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SAMPLE COSTS TO PRODUCE WINEGRAPES

Chardonnay & Pinot noir

NORTH COAST REGION

Russian River Valley Sonoma County-2016

Amended-September 2017

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CONTENTS

INTRODUCTION

Sample costs for wine grape production in the Russian River Valley of Sonoma County are presented in this study. Vineyard establishment costs are not presented. The hypothetical vineyard used in this report consists of 50 acres, 20 of Chardonnay and 20 of Pinot noir and 10 acres in easements, roads and irrigation system. This study is intended as a guide only. It can be used to help guide production decisions, estimate potential returns, prepare budgets and evaluate production loans. Sample costs for labor, materials, equipment and contract services are based on January 2017 figures. Production practices described are considered typical for the crop in many local vineyards, but will not apply to every situation. A blank column titled Your Costs is provided in Tables 1 and 2 to enter your estimated costs.

For an explanation of calculations used in the study refer to the section titled Assumptions. For more information contact the University of California, Agriculture and Natural Resources, Agricultural Issues Center, Department of Agricultural and Resource Economics, at 530-752-4651 or destewart@ucdavis.edu or Rhonda Smith, UC Cooperative Extension Sonoma County Farm Advisor, at 707-565-2621 or rhsmith@ucanr.edu.

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.

ASSUMPTIONS

The following assumptions refer to Tables 1 to 7 and pertain to sample costs to produce wine grapes in the North Coast Region-Russian River Valley-Sonoma County (Crush District 3). Practices described represent production procedures and materials that for the most part are utilized in a well-managed vineyard in Sonoma County. However, some of the practices and costs described are not representative of all vineyard sites located in the county. Site characteristics that will have the greatest impact on farming practices and thus establishment and production costs include the following: slope, rocky, very clayey, gravelly or shallow soils, natural drainage, soil chemistry characteristics that affect nutrient uptake, excessive wind, and soil pests and diseases such as nematodes and Armillaria root rot.

The use of trade names and cultural practices in this report does not constitute an endorsement or recommendation by the University of California nor is any criticism implied by omission of other similar products or cultural practices.

Farm. The hypothetical vineyard is assumed to lie in the warmer edge of the Russian River Valley, American Viticultural Area (AVA) in Sonoma County, CA. The farm is owned and operated by the grower with assistance from a part-time employee (general laborer). The site has less than a 15 percent natural slope. The farm is 50 contiguous acres that contains 40 acres of established grapevines of which 20 acres are planted to Chardonnay and 20 acres to Pinot noir. Roads, easements, irrigation system, and equipment storage area occupy the other 10 acres.

A high yielding clone of Chardonnay and a low yielding clone of Pinot noir are planted in the vineyard and vines are in full production. Specifically, the average annual yield of Chardonnay and Pinot noir over the life of the mature vineyard is 6.75 and 4.0 tons per acre respectively. In reality, production is strongly influenced by the vineyard's specific location within the Russian River Valley and by weather that will significantly impact yield in some years.

Vineyard Management. In this study, the vineyard owner is responsible for making all of the production decisions and operating and maintaining the machinery owned. The owner has a contract with a vineyard management company **(VMC)** that provides farming equipment and trained operators as well as laborers for hand operations such as suckering, shoot thinning, tucking, harvesting and pruning. The VMC performs most operations that require equipment e.g. mower, hedger, mechanical leaf remover and disc. In addition, the VMC operates a ripper, gypsum/lime spreader and seed drill which must be rented. Charges associated with all equipment operated by the VMC appear in the "custom" column in Table 1. In addition to charging for operator labor and equipment use, the VMC has a move-in charge when any equipment is brought to the site. This is an hourly charge which increases with distance and may vary depending on the equipment transported and distance traveled; however, a flat move-in fee of $1,400 is used for the entire 40 acres. This operation is charged at $35 per acre for each variety and shown as a line item in Table 1.

In this study the VMC charges a flat management fee of $400 per acre during the production years. The VMC is responsible for conducting the operations as assigned. The VMC is a licensed labor contractor and supervises all labor associated with the operations, provides employee safety trainings, pays labor rates that meet or exceed those required by state law and required health insurance. The VMC is responsible for maintaining federal, state and local licenses and permits as required by law and regulations. Management fees associated with management companies vary widely depending on individual site challenges, size of vineyard property, and other factors.

Vineyard Site Regulations & Design

Site Regulations. The vineyard described was established with the appropriate permits required by the County of Sonoma at the time it was developed. Permits are required prior to planting or replanting a new or existing vineyard greater than one-half acre in land area in Sonoma County. Permit requirements and fees vary considerably depending on several factors including highest natural slope on the project; presence of specific soil series considered highly erodible ("cohesion less"); planned removal of trees (regardless if trees are considered commercial timber species); if engineered grading or drainage is necessary and the number of acres to be developed.

The site is considered a "Level 1" in that the highest slope of the area planted does not exceed 15 percent and it does not contain highly erodible soils. Project fees were required when the vineyard was planted and are not included in this cost study.

Vineyard Design. The vineyard is laid out in two 20 acre blocks each containing 121 rows with nine-foot row spacing. There is one avenue between the blocks with turn-around space for equipment at each end of the rows. Each block contains 2 stationary wind machines that provide frost protection. In the center of each block, two vine rows were not planted to allow tractor access on both sides of the machines. The Chardonnay vines are spaced at six feet within rows; all rows are 828 feet long and have 138 vines per row (806 vines per acre). Vine spacing in the Pinot noir block is five feet; all rows are 770 feet long and have 154 vines per row (968 vines per acre).

Trellis Systems. The vineyard utilizes a modified vertically shoot positioned trellis. In the Chardonnay block, five-foot T-posts are on six foot centers and eight-foot T-posts are on 18-foot centers. In the Pinot noir block, five-foot T-posts are on five-foot centers and eight-foot T-posts are on 15-foot centers. In both blocks, a vine is planted at each T-post (stake). A ten-foot, 2-7/8 inch drill pipe with a single spade is at the end of each row and was driven 4.5 feet into the ground. The 14-gauge wire for supporting the drip irrigation system's poly tubing is clipped to each stake 14 inches above the ground and secured to each end post. The poly tubing is attached to the drip wire with one K-curl per vine.

The Chardonnay vines are bilateral cordoned trained and spur pruned. A permanent, 12-gauge, high tensile cordon wire is attached to each stake at 38 inches above the ground. One 8-inch cross arm is located 14 inches above the cordon wire and an 18-inch cross arm is mounted at the top of the stake. The Pinot noir vines are head trained cane pruned and a single fruiting wire is attached to each stake at 36 inches above the ground. One 6-inch cross arm is located 12 inches above the fruiting wire and a 12 inch cross arm is mounted at the top of the stake. The vines are pruned to two fruiting canes and 2 renewal spurs; the latter are located near the vine head. In both cultivars, wires at the ends of both cross arms are 12 gauge, high tensile and fixed; there are no moveable wires.

Vines. The vineyard was planted in 2011 with grafted green vines (also known as potted bench grafts). They will be sufficiently productive for 25-30 years (through 2036). To maintain a complete stand, individual vines are replaced each year as needed because of poor vine performance or loss due to gopher damage, trunk diseases or virus diseases. Forty vines are replanted every year through 2031; vine purchases are included in Tables 1, 2 & 3. Labor costs to replant vines is under general laborer.

Production Cultural Practices and Material Inputs

Prune, Tie, and Sucker. Pruning and tying are done during the winter months (January/March) and the prunings are chopped in March during the first mowing. Immediately after pruning in January, the grower applies a tank mix of Rally 40WSP and Topsin M WSB fungicides to protect pruning wounds from infection. The application is made with a 60HP tractor and an air-blast sprayer. In February, canes are tied to the fruiting wire in the Pinot noir. In the Chardonnay, it is assumed that one-third of the cordons are re-tied each year. Suckering occurs in April and May. Suckering is the removal of undesired shoots that originate on trunks, vine heads and less frequently just below the soil level. Pruning, tying and suckering operations are performed by the VMC.

Canopy Management (CM) and Crop Adjustment. In addition to suckering, canopy management includes shoot thinning, leaf and lateral shoot removal from the fruit zone as well as shoot positioning. Shoot thinning includes the removal of "doubles" from nodes on the Pinot noir canes and insures that fruitful shoots are kept on spurs in both the Pinot noir and Chardonnay. The decision to combine suckering with shoot thinning must be made with care; if vines have a significant amount of suckers and/or suckers originate near the soil level, then suckering and shoot thinning operations are performed in separate passes. Pinot noir vines are suckered/shoot thinned in April and May in 3 passes. In the Chardonnay, there are two passes. Suckering and shoot thinning operations are performed by the VMC.

Leaves are removed from the fruit zone in both cultivars on one side of the canopy. Leaf removal is done mechanically in the Chardonnay and by hand in the Pinot noir. In the latter cultivar, selected leaves and lateral shoots are removed at the same time from the fruit zone in both May and early June. In both cultivars, shoots are tucked between wires in April and May. In June or July vines are mechanically hedged in one pass to trim shoots that have grown significantly beyond the top cross arm. Leaf and lateral shoot removal, shoot positioning and hedging operations are performed by the VMC.

Clusters are thinned in the Chardonnay as cluster size increases in June and July only to prevent dense clumps of fruit which reduces the risk of botrytis bunch rot. In August when veraison is nearly complete in Pinot noir (i.e. 95 percent of the clusters have turned color), there is a single "green drop" pass to remove clusters that are not fully colored. During that pass, second-crop clusters will be also removed from the Pinot noir as needed. All cluster thinning operations are conducted by the VMC.

Fertilize. Fertilizers are applied through the drip system and as foliar sprays. Costs are given for a single fertilizer program, however, in practice, the two cultivars may require different rates of applied macronutrients due to different cropping levels and other variables. A liquid fertilizer, CAN-17, is injected through the drip system once in the amount of 3.5 gallons (44 pounds of material) in April (one month after bud break) to deliver 7.5 pounds of nitrogen. Beginning in mid-June a highly soluble solid fertilizer (12-26-26) is injected in 3 split applications ending mid-August in amounts that deliver a total of 100 pounds of material. The total amount of N-P-K applied per acre is 19.5 pounds of nitrogen, 26 pounds of phosphorus and 26 pounds of potassium. The grower is responsible for applying the fertilizer injections through the drip irrigation system.

Both zinc (Neutral Zinc) and boron (Solubor) are added to the pre-bloom disease control spray application in May. Two pounds of actual zinc and one-pound actual boron are applied. Each year, opposite cluster petioles are collected at bloom for tissue nutrient analyses in each cultivar. Every third year petioles are also collected at veraison (July).

Irrigation. The pumping costs are based on grower input; pumped irrigation water cost is $16.50 per

acre-inch. Price will vary by grower in this region depending on quantity and frequency pumped, power cost and various well characteristics. Assuming "normal" winter rainfall, irrigation water is applied every two weeks beginning mid-June and ending on October 1st for a total of 8 dates. One or more post-harvest irrigations may be made depending on the onset of fall rain events. Irrigation costs incurred after October 1st are not included in the study. Fertilizer is injected on three of those dates: once in June, July and August as well as in April to attain the rates given in the previous section. In April the irrigation system is operated just long enough to insure a uniform distribution of CAN-17 throughout the system coupled with adequate time to thoroughly clear the lines of the fertilizer. Total annual applied water is 2 ac-inches. No assumption is made about in-season rainfall or the irrigation system's emission uniformity. The grower is responsible for operating the drip irrigation system.

Frost Protection. The vineyard will need frost protection during the months of March, April, and possibly May. Four stationary wind machines provide frost protection and are powered with propane. For this study, 10 nights at 5 hours per night, over 3 months is included in the cultural costs. No labor is charged for frost protection; the machines are operated by the grower.

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 or contact the UC Cooperative Extension Sonoma County Viticulture Farm Advisor. The vineyard owner who applies pesticides to his or her property may need to hold a valid private applicator certificate that is issued by 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, however, adjuvants and their costs are not included.

Pest Control Adviser/Certified Crop Adviser, (PCA/CCA). An individual who is licensed as a PCA and/or a CCA may monitor the field for pests and disease and collect samples for nutrient analyses. A CCA emphasizes fertilizer and plant nutrient management issues. If pest management advice is provided by a PCA, that individual is required to provide the grower written recommendations for pesticides that he/she advises a grower to use. In this region, a written recommendation by a CCA for applying fertilizers is currently not required. An independent PCA, who is not associated with a retail supplier of agricultural chemicals, is hired by the grower to monitor the vineyard for disease and insect pests weekly for nine months. The annual per acre fee for monitoring the vineyard is shown in Tables 3-A and 3-B in October.

Vineyard Floor Management/Weeds/Cover Crop. In this study, costs are given for a single floor management system; however in practice the two cultivars may have different cover crops depending on vine growth objectives and other variables. Mowing is used to manage vegetation in the row middles and herbicides are used to control weeds in the vine rows. Alternate middles have a winter annual cover crop (CC) and resident vegetation, i.e. the latter are not-cover cropped (NC). During pruning, brush is pulled off the trellis wires and into the NC middles. In late March, just before bud break, the brush is chopped in the NC middles and vegetation is mowed in the CC middles. In May and again in June, all middles are mowed. The March pass requires more time than the subsequent passes. The equipment and labor required to chop prunings and mow is provided by the VMC.

Mowing and discing operations are only those described; however, depending on spring rainfall the CC middles may be mowed more or less frequently to insure adequate, but not excessive soil moisture content. In addition, in dry years, alternate middles or all middles may be disced to conserve soil moisture.

Vine row weeds are controlled with a winter (January) dormant mix using a herbicide for pre- or early post emergent use (flumioxazin – Chateau) and a contact herbicide (glyphosate – Buccaneer) applied as a strip spray. That application targets several weeds including horseweed (*Conyza canadensis*) – also called mare's tail. In practice, a different pre-emergent herbicide will be applied every third year. A second strip spray is applied in May with a tank mix containing glyphosate and a non-selective post-emergence herbicide (glufosinate – Reckon). That application targets field bindweed, Bermudagrass and fluvellin *(Kickxia elatine)*. Vine row weed control is done by the grower with the ATV 20-gallon sprayer.

Insect and Mite Management. A PCA/CCA monitors the vineyard weekly. It is assumed it is necessary to treat for insect pests or mites once every third year. One-third of the costs are charged to the vineyard each year. The rates and material costs reflect the fact that they are not used every year. No costs are assigned to control mealybug pests; however if the vineyard becomes infested, control costs can be significant. Grape mealybug (*Pseudococcus maritimus*) is usually kept to low population levels by natural enemies; however, it is a vector of grapevine leafroll virus thus control measures may be required to prevent grapevine leafroll disease. Vine mealybug (*Planococcus ficus*) is also a vector of grapevine leafroll virus. If it becomes established in the vineyard, at least two insecticide applications will be required annually to reduce the population. Sanitation measures may also be required to reduce the movement of vine mealybugs to uninfested blocks by contaminated equipment. The costs associated with sanitation may be passed on to the grower by the VMC. Costs are assigned to monitor mealybugs using pheromone traps that attract the males of two mealybug pests found in north coast vineyards. The grower has four grape mealybug and four vine mealybug pheromone traps (8 trap sites) in the vineyard from May through October. Traps are read and replaced every two weeks by the PCA/CCA during the 6 month trapping period. The pheromone lures are replaced as recommended by the supplier. The per acre charge representing the PCA's trapping fee includes trap supplies for all six months of trapping and is shown in Tables 3-A and 3-B in October.

Disease Management. In late March and early April, micronized sulfur is applied to every other row. These sprays are followed by three applications of dusting sulfur at 10-day intervals (twice in April and once in May). Beginning with the final dust application in May, all subsequent treatments are applied to each row. Pristine, a material with two active ingredients (modes of action) is applied pre-bloom in May at the high label rate. (The pre-bloom application is combined with foliar fertilizers). Luna Experience is applied in early June at the high rate. In the third week of June the pre-bunch close spray includes Flint and Elevate. A final powdery mildew treatment is made in July using Rally. (Research has shown that sequential sprays of products with the same mode of action can lead to the development of reduced sensitivity to the active ingredients). All foliar pesticide applications are made by the owner using a 60 HP tractor and a 300-gallon vineyard air blast sprayer or a vineyard duster.

There are no costs assigned to control Pierce's disease in this study. The incidence of this disease in Sonoma County vineyards is quite variable; however control measures and annual replanting costs can be significant.

Vertebrate Pests. Pocket gophers are very problematic in many Sonoma County vineyards and require control. Gophinator traps are set and retrieved by the vineyard laborer over a 10 month period. The grower owns several traps and in practice very few are replaced annually. Annual trap cost per acre is shown in tables 3-A and 3-B in October. Labor costs for gopher trapping are assigned to the general laborer. Deer can also damage vines and a deer fence was erected during the vineyard establishment years.

Harvest. The vineyard management company machine harvests the Chardonnay block at a rate of $250 per ton. The Pinot noir block is hand harvested at a rate of $400 per ton. It is assumed that the grapes are

delivered to a winery within the county and the hauling cost is included in the harvest cost. Timing of the harvest is contracted with the winery. Costs also include stand-by time which may not occur each year.

Yields. An assumed average yield of 6.75 tons per acre for Chardonnay and 4.0 tons per acre for Pinot noir over the vineyard life is used in this study. Yields can range, depending upon the weather and location. A conservative yield range for Chardonnay and Pinot noir in Sonoma County is about 4.5 to 9.0 tons and 2.5 to 5.5 tons per acre respectively.

Returns. Grape buyers determine return prices per ton for wine grapes according to variety, brand or program assigned to the fruit given quality expectations, AVA grown, immediate supply needs and other factors. For growers in Crush District 3 the mean weighted average price over the five-year period of 2012-2016 for Chardonnay is $1,997 per ton and for Pinot noir is $3,301 per ton; therefore, these return prices are used in Tables 2 and 4, for this study.

Ranging Analysis. Tables 4-A & 4-B are separate analysis of each variety which has a range of return prices used for calculating net returns per acre at different yields.

Wine grape producers target yield and prices such that in general, lower yields tend to be associated with higher prices. Therefore the ranging analyses do not show the cases of very high yields with very high return prices or very low yields with very low return prices.

Assessments. *Sonoma County Winegrape Commission (SCWC):* Grape growers in Sonoma County who sell a minimum of 25 tons are required to pay a fee on the gross dollar value of the crop under the authority of the California Winegrape Growers Commission Law. (http://www.cdfa.ca.gov/mkt/mkt/pdf/Winegrape_Growers_Commission_Law.pdf, Chapter 12.7, Part 2, Division 22 of the California Food and Agricultural Code). Grape sales assessments are made available to the SCWC to fund marketing programs that increase the value of Sonoma County winegrapes. In this study, the assessment rate is 0.5 percent. The assessment rate is approved annually by the board of directors of the SCWC. http://www.sonomawinegrape.org/district-3-assessment-for-harvest-year-2017

Sonoma County Hazardous Materials Program, (SCHMP): For this study it is assumed the grower has less than 55 gallons of waste oil per year. The county assessment as of July 2016 is $144 for the farm (Hazardous Material Range 6). The fee is revised annually on July 1st and can be found at http://sonomacounty.ca.gov/Agriculture-Weights-and-Measures/Agriculture-Division/Fees-Agricultural-Division/.

Pierce's Disease Glassy-winged Sharpshooter Board (PD/GWSS Board): California law enables grape growers to reauthorize assessments on wine grape production to fund research that addresses PD, a lethal disease of grapevines. https://www.cdfa.ca.gov/pdcp/

In June 2015 the PD/GWSS Referendum passed with growers voting in favor of continuing an assessment for another 5 years. In this study, the assessments is $1.25 per $1,000 of crop value. The fee is deducted from the grower's crop payment by the winery. It is subject to change annually. http://pdgwss.net/cdfa-secretary-approves-pdgwss-boards-recommendation-for-2017-winegrape-assessment-rate/

Others: Membership in grower organizations or donations to non-profit foundations that provide funding for research is voluntary and not assigned in this study. Examples include the Russian River Valley Winegrowers, California Association of Winegrape Growers, Sonoma County Vineyard Technical Group and the American Vineyard Foundation.

Post-Harvest. In October, the cover crop is planted in the NC middles, i.e. the middles are switched every year. A custom seed mix of Magnus peas, common vetch, barley and triticale is planted at 90 pounds per seeded acre. Planting the cover crop involves ripping the middles to be planted to a 24-inch depth. Every fourth year; three tons per acre of gypsum is spread prior to ripping. Following ripping, middles are disced twice to further incorporate gypsum and smooth the surface prior to seeding. The cover crop seed is then planted with a seed drill. One quarter of the gypsum costs are allocated to the budget each year. The equipment and labor required to rip, spread gypsum, disc and seed is provided by the VMC.

Pickup/ATV-4WD/4WD-Utility vehicles. The grower uses the half-ton pickup for business and farm use. The assumed business use for the pickup is 5,000 miles per year for the ranch. The All-Terrain Vehicle (ATV-4WD) is used by the owner for strip spraying vine rows and checking the vineyard. The 4WD-Utility vehicle is used by the general laborer for transporting hand tools, gopher traps, equipment for maintenance and repair tasks, and replacement vines.

Labor, Interest and Equipment

Labor. The Vineyard Management Company labor rates are $29.19 per hour for machine operators and $25.02 for specialized hand labor including payroll overhead of 39 percent. The basic hourly wages are $21.00 for machine operators and $18.00 for general labor. For this study, the overhead includes the employer's share of federal and California state payroll taxes (13.85%), workers' compensation insurance (9.13%) for vineyards, and a percentage for other possible benefits (16.02%). These costs are based on the average industry final rate as of January, 2017. Workers' compensation insurance costs will vary among farms. Some vineyard management companies' percentage for other possible benefits is significantly higher, and depending on the employee's salary, the total overhead may be 60% which could include a retirement plan and health coverage.

Machinery operation times by the owner are included in Tables 1 and 6. The labor for operations involving machinery are 20 percent higher than actual operation time to account for the time spent performing equipment set up, moving, maintenance and downtime.

Owner/Operator Labor. The vineyard owner performs various tasks throughout the year which include field operations and most importantly management decisions. The cost of management decisions made by the owner/operator are difficult to quantify. The half-ton pickup operation labor, the ATV-4WD operation labor and all of the applications made with the air-blast sprayer are charged as equipment operator labor as performed by the owner in Table 6. Labor costs for operations such as frost protection, fertilizer injections and irrigating are not quantified. The single line item charge of $200 per acre is included in this study to cover a portion of the grower's labor.

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 4.50 percent per year. A nominal interest rate is the typical market cost of borrowed funds (Line of credit). The interest cost of post-harvest operations is discounted back to the last harvest month using a negative interest charge. The interest rate will vary depending upon various factors; the rate utilized is considered a typical lending rate by a farm lending agency as of January 2017.

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 Engineers (ASAE). Fuel and lubrication costs are also determined by ASAE equations based on maximum power takeoff (PTO)

horsepower, and fuel type. Prices for on-farm delivery of red dye diesel and gasoline are $2.87 (excludes excise tax) and $2.76 per gallon, respectively. Fuel costs are derived from the Energy Information Administration, January 2017. Gasoline also includes federal and state excise tax, which are refundable for on-farm use when filing your income tax.

Fuel, Lube & Repair. The fuel, lube, and repair cost per acre for each operation in Table 1 is determined by multiplying the total hourly operating cost in Table 6 for each piece of equipment used for the selected operation by the hours per acre. Tractor time is 10 percent higher than implement time for a given operation to account for setup, travel and down time.

Risk. The risks associated with producing and marketing wine grapes are significant. 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 that affect the profitability and economic viability of wine grape production. A market channel should be determined before the vineyard is planted and brought into 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.

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.

Property Taxes. Counties in California charge a base property tax rate of 1 percent on the assessed value of the property. In some counties special assessment districts exist and charge additional taxes on property including equipment, buildings, and improvements. For this study, county taxes are calculated as 1 percent of the average value of the property. Average value equals new cost plus salvage value divided by 2 on a per acre basis. The salvage value for land is equal to the purchase price because land does not depreciate.

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

Property Insurance. Property insurance provides coverage for property loss and is charged at 0.846 percent of the average value of the assets over their useful life.

Liability Insurance. Liability insurance covers accidents in the vineyard and costs $1,310 for $2 million coverage for the 40 acres of producing vines. Blanket policies covering the entire farm are available.

Crop Insurance. This is available to winegrape 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 Sonoma County. Due to variability in coverage levels crop insurance cost is not specified.

Office Expense. Office and business expenses for 40 acres are estimated at $24,000 annually or $600 per acre. These expenses include office supplies, accounting, bookkeeping, communications, road permits and garbage disposal.

Sanitation Services. A sanitation service provides one portable toilet for the vineyard which is serviced four times during the growing season and costs the farm $280 annually or $7 per acre over the 40 acres. This cost includes delivery and servicing the toilet.

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

Non-Cash Overhead

Non-cash overhead is calculated as the capital recovery cost for equipment and other farm investments.

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

Salvage Value. Salvage value is an estimate of the remaining value of an investment at the end of its useful life. For farm machinery (tractors and implements) the remaining value is a percentage of the new cost of the investment (Boehlje and Eidman). The percent remaining value is calculated from equations developed by the American Society of Agricultural Engineers (ASAE) based on equipment type and years of life. The life in years is estimated by dividing the wear out life, as given by ASAE by the annual hours of use in this operation. For other investments including irrigation systems, buildings, and miscellaneous equipment, the value at the end of its useful life is zero. The salvage value for land is the purchase price because land does not depreciate.

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 vines and machinery.

Interest Rate. The interest rate of 5.00 percent used to calculate capital recovery cost is the effective long term interest rate effective January, 2017. The interest rate is provided by a local farm lending agency and will vary according to risk and amount of loan.

Building. The shop building is a 1,000 square foot metal building on a cement slab with an attached 1,000 square foot gravel floor-pole barn for parking and storing equipment.

Land. Based on grower input, bare ground that can be developed into wine grape vineyards and has water available for irrigation is valued at $50,000 per acre. For this study, the producing acreage estimated worth is $95,000 per acre. It is the bare land value plus the establishment cost, ($50,000 + $45,000 = $95,000). Established wine grape vineyards range in value from $70,000 to $150,000 per acre in this region. The land value for Tables 1-A and 1-B are calculated at 1 acre. In Table 5, Whole Farm Annual Investment Costs, the land value is calculated at 50 acres for the entire farm.

Vineyard Establishment Costs. The establishment cost is the sum of the costs for land preparation, trellis system, irrigation systems, 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, and capital recovery costs during the production years. For this study, the total accumulated net cash cost in the third year represents the establishment cost and is estimated at $45,000 per planted acre ($1,800,000 for the entire 40 acres). The cost is amortized over the remaining 22 years of vineyard production to estimate the annual capital recovery cost.

Irrigation System. Since the vineyard is established and planted to grapevines it is assumed to have an existing well and an adequate water supply. A 10 horsepower (hp) booster pump, filter system, and fertilizer injector were installed along with the drip irrigation system during vineyard establishment. Water and fertilizers are pumped to the vineyard through a filtration station into a mainline, sub-mains and then into the drip laterals along the vine rows. Drip systems vary in design and cost according to vine spacing, variety and other environmental factors. The annual maintenance/repair costs for the irrigation system is calculated at $32 per acre.

Fuel Tank. One 500-gallon diesel fuel tank using gravity feed is on a metal stand. The tank is set up in a cement containment pad that meets federal, state, and county regulations. Gasoline is brought onto the ranch by the grower in hand carried containers.

Shop Tools. This includes shop, hand, and miscellaneous field tools and supplies.

Equipment. Farm equipment is purchased either new or used. In Table 6, the new purchase price is adjusted to 60 percent to indicate a mix of new and used equipment. Equipment costs are composed of three parts: non-cash overhead, cash overhead, and operating costs. Both of the overhead factors have been discussed in previous sections. The operating costs consist of repairs, fuel, and lubrication and are discussed under *Equipment Operating Costs*.

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

Acknowledgment. Appreciation is expressed to the growers, input suppliers and other industry representatives who provided information, assistance, and expertise for this study.

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UC COOPERATIVE EXTENSION-AGRICULTURAL ISSUES CENTER

TABLE 1-A. CULTURAL COSTS PER ACRE TO PRODUCE WINE GRAPES-Chardonnay

Russian River Valley-2017

Operation	Equipment Time (Hrs/Ac)	Cash and Labor Costs per Acre						
		Labor Cost	Fuel	Lube & Repairs	Material Cost	Custom/ Contract	Total Cost	Your Cost
Cultural:								
Weeds-Strip Spray 2x	0.42	15	2	1	77	0	94	
VMC-Winter Pruning	0.00	525	0	0	0	0	525	
Disease-Protect Pruning Wounds	0.46	16	4	3	61	0	84	
VMC-Tie Cordons	0.00	100	0	0	0	0	100	
VMC-Shred Prunings/Mow Cover Crop	0.00	0	0	0	0	100	100	
Frost Protection-Wind Machines	0.00	0	0	0	162	0	162	
Disease-Micronized Sulfur 2x	0.46	16	4	3	13	0	36	
VMC-Sucker/Thin Shoots 2x	0.00	420	0	0	0	0	420	
Disease-Sulfur Dust 2x	0.34	12	3	2	31	0	48	
Fertigate 4x	0.00	0	0	0	100	0	100	
VMC-Mow Middles 2x	0.00	0	0	0	0	150	150	
VMC-CM Tuck Shoots 2x	0.00	450	0	0	0	0	450	
Disease-Sulfur Dust	0.34	12	3	2	16	0	32	
Disease-Pre-Bloom/Fertilize-B, Zn	0.46	16	4	3	116	0	139	
PCA-Petiole Sampling (Analysis)	0.00	0	0	0	0	4	4	
Vine Replacements (Vines)	0.00	0	0	0	4	0	4	
VMC-Leaf Removal (Mechanical)	0.00	0	0	0	0	75	75	
Disease-Post Bloom	0.46	16	4	3	40	0	64	
VMC-Hedging Machine	0.00	0	0	0	0	25	25	
VMC-Thin Congested Clusters 2x (Hand)	0.00	250	0	0	0	0	250	
Disease-Pre-Bunch Closure	0.46	16	4	3	53	0	77	
Insects/Mites 1/3 Yrs.	0.15	5	1	1	16	0	24	
Irrigation 8x	0.00	0	0	0	33	0	33	
Disease-Veraison	0.46	16	4	3	28	0	51	
Vertebrate Pests (Traps)	0.00	0	0	0	1	0	1	
General Laborer	0.00	500	0	0	0	0	500	
PCA-Mealybug Trapping Fee	0.00	0	0	0	0	11	11	
PCA/CCA Fee	0.00	0	0	0	0	90	90	
VMC-In Fee	0.00	0	0	0	0	35	35	
VMC-Management Fee	0.00	0	0	0	0	400	400	
Owner/Operator Management Fee	0.00	0	0	0	0	200	200	
Pickup Truck 1/2 Ton-Farm Use	0.67	23	5	2	0	0	30	
ATV-4WD	0.58	20	2	0	0	0	23	
4WD-Utility	0.58	20	1	0	0	0	21	
TOTAL CULTURAL COSTS	5.85	2,452	43	27	749	1,090	4,361	
Harvest: Chardonnay								
Harvest & Haul (Mechanical)	0.00	0	0	0	0	1,688	1,688	
TOTAL HARVEST COSTS	0.00	0	0	0	0	1,688	1,688	
Post-Harvest:								
VMC-NC-Rip Row Middles 50% Ac	0.00	0	0	0	0	45	45	
VMC-Spread Gypsum 50% Ac 1/4 Yrs.	0.00	0	0	0	0	56	56	
VMC-CC Seed Bed Prep 50% Ac 2x	0.00	0	0	0	0	50	50	
VMC-CC Plant 50% Ac	0.00	0	0	0	63	18	81	
TOTAL POST-HARVEST COSTS	0.00	0	0	0	63	169	232	
Assessment:								
Assessment	0.00	0	0	0	88	0	88	
TOTAL ASSESSMENT COSTS	0.00	0	0	0	88	0	88	
Interest on Operating Capital at 4.50%							84	
TOTAL OPERATING COSTS/ACRE	5.85	2,452	43	27	900	2,946	6,452	

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Table 1-A. CONTINUED-Chardonnay

Russian River Valley-2017

Operation	Equipment Time (Hrs/Ac)	Cash and Labor Costs per Acre						
		Labor Cost	Fuel	Lube & Repairs	Material Cost	Custom/ Contract	Total Cost	Your Cost
CASH OVERHEAD:								
Liability Insurance							33	
Office Expense							600	
Field Sanitation							7	
Property Taxes							757	
Property Insurance							64	
Investment Repairs							119	
TOTAL CASH OVERHEAD COSTS/ACRE							1,580	
TOTAL CASH COSTS/ACRE							8,032	
NON-CASH OVERHEAD:		Per Producing Acre		Annual Cost Capital Recovery				
Land-50 Acres		50,000		2,500			2,500	
Shop Tools		200		13			13	
Building, Shop/Pole Barn		900		59			59	
Vineyard Establishment		45,000		3,419			3,419	
Fuel Tank-Diesel 500-Gallon		126		8			8	
Drip Irrigation System-40 Acres		1,600		114			114	
Wind Machines		3,100		215			215	
Equipment		543		57			57	
TOTAL NON-CASH OVERHEAD COSTS		101,469		6,384			6,384	
TOTAL COSTS/ACRE							14,416	

UC COOPERATIVE EXTENSION-AGRICULTURAL ISSUES CENTER

TABLE 1-B. CULTURAL COSTS PER ACRE TO PRODUCE WINE GRAPES-Pinot noir

Russian River Valley-2017

		Cash and Labor Costs per Acre						
Operation	Equipment Time (Hrs/Ac)	Labor Cost	Fuel	Lube & Repairs	Material Cost	Custom/ Contract	Total Cost	Your Cost
Cultural:								
Weeds-Strip Spray 2x	0.42	15	2	1	77	0	94	
VMC-Winter Pruning	0.00	631	0	0	0	0	631	
Disease-Protect Pruning Wounds	0.46	16	4	3	61	0	84	
VMC-Tie Canes	0.00	300	0	0	0	0	300	
VMC-Shred Prunings/Mow Cover Crop	0.00	0	0	0	0	100	100	
Frost Protection-Wind Machines 10x	0.00	0	0	0	162	0	162	
Disease-Micronized Sulfur 2x	0.46	16	4	3	13	0	36	
VMC-Sucker/Thin Shoots 3x	0.00	725	0	0	0	0	725	
Disease-Sulfur Dust 2x	0.34	12	3	2	31	0	48	
Fertigate 4x	0.00	0	0	0	100	0	100	
VMC-Mow Middles 2x	0.00	0	0	0	0	150	150	
VMC-CM Tuck Shoots 2x	0.00	450	0	0	0	0	450	
Disease-Sulfur Dust	0.34	12	3	2	16	0	32	
Disease-Pre-Bloom/Fertilize-B, Zn	0.46	16	4	3	116	0	139	
PCA-Petiole Sampling (Analysis)	0.00	0	0	0	0	4	4	
Vine Replacements (Vines)	0.00	0	0	0	4	0	4	
VMC-Leaf /Lateral Removal (Hand)	0.00	901	0	0	0	0	901	
Disease-Post Bloom	0.46	16	4	3	40	0	64	
VMC-Hedging Machine	0.00	0	0	0	0	25	25	
Disease-Pre-Bunch Closure	0.46	16	4	3	53	0	77	
Insects/Mites 1/3 Yrs.	0.15	5	1	1	16	0	24	
Irrigation 8x	0.00	0	0	0	33	0	33	
Disease-Veraison	0.46	16	4	3	28	0	51	
VMC-Crop Adjustment/Green Drop (Hand)	0.00	125	0	0	0	0	125	
Vertebrate Pests (Traps)	0.00	0	0	0	1	0	1	
General Laborer	0.00	500	0	0	0	0	500	
PCA-Mealybug Trapping Fee	0.00	0	0	0	0	11	11	
PCA/CCA Fee	0.00	0	0	0	0	90	90	
VMC-In Fee	0.00	0	0	0	0	35	35	
VMC-Management Fee	0.00	0	0	0	0	400	400	
Owner/Operator Management Fee	0.00	0	0	0	0	200	200	
Pickup Truck 1/2 Ton-Farm Use	0.67	23	5	2	0	0	30	
ATV-4WD	0.58	20	2	0	0	0	23	
4WD-Utility	0.58	20	1	0	0	0	21	
TOTAL CULTURAL COSTS	5.85	3,837	43	27	749	1,015	5,672	
Harvest: Pinot noir								
Harvest & Haul (Hand)	0.00	0	0	0	0	1,600	1,600	
TOTAL HARVEST COSTS	0.00	0	0	0	0	1,600	1,600	
Post-Harvest:								
VMC-NC-Rip Row Middles 50% Ac	0.00	0	0	0	0	45	45	
VMC-Spread Gypsum 50% Ac 1/4 Yrs.	0.00	0	0	0	0	56	56	
VMC-CC Seed Bed Prep 50% Ac 2x	0.00	0	0	0	0	50	50	
VMC-CC Plant 50% Ac	0.00	0	0	0	63	18	81	
TOTAL POST-HARVEST COSTS	0.00	0	0	0	63	169	232	
Assessment:								
Assessment	0.00	0	0	0	86	0	86	
TOTAL ASSESSMENT COSTS	0.00	0	0	0	86	0	86	
Interest on Operating Capital at 4.50%							119	
TOTAL OPERATING COSTS/ACRE	5.85	3,837	43	27	899	2,784	7,709	

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Table 1-B. CONTINUED-Pinot noir

Russian River Valley-2017

Operation	Equipment Time (Hrs/Ac)	Cash and Labor Costs per Acre: Labor Cost	Fuel	Lube & Repairs	Material Cost	Custom/ Contract	Total Cost	Your Cost
CASH OVERHEAD:								
Liability Insurance							33	
Office Expense							600	
Field Sanitation							7	
Property Taxes							757	
Property Insurance							64	
Investment Repairs							119	
TOTAL CASH OVERHEAD COSTS/ACRE							1,580	
TOTAL CASH COSTS/ACRE							9,289	
NON-CASH OVERHEAD:		Per Producing Acre		Annual Cost Capital Recovery				
Land-50 Acres		50,000		2,500			2,500	
Shop Tools		200		13			13	
Building, Shop/Pole Barn		900		59			59	
Vineyard Establishment		45,000		3,419			3,419	
Fuel Tank-Diesel 500-Gallon		126		8			8	
Drip Irrigation System 40 Acres		1,600		114			114	
Wind Machines		3,100		215			215	
Equipment		543		57			57	
TOTAL NON-CASH OVERHEAD COSTS		101,469		6,384			6,384	
TOTAL COSTS/ACRE							15,673	

UC COOPERATIVE EXTENSION-AGRICULTURAL ISSUES CENTER

TABLE 2-A. COSTS AND RETURNS PER ACRE TO PRODUCE WINE GRAPES-Chardonnay

Russian River Valley-2017

	Quantity/ Acre	Unit	Price or Cost/Unit	Value or Cost/Acre	Your Cost
GROSS RETURNS					
Chardonnay	6.75	Ton	1,997	13,480	
TOTAL GROSS RETURNS				13,480	
OPERATING COSTS					
Fertilizer:				**122**	
CAN-17	44.00	Lb	0.23	10	
Boron- Solubor 20.5%	4.87	Lb	1.94	9	
Neutral Zinc	3.84	Qt	3.20	12	
12-26-26 (Water Soluble)	100.00	Lb	0.90	90	
Fungicide:				**335**	
Rally 40WSP	9.50	Oz	5.50	52	
Topsin M WSB	1.50	Lb	23.97	36	
Microthiol Disperss Sulfur	10.00	Lb	1.27	13	
Sulfur Dust	30.00	Lb	1.57	47	
Pristine	23.00	Oz	4.08	94	
Luna Experience	8.60	FlOz	4.65	40	
Elevate 50WG	1.00	Lb	28.10	28	
Flint	1.50	FlOz	16.50	25	
Herbicide:				**77**	
Buccaneer	3.00	Pint	4.37	13	
Chateau	6.00	Oz	8.50	51	
Reckon	11.00	FlOz	1.18	13	
Miticide:				**16**	
Nealta	4.57	FlOz	3.61	16	
Vertebrate Pests:				**1**	
Gopher Traps	1.00	Acre	0.85	1	
Irrigation:				**33**	
Water-Pumped-Drip	2.00	AcIn	16.50	33	
Custom:				**105**	
PCA-Petiole (Analysis)	1.33	Each	3.00	4	
PCA-Pheromone Trap-Reading	1.00	Acre	11.00	11	
PCA/CCA Fee	1.00	Acre	90.00	90	
Vineyard Manager:				**954**	
VMC-Shred Prunings/Mow Cover Crop	1.00	Acre	100.00	100	
VMC-Mowing	2.00	Acre	75.00	150	
VMC-Leaf Removal Machine	1.00	Acre	75.00	75	
VMC-Hedging Machine	1.00	Acre	25.00	25	
VMC-D4 Ripper Single Shank	0.50	Acre	90.00	45	
VMC-Gypsum Hauled/Spread	0.75	Ton	75.00	56	
VMC-Discing	1.00	Acre	50.00	50	
VMC-Cover Crop Seeding	0.50	Acre	35.00	18	
VMC-In Fee	1.00	Acre	35.00	35	
VMC-Management Fee	1.00	Acre	400.00	400	
Contract:				**1,888**	
Harvest/Haul-Chardonnay-Contract (Mechanical)	6.75	Ton	250.00	1,688	
Owner/Operator Management Fee	1.00	Acre	200.00	200	
Miscellaneous:				**229**	
Frost Protection-Wind Machines	1.00	Acre	162.00	162	
Grapevines	1.00	Each	3.50	4	
Cover Crop Seed Mix	90.00	Lb	0.70	63	
Assessment :				**88**	
Pierce Disease GWSS	13.48	$1,000	1.25	17	
SCWC-Chardonnay	13,480.00	$-Value	0.005	67	
SCHMP	1.00	Acre	3.60	4	
Labor				**2,452**	
Equipment Operator Labor	7.02	hrs	29.19	205	
VMC	69.80	hrs	25.02	1,746	
General laborer	20.00	hrs	25.02	500	
Machinery				**70**	
Fuel-Gas	3.47	gal	2.76	10	
Fuel-Diesel	11.64	gal	2.87	33	
Lube				6	
Machinery Repair				21	
Interest on Operating Capital @ 4.50%				84	
TOTAL OPERATING COSTS/ACRE				6,452	
TOTAL OPERATING COSTS/TON				956	
NET RETURNS ABOVE OPERATING COSTS				7,028	

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TABLE 2-A. CONTINUED-Chardonnay

Russian River Valley-2017

	Quantity/ Acre	Unit	Price or Cost/Unit	Value or Cost/Acre	Your Cost
CASH OVERHEAD COSTS					
Liability Insurance				33	
Office Expense				600	
Field Sanitation				7	
Property Taxes				757	
Property Insurance				64	
Investment Repairs				119	
TOTAL CASH OVERHEAD COSTS/ACRE				1,580	
TOTAL CASH OVERHEAD COSTS/TON				234	
TOTAL CASH COSTS/ACRE				8,032	
TOTAL CASH COSTS/TON				1,190	
NET RETURNS ABOVE CASH COSTS				5,448	
NON-CASH OVERHEAD COSTS (Capital Recovery)					
Land-50 Acres				2,500	
Shop Tools				13	
Building, Shop/Pole Barn				59	
Vineyard Establishment				3,419	
Fuel Tank-Diesel-500-Gallon				8	
Drip Irrigation System-40 Acres				114	
Wind Machines				215	
Equipment				57	
TOTAL NON-CASH OVERHEAD COSTS/ACRE				6,384	
TOTAL NON-CASH OVERHEAD COSTS/TON				946	
TOTAL COST/ACRE				14,416	
TOTAL COST/TON				2,136	
NET RETURNS ABOVE TOTAL COST				-937	

UC COOPERATIVE EXTENSION-AGRICULTURAL ISSUES CENTER

TABLE 2-B. COSTS AND RETURNS PER ACRE TO PRODUCE WINE GRAPES –Pinot noir

Russian River Valley-2017

	Quantity/ Acre	Unit	Price or Cost/Unit	Value or Cost/Acre	Your Cost
GROSS RETURNS					
Pinot noir	4.0	Ton	3,301	13,204	
TOTAL GROSS RETURNS				13,204	
OPERATING COSTS					
Fertilizer:				**122**	
CAN-17	44.00	Lb	0.23	10	
Boron- Solubor 20.5%	4.87	Lb	1.94	9	
Neutral Zinc	3.84	Qt	3.20	12	
12-26-26 (Water Soluble)	100.00	Lb	0.90	90	
Fungicide:				**335**	
Rally 40WSP	9.50	Oz	5.50	52	
Topsin M WSB	1.50	Lb	23.97	36	
Microthiol Disperss Sulfur	10.00	Lb	1.27	13	
Sulfur Dust	30.00	Lb	1.57	47	
Pristine	23.00	Oz	4.08	94	
Luna Experience	8.60	FlOz	4.65	40	
Elevate 50WG	1.00	Lb	28.10	28	
Flint	1.50	FlOz	16.50	25	
Herbicide:				**77**	
Buccaneer	3.00	Pint	4.37	13	
Chateau	6.00	Oz	8.50	51	
Reckon	11.00	FlOz	1.18	13	
Miticide:				**16**	
Nealta	4.57	FlOz	3.61	16	
Vertebrate Pests:				**1**	
Gopher Traps	1.00	Acre	0.85	1	
Irrigation:				**33**	
Water-Pumped-Drip	2.00	AcIn	16.50	33	
Custom:				**105**	
PCA-Petiole (Analysis)	1.33	Each	7.00	4	
PCA-Pheromone Trap-Reading	1.00	Acre	11.00	11	
PCA/CCA Fee	1.00	Acre	90.00	90	
Vineyard Manager:				**879**	
VMC-Shred Prunings/Mow Cover Crop	1.00	Acre	100.00	100	
VMC-Mowing	2.00	Acre	75.00	150	
VMC-Hedging Machine	1.00	Acre	25.00	25	
VMC-D4 Ripper Single Shank	0.50	Acre	90.00	45	
VMC-Gypsum Hauled/Spread	0.75	Ton	75.00	56	
VMC-Discing	1.00	Acre	50.00	50	
VMC-Cover Crop Seeding	0.50	Acre	35.00	18	
VMC-In Fee	1.00	Acre	35.00	35	
VMC-Management Fee	1.00	Acre	400.00	400	
Contract:				**1,800**	
Harvest/Haul-Pinot noir-Contract (Hand)	4.00	Ton	400.00	1,600	
Owner/Operator Management Fee	1.00	Acre	200.00	200	
Miscellaneous:				**229**	
Frost Protection-Wind Machines	1.00	Acre	162.00	162	
Grapevines	1.00	Each	3.50	4	
Cover Crop Seed Mix	90.00	Lb	0.70	63	
Assessment :				**86**	
Pierce Disease GWSS	13.20	$1,000	1.25	17	
SCWC-Pinot noir	13,204.00	$-Value	0.005	66	
SCHMP	1.00	Acre	3.60	4	
Labor				**3,837**	
Equipment Operator Labor	7.02	hrs	29.19	205	
VMC	125.18	hrs	25.02	3,132	
General laborer	20.00	hrs	25.02	500	
Machinery				**70**	
Fuel-Gas	3.47	gal	2.76	10	
Fuel-Diesel	11.64	gal	2.87	33	
Lube				6	
Machinery Repair				21	
Interest on Operating Capital @ 4.50%				119	
TOTAL OPERATING COSTS/ACRE				7,709	
TOTAL OPERATING COSTS/TON				1,927	
NET RETURNS ABOVE OPERATING COSTS				5,495	

UC COOPERATIVE EXTENSION-AGRICULTURAL ISSUES CENTER
TABLE 2-B. CONTINUED –Pinot noir
Russian River Valley-2017

	Quantity/ Acre	Unit	Price or Cost/Unit	Value or Cost/Acre	Your Cost
CASH OVERHEAD COSTS					
Liability Insurance				33	
Office Expense				600	
Field Sanitation				7	
Property Taxes				757	
Property Insurance				64	
Investment Repairs				119	
TOTAL CASH OVERHEAD COSTS/ACRE				1,580	
TOTAL CASH OVERHEAD COSTS/TON				395	
TOTAL CASH COSTS/ACRE				9,289	
TOTAL CASH COSTS/TON				2,322	
NET RETURNS ABOVE CASH COSTS				3,915	
NON-CASH OVERHEAD COSTS (Capital Recovery)					
Land -50 Acres				2,500	
Shop Tools				13	
Building, Shop/Pole Barn				59	
Vineyard Establishment				3,419	
Fuel Tank-Diesel-500-Gallon				8	
Drip Irrigation System-40 Acres				114	
Wind Machines				215	
Equipment				57	
TOTAL NON-CASH OVERHEAD COSTS/ACRE				6,384	
TOTAL NON-CASH OVERHEAD COSTS/TON				1,596	
TOTAL COST/ACRE				15,673	
TOTAL COST/TON				3,918	
NET RETURNS ABOVE TOTAL COST				-2,469	

UC COOPERATIVE EXTENSION-AGRICULTURAL ISSUES CENTER

TABLE 3-A. MONTHLY COSTS PER ACRE TO PRODUCE WINE GRAPES-Chardonnay

Russian River Valley-2017

	JAN 16	FEB 16	MAR 16	APR 16	MAY 16	JUN 16	JUL 16	AUG 16	SEP 16	OCT 16	Total
Cultural:											
Weeds-Strip Spray 2x	68				26						94
VMC-Winter Pruning	525										525
Disease-Protect Pruning Wounds	84										84
VMC-Tie Cordons		100									100
VMC-Shred Prunings/Mow Cover Crop			100								100
Frost Protection-Wind Machines 10x			55	53	53						162
Disease-Micronized Sulfur 2x			18	18							36
VMC-Sucker/Thin Shoots 2x				210	210						420
Disease-Sulfur Dust 2x				48							48
Fertigate 4x				10		31	30	30			100
VMC-Mow Middles 2x					75	75					150
VMC-CM Tuck Shoots 2x				225	225						450
Disease-Sulfur Dust					32						32
Disease-Pre-Bloom/Fertilize-B, Zn					139						139
PCA-Petiole Sampling (Analysis)					3		1				4
Vine Replacements (Vines)					4						4
VMC-Leaf Removal (Mechanical)						75					75
Disease-Post Bloom						64					64
VMC-Hedging Machine							25				25
VMC-Thin Congested Clusters 2x (Hand)						125	125				250
Disease-Pre-Bunch Closure						77					77
Insects/Mites 1/3 Yrs.						24					24
Irrigation 8x				2		2	8	8	8	4	33
Disease-Veraison							51				51
Vertebrate Pests (Traps)										1	1
General Laborer	50	50	50	50	50	50	50	50	50	50	500
PCA-Mealybug Trapping Fee										11	11
PCA/CCA Fee										90	90
VMC-In Fee										35	35
VMC-Management Fee										400	400
Owner/Operator Management Fee	20	20	20	20	20	20	20	20	20	20	200
Pickup Truck 1/2 Ton-Farm Use	3	3	3	3	3	3	3	3	3	3	30
ATV-4WD	2	2	2	2	2	2	2	2	2	2	23
4WD-Utility	2	2	2	2	2	2	2	2	2	2	21
TOTAL CULTURAL COSTS	756	178	251	644	845	550	318	115	87	618	4,361
Harvest: Chardonnay											
Harvest & Haul (Mechanical)									1,688		1,688
TOTAL HARVEST COSTS	0	0	0	0	0	0	0	0	1,688	0	1,688
Post-Harvest:											
VMC-NC-Rip Row Middles 50% Ac										45	45
VMC-Spread Gypsum 50% Ac 1/4 Yrs.										56	56
VMC-CC Seed Bed Prep 50% Ac 2x										50	50
VMC-CC Plant 50% Ac										81	81
TOTAL POST-HARVEST COSTS	0	0	0	0	0	0	0	0	0	232	232

UC COOPERATIVE EXTENSION-AGRICULTURAL ISSUES CENTER

TABLE 3-A. CONTINUED-Chardonnay

Russian River Valley-2017

	JAN 16	FEB 16	MAR 16	APR 16	MAY 16	JUN 16	JUL 16	AUG 16	SEP 16	OCT 16	Total
Assessment:											
Assessment										88	88
TOTAL ASSESSMENT COSTS	0	0	0	0	0	0	0	0	0	88	88
Interest on Operating Capital @4.50%	2.83	3.50	4.44	6.86	10.03	12.09	13.28	13.71	20.37	-3.51	83.59
TOTAL OPERATING COSTS/ACRE	758	181	255	651	855	562	331	129	1,794	934	6,452
CASH OVERHEAD											
Liability Insurance	3	3	3	3	3	3	3	3	3	3	33
Office Expense	60	60	60	60	60	60	60	60	60	60	600
Field Sanitation	1	1	1	1	1	1	1	1	1	1	7
Property Taxes		379					379				757
Property Insurance		32					32				64
Investment Repairs	12	12	12	12	12	12	12	12	12	12	119
TOTAL CASH OVERHEAD COSTS	76	486	76	76	76	76	486	76	76	76	1,580
TOTAL CASH COSTS/ACRE	834	668	331	727	931	638	817	205	1,870	1,010	8,032

UC COOPERATIVE EXTENSION-AGRICULTURAL ISSUES CENTER

TABLE 3-B. MONTHLY COSTS PER ACRE TO PRODUCE WINE GRAPES-Pinot noir

Russian River Valley-2017

	JAN 16	FEB 16	MAR 16	APR 16	MAY 16	JUN 16	JUL 16	AUG 16	SEP 16	OCT 16	Total
Cultural:											
Weeds-Strip Spray 2x	68				26						94
VMC-Winter Pruning	631										631
Disease-Protect Pruning Wounds	84										84
VMC-Tie Canes		300									300
VMC-Shred Prunings/Mow Cover Crop			100								100
Frost Protection-Wind Machines 10x			55	53	53						162
Disease-Micronized Sulfur 2x			18	18							36
VMC-Sucker/Thin Shoots 3x				462	263						725
Disease-Sulfur Dust 2x				48							48
Fertigate 4x				10		31	30	30			100
VMC-Mow Middles 2x					75	75					150
VMC-CM Tuck Shoots 2x				225	225						450
Disease-Sulfur Dust					32						32
Disease-Pre-Bloom/Fertilize-B, Zn					139						139
PCA-Petiole Sampling (Analysis)					3		1				4
Vine Replacements (Vines)					4						4
VMC-Leaf /Lateral Removal (Hand)					450	450					901
Disease-Post Bloom						64					64
VMC-Hedging Machine						25					25
Disease-Pre-Bunch Closure						77					77
Insects/Mites 1/3 Yrs.						24					24
Irrigation 8x				2		2	8	8	8	4	33
Disease-Veraison							51				51
VMC-Crop Adjustment/Green Drop (Hand)								125			125
Vertebrate Pests (Traps)										1	1
General Laborer	50	50	50	50	50	50	50	50	50	50	500
PCA-Mealybug Trapping Fee										11	11
PCA/CCA Fee										90	90
VMC-In Fee										35	35
VMC-Management Fee	40	40	40	40	40	40	40	40	40	40	400
Owner/Operator Mgmt. Fee	20	20	20	20	20	20	20	20	20	20	200
Pickup Truck 1/2 Ton-Farm Use	3	3	3	3	3	3	3	3	3	3	30
ATV-4WD	2	2	2	2	2	2	2	2	2	2	23
4WD-Utility	2	2	2	2	2	2	2	2	2	2	21
TOTAL CULTURAL COSTS	901	418	291	936	1,389	841	233	281	126	258	5,672
Harvest: Pinot noir											
Harvest & Haul (Hand)									1,600		1,600
TOTAL HARVEST COSTS	0	0	0	0	0	0	0	0	1,600	0	1,600
Post-Harvest:											
VMC-NC-Rip Row Middles 50% Ac										45	45
VMC-Spread Gypsum 50% Ac 1/4 Yrs.										56	56
VMC-CC Seed Bed Prep 50% Ac 2x										50	50
VMC-CC Plant 50% Ac										81	81
TOTAL POST-HARVEST COSTS	0	0	0	0	0	0	0	0	0	232	232

UC COOPERATIVE EXTENSION-AGRICULTURAL ISSUES CENTER

TABLE 3-B. CONTINUED-Pinot noir

Russian River Valley-2017

	JAN 16	FEB 16	MAR 16	APR 16	MAY 16	JUN 16	JUL 16	AUG 16	SEP 16	OCT 16	Total
Assessment:											
Assessment										86	86
TOTAL ASSESSMENT COSTS	0	0	0	0	0	0	0	0	0	86	86
Interest on Operating Capital @4.50%	3.38	4.94	6.03	9.54	14.75	17.90	18.78	19.83	26.30	-2.16	119.30
TOTAL OPERATING COSTS/ACRE	904	423	297	946	1,404	858	251	300	1,752	574	7,709
CASH OVERHEAD											
Liability Insurance	3	3	3	3	3	3	3	3	3	3	33
Office Expense	60	60	60	60	60	60	60	60	60	60	600
Field Sanitation									7		7
Property Taxes		379					379				757
Property Insurance		32					32				64
Investment Repairs	12	12	12	12	12	12	12	12	12	12	119
TOTAL CASH OVERHEAD COSTS	76	486	76	76	76	76	486	76	76	76	1,580
TOTAL CASH COSTS/ACRE	980	909	373	1,021	1,479	934	738	376	1,828	650	9,289

UC COOPERATIVE EXTENSION-AGRICULTURAL ISSUES CENTER
TABLE 4-A. RANGING ANALYSIS - WINE GRAPES-Chardonnay
Russian River Valley-2017

COSTS PER ACRE AND PER TON AT VARYING YIELDS TO PRODUCE WINE GRAPES-CHARDONNAY

	YIELD (TONS)						
	4.50	5.25	6.00	6.75	7.50	8.25	9.00
OPERATING COSTS/ACRE:							
Cultural	4,361	4,361	4,361	4,361	4,361	4,361	4,361
Harvest	1,125	1,313	1,500	1,688	1,875	2,063	2,250
Post-Harvest	232	232	232	232	232	232	232
Assessment	59	68	78	88	98	107	117
Interest on Operating Capital @ 4.50%	81.59	82.26	82.93	83.59	84.26	84.93	85.59
TOTAL OPERATING COSTS/ACRE	5,858	6,056	6,254	6,452	6,650	6,848	7,046
TOTAL OPERATING COSTS/TON	1,301.84	1,153.56	1,042.35	955.86	886.66	830.05	782.87
CASH OVERHEAD COSTS/ACRE	1,580	1,580	1,580	1,580	1,580	1,580	1,580
TOTAL CASH COSTS/ACRE	7,438	7,636	7,834	8,032	8,230	8,427	8,625
TOTAL CASH COSTS/TON	1,652.85	1,454.43	1,305.61	1,189.86	1,097.27	1,021.51	958.37
NON-CASH OVERHEAD COSTS/ACRE	6,384	6,384	6,384	6,384	6,384	6,384	6,384
TOTAL COSTS/ACRE	13,822	14,020	14,218	14,416	14,613	14,811	15,009
TOTAL COSTS/TON	3,071.00	2,670.00	2,370.00	2,136.00	1,948.00	1,795.00	1,668.00

Net Return per Acre above Operating Costs for Wine Grapes - Chardonnay

PRICE ($/ton)	YIELD (tons/acre)						
Chardonnay	4.50	5.25	6.00	6.75	7.50	8.25	9.00
1547.00	1,103	2,066	3,028	3,990	4,953	5,915	6,877
1697.00	1,778	2,853	3,928	5,003	6,078	7,152	8,227
1847.00	2,453	3,641	4,828	6,015	7,203	8,390	9,577
1997.00	3,128	4,428	5,728	7,028	8,328	9,627	10,927
2147.00	3,803	5,216	6,628	8,040	9,453	10,865	12,277
2297.00	4,478	6,003	7,528	9,053	10,578	12,102	13,627
2447.00	5,153	6,791	8,428	10,065	11,703	13,340	14,977

Net Return per Acre above Cash Costs for Wine Grapes - Chardonnay

PRICE ($/ton)	YIELD (tons/acre)						
Chardonnay	4.50	5.25	6.00	6.75	7.50	8.25	9.00
1547.00	-476	486	1,448	2,411	3,373	4,335	5,298
1697.00	199	1,274	2,348	3,423	4,498	5,573	6,648
1847.00	874	2,061	3,248	4,436	5,623	6,810	7,998
1997.00	1,549	2,849	4,148	5,448	6,748	8,048	9,348
2147.00	2,224	3,636	5,048	6,461	7,873	9,285	10,698
2297.00	2,899	4,424	5,948	7,473	8,998	10,523	12,048
2447.00	3,574	5,211	6,848	8,486	10,123	11,760	13,398

Net Return per Acre above Total Costs for Wine Grapes - Chardonnay

PRICE ($/ton)	YIELD (tons/acre)						
Chardonnay	4.50	5.25	6.00	6.75	7.50	8.25	9.00
1547.00	-6,860	-5,898	-4,936	-3,973	-3,011	-2,049	-1,086
1697.00	-6,185	-5,110	-4,036	-2,961	-1,886	-811	264
1847.00	-5,510	-4,323	-3,136	-1,948	-761	426	1,614
1997.00	-4,835	-3,535	-2,236	-936	364	1,664	2,964
2147.00	-4,160	-2,748	-1,336	77	1,489	2,901	4,314
2297.00	-3,485	-1,960	-436	1,089	2,614	4,139	5,664
2447.00	-2,810	-1,173	464	2,102	3,739	5,376	7,014

UC COOPERATIVE EXTENSION-AGRICULTURAL ISSUES CENTER
TABLE 4-B. RANGING ANALYSIS - WINE GRAPES-Pinot noir
Russian River Valley-2017

COSTS PER ACRE AND PER TON AT VARYING YIELDS TO PRODUCE WINE GRAPES-PINOT NOIR

	YIELD (TONS)						
	2.50	3.00	3.50	4.00	4.50	5.00	5.50
OPERATING COSTS/ACRE:							
Cultural	5,672	5,672	5,672	5,672	5,672	5,672	5,672
Harvest	1,000	1,200	1,400	1,600	1,800	2,000	2,200
Post-Harvest	232	232	232	232	232	232	232
Assessment	54	65	75	86	97	108	118
Interest on Operating Capital @ 4.50%	117.18	117.89	118.59	119.30	120.01	120.72	121.43
TOTAL OPERATING COSTS/ACRE	7,075	7,286	7,498	7,709	7,921	8,132	8,344
TOTAL OPERATING COSTS/TON	2,829.89	2,428.73	2,142.19	1,927.28	1,760.14	1,626.42	1,517.02
CASH OVERHEAD COSTS/ACRE	1,580	1,580	1,580	1,580	1,580	1,580	1,580
TOTAL CASH COSTS/ACRE	8,654	8,866	9,077	9,289	9,500	9,712	9,923
TOTAL CASH COSTS/TON	3,461.71	2,955.24	2,593.49	2,322.17	2,111.15	1,942.33	1,804.21
NON-CASH OVERHEAD COSTS/ACRE	6,384	6,384	6,384	6,384	6,384	6,384	6,384
TOTAL COSTS/ACRE	15,038	15,250	15,461	15,673	15,884	16,096	16,307
TOTAL COSTS/TON	6,015.00	5,083.00	4,417.00	3,918.00	3,530.00	3,219.00	2,965.00

Net Return per Acre above Operating Costs for Wine Grapes - Pinot noir

PRICE ($/ton)	YIELD (tons/acre)						
Pinot noir	2.50	3.00	3.50	4.00	4.50	5.00	5.50
2551.00	-697	367	1,431	2,495	3,559	4,623	5,687
2801.00	-72	1,117	2,306	3,495	4,684	5,873	7,062
3051.00	553	1,867	3,181	4,495	5,809	7,123	8,437
3301.00	1,178	2,617	4,056	5,495	6,934	8,373	9,812
3551.00	1,803	3,367	4,931	6,495	8,059	9,623	11,18
3801.00	2,428	4,117	5,806	7,495	9,184	10,873	12,562
4051.00	3,053	4,867	6,681	8,495	10,309	12,123	13,937

Net Return per Acre above Cash Costs for Wine Grapes - Pinot noir

PRICE ($/ton)	YIELD (tons/acre)						
Pinot noir	2.50	3.00	3.50	4.00	4.50	5.00	5.50
2551.00	-2,277	-1,213	-149	915	1,979	3,043	4,107
2801.00	-1,652	-463	726	1,915	3,104	4,293	5,482
3051.00	-1,027	287	1,601	2,915	4,229	5,543	6,857
3301.00	-402	1,037	2,476	3,915	5,354	6,793	8,232
3551.00	223	1,787	3,351	4,915	6,479	8,043	9,607
3801.00	848	2,537	4,226	5,915	7,604	9,293	10,982
4051.00	1,473	3,287	5,101	6,915	8,729	10,543	12,357

Net Return per Acre above Total Costs for Wine Grapes - Pinot noir

PRICE ($/ton)	YIELD (tons/acre)						
Pinot noir	2.50	3.00	3.50	4.00	4.50	5.00	5.50
2551.00	-8,661	-7,597	-6,533	-5,469	-4,405	-3,341	-2,277
2801.00	-8,036	-6,847	-5,658	-4,469	-3,280	-2,091	-902
3051.00	-7,411	-6,097	-4,783	-3,469	-2,155	-841	473
3301.00	-6,786	-5,347	-3,908	-2,469	-1,030	409	1,84
3551.00	-6,161	-4,597	-3,033	-1,469	95	1,659	3,223
3801.00	-5,536	-3,847	-2,158	-469	1,220	2,909	4,598
4051.00	-4,911	-3,097	-1,283	531	2,345	4,159	5,973

UC COOPERATIVE EXTENSION-AGRICULTURAL ISSUES CENTER

TABLE 5. WHOLE FARM ANNUAL EQUIPMENT, INVESTMENT, AND BUSINESS OVERHEAD COSTS

Russian River Valley-2017

ANNUAL EQUIPMENT COSTS

Yr.	Description	Price	Yrs. Life	Salvage Value	Capital Recovery	Cash Overhead Insurance	Cash Overhead Taxes	Total
17	60HP4WD-Cab Tractor	62,228	15	12,115	5,434	31	372	5,837
17	Air-Blast Sprayer-PTO 300-Gal	25,000	10	4,421	2,886	12	147	3,046
17	ATV-4WD	8,500	10	2,511	901	5	55	887
17	Duster-3 Point-PTO	8,000	10	1,415	924	4	47	975
17	4WD-Utility	7,850	10	2,319	832	4	51	887
17	ATV Sprayer 20-Gal	2,600	10	460	300	1	15	317
17	Pickup Truck 1/2 Ton	28,000	10	8,271	2,969	15	181	3,165
	TOTAL	142,178	-	31,511	14,246	73	868	15,188
	60% of New Cost*	85,307	-	18,906	8,547	44	521	9,113

*Used to reflect a mix of new and used equipment

ANNUAL INVESTMENT COSTS

Description	Price	Yrs. Life	Salvage Value	Capital Recovery	Cash Overhead Insurance	Cash Overhead Taxes	Cash Overhead Repairs	Total
INVESTMENT								
Land-50 Acres	2,500,000	25	2,500,000	125,00	2,115	25,000	0	152,115
Shop Tools	10,000	30	1,000	635	5	55	200	895
Building, Shop/Pole Barn	45,000	30	0	2,927	19	225	900	4,071
Vineyard Establishment	1,800,000	22	0	136,747	761	9,000	0	146,508
Fuel Tank-Diesel 500-Gallon	6,310	30	631	401	3	35	126	565
Drip Irrigation System 40 Acres	64,000	25	0	4,541	27	320	1,280	6,168
Wind Machines	124,000	25	8,680	8,616	56	663	2,480	11,816
TOTAL INVESTMENT	4,549,310	-	2,510,311	278,868	2,986	35,298	4,986	322,138

ANNUAL BUSINESS OVERHEAD COSTS

Description	Units/ Farm	Unit	Price/ Unit	Total Cost
Liability Insurance	40	Acre	32.76	1,310
Office Expense	40	Acre	600.00	24,000
Field Sanitation	40	Acre	7.00	280

UC COOPERATIVE EXTENSION-AGRICULTURAL ISSUES CENTER

TABLE 6. HOURLY EQUIPMENT COSTS

Russian River Valley-2017

Yr.	Description	Wine Grapes Hours Used	Capital Recovery	Cash Overhead Insurance	Cash Overhead Taxes	Operating Lube & Repairs	Operating Fuel	Total Oper.	Total Costs/Hr.
17	60HP4WD-Cab Tractor	158	3.26	0.02	0.22	2.75	8.46	11.20	14.70
17	Air-Blast Sprayer-PTO 300-Gal	106	8.66	0.04	0.44	4.29	0.00	4.29	13.43
17	ATV-4WD	40	1.80	0.01	0.11	0.77	4.14	4.91	6.83
17	Duster-3 Point-PTO	28	2.77	0.01	0.14	1.37	0.00	1.37	4.30
17	4WD-Utility	24	4.99	0.03	0.31	0.30	1.38	1.68	7.00
17	ATV Sprayer 20-Gal	16	1.20	0.01	0.06	0.70	0.00	0.70	1.97
17	Pickup Truck 1/2 Ton	26	17.81	0.09	1.09	2.58	6.90	9.48	28.47

UC COOPERATIVE EXTENSION-AGRICULTURAL ISSUES CENTER

TABLE 7-A. OPERATIONS WITH EQUIPMENT & MATERIALS-Chardonnay

Russian River Valley-2017

Operation	Operation Month	Tractor	Implement	Labor Type/ Material	Rate/ acre	Unit
Weeds-Strip Spray 2x	Jan		ATV-4WD	Equipment Operator Labor	0.25	Hours
				Buccaneer	2.00	Pint
			ATV Sprayer 20-Gal	Chateau	6.00	Oz
	May		ATV-4WD	Equipment Operator Labor	0.25	Hours
				Buccaneer	1.00	Pint
			ATV Sprayer 20-Gal	Reckon	11.00	FlOz
VMC-Winter Pruning	Jan			VMC-Hand Labor	21.00	Hours
Disease-Protect Wounds	Jan	60HP4WD-Cab Tractor	Air-Blast Sprayer-PTO 300-Gal	Equipment Operator Labor	0.55	Hours
				Rally 40WSP	4.50	Oz
				Topsin M WSB	1.50	Lb
VMC-Tie Cordons	Feb			VMC-Hand Labor	4.00	Hours
VMC-Shred Prunings	Mar			VMC-Shred/Mow	1.00	Acre
Frost Protection	Mar/Apr/May			Frost Protection-Wind Machines	1.00	Acre
Disease-Micronized sulfur	Mar	60HP4WD-Cab Tractor	Air-Blast Sprayer-PTO 300-Gal	Equipment Operator Labor	0.28	Hours
				Microthiol Disperss Sulfur	5.00	Lb
	Apr	60HP4WD-Cab Tractor	Air-Blast Sprayer-PTO 300-Gal	Equipment Operator Labor	0.28	Hours
				Microthiol Disperss Sulfur	5.00	Lb
VMC-Sucker/Thin Shoots 2x	Apr			VMC-Hand Labor	8.40	Hours
	May			VMC-Hand Labor	8.40	Hours
Disease-Sulfur Dust	Apr	60HP4WD-Cab Tractor	Duster-3 Point-PTO	Equipment Operator Labor	0.21	Hours
				Sulfur Dust	10.00	Lb
	Apr	60HP4WD-Cab Tractor	Duster-3 Point-PTO	Equipment Operator Labor	0.21	Hour
				Sulfur Dust	10.00	Lb
Fertigate 4x	Apr			CAN-17	44.00	Lb
	June/July/Aug			12-26-26 (Water Soluble)	100.00	Lb
VMC-Mow Middles 2x	May/June			VMC-Mowing	2.00	Acre
VMC-CM Tuck Shoots 2x	Apr/May			VMC-Hand Labor	18.00	Hours
Disease-Sulfur Dust	May	60HP4WD-Cab Tractor	Duster-3 Point-PTO	Equipment Operator Labor	0.41	Hour
				Sulfur Dust	10.00	Lb
Disease-Pre-Bloom/Fert	May	60HP4WD-Cab Tractor	Air-Blast Sprayer-PTO 300-Gal	Equipment Operator Labor	0.55	Hours
				Pristine	23.00	Oz
				Boron- Solubor 20.5%	4.87	Lb
				Neutral Zinc	3.84	Qt
PCA-Petiole Sampling	May			PCA-Petiole (Analysis)	1.00	Each
	July			PCA-Petiole (Analysis)	0.33	Each
Vine Replacements	May			Grapevines	1.00	Each
VMC-Leaf Removal	June			VMC-Leaf Removal Machine	1.00	Acre
Disease-Post Bloom	June	60HP4WD-Cab Tractor	Air-Blast Sprayer-PTO 300-Gal	Equipment Operator Labor	0.55	Hours
				Luna Experience	8.60	FlOz
VMC-Hedging Machine	July			VMC-Hedging Machine	1.00	Acre
VMC-Thin Clusters 2x	June/July			VMC-Hand Labor	10.00	Hours
Disease-Pre-Bunch Closure	June	60HP4WD-Cab Tractor	Air-Blast Sprayer-PTO 300-Gal	Equipment Operator Labor	0.55	Hours
				Elevate 50WG	1.00	Lb
				Flint	1.50	FlOz
Insects/Mites 1/3 Yr.	June	60HP4WD-Cab Tractor	Air-Blast Sprayer-PTO 300-Gal	Equipment Operator Labor	0.18	Hour
				Nealta	4.57	FlOz
Irrigation 8x	Apr-Oct			Water-Pumped-Drip	2.00	AcIn
Disease-Veraison	July	60HP4WD-Cab Tractor	Air-Blast Sprayer-PTO 300-Gal	Equipment Operator Labor	0.55	Hours
				Rally 40WSP	5.00	Oz
Vertebrate Pests	Oct			Gopher Traps	1.00	Acre
General Labor	ALL			General laborer	20.00	Hours
PCA-Mealybug Trapping	Oct			PCA-Pheromone Trap-Reading	1.00	Acre
Harvest & Haul (Mechanical)	Sept			Harvest/Haul-Chardonnay	6.75	Ton
VMC-Rip Row Middles	Oct			D4 Ripper-Single Shank	0.50	Acre
VMC-Spread Gypsum	Oct			Gypsum Hauled/Spread	0.75	Ton
VMC-CC Seed Bed Prep	Oct			Discing	1.00	Acre
VMC-CC Plant 50% Ac	Oct			Cover Crop Seeding	0.50	Acre
				Cover Crop Seed Mix	90.00	Lb

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TABLE 7-B. OPERATIONS WITH EQUIPMENT & MATERIALS-Pinot noir

Russian River Valley-2017

Operation	Operation Month	Tractor	Implement	Labor Type/ Material	Rate/ acre	Unit
Weeds-Strip Spray 2x	Jan		ATV-4WD	Equipment Operator Labor	0.25	Hours
				Buccaneer	2.00	Pint
			ATV Sprayer 20-Gal	Chateau	6.00	Oz
	May		ATV-4WD	Equipment Operator Labor	0.25	Hours
				Buccaneer	1.00	Pint
			ATV Sprayer 20-Gal	Reckon	11.00	FlOz
VMC-Winter Pruning	Jan			VMC-Hand Labor	25.20	Hours
Disease-Protect Wounds	Jan	60HP4WD-Cab Tractor	Air-Blast Sprayer-PTO 300-Gal	Equipment Operator Labor	0.55	Hours
				Rally 40WSP	4.50	Oz
				Topsin M WSB	1.50	Lb
VMC-Tie Canes	Feb			VMC-Hand labor	12.00	Hours
VMC-Shred Prunings	Mar			VMC-Shred/Mow	1.00	Acre
Frost Protection	Mar/Apr/May			Frost Protection-Wind Machines	1.00	Acre
Disease-Micronized Sulfur	Mar	60HP4WD-Cab Tractor	Air-Blast Sprayer-PTO 300-Gal	Equipment Operator Labor	0.28	Hours
				Microthiol Disperss Sulfur	5.00	Lb
	Apr	60HP4WD-Cab Tractor	Air-Blast Sprayer-PTO 300-Gal	Equipment Operator Labor	0.28	Hours
				Microthiol Disperss Sulfur	5.00	Lb
VMC-Sucker/Thin Shoots	Apr			VMC-Hand labor	18.46	Hours
	May			VMC-Hand labor	10.52	Hours
Disease-Sulfur Dust 2x	Apr	60HP4WD-Cab Tractor	Duster-3 Point-PTO	Equipment Operator Labor	0.21	Hours
				Sulfur Dust	10.00	Lb
	Apr	60HP4WD-Cab Tractor	Duster-3 Point-PTO	Equipment Operator Labor	0.21	Hours
				Sulfur Dust	10.00	Lb
Fertigate 4x	Apr			CAN-17	44.00	Lb
	June/July/Aug			12-26-26 (Water Soluble)	100.00	Lb
VMC-Mow Middles 2x	May/June			VMC-Mowing	2.00	Acre
VMC-CM Tuck Shoots	Apr/May			VMC-Hand Labor	18.00	Hours
Disease-Sulfur Dust	May	60HP4WD-Cab Tractor	Duster-3 Point-PTO	Equipment Operator Labor	0.41	Hours
				Sulfur Dust	10.00	Lb
Disease-Pre-Bloom/Fert	May	60HP4WD-Cab Tractor	Air-Blast Sprayer-PTO 300-Gal	Equipment Operator Labor	0.55	Hours
				Pristine	23.00	Oz
				Boron- Solubor 20.5%	4.87	Lb
				Neutral Zinc	3.84	Qt
PCA-Petiole Sampling	May			PCA-Petiole Analysis	1.00	Each
	July			PCA-Petiole Analysis	0.33	Each
Vine Replacements	May			Grapevines	1.00	Each
VMC-Leaf Removal	May/June			VMC-Hand Labor	36.00	Hours
Disease-Post Bloom	June	60HP4WD-Cab Tractor	Air-Blast Sprayer-PTO 300-Gal	Equipment Operator Labor	0.55	Hours
				Luna Experience	8.60	FlOz
VMC-Hedging Machine	July			VMC-Hedging Machine	1.00	Acre
Disease-Pre-Bunch Closure	June	60HP4WD-Cab Tractor	Air-Blast Sprayer-PTO 300-Gal	Equipment Operator Labor	0.55	Hours
				Elevate 50WG	1.00	Lb
				Flint	1.50	FlOz
Insects/Mites 1/3 Yr.	June	60HP4WD-Cab Tractor	Air-Blast Sprayer-PTO 300-Gal	Equipment Operator Labor	0.18	Hours
				Nealta	4.57	FlOz
Irrigation 8x	Apr-Oct			Water-Pumped-Drip	2.00	AcIn
Disease-Veraison	July	60HP4WD-Cab Tractor	Air-Blast Sprayer-PTO 300-Gal	Equipment Operator Labor	0.55	Hours
				Rally 40WSP	5.00	Oz
VMC-Crop Adjustment	Aug			VMC-Hand Labor	5.00	Hours
Vertebrate Pests	Oct			Gopher Traps	1.00	Each
General Labor	ALL			General laborer	20.00	Hours
PCA-Mealybug Trapping	Oct			PCA-Pheromone Trap-Reading	1.00	Acre
Harvest & Haul (Hand)	Sept			Harvest/Haul-Pinot noir	4.00	Ton
VMC-Rip Row Middles	Oct			VMC-D4 Ripper Single Shank	0.50	Acre
VMC-Spread Gypsum	Oct			VMC-Gypsum Hauled/Spread	0.75	Ton
VMC-CC Seed Bed Prep	Oct			VMC-Discing	1.00	Acre
VMC-CC Plant 50% Ac	Oct			VMC-Cover Crop Seeding	0.50	Acre
				Cover Crop Seed Mix	90.00	Lb