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UNIVERSITY OF CALIFORNIA AGRICULTURE AND NATURAL RESOURCES  
COOPERATIVE EXTENSION  
AGRICULTURAL ISSUES CENTER  
UC DAVIS DEPARTMENT OF AGRICULTURAL AND RESOURCE ECONOMICS

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



**OVERHEAD TRELLIS SYSTEM**

Early Maturing Varieties

**SAN JOAQUIN VALLEY-2016**

Matthew Fidelibus	UCCE Viticulture Specialist, Kearney Agricultural Center, Parlier, CA.
Allison Ferry	UCCE Farm Advisor, Viticulture, Tulare County
Lindsay Jordan	UCCE Farm Advisor, Viticulture, Madera, Merced and Mariposa Counties
George Zhuang	UCCE Farm Advisor, Viticulture, Fresno County
Daniel A. Sumner	Director, UC Agricultural Issues Center, Professor, Department of Agricultural and Resource Economics, UC Davis
Donald Stewart	Staff Research Associate, UC Agricultural Issues Center and the Department of Agricultural and Resource Economics, UC Davis

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**SAMPLE COST TO ESTABLISH A VINEYARD AND PRODUCE RAISINS**  
 Dry-On-Vine (DOV) on an Overhead Trellis  
 San Joaquin Valley-2016

CONTENTS

INTRODUCTION	2
ASSUMPTIONS	3
Establishment Cultural Practices and Material Inputs	3
Production Cultural Practices and Material Inputs	5
Tables A, B & C	6
Labor, Equipment and Interest	7
Cash Overhead	8
Non-Cash Overhead	9
REFERENCES	12
Table 1. COSTS PER ACRE TO ESTABLISH A DOV RAISIN VINEYARD	13
Table 2. COSTS PER ACRE TO PRODUCE DOV RAISINS	15
Table 3. COSTS AND RETURNS PER ACRE TO PRODUCE DOV RAISINS	17
Table 4. MONTHLY CASH COSTS – DOV RAISIN	19
Table 5. RANGING ANALYSIS-DOV RAISINS	20
Table 6. WHOLE FARM EQUIPMENT, INVESTMENT & BUSINESS OVERHEAD COSTS	21
Table 7. HOURLY EQUIPMENT COSTS	21
Table 8. OPERATIONS WITH EQUIPMENT AND MATERIALS	22

**INTRODUCTION**

The sample costs to produce DOV raisins in the San Joaquin Valley are presented in this study. This study is intended as a guide only. It can be used to guide production decisions, estimate potential returns, prepare budgets and evaluate production loans. Sample costs given for labor, materials, equipment and contract services are based on July 2016 figures. Practices described are based on production practices considered typical for the crop and area, but will not apply to every situation. A blank column titled Your Costs is provided in Tables 2 and 3 to enter your estimated costs. An additional cost of production study for DOV raisins in this region is also available: (“Sample Costs to Produce Dry-on-Vine Raisins (DOV), Open Gable Trellis System-2016”).

For an explanation of calculations used in the study refer to the section titled Assumptions. For more information contact Donald Stewart; University of California Agriculture and Natural Resources, Agricultural Issues Center, Department of Agricultural and Resource Economics, at 530-752-4651 or [destewart@ucdavis.edu](mailto:destewart@ucdavis.edu). For other questions about this study, contact your local UC Cooperative Extension office.

Sample Cost of Production studies for many commodities are available and can be down loaded from the website, <http://coststudies.ucdavis.edu>. Archived studies are also available on the website.

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## ASSUMPTIONS

The assumptions refer to Tables 1 to 8 and pertain to sample costs to establish a vineyard and produce DOV raisins using an overhead 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 overhead 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, Triflurex HFP is broadcast applied and the ground is disced twice to incorporate the pre-plant herbicide. Nematode samples should be taken from land formerly in trees or vines and the soil 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 overhead trellis system uses alternating row middles for fruiting and cane renewal. It consists of the following materials: (1) Metal “T” posts, 9-foot long, spaced every 12-feet down the row (two vines per post), stake material is 80 carbon and weighing a minimum of 1.44 pounds per foot; (2) End assemblies are 10-foot Douglas fir post, 5 to 6-inch diameter with screw anchors; (3) Corner assemblies are 6 to 7-inch, 12-foot Douglas fir post with multiple anchors; (4) Perimeter cable is 5/16 inch extra high strength (EHS) cable; deck wires consist of 8, 13 gauge extra high strength (includes one rake wire) in- row direction, and double 12.5 gauge high tensile wire at each stake position across rows. For quadrilateral cordons, an additional cost is incurred for cross arms and support wires.

**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 vines. In the second year 2 percent or 12 vines per acre are replanted for those lost in the first year.

**Vines.** Early maturing varieties such as Selma Pete or Fiesta are planted on a 6 x 10-foot spacing at 726 vines per acre. They are purchased as dormant vines that have been bench grafted or field budded onto a nematode/phylloxera resistant rootstock. The life of the vineyard is expected to be 30 years and the grapevines expected to begin yielding fruit in three years.

**Training/Pruning.** Training and pruning establish the vine framework and these techniques will vary with variety and trellis system. In this study, the vines are head trained and cane pruned. Dormant pruning begins in January of the second year. The young vines are pruned back to a 2-bud spur. Training includes suckering, tying, and positioning the selected shoots. The vines are suckered and one shoot tied in April. From April through July, the spare shoots are removed and most of the training is completed by the end of the third year. In February of the third year, two to three canes are tied, and is followed by shoot thinning and flower removal in April, renewal fruit removal in May, shoot positioning in May and June.

**Irrigation.** In this study, irrigations occur during the growing season from April through early October. Annual applied irrigation water is listed in Table B. No assumption is made about effective rainfall or runoff. A water analysis should be done annually in December or January-along with the well test-to determine nitrate content and to maintain regulatory records. Water analysis testing costs are combined with the well test and included in this study.

**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](http://www.ipm.ucdavis.edu). **Although growers commonly use the pesticides mentioned, many other pesticides are available.** Check with your PCA and/or the UC IPM website for current recommendations. **For information and pesticide use permits, contact the local county agricultural commissioner's office.** Pesticides with different active ingredients, mode of action, and sites of action should be rotated as needed to combat species shift and resistance. Check individual pesticide labels for compatibility, mixing requirements and usage. Adjuvants are recommended for use with many pesticides for effective control, but the adjuvants and their costs are not included in this study.

*Insects.* During the first two establishment years no insect control is needed. Beginning in the third year, Movento insecticide is applied in early May at bloom (combined with Rubigan) to control mealybug species and worms (grape leaf folder, omnivorous Leafroller, and Western Grapeleaf Skeletonizer). Insect monitoring programs should be used to determine if any treatment is necessary-(See insects section under production).

*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 bud-break 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 may be advisable at bud-break 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.* A pre-emergence herbicide is broadcast applied pre-plant to the entire vineyard. Post planting vineyard floor management begins in late winter, February of the second year and continues into the third year with a strip spray in the vine row (6-foot) with a tank mix of Roundup, Surflan, and Goal 2XL. The row middles are also disced in February and May. The vine rows are spot treated with Roundup in late April and early August.

**Fertilization.** Liquid nitrogen fertilizer - UAN32 - is applied in equal amounts through the drip system in April and May. For the purposes of this study, we assumed 15 pounds of N per acre is applied in the first year, 25 pounds per acre in the second and third years. Beginning in the third year foliar fertilizer containing

micronutrients zinc and boron are applied with the bloom disease application.

**Harvest.** Harvest begins in the third year. In this system, DOV raisins may be produced in the third year from vineyards having vigorous or adequate growth.

**Yields.** The vineyard will yield approximately 2-3 tons of raisins in the third year. Refer to Table C. for annual yields of raisins under this trellis system.

**Returns.** In this study, the dried fruit is sold to a dehydrator/processor for which the grower receives a current estimated market price of \$1600 per ton.

### **Production Cultural Practices and Material Inputs**

**Pruning.** Pruning is done during the winter months. The prunings are stacked in the row middles and then shredded and disced. The vines are cane pruned with renewal spurs in January, canes tied in February, shoot-thinned in April, shoot positioned in early May. Fruit or flower clusters are removed from the head, if necessary 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, then shredded.

**Fertilization.** Forty-five pounds per acre of nitrogen (N) as UAN-32 is divided and applied in equal amounts in April (one month after bud-break) and again in May (after fruit set). Once the vines are in full production N requirements can be as much as 50 pounds per acre. However, in deciding how much, if any, nitrogen fertilizer may be needed, growers should consider vine vigor, petiole nitrogen content, and other potential sources of nitrogen including nitrates in well water and nitrogen from leguminous cover crops. Foliar fertilizer containing micronutrients Neutral Zinc (50%) at five pounds per acre and Boron (20.5%) at one pound per acre are applied with the bloom disease application.

*Pest Control Advisor/Certified Crop Advisor (PCA/CCA).* Written recommendations are required for pesticides commercially applied and are made by licensed pest control advisors. In addition the PCA will monitor the field for agronomic problems including pests and nutrition. The PCA will create and fulfill a Nitrogen Management Plan. Growers may hire private PCA's or receive the service as part of a service agreement with an agricultural chemical and fertilizer company. Costs for a PCA are included in this study.

*Sampling.* Petiole analysis has been the main tool for assessing potassium (K) status and the need for K applications to vines. Petioles are usually collected at bloom from leaves opposite the cluster position on the shoot. Vines are generally sufficient at 1.5 to 2.0 percent, and deficiency may occur at 1.0 percent or less. Though it is not a completely reliable tool for making K management decisions, petiole analysis is the most consistent guideline currently available. No potassium is applied to the vineyard in this study. Beginning in the third year and continuing the PCA uses an ATV to collect the samples. The PCA sends the samples to a commercial lab for analysis, the charges shown are for the lab analysis.

**Irrigation.** Water pumping costs plus labor for checking the drip lines, constitute the irrigation cost. In this study, ground water pumping costs are calculated at \$90 per acre-foot. The pumping cost is based on using a 40 horsepower motor to pump from 130 feet deep. District/surface water delivery costs are at \$40 per acre-foot. An average price of \$65 per acre foot (\$5.42 per acre inch) is used in the study. Price per acre-foot of water will vary depending on quantity used, water district, power cost, various well characteristics, and other irrigation



factors. Thirty-six acre-inches are applied from April through early October (See Table B). No assumption is made about effective rainfall and runoff.

Table A. Applied (N) UAN32		Table B. Total Applied Water		Table C. Annual Yields	
Year	Lbs. of N/Acre	Year	AcIn/Year	Year	Tons/ac
1	15	1	12	2	0.0
2&3	25	2	24	3	2.5
4+	45	3+	36	4+	5.0

**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.

*Weeds.* Shading from overhead 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, April and August. Weed control in the vine rows during production years may require addition chemical or mechanical control.

*Insects.* Insect monitoring programs as a part of an IPM System are used to determine when insecticide treatment is necessary. Beginning in the third year, an insecticide is applied in early May at bloom (combined with fungicide and micronutrient application) to control moth pests (grape leaf folder, omnivorous leafroller, western grapeleaf skeletonizer). Movento is applied in the late spring in May to control mealybug species. After bloom, mite populations are monitored and treated when IPM recommended thresholds are reached, and Acramite is applied. Additional control of leafhoppers in July might be necessary as well.

*Disease.* 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 with an application of wettable sulfur soon after bud-break in late March or early April. Dusting sulfur is applied twice in April and once in June. In this study, an application of Pristine is applied in May at bloom, and an additional synthetic fungicide applied in July (in this study, Abound). In some years, in addition to wettable sulfur, a spring foliar application of an appropriate fungicide such as Abound or Sovran may be advisable at bud-break 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. If these fungicides are used early in the season, then alternative fungicide products may be selected for the later synthetic fungicide sprays, for resistance management.

**Harvest.** Canes bearing fruit are severed in August to allow the fruit to dry on the vine. The custom harvesting operation brings along with the harvester two bin trailers, two tractors, one flatbed truck and a forklift. The over-the-row harvester, picks all the fruit in one pass per vine row. The crop is harvested into one-half ton bins carried on the harvester which includes the harvester driver and an assistant. Bin handling includes loading bins on and off the harvester, stacking and/or stacking filled bins on site. The bins, which hold 1,000 to 1,200 pounds, are rented from the packer for \$21 per ton. Approximately 10 bins per acre are needed for a vineyard that produces 5 tons per acre of raisins. It is assumed that the equipment operators and assistants work hour's equivalent to the harvest time. The filled bins are hauled to the packer on the flatbed truck and the costs are

included in hauling. The truck holds 16 bins, fruit from less than two acres.

**Yields.** Raisin vineyards are fully mature by the fourth year and over years will average five-tons per acre under this trellis system. Refer to table C. for annual yields of DOV raisins under this trellis system. 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 \$1,600 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.

*Ranging Analysis.* Table 5 has a range of return prices used for calculating net returns per acre at different yields. Agricultural producers target yield and prices such that lower yields tend to be associated with higher prices. Therefore the ranging analysis's do not show the cases of very high yields with very high return prices or very low yields with very low return prices. The range of yields is from 2.75 – 7.25 tons per acre. The range in prices are \$1,150 - \$2,050.

**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 their crop from the packer.

**Pickup/ATV.** The grower uses the pickup for picking up supplies, moving equipment and employees around 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, and Interest**

**Labor.** Hourly wages for workers are \$16.00 for machine operators and \$12.00 per hour non-machine labor. These are prevailing rates in the region in July 2016. Adding 39 percent for the employers' share of federal and state payroll taxes, insurance, and other possible benefits gives the labor rates shown of \$22.24 and \$16.68 per hour for machine labor and non-machine labor, respectively. Workers' compensation insurance costs will vary among growers. The cost is based on the average industry rate as of July 2016. Labor hours for operations involving machinery are 20 percent 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. This study does not account for the new regulations on the increase in minimum wage and overtime for farm labor.

**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. The cost includes a 9.25 percent sales tax (effective January 2016) on diesel fuel and 2.25 percent sales tax on gasoline. Prices for on-farm delivery of diesel and gasoline are \$2.43 and \$2.70 per gallon, respectively. The costs are based on July 2016, Energy Information Administration (EIA), monthly data. 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 percent 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 4.25 percent 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. The rate will vary depending upon various factors, but the rate in this study is considered a typical lending rate by a farm lending agency as of July 2016.

**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 of agricultural production. Because of so many potential risk factors, effective risk management must combine specific tactics in a detailed manner, in various combinations for a sustainable operation. Moreover, Table 5 of this study reflects a ranging analysis of returns based on various assumptions which is therefore hypothetical in nature. It is important to realize that actual results may differ from the returns contained in this study. Any returns above total costs are considered returns on risk and investment to management, (or owners).

### **Cash Overhead**

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 percent 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 percent 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.

*Crop Insurance.* Federally supported crop insurance is available to growers for any unavoidable loss of production, damage or poor quality resulting from adverse weather conditions such as cool wet weather, freeze, frost, hail, heat, rain, wind and damage from birds, drought, earthquakes and fire. The crop insurance program is administered by the USDA Risk Management Agency (RMA), <http://www.rma.usda.gov/> Coverage levels are from 50-85 percent of the approved average yield as established by verifiable production records from the vineyard. Insurance coverage is for the unit, not by acre. A significant number of growers purchase crop insurance in this region. However, due to wide variability in coverages, we assume no insurance purchase in this study.

*Property Insurance.* This provides coverage for property loss and is charged at 0.843 percent of the average value of the assets over their useful life.

*Liability Insurance.* A standard farm liability insurance policy will help cover the expenses for which you become legally obligated to pay for bodily injury claims on your property and damages to another person's property as a result of a covered accident. Common liability expenses covered under your policy include



attorney fees and court costs, medical expenses for people injured on your property, injury or damage to another's property. In this study, \$884 is charged and covers the entire farm.

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

**Sanitation Services.** Sanitation services provide portable toilets for the vineyard and costs the farm \$9.88 per acre. The cost includes two double toilet units with wash basins, shade structure, delivery and pickup, and five months of weekly servicing. Costs also include soap or other suitable cleansing agent, and single use towels. 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**

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 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.* An interest rate of 3.75 percent is used to calculate capital recovery. Note this long term interest rate is lower than the interest rate used for capital invested in annual production operations. The rate will vary depending upon loan amount and other lending agency conditions, but is the basic suggested rate by a farm

lending agency as of April 2016.

**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 \$13,994 per acre or \$1,119,520 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. This well could irrigate this 80 acres in case of pump failure or other situation, but costs are not included. The irrigation system is considered an improvement to the property and has a 30-year life. District water is available to this vineyard and the water delivery costs are included in this study. An annual pump test and water analysis is performed in December or January to monitor pumping level and efficiency (gallons/minute) at a cost of \$200 per pump for the test. The costs is spread out over the total acreage of the farm. The water analysis (a separate charge) should be done annually to determine nitrate availability and to maintain regulatory records. Costs for both operations are included in this study.

**Land.** The land was formerly a vineyard, but has been out of production for two years. The open land was planted to grain crops. Bare ground with irrigation availability plantable to raisin grape vineyards is valued between \$10,000 and \$30,000. This study assumes the land is purchased at \$20,000 per acre and the producing acreage estimated worth is; \$33,994 per acre. It is the bare land value plus the establishment cost, ( $\$20,000 + \$13,994 = \$33,994$ ) Established raisin grape vineyards range in value from \$20,000 to \$33,000 per acre in this region.

**Shop/Pole Barn.** The metal building is on a cement slab with an attached gravel floor pole barn for a total of 4,000 square feet.

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

**Fuel Tanks.** Two 1,000-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 percent to indicate a mix of new and used equipment. 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 the extension personnel, growers, packers, input suppliers, and other industry representatives who provided information, assistance, and expertise for this study.

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UC COOPERATIVE EXTENSION-AGRICULTURAL ISSUES CENTER  
**TABLE 1. SAMPLE COSTS PER ACRE TO ESTABLISH A DOV RAISIN VINEYARD**  
 San Joaquin Valley- Overhead Trellis System-2016

	Year:	Costs per Acre		
		1st	2nd	3rd
Tons Per Acre Dried Fruit @ \$1,600/ton		0.0	0.0	2.5
<b>Pre-Plant &amp; Planting Costs:</b>				
Chisel 3' 2x (Custom)		340		
Level/Float		11		
Pests-Weeds-Pre-Emergence Herbicides		20		
Pests-Weeds-Disc (Incorporate Herbicide)		10		
Survey/Layout Vineyard		245		
Plant, Dig Holes/Cover/Wrap Vines (726 Vines/Ac)		6,482		
Plant, Dig Holes/Cover/Wrap-(2% Replant-2nd Year)			165	
Install Trellis System			5,635	
<b>TOTAL PLANTING COSTS</b>		<b>7,108</b>	<b>5,800</b>	<b>0</b>
<b>Cultural Costs:</b>				
Well/Water-Test/Analysis		4	4	4
Prune-Dormant (Cut Back 2 Buds)			200	400
Tie Canes				200
Shred Prunings				12
Shoot Thin/Sucker Trunks (Tie 1 Shoot)			167	167
Remove Spare Shoots/Re-Tie-Positioning			400	133
Petiole Sampling				2
Fertigate-UAN 32		11	18	18
Irrigate		124	177	242
Pests-Weeds-Winter Strip Spray			39	39
Pests-Weeds-Disc Middle 2x			15	15
Pests-Weeds-Spot Spray 20% Ac 2x			16	16
Pests-Insects/Mites				73
Pests-Disease-Mildew 5x				147
Pests-Insects-(Worms)/Disease (Mildew)/Fertilize (Zinc, Boron)				79
PCA Fee				35
ATV Use		30	30	35
Pickup Truck Use		45	45	45
<b>TOTAL CULTURAL COSTS</b>		<b>212</b>	<b>1,111</b>	<b>1,663</b>
<b>Harvest Costs:</b>				
Harvest-Sever Canes (Hand)				100
Harvest-Custom (Mechanical)				300
Harvest/Haul				61
<b>TOTAL HARVEST COSTS</b>		<b>0</b>	<b>0</b>	<b>461</b>
<b>Post-Harvest Costs:</b>				
Severed Cane Removal (Hand)				83
Shred Canes-Alternate Row Middles				6
<b>TOTAL POST-HARVEST COSTS</b>				<b>89</b>
Interest On Operating Capital @ 4.25%		211	208	38
<b>TOTAL OPERATING COSTS/ACRE</b>		<b>7,531</b>	<b>7,118</b>	<b>2,252</b>
<b>Cash Overhead Costs:</b>				
Office Expense		75	75	75
Liability Insurance		11	11	11
Sanitation Services		10	10	10
Property Taxes		211	211	212
Property Insurance		18	18	18
Investment Repairs		39	39	39
<b>TOTAL CASH OVERHEAD COSTS</b>		<b>364</b>	<b>364</b>	<b>365</b>
<b>TOTAL CASH COSTS/ACRE</b>		<b>7,895</b>	<b>7,482</b>	<b>2,617</b>
<b>INCOME/ACRE FROM PRODUCTION</b>		<b>0</b>	<b>0</b>	<b>4,000</b>
<b>NET CASH COSTS/ACRE FOR THE YEAR</b>		<b>7,895</b>	<b>7,482</b>	<b>0</b>
<b>PROFIT/ACRE ABOVE CASH COSTS</b>		<b>0</b>	<b>0</b>	<b>1,383</b>
<b>ACCUMULATED NET CASH COSTS/ACRE</b>		<b>7,895</b>	<b>15,377</b>	<b>13,994</b>

UC COOPERATIVE EXTENSION-AGRICULTURAL ISSUES CENTER  
**TABLE 1. CONTINUED**  
 San Joaquin Valley- Overhead Trellis System-2016

	Year;	Costs per Acre		
		1 <sup>st</sup>	2 <sup>nd</sup>	3 <sup>rd</sup>
Tons per Acre Dried Fruit @ \$1,600/ton;		0	0	2.5
<b>Non-Cash Overhead Costs:</b>				
Land		750	750	750
Irrigation System		75	75	75
Shop Building		35	35	35
Shop Tools		3	3	3
Fuel Tank & Pump		4	4	4
Equipment		30	31	77
<b>TOTAL NON-CASH OVERHEAD COSTS</b>		<b>897</b>	<b>898</b>	<b>945</b>
<b>TOTAL COST/ACRE FOR THE YEAR</b>		<b>8,792</b>	<b>8,380</b>	<b>3,562</b>
<b>INCOME/ACRE FROM PRODUCTION</b>		<b>0</b>	<b>0</b>	<b>4,000</b>
<b>TOTAL NET COST/ACRE FOR THE YEAR</b>		<b>8,792</b>	<b>8,380</b>	<b>0</b>
<b>NET PROFIT/ACRE ABOVE TOTAL COSTS</b>		<b>0</b>	<b>0</b>	<b>438</b>
<b>TOTAL ACCUMULATED NET COST/ACRE</b>		<b>8,792</b>	<b>17,172</b>	<b>16,734</b>



UC COOPERATIVE EXTENSION-AGRICULTURAL ISSUES CENTER  
**TABLE 2. COSTS PER ACRE TO PRODUCE DOV RAISINS**  
 San Joaquin Valley- Overhead Trellis System-2016

Operation	Equipment	Cash and Labor Costs per Acre						Total Cost	Your Cost
	Time (Hrs/A)	Labor Cost	Fuel	Lube & Repairs	Material Cost	Custom/Rent			
Cultural:									
Well/Water Test/Analysis	0.00	0	0	0	0	4	4		
Prune-Cut Back	0.00	400	0	0	0	0	400		
Tie Canes	0.00	234	0	0	0	0	234		
Shred Prunings	0.29	8	2	3	0	0	12		
Sucker Trunks/Thin Shoots	0.00	200	0	0	0	0	200		
Shoot Positioning	0.00	167	0	0	0	0	167		
Petiole Sampling-PCA	0.00	0	0	0	0	2	2		
Irrigate	0.00	47	0	0	195	0	242		
Fertilize 2x	0.00	0	0	0	31	0	31		
Pests-Weeds Spot Spray 20% Ac 3x	0.59	16	2	1	7	0	25		
Pests-Weeds Disc 2x	0.41	11	2	2	0	0	15		
Pests-Insects/Disease/Fertilizer	0.46	12	3	3	61	0	79		
Pests-Insects 2x	0.92	24	5	7	125	0	161		
Pests-Disease-Mildew 5x	2.29	61	13	13	54	0	140		
Pickup Truck Use	1.25	33	8	4	0	0	45		
ATV 4WD	1.00	27	3	0	0	0	30		
PCA Fee	0.00	0	0	0	0	35	35		
<b>TOTAL CULTURAL COSTS</b>	<b>7.21</b>	<b>1,240</b>	<b>37</b>	<b>32</b>	<b>473</b>	<b>41</b>	<b>1,823</b>		
Harvest:									
Harvest-Sever Canes	0.00	133	0	0	0	0	133		
Harvest-Custom	0.00	0	0	0	0	300	300		
Harvest-Haul	1.67	44	12	12	0	0	68		
<b>TOTAL HARVEST COSTS</b>	<b>1.67</b>	<b>178</b>	<b>12</b>	<b>12</b>	<b>0</b>	<b>300</b>	<b>502</b>		
Post-Harvest:									
Severed Cane Removal	0.00	83	0	0	0	0	83		
Shred Canes-Alternate Middles	0.15	4	1	1	0	0	6		
<b>TOTAL POST-HARVEST COSTS</b>	<b>0.15</b>	<b>87</b>	<b>1</b>	<b>1</b>	<b>0</b>	<b>0</b>	<b>89</b>		
Interest on Operating Capital at 4.25%								39	
<b>TOTAL OPERATING COSTS/ACRE</b>	<b>9.00</b>	<b>1,506</b>	<b>50</b>	<b>45</b>	<b>473</b>	<b>341</b>	<b>2,453</b>		

UC COOPERATIVE EXTENSION-AGRICULTURAL ISSUES CENTER  
**TABLE 2. CONTINUED**  
 San Joaquin Valley- Overhead Trellis System-2016

Operation	Equipment	Cash and Labor Costs per Acre					Total Cost	Your Cost
	Time (Hrs/A)	Labor Cost	Fuel	Lube & Repairs	Material Cost	Custom/Rent		
<b>CASH OVERHEAD:</b>								
Liability Insurance							11	
Office Expense							75	
Field Sanitation							10	
Property Taxes							283	
Property Insurance							24	
Investment Repairs							39	
<b>TOTAL CASH OVERHEAD COSTS/ACRE</b>							<b>441</b>	
<b>TOTAL CASH COSTS/ACRE</b>							<b>2,894</b>	
<b>NON-CASH OVERHEAD:</b>								
		Per Producing Acre	Annual Cost					
			Capital Recovery					
Shop Building 4000SqFt		625	35				35	
Drip Irrigation System		1,200	75				75	
Shop Tools		63	3				3	
Land-Raisins		20,000	750				750	
Fuel Tanks (2) 1,000gal		69	4				4	
Vineyard Establishment-OHT		13,994	833				833	
Equipment		894	85				85	
<b>TOTAL NON-CASH OVERHEAD COSTS</b>		<b>36,845</b>	<b>1,786</b>				<b>1,786</b>	
<b>TOTAL COSTS/ACRE</b>							<b>4,680</b>	

UC COOPERATIVE EXTENSION-AGRICULTURAL ISSUES CENTER  
**TABLE 3. COSTS AND RETURNS PER ACRE TO PRODUCE DOV RAISINS**  
 San Joaquin Valley- Overhead Trellis System-2016

	Quantity/ Acre	Unit	Price or Cost/Unit	Value or Cost/Acre	Your Cost
<b>GROSS RETURNS</b>					
Raisins	5.0	Ton	1,600	8,000	
<b>TOTAL GROSS RETURNS</b>				8,000	
<b>OPERATING COSTS</b>					
<b>Fertilizer:</b>					
UAN32	45.00	Lb N	0.70		54
Neutral Zinc 50%	10.00	Lb	1.30		31
Boron- Solubor 20.5%	4.87	Lb	1.94		13
<b>Insecticide:</b>					
Admire Pro	1.40	FLOz	2.86		9
Movement	8.00	FLOz	6.88		129
Acramite	1.00	Lb	69.74		4
<b>Fungicide:</b>					
Rubigan EC	10.00	FLOz	6.88		55
Sulfur DF	10.00	Lb	1.57		70
Sulfur Dry-Dust	30.00	Lb	0.12		88
<b>Herbicide:</b>					
Roundup Ultra	1.50	Pint	4.38		69
<b>Irrigation:</b>					
Water-Raisins	36.00	Acln	5.42		16
<b>Custom:</b>					
Well Test	1.00	Acre	2.50		4
Water Analysis	1.00	Acre	1.00		7
Harvest Raisins-Custom	1.00	Acre	300.00		195
<b>Contract:</b>					
Petiole Sampling	1.00	Acre	2.00		304
Pest Control Advisor (PCA)	1.00	Acre	35.00		3
<b>Labor</b>					
Equipment Operator Labor	10.83	hrs	22.24		241
Pruning Labor	24.00	hrs	16.68		400
Canopy Mgmt	36.00	hrs	16.68		600
Irrigation Labor	2.82	hrs	16.68		47
Non-Machine Labor	13.00	hrs	16.68		217
<b>Machinery</b>					
Fuel-Gas	4.71	gal	2.70		95
Fuel-Diesel	15.26	gal	2.43		13
Lube					37
Machinery Repair					7
Interest on Operating Capital @ 4.25%					38
<b>TOTAL OPERATING COSTS/ACRE</b>				2,453	
<b>TOTAL OPERATING COSTS/TON</b>				491	
<b>NET RETURNS ABOVE OPERATING COSTS</b>				5,547	

## UC COOPERATIVE EXTENSION-AGRICULTURAL ISSUES CENTER

**TABLE 3. CONTINUED**

San Joaquin Valley- Overhead Trellis System-2016

	Quantity/ Acre	Unit	Price or Cost/Unit	Value or Cost/Acre	Your Cost
<b>CASH OVERHEAD COSTS</b>					
Liability Insurance				11	
Office Expense				75	
Field Sanitation				10	
Property Taxes				283	
Property Insurance				24	
Investment Repairs				39	
<b>TOTAL CASH OVERHEAD COSTS/ACRE</b>				<b>441</b>	
<b>TOTAL CASH OVERHEAD COSTS/TON</b>				<b>88</b>	
<b>TOTAL CASH COSTS/ACRE</b>				<b>2,894</b>	
<b>TOTAL CASH COSTS/TON</b>				<b>579</b>	
<b>NET RETURNS ABOVE CASH COSTS</b>				<b>5,106</b>	
<b>NON-CASH OVERHEAD COSTS (Capital Recovery)</b>					
Shop Building 4000SqFt				35	
Drip Irrigation System				75	
Shop Tools				3	
Land-Raisins				750	
Fuel Tanks (2) 1,000gal				4	
Vineyard Establishment-OHT				833	
Equipment				85	
<b>TOTAL NON-CASH OVERHEAD COSTS/ACRE</b>				<b>1,786</b>	
<b>TOTAL NON-CASH OVERHEAD COSTS/TON</b>				<b>357</b>	
<b>TOTAL COST/ACRE</b>				<b>4,680</b>	
<b>TOTAL COST/TON</b>				<b>936</b>	
<b>NET RETURNS ABOVE TOTAL COST</b>				<b>3,320</b>	

UC COOPERATIVE EXTENSION-AGRICULTURAL ISSUES CENTER  
**TABLE 4. MONTHLY CASH COSTS PER ACRE TO PRODUCE DOV RAISINS**  
 San Joaquin Valley- Overhead Trellis System-2016

	JAN 16	FEB 16	MAR 16	APR 16	MAY 16	JUN 16	JUL 16	AUG 16	SEP 16	OCT 16	Total
<b>Cultural:</b>											
Well/Water Test/Analysis	4										4
Prune-Cut Back	400										400
Tie Canes		234									234
Shred Prunings		12									12
Sucker Trunks/Thin Shoots				200							200
Shoot Positioning					167						167
Petiole Sampling-PCA				2							2
Irrigate				19	25	41	50	50	38	19	242
Fertilize 2x				16	16						31
Pests-Weeds Spot Spray 20% Ac 3x		8		8				8			25
Pests-Weeds Disc 2x		8			8						15
Pests-Insects/Disease/Fertilizer					79						79
Pests-Insects 2x					73	88					161
Pests-Disease-Mildew 5x			34	36		70					140
Pickup Truck Use										45	45
ATV 4WD										30	30
PCA Fee										35	35
<b>TOTAL CULTURAL COSTS</b>	<b>404</b>	<b>262</b>	<b>34</b>	<b>281</b>	<b>367</b>	<b>199</b>	<b>50</b>	<b>58</b>	<b>38</b>	<b>129</b>	<b>1,823</b>
<b>Harvest:</b>											
Harvest-Sever Canes								133			133
Harvest-Custom									300		300
Harvest-Haul									68		68
<b>TOTAL HARVEST COSTS</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>133</b>	<b>368</b>	<b>0</b>	<b>502</b>
<b>Post-Harvest:</b>											
Severed Cane Removal										83	83
Shred Canes-Alternate Middles										6	6
<b>TOTAL POST-HARVEST COSTS</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>89</b>	<b>89</b>
Interest on Operating Capital @4.25%	1	2	2	3	5	5	6	6	8	-1	39
<b>TOTAL OPERATING COSTS/ACRE</b>	<b>405</b>	<b>264</b>	<b>36</b>	<b>285</b>	<b>372</b>	<b>205</b>	<b>55</b>	<b>198</b>	<b>414</b>	<b>218</b>	<b>2,453</b>
<b>CASH OVERHEAD</b>											
Liability Insurance									11		11
Office Expense									75		75
Field Sanitation	1	1	1	1	1	1	1	1	1	1	10
Property Taxes		141					141				283
Property Insurance		12					12				24
Investment Repairs	4	4	4	4	4	4	4	4	4	4	39
<b>TOTAL CASH OVERHEAD COSTS</b>	<b>5</b>	<b>158</b>	<b>5</b>	<b>5</b>	<b>5</b>	<b>5</b>	<b>158</b>	<b>5</b>	<b>91</b>	<b>5</b>	<b>441</b>
<b>TOTAL CASH COSTS/ACRE</b>	<b>410</b>	<b>422</b>	<b>41</b>	<b>290</b>	<b>377</b>	<b>210</b>	<b>214</b>	<b>203</b>	<b>505</b>	<b>223</b>	<b>2,894</b>

UC COOPERATIVE EXTENSION-AGRICULTURAL ISSUES CENTER  
**TABLE 5. RANGING ANALYSIS-DOV RAISINS**  
 San Joaquin Valley- Overhead Trellis System-2016

COSTS PER ACRE AND PER TON AT VARYING YIELDS FOR DOV-RAISINS (OHT)

	YIELD (TONS)						
	2.75	3.50	4.25	5.00	5.75	6.50	7.25
<b>OPERATING COSTS/ACRE:</b>							
Cultural	1,823	1,823	1,823	1,823	1,823	1,823	1,823
Harvest	307	372	437	502	567	632	697
Post-Harvest	89	89	89	89	89	89	89
Interest on Operating Capital @ 4.25%	38.07	38.37	38.67	38.97	39.28	39.58	39.88
<b>TOTAL OPERATING COSTS/ACRE</b>	<b>2,257</b>	<b>2,322</b>	<b>2,387</b>	<b>2,453</b>	<b>2,518</b>	<b>2,583</b>	<b>2,649</b>
<b>TOTAL OPERATING COSTS/TON</b>	<b>820.62</b>	<b>663.44</b>	<b>561.73</b>	<b>490.53</b>	<b>437.91</b>	<b>397.43</b>	<b>365.33</b>
<b>CASH OVERHEAD COSTS/ACRE</b>	<b>441</b>	<b>441</b>	<b>441</b>	<b>441</b>	<b>441</b>	<b>441</b>	<b>441</b>
<b>TOTAL CASH COSTS/ACRE</b>	<b>2,698</b>	<b>2,764</b>	<b>2,829</b>	<b>2,894</b>	<b>2,959</b>	<b>3,025</b>	<b>3,090</b>
<b>TOTAL CASH COSTS/TON</b>	<b>981.17</b>	<b>789.58</b>	<b>665.61</b>	<b>578.83</b>	<b>514.69</b>	<b>465.35</b>	<b>426.22</b>
<b>NON-CASH OVERHEAD COSTS/ACRE</b>	<b>1,786</b>	<b>1,786</b>	<b>1,786</b>	<b>1,786</b>	<b>1,786</b>	<b>1,786</b>	<b>1,786</b>
<b>TOTAL COSTS/ACRE</b>	<b>4,484</b>	<b>4,550</b>	<b>4,615</b>	<b>4,680</b>	<b>4,746</b>	<b>4,811</b>	<b>4,876</b>
<b>TOTAL COSTS/TON</b>	<b>1,631.00</b>	<b>1,300.00</b>	<b>1,086.0</b>	<b>936.00</b>	<b>825.00</b>	<b>740.00</b>	<b>673.00</b>
<b>Net Return per Acre above Operating Costs for Production</b>							
PRICE (\$/ton)	YIELD (Tons/acre)						
Raisins	2.75	3.50	4.25	5.00	5.75	6.50	7.25
1150.00	906	1,703	2,500	3,297	4,095	4,892	5,689
1300.00	1,318	2,228	3,138	4,047	4,957	5,867	6,776
1450.00	1,731	2,753	3,775	4,797	5,820	6,842	7,864
1600.00	2,143	3,278	4,413	5,547	6,682	7,817	8,951
1750.00	2,556	3,803	5,050	6,297	7,545	8,792	10,039
1900.00	2,968	4,328	5,688	7,047	8,407	9,767	11,126
2050.00	3,381	4,853	6,325	7,797	9,270	10,742	12,214
<b>Net Return per Acre above Cash Costs for Production</b>							
PRICE (\$/ton)	YIELD (Tons/acre)						
Raisins	2.75	3.50	4.25	5.00	5.75	6.50	7.25
1150.00	464	1,261	2,059	2,856	3,653	4,450	5,247
1300.00	877	1,786	2,696	3,606	4,516	5,425	6,335
1450.00	1,289	2,311	3,334	4,356	5,378	6,400	7,422
1600.00	1,702	2,836	3,971	5,106	6,241	7,375	8,510
1750.00	2,114	3,361	4,609	5,856	7,103	8,350	9,597
1900.00	2,527	3,886	5,246	6,606	7,966	9,325	10,685
2050.00	2,939	4,411	5,884	7,356	8,828	10,300	11,772
<b>Net Return per Acre above Total Costs for Production</b>							
PRICE (\$/ton)	YIELD (Tons/acre)						
Raisins	2.75	3.50	4.25	5.00	5.75	6.50	7.25
1150.00	-1,322	-525	273	1,070	1,867	2,664	3,461
1300.00	-909	_0	910	1,820	2,729	3,639	4,549
1450.00	-497	525	1,548	2,570	3,592	4,614	5,636
1600.00	-84	1,050	2,185	3,320	4,454	5,589	6,724
1750.00	328	1,575	2,823	4,070	5,317	6,564	7,811
1900.00	741	2,100	3,460	4,820	6,179	7,539	8,899
2050.00	1,153	2,625	4,098	5,570	7,042	8,514	9,986



UC COOPERATIVE EXTENSION-AGRICULTURAL ISSUES CENTER  
**TABLE 6. WHOLE FARM EQUIPMENT, INVESTMENT, AND BUSINESS OVERHEAD COSTS**  
 San Joaquin Valley- Overhead Trellis System-2016

ANNUAL EQUIPMENT COSTS								
Yr.	Description	Price	Yrs. Life	Salvage Value	Capital Recovery	Cash Overhead		Total
						Insurance	Taxes	
16	Pickup Truck 1/2 T	26,000	7	9,863	3,034	15	179	3,228
16	ATV	6,499	10	1,920	630	4	42	675
16	ATV Sprayer 20 Gallon	4,017	10	710	429	2	24	455
16	85 HP Tractor	77,638	15	15,115	6,092	39	464	6,595
16	Duster 3 Point-PTO	8,000	10	1,415	855	4	47	906
16	8' Offset Disc	12,444	20	649	873	6	65	944
16	Airblast Sprayer-PTO, 300 Gal	25,000	10	4,421	2,672	12	147	2,831
16	Bobtail Truck	60,000	10	17,723	5,812	33	389	6,234
16	Shredder/Mower 8'	14,579	10	2,578	1,558	7	86	1,651
<b>TOTAL</b>		<b>234,177</b>	<b>-</b>	<b>54,393</b>	<b>21,955</b>	<b>122</b>	<b>1,443</b>	<b>23,519</b>
60% of New Cost*		140,506	-	32,636	13,173	73	866	14,111

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

ANNUAL INVESTMENT COSTS

Description	Price	Yrs. Life	Salvage Value	Capital Recovery	Cash Overhead			Total
					Insurance	Taxes	Repairs	
<b>INVESTMENT</b>								
Shop Building 4000SqFt	100,000	30	0	5,609	42	500	2,000	8,151
Drip Irrigation System	96,000	25	0	5,984	40	480	1,920	8,424
Shop Tools	10,000	30	1,000	542	5	55	200	802
Land-Raisins	1,600,000	30	1,600,000	60,000	1,349	16,000	0	77,349
Fuel Tanks (2) 1,000gal	10,975	20	2,195	714	6	66	220	1,006
Vineyard Establishment-OHT	1,119,520	27	0	66,649	472	5,598	0	72,718
<b>TOTAL INVESTMENT</b>	<b>2,936,495</b>	<b>-</b>	<b>1,603,195</b>	<b>139,498</b>	<b>1,913</b>	<b>22,698</b>	<b>4,340</b>	<b>168,450</b>

ANNUAL BUSINESS OVERHEAD COSTS

Description	Units/ Farm	Unit	Price/ Unit	Total Cost
Liability Insurance	80	Acre	11.05	884
Office Expense SJV	80	Acre	75.00	6,000
Field Sanitation	80	Acre	9.875	790

ANNUAL EQUIPMENT COSTS  
 UC COOPERATIVE EXTENSION-AGRICULTURAL ISSUES CENTER  
**TABLE 7. HOURLY EQUIPMENT COSTS**  
 San Joaquin Valley- Overhead Trellis System-2016

Yr.	Description	Hours Used	Total Hours Used	Capital Recovery	Cash Overhead		Operating		Total Oper.	Total Costs/Hr.
					Insurance	Taxes	Lube & Repairs	Fuel		
16	Pickup Truck 1/2 T	100	290	6.28	0.03	0.37	2.91	6.75	9.66	16.34
16	ATV	127	200	1.89	0.01	0.13	0.46	2.70	3.16	5.19
16	ATV Sprayer 20 Gallon	47	150	1.72	0.01	0.09	1.09	0.00	1.09	2.91
16	85 HP Tractor	398	1000	3.66	0.02	0.28	2.66	5.01	7.67	11.63
16	Duster 3 Point-PTO	110	200	2.56	0.01	0.14	1.39	0.00	1.39	4.11
16	8' Offset Disc	33	100	5.24	0.03	0.39	1.98	0.00	1.98	7.64
16	Bobtail Truck	133	200	17.44	0.10	1.17	6.94	7.29	14.23	32.93
16	Shredder/Mower 8'	35	200	4.67	0.02	0.26	6.23	0.00	6.23	11.18
16	Airblast Sprayer-PTO, 300 Gal	183	200	8.01	0.04	0.44	4.36	0.00	4.36	12.85

UC COOPERATIVE EXTENSION-AGRICULTURAL ISSUES CENTER  
**TABLE 8. OPERATIONS WITH EQUIPMENT & MATERIALS**  
 San Joaquin Valley- Overhead Trellis System-2016

Operation	Operation Month	Tractor	Implement	Labor Type/ Material	Rate/ acre	Unit
Well/Water Test/Analysis	Jan			Well Test	1.00	Acre
				Water Analysis	1.00	Acre
Prune-Cut Back	Jan			Pruning Labor	24.00	hours
Tie Canes	Feb			Canopy Mgmt	14.00	hours
Shred Prunings	Feb	85 HP Tractor	Shredder/Mower 8'	Equipment Operator Labor	0.35	hour
Sucker Trunks/Thin Shoots	Apr			Canopy Mgmt	12.00	hours
Shoot Positioning	May			Canopy Mgmt	10.00	hours
Petiole Sampling-PCA	Apr			Petiole Sampling	1.00	Acre
Irrigate	Apr			Irrigation Labor	0.18	hour
	May			Water-Raisins	3.00	AcIn
	May			Irrigation Labor	0.35	hour
	June			Water-Raisins	3.50	AcIn
	June			Irrigation Labor	0.35	hour
	July			Water-Raisins	6.50	AcIn
	July			Irrigation Labor	0.71	hour
	Aug			Water-Raisins	7.00	AcIn
	Aug			Irrigation Labor	0.71	hour
	Sept			Water-Raisins	7.00	AcIn
	Sept			Irrigation Labor	0.35	hour
	Oct			Water-Raisins	6.00	AcIn
	Oct			Irrigation Labor	0.17	hour
				Water-Raisins	3.00	AcIn
Fertilize 2x	Apr			UAN32	22.50	Lb N
	May			UAN32	22.50	Lb N
Pests-Weeds Spot Spray	Feb		ATV	Equipment Operator Labor	0.23	hour
				Roundup Ultra	0.50	Pint
	Apr		ATV Sprayer 20 Gallon ATV	Equipment Operator Labor	0.23	hour
				Roundup Ultra	0.50	Pint
	Aug		ATV Sprayer 20 Gallon ATV	Equipment Operator Labor	0.23	hour
				Roundup Ultra	0.50	Pint
Pests-Weeds Disc 2x	Feb	85 HP Tractor	ATV Sprayer 20 Gallon 8' Offset Disc	Equipment Operator Labor	0.25	hour
	May	85 HP Tractor	8' Offset Disc	Equipment Operator Labor	0.25	hour
Pests-Insects/Disease	May	85 HP Tractor	Airblast Sprayer-PTO, 300 Gal	Equipment Operator Labor	0.55	hour
				Rubigan EC	5.00	FIOz
				Neutral Zinc 50%	10.00	Lb
				Boron- Solubor 20.5%	4.87	Lb
				Admire Pro	1.40	FIOz
Pests-Insects 2x	May	85 HP Tractor	Airblast Sprayer-PTO, 300 Gal	Equipment Operator Labor	0.55	hour
	June	85 HP Tractor	Airblast Sprayer-PTO, 300 Gal	Movento	8.00	FIOz
				Equipment Operator Labor	0.55	hour
				Acramite	1.00	Lb
Pests-Disease-Mildew	Mar	85 HP Tractor	Airblast Sprayer-PTO, 300 Gal	Equipment Operator Labor	0.55	hour
	Apr	85 HP Tractor	Duster 3 Point-PTO	Sulfur DF	10.00	Lb
	Apr	85 HP Tractor	Duster 3 Point-PTO	Equipment Operator Labor	0.55	hour
	Apr	85 HP Tractor	Duster 3 Point-PTO	Sulfur Dry-Dust	10.00	Lb
	June	85 HP Tractor	Duster 3 Point-PTO	Equipment Operator Labor	0.55	hour
	June	85 HP Tractor	Duster 3 Point-PTO	Sulfur Dry-Dust	10.00	Lb
	June	85 HP Tractor	Airblast Sprayer-PTO, 300 Gal	Equipment Operator Labor	0.55	hour
				Rubigan EC	5.00	FIOz
Pickup Truck Use	Oct		Pickup Truck 1/2 T	Equipment Operator Labor	1.50	hours
ATV 4WD	Oct		ATV	Equipment Operator Labor	1.20	hours
PCA Fee	Oct			Pest Control Advisor (PCA)	1.00	Acre
Harvest-Sever Canes	Aug			Non-Machine Labor	8.00	hours
Harvest-Custom	Sept			Harvest Raisins-Custom	1.00	Acre
Harvest-Haul	Sept		Bobtail Truck	Equipment Operator Labor	2.00	hours
Severed Cane Removal	Oct			Non-Machine Labor	5.00	hours
Shred Canes-Alternate Rows	Oct	85 HP Tractor	Shredder/Mower 8'	Equipment Operator Labor	0.18	hour