
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**



Photo courtesy of Matt Fidelibus

OPEN GABLE TRELLIS SYSTEM

Early Maturing Varieties

SAN JOAQUIN VALLEY-2016

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

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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), Overhead 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. 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 dried-on-the-vine raisins using an open gable trellis system. Cultural practices may vary among growers within the region; therefore, many of the costs, practices, and materials in this study may not be applicable to every farm. The practices and inputs used in this cost study serve 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 vineyard, owned and operated by the grower, is located on previously farmed land in the San Joaquin Valley. The farm is comprised of 160 acres, 75 of which are producing raisins, and 80 acres of raisin grapes being established on an open gable trellis system. Roads, irrigation systems, and farmstead occupy the remaining 5 acres.

Establishment Cultural Practices and Material Inputs

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 combined and shown in the first year.

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

Planting. Planting starts by laying out and marking vine sites in late winter. In the spring, holes are dug and the vines are planted and protected with an open carton placed over the vine. In the second year 2 percent or 13 vines per acre are replanted for those lost in the first year.

Vines. Early maturing varieties such as Selma Pete or Fiesta are planted with 11 feet between rows, and with 6 foot spacing between vines at 660 vines per acre. They are purchased as dormant vines that have been bench grafted or field budded onto nematode/phyllloxera resistant rootstock. The life of the vineyard at planting is expected to be 30 years and the grapevines are expected to begin yielding harvestable fruit in three years.

Training/Pruning. Training and pruning to establish the vine framework will vary with variety and trellis

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

Irrigation. In this study, 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. **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).

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. Vineyard floor management begins in late winter, February of the second 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 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 third years (Table A.). Beginning in the third year, Zinc as neutral zinc and Boron are applied with the bloom spray (Movento and Rubigan).

Harvest. Harvest begins 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 yields approximately 2-3 tons of dried 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 placed in row middles are shredded and disced (see weeds). The vines are cane pruned with renewal spurs in January, canes tied in February, shoot thinned in April, and shoot positioning 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 and 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 many pesticides and are made by licensed pest control advisors. In addition the PCA will monitor the field for agronomic problems including pests and nutrition. The PCA will create and fulfill a Nitrogen Management Plan. 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 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.

Tables;

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+	4.0

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. For information and pesticide use permits, contact the local county agricultural commissioner's office.

Weeds. Shading from open gable trellising in mature vineyards helps control weeds. The row middles are mowed with shredding of prunings and disced in February and all rows are disced again in May. Vine row weeds are controlled with three Roundup spot sprays in February, April and August. Weed control in the vine rows during production years may require addition chemical or mechanical control.

Insects. In early May at bloom, an insecticide, Provado is applied (combined with fungicide and micronutrient application) to control moth pests (grape leaf folder, omnivorous Leafroller, western Grapeleaf Skeletonizer). Movento insecticide is applied in early May at bloom 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 may be necessary as well.

Disease. Many pathogens attack grapevines, but the major diseases considered in this study are powdery mildew, and Phomopsis cane and leaf spot. A dusting and spraying program for these diseases begins with an application of wettable sulfur soon after 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 at early bloom (with the worm and fertilizer application) 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 disease pressure is high. A strobilurin fungicide may be used for longer residual effect during extended rain events.

Harvest. Canes bearing fruit are cut by hand in August to allow the fruit to dry on the vine. The grower owns a self-propelled raisin harvester, two bin trailers, two tractors and one flatbed truck. The grower rents a forklift for two weeks. An over-the-row harvester is used, making one pass per vine row. The crop is harvested into one-half ton bins, which hold 1,000 to 1,200 pounds of raisins that are rented from the packer at \$20 per ton. If a vineyard produces 4.0 tons of raisins per acre, approximately 8 bins per acre will be needed. Labor costs include a driver for each tractor (3) and the forklift operator. The grower owned tractors pull the two bin trailers. One bin trailer driver follows the harvester while the other bin driver delivers the raisins to the staging area. The forklift operator works in the staging area unloading and loading bins. It is assumed that all drivers and operators work 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, containing raisins from approximately two acres.

Yields. Raisin vineyards reach maturity in the fourth year and over the production years will average 3.5-4.0 tons per acre, under this trellis system. Refer to Table C. for annual yields of 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 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 2.50 – 5.50 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 purchased 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 cost the farm \$9.88 per acre. The cost includes two double toilet units with washbasins, shade structure, delivery and pickup, and five months of weekly servicing. Costs also include soap or other suitable cleansing agent, and single use towers. Separate potable water and single-use drinking cups are also supplied.

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

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

Non-Cash Overhead

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 July 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 \$13,412 per acre or \$1,072,960 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. An annual pump test 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 cost 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. For this study, the producing acreage estimated worth is; \$33,971 per acre. It is the bare land value plus the establishment cost, ($\$20,000 + \$13,971 = \$33,971$) 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 a cement slab with an attached gravel floor pole barn for a total of 4,000 square feet.

Shop 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. Annual ownership costs for equipment and other investments are shown in Tables 3 and 8. Equipment costs are composed of three parts: non-cash overhead, cash overhead, and operating costs. Both of the overhead factors have been discussed in previous sections. The operating costs consist of repairs, fuel, and lubrication and are discussed under operating costs.

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

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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-Open Gable Trellis System-2016

Year:	1st	2nd	3rd
Tons per Acre: Dried Fruit @ \$1,600/ton:	0.0	0.0	2.5
Planting Costs:			
Chisel 3' 2x (Custom)	340		
Level/Float	11		
Pests-Weeds-Pre-Emergence Herbicide	20		
Pests-Weeds-Disc (Incorporate Herbicide)	10		
Survey/Layout Vineyard	245		
Dig Holes, Plant, Cover Vines	5,938		
Vines: 660 Per Acre (2% Replant/2nd Year)		158	
Install Trellis System		5,635	
TOTAL PLANTING COSTS	6,564	5,793	0
Cultural Costs:			
Well/Water Test/Analysis	4	4	4
Prune-Dormant (Cut back 2 buds)		200	400
Tie Canes			200
Shred Prunings			12
Thin Shoots/Sucker Trunks (Tie 1 Shoot)		167	167
Remove Spare Shoots/Re-Tie-Positioning		400	133
Fertigate UAN 32	11	18	18
Irrigate	124	177	242
Petiole Sampling			2
Pests-Weeds-Strip Spray		39	39
Pests-Weeds-Disc Middles 2x		15	15
Pests-Weeds-Spot Spray 20% Ac 2x		16	16
Pests-Insects			73
Pests-Disease-Mildew 5x			147
Pests-Insect-(Worms)/Disease-(Mildew)/Fertilize-(Zinc & Boron)			185
PCA Fee			35
ATV Use	30	30	35
Pickup Truck Use	45	45	45
TOTAL CULTURAL COSTS	212	1,111	1,769
Harvest Costs:			
Harvest-Sever Canes			100
Harvest-Mechanical			51
Harvest-Bin Handling			125
Harvest/Haul			61
TOTAL HARVEST COSTS	0	0	337
Post-Harvest Costs:			
Cane Removal			83
Shred Canes-Alternate Rows			6
TOTAL POST HARVEST COSTS			89
Interest On Operating Capital @ 4.25%	196	208	39
TOTAL OPERATING COSTS/ACRE	6,972	7,111	2,235
Cash Overhead Costs:			
Office Expense	75	75	75
Liability Insurance	11	11	11
Sanitation Services	10	10	10
Property Taxes	211	211	213
Property Insurance	18	18	18
Investment Repairs	39	39	39
TOTAL CASH OVERHEAD COSTS	364	364	366
TOTAL CASH COSTS/ACRE	7,336	7,475	2,601
INCOME/ACRE FROM PRODUCTION			4,000
NET CASH COSTS/ACRE FOR THE YEAR	7,336	7,475	
PROFIT/ACRE ABOVE CASH COSTS			1,399
ACCUMULATED NET CASH COSTS/ACRE	7,336	14,811	13,412

UC COOPERATIVE EXTENSION-AGRICULTURAL ISSUES CENTER

Table 1. CONTINUED

San Joaquin Valley-Open Gable Trellis System-2016

Year:	1st	2nd	3rd
Tons per Acre: Dried Fruit @ \$1,600/ton:	0.0	0.0	2.5
NON-CASH OVERHEAD:			
Land-Raisins	750	750	750
Drip Irrigation System	75	75	75
Shop/Pole Barn	35	35	35
Shop Tools	3	3	3
Fuel Tanks	4	4	4
Equipment	30	31	90
TOTAL CAPITAL RECOVERY COST	897	898	958
TOTAL COST/ACRE FOR THE YEAR	8,233	8,373	3,558
INCOME/ACRE FROM PRODUCTION			4,000
TOTAL NET COST/ACRE FOR THE YEAR	8,233	8,373	
NET PROFIT/ACRE ABOVE TOTAL COST			442
TOTAL ACCUMULATED NET COST/ACRE	8,233	16,606	16,164

UC COOPERATIVE EXTENSION-AGRICULTURAL ISSUES CENTER

Table 2. COSTS PER ACRE TO PRODUCE DOV RAISINS

San Joaquin Valley-Open Gable 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	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	
TOTAL CULTURAL COSTS	7.21	1,240	37	32	473	41	1,823	
Harvest:								
Harvest-Sever Canes-Hand	0.00	133	0	0	0	0	133	
Harvest-Mechanical	0.75	53	24	7	0	0	84	
Harvest-Bin Handling	1.00	43	6	3	0	155	207	
Harvest-Haul	1.67	44	12	12	0	0	68	
TOTAL HARVEST COSTS	3.42	275	43	21	0	155	493	
Post-Harvest:								
Severed Cane Removal	0.00	83	0	0	0	0	83	
Shred Canes-Alternate Row Middle	0.15	4	1	1	0	0	6	
TOTAL POST-HARVEST COSTS	0.15	87	1	1	0	0	89	
Interest on Operating Capital at 4.25%							41	
TOTAL OPERATING COSTS/ACRE	11	1,602	80	55	473	196	2,447	

UC COOPERATIVE EXTENSION-AGRICULTURAL ISSUES CENTER
Table 2. CONTINUED
 San Joaquin Valley-Open Gable 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			
CASH OVERHEAD:									
Liability Insurance								11	
Office Expense								75	
Field Sanitation								10	
Property Taxes								280	
Property Insurance								24	
Investment Repairs								39	
TOTAL CASH OVERHEAD COSTS/ACRE								439	
TOTAL CASH COSTS/ACRE								2,886	
NON-CASH OVERHEAD:									
		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-OGT		13,412			798			798	
Equipment		1,170			105			105	
TOTAL NON-CASH OVERHEAD COSTS		36,538			1,771			1,771	
TOTAL COSTS/ACRE								4,657	

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

	Quantity/ Acre	Unit	Price or Cost/Unit	Value or Cost/Acre	Your Cost
GROSS RETURNS					
Raisins	4.0	Ton	1,600	6,400	
TOTAL GROSS RETURNS				6,400	
OPERATING COSTS					
Fertilizer:					54
UAN32	45.00	Lb N	0.70		31
Boron- Solubor 20.5%	4.87	Lb	1.94		9
Neutral Zinc 50%	10.00	Lb	1.30		13
Insecticide:					129
Admire Pro	1.40	FLOz	2.86		4
Movento	8.00	FLOz	6.88		55
Acramite	1.00	Lb	69.74		70
Fungicide:					88
Rubigan EC	10.00	FLOz	6.88		69
Sulfur DF	10.00	Lb	1.57		16
Sulfur Dry-Dust	30.00	Lb	0.12		4
Herbicide:					7
Roundup Ultra	1.50	Pint	4.38		7
Irrigation:					195
Water-Raisins	36.00	Acln	5.42		195
Custom:					4
Well Test	1.00	Acre	2.50		3
Water Analysis	1.00	Acre	1.00		1
Contract:					37
Petiole Sampling	1.00	Acre	2.00		2
Pest Control Advisor (PCA)	1.00	Acre	35.00		35
Rent:					155
Harvest Bins	4.00	Ton	20.00		80
Forklift	0.75	Each	100.00		75
Labor					1,602
Equipment Operator Labor	12.93	hrs	22.24		288
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	15.00	hrs	16.68		250
Equipment Operator Labor	0.75	hrs	22.24		17
Machinery					135
Fuel-Gas	4.71	gal	2.70		13
Fuel-Diesel	27.84	gal	2.43		68
Lube					12
Machinery Repair					43
Interest on Operating Capital @ 4.25%					43
TOTAL OPERATING COSTS/ACRE				2,447	
TOTAL OPERATING COSTS/TON				612	
NET RETURNS ABOVE OPERATING COSTS				3,953	

UC COOPERATIVE EXTENSION-AGRICULTURAL ISSUES CENTER
Table 3. CONTINUED
San Joaquin Valley-Open Gable Trellis System-2016

	Quantity/ Acre	Unit	Price or Cost/Unit	Value or Cost/Acre	Your Cost
CASH OVERHEAD COSTS					
Liability Insurance				11	
Office Expense				75	
Field Sanitation				10	
Property Taxes				280	
Property Insurance				24	
Investment Repairs				39	
TOTAL CASH OVERHEAD COSTS/ACRE				439	
TOTAL CASH OVERHEAD COSTS/TON				110	
TOTAL CASH COSTS/ACRE				2,886	
TOTAL CASH COSTS/TON				721	
NET RETURNS ABOVE CASH COSTS				3,514	
NON-CASH OVERHEAD COSTS (Capital Recovery)					
Shop Building 4000SqFt				35	
Drip Irrigation System				75	
Shop Tools				3	
Land-Raisins				750	
Fuel Tanks (2) 1,000gal				4	
Vineyard Establishment-OGT				798	
Equipment				105	
TOTAL NON-CASH OVERHEAD COSTS/ACRE				1,771	
TOTAL NON-CASH OVERHEAD COSTS/TON				443	
TOTAL COST/ACRE				4,657	
TOTAL COST/TON				1,164	
NET RETURNS ABOVE TOTAL COST				1,743	

UC COOPERATIVE EXTENSION-AGRICULTURAL ISSUES CENTER
Table 4. MONTHLY CASH COSTS to PRODUCE DOV RAISINS
 San Joaquin Valley-Open Gable Trellis System-2016

	JAN 16	FEB 16	MAR 16	APR 16	MAY 16	JUN 16	JUL 16	AUG 16	SEP 16	OCT 16	Total
Cultural:											
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				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			23
Pests-Weeds Disc 2x		8									15
Pests-Insects/Disease/Fertilizer					79						79
Pests-Insects 2x					73	88					161
Pests-Disease-Mildew 5x			32	36		69					137
Pickup Truck Use	5	5	5	5	5	5	5	5	5	5	45
ATV 4WD	3	3	3	3	3	3	3	3	3	3	27
PCA Fee	4	4	4	4	4	4	4	4	4	4	35
TOTAL CULTURAL COSTS	415	273	45	292	378	210	61	69	49	30	1,823
Harvest:											
Harvest-Sever Canes-Hand								133			133
Harvest-Mechanical									84		84
Harvest-Bin Handling									207		207
Harvest-Haul									68		68
TOTAL HARVEST COSTS	0	0	0	0	0	0	0	133	360	0	493
Post-Harvest:											
Severed Cane Removal										83	83
Shred Canes-Alternate Row Middle										6	6
TOTAL POST-HARVEST COSTS	0	0	0	0	0	0	0	0	0	89	89
Interest on Operating Capital @4.25%	1	2	3	4	5	6	6	7	8	0	43
TOTAL OPERATING COSTS/ACRE	416	275	47	296	489	216	67	210	418	119	2,447
CASH OVERHEAD											
Liability Insurance	1	1	1	1	1	1	1	1	1	1	11
Office Expense	8	8	8	8	8	8	8	8	8	8	75
Field Sanitation									10		10
Property Taxes		140					140				280
Property Insurance		12					12				24
Investment Repairs	4	4	4	4	4	4	4	4	4	4	39
TOTAL CASH OVERHEAD COSTS	13	165	13	13	13	13	165	13	22	13	439
TOTAL CASH COSTS/ACRE	429	440	60	308	396	229	231	222	440	132	2,886

UC COOPERATIVE EXTENSION-AGRICULTURAL ISSUES CENTER

Table 5. RANGING ANALYSIS-DOV RAISINS

San Joaquin Valley-Open Gable Trellis System-2016

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

	YIELD (TONS)						
	2.50	3.00	3.50	4.00	4.50	5.00	5.50
OPERATING COSTS/ACRE:							
Cultural	1,823	1,823	1,823	1,823	1,823	1,823	1,823
Harvest	367	408	452	493	535	578	620
Post-Harvest	89	89	89	89	89	89	89
Interest on Operating Capital @ 4.25%	40.43	40.64	40.85	41.05	41.26	41.47	41.68
TOTAL OPERATING COSTS/ACRE	2,319	2,361	2,404	2,447	2,489	2,532	2,574
TOTAL OPERATING COSTS/TON	927.65	787.06	686.99	611.63	553.02	506.37	467.99
CASH OVERHEAD COSTS/ACRE							
CASH OVERHEAD COSTS/ACRE	439	439	439	439	439	439	439
TOTAL CASH COSTS/ACRE	2,758	2,800	2,844	2,886	2,928	2,971	3,013
TOTAL CASH COSTS/TON	1,103.30	933.44	812.46	721.41	650.60	594.20	547.83
NON-CASH OVERHEAD COSTS/ACRE							
NON-CASH OVERHEAD COSTS/ACRE	1,771	1,771	1,771	1,771	1,771	1,771	1,771
TOTAL COSTS/ACRE	4,529	4,571	4,615	4,657	4,699	4,742	4,784
TOTAL COSTS/TON	1,812.00	1,524.00	1,318.00	1,164.00	1,044.00	948.00	870.00
Net Return per Acre above Operating Costs for Production							
PRICE (\$/ton)	YIELD (tons/acre)						
Raisins	2.50	3.00	3.50	4.00	4.50	5.00	5.50
1150.00	556	1,089	1,621	2,153	2,686	3,218	3,751
1300.00	931	1,539	2,146	2,753	3,361	3,968	4,576
1450.00	1,306	1,989	2,671	3,353	4,036	4,718	5,401
1600.00	1,681	2,439	3,196	3,953	4,711	5,468	6,226
1750.00	2,056	2,889	3,721	4,553	5,386	6,218	7,051
1900.00	2,431	3,339	4,246	5,153	6,061	6,968	7,876
2050.00	2,806	3,789	4,771	5,753	6,736	7,718	8,701
Net Return per Acre above Cash Costs for Production							
PRICE (\$/ton)	YIELD (tons/acre)						
Raisins	2.50	3.00	3.50	4.00	4.50	5.00	5.50
1150.00	117	650	1,181	1,714	2,247	2,779	3,312
1300.00	492	1,100	1,706	2,314	2,922	3,529	4,137
1450.00	867	1,550	2,231	2,914	3,597	4,279	4,962
1600.00	1,242	2,000	2,756	3,514	4,272	5,029	5,787
1750.00	1,617	2,450	3,281	4,114	4,947	5,779	6,612
1900.00	1,992	2,900	3,806	4,714	5,622	6,529	7,437
2050.00	2,367	3,350	4,331	5,314	6,297	7,279	8,262
Net Return per Acre above Total Costs for Production							
PRICE (\$/ton)	YIELD (tons/acre)						
Raisins	2.50	3.00	3.50	4.00	4.50	5.00	5.50
1150.00	-1,654	-1,121	-590	-57	476	1,008	1,541
1300.00	-1,279	-671	-65	543	1,151	1,758	2,366
1450.00	-904	-221	460	1,143	1,826	2,508	3,191
1600.00	-529	229	985	1,743	2,501	3,258	4,016
1750.00	-154	679	1,510	2,343	3,176	4,008	4,841
1900.00	221	1,129	2,035	2,943	3,851	4,758	5,666
2050.00	596	1,579	2,560	3,543	4,526	5,508	6,491

UC COOPERATIVE EXTENSION - AGRICULTURAL ISSUES CENTER
Table 6. WHOLE FARM ANNUAL EQUIPMENT, INVESTMENT, AND BUSINESS OVERHEAD COSTS
 San Joaquin Valley-Open Gable 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	Bobtail Truck	60,000	10	17,723	5,812	33	389	6,234
16	DOV Raisin Harvester	235,000	20	12,249	16,489	104	1,236	17,829
16	57 HP4WD Tractor	36,682	15	7,141	2,878	18	219	3,116
16	Shredder/Mower 8'	14,579	10	2,578	1,558	7	86	1,651
16	Harvest Bin Trailer #1	2,090	25	63	129	1	11	140
16	Harvest Bin Trailer #2	2,090	25	63	129	1	11	140
16	Airblast Sprayer-PTO, 300 Gal	25,000	10	4,421	2,672	12	147	2,831
TOTAL		510,039	-	73,909	41,580	246	2,920	44,745
60% of New Cost*		306,023	-	44,346	24,948	148	1,752	26,847

*Used to reflect a mix of new and used equipment

ANNUAL INVESTMENT COSTS									
Description	Price	Yrs. Life	Salvage Value	Capital Recover	Cash Overhead			Total	
					Insurance	Taxes	Repairs		
INVESTMENT									
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-OGT	1,072,960	27	0	63,877	452	5,365	0	69,694	
TOTAL INVESTMENT		2,889,935	-	1,603,195	136,726	1,894	22,466	4,340	165,426

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

UC COOPERATIVE EXTENSION-AGRICULTURAL ISSUES CENTER
Table 7. HOURLY EQUIPMENT COSTS
 San Joaquin Valley-Open Gable Trellis System-2016

Yr.	Description	Production	Total	Capital Recover	Cash Overhead		Operating		Total Costs/Hr	
		Hours Used	Hours Used		Insurance	Taxes	Lube & Repairs	Fuel		Total Oper.
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	442	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	DOV Raisin Harvester	66	500	19.79	0.13	1.48	8.36	29.16	37.52	58.92
16	57 HP4WD Tractor	44	1066	1.62	0.01	0.12	1.98	6.80	8.78	10.54
16	Shredder/Mower 8'	35	200	4.67	0.02	0.26	6.23	0.00	6.23	11.18
16	Harvest Bin Trailer #1	40	200	0.39	0.00	0.03	0.03	0.00	0.03	0.45
16	Harvest Bin Trailer #2	40	200	0.39	0.00	0.03	0.03	0.00	0.03	0.45
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-Open Gable Trellis System-2016

Operation	Operati on	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	Apr			Canopy Mgmt	12.00	hours
Shoot Positioning	May			Canopy Mgmt	10.00	hours
Petiole Sampling	Apr			Petiole Sampling	1.00	Acre
Irrigate	Apr			Irrigation Labor	0.18	hour
	May			Water-Raisins	3.00	AcIn
				Irrigation Labor	0.35	hour
				Water-Raisins	3.50	AcIn
	June			Irrigation Labor	0.35	hour
				Water-Raisins	6.50	AcIn
	July			Irrigation Labor	0.71	hour
				Water-Raisins	7.00	AcIn
	Aug			Irrigation Labor	0.71	hour
				Water-Raisins	7.00	AcIn
	Sept			Irrigation Labor	0.35	hour
				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
				Boron- Solubor 20.5%	4.87	Lb
				Neutral Zinc 50%	10.00	Lb
				Provado 1.6	2.50	FIOz
Pests-Insects 2x	May	85 HP Tractor	Airblast Sprayer-PTO, 300 Gal	Equipment Operator Labor	0.55	hour
				Movento	8.00	FIOz
	June	85 HP Tractor	Airblast Sprayer-PTO, 300 Gal	Equipment Operator Labor	0.55	hour
				Acramite	1.00	Lb
Pests-Disease-Mildew	Mar	85 HP Tractor	Duster 3 Point-PTO	Equipment Operator Labor	0.55	hour
				Sulfur DF	10.00	Lb
	Apr	85 HP Tractor	Duster 3 Point-PTO	Equipment Operator Labor	0.55	hour
				Sulfur Dry-Dust	10.00	Lb
	Apr	85 HP Tractor	Duster 3 Point-PTO	Equipment Operator Labor	0.55	hour
				Sulfur Dry-Dust	10.00	Lb
	June	85 HP Tractor	Duster 3 Point-PTO	Equipment Operator Labor	0.55	hour
				Sulfur Dry-Dust	10.00	Lb
	June	85 HP Tractor	Duster 3 Point-PTO	Equipment Operator Labor	0.55	hour
				Rubigan EC	5.00	FIOz
Pickup Truck Use	June		Pickup Truck 1/2 Ton	Equipment Operator Labor	1.50	hours
ATV 4WD	June		ATV4WD	Equipment Operator Labor	1.20	hours
PCA Fee	June			Pest Control Advisor (PCA)	1.00	Acre
Harvest-Sever Canes	Aug			Non-Machine Labor	8.00	hours
Harvest-Mechanical	Sept		DOV Raisin Harvester	Non-Machine Labor	2.00	hours
Harvest-Bin Handling	Sept	85 HP Tractor	Harvest Bin Trailer #1	Equipment Operator Labor	0.60	hour
				Harvest Bins	2.00	Ton
	Sept	57 HP4WD Tractor	Harvest Bin Trailer #2	Equipment Operator Labor	0.60	hour
				Harvest Bins	2.00	Ton
	Sept			Equipment Operator Labor	0.75	hour
				Forklift	0.75	Each
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