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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 FOR WINEGRAPES



**TO ESTABLISH A VINEYARD AND PRODUCE  
WINEGRAPES - *Cabernet Sauvignon Variety*  
San Joaquin Valley North – San Joaquin and Sacramento Counties  
CRUSH DISTRICT 11 - 2016**

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AND PRODUCE CABERNET SAUVIGNON WINEGRAPES  
San Joaquin Valley - North 2016  
Crush District 11 of San Joaquin and Sacramento Counties**

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**INTRODUCTION**

The sample costs to establish a vineyard and produce winegrapes using drip irrigation in the northern San Joaquin Valley are presented in this study. The 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 April 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.

For an explanation of calculations used in the study refer to the section titled Assumptions. For more information contact Jeremy Murdock; University of California Agriculture and Natural Resources, Agricultural Issues Center, Department of Agricultural and Resource Economics, at 530-752-4651 or [jmmurdock@ucdavis.edu](mailto:jmmurdock@ucdavis.edu). The local extension office can be contacted through Paul Verdegaal, [psverdegaal@ucanr.edu](mailto:psverdegaal@ucanr.edu), UCCE, San Joaquin County.

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 following assumptions refer to Tables 1 to 8 and pertain to sample costs to establish the vineyard and produce winegrapes in the northern San Joaquin Valley – Crush District 11 of Sacramento and San Joaquin counties. For district location and other related information, see the website <http://www.lodiwine.com>. 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.**

**Farm.** The hypothetical 200 contiguous acre farm, located on the valley floor in Crush District 11 of San Joaquin and Sacramento counties, is owned and operated by the grower. Sixty acres of winegrapes are being established and are the basis of this study. In addition, 135 acres of mature vineyards are in production, and roads, irrigation systems, fencing, and farmstead occupy five acres.

### Establishment Cultural Practices and Material Inputs

The following practices refer to Table 1

**Vineyard Conversion and Land Preparation.** The new vineyard is being planted on land that had an existing vineyard. The old grapevines are removed in the fall. After the vines have been pulled out and burned, soil amendments may be added. The land is ripped or slip plowed (depending on soil type) in two different directions to a depth up to 6 feet to break up hardpan, improve root penetration, water infiltration and also pull up additional roots remaining from the previous vines. The ground is then disced two times. The field is floated (triplaned) two times. All operations that prepare the vineyard for planting are done in the year prior to planting, but costs are shown in the first year. The following spring the ground is cultivated (disced) two times with a pre-emergent, residual herbicide applied during the first discing and the material is further incorporated with the second discing. Custom or contract operators do all operations except the spring discing and herbicide application.

**Fumigation:** Because of costs and governmental restrictions, fumigation is not considered as a cost in this study. Fumigation costs may range from \$600 to \$3,200 per acre depending on materials and methods and may be useful for controlling oak root fungus or nematodes.

**Vines.** Potted bench graft vines (Cabernet Sauvignon variety) are planted on a 5-foot x 11-foot spacing at 792 vines per acre. Vines are trained to a quadrilateral cordon height at 60 inches above ground and spur pruned. Cordons are the horizontal branches (separated between 24 and 36 inches) and spurs or shoots are the bearing units on the cordon. The grapevines are assumed to begin yielding fruit in three years and produce for an additional 22 years.

**Planting.** The field is marked and laid out in the fall or spring (April). Planting starts in the spring (May) and is done by hand. The potted plants are placed in the planting hole and the soil is formed around the roots. The following year an average of 2 percent or 16 vines per acre will be replanted in May. Second year replants are provided by the nursery at no cost.

**Trellis System.** A commercial trellis company installs the system. The cost in the study is for complete installation and includes materials and labor. The system is assumed to be installed between February and June and the 36-inch cross arms are attached to each stake between June and October. The trellis system is

designed to support a quadrilateral cordon trained to a horizontally divided canopy and spur pruned vineyard. The system in this study utilizes 125 gauge metal T-stakes at each vine with eight ten-foot end posts per acre at row ends to anchor the wires. The T-stakes can be installed at the time of survey and marking or any time prior to planting. Two permanent cordon wires (11 gauge) are secured to the end posts and attached to the metal T-stakes. The drip irrigation line is suspended from the bottom wire (13 gauge) with drip clips. The trellis system is considered part of the vineyard since it will be removed when the vines are removed; therefore, it is included as part of the establishment cost.

**Training.** Training and pruning establish the vine framework and these techniques will vary with variety and trellis system. In this study, training during the establishment years includes pruning, tying, suckering, shoot positioning, and shoot thinning. All operations are not done each year, nor are all the operations used for other training methods or trellis systems. The prunings during the first three years are placed in between the vine rows (vine middles) and are chopped during the first discing.

*First Year.* The vines are allowed to grow freely with no attempt at training. However, new vines may require to be loosely tied to a stake to keep from growing into the row middles and getting damaged during cultivation.

*Second Year.* During dormancy (February) vines are pruned back to two buds to provide shoots of which one is selected for trunk development. The pruning takes approximately 22 man-hours per acre. Green tying, which includes suckering, tying, and vine training is done in May, June, and July, but can be done from April through September. Green tying takes a total of 110 man-hours. Vines are trained by tying one shoot up the T-stake to become the main trunk. During the latter part of the season, this shoot is topped at or slightly below the cordon wire. Two lateral shoots are selected from the trunk as the bilateral cordons. Any remaining lower laterals are also pruned and the cordons cut back to the appropriate length as determined by girth. Suckering is the removal of sprouts from the rootstock that compete with the main trunk and cordons for water and nutrients.

*Third Year.* Green tying at 46 man-hours (including suckering) in May and June continues by extending the cordons along the permanent cordon wire and selecting spur positions. Dormant canes from spurs are pruned to 2-bud spur taking 20 man-hours. Slower growing vines continue to be trained; however, year three is the last year that the vines are trained in this study. After the vines are trained, canopy management including shoot positioning, thinning, and suckering trunks and cordons is done in June and takes 18 man-hours. The vines are mechanically trimmed in September prior to harvest.

**Irrigation.** Irrigation costs in the tables include pumped water plus labor. Water is calculated to cost \$100.00 per acre-foot (\$8.33 per acre inch). Assume six inches of stored rainfall from an average of 17 inches of annual winter/spring rains. During the first two years, irrigations begin in May and end around September. In the third year additional irrigations are made post-harvest. The amount of water applied to the vineyard varies each year as shown in Table A.

Table A. Applied Irrigation Water			
Year	Acre-inches/year		Total
	Pre-harvest	Post-harvest	
1	6	0	6
2	12	0	12
3+	15	3	18

*Drip System.* Prior to planting mainlines are laid out in the fall. The drip line is laid on top of the ground. After planting the drip line is attached to the drip wire on the trellis system. If needed, the ground is pre-irrigated to ease the hand digging for the planting hole. The drip system includes the tape or drip line, laterals, fertilizer injectors, and filters. The cost for the drip irrigation system is under Non-Cash Overhead (Investments). The drip irrigation installation labor includes laying out the line and hanging it on the bottom trellis wire. The irrigation system installation labor is included as a planting cost in Table 1.

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

*Insects.* Nursery materials should be checked to prevent introduction of invasive species such as vine mealy bug (VMB), light brown apple moth (LBAM), and European grapevine moth (EGVM). Many insects attack grapevines, therefore monitoring begins in the first year. Leafhoppers (*Erythroneura elegantula* and *E. variabilis*) can cause serious problems and are controlled with Provado (neonicotinoid) insecticide beginning in June of the third year. Acramite is applied in the summer of the second and third years for mite control. In some situations it is necessary to apply Acramite the first year. All materials are applied with the grower's tractor and vineyard sprayer.

*Diseases.* Several primary pathogens attack grapevines, but the major disease assumed is powdery mildew (*Uncinula necator*). Powdery mildew control begins in April of the third year, but timing depends upon the disease pressure, which can vary from year to year. Sulfur dust is applied six times and Rally, a sterol inhibitor, one time and Flint, a strobilurine, one time. The usage of a di-methyl inhibitor (dbi) can also be rotated with a strobilurine (sbi). Also, *Eutypa* dieback sensitive varieties, such as Cabernet Sauvignon, benefit from Rally/Topsin-M applied immediately after pruning dormant canes beginning in the second year.

*Weeds.* Prior to planting, Treflan, a pre-emergent herbicide, is applied with a spray boom attached to the front of a disc. Incorporation is completed with a second discing. The row middles are cultivated (disced) three to five times per season during the establishment years. The vine rows are sprayed in late fall or winter during the first two years with a combination of herbicides such as Prowl, Goal and Roundup. Also, during the first two years, the vine rows are hand weeded and assumed to take 4.00 man-hours each year. Surflan, Goal and Roundup are applied to the vine rows in the winter (winter strip spray) beginning in the third year. Summer weed control in the vine row begins in the second year with Rely herbicide applied by the grower.

*Vertebrate.* Jackrabbits are the major pest, although cottontail, brush rabbit, pocket gophers, squirrels, voles (meadow mice), and coyotes can also cause damage. Milk cartons placed around the young vines at planting protect the vines from rabbit damage. Another method is to build a fence around the vineyard. The cost of protecting the vines with cartons is included in vineyard planting cost plant, so no additional vertebrate control costs have been included in this study.

**Fertilization.** Liquid fertilizer, 5-0-12, (9.6 lbs/gal), is applied through the drip irrigation system at 500 pounds (52 gallons) per acre per year during the first three years. This applies nitrogen at 25 pounds per acre and potassium at 60 pounds per acre. It is important to note that potassium is not required until the first harvested crop in year three, but will remain relatively in place during years one and two.

Annual fertilizer rates are split equally and applied monthly in April, May, and June during years one and two. In year three the fertilizer is split into four equal parts and is applied in April, May, and June, with

an additional post-harvest application in October. This is a standard fertility program, however, depending on the soil type and wine grape variety adjustments to the rate, frequency, and timing of fertilizer applications may be necessary.

**Harvesting.** Harvesting starts in the third year. In this study the crop is custom harvested by machine. Hauling to the winery is contracted and the grower pays both the harvest and hauling costs.

**Yield.** Typical annual yields for Cabernet Sauvignon in Crush District 11 are shown in Table B. In this study, a year three annual yield of 5 tons was used.

Table B. Annual Yields for Cabernet Sauvignon		
Year:	3	4+
Tons Per Acre:	5	10

### Production Cultural Practices and Material Inputs

Refers to Tables 2 - 8

**Vine Management (VM)/Prune.** Hand pruning at 33 man-hours per acre is done during the winter months (February). The prunings are placed in the row middles and incorporated into the soil with a flail mower in March. Also in March, winter tying at 6.0 man-hours per acre is completed. Cordons are tied to the cordon wire with twine at the trunk and at each end of the cordons. Subsequently, trunk suckering (3.5 man-hours) is done in April; shoot removal (18 man-hours) in May. The vines are mechanically trimmed (skirted) in June. A more severe trimming is done prior to harvest in September to facilitate fruit removal by the machine harvester. Suckering is the removal of water sprouts from the trunk and below the soil surface. Shoot removal is the operation whereby the weak shoots, which lack vigor and do not originate from the fruiting spur buds, are removed.

If needed, the clusters may be thinned (cluster thinning) later in the season to reduce crop load or remove clusters that may be delayed in maturity. Cluster thinning is not included in this study. Other varieties may require cluster thinning due to compactness. In some plantings, the basal leaves are removed in and around the fruit zone to allow for exposure and better air movement. Shoot positioning, thinning, and suckering trunks and cordons continue through the production years. Positioning and thinning shoots allows vines space to develop good fruit clusters, and opens the canopy to allow greater air movement through the vines and around the clusters. Pruning costs in this study are based on an hourly rate, although much of the pruning in the region is done by piecework.

**Fertilization.** Fertilizer can be applied through the drip system throughout the year. In this study, assuming a 10 ton yield, fertilizer (5-0-12) containing nitrogen (Urea) and potassium (KTS) is applied equally in April, May, June, and October at 150 pounds (15.6 gallons) per acre. The total amount of fertilizer applied per year is 600 pounds per acre (30 pounds of N and 72 pounds of K per year). Labor costs for applying the fertilizer are assumed to be included in the irrigation labor.

**Sampling.** Petiole samples are taken at bloom, between bud closure and veraison, and at the end of the growing season to monitor micronutrient (particularly manganese and magnesium) and potassium levels. One sample is taken for every 30 acres. Additional soil amendments that may be needed to address plant nutrient deficiencies are not included in the study. The cost of petiole tissue analysis has been included in this study.

**Irrigation.** Irrigation costs in the tables include pumped water and irrigation labor. The water is calculated to cost \$100.00 per acre-foot (\$8.33/acre-inch) based on pumping costs as provided by the growers. Fifteen acre-inches are applied during the growing season beginning in April and three acre-inches are applied post-harvest (October/November). No assumption is made about effective rainfall. The average rainfall in the area is 17 to 18 inches. Irrigation labor is averaged over the season, although extra time may be required during the first irrigation to flush and check the system, and make any necessary repairs. N-phuric acid is injected into the irrigation system in October to prevent scale buildup during the winter months. The labor to chemigate N-phuric acid is included as irrigation labor.

**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.** To purchase pesticides for commercial use, a grower must be a Certified Private Applicator to obtain a Pesticide Identification number. **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. Adjuvants are recommended for use with many pesticides for effective control, the adjuvants and their costs are not included in this study.

*Pest Control Adviser (PCA).* Written recommendations are required for many pesticides and are available from licensed pest control or certified crop advisers. In addition, the PCA or an independent consultant will monitor the field during the growing season for fertilizer recommendations. Growers may hire a private PCA or receive the service as part of a service agreement with an agricultural chemical and fertilizer company. Separate costs for a PCA are not included in this study.

*Application Methods.* Pesticide and fertilizer applications are made by either chemigation (pesticides and/or fertilizers applied through the irrigation water), by tractor mounted ground sprayer or foliar-broadcast with tractor mounted air blast sprayer. Insecticides and fungicides can be tank mixed and applied to the crop in the same operation. Check individual pesticide labels for compatibility, mixing requirements and usage. Some pesticides are applied to a portion of the acreage. See tables 3 & 8 for a list of chemicals used for the applications.

*Weeds.* Herbicide choice is a function of weed pressure, which can change over time. In this vineyard vine row weeds (strip spray) are controlled with a tank mix of Chateau, Prowl H2O, Goal, and Roundup applied during December or January. Rely herbicide is used primarily for summer weed control in the vine row as a strip or spot spray. It is assumed that although the spray applicator drives every row, material applied to the vine row amounts to 40 percent of the field acreage. Resident vegetation in the row middles is managed with four discings per season – March, April, June, and October.

*Insects.* Pacific spider mite (*Tetranychus pacificus*) and Willamette spider mite (*Eotetranychus willamettei*) are controlled with an application of Acramite miticide in July (combined with mildew spray). Platinum is applied in June (combined with mildew spray) to control leafhoppers. Incidental pests such as omnivorous leafroller (OLR), light brown apple moth (LBAM), leafroller, grape mealybug, grape leafhopper (*Erythroneura elegantula*), variegated leafhopper (*Erythroneura variabilis*), virginia creeper leafhopper and thrips are controlled by the treatments stated above. Vine mealybug, a new pest, may need to be controlled midseason (May, June) with Movento or Admire. A treatment for vine mealybug has been included in this study.

*Diseases.* Many diseases attack grapevines, but the major disease assumed in this study is powdery mildew (*Uncinula necator*). Powdery mildew treatments begin in mid-April with dusting sulfur applications at 7 to 14 day intervals, and by two fungicide applications (Rally and Luna Sensation), each with different modes of action. Rally (sterol inhibitor) is applied in June and Luna Sensation (strobilurine) in July. Dusting sulfur is applied six times from April to July.

**Harvest.** The crop is machine harvested by a custom operator and costs \$350 per acre. Hauling to the winery/crusher is contracted and the grower pays \$18 per ton for local hauls. Additional charges will apply to hauls considered being out of the local area.

**Yields.** Yield maturity is reached in the fourth year. An assumed average yield of 10.0 tons per acre is used to calculate yields over the production years. Yield range for Cabernet Sauvignon in Crush District 11 is 8.0 to 12.0 tons per acre and is affected by variations in vine spacing and trellis systems. Annual yields are measured in tons as shown in Table B.

**Returns.** Return prices per ton for winegrapes are determined by variety and percent sugar (Brix). The price used in this study is \$600 per ton for Cabernet Sauvignon winegrapes.

*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. Table 5 includes a yield range of 7 tons to 13 tons per acre and a price range of \$300 to \$900 per ton.

#### **Assessment Fees.**

- *Lodi Winegrape Commission.* The LWC supports winegrape promotion, research, and education for Crush District 11 growers. The commission assesses growers \$0.0045 (\$4.50 per \$1,000) on the gross crop returns (yield x returns).
- *California Air Resources Board Mitigation Plan Fee.* Each grower with 100 contiguous acres is required to submit an annual plan to the California Air Resources Board (CARB), as to practices or operations to reduce particulate matter from roadways and agricultural operations. This fee is \$100 per site.
- *Irrigated Lands Regulatory Program (ILRP).* Each grower is required to join a Water Coalition or provide their own monitoring and data collected to the Regional Water Quality Control Board (RWQCB). Each site under a growers operation is assessed a per acre fee in order to set up monitoring sites representative of the Water Coalitions to which the grower belongs. These sites are monitored and periodically samples are collected and analyzed by an independent laboratory for containments of concern. Results are reported to the RWQCB. The fee is \$5.00 per acre
- *County Agricultural Commissioner (CAC) Pesticide Storage Fee.* Each grower is required to report to the local County Ag Commissioner, all pesticides stored on an annual basis above established minimums for registering in case of a fire or natural disaster. The fee is \$100 per site.
- *3<sup>rd</sup> Party Inspection Fee.* The Winegrape Inspection Program provides an impartial service that makes determinations and certification of soluble solids, materials other than grapes (MOG) and defects. The fee is \$0.415 per ton.
- *Glassy Winged Sharpshooter (GWSS).* A program to control the GWSS. The fee is \$1.25 per \$1000 of gross crop returns

**Pickup/ATV.** It is assumed that the pickup is used for business use. Time and mileage use for the pickup and ATV are not taken from any specific data.



## Labor, Equipment, and Interest

**Labor.** Hourly wages for workers are \$14.00 for machine operators and \$11.00 per hour non-machine labor. Adding 39 percent for the employers' share of federal and state payroll taxes, insurance, and other possible benefits gives the labor rates shown of \$19.46 and \$15.29 per hour for machine labor and non-machine labor, respectively. The overhead includes the employer's share of federal and California state payroll taxes, workers' compensation insurance for vineyards and a percentage for other possible benefits. Workers' compensation insurance costs will vary among growers. The cost is based on the average industry rate as of April, 2016. Labor 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.

**Equipment Operating Costs.** Repair costs are based on purchase price, annual hours of use, total hours of life, and repair coefficients formulated by American Society of Agricultural and Biological Engineers (ASABE). Fuel and lubrication costs are also determined by ASABE equations based on maximum power takeoff (PTO) horsepower, and fuel type. Average prices for on-farm delivery of diesel and gasoline based on 2016 data from the Energy Information Administration are \$2.43 and \$2.70 per gallon, respectively. The cost includes a 9.25 percent sales tax, a \$0.13/gal excise tax on diesel fuel, an 8 percent sales tax, and a \$0.30/gal excise tax on gasoline. It is noted that federal and state excise taxes are refundable for on-farm use when filing the farm income tax return.

*Fuel Lube & Repair.* The fuel, lube, and repair cost per acre for each operation is determined by multiplying the total hourly operating cost 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 April 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 wine grape 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).

Growers may purchase Federal crop insurance to reduce the production risk associated with specific natural hazards. Insurance costs will depend on the type and level of coverage.

## 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 can 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.

**Insurance.** Insurance for farm investments varies depending on the assets included and the amount of coverage.

*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, liability insurance costs \$884 for the entire farm.

*Crop Insurance.* Federally supported crop insurance is available to wine grape 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. Coverage levels are from 50-85 percent of the approved average yield as established by verifiable production records from the vineyard. Actual insurance coverage is by unit, not by acre. A significant number of growers purchase crop insurance in this region. The cost of \$300 per unit (variety) is the basic catastrophic rate paid by the growers in the region of this study. This study has included a cost of \$300 or \$5 per acre for crop insurance.

**Office Expense.** Office and business expenses are estimated at \$156 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 and garbage disposal for the vineyard at annual cost of \$30 per acre. The cost includes a double trailer mounted toilet, sinks for hand washing, delivery, and 9 months of weekly toilet and garbage service.

**Management/Supervisor Wages.** A salary for a farm manager for the 200-acre farm is included to indicate that a cash cost for professional supervision of the vineyard is incurred. An expense of \$81,600 per year that includes 39 percent for payroll overhead and insurance benefits is used in this study. The total cost for a farm manager is \$408 per acre or \$24,480 for management of the 60 acres included in this study.

**Investment Repairs.** Annual maintenance is calculated as 2 percent of the purchase price except on vineyard establishment which is 0.5 percent to cover costs for vine replacement and trellis repairs.

## Non-Cash Overhead

Non-cash overhead costs, shown on an annual per-acre basis, are calculated as the capital recovery cost for equipment and other farm investments.

**Capital Recovery Costs.** Capital recovery cost is the annual depreciation and interest costs for a capital investment. It is the amount of money required each year to recover the difference between the purchase price and salvage value (unrecovered capital). It is equivalent to the annual payment on a loan for the investment with the down payment equal to the discounted salvage value. This is a more complex method of calculating ownership costs than straight-line depreciation and opportunity costs, but more accurately represents the annual costs of ownership because it takes the time value of money into account (Boehlje and Eidman). The formula for the calculation of the annual capital recovery costs is  $((\text{Purchase Price} - \text{Salvage Value}) \times (\text{Capital Recovery Factor})) + (\text{Salvage Value} \times \text{Interest Rate})$ .

*Salvage Value.* Salvage value is an estimate of the remaining value of an investment at the end of its useful life. For farm machinery (tractors and implements), the remaining value is a percentage of the new cost of the investment (Boehlje and Eidman). The percent remaining value is calculated from equations developed by the American Society of Agricultural and Biological Engineers (ASABE) based on equipment type and years of life. The life in years is estimated by dividing the wear out life, as given by ASABE, by the annual hours of use in the 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 6.

*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, drip 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 \$18,979 per acre or \$1,138,740 for the 60-acre vineyard. The establishment cost is amortized over the remaining 22 years of the 25 years the vineyard is in production. Annual vineyard maintenance (vines and trellis) is calculated at 0.5 percent of the establishment costs.

**Irrigation System.** The well and a 40 horsepower (HP) pump are included as a non-cash overhead cost. The well and pump serve only the 60-acre vineyard. Other well(s) are used on the remaining property and are not included. Water is pumped from a 120-foot depth. This study includes an additional operating cost for an annual well test and water analysis. The irrigation system is included as a separate non-cash overhead cost and is considered an improvement to the property with a 25-year life.

**Land.** Based on grower input, crop land with irrigation availability plantable to wine grape vineyards is valued at \$25,000 per acre. For this study, the producing acreage estimated worth is; \$43,979 per acre. It is the crop land value plus the establishment cost, ( $\$25,000 + \$18,979 = \$43,979$ ) Established winegrape vineyards range in value from \$35,000 to \$65,000 per acre in this region.

**Building.** The shop building(s) consists of 2,400 square feet of metal building on a cement slab.

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

**Fuel Tanks.** Two 500-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 Costs.** 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 in the Whole Farm Equipment, Investment and Business Overhead Tables. 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.

**Acknowledgements.** The authors thank the many individuals who furnished information for this study. Additional thanks go to the growers and industry people who gathered to provide their support and input.

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UC COOPERATIVE EXTENSION-AGRICULTURAL ISSUES CENTER  
**TABLE 1. SAMPLE COSTS PER ACRE TO ESTABLISH A VINEYARD**  
 SAN JOAQUIN VALLEY NORTH, Crush District 11 - 2016

	Wine Grape price per Ton = \$600		
	Year:	Cost Per Acre	
Tons Per Acre:	1st	2nd	3rd
			5.0
Planting Costs:			
Vineyard Removal	800		
Rip/Slip Plow 2X	1000		
Disc 2X	100		
Triplane 2X	80		
Apply Pre-emergent Herbicide & Incorporate	36		
Mark & Layout Vineyard	143		
Irrigation System Installation	400		
Plant, Place Cartons, & Wrap Vines	570	40	
Vines: 792 Per Acre (2% Replant In 2nd Year) (No cost for replants)	2,772		
<b>TOTAL PLANTING COSTS</b>	<b>5,901</b>	<b>40</b>	
Trellis & Drip System Costs:			
Install Trellis (custom)	6,740		
<b>TOTAL TRELLIS &amp; DRIP SYSTEM COSTS</b>	<b>6,740</b>		
Cultural Costs:			
Prune- Prune Vines by Hand		336	306
Irrigate- Pumping & Labor	105	167	236
Irrigation- Well Test/Water Analysis	4	4	4
Irrigation System Maintenance- N-phuric Acid	12	12	12
Fertilizer- 5-0-12	65	65	65
Train- Green Tie (Sucker, Tie & Train)		1,727	733
Weed- Winter Strip Spray (Yrs 1-2, Prowl, Goal, Roundup. Yr 3, Surflan, Goal, Roundup)	62	62	91
Weed- Hand Weed	61	61	
Weed- Disc (3X 1st Year, 5X Year 2+)	53	88	88
Weed- Summer Strip Spray (Rely)		27	27
Disease- Eutypa (Rally, Topsin)		67	67
Insect- Leafhoppers (Provado)			46
Insect- Mites		85	85
Train- Shoot Positioning/Thin			275
Disease- Mildew 6X (Dusting Sulfur)			58
Disease- Mildew 1X (Rally)			37
Disease- Mildew: 1X (Flint)			67
Train- Trim Vines (Mechanical)			15
Pickup Truck Use	34	34	34
ATV Use	21	21	21
<b>TOTAL CULTURAL COSTS</b>	<b>417</b>	<b>2,756</b>	<b>2,267</b>
Harvest Costs:			
Pick Fruit			350
Haul To Crusher			90
<b>TOTAL HARVEST COSTS</b>			<b>440</b>
Assessments:			
LWC, ILRP, CAC Pesticide Storage, 3 <sup>rd</sup> Party Inspection, GWSS, & CARB			25
<b>TOTAL ASSESSMENT COSTS</b>			<b>25</b>
Interest On Operating Capital @ 4.25%	410	67	37
<b>TOTAL OPERATING COSTS/ACRE</b>	<b>13,468</b>	<b>2,863</b>	<b>2,769</b>

## UC COOPERATIVE EXTENSION-AGRICULTURAL ISSUES CENTER

**TABLE 1. CONTINUED**

SAN JOAQUIN VALLEY NORTH, Crush District 11 - 2016

	Cost Per Acre			
	Year:	1st	2nd	3rd
	Tons Per Acre:			5
Cash Overhead Costs:				
Office Expense		156	156	156
Liability Insurance		4	4	4
Sanitation Fees		30	30	30
Managers Salary		408	408	408
Property Taxes		268	269	269
Property Insurance		23	23	23
Investment Repairs		70	70	70
<b>TOTAL CASH OVERHEAD COSTS</b>		<b>959</b>	<b>960</b>	<b>960</b>
<b>TOTAL CASH COSTS/ACRE</b>		<b>14,427</b>	<b>3,823</b>	<b>3,729</b>
<b>INCOME/ACRE FROM PRODUCTION</b>				<b>3,000</b>
<b>NET CASH COSTS/ACRE FOR THE YEAR</b>		<b>14,427</b>	<b>3,823</b>	<b>729</b>
<b>PROFIT/ACRE ABOVE CASH COSTS</b>				
<b>ACCUMULATED NET CASH COSTS/ACRE</b>		<b>14,427</b>	<b>18,250</b>	<b>18,979</b>
Non-Cash Overhead (Capital Recovery):				
Building- 2400 sq. ft.		20	20	20
Fuel Tanks- 2, 500 Gal		2	2	2
Shop/Field Tools		6	6	6
Irrigation System- Single-line drip, injector, filter		112	112	112
Pumping Station (pump, well)		76	76	76
Land- Lodi		938	938	938
Equipment		25	39	67
<b>TOTAL INTEREST ON INVESTMENT</b>		<b>1,179</b>	<b>1,193</b>	<b>1,221</b>
<b>TOTAL COST/ACRE FOR THE YEAR</b>		<b>15,606</b>	<b>5,016</b>	<b>4,950</b>
<b>INCOME/ACRE FROM PRODUCTION</b>				<b>3,000</b>
<b>TOTAL NET COST/ACRE FOR THE YEAR</b>		<b>15,606</b>	<b>5,016</b>	<b>1,950</b>
<b>NET PROFIT/ACRE ABOVE TOTAL COST</b>				
<b>TOTAL ACCUMULATED NET COST/ACRE</b>		<b>15,606</b>	<b>20,622</b>	<b>22,572</b>

UC COOPERATIVE EXTENSION-AGRICULTURAL ISSUES CENTER  
**TABLE 2. COSTS PER ACRE TO PRODUCE WINE GRAPES**  
 SAN JOAQUIN VALLEY NORTH, Crush District 11 - 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:								
Irrigation- Well/Pump Test	0.00	0	0	0	3	0	3	
Irrigation- Water Analysis	0.00	0	0	0	1	0	1	
Prune- Hand	0.00	505	0	0	0	0	505	
Prune- Chop Prunings	0.19	4	2	2	0	0	8	
Pests- Weeds/Disc4X	1.25	29	15	7	0	0	51	
Winter Tie	0.00	92	0	0	15	0	107	
Trunk Suckering	0.00	54	0	0	0	0	54	
Petiole Tissue Sample/Analysis	0.00	0	0	0	0	6	6	
Pests- Disease/Mildew (Dust)	1.20	28	5	3	23	0	58	
Fertigate- 5-0-12	0.00	46	0	0	125	0	171	
Shoot Removal/Positioning	0.00	275	0	0	0	0	275	
Trim Vines	0.63	15	7	7	0	0	29	
Pests- Mildew, Leafhopper, & Mealy Bugs	0.36	8	4	3	107	0	123	
Pests- Weeds, Summer Strip Spray	0.43	10	2	1	15	0	27	
Irrigate	0.00	37	0	0	71	0	108	
Pests- Insects/Mites & Mildew	0.36	8	4	3	97	0	112	
Chemigate/Fertigate 5-0-12	0.00	15	0	0	44	0	59	
Pests- Weeds/Winter Strip Spray	0.43	10	2	1	83	0	95	
Pickup Truck Use	0.86	20	11	3	0	0	34	
ATV Use	0.86	20	1	1	0	0	22	
<b>TOTAL CULTURAL COSTS</b>	<b>6.56</b>	<b>1,176</b>	<b>52</b>	<b>30</b>	<b>584</b>	<b>360</b>	<b>1,848</b>	
Harvest:								
Machine Harvest Fruit	0.00	0	0	0	0	350	350	
Haul to Crusher	0.00	0	0	0	0	180	180	
<b>TOTAL HARVEST COSTS</b>	<b>0.00</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>530</b>	<b>530</b>	
Assessment:								
Assessments	0.00	0	0	0	45	0	45	
<b>TOTAL ASSESSMENT COSTS</b>	<b>0.00</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>45</b>	<b>0</b>	<b>45</b>	
Interest on Operating Capital at 4.25%							34	
<b>TOTAL OPERATING COSTS/ACRE</b>	<b>6.56</b>	<b>1,176</b>	<b>52</b>	<b>30</b>	<b>629</b>	<b>890</b>	<b>2,457</b>	



UC COOPERATIVE EXTENSION-AGRICULTURAL ISSUES CENTER  
**TABLE 2. CONTINUED**  
 SAN JOAQUIN VALLEY NORTH, Crush District 11 - 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>								
Crop Insurance (\$300/variety)							5	
Liability Insurance							4	
Manager Salary (include P/R OH)							408	
Office Expense							156	
Sanitation (Lodi-60ac)							30	
Property Taxes							364	
Property Insurance							31	
Investment Repairs							165	
<b>TOTAL CASH OVERHEAD COSTS/ACRE</b>							<b>1,163</b>	
<b>TOTAL CASH COSTS/ACRE</b>							<b>3,620</b>	
<b>NON-CASH OVERHEAD:</b>								
		<u>Per Producing Acre</u>		<u>Annual Cost</u>				
				<u>Capital Recovery</u>				
Building- 2,400 sq. ft.		360		20			20	
Irrigation- Single-line drip, injector, filter		1,800		112			112	
Fuel Tanks- 2, 500 Gal		35		2			2	
Land- Lodi		25,000		938			938	
Pumping Station (pump, well)		1,250		76			76	
Shop/Field Tools		70		6			6	
Vineyard Establishment		18,979		1,282			1,282	
Equipment		470		47			47	
<b>TOTAL NON-CASH OVERHEAD COSTS</b>							<b>2,483</b>	
<b>TOTAL COSTS/ACRE</b>							<b>6,103</b>	

UC COOPERATIVE EXTENSION-AGRICULTURAL ISSUES CENTER  
**TABLE 3. COSTS AND RETURNS PER ACRE TO PRODUCE WINE GRAPES**  
 SAN JOAQUIN VALLEY NORTH, Crush District 11 - 2016

	Quantity/ Acre	Unit	Price or Cost/Unit	Value or Cost/Acre	Your Cost
<b>GROSS RETURNS</b>					
Wine Grape	10	Ton	600.00	6,000	
<b>TOTAL GROSS RETURNS</b>				6,000	
<b>OPERATING COSTS</b>					
<b>Herbicide:</b>				<b>98</b>	
Rely 200	1.50	Pint	9.72	15	
Goal 2XL	2.40	Pint	11.20	27	
Prowl H2O	4.00	Pint	4.49	18	
Roundup Ultra Max	1.20	Pint	4.31	5	
Chateau	6.00	oz	5.50	33	
<b>Insecticide:</b>				<b>155</b>	
Platinum 75 SG	4.00	floz	7.59	30	
Movento	8.00	floz	6.88	55	
Acramite 50WS	16.00	oz	4.36	70	
<b>Fungicide:</b>				<b>72</b>	
Dusting Sulfur	90.00	lb	0.25	23	
Rally 40W	4.00	oz	5.50	22	
Luna Experience	6.00	oz	4.55	27	
<b>Fertilizer:</b>				<b>78</b>	
05-00-12	600.00	lb	0.13	78	
<b>Water:</b>				<b>154</b>	
Well/Pump Test	0.02	Each	200.00	3	
Water Analysis	0.02	Each	50.00	1	
Water Pumped	18.00	acin	8.33	150	
<b>Irrigation System Aids:</b>				<b>12</b>	
N-phuric Acid	0.12	Gal	100.00	12	
<b>Custom:</b>				<b>536</b>	
Petiole Tissue Analysis	0.10	Each	60.00	6	
Machine Harvest	1.00	Acre	350.00	350	
Haul to Crusher	10.00	Ton	18.00	180	
<b>Vine Aids:</b>				<b>15</b>	
Tying Materials	1.00	Acre	15.00	15	
<b>Assessment:</b>				<b>45</b>	
Lodi Winegrape Commission	6.00	GVal	4.50	27	
ILRP	1.00	Acre	5.00	5	
CAC Pesticide Storage	1.00	Acre	0.50	1	
3rd Party Inspection Fee	10.00	Ton	0.42	4	
GWSS	6.00	GVal	1.25	8	
CARB	1.00	Acre	0.50	1	
<b>Labor:</b>				<b>1,176</b>	
Equipment Operator Labor	7.88	hrs	19.46	153	
Pruning Labor	60.50	hrs	15.29	925	
Irrigation Labor	6.40	hrs	15.29	98	
<b>Machinery:</b>				<b>83</b>	
Fuel-Gas	4.25	gal	2.70	11	
Fuel-Diesel	16.84	gal	2.43	41	
Lube				8	
Machinery Repair				22	
Interest on Operating Capital @ 4.25%				34	
<b>TOTAL OPERATING COSTS/ACRE</b>				2,457	
<b>TOTAL OPERATING COSTS/TON</b>				246	
<b>NET RETURNS ABOVE OPERATING COSTS</b>				3,543	

## UC COOPERATIVE EXTENSION-AGRICULTURAL ISSUES CENTER

**TABLE 3. CONTINUED**

SAN JOAQUIN VALLEY NORTH, Crush District 11 - 2016

	Quantity/ Acre	Unit	Price or Cost/Unit	Value or Cost/Acre	Your Cost
<b>CASH OVERHEAD COSTS</b>					
Crop Insurance (\$300/variety)				5	
Liability Insurance				4	
Manager Salary (include P/R OH)				408	
Office Expense				156	
Sanitation				30	
Property Taxes				364	
Property Insurance				31	
Investment Repairs				165	
<b>TOTAL CASH OVERHEAD COSTS/ACRE</b>				<b>1,163</b>	
<b>TOTAL CASH OVERHEAD COSTS/TON</b>				<b>116</b>	
<b>TOTAL CASH COSTS/ACRE</b>				<b>3,620</b>	
<b>TOTAL CASH COSTS/TON</b>				<b>362</b>	
<b>NET RETURNS ABOVE CASH COSTS</b>				<b>2,380</b>	
<b>NON-CASH OVERHEAD COSTS (Capital Recovery)</b>					
Building- 2,400 sq. ft.				20	
Irrigation- Single-line drip, injector, filter				112	
Fuel Tanks- 2, 500 Gal				2	
Land- Lodi				938	
Pumping Station (pump, well)				76	
Shop/Field Tools				6	
Vineyard Establishment				1,282	
Equipment				47	
<b>TOTAL NON-CASH OVERHEAD COSTS/ACRE</b>				<b>2,483</b>	
<b>TOTAL NON-CASH OVERHEAD COSTS/TON</b>				<b>248</b>	
<b>TOTAL COST/ACRE</b>				<b>6,103</b>	
<b>TOTAL COST/TON</b>				<b>610</b>	
<b>NET RETURNS ABOVE TOTAL COST</b>				<b>-102</b>	

UC COOPERATIVE EXTENSION-AGRICULTURAL ISSUES CENTER  
**TABLE 4. MONTHLY COSTS PER ACRE TO PRODUCE WINE GRAPE**  
 SAN JOAQUIN VALLEY NORTH, Crush District 11 - 2016

	FEB 16	MAR 16	APR 16	MAY 16	JUN 16	JUL 16	AUG 16	SEP 16	OCT 16	NOV 16	DEC 16	JAN 17	Total
<b>Cultural:</b>													
Irrigation- Well/Pump Test	3												3
Irrigation- Water Analysis	1												1
Prune- Hand	505												505
Prune- Chop Prunings		8											8
Pests- Weeds/Disc 4X		13	13		13				13				51
Winter Tie		107											107
Trunk Suckering			54										54
Petiole Tissue Sample/Analysis			2			2			2				6
Pests- Disease/Mildew (Dust)			10	29	10	10							58
Fertigate- 5-0-12			51	56	64								171
Shoot Removal/Positioning				275									275
Trim Vines					15			15					29
Pests- Mildew, Leafhopper, & Mealy Bugs					123								123
Pests- Weeds,Summer Strip Spray					27								27
Irrigate						41	41	25					108
Pests- Insects/Mites & Mildew						112							112
Chemigate/Fertigate 5-0-12									59				59
Pests- Weeds/Winter Strip Spray											95		95
Pickup Truck Use	3	3	3	3	3	3	3	3	3	3	3	3	34
ATV Use	2	2	2	2	2	2	2	2	2	2	2	2	22
<b>TOTAL CULTURAL COSTS</b>	<b>513</b>	<b>133</b>	<b>134</b>	<b>364</b>	<b>256</b>	<b>170</b>	<b>46</b>	<b>44</b>	<b>79</b>	<b>5</b>	<b>100</b>	<b>5</b>	<b>1,848</b>
<b>Harvest:</b>													
Machine Harvest Fruit								350					350
Haul to Crusher								180					180
<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>530</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>530</b>
<b>Assessment:</b>													
Assessments								45					45
<b>TOTAL ASSESSMENT COSTS</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>45</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>45</b>
Interest on Operating Capital @ 4.25%	1.82	2.29	2.76	4.05	4.96	5.56	5.72	7.92	-0.67	0	0	0	34
<b>TOTAL OPERATING COSTS/ACRE</b>	<b>515</b>	<b>135</b>	<b>137</b>	<b>369</b>	<b>260</b>	<b>176</b>	<b>52</b>	<b>627</b>	<b>78</b>	<b>4</b>	<b>100</b>	<b>5</b>	<b>2,457</b>
<b>CASH OVERHEAD</b>													
Crop Insurance (\$300/variety)			5										5
Liability Insurance	4												4
Manager Salary (include P/R OH)	34	34	34	34	34	34	34	34	34	34	34	34	408
Office Expense	13	13	13	13	13	13	13	13	13	13	13	13	156
Sanitation	3	3	3	3	3	3	3	3	3	3	3		30
Property Taxes	364												364
Property Insurance	31												31
Investment Repairs	14	14	14	14	14	14	14	14	14	14	14	14	165
<b>TOTAL CASH OVERHEAD COSTS</b>	<b>462</b>	<b>63</b>	<b>68</b>	<b>63</b>	<b>63</b>	<b>63</b>	<b>63</b>	<b>63</b>	<b>63</b>	<b>63</b>	<b>63</b>	<b>61</b>	<b>1,163</b>
<b>TOTAL CASH COSTS/ACRE</b>	<b>978</b>	<b>198</b>	<b>205</b>	<b>432</b>	<b>324</b>	<b>239</b>	<b>115</b>	<b>690</b>	<b>142</b>	<b>68</b>	<b>163</b>	<b>65</b>	<b>3,620</b>

## UC COOPERATIVE EXTENSION-AGRICULTURAL ISSUES CENTER

**TABLE 5. RANGING ANALYSIS**  
SAN JOAQUIN VALLEY NORTH, Crush District 11 - 2016

## COSTS PER ACRE AND PER TON AT VARYING YIELDS TO PRODUCE WINEGRAPES

	YIELD (TON)						
	7.00	8.00	9.00	10.00	11.00	12.00	13.00
OPERATING COSTS/ACRE:							
Cultural	1,848	1,848	1,848	1,848	1,848	1,848	1,848
Harvest	476	494	512	530	548	566	584
Assessment	31	36	40	45	49	54	58
Interest on Operating Capital @ 4.25%	33.47	33.55	33.63	33.71	33.78	33.86	33.94
TOTAL OPERATING COSTS/ACRE	2,389	2,412	2,434	2,457	2,479	2,502	2,524
TOTAL OPERATING COSTS/TON	341.30	301.46	270.47	245.67	225.39	208.49	194.18
CASH OVERHEAD COSTS/ACRE	1,163	1,163	1,163	1,163	1,163	1,163	1,163
TOTAL CASH COSTS/ACRE	3,552	3,575	3,597	3,620	3,642	3,665	3,687
TOTAL CASH COSTS/TON	507.46	446.84	399.70	361.98	331.12	305.41	283.65
NON-CASH OVERHEAD COSTS/ACRE	2,483	2,483	2,483	2,483	2,483	2,483	2,483
TOTAL COSTS/ACRE	6,035	6,057	6,080	6,103	6,125	6,147	6,170
TOTAL COSTS/TON	862.00	757.00	676.00	610.00	557.00	512.00	475.00

Net Return per Acre above Operating Costs for Winegrape

PRICE (\$/ton)	YIELD (Ton/acre)						
Winegrape	7.00	8.00	9.00	10.00	11.00	12.00	13.00
300.00	-289	-12	266	543	821	1,098	1,376
400.00	411	788	1,166	1,543	1,921	2,298	2,676
500.00	1,111	1,588	2,066	2,543	3,021	3,498	3,976
600.00	1,811	2,388	2,966	3,543	4,121	4,698	5,276
700.00	2,511	3,188	3,866	4,543	5,221	5,898	6,576
800.00	3,211	3,988	4,766	5,543	6,321	7,098	7,876
900.00	3,911	4,788	5,666	6,543	7,421	8,298	9,176

Net Return per Acre above Cash Costs for Winegrape

PRICE (\$/ton)	YIELD (Ton/acre)						
Winegrape	7.00	8.00	9.00	10.00	11.00	12.00	13.00
300.00	-1,452	-1,175	-897	-620	-342	-65	213
400.00	-752	-375	3	380	758	1,135	1,513
500.00	-52	425	903	1,380	1,858	2,335	2,813
600.00	648	1,225	1,803	2,380	2,958	3,535	4,113
700.00	1,348	2,025	2,703	3,380	4,058	4,735	5,413
800.00	2,048	2,825	3,603	4,380	5,158	5,935	6,713
900.00	2,748	3,625	4,503	5,380	6,258	7,135	8,013

Net Return per Acre above Total Costs for Winegrape

PRICE (\$/ton)	YIELD (Ton/acre)						
Winegrape	7.00	8.00	9.00	10.00	11.00	12.00	13.00
300.00	-3,935	-3,657	-3,380	-3,102	-2,825	-2,547	-2,270
400.00	-3,235	-2,857	-2,480	-2,102	-1,725	-1,347	-970
500.00	-2,535	-2,057	-1,580	-1,102	-625	-147	330
600.00	-1,835	-1,257	-680	-102	475	1,053	1,630
700.00	-1,135	-457	220	898	1,575	2,253	2,930
800.00	-435	343	1,120	1,898	2,675	3,453	4,230
900.00	265	1,143	2,020	2,898	3,775	4,653	5,530

UC COOPERATIVE EXTENSION-AGRICULTURAL ISSUES CENTER  
**TABLE 6. WHOLE FARM ANNUAL EQUIPMENT, INVESTMENT, AND BUSINESS OVERHEAD COSTS**  
 SAN JOAQUIN VALLEY NORTH, Crush District 11 - 2016

ANNUAL EQUIPMENT COSTS

Yr.	Description	Price	Years Life	Salvage Value	Capital Recovery	Cash Overhead		Total
						Insurance	Taxes	
16	30 HP 4WD Tractor	22,500	15	4,380	1,766	11	134	1,911
16	ATV 4WD	8,350	5	3,742	1,168	5	60	1,234
16	Pickup Truck 1/2 T	28,000	7	10,621	3,267	16	193	3,476
16	Weed Sprayer 200 Gal	4,800	5	1,564	781	3	32	815
16	Disc - Tandem 8'	11,000	10	1,945	1,175	5	65	1,246
16	Mower-Flail 8'	12,000	15	1,152	1,002	6	66	1,073
16	Vine Trimmer 8'	18,000	10	3,183	1,923	9	106	2,038
16	90 HP 4WD Tractor	78,000	15	15,185	6,121	39	466	6,626
16	Duster - 3 Pt 11'	8,000	10	1,415	855	4	47	906
16	Orch Sprayer 500 Gal	26,000	10	4,598	2,778	13	153	2,944
TOTAL		216,650	-	47,786	20,836	111	1,322	22,270
60% of NewCost*		129,990	-	28,672	12,502	67	793	13,362

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

ANNUAL INVESTMENT COSTS

Description	Price	Years Life	Salvage Value	Capital Recovery	Cash Overhead			Total
					Insurance	Taxes	Repairs	
INVESTMENT								
Building 2400 sq. ft.	72,000	30	0	4,038	30	360	1,440	5,869
Irrigation- Single-line drip	108,000	25	0	6,732	46	540	2,160	9,477
Fuel Tanks 2X500 Gal	7,000	25	490	424	3	37	140	605
Land-Lodi	1,500,000	40	1,500,000	56,250	1,265	15,000	0	72,515
Pumping Station (pump, well)	75,000	25	5,250	4,545	34	401	1,500	6,480
Tools-Shop/Field	14,000	15	980	1,187	6	75	280	1,549
Vineyard Establishment	1,138,740	22	0	76,928	480	5,694	5,694	88,796
TOTAL INVESTMENT	2,914,740	-	1,506,720	150,104	1,864	22,107	11,214	185,289

ANNUAL BUSINESS OVERHEAD COSTS

Description	Units/		Price/	Total
	Farm	Unit		
Crop Insurance	60.00	Acre	5.00	300
Liability Insurance	60.00	Acre	4.42	265
Manager Salary (include P/R OH)	60.00	Acre	408.00	24,480
Office Expense	60.00	Acre	156.00	9,360
Sanitation	60.00	Acre	30.00	1,800

UC COOPERATIVE EXTENSION-AGRICULTURAL ISSUES CENTER  
**TABLE 7. HOURLY EQUIPMENT COSTS**  
 SAN JOAQUIN VALLEY NORTH, Crush District 11 - 2016

Yr.	Description	Hours Used	Total Hours Used	Capital Recovery	Cash Overhead		Operating		Total Oper.	Total Costs/Hr.
					Insurance	Taxes	Lube & Repairs	Fuel		
16	30 HP 4WD Tractor	169	800	1.32	0.01	0.10	0.98	3.58	4.56	5.99
16	ATV 4WD	52	400	1.75	0.01	0.09	0.76	0.90	1.66	3.51
16	Pickup Truck 1/2 T	52	285	6.88	0.03	0.41	3.94	12.38	16.31	23.63
16	Weed Sprayer 200 Gal	52	240	1.95	0.01	0.08	0.70	0.00	0.70	2.74
16	Disc - Tandem 8'	75	200	3.53	0.02	0.19	1.84	0.00	1.84	5.58
16	Mower-Flail 8'	11	133	4.52	0.03	0.30	5.74	0.00	5.74	10.59
16	Vine Trimmer 8'	38	200	5.77	0.03	0.32	7.69	0.00	7.69	13.80
16	90 HP 4WD Tractor	183	1066	3.45	0.02	0.26	3.65	10.74	14.39	18.12
16	Duster - 3 Pt 11'	102	120	4.27	0.02	0.24	1.15	0.00	1.15	5.68
16	Orch Sprayer 500 Gal	43	120	13.89	0.06	0.76	3.74	0.00	3.74	18.46

UC COOPERATIVE EXTENSION-AGRICULTURAL ISSUES CENTER  
**TABLE 8. OPERATIONS WITH EQUIPMENT AND MATERIAL INPUTS**  
 SAN JOAQUIN VALLEY NORTH, Crush District 11 - 2016

Operation	Operation Month	Tractor	Implement	Labor Type/ Material	Rate/ acre	Unit
Irrigation: Well/Pump	Feb			Well/Pump Test	0.02	Each
Irrigation: Water	Feb			Water Analysis	0.02	Each
Prune: Hand	Feb			Pruning Labor	33.00	hours
Prune: Chop Prunings	Mar	90 HP 4WD Tractor	Mower-Flail 8'	Equipment Operator Labor	0.23	hour
Pests- Weeds/Disc4X	Mar	90 HP 4WD Tractor	Disc - Tandem 8'	Equipment Operator Labor	0.38	hour
	Apr	90 HP 4WD Tractor	Disc - Tandem 8'	Equipment Operator Labor	0.38	hour
	June	90 HP 4WD Tractor	Disc - Tandem 8'	Equipment Operator Labor	0.38	hour
	Oct	90 HP 4WD Tractor	Disc - Tandem 8'	Equipment Operator Labor	0.38	hour
Winter Tie	Mar			Pruning Labor	6.00	hours
				Tying Materials	1.00	Acre
Trunk Suckering	Apr			Pruning Labor	3.50	hours
Petiole Tissue Samples	Apr			Petiole Tissue Analysis	0.033	Each
	July			Petiole Tissue Analysis	0.033	Each
	Oct			Petiole Tissue Analysis	0.033	Each
Pests- Disease/Mildew	Apr	30 HP 4WD Tractor	Duster - 3 Pt 11'	Equipment Operator Labor	0.24	hour
				Dusting Sulfur	15.00	lb
	May	30 HP 4WD Tractor	Duster - 3 Pt 11'	Equipment Operator Labor	0.72	hour
				Dusting Sulfur 3X	45.00	lb
	June	30 HP 4WD Tractor	Duster - 3 Pt 11'	Equipment Operator Labor	0.24	hour
				Dusting Sulfur	15.00	lb
	July	30 HP 4WD Tractor	Duster - 3 Pt 11'	Equipment Operator Labor	0.24	hour
				Dusting Sulfur	15.00	lb
Fertigate- 5-0-12	Apr			Irrigation Labor	1.00	hour
				Water Pumped	2.00	acin
				05-00-12	150.00	lb
	May			Irrigation Labor	1.00	hour
				Water Pumped	2.50	acin
				05-00-12	150.00	lb
	June			Irrigation Labor	1.00	hour
				Water Pumped	3.50	acin
				05-00-12	150.00	lb
Shoot Removal/Position	May			Pruning Labor	18.00	hours
Trim Vines	June	90 HP 4WD Tractor	Vine Trimmer 8'	Equipment Operator Labor	0.38	hour
	Sept	90 HP 4WD Tractor	Vine Trimmer 8'	Equipment Operator Labor	0.38	hour
Pests- Mildew,	June	90 HP 4WD Tractor	Orch Sprayer 500 Gal	Equipment Operator Labor	0.43	hour
				Rally 40W	4.00	oz
				Platinum 75 SG	4.00	floz
				Movento	8.00	floz
Pests- Weeds/Summer	June	30 HP 4WD Tractor	Weed Sprayer 200 Gal	Equipment Operator Labor	0.52	hour
				Rely 200	1.50	Pint
Irrigate	July			Irrigation Labor	0.80	hour
				Water Pumped	3.50	acin
	Aug			Irrigation Labor	0.80	hour
				Water Pumped	3.50	acin
	Sept			Irrigation Labor	0.80	hour
				Water Pumped	1.50	acin
Pests- Insects/Mites	July	90 HP 4WD Tractor	Orch Sprayer 500 Gal	Equipment Operator Labor	0.43	hour
				Luna Experience	6.00	oz
				Acramite 50WS	16.00	oz
Chemigate/Fertigate	Oct			Irrigation Labor	1.00	hour
				Water Pumped	1.50	acin
				05-00-12	150.00	lb
				N-phuric Acid	0.12	Gal
Pests- Weeds/Winter	Dec	30 HP 4WD Tractor	Weed Sprayer 200 Gal	Equipment Operator Labor	0.52	hour
				Goal 2XL	2.40	Pint
				Prowl H2O	4.00	Pint
				Roundup Ultra Max	1.20	Pint
				Chateau	6.00	Oz
Pickup Truck Use	Dec		Pickup Truck 1/2 Ton	Equipment Operator Labor	1.04	hours
ATV Use	Dec		ATV 4WD	Equipment Operator Labor	1.04	hours
Machine Harvest Fruit	Sept			Machine Harvest	1.00	Acre
Haul to Crusher	Sept			Haul to Crusher	10.00	Ton
Assessments	Sept			Lodi Winegrape Commission	6.00	GVal
				ILRP	1.00	Acre
				CAC Pesticide Storage	1.00	Acre
				3rd Party Inspection Fee	10.00	Ton
				GWSS	6.00	GVal
				CARB	1.00	Acre