1,350	13	282	550	819	1,085	1,355	1,622
1,450	163	457	750	1,044	1,335	1,630	1,922

NET RETURNS PER ACRE ABOVE TOTAL COST

PRICE \$/ton	YIELD (tons/acre)						
	1.50	1.75	2.00	2.25	2.50	2.75	3.00
850	-1,867	-1,723	-1,580	-1,436	-1,295	-1,150	-1,008
950	-1,717	-1,548	-1,380	-1,211	-1,045	-875	-708
1,050	-1,567	-1,373	-1,180	-986	-795	-600	-408
1,150	-1,417	-1,198	-980	-761	-545	-325	-108
1,250	-1,267	-1,023	-780	-536	-295	-50	192
1,350	-1,117	-848	-580	-311	-45	225	492
1,450	-967	-673	-380	-86	205	500	792

UC COOPERATIVE EXTENSION
Table 7. WHOLE FARM ANNUAL EQUIPMENT, INVESTMENT,
 SAN JOAQUIN VALLEY - 2006

ANNUAL EQUIPMENT COSTS

Yr	Description	Price	Yrs Life	Salvage Value	Capital Recovery	Cash Overhead		Total
						Insur- ance	Taxes	
06	60 HP 4WD Narrow Tractor	36,000	15	7,009	3,472	151	215	3,838
06	ATV 4WD	6,700	5	3,003	1,071	34	49	1,154
06	Bin Trailer	2,100	10	371	261	9	12	282
06	Bin Trailer	2,100	10	371	261	9	12	282
06	Cane Cutter 12'	2,500	20	130	219	9	13	241
06	Disk - Tandem 8'	6,800	10	1,203	845	28	40	913
06	Duster - 3 Pt 12'	5,000	5	1,629	908	23	33	964
06	Mower-Flail 8'	9,600	15	922	966	37	53	1,056
06	Orchard/Vine Sprayer 500 gal	20,378	5	6,638	3,699	95	135	3,928
06	Pickup Truck 1/2 T	26,000	7	9,863	3,533	126	179	3,837
06	Rear Blade 8'	3,000	20	156	263	11	16	290
06	Sprayer ATV 20 gal	350	10	62	43	1	2	47
06	Weed Sprayer 3 PT 100 gal	3,500	10	619	435	14	21	470
TOTAL		124,028		31,976	15,975	546	780	17,302
60% of New Cost *		74,417		19,186	9,585	328	468	10,381

* 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 2400 sqft	80,000	20		5,968	280	400	1,600	8,248
Drip Irrigation System 115 acres	92,000	25		7,369	322	460	1,840	9,991
Vineyard Establishment	269,840	22		22,899	944	1,349	1,350	26,542
Fuel Tanks 2-300 gal	3,500	30	350	257	13	19	70	360
Land	660,000	25	660,000	41,250	0	6,600	0	47,850
Shaker/Screenener	5,000	20	0	445	18	25	100	587
Tools-Shop/Field	12,000	15	1,133	1,208	46	66	240	1,560
TOTAL INVESTMENT	1,122,340		661,483	79,395	1,623	8,919	5,200	95,138

ANNUAL BUSINESS OVERHEAD COSTS

Description	Units/ Farm	Unit	Price/ Unit	Total Cost
Liability Insurance	115	acre	5.75	661
Office Expense	115	acre	80.00	9,200
Sanitation Fees	115	acre	16.51	1,899

UC COOPERATIVE EXTENSION
Table 8. HOURLY EQUIPMENT COSTS
 SAN JOAQUIN VALLEY - 2006

Yr	Description	COSTS PER HOUR							Total Costs/Hr.	
		Actual Hours Used	Capital Recovery	Cash Overhead			Operating			Total Oper.
				Insur- ance	Taxes	Repairs	Fuel & Lube			
06	60 HP 4WD Narrow Tractor	1,068	1.95	0.08	0.12	0.88	6.78	7.66	9.81	
06	ATV 4WD	401	1.61	0.05	0.07	0.50	0.98	1.48	3.21	
06	Bin Trailer	300	0.52	0.02	0.02	0.32	0.00	0.32	0.88	
06	Bin Trailer	300	0.52	0.02	0.02	0.32	0.00	0.32	0.88	
06	Cane Cutter 12'	98	1.32	0.06	0.08	0.95	0.00	0.95	2.41	
06	Disk - Tandem 8'	200	2.55	0.08	0.12	1.10	0.00	1.10	3.85	
06	Duster - 3 Pt 12'	240	2.26	0.06	0.08	0.73	0.00	0.73	3.13	
06	Mower-Flail 8'	133	4.35	0.17	0.24	4.30	0.00	4.30	9.06	
06	Orchard/Vine Sprayer 500 gal	400	5.55	0.14	0.20	3.58	0.00	3.58	9.47	
06	Pickup Truck 1/2 T	286	7.43	0.26	0.38	1.91	13.44	15.35	23.42	
06	Rear Blade 8'	100	1.57	0.07	0.09	0.44	0.00	0.44	2.17	
06	Sprayer ATV 20 gal	151	0.17	0.01	0.01	0.10	0.00	0.10	0.29	
06	Weed Sprayer 3 PT 100 gal	200	1.31	0.04	0.06	0.61	0.00	0.61	2.02	

UC COOPERATIVE EXTENSION
Table 9. OPERATIONS PRODUCTION YEAR FOR TRAY DRIED RAISINS
 SAN JOAQUIN VALLEY 2006

MONTH	OPERATION	TRACTOR	IMPLEMENT	OPERATION	LABOR	MATERIAL	RATE/	UNIT
				Minutes/acre	Hrs/acre		ACRE	
Jan	Prune				24.00			
Jan	Brush Disposal/Shred	60 HP	Shredder 6'	15.48				
Feb	Tie Canes				4.50	Twist-ems	2,000.00	each
Feb	Weed: Winter Strip	60 HP	Sprayer	29.46		Surflan	2.40	pt
						Roundup	0.60	pt
March	Insect: Mealybug	60 HP	Vine Sprayer	30.00		Lorsban	4.00	pt
March	Disease: Mildew/Phomopsis	60 HP	Vine Sprayer	30.00		Abound	12.00	floz
						Microthhiol	1.00	lb
March	Disk Middles	60 HP	Disk 8'	17.16				
April	Disease: Mildew Alternate Rows	60 HP	Duster	15.00		Dusting Sulfur	5.00	lb
April	Disease: Mildew. Fert: Zinc	60 HP	Vine Sprayer	30.00		Microthhiol	2.00	lb
						Rally	4.00	oz
						Neutral Zinc	5.00	lb
April	Fertilize					UN32	40.00	lb N
April	Irrigate				0.50	Water	1.67	acin
April	Spot Spray	ATV	ATV Sprayer	31.74		Roundup	0.50	pt
May	Disk Middles	60 HP	Disk 8'	17.16				
May	Disease: Mildew. Insect: Skeletonizer. FM: Thin	60 HP	Vine Sprayer	30.00		Microthhiol	2.00	lb
						Flint	2.00	oz
						Kryocide	6.00	lb
						ProGibb	6.00	grams
May	Irrigate				1.00	Water	3.11	acin
June	Mildew	60 HP	Vine Sprayer	30.00		Rally	4.00	oz
						Microthiol	2.00	lb
June	Skirt Canes	60 HP	Cane Cutter	17.16				
June	Insect: Leafhopper. FM: Maturity	60 HP	Vine Sprayer	30.00		Ethrel	1.00	pt
						Provado	1.00	oz
June	Irrigate				1.00	Water	5.70	acin
June	Spot Spray	ATV	ATV Sprayer	31.74		Roundup	0.50	pt
June	Disease: Mildew Alternate Rows	60 HP	Duster	15.00		Dusting Sulfur	10.00	lb
June	Disease: Mildew Alternate Rows	60 HP	Duster	15.00		Dusting Sulfur	10.00	lb
July	Spot Spray	ATV	ATV Sprayer	31.74		Roundup	0.50	pt
July	Irrigate				1.00	Water	7.11	acin
Aug	Irrigate				1.00	Water	5.29	acin
Aug	Skirt Canes	60 HP	Cane Cutter	17.16				
Aug	Terrace: Disk Middles	60 HP	Disk 8'	17.16				
Aug	Terrace: Disk Middles	60 HP	Disk 8'	17.16				
Aug	Terrace: Make Terrace	60 HP	Blade	26.46				
Sept	Harvest Pick	Custom				Trays	900.00	trays
Sept	Roll Trays	Custom						
Sept	Box Raisins	60 HP	Bin Trailer	45	3.00	Forklift Rent	0.05	wk
			Bin Trailer			Rented Tractor	0.05	wk
Sept	Shake Raisins	Shaker			1.00	Forklift Rent	0.03	week
Sept	Haul	Custom				Haul @ \$13	2.00	ton
Sept	Terrace Back	60 HP	Blade	26.46				
Sept	Terrace: Disk Middles	60 HP	Disk 8'	17.16				
Sept	Irrigate				1.00	Water	5.12	acin