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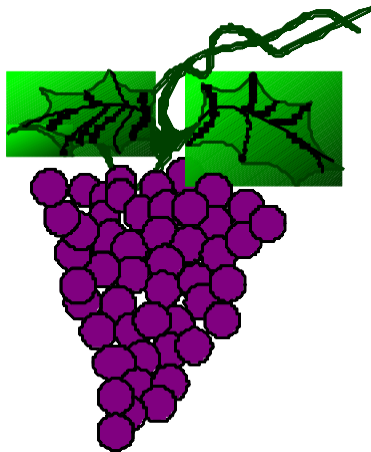
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**UNIVERSITY OF CALIFORNIA COOPERATIVE  
EXTENSION**

**2015**

***SAMPLE COSTS TO ESTABLISH A VINEYARD AND  
PRODUCE***

***WINE GRAPES***



**SIERRA NEVADA FOOTHILLS**

*Red Wine Variety - 5 Acre Bilateral Cordon Vineyard*

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Sierra Nevada Foothills - 2015  
*Red Wine Variety - 5 acre bilateral cordon vineyard*

## INTRODUCTION

The sample costs to establish and produce wine grapes in the Sierra Nevada foothills are presented in this study. The hypothetical farm used in this report consists of a total of 20 acres, 5 are in wine grapes and the other 15 acres are in forest, roads, farmstead, and/or other vine or tree crops.

This study is intended as a guide only, and can be used in making production decisions, determining potential returns, preparing budgets and evaluating production loans. The practices described in this cost study are considered typical for this crop and area. Sample costs given for labor, materials, equipment and contract services are based on current figures. Some costs and practices detailed in this study may not be applicable to your situation. The use of trade names is not an endorsement or a recommendation. A “Your Cost” column is included in Tables 1 and 2 for you to fill in your actual information.

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The hypothetical farm operation, production practices, overhead, and calculations are described under the assumptions. For additional information or an explanation of the calculations used in the study call the Department of Agricultural and Resource Economics, University of California, Davis, 530-752-4651, [destewart@ucdavis.edu](mailto:destewart@ucdavis.edu). You can contact the UCCE Central Sierra Region Farm Advisor, Lynn Wunderlich at 530-621-5505 or [lrwunderlich@ucanr.edu](mailto:lrwunderlich@ucanr.edu).

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

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## ASSUMPTIONS

The following assumptions pertain to sample costs to produce wine grapes in the Sierra Nevada foothills. Practices described should not be considered recommendations by the University of California, but rather represent production procedures considered typical for this crop and area. Some of these costs and practices may not be applicable to your situation nor used during every production year. Additional costs not indicated may be needed. Establishment and cultural practices for the production of wine grapes can vary significantly amongst growers and regions. Many different vineyard site capacities are found in the Sierra foothill region, due to variability in soil type, soil depth, microclimate and irrigation water availability, all of which effect potential costs and yields. The practices and inputs used in this cost study serve only as a sample or guide. The costs are presented on an annual, per acre basis. **The use of trade names 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.**

**Land.** The vineyard is owned by a person who participates minimally in vineyard operations (i.e. seeding of cover crop, mowing aisles). The vineyard is located in the Sierra Nevada foothills on previously unfarmed land at an elevation above 2,000 feet. No rock removal or tree clearing costs are included in this study. The farm is comprised of 20 acres, five of which are planted to wine grapes. The other 15 acres are occupied by forest, roads, irrigation systems, fencing, farmstead and/or other vine or tree crops. Land is valued at \$20,000 per acre. This study assumes that the land was purchased primarily for a home site and the vineyard was planted on the unused acres. No winery or tasting room is developed at this site. Some foothill counties require an amount of minimum acreage to have a winery so those interested should check with the individual county.

**Vineyard management.** The owner hires a custom vineyard manager with a trained crew to install the vineyard and perform all major management operations: pruning, canopy management and fruit thinning, spraying, and harvesting. Other operations are defined as those jobs for which the vineyard manager must bring in an additional piece of equipment or labor, other than what the vineyard manager and crew can do, i.e. deep soil ripping, surveying. These charges are also listed in the “custom” column. In addition to charging for operator labor, material if used (i.e. pesticide) and equipment rental, an “in and out” fee is added to each operation that requires equipment be brought to the site (i.e. spraying). This fee varies depending on the equipment and distance necessary to travel; however, in this study a flat in and out fee of \$75.00 is used for each time heavy equipment is brought to the site.

The vineyard manager is responsible for the planning and design of the vineyard, operations logistics, all necessary paperwork, and limited supervision of crew, all requiring special knowledge, experience and skill. The vineyard manager owns all equipment necessary for management operations. Vineyard manager fees vary widely depending on individual site challenges, size of vineyard, and management required. This study assumes the vineyard manager charges a flat fee of \$1500 per acre per year during the establishment years 1-3; and a fee of \$800 per acre per year thereafter.

## Establishment and Operating Costs (Tables 1-4)

**Site preparation.** The site is prepped for early spring planting in the previous year and these costs are included in the table for Year 1. In late summer, a minimum of three backhoe pits are dug with a custom hired backhoe. The pit soil horizon profile is viewed and recorded by the grower's hired vineyard manager, Pest Control Advisor (PCA), or Certified Crop Advisor (CCA) and three soil samples at various depths are taken from each pit and sent to a commercial lab for standard soils analysis. The information from the pits is used to plan vine spacing, choose rootstocks and to help determine vine irrigation needs based on soil depth, texture, and plant available water; all of which can vary greatly in the foothills.

In September or October, a custom ripper is hired to rip the field 3-5 feet deep in two directions. A stubble disc & roller make one pass to break up clods and a finish disc is used to smooth over the ground. A no-till cover crop of rose clover and subterranean clover, at 15 lbs. per seeded acre, with 2 lbs. of Zorro fescue and 2 lbs. of Blando brome, is planted in October by the owner. The cover crop is allowed to grow until prior to planting the following year (early spring) when it is mowed with a flail mower and left on top of the soil.

**Staking field.** A professional surveyor is custom hired and works with two of the vineyard manager's trained crew to lay out the baseline edges of the field in fall. The vine rows are staked and the vineyard manager's trained crew of 4-5 field workers place a straw into the ground marking where each vine will be planted.

**Trellis system.** The trellis system is designed to support a bilateral cordon trained and spur pruned vineyard. The system in this study utilizes metal T stakes at each vine with end posts at row ends to anchor the wires. Six permanent wires are secured to the end posts and attached to the metal T stakes— one drip wire, one cordon wire, two middle wires, and two upper tees (wires). The vineyard manager and his trained workers install the “modified vertical trellis” system. The system is considered part of the vineyard since it will be removed when the vines are removed. Therefore it is included in the establishment cost. The trellis system is installed during the first two years; however, all trellis costs are listed in year one.

**First Year.** In the fall of the first year or spring of the second (second year in this study), T stakes and end posts are installed. Eight-foot metal T stakes are set at the first and last vine in each row and at every third vine down the row; five-foot T stakes are set at first and second vine locations after the initial eight-foot stakes. End posts are pounded into the soil at the row ends.

**Second Year.** Twenty-four inch cross arms are attached to the eight-foot stakes with twelve-inch cross arms attached below the larger cross arms. The wires are strung from end post to end post. Five 13gauge, high tensile, cordon and catch (top) wires are attached to the cross arms. The bottom strand is 14 gauge, high tensile wire permanently attached to the end posts and T stakes. The drip irrigation line is suspended from this bottom strand with drip clips.

**Planting vines.** In spring (February-March) of the planting year, certified disease-free\* dormant bench grafted bare root vines of a single red wine variety and rootstock typical for the foothills (i.e. Zinfandel, Cabernet Sauvignon, Syrah or Barbera on 110R rootstock) are planted on a 6' x 10' spacing (726 vines per acre). One pound per acre of triple super phosphate is put in the bottom of each hole at planting. The vines are completely mounded over with soil to prevent sunburn damage and the soil mounds are taken down after shoot tip emergence in spring and protective cartons are placed at the bottom of the vine trunk and left in place until emergence after year 2. Vines will be trained to a bilateral cordon and spur pruned.

**Note:** Rootstock selection is based on many factors, including resistance to soil borne pests, suitability for the site's soil texture, depth, and plant available water, and appropriateness for the grafted variety. Many vineyards have planted a range of variety-rootstock combinations. We assume here the same rootstock for all varieties to simplify our study.

In the second year 5% or 36 vines per acre are replanted for those lost in the first year. Vines are trained up a five foot T stake during the second and third years. The grape vines begin yielding a small amount of fruit in the third year, reaching full yield in the 5th year, and are expected to be productive for an additional 22 years.

**\*Note on nursery stock certification:** In 2012 a newly described virus of grape vines, red blotch associated virus (RBaV) was found. At the time of this study, testing for RBaV is not included in certification of nursery stock; therefore, the cost for testing for red blotch virus is not included in the price per certified vine. It is highly recommended that growers independently test their nursery stock for red blotch disease prior to planting. Independent laboratories will test planting stock for a range of viruses, including RBaV, and costs typically range from \$35 per sample for a single virus test to \$280 per sample for a larger virus panel; plus an additional one time \$100 set up fee.

**Irrigation system.** Irrigation mainlines, sub-mains, and manifolds, including filters and risers, are installed for each vine row in the fall prior to planting. After planting, drip tubing with pressure compensated emitters delivering one gallon/minute/vine, or alternatively two half gallon/minute/vine emitters, are installed at each vine. A battery powered automated valve controller is included in the installation.

This study assumes that a well with the capability to irrigate this vineyard will be in place and the cost to drill and establish an adequate well is not included in this study. A booster pump and filtration station are installed along with the drip lines prior to planting. The five horsepower booster pump, filtration station, emitter lines and the labor to install these components is included in the irrigation system cost. The irrigation system is considered an improvement to the property and has a 25 year lifespan. It is shown in the non-cash overhead sections as a capital recovery cost in the various tables and the investments portion of Table5.

**Deer fence.** Fencing to exclude deer from the five acre vineyard site is constructed around the perimeter of the vineyard. The fence material is woven medium gauge wire six feet high with an additional two strands of barbed wire running across the top for a finished fence height of ten feet. The fence has intermediate 'T' posts placed every ten feet and wooden corner posts and includes two gates. Labor to install the fence is included in the line item cost of \$9 per running foot. It is assumed 2,000 feet of deer fence is needed to encircle the 5 acre vineyard.

**Training and pruning.** Training and pruning establish the vine framework and these techniques will vary with variety and trellis system, and based on site capacity. Training during the establishment years includes pruning, tying, suckering, shoot positioning, and thinning.

**First Year.** The vines are allowed to grow freely with no attempt at training. Emphasis the first year is on establishing the vine's root system and all foliage is left to feed the roots. The protective cartons placed after planting aid to protect the vines from rabbits, herbicides and wind damage.

**Second Year.** During late dormancy (March), vines are pruned back to two bud spurs to provide shoots of which one will be selected for trunk development. Vines are trained by selecting and tying one shoot up the T stake to become the main trunk and removing the other competing shoots. Later in the season, when this shoot reaches about 18 inches above the cordon wire, it is topped (cut) to just at or slightly below the cordon wire (this may occur in year 3 in a less vigorous site). Two lateral shoots are selected from the trunk as the bilateral cordons. Any remaining lower laterals are also pruned off and the cordons cut back to the appropriate length as determined by girth. Green tying and training is done with 3 passes through the vineyard from May through July.

**Third Year.** Training vines continues by extending the cordons along the permanent cordon wire and selecting spur positions. In this study, 10-12 spur positions (5-6 on each side of the cordon) are created. Canes are pruned to 1-2 buds at each spur. Slower growing vines continue to be trained; however, year three is the last year that the vines are trained in this study.

**Fruit (cluster) thinning.** Fruit thinning is the removal of clusters to lighten the vine’s crop load and is especially important in the establishment years when the emphasis is on producing a vine root, trunk and canopy system and not yet on fruit production. One half to one-third of the clusters that arise in year 3 are removed, and a similar portion of the clusters are removed in each production year.

**Irrigation.** We assume ten acre inches from winter rains are available in the soil profile as plant available water at the beginning of each season. All the irrigation water is applied through the drip system. Irrigations during year 1 and 2 of vineyard establishment occur from mid to late May through early September, for a total of 18 weeks, delivering five gallons per vine twice per week, a total of 180 gallons/vine for the season (4.8 acre inches). In the first year, three eighteen inch tensiometers are installed into the soil profile in several locations and monitored by the owner to help time and manage irrigations. During year three and beyond irrigations occur once per week beginning in mid- to late June through mid- September, for a total of 13 weeks, delivering twelve gallons per vine, a total of 156 gallons per season (4.2 acre inches). After harvest, one additional irrigation is made. To properly time the start of seasonal irrigations, a soil neutron probe is custom installed in year 3 (one probe site per 5 acres) and monitored by an irrigation consultant, along with weekly plant based stress measurements using a pressure chamber. Water costs vary between \$90.00 and \$200.00 per acre foot for well/pumped water, depending on area. For this study \$7.50 per acre inch (\$90.00/acre foot) is used for water costs and the ac-inches are rounded up to 5.0 acre inches applied annually. Depending on the site capacity and available water, other irrigation strategies can be used.

**Table A. Applied Irrigation Water\***

Year	Ac-in. per year		Total
	Pre-harvest	Post-harvest	
1	4.8	0	4.8
2	4.8	0	4.8
3+	4.2	0.3	4.5

\*assume 10 ac-in effective rainfall

**Fertilizer.** Most foothill soils are low in phosphorous, a nutrient which is difficult to get to the root zone after planting. Therefore, triple super phosphate is applied into each hole at planting at 1 lb. per plant. UN 32 is applied twice during the season through the drip system at 5 lbs. N per application in year.

**Pest Management.** Although some choose to farm organically, without synthetic pesticide use, this study assumes a program of conventional pest management and the use of synthetic pesticides. The pesticides, rates, and application practices mentioned in this cost study are listed in the *UC IPM Pest Management Guidelines for Agriculture-Grape*, available online at UC IPM. **Pesticides mentioned in this study are not**

**recommendations, but those commonly used in the region.** For information and pesticide use permits, contact the local county Agricultural Commissioner's office. For information on other pesticides available, pest identification, monitoring, and management, visit the UC IPM website at <http://ipm.ucanr.edu>. **Pest control costs can vary considerably each year depending upon local conditions and pest populations in any given year.** Adjuvants are recommended for many pesticides for effective control and are an added cost. For additional production information contact the UCCE Central Sierra farm advisor office. <http://cecentralsierra.ucanr.edu>.

*Pest Control Adviser/Certified Crop Advisor, (PCA/CCA).* Written recommendations are required for many pesticides commercially applied and are made by licensed pest control advisers and certified crop advisers. In addition the PCA/CCA will monitor the field for pests and nutrition. Growers may hire independent PCA/CCA or receive the service as part of a service agreement with an agricultural chemical and fertilizer company. For this study an independent PCA/CCA is hired by the vineyard manager to monitor the field for pests for \$35 per acre.

*Weeds.* Strip spraying with a contact herbicide occurs in spring of year 1 before vines are planted. The cover crop planted in the row centers reseeds in the winter following year 1 and is mowed three times per season every year: once to coincide with disking in prunings and two more times during the spring before the cover dries out in summer. The vine rows are strip sprayed with a residual herbicide tank mixed with a contact herbicide in late fall or winter during years two and three. Summer weed control in the vine row begins in the second year with 2-3 spot-spray applications of a contact herbicide. In year 3, the vine rows are sprayed in February with a contact and a residual herbicide, and again in July with a contact only. Strip sprays are applied to the soil surface under the vines in each row with an ATV pulled self-pressurizing boom sprayer. A 1-1.5 foot strip is sprayed on each side of the vine row resulting in a 2-3 foot bare strip under the vines. Herbicide active ingredients are rotated to avoid resistance development in target weed species.

*Diseases.* Many pathogens attack grape vines, but the major disease assumed in this study is powdery mildew (*Uncinula necator*). Three to six fungicide applications are made each year for powdery mildew control depending on the weather. Fungicide classes with different modes of action are rotated to avoid resistance development. Applications begin in the spring of the third year at bud break with an application of 1.5% stilet oil. Two more applications are made prior to veraison: an application of wettable sulfur plus an adjuvant sticker, and an application of a multiple active formulation. A PTO driven air-assisted sprayer is used for fungicide and insecticide applications. Good spray coverage is considered essential for adequate powdery mildew control. Spray volume varies to coincide with canopy growth; typically 50 gallons per acre is used early in the season and 75 to 125 gallons per acre is used later in the season when canopies are larger. A pass is made down each aisle, covering ½ of the vine row canopy on either side of the sprayer.

*Vertebrate Pests.* Gophers are controlled twice during the season with bait applied in between the rows, (down the middles) with a sub-soil bait applicator that is custom applied. Deer are controlled by fencing as described above

**Harvest.** Harvest begins in the third year and the owner uses the vineyard manager's crew for hand harvest.

**Yields.** Harvestable yields begin in the third year with 1.0 ton per acre and increase to 4 tons per acre by the fifth year. Typical yields and returns are shown below in Tables B & C.

## Production Operating Costs (Tables 5-9)

*Pruning and tying.* Once vines are established, pruning operations are done using a “double pruning” technique (also referred to as “long pruning”) to prevent canker disease from entering pruning wounds and to prevent spring frost damage. With double pruning, the crew makes a first pass through the vineyard during the winter, cutting the canes to leave two to three feet and removing the cane prunings from the trellis wire. The prunings are placed in between the vine rows and chopped during the first mowing. A second pruning pass cutting the cane down to a one or two bud spur is made as late as possible in the season prior to bud break (March). Pruning costs in this study are based on an hourly rate, although much of the pruning in the region is done by piecework. Winter tying, where cordons are tied to the cordon wire with green tape at the trunk and at each end of the cordon, is done in March. Vines are retied every three years, therefore, one-third of the cost of retying is shown each year in the production costs.

*\*Note:* in addition to double pruning, it is strongly recommended that growers apply protectant fungicides to pruning wounds to prevent canker disease pathogens from entering. Several fungicides are registered for air-blast sprayer application to pruning wounds. This practice has not been widely adopted, however, and the cost of the fungicide application to pruning wounds is not included in this study.

*Trunk suckering and canopy management.* Suckering is the removal of water sprouts from the trunk and rootstock, and is done annually in May-June. Canopy management is done in the summer months prior to veraison and includes removal of weak (those shoots that do not arise from the fruiting buds) and lateral shoots, removal of basal leaves near the fruiting zone (“leafing”), and wire lifting and then positioning of canes up into the trellis wires to allow air into the canopy. Leafing and shoot positioning reduces powdery mildew and botrytis disease by allowing air movement in the canopy. Canopy management may include all or just some of these operations, dependent on the season, variety and its vigor. This cost study assumes all canopy management operations are done annually in the production years to produce the best quality fruit possible.

*Fruit (cluster) thinning.* During the production years some fruit thinning is usually necessary to achieve proper vine balance. The amount of fruit to be dropped depends on the site capacity, variety, and winemaker preference. Clusters that have green berries (delayed maturity), have disease, or are too closely compacted to each other are removed post-veraison. In some varieties such as Zinfandel the cluster “wings” and/or second crop may be removed to reduce rot potential and compactness.

**Fertilizer.** A petiole sample is taken at bloom time every other year to assist in gauging nutritional needs. A hired pest control advisor (PCA) or a certified crop advisor (CCA) takes 2-3 petiole samples (75 petioles in each sample) in the five acre block, submits them to a laboratory for analysis and consults with the vineyard manager on recommendations. The PCA/CCA charges \$30 per sample to collect and send the petioles, in addition to the laboratory analysis charge of \$35 per sample.

*Nitrogen.* UN 32 is applied twice during the season, one month after bud break and again just after berry set, through the drip system at 5 lbs. of N per application per year.



*Boron.* Boron is often low in foothill soils and boron is required for good fruit set. A maintenance application of one half pound of actual boron per acre per year is applied foliar prior to flowering, mixed with the first sulfur (not oil) mildew spray.

*Zinc.* Zinc is necessary for chloroplasts in leaves (photosynthesis), pollen development and set. Zinc deficiency is an occasional problem and in this study zinc is applied every other year 2-3 weeks before bloom beginning in year three. Foliar applications are made with liquid zinc metalasate mixed in with an early mildew treatment. The treatments are made every other year, the cost study shows ½ of the cost each year starting in year three.

*Potassium.* Potassium is used by vines for the formation of sugars, proteins and cell division. Potassium deficiency is often a problem in the foothills. In this study, potassium is applied every three years through the drip irrigation system in a non-acidifying formulation at 23 lbs. of potassium per acre of Ultrasol K-Plus, (13.7-0-46.3). One third of the cost is charged per year because it is applied every three years.

**Pest Management.** Pest control in the production years include the continuation of weed and powdery mildew control, and adds pest control treatments for mites, leafhoppers and mealybugs.

*Weeds.* Herbicide choice is a function of weed pressure which can change over time. Herbicide active ingredients are used in rotation to prevent resistance development in target weed species. In this study, vine row weeds are controlled with pre-emergent (residual) & post-emergent (contact) herbicides. In spring, prior to bud break, the vine rows are strip sprayed with a residual herbicide mixed with a contact herbicide, in 25 gallons per sprayed acre. A second strip spray is done in summer with contact herbicide. Resident vegetation or a permanent cover crop in the row centers is mowed multiple times during the season.

*Diseases.* As in the establishment years, powdery mildew (*Uncinula necator*) continues to be the major disease requiring diligent pest control in the production years. Three to six fungicide applications are made each year for powdery mildew control, depending on the weather. The red varieties assumed in this study are considered “moderately” susceptible to powdery mildew disease; however, in wet years or when neighboring vineyards have mildew outbreaks, disease can be severe if protectant fungicides are not adequately applied. There are several UC and grower sponsored weather stations monitoring conditions favorable for mildew disease in the foothill region. These stations are equipped with canopy temperature and leaf wetness sensors that collect data used to calculate the Gubler-Thomas mildew risk index. The index helps growers time fungicide sprays and choose appropriate materials and is available online at <http://www.ipm.ucdavis.edu/>.

Applications for disease control begin in the spring of the third year at bud break with an application of 1.5% styet oil for dormant control of diseases and insects. Applications for mildew control begin at 10-12 inches of shoot growth with wettable sulfur plus an adjuvant sticker, followed 2-3 weeks later by an application of wettable sulfur plus a DMI fungicide and a sticker and one more application of a multiple active formulation fungicide prior to bunch closure. Fungicide classes with different modes of action are rotated to avoid resistance development.

**Note:** For some tight cluster varieties (Zinfandel), Botrytis bunch rot can occasionally be a problem in wet years. The application of a fungicide targeting Botrytis prior to bunch closure assists in bunch rot control; however, 2-3 sprays for Botrytis may be necessary and those applications are not included in this study. Some Zinfandel growers apply an application of the growth hormone gibberellin to elongate the rachis and open the cluster, reducing rot; however, that practice is considered somewhat risky due to the care required for proper spray concentration and timing and is not included in costs here.

*Insects and Arthropods.* Pest populations are monitored by an independent PCA/CCA to determine when an economically damaging level will occur and which control method to use. Typically, a miticide application is made in mid-summer to control Willamette mite. An insecticide application of an insect growth regulator (IGR) is made in late spring-early summer to control Gill’s mealybug (*Ferrisia gilli*) and/or grape mealybug (*Pseudococcus maritimus*). If mealybug populations are heavy, a second IGR application may be required. The mealybug populations are generally knocked back by sprays combined with parasitism by naturally occurring beneficial wasps, so one to two applications are required every other year. Late in the season an application of a neonicotinoid is made when needed to lower leafhopper populations prior to harvest.

*Vertebrate Pests.* Gophers are controlled as necessary by hand trapping. Deer are controlled by fencing as described above. Some foothill vineyards, especially those isolated and surrounded by forest lands, require netting for bird control. Bird control costs are not included in this study.

**Harvest.** In this study the owner uses the vineyard manager’s crew for harvest. The owner is charged \$140 per ton for picking and leafing (removing leaves from the bin). An additional \$20 per ton is charged to prep the field for harvest and \$30 per ton to swamp and load the crop. A \$40 per ton hauling charge is assumed to a local winery (within the county).

**Yields.** Yield maturity is reached in the fifth year. Yields vary in the foothills from about 2-6 tons per acre; for this study, 4 tons per acre is used to calculate cost per ton in the production years.

**Table B.** Foothill Red Wine Grape Variety

Year	Annual Yields		
	3	4	5+
Tons per Acre	1	2	4

**Returns.** Return prices per ton for red wine grapes are determined by variety, quality and percent soluble solids (°Brix). The five year (2010-2014) weighted average price for the red wine grape varieties assumed in this study from California’s crush district 10 are shown in Table C below. The yields and returns in this study are an estimate based on variety, fruit quality, and current market and a price per ton of \$1300 is assumed to reflect 2014 prices. Since price per ton can vary greatly due to grape quality and current market conditions, a “break even” (price per ton \$2200, 4 ton per acre yield) ranging analysis table is included to reflect the price necessary to cover the costs described in this study.

**Table C.** Averaged Prices per Ton Received by Growers in Crush District 10 for Specific Wine Grape Varieties (Barbera, Cabernet Sauvignon, Syrah, Zinfandel)

Weighted price received/ton	
Year	Average
2014	\$1347
2013	\$1,348
2012	\$1,295
2011	\$1,175
2010	\$1,165
Average	\$1266

Data compiled from the 2010-2014 annual Grape Crush Report produced by the California Department of Food and Agriculture. Weighted Average Grower Returns Per Ton Delivered Basis Non-Related Purchase For Wine, Concentrate, Juice, Vinegar, and Beverage Brandy By California Processors, for Crush District 10 (Nevada, Placer, El Dorado, Amador, Calaveras, Tuolumne and Mariposa Counties). Averaged for Barbera, Cabernet Sauvignon, Syrah, and Zinfandel.

**Assessments.** These are annual certification and association membership fees paid by the grower.

*Grape Grower Association fee.* Each foothill county has a voluntary grape grower association whose mission is to educate their members and assist with marketing. It is assumed that the owner joins the local grape grower organization by year three and continues this membership throughout the production years. The fee for membership is \$100 annually. Pierce's disease monitoring has an assessment fee of \$0.001 per pound of harvested product and starts in the third year or first harvest year.

*Irrigated Lands Ag Water Quality Coalition Fee.* This fee is for local watershed coalition membership in order to satisfy the requirements of the Irrigated Lands Regulatory program; including administration, reporting and monitoring of water quality. The annual fee is assessed at \$5 per acre plus a base fee of \$50.

### **Labor, Equipment and Interest**

*Labor.* Hourly wages for workers are \$14.10 and \$10.24 per hour for machine and non-machine workers, respectively. Adding 36% for the employers' share of federal and state payroll taxes, insurance, and other benefits gives the labor rates shown of \$22.00 and \$16.00 per hour for machine labor and non-machine labor, respectively. Labor time for operations involving machinery are 20% higher than the operation time given in Table 1 to account for the extra labor involved in equipment set up, moving, maintenance, work breaks, and field repair. Wages for a field crew manager, in addition to the vineyard manager, are not included. Returns above total costs are considered a return to management and risk.

*Equipment Operating Costs.* In this study the grower does not own any equipment. The operations are performed by the vineyard manager with their own equipment or equipment they have rented. The equipment operation costs are factored into the custom operational charges.

*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 5.75% 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 January 2015.

*Risk.* Risk results from various sources of uncertainty including fluctuations in production, price, and interest rates. The risks associated with producing wine grapes in the Sierra Nevada foothills should not be underestimated. While this study makes every effort to model a production system based on typical, real world practices, it cannot fully represent agronomic, market, and financial risks which affect the profitability and economic viability of wine grape production. In addition, establishment of vineyards and the equipment required to operate the vineyard is capital intensive. Growers should consider all of the agronomic and economic risks before committing resources to establishing a vineyard and wine grape production in this region.

## Cash Overhead

*Cash Overhead.* Cash overhead consists of various cash expenses paid out during the year that are assigned to the whole farm, not to a particular operation. These costs include property taxes, office expense, insurance, education and investment repairs.

*Property Taxes.* Counties charge a base property tax rate of 1% on the assessed value of the property. In some counties special assessment districts exist and charge additional taxes on property including equipment, buildings, and improvements. For this study, county taxes are calculated as 1% of the average value of the property. Average value equals new cost plus salvage value divided by 2 on a per acre basis.

*Insurance.* Insurance for farm investments vary depending on the assets included and the amount of coverage. Property insurance provides coverage for property loss and is charged at 0.740% of the average value of the assets over their useful life. Liability insurance covers accidents on the farm and costs \$510 for the entire farm.

*Office Expense.* Office and business expenses for the five acres are estimated at \$375.00 annually or \$75.00 per acre. These expenses include office supplies, telephones, bookkeeping, accounting, legal fees, etc.

*Investment Repairs.* Annual repairs on investments or capital recovery items that require maintenance are calculated as 2% of the purchase price. Repairs are not calculated for land and establishment costs.

*Miscellaneous Costs/Training.* Farming requires knowledge that is continually changing due to new practices, pests and regulations. Several avenues for continuing education exist for vineyard owners as well as managers. Private industry and associations hold annual educational meetings, such as the annual Unified Wine and Grape Symposium presented by American Society of Enology and Viticulture and California Association of Wine Grape Growers. The local UC Cooperative Extension Farm Advisor office typically holds an annual Foothill Grape Day educational meeting for local growers, as well as several smaller field days. UC Davis Extension holds several research meetings each year to educate growers on “hot topics”. A fee of \$75 annually is included for voluntary continuing education.

## Non-cash Overhead

Non-cash overhead is calculated as the capital recovery cost for equipment and other farm investments. Although farm equipment used on farms in the Sierra Nevada foothills may be purchased new or used, this study shows the current purchase price for new equipment. The new purchase price is adjusted to 50% to indicate a mix of new and used equipment. Annual ownership costs (Equipment and Investments) are shown in Tables 1-3 and 5. They represent the capital recovery cost for investments on an annual per acre basis.

*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). Put another way, 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. The calculation for the annual capital recovery costs is as follows.

$$[(\text{Purchase Price} - \text{Salvage Value}) \times (\text{Capital Recovery Factor})] + [\text{Salvage} \times \text{Interest}]$$

*Salvage Value.* Salvage value is an estimate of the remaining value of an investment at the end of its useful life. For farm machinery (e.g., 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 equal to the purchase price because land does not depreciate.

*Capital Recovery Factor.* Capital recovery factor is the amortization factor or annual payment whose present value at compound interest is one. It is the function of the interest rate and years of life of the equipment.

*Interest Rate.* An interest rate of 4.75% is used to calculate capital recovery. The rate will vary depending upon loan amount and other lending agency conditions, but is the basic rate suggested by a farm lending agency as of January 2015.

*Establishment Costs.* The establishment cost is the sum of the costs for land preparation, trellis system, planting, vines, cash overhead, and production expenses for growing vines through the first year that grapes are harvested. It is used to determine the non-cash overhead expense, capital recovery cost, during the production years. The total accumulated net cash cost in the third year represents the establishment cost. The Establishment tables show these costs over the first 3 years. The cost is amortized over the remaining 22 years of vineyard production to estimate the annual capital recovery cost.

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

**Acknowledgment.** Appreciation is expressed to those growers who provided assistance in developing this cost and returns study.

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**UC COOPERATIVE EXTENSION**  
**TABLE 1. COSTS PER ACRE TO ESTABLISH AND PRODUCE WINE GRAPES-OVER YEARS**  
**SIERRA NEVADA FOOTHILLS-2015**

	Estab/Yr-1	Yr-2	Yr-3	Yr-4	Yr-5	YOUR COSTS
<b>TONS/ACRE @ \$1,300/TON</b>			1.0	2.0	4.0	
Soil Sample	215					
Sub-Soil 3' Depth	340					
Stubble Disc & Roll	180					
Finish Disc & Smooth	150					
Plant Cover Crop	106					
Survey Crew	245					
Strip Spray Vine Rows-Roundup UltraMax	39					
Mow Cover Crop	25					
Stake/Straw Installation	1,117					
Irrigation System Installation	3,496					
<b>TOTAL PRE-PLANT COSTS</b>	<b>5,913</b>					
Cultural:						
Prune-Dormant-Long				256	256	
Mow Prunings		25	25	25	25	
Dormant Oil/Fertilizer-Zinc 50%			56	56	56	
Weeds-Strip Spray, Boron 20% Fertilizer		59	92	87	87	
Plant Vines/Fertilize	4,418					
Re-Tie Vines (1/3 of Acreage)		7				
Prune-2 Buds		160	176	176	176	
Suckers/Training Vines-3 Passes		1,600	320			
Re-Plant 5%, Vines		154				
Disease/Mildew Control			70			
Disease-Mildew Control Bunch Closure			92	100	100	
Disease-Mildew Control Verasion				99	99	
Disease-Mildew/Insect Control				49	49	
Insects-Leaf Hoppers 50% Ac				29	29	
Fruit/Cluster Thinning 2X			192	320	320	
Suckering/Canopy Management				640	640	
Irrigate-Drip (36X), (13X)	38	38	30	30	30	
Fertigation-UN32 (2X)	228	228	154	154	154	
Weed Control-Mow Middles 2X, 3X	50	50	100	25	25	
Gopher Control 2X	75	70	70	34	34	
Trellis Installation	3,835					
Weed Control-Spot/Strip Spray		28	57	57	57	
Deer Fence Installation	3,600					
Neutron Probe Monitoring	240	240	240	240	240	
In/Out Fee	75	75	75	75	75	
PCA/CCA Monitoring Fee	35	35	35	35	35	
Vineyard Manager Fee	1,500	1,500	1,500	800	800	
<b>TOTAL CULTURAL COSTS</b>	<b>14,094</b>	<b>4,269</b>	<b>3,294</b>	<b>3,370</b>	<b>3,370</b>	
Harvest:						
Pre-Harvest Setup			20	40	80	
Harvest-Contract			140	280	560	
Swamp/Load Bins			30	60	120	
Haul To Winery-Contract			40	80	160	
<b>TOTAL HARVEST COSTS</b>			<b>230</b>	<b>460</b>	<b>920</b>	
Post-Harvest:						
Irrigate-Drip-Chemigation Flush System(13X)			8	8	8	
Fertigation Ultrasol Kplus 1/3 A			81	81	81	
Chemigation-Flush System			0	0	0	
<b>TOTAL POST-HARVEST COSTS</b>			<b>88</b>	<b>88</b>	<b>88</b>	

**TABLE 1. CONTINUED**  
SIERRA NEVADA FOOTHILLS-2015

	Estab/Yr-1	Yr-2	Yr-3	Yr-4	Yr-5	YOUR COSTS
TONS/ACRE @ \$1,300/TON			1.0	2.0	4.0	
Assessment:						
Ag Water Quality Coalition			15	15	15	
Grape Growers Association			22	24	24	
TOTAL ASSESSMENT COSTS			37	39	39	
Interest on Operating Capital at 5.75%	465	68	55	72	74	
TOTAL OPERATING COSTS/ACRE	20,467	4,337	3,704	4,029	4,491	
CASH OVERHEAD:						
Liability Insurance	21	21	21	21	21	
Office Expense	75	75	75	75	75	
Miscellaneous Cost-Training	75	75	75	75	75	
Property Taxes	217	217	217	360	360	
Property Insurance	18	18	18	30	30	
Investment Repairs	60	60	60	60	60	
TOTAL CASH OVERHEAD COSTS/ACRE	465	465	465	620	620	
TOTAL CASH COSTS/ACRE	20,933	4,801	4,169	4,650	5,112	
INCOME/ACRE FROM PRODUCTION	0	0	<b>1,300</b>	<b>2,600</b>	<b>5,200</b>	
NET CASH COSTS/ACRE FOR THE YEAR	20,933	4,801	2,869	2,050	0	
PROFIT/ACRE ABOVE CASH COSTS	0	0	0	0	<b>88</b>	
ACCUMULATED NET CASH COSTS/ACRE	20,933	25,734	28,603	30,653	30,565	
NON-CASH OVERHEAD: (Capital Recovery)						
Land 5 Acres	950	950	950	950	950	
Drip Irrigation System	228	228	228	228	228	
Vineyard Establishment (Years 1-3)				2,124	2,124	
TOTAL NON-CASH OVERHEAD COSTS	1,178	1,178	1,178	3,302	3,302	
TOTAL COSTS/ACRE	22,111	5,981	5,348	7,952	8,414	
TOTAL INTEREST ON INVESTMENT @ 4.75%	1,050	284	254	378	400	
TOTAL COSTS/ACRE FOR THE YEAR	23,161	6,265	5,602	8,330	8,814	
INCOME/ACRE FROM PRODUCTION	0	0	<b>1,300</b>	<b>2,600</b>	<b>5,200</b>	
TOTAL NET COSTS/ACRE FOR THE YEAR	23,161	6,265	4,302	5,730	3,614	
NET PROFIT/ACRE ABOVE TOTAL COSTS	0	0	0	0	0	
TOTAL ACCUMULATED NET COST/ACRE	23,161	29,426	33,728	39,458	43,072	



**UC COOPERATIVE EXTENSION**  
**TABLE 2. COSTS PER ACRE TO ESTABLISH WINE GRAPES ESTABLISHMENT-YEAR 1**  
**WINE GRAPES SIERRA NEVADA FOOTHILL-2015**

	Quantity/ Acre	Unit	Price or Cost/Unit	Value or Cost/Acre	Your Cost
<b>OPERATING COSTS</b>					
<b>Fertilizer:</b>					<b>132</b>
Triple Super Phosphate	726.00	Lb	0.17	123	
UN 32	10.00	Lb N	0.84	8	
<b>Herbicide:</b>					<b>9</b>
Roundup UltraMax	2.00	Pint	4.31	9	
<b>Rodenticide:</b>					<b>25</b>
Rodent Bait	10.00	Lb	2.50	25	
<b>Irrigation:</b>					<b>38</b>
Well Water-Pumped	5.00	AcIn	7.50	38	
<b>Custom:</b>					<b>17,748</b>
Soil Sample	1.00	Acre	215.00	215	
Deep Tillage 3' Depth	1.00	Acre	340.00	340	
Stubble Disc	1.00	Acre	180.00	180	
Finish Disc & Smooth	1.00	Acre	150.00	150	
Survey Crew	1.00	Acre	245.00	245	
Stake/Straw Installation Labor	1.00	Acre	1117.00	1,117	
Irrigation System Installation	1.00	Acre	1496.00	1,496	
Irrigation System Material	1.00	Acre	2000.00	2,000	
Vines	726.00	Each	3.75	2,723	
Vine Planting Labor	1.00	Acre	1440.00	1,440	
Cartons	726.00	Each	0.16	116	
Vine Tape	1.00	Acre	16.00	16	
Trellis Material End/T-Stakes	1.00	Acre	565.00	565	
Trellis Material 8' T-Stakes	1.00	Acre	900.00	900	
Trellis Material 5' T-Stakes	1.00	Acre	874.00	874	
Trellis Material Wire & Clips	1.00	Acre	284.00	284	
Trellis Material Cross Arms	1.00	Acre	412.00	412	
Trellis Installation Labor	1.00	Acre	800.00	800	
Deer Fencing Material/Labor	1.00	Acre	3600.00	3,600	
Neutron Probe Monitoring	1.00	Acre	240.00	240	
PCA/CCA Fee	1.00	Acre	35.00	35	
<b>Vineyard Manager:</b>					<b>2,000</b>
Cover Crop Planting	1.00	Acre	50.00	50	
Spraying-Ground/Strip	1.00	Acre	30.00	30	
Mowing	3.00	Acre	25.00	75	
Irrigation/Fertigation Monitoring	1.00	Acre	220.00	220	
Pest Control-Vertebrate	1.00	Acre	50.00	50	
In/Out Fees	1.00	Acre	75.00	75	
Vineyard Management Fee-Establishment Year	1.00	Acre	1500.00	1,500	
<b>Miscellaneous:</b>					<b>56</b>
Clover Seed-Mixture	15.00	Lb	3.74	56	
N-pHuric Acid	0.12	Gal	1.00	0	
Interest on Operating Capital @ 5.75%					461
<b>TOTAL OPERATING COSTS/ACRE</b>					<b>20,467</b>

**UC COOPERATIVE EXTENSION**  
**TABLE 3. COSTS PER ACRE TO ESTABLISH WINE GRAPES YEAR-2**  
**WINE GRAPES SIERRA NEVADA FOOTHILL-2015**

	Quantity/ Acre	Unit	Price or Cost/Unit	Value or Cost/Acre	Your Cost
<b>OPERATING COSTS</b>					
<b>Fertilizer:</b>					<b>8</b>
UN 32	10.00	Lb N	0.84		8
<b>Herbicide:</b>					<b>57</b>
Prowl 3EC	3.00	Qt	14.75		44
Roundup UltraMax	3.00	Pint	4.31		13
<b>Rodenticide:</b>					<b>20</b>
Rodent Bait	8.00	Lb	2.50		20
<b>Irrigation:</b>					<b>38</b>
Well Water-Pumped	5.00	AcIn	7.50		38
<b>Custom:</b>					<b>417</b>
Vines	36.00	Each	3.75		135
Cartons	36.00	Each	0.16		6
Vine Tape	0.05	Acre	16.00		1
Neutron Probe Monitoring	1.00	Acre	240.00		240
PCA/CCA Fee	1.00	Acre	35.00		35
<b>Vineyard Manager:</b>					<b>1,950</b>
Spraying-Ground/Strip	1.00	Acre	30.00		30
Mowing	3.00	Acre	25.00		75
Irrigation/Fertigation Monitoring	1.00	Acre	220.00		220
Pest Control-Vertebrate	1.00	Acre	50.00		50
In/Out Fees	1.00	Acre	75.00		75
Vineyard Management Fee-Establishment Year	1.00	Acre	1500.00		1,500
<b>Contract:</b>					<b>1,779</b>
Hand Labor	111.20	Hour	16.00		1,779
<b>Miscellaneous:</b>					<b>0</b>
N-pHuric Acid	0.12	Gal	1.00		0
Interest on Operating Capital @ 5.75%					68
<b>TOTAL OPERATING COSTS/ACRE</b>				4,337	

**UC COOPERATIVE EXTENSION**  
**TABLE 4. COSTS PER ACRE TO ESTABLISH WINE GRAPES YEAR-3**  
**WINE GRAPES SIERRA NEVADA FOOTHILL-2015**

	Quantity/ Acre	Unit	Price or Cost/Unit	Value or Cost/Acre	Your Cost
<b>GROSS RETURNS</b>					
Grapes	1	Ton	1300.00	1,300	
<b>TOTAL GROSS RETURNS</b>				<b>1,300</b>	
<b>OPERATING COSTS</b>					
<b>Fertilizer:</b>					<b>18</b>
Liquid Zinc	1.00	Qt	3.20	3	
Boron- Solubor 20%	0.50	Lb	1.94	1	
UN 32	10.00	Lb N	0.84	8	
UltraSol K-Plus	7.65	Lb	0.76	6	
<b>Fungicide:</b>					<b>85</b>
Stylet-Oil	4.00	Pint	2.50	10	
Microthiol Disperss Sulfur	2.50	Lb	1.27	3	
Rally 40WSP	5.00	Oz	4.57	23	
Pristine	12.00	Oz	4.08	49	
<b>Herbicide:</b>					<b>104</b>
Surflan	2.00	Qt	29.00	58	
Roundup UltraMax	1.00	Pint	4.31	4	
Rely 280	48.00	Oz	0.87	42	
<b>Rodenticide:</b>					<b>20</b>
Rodent Bait	8.00	Lb	2.50	20	
<b>Adjuvants:</b>					<b>2</b>
NuFilm	0.50	Pint	3.17	2	
<b>Irrigation:</b>					<b>38</b>
Well Water-Pumped	5.00	AcIn	7.50	38	
<b>Custom:</b>					<b>275</b>
Neutron Probe Monitoring	1.00	Acre	240.00	240	
PCA/CCA Fee	1.00	Acre	35.00	35	
<b>Vineyard Manager:</b>					<b>2,343</b>
Spraying-Ground/Strip	1.50	Acre	30.00	45	
Mowing	3.00	Acre	25.00	75	
Spraying-Airblast	3.00	Acre	42.50	128	
Pest Control-Vertebrate	1.00	Acre	50.00	50	
Irrigation/Fertigation Monitoring	1.00	Acre	220.00	220	
Vineyard Management Fee-Establishment Year	1.00	Acre	1500.00	1,500	
In/Out Fees	1.00	Acre	135.00	135	
Pre-Harvest Setup	1.00	Ton	20.00	20	
Harvest	1.00	Ton	140.00	140	
Swamp/Load Bins	1.00	Ton	30.00	30	
<b>Contract:</b>					<b>728</b>
Hand Labor	43.00	Hour	16.00	688	
Hauling	1.00	Ton	40.00	40	
<b>Miscellaneous:</b>					<b>0</b>
N-pHuric Acid	0.12	Gal	1.00	0	
<b>Assessment :</b>					<b>37</b>
Grape Grower Association	1.00	Acre	20.00	20	
Pierce Disease	2000.00	Lb	0.00	2	
Ag Water Quality Coalition	1.00	Acre	15.00	15	
Interest on Operating Capital @ 5.75%					55
<b>TOTAL OPERATING COSTS/ACRE</b>				<b>3,704</b>	
<b>NET RETURNS ABOVE OPERATING COSTS</b>					<b>-2,404</b>

**UC COOPERATIVE EXTENSION**  
**TABLE 5. COSTS AND RETURNS PER ACRE TO PRODUCE WINE GRAPES**  
WINE GRAPES SIERRA NEVADA FOOTHILL-2015

	Quantity/ Acre	Unit	Price or Cost/Unit	Value or Cost/Acre	Your Cost
<b>GROSS RETURNS</b>					
Grapes	4	Ton	1300.00	5,200	
<b>TOTAL GROSS RETURNS</b>				5,200	
<b>OPERATING COSTS</b>					
<b>Fertilizer:</b>					<b>18</b>
Liquid Zinc	1.00	Qt	3.20	3	
Boron- Solubor 20%	0.50	Lb	1.94	1	
UN 32	10.00	Lb N	0.84	8	
UltraSol K-Plus	7.60	Lb	0.76	6	
<b>Insecticide:</b>					<b>9</b>
Applaud	0.50	Oz	2.78	1	
Assail 70WP	0.50	Oz	15.38	8	
<b>Fungicide:</b>					<b>72</b>
Stylet-Oil	4.00	Pint	2.50	10	
Microthiol Disperss Sulfur	5.00	Lb	1.27	6	
Pristine	8.00	Oz	4.08	33	
Rally 40WSP	5.00	Oz	4.57	23	
<b>Herbicide:</b>					<b>99</b>
Chateau	6.00	Oz	8.50	51	
Roundup UltraMax	1.00	Pint	4.31	4	
Ammonium Sulfate	4.25	Lb	0.34	1	
Rely 280	48.00	Oz	0.87	42	
<b>Miticide:</b>					<b>53</b>
Acramite 50WS	0.75	Lb	71.25	53	
<b>Rodenticide:</b>					<b>9</b>
Gopher Traps	1.00	Each	8.50	9	
<b>Adjuvants:</b>					<b>2</b>
NuFilm	0.75	Pint	3.17	2	
<b>Irrigation:</b>					<b>38</b>
Well Water-Pumped	5.00	Acln	7.50	38	
<b>Custom:</b>					<b>275</b>
Neutron Probe Monitoring	1.00	Acre	240.00	240	
PCA/CCA Fee	1.00	Acre	35.00	35	
<b>Vineyard Manager:</b>					<b>2,251</b>
Mowing	3.00	Acre	25.00	75	
Spraying-Ground/Strip	1.50	Acre	30.00	45	
Spraying-Airblast	4.50	Acre	42.50	191	
Pest Control-Vertebrate	0.50	Acre	50.00	25	
Irrigation/Fertigation Monitoring	1.00	Acre	220.00	220	
Vineyard Management Fee-Production Year	1.00	Acre	800.00	800	
In/Out Fees	1.00	Acre	135.00	135	
Pre-Harvest Setup	4.00	Ton	20.00	80	
Harvest	4.00	Ton	140.00	560	
Swamp/Load Bins	4.00	Ton	30.00	120	
<b>Contract:</b>					<b>1,552</b>
Hand Labor	87.00	Hour	16.00	1,392	
Hauling	4.00	Ton	40.00	160	
<b>Miscellaneous:</b>					<b>0</b>
N-pHuric Acid	0.12	Gal	1.00	0	
<b>Assessment :</b>					<b>39</b>
Grape Grower Association	1.00	Acre	20.00	20	
Pierce Disease	4000.00	Lb	0.00	4	
Ag Water Quality Coalition	1.00	Acre	15.00	15	
<b>Labor</b>					<b>0</b>
<b>Machinery</b>					<b>0</b>
Fuel-Gas	0.00	gal	3.79	0	
Fuel-Diesel	0.00	gal	3.88	0	
Lube				0	
Machinery Repair				0	
Interest on Operating Capital @ 5.75%				74	
<b>TOTAL OPERATING COSTS/ACRE</b>				4,491	
<b>TOTAL OPERATING COSTS/TON</b>				1,123	
<b>NET RETURNS ABOVE OPERATING COSTS</b>				709	

**TABLE 5. CONTINUED**  
WINE GRAPES SIERRA NEVADA FOOTHILL-2015

	Quantity/ Acre	Unit	Price or Cost/Unit	Value or Cost/Acre	Your Cost
<b>CASH OVERHEAD COSTS</b>					
Liability Insurance				21	
Office Expense				75	
Miscellaneous Cost-Training				75	
Property Taxes				360	
Property Insurance				30	
Investment Repairs				60	
<b>TOTAL CASH OVERHEAD COSTS/ACRE</b>				620	
<b>TOTAL CASH OVERHEAD COSTS/TON</b>				155	
<b>TOTAL CASH COSTS/ACRE</b>				5,112	
<b>TOTAL CASH COSTS/TON</b>				1,278	
<b>NET RETURNS ABOVE CASH COSTS</b>				88	
<b>NON-CASH OVERHEAD COSTS (Capital Recovery)</b>					
Land 5 Acres				950	
Drip Irrigation System				228	
Vineyard Establishment				2,124	
Equipment				0	
<b>TOTAL NON-CASH OVERHEAD COSTS/ACRE</b>				3,302	
<b>TOTAL NON-CASH OVERHEAD COSTS/TON</b>				826	
<b>TOTAL COST/ACRE</b>				8,414	
<b>TOTAL COST/TON</b>				2,103	
<b>NET RETURNS ABOVE TOTAL COST</b>				-3,214	

**UC COOPERATIVE EXTENSION**  
**TABLE 6. MONTHLY COSTS PER ACRE TO PRODUCE WINE GRAPES**  
**WINE GRAPES SIERRA NEVADA FOOTHILL-2015**

	JAN 15	FEB 15	MAR 15	APR 15	MAY 15	JUN 15	JUL 15	AUG 15	SEP 15	Total
Cultural:										
Dormant Prune-Long Prune	256									256
Mowing-Weeds/Prunings 1X	25									25
Weed Control-Strip Spray/Fertilize		87								87
Pruning 2-Bud Spurs			176							176
Dormant Oil/Fertilize-Zinc 50% Ac				56						56
Disease-Mildew/Insect Control					49					49
Pest Control-Gophers					34					34
Suckering/Canopy Management					640					640
Mowing-Weeds Row Middles 2X						25				25
Disease-Mildew/Mites-Bunch Close						100				100
Irrigate-Drip (13X)						8	11	11		30
Fertigation UN32 2X						77	77			154
Fruit/Cluster Thinning 2X						160	160			320
Disease-Mildew Control Verasion						99				99
Weed Control-Strip Spray Rely 280							57			57
Weed Control-Mow Middles 2X								25		25
Insects-leafhoppers 50% Ac								29		29
Neutron Probe Monitoring	27	27	27	27	27	27	27	27	27	240
Vineyard Management Fee								800		800
PCA/CCA Monitoring Fee								35		35
In/Out Fees								135		135
<b>TOTAL CULTURAL COSTS</b>	<b>308</b>	<b>113</b>	<b>203</b>	<b>82</b>	<b>749</b>	<b>495</b>	<b>331</b>	<b>1,062</b>	<b>27</b>	<b>3,370</b>
Harvest:										
Pre-Harvest Setup									80	80
Harvest-Contract									560	560
Swamp/Load Bins									120	120
Haul To Winery-Contract									160	160
<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>0</b>	<b>920</b>	<b>920</b>
Post-Harvest:										
Irrigate-Drip (13X)									8	8
Fertigation Ultrasol Kplus 1/3 Ac									81	81
Chemigation-Flush System									0	0
<b>TOTAL POST-HARVEST COSTS</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>88</b>	<b>88</b>
Assessment:										
Grape Growers Association									24	24
Ag Water Quality Coalition									15	15
<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>0</b>	<b>39</b>	<b>39</b>
Interest on Operating Capital @5.75%	1	2	3	3	7	9	11	16	21	74
<b>TOTAL OPERATING COSTS/ACRE</b>	<b>309</b>	<b>115</b>	<b>206</b>	<b>86</b>	<b>756</b>	<b>504</b>	<b>342</b>	<b>1,078</b>	<b>1,095</b>	<b>4,491</b>
CASH OVERHEAD										
Liability Insurance		21								21

**TABLE 6. CONTINUED**  
WINE GRAPES SIERRA NEVADA FOOTHILL-2015

	JAN 15	FEB 15	MAR 15	APR 15	MAY 15	JUN 15	JUL 15	AUG 15	SEP 15	Total
Office Expense									75	75
Miscellaneous Cost-Training									75	75
Property Taxes		180					180			360
Property Insurance		15					15			30
Investment Repairs	7	7	7	7	7	7	7	7	7	60
<b>TOTAL CASH OVERHEAD COSTS</b>	<b>7</b>	<b>223</b>	<b>7</b>	<b>7</b>	<b>7</b>	<b>7</b>	<b>202</b>	<b>7</b>	<b>157</b>	<b>620</b>
<b>TOTAL CASH COSTS/ACRE</b>	<b>316</b>	<b>338</b>	<b>212</b>	<b>92</b>	<b>763</b>	<b>511</b>	<b>544</b>	<b>1,084</b>	<b>1,252</b>	<b>5,112</b>

**UC COOPERATIVE EXTENSION**  
**TABLE 7. RANGING ANALYSIS-WINE GRAPES**  
**WINE GRAPES SIERRA NEVADA FOOTHILL-2015**  
**COSTS PER ACRE AND PER TON AT VARYING YIELDS TO PRODUCE WINE GRAPES**

	YIELD (TON)						
	3.25	3.50	3.75	4.00	4.25	4.50	4.75
OPERATING COSTS/ACRE:							
Cultural	3,370	3,370	3,370	3,370	3,370	3,370	3,370
Harvest	748	805	863	920	978	1,035	1,093
Post-Harvest	88	88	88	88	88	88	88
Assessment	39	39	39	39	39	39	39
Interest on Operating Capital @ 5.75%	73	74	74	74	75	75	75
<b>TOTAL OPERATING COSTS/ACRE</b>	<b>4,318</b>	<b>4,376</b>	<b>4,433</b>	<b>4,491</b>	<b>4,549</b>	<b>4,607</b>	<b>4,665</b>
<b>TOTAL OPERATING COSTS/TON</b>	<b>1,328.59</b>	<b>1,250.20</b>	<b>1,182.26</b>	<b>1,122.81</b>	<b>1,070.36</b>	<b>1,023.74</b>	<b>982.02</b>
CASH OVERHEAD COSTS/ACRE	620	620	620	620	620	620	620
<b>TOTAL CASH COSTS/ACRE</b>	<b>4,938</b>	<b>4,996</b>	<b>5,054</b>	<b>5,112</b>	<b>5,169</b>	<b>5,227</b>	<b>5,285</b>
<b>TOTAL CASH COSTS/TON</b>	<b>1,519.49</b>	<b>1,427.47</b>	<b>1,347.71</b>	<b>1,277.92</b>	<b>1,216.34</b>	<b>1,161.61</b>	<b>1,112.63</b>
NON-CASH OVERHEAD COSTS/ACRE	3,302	3,302	3,302	3,302	3,302	3,302	3,302
<b>TOTAL COSTS/ACRE</b>	<b>8,240</b>	<b>8,298</b>	<b>8,356</b>	<b>8,414</b>	<b>8,471</b>	<b>8,529</b>	<b>8,587</b>
<b>TOTAL COSTS/TON</b>	<b>2,536.00</b>	<b>2,371.00</b>	<b>2,228.00</b>	<b>2,103.00</b>	<b>1,993.00</b>	<b>1,895.00</b>	<b>1,808.00</b>

Net Return per Acre above Operating Costs for Wine Grapes

PRICE (\$/ton)	YIELD (Ton/acre)						
Grapes	3.25	3.50	3.75	4.00	4.25	4.50	4.75
1000.00	-1,068	-876	-683	-491	-299	-107	85
1100.00	-743	-526	-308	-91	126	343	560
1200.00	-418	-176	67	309	551	793	1,035
1300.00	-93	174	442	709	976	1,243	1,510
1400.00	232	524	817	1,109	1,401	1,693	1,985
1500.00	557	874	1,192	1,509	1,826	2,143	2,460
1600.00	882	1,224	1,567	1,909	2,251	2,593	2,935

Net Return per Acre above Cash Costs for Wine Grapes

PRICE (\$/ton)	YIELD (Ton/acre)						
Grapes	3.25	3.50	3.75	4.00	4.25	4.50	4.75
1000.00	-1,688	-1,496	-1,304	-1,112	-919	-727	-535
1100.00	-1,363	-1,146	-929	-712	-494	-277	-60
1200.00	-1,038	-796	-554	-312	-69	173	415
1300.00	-713	-446	-179	88	356	623	890
1400.00	-388	-96	196	488	781	1,073	1,365
1500.00	-63	254	571	888	1,206	1,523	1,840
1600.00	262	604	946	1,288	1,631	1,973	2,315



**TABLE 7. CONTINUED**  
**WINE GRAPES SIERRA NEVADA FOOTHILL-2015**

Net Return per Acre above Total Costs for Wine Grapes

PRICE (\$/ton)	YIELD (Ton/acre)						
Grapes	3.25	3.50	3.75	4.00	4.25	4.50	4.75
1000.00	-4,990	-4,798	-4,606	-4,414	-4,221	-4,029	-3,837
1100.00	-4,665	-4,448	-4,231	-4,014	-3,796	-3,579	-3,362
1200.00	-4,340	-4,098	-3,856	-3,614	-3,371	-3,129	-2,887
1300.00	-4,015	-3,748	-3,481	-3,214	-2,946	-2,679	-2,412
1400.00	-3,690	-3,398	-3,106	-2,814	-2,521	-2,229	-1,937
1500.00	-3,365	-3,048	-2,731	-2,414	-2,096	-1,779	-1,462
1600.00	-3,040	-2,698	-2,356	-2,014	-1,671	-1,329	-987

**BREAK EVEN-RANGING ANALYSIS**

**\$2200/TON PRICE AT 4.0 TONS/ACRE YIELD**

Net Return per Acre above Total Costs for Wine Grapes

PRICE (\$/ton)	YIELD (Ton/acre)						
Grapes	3.25	3.50	3.75	4.00	4.25	4.50	4.75
1900.00	-2,065	-1,648	-1,231	-814	-396	21	438
2000.00	-1,740	-1,298	-856	-414	29	471	913
2100.00	-1,415	-948	-481	-14	454	921	1,388
2200.00	-1,090	-598	-106	386	879	1,371	1,863
2300.00	-765	-248	269	786	1,304	1,821	2,338
2400.00	-440	102	644	1,186	1,729	2,271	2,813
2500.00	-115	452	1,019	1,586	2,154	2,721	3,288

**UC COOPERATIVE EXTENSION**  
**TABLE 8. WHOLE FARM ANNUAL INVESTMENT AND BUSINESS OVERHEAD COSTS-PRODUCTION YEARS**  
**WINE GRAPES SIERRA NEVADA FOOTHILL-2015**

ANNUAL INVESTMENT COSTS

Description	Price	Yrs Life	Salvage Value	Capital Recovery	Cash Overhead			Total
					Insur- ance	Taxes	Repairs	
INVESTMENT								
Land 5 Acres	100,000	30	100,000	4,750	84	1,000	0	5,834
Drip Irrigation System	16,500	25	0	1,142	7	83	298	1,529
Vineyard Establishment	143,015	22	0	10,619	60	715	0	11,394
<b>TOTAL INVESTMENT</b>	<b>259,515</b>	<b>-</b>	<b>100,000</b>	<b>16,510</b>	<b>152</b>	<b>1,798</b>	<b>298</b>	<b>18,757</b>

ANNUAL BUSINESS OVERHEAD COSTS

Description	Farm	Units/ Unit	Price/ Unit	Total Cost
Liability Insurance	5	Acre	21.00	105
Office Expense	5	Acre	75.00	375
Miscellaneous Cost-Training	5	Acre	75.00	375

**UC COOPERATIVE EXTENSION**  
**TABLE 9. OPERATIONS WITH MATERIALS-PRODUCTION YEARS**  
**WINE GRAPES SIERRA NEVADA FOOTHILL-2015**

Operation	Operation Month	Labor Type/ Material	Rate/ acre	Unit
Dormant Prune-Long Prune	Jan	Hand Labor	16.00	Hour
Mowing-Weeds/Prunings	Jan	Mowing	1.00	Acre
Weed Control-Strip Spray	Feb	Chateau	6.00	Oz
		Spraying-Ground/Strip	1.00	Acre
		Roundup UltraMax	1.00	Pint
		Ammonium Sulfate	4.25	Lb
Pruning 2-Bud Spurs	Mar	Hand Labor	11.00	Hour
Dormant Oil/Fertilize	Apr	Stylet-Oil	4.00	Pint
		Spraying-Airblast	1.00	Acre
		Liquid Zinc	1.00	Qt
Disease-Mildew/Insect	May	NuFilm	0.25	Pint
		Microthiol Disperss Sulfur	2.50	Lb
		Spraying-Airblast	1.00	Acre
		Applaud	0.50	Oz
		Boron- Solubor 20%	0.50	Lb
Pest Control-Gophers	May	Gopher Traps	1.00	Each
		Pest Control-Vertebrate	0.50	Acre
Suckering/Canopy Management	May	Hand Labor	40.00	Hour
Weed Control-Mow Middles	June	Mowing	1.00	Acre
Disease-Mildew/Mites	June	NuFilm	0.25	Pint
		Spraying-Airblast	1.00	Acre
		Microthiol Disperss Sulfur	2.50	Lb
		Acramite 50WS	0.75	Lb
Irrigate-Drip (13X)	June	Well Water-Pumped	1.00	AcIn
	July	Well Water-Pumped	1.50	AcIn
	Aug	Well Water-Pumped	1.50	AcIn
	Sept	Well Water-Pumped	1.00	AcIn
Fertigation UN32 2X	June	UN 32	5.00	Lb N
		Irrigation/Fertigation Monitoring	0.33	Acre
	July	UN 32	5.00	Lb N
		Irrigation/Fertigation Monitoring	0.33	Acre
Fruit/Cluster Thinning	June	Hand Labor	10.00	Hour
	July	Hand Labor	10.00	Hour
Disease-Mildew Control	June	Spraying-Airblast	1.00	Acre
		NuFilm	0.25	Pint
		Pristine	8.00	Oz
		Rally 40WSP	5.00	Oz
Weed Control-Strip Spray	July	Rely 280	48.00	Oz
		Spraying-Ground/Strip	0.50	Acre
Weed Control-Mow Middles	Aug	Mowing	1.00	Acre
Insects-leafhoppers	Aug	Spraying-Airblast	0.50	Acre
		Assail 70WP	0.50	Oz
Neutron Probe Monitor	Aug	Neutron Probe Monitoring	1.00	Acre
Vineyard Management	Aug	Vineyard Management Fee	1.00	Acre
PCA/CCA Monitoring Fee	Aug	PCA/CCA Fee	1.00	Acre
In/Out Fees	Aug	In/Out Fees	1.00	Acre
Pre-Harvest Setup	Sept	Pre-Harvest Setup	4.00	Ton
Harvest-Contract	Sept	Harvest	4.00	Ton
Swamp/Load Bins	Sept	Swamp/Load Bins	4.00	Ton
Haul To Winery-Control	Sept	Hauling	4.00	Ton
Irrigate-Drip (13X)	June	Well Water-Pumped	1.00	AcIn
	July	Well Water-Pumped	1.50	AcIn
	Aug	Well Water-Pumped	1.50	AcIn
	Sept	Well Water-Pumped	1.00	AcIn
Fertigation Ultrasol	Sept	UltraSol K-Plus	7.60	Lb
		Irrigation/Fertigation Monitoring	0.34	Acre
Chemigation-Flush System	Sept	N-pHuric Acid	0.12	Gal