

## **SAMPLE COSTS FOR OLIVE OIL**



Picture by Paul M. Vossen

### **ESTABLISH A SUPER-HIGH DENSITY OLIVE ORCHARD AND PRODUCE OLIVES FOR OIL ARBEQUINA VARIETY – DRIP IRRIGATION SACRAMENTO VALLEY - 2016**

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UC AGRICULTURE AND NATURAL RESOURCES  
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 UC DAVIS DEPARTMENT OF AGRICULTURAL AND RESOURCE ECONOMICS

**SAMPLE COSTS FOR OLIVE OIL-ESTABLISH A SUPER-HIGH DENSITY OLIVE  
 ORCHARD AND PRODUCE OLIVES FOR OIL  
 Arbequina Variety Sacramento Valley - 2016**

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**INTRODUCTION**

The sample costs to establish a super-high density olive orchard planting on a trellis system and produce olives for oil in the Sacramento Valley are presented in this study. 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 April 2016 figures. Practices described are based on production practices considered typical for the crop and area, but will not apply to every situation. A blank column titled Your Costs is provided in Tables 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 Jeremy Murdock; University of California Agriculture and Natural Resources, Agricultural Issues Center, Department of Agricultural and Resource Economics, at 530-752-4651, [jmmurdock@ucdavis.edu](mailto:jmmurdock@ucdavis.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.

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## ASSUMPTIONS

The following assumptions refer to tables 1 to 8 and pertain to sample costs to establish a super-high density olive orchard and produce olives for oil using a trellis system in the Sacramento Valley. The super-high density system is still fairly new to California and its long term performance is not known. The described practices are not University of California recommendations, but represent operations and materials considered typical of a well-managed orchard in the region. The costs, materials, and practices shown in this study are based on the assumptions and are not applicable to all farms. Establishment and cultural practices vary by farm and the differences can be significant. **The use of trade names in this report does not constitute an endorsement or recommendation by the University of California.**

**Farm.** The hypothetical farm consists of 120 acres of land farmed by the owner. The olive orchard is established on 110 acres and the remaining 10 acres are used for roads, the irrigation system, headlands, and farmstead.

### Establishment Cultural Practices and Material Inputs

**Trees.** The cost of trees for this study is \$2.15 per tree. Costs will vary depending on variety, tree size, and quantity purchased. A more inclusive list of oil producing varieties and their characteristics can be found in the *Organic Olive Production Manual*. This study describes a conventional (non-organic) production system, however, the organic production manual has a useful variety listing and descriptions. Olive oil cultivars will produce 30 to 50 gallons of oil per ton. Super-high density olive trees can be planted at spacings ranging from 3' within the row to 14' between rows. This study uses trees planted on a 5' X 12' spacing (726 trees per acre). Olive trees have a long production life if they are well maintained. The economic productive life of the orchard at the time of planting in this study is estimated to be 25 years before removal.

**Irrigation.** The water cost for irrigation is the pumping charge for groundwater. The cost per acre-foot for water will vary by grower in the region depending on well characteristics and other irrigation factors. In this study, water is calculated to cost \$90/acre foot or \$7.50/acre inch. Irrigation rates, shown in Table A, increase each year as the orchard develops vegetatively up through year three. Water use remains the same after year three under a controlled deficit irrigation strategy that is used to manage growth and increase the fruit oil to moisture ratio. Because the orchard is planted on uneven ground and not leveled, water is delivered to the orchard by a single line drip with 0.3 gallon/hour built in emitters located every 24 inches (approximately 3 emitters per tree. This equates to one gallon of water delivered to each tree in one hour. The cost of the irrigation system is in the Non-Cash Overhead Costs section of this study.

Table A. Annual water applications

Year	Acre-inches/year	Acre-feet/year
1	8	0.67
2	16	1.33
3	18	1.5
4	18	1.5
5+	18	1.5

**Site Preparation.** Land is bare ground with resident vegetation. Preparation begins in the fall by ripping to a depth of three feet to break up compaction. The ground is then disced twice with a stubble disc to break up large clods. Berms are then pulled to establish the tree rows and then a finish disc and float smooths out the row middles. Custom operators perform the ripping, stubble discing, pulling of the berms, finish discing, and floating. All operations that prepare the orchard for planting are done in the same year when

the trees are planted. In this study, the costs are included in the first year.

**Planting.** In the spring, the tree sites are marked by a global positioning (GPS) system so the tree rows are in a north to south orientation. The drip irrigation system is laid on the ground. Seven-foot bamboo stakes are placed in the ground where the trees will be planted. The holes are dug and the trees planted. Later the trees are tied with green tape to the bamboo stakes. The trees are spaced 5 feet in-row by 12 feet between rows or 726 trees per acre. Trees that die are replanted in the second year. It is estimated that one percent of the trees will need to be replaced in the 2nd year.

**Trellis System.** The trellis is installed in the first year and consists of one horizontal wire which supports a bamboo stake supporting the trees during the first few years of mechanical harvest. For each tree row the trellis consists of two ten-foot, metal end posts with spade-shaped bottoms to anchor the ends firmly in the ground. One strand of 12-gauge wire is strung between the two end posts at 30 inches in height to keep the trees aligned for mechanical harvesting. Every 50 feet an eight-foot, metal T-post is placed in the ground and the 12-gauge wire is clipped to them to maintain a straight tree row. The seven-foot bamboo stake next to each tree is buried only a few inches and is attached to the horizontal wire for training the tree upwards.

**Training.** Training the new trees starts by tying the tree to the bamboo stake once after planting as the central leader grows. The trees are trained to be upright with a single central leader trunk. Prunings are placed in row middles and shredded during the first mowing.

*First Year.* The trees are tied twice during the first growing season. In April the trees are 16-18 inches tall and are tied to the bamboo stake when planted. In July or August, the trees are tied to the horizontal wire and hand pruned to remove any suckers and the lowest branches.

*Second Year.* Trees are mechanically tipped in April which is similar to hedging, but for smaller trees. Suckers and branches originating below 24 inches are removed by hand in June.

*Third Year.* Tree skirts are mechanically pruned to allow for good catch frame seal around the lower trunks during harvest and to avoid foliage contact with weed control sprays. Some larger side branches can be left the first three years to help fill the space in the row and produce more fruit early. Tree rows are mechanically skirt pruned, hedged, and topped (three separate mechanical passes) every year starting in the third year.

*Fourth Year.* Trees continue to be mechanically skirt pruned, hedged, and topped. Beginning in the fourth year trees are topped at 8-9 feet in the summer with a hedging machine to maintain a height of about 10-12 feet for the mechanical harvester.

**Insect and Disease Management.** Copper sprays are used to prevent olive knot. This is the major olive diseases that infect leaves and shoots, causing defoliation and shoot death. Control begins in the first year with one spray in March. Control of insects and other diseases during the orchard establishment period in olive orchards are normally minimal. Rarely, black scale control may be needed. The olive fruit fly has not become a significant pest in super-high density orchards as it has in other orchards, but olive orchards should be monitored for flies to indicate need for treatments. No sprays are made for olive fruit fly in this study.

**Weed Management.** Orchard floors are managed differently within and between the tree rows. Resident vegetation is allowed to grow between the tree rows to maintain a cover crop. This vegetation in the row middles is mowed twice during the growing season in all years, starting in the first year. Mowing only two times allows a ground cover to protect the soil providing dust control and native habitat.

The fall before planting, after land preparation has been completed, a strip application of Surflan AS and Goal 2XL is applied to prevent weed germination within the tree row, two feet out on each side of the trees. This will effectively prevent the growth of most weeds, but will not cause phytotoxicity if there is some contact with the young trees. After the tree have been planted in the spring, four-foot wide strip sprays with Roundup Ultra Max are usually necessary within the tree row to clean up later emerging weeds during the growing season. Roundup applications are reduced from three strip sprays to two after the first year due to a more established tree canopy. Roundup at low rates on very small weeds is used by itself during the summer until harvest (at higher rates, milk cartons should be used to protect the trees from spray contact). An application of Goal plus Surflan is made in the late fall or early winter. Good weed control is important to prevent competition with young trees for nutrients and water. Refer to Table B.

Table B. Orchard Establishment Weed Management

Year	Mowing	Herbicide Treatments
1	Mow row middles 2X	Strip spray: Surflan + Goal 1X Strip spray: Roundup 3X
2+	Mow row middles 2X	Strip spray: Roundup 2X Strip spray: Surflan and Goal 1X

**Fertilization.** Nitrogen is the major nutrient required for proper tree growth and optimum yields. Young trees receive liquid nitrogen fertilizer through the drip irrigation system at increasing rates during orchard establishment as shown in Table C. Rates are for actual nitrogen and potassium. In the first two years the nitrogen is delivered as CAN 17. In this study, 15 lbs. of N is applied in each of the first two years. The nitrogen source is switched to UAN-32 for the third year and beyond. Amount of material applied depends on the percentage of actual nitrogen in each product. Potassium in the form of potassium chloride (KCL-0-0-12) is dissolved and injected into the drip irrigation system starting the third year and applied at a rate of 60 pounds per acre the third year and 80 pounds per acre the fourth year and after. Annual nitrogen and potassium rates are split equally and applied monthly through the drip system from March through July.

Table C. Pounds of nutrients per acre for olives

Year	Range of N	Potassium
1	15-20	0
2	15-20	0
3	30-50	60
4+	30-50	80

**Harvest and Yield.** Note: Refer to harvest and yield data in the production section of this study.

### Production Cultural Practices and Material Inputs

**Pruning.** Pruning manipulates tree growth to facilitate mechanical harvest and to maintain fruit production. All pruning is mechanical starting in year three. Mechanical hedging, topping, and skirt pruning are done every year and are contracted services. The prunings are placed in the row middles and shredded.

**Fertilization.** UAN-32 is applied at 30 to 50 pounds of actual nitrogen per acre to the trees through the drip irrigation system. In this study, 40 lbs. of N is applied every year starting in year three. Potassium as potassium chloride is dissolved in water and injected through the drip system at a rate of 80 pounds of material per acre. Actual rates should be determined by annual leaf tissue analysis. One leaf tissue sample per 50 acres is collected and analyzed.

**Pest Management.** The pesticides and rates mentioned in this cost study are listed in *UC Integrated Pest Management Guidelines, Olives* and the *Olive Production Manual*. For information on other pesticides available, pest identification, monitoring, and management visit the UC IPM website at [www.ipm.ucdavis.edu](http://www.ipm.ucdavis.edu). **Although growers commonly use the pesticides mentioned, many other pesticides are available. Check with your PCA and/or the UC IPM website for current recommendations.** To purchase pesticides for commercial use, a grower must be a Certified Private Applicator to obtain a Pesticide Identification number. For information and pesticide use permits, contact the local county agricultural commissioner's office. Pesticides with different active ingredients, mode of action, and sites of action should be rotated as needed to combat species shift and resistance. Adjuvants are recommended for use with many pesticides for effective control, but the adjuvants and their costs are not included in this study.

*Application Methods.* Pesticide and fertilizer applications are made by either chemigation/fertigation (pesticides and/or fertilizers applied through the irrigation water), by tractor mounted ground sprayer or foliar-broadcast with tractor mounted air blast sprayer. Check individual pesticide labels for compatibility, mixing and usage.

*Pest Control Adviser/Certified Crop Advisor (PCA/CCA).* Written recommendations are required for many pesticides and are available from licensed pest control or certified crop advisers. In addition the PCA/CCA or an independent consultant will monitor the field for agronomic problems including irrigation and nutrition. Growers may hire a private PCA/CCA or receive the service as part of a service agreement with an agricultural chemical and fertilizer company.

*Weed Control.* Weeds in mature orchards are controlled with a combination of chemicals and mowing. Weeds within the tree rows are controlled with a mixture of residual pre-emergent herbicides in the fall or winter with multiple applications of a contact herbicide during the growing season. Row middles are mowed two times during the spring and summer.

*Insect Control.* Monitor for olive fruit fly once fruit pit hardening begins. Olive fruit fly is treated if needed. No spray for olive fruit fly is applied to the orchard in this study. Black scale is occasionally a concern to olive growers primarily in dense shaded orchards with large trees. Super-high density orchards under drip irrigation are not conducive to developing either olive fly or black scale problems, but monitoring for these pests is always recommended. Specific control measures are not included in this study.

*Disease Management.* Verticillium wilt kills olive trees. Olive orchards should not be planted on ground with a history of Verticillium wilt problems or that has recently been farmed to cotton or other Verticillium hosts. To prevent the bacterial disease, olive knot, two copper sprays are required. The first is applied just after harvest, and the second in March prior to bloom.

**Harvest.** Harvest starts in the third year and is done by a contracted harvesting company. In this study, a rate of \$350 per acre is charged. The cost to the grower of hauling the harvested crop to the processor is charged by a separate company and it can range from \$200 to \$300 for a 25-ton load hauled 40 miles. The hauling cost of \$10/ton is used in this study. Olives for oil are mechanically picked at the color change stage (verasion) of yellow-green to red-purple skin color with white-green flesh in October or November. An over-the-row harvester is employed to shake fruit off the trees and convey olives into field bins. Harvested olives are taken straight from the field for immediate processing. Care must be taken when harvesting olives so that the skin of the fruit is not broken nor the flesh excessively bruised.

**Yield.** Super-high density planted olives begin bearing an economic crop in the third year after planting and maximum yield is reached in the fifth year. Typical annual yields for olives are measured and reported in tons per acre, but processors pay growers on the basis of gallons of oil produced. For this reason, yields in

this study are stated in terms of gallons/acre instead of tons/acre, which has become an industry standard. Therefore, this study uses gallons of oil as units for the crop yield and the price of output in determining returns. An olive orchards yield of 5.0 tons per acre and 16 to 18 percent oil per fresh weight (olive oil weighs 7.58 pounds per gallon and there are 2,000 pounds per ton) has been used in this study. Arbequina olives produce about 40 to 45 gallons of oil per ton of olives. For this study, 42 gallons per ton (18 percent oil content) is used which equals a yield of 210 gallons of olive oil per acre. A ton of olives with a 16 percent oil contents would yield approximately 39 gallons of oil. Annual olive yield tonnage and gallons are shown in Table D.

The amount of extracted oil from a ton of olives can vary considerably by tree age, fruit moisture content as influenced by irrigation and rainfall, crop load, and fruit maturity. For example, growers have found controlled deficit irrigation and picking the fruit when it begins verasion can help maximize the oil content.

Table D. Annual olive and olive oil yields per acre

Year	Tons of Fruit (Fresh weight)	Range of oil (Gallons)
3	2.7	108 - 119
4	4.0	160- 176
5+	5.0	190-210

**Returns and Prices.** The processor normally pays growers in dollars per gallon of oil. In this study a price of \$16 per gallon is used. Many small-scale specialty oil olive growers in California make their own oil consequently their olives are never traded in the open market, making it difficult to determine historical prices. Olives that do enter the market are sold at prices that are based on supply and demand. The value of raw olives on the farm depends primarily on the variety and the condition of the fruit.

*Ranging Analysis.* Table 5 has a range of return prices used for calculating net returns per acre at different yields. Agricultural producers target yield and prices such that lower yields tend to be associated with higher prices. Therefore the ranging analysis's do not show the cases of very high yields with very high return prices or very low yields with very low return prices. Table 5 includes a yield range of 147 gallons to 273 gallons per acre and a price range of \$13 to \$19 per gallon.

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

**Labor.** Hourly wages for workers are \$13.00 for machine operators and \$11.00 per hour non-machine labor. These are prevailing rates in the region in early 2016. Adding 46 percent for the employers' share of federal and state payroll taxes, insurance, and other possible benefits gives the labor rates shown of \$18.98 and \$16.06 per hour for machine labor and non-machine labor, respectively. Workers' compensation insurance costs will vary among growers. The cost is based on the average industry rate as of April, 2016. Labor hours for operations involving machinery are 20 percent higher than the operation time given in Table 2 to account for the extra labor involved in equipment set up, moving, maintenance, work breaks, and field repair.

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

for on-farm use when filing the farm income tax return. The fuel, lube, and repair cost per acre for each operation is determined by multiplying the total hourly operating cost for each piece of equipment used for the selected operation by the hours per acre. Tractor time is 10 percent higher than implement time for a given operation to account for setup, travel and down time.

**Interest on Operating Capital.** Interest on operating capital is based on cash operating costs and is calculated monthly until harvest at a nominal rate of 4.25 percent per year. A nominal interest rate is the typical market cost of borrowed funds. The interest cost of post-harvest operations is discounted back to the last harvest month using a negative interest charge. The rate will vary depending upon various factors, but the rate in this study is considered a typical lending rate by a farm lending agency as of April 2016.

**Risk.** The risks associated with crop production should not be minimized. While this study makes every effort to model a production system based on typical, real world practices, it cannot fully represent financial, agronomic and market risks, which affect profitability and economic viability of olive for oil production. Because of so many potential risk factors, effective risk management must combine specific tactics in a detailed manner, in various combinations for a sustainable operation. Moreover, Table 5 of this study reflects a ranging analysis of returns based on various assumptions which is therefore hypothetical in nature. It is important to realize that actual results may differ from the returns contained in this study. Any returns above total costs are considered returns on risk and investment to management, (or owners).

### Cash Overhead

Cash overhead consists of various cash expenses paid out during the year that are assigned to the whole farm and not to a particular operation. These costs can include property taxes, interest on operating capital, office expense, liability and property insurance, sanitation services, equipment repairs, and management.

**Property Taxes.** Counties charge a base property tax rate of 1 percent on the assessed value of the property. In some counties special assessment districts exist and charge additional taxes on property including equipment, buildings, and improvements. For this study, county taxes are calculated as 1 percent of the average value of the property.

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

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

*Liability insurance.* A standard farm liability insurance policy will help cover the expenses for which you become legally obligated to pay for bodily injury claims on your property and damages to another person's property as a result of a covered accident. Common liability expenses covered under your policy include attorney fees and court costs, medical expenses for people injured on your property, injury or damage to another's property. In this study, liability insurance costs \$792 for the entire farm.

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

for the operation in this study.

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

**Sanitation Services.** Sanitation services provide portable toilets and washing facilities for the orchard and cost the farm \$13.68/acre annually. The cost includes a double toilet, delivery and 7 months of weekly service from April through November.

**Management.** Wages for management are not included in this study. Any return above total costs is considered a return to management.

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

### **Non-Cash Overhead**

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

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

*Salvage Value.* Salvage value is an estimate of the remaining value of an investment at the end of its useful life. For farm machinery (tractors and implements), the remaining value is a percentage of the new cost of the investment (Boehlje and Eidman). The percent remaining value is calculated from equations developed by the American Society of Agricultural and Biological Engineers (ASABE) based on equipment type and years of life. The life in years is estimated by dividing the wear out life, as given by ASABE, by the annual hours of use in the operation. For other investments including irrigation systems, buildings, and miscellaneous equipment, the value at the end of its useful life is zero. The salvage value for land is the purchase price because land does not depreciate. The purchase price and salvage value for equipment and investments are shown in Table 5.

*Capital Recovery Factor.* Capital recovery factor is the amortization factor or annual payment whose present value at compound interest is 1. The amortization factor is a table value that corresponds to the interest rate used and the life of the machine.

**Interest Rate.** An interest rate of 3.75 percent is used to calculate capital recovery. Note this long term interest rate is lower than the interest rate used for capital invested in annual production operations. The rate will vary depending upon loan amount and other lending agency conditions, but is the basic suggested rate by a farm lending agency as of April 2016.

**Building.** The shop building is a 1,800 square foot metal building or buildings on a cement slab.

**Land.** In the Sacramento Valley property costs for land used to grow olives for oil production range from \$3,500 to \$12,000 per acre. Based on grower input, crop land with irrigation availability plantable to olives for olive oil is valued at \$5,000 per acre. Olives can be grown on class 3 or 4 soil and hilly land. Also, the water demand for an olive orchard is relatively low, so land suitable for olive for oil production can be less expensive than most fruit and nut crops. For this study, the producing acreage estimated worth is; \$9,403 per acre. It is the crop land value plus the establishment cost ( $\$5,000 + \$4,403 = \$9,403$ ).

**Irrigation System.** The cost of the irrigation system includes re-casing the existing 8-inch well, installation of a submersible 110 hp pump, control valves, electrical panel, filters, mainlines, laterals, and drip tubing with emitters. Pumping costs are based on delivering 18-acre inches to the orchard from a 300-foot well, pumping from a 200-foot depth and 30 pounds per square inch (psi) operating pressure. The irrigation system is installed and completed before the trees are planted. The pump, filter station, and mainlines have an expected useful life of 40 years. The life of well-maintained drip irrigation lines and emitters is estimated at 20 years. The irrigation system is considered an improvement to the property and is shown in the capital recovery or investment sections of the tables.

**Fuel Tank.** 1000-gallon fuel tank using gravity feed on a metal stand. The tank is setup in a cement containment pad that meets federal, state, and county regulations

**Shop Tools.** Includes shop equipment/tools, hand tools, and field tools such as pruning equipment and shovels.

**Establishment Cost.** Costs to establish the orchard are used to determine the non-cash overhead expenses, capital recovery, and interest on investment for the production years. The establishment cost is the sum of cash costs for land preparation, trees, planting, production expenses, and cash overhead for growing olive trees until oil is produced, minus any returns. In this study, production begins the 3rd year. The Accumulated Net Cash Cost in the third year shown in Table 1 represents the establishment cost per acre. For this study, the cost is \$4,403 per acre or \$484,330 for the 110 acres planted to olives. Establishment cost is amortized beginning in the fourth year over the remaining 22 years that the orchard is assumed to be in production.

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

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

**Acknowledgements.** Appreciation is expressed to those growers and cooperators who participated in the development of this study by providing specific costs and practices.

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UC COOPERATIVE EXTENSION-AGRICULTURAL ISSUES CENTER  
**Table 1. COSTS PER ACRE TO ESTABLISH A SUPER-HIGH DENSITY OLIVE OIL ORCHARD**  
 SACRAMENTO VALLEY – 2016

Year	Olive Oil Price- \$16/Gallon	Cost Per Acre			
		1st	2nd	3rd	4th
Tons Per Acre				2.7	4.0
Gallons Per Acre				113.4	168.0
<b>Planting Costs:</b>					
Land Preparation- Rip 3' Depth		300			
Land Preparation- Stubble Disc 2X		35			
Land Preparation- Pull Berms		25			
Land Preparation- Finish Disc and Float		35			
Trellis Material Cost		530			
Orchard Installation- Survey, Trellis, Plant		625			
Trees: 726 Per Acre		1561			
Replant Trees (1% in 2 <sup>nd</sup> Year)		0	16		
<b>TOTAL PLANTING COSTS</b>		<b>3111</b>	<b>16</b>		
<b>Cultural Costs:</b>					
Irrigate		64	133	148	148
Fertigate- Nitrogen		15	19	32	32
Fertigate- Potassium				47	62
Pests- Weeds/Pre-emergent		195	98		
Pests- Weeds/Mow Middles 2X		14	14	14	14
Pests- Disease/Olive Knot		46	46	46	46
Pruning- Mechanical Tipping			25		
Tie Tree 2X		96			
Pruning- Mechanical Hedging				25	25
Pests- Weeds/Strip Spray 2X (3X in 1 <sup>st</sup> Year)		38	25	25	25
Pruning- Hand Skirting		96	96		
Pruning- Mechanical Skirting				40	40
Pruning- Mechanical Topping				25	25
Pickup Truck Use		78	78	78	78
ATV Use		66	66	66	66
<b>TOTAL CULTURAL COSTS</b>		<b>710</b>	<b>601</b>	<b>546</b>	<b>561</b>
<b>Harvest:</b>					
Harvest- Mechanical				350	350
Haul Fruit to Processor				27	40
<b>TOTAL HARVEST COSTS</b>				<b>377</b>	<b>390</b>
<b>Post-Harvest:</b>					
Pests- Disease/Olive Knot				46	46
Pests- Weeds/Pre-emergent				98	98
<b>TOTAL POSTHARVEST COSTS</b>				<b>144</b>	<b>144</b>
Interest on Operating Capital at 4.25%		103	8	10	10
<b>TOTAL OPERATING COST/ACRE</b>		<b>3,924</b>	<b>625</b>	<b>1,077</b>	<b>1,105</b>
<b>Cash Overhead Costs:</b>					
Liability Insurance		7	7	7	7
Office Expense		75	75	75	75
Sanitation Fees		14	14	14	14
Property Taxes		61	61	61	83
Property Insurance		5	5	5	7
Investment Repairs		35	35	35	35
<b>TOTAL CASH OVERHEAD COSTS</b>		<b>197</b>	<b>197</b>	<b>197</b>	<b>220</b>
<b>TOTAL CASH COSTS/ACRE</b>		<b>4,121</b>	<b>822</b>	<b>1,274</b>	<b>1,325</b>
<b>INCOME/ACRE FROM PRODUCTION</b>				<b>1,814</b>	<b>2,688</b>
<b>NET CASH COSTS/ACRE FOR THE YEAR</b>		<b>4,121</b>	<b>822</b>		
<b>PROFIT/ACRE ABOVE CASH COSTS</b>				<b>540</b>	<b>1,363</b>
<b>ACCUMULATED NET CASH COSTS/ACRE</b>		<b>4,121</b>	<b>4,943</b>	<b>4,403</b>	<b>3,040</b>

## UC COOPERATIVE EXTENSION-AGRICULTURAL ISSUES CENTER

**Table 1. CONTINUED**  
SACRAMENTO VALLEY – 2016

Year	Olive Oil Price- \$16/Gallon	Cost Per Acre			
		1st	2nd	3rd	4th
Tons Per Acre				2.7	4.0
Gallons Per Acre				113.4	168.0
<b>Capital Recovery Cost:</b>					
Shop Building - 1,800 Sq. Ft		25	25	25	25
Super-High Density Olive Orchard Establishment					297
Fuel Tank: 1000 Gallon		4	4	4	4
Land @ \$5,000 Per Acre		188	188	188	188
Irrigation- Single Line Drip		58	58	58	58
Shop Tools		2	2	2	2
Equipment		36	33	37	37
<b>TOTAL CAPITAL RECOVERY COST</b>		<b>313</b>	<b>310</b>	<b>314</b>	<b>611</b>
<b>TOTAL COST/ACRE FOR THE YEAR</b>		<b>4,434</b>	<b>1,132</b>	<b>1,588</b>	<b>1,936</b>
<b>INCOME/ACRE FROM PRODUCTION</b>				<b>1,814</b>	<b>2,688</b>
<b>TOTAL NET COST/ACRE FOR THE YEAR</b>		<b>4,434</b>	<b>1,132</b>		
<b>NET PROFIT/ACRE FOR THE YEAR</b>				<b>226</b>	<b>752</b>
<b>TOTAL ACCUMULATED NET COST/ACRE</b>		<b>4,434</b>	<b>5,566</b>	<b>5,340</b>	<b>4,588</b>

UC COOPERATIVE EXTENSION-AGRICULTURAL ISSUES CENTER  
**Table 2. COSTS PER ACRE TO PRODUCE SUPER-HIGH DENSITY OLIVES FOR OLIVE OIL**  
 SACRAMENTO VALLEY – 2016

Operation	Operation Time (Hrs/A)	Cash and Labor Costs per Acre					Total Cost	Your Cost
		Labor Cost	Fuel	Lube & Repairs	Material Cost	Custom/ Rent		
<b>Cultural:</b>								
Irrigate	0.00	13	0	0	135	0	148	
Fertigate- UAN 32	0.00	8	0	0	24	0	32	
Fertigate- KCL	0.00	8	0	0	54	0	62	
Pruning- Mechanical Hedging	0.00	0	0	0	0	25	25	
Pests- Weeds/Mow Middles 2X	0.34	8	4	3	0	0	14	
Pests- Disease/Olive Knot	0.35	8	4	3	31	0	46	
Pests- Weeds/Strip Spray 2X	0.43	10	5	2	8	0	25	
Pruning- Mechanical Skirting	0.00	0	0	0	0	40	40	
Leaf Tissue Analysis (1/50 acres)	0.00	0	0	0	0	1	1	
Pruning- Mechanical Topping	0.00	0	0	0	0	25	25	
Pickup Truck Use	2.59	59	12	7	0	0	78	
ATV Use	2.59	59	5	2	0	0	66	
<b>TOTAL CULTURAL COSTS</b>	<b>6.31</b>	<b>173</b>	<b>29</b>	<b>17</b>	<b>251</b>	<b>91</b>	<b>561</b>	
<b>Harvest:</b>								
Harvest	0.00	0	0	0	0	350	350	
Haul Fruit to Processor	0.00	0	0	0	0	50	50	
<b>TOTAL HARVEST COSTS</b>	<b>0.00</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>400</b>	<b>400</b>	
<b>Post-Harvest:</b>								
Pests- Disease/Olive Knot	0.35	8	4	3	31	0	46	
Pests- Weeds/Pre-emergent	0.22	5	2	1	89	0	98	
<b>TOTAL POSTHARVEST COSTS</b>	<b>0.57</b>	<b>13</b>	<b>6</b>	<b>4</b>	<b>120</b>	<b>0</b>	<b>144</b>	
Interest on Operating Capital at 4.25%							10	
<b>TOTAL OPERATING COSTS/ACRE</b>	<b>7</b>	<b>186</b>	<b>35</b>	<b>21</b>	<b>372</b>	<b>491</b>	<b>1,115</b>	
<b>CASH OVERHEAD:</b>								
Liability Insurance							7	
Office Expense							75	
Sanitation Fee							14	
Property Taxes							83	
Property Insurance							7	
Investment Repairs							35	
<b>TOTAL CASH OVERHEAD COSTS/ACRE</b>							<b>220</b>	
<b>TOTAL CASH COSTS/ACRE</b>							<b>1,335</b>	
<b>NON-CASH OVERHEAD:</b>								
		Per Producing Acre		Annual Cost Capital Recovery				
Buildings 1,800SqF		450		25			25	
Establishment SHDO		4,403		297			297	
Fuel Tank: 1000 Gallon		54		4			4	
Irrigation-Single Drip Line		1,200		58			58	
Land Olives		5,000		188			188	
Shop Tools Olive		29		2			2	
Equipment		349		37			37	
<b>TOTAL NON-CASH OVERHEAD COSTS</b>		<b>11,485</b>		<b>611</b>			<b>611</b>	
<b>TOTAL COSTS/ACRE</b>							<b>1,946</b>	

UC COOPERATIVE EXTENSION-AGRICULTURAL ISSUES CENTER  
**Table 3. COSTS AND RETURNS PER ACRE TO PRODUCE SUPER-HIGH DENSITY OLIVES FOR OIL**  
 SACRAMENTO VALLEY – 2016

	Quantity/ Acre	Unit	Price or Cost/Unit	Value or Cost/Acre	Your Cost
<b>GROSS RETURNS</b>					
Olive Oil	210	Gal	16.00	3,360	
<b>TOTAL GROSS RETURNS</b>				3,360	
<b>OPERATING COSTS</b>					
<b>Herbicide:</b>				<b>97</b>	
Roundup Ultra Max	1.84	Pint	4.31	8	
Goal 2XL	64.00	Fl Oz	1.08	69	
Surflan AS	4.00	Pint	5.00	20	
<b>Fungicide:</b>				<b>62</b>	
Kocide 3000	8.00	Lb	7.80	62	
<b>Custom:</b>				<b>491</b>	
Mechanical Hedging	1.00	Acre	25.00	25	
Mechanical Skirting	1.00	Acre	40.00	40	
Leaf Analysis	0.02	Each	60.00	1	
Mechanical Topping	1.00	Acre	25.00	25	
Harvest-Mechanical	1.00	Acre	350.00	350	
Hauling	5.00	Ton	10.00	50	
<b>Irrigation:</b>				<b>135</b>	
Water-Pumped	18.00	Acln	7.50	135	
<b>Fertilizer:</b>				<b>77</b>	
UAN-32	40.00	Lb N	0.59	24	
KCL(0-0-12)	80.00	Lb K	0.67	54	
<b>Labor</b>				<b>186</b>	
Equipment Operator Labor	8.25	hrs	18.98	157	
Irrigation Labor	0.80	hrs	16.06	13	
Non-Machine Labor	1.00	hrs	16.06	16	
<b>Machinery</b>				<b>56</b>	
Fuel-Gas	6.04	gal	2.70	16	
Fuel-Diesel	7.80	gal	2.43	19	
Lube				5	
Machinery Repair				16	
Interest on Operating Capital @ 4.25%				10	
<b>TOTAL OPERATING COSTS/ACRE</b>				1,115	
<b>TOTAL OPERATING COSTS/GAL</b>				5	
<b>NET RETURNS ABOVE OPERATING COSTS</b>				2,245	
<b>CASH OVERHEAD COSTS</b>					
Liability Insurance				7	
Office Expense				75	
Sanitation Fee				14	
Property Taxes				83	
Property Insurance				7	
Investment Repairs				35	
<b>TOTAL CASH OVERHEAD COSTS/ACRE</b>				220	
<b>TOTAL CASH OVERHEAD COSTS/GAL</b>				1	
<b>TOTAL CASH COSTS/ACRE</b>				1,335	
<b>TOTAL CASH COSTS/GAL</b>				6	
<b>NET RETURNS ABOVE CASH COSTS</b>				2,025	
<b>NON-CASH OVERHEAD COSTS (Capital Recovery)</b>					
Buildings 1,800SqF				25	
Establishment SHDO				297	
Fuel Tanks: 1000 Gallon				4	
Irrigation-Single Drip Line				58	
Land Olives				188	
Shop Tools Olive				2	
Equipment				37	
<b>TOTAL NON-CASH OVERHEAD COSTS/ACRE</b>				611	
<b>TOTAL NON-CASH OVERHEAD COSTS/GAL</b>				3	
<b>TOTAL COST/ACRE</b>				1,946	
<b>TOTAL COST/GAL</b>				9	
<b>NET RETURNS ABOVE TOTAL COST</b>				1,414	

UC COOPERATIVE EXTENSION-AGRICULTURAL ISSUES CENTER  
**Table 4. MONTHLY CASH COSTS – SUPER-HIGH DENSITY OLIVES**  
 SACRAMENTO VALLEY – 2016

	MAR 16	APR 16	MAY 16	JUN 16	JUL 16	AUG 16	SEP 16	OCT 16	NOV 16	DEC 16	JAN 17	FEB 17	Total
<b>Cultural:</b>													
Irrigate	18	18	18	18	18	18	18	18					148
Fertigate- UAN 32	6	6	6	6	6								32
Fertigate- KCL	12	12	12	12	12								62
Pruning- Mechanical Hedging		25											25
Pests- Weeds/Mow Middles 2X		7		7									14
Pests- Disease/Olive Knot		46											46
Pests- Weeds/Strip Spray 2X			12				12						25
Pruning- Mechanical Skirting				40									40
Leaf Tissue Analysis (1/50 acres)					1								1
Pruning- Mechanical Topping					25								25
Pickup Truck Use	6	6	6	6	6	6	6	6	6	6	6	6	78
ATV Use	5	5	5	5	5	5	5	5	5	5	5	5	66
<b>TOTAL CULTURAL COSTS</b>	<b>49</b>	<b>127</b>	<b>62</b>	<b>96</b>	<b>75</b>	<b>30</b>	<b>43</b>	<b>30</b>	<b>12</b>	<b>12</b>	<b>12</b>	<b>12</b>	<b>561</b>
<b>Harvest:</b>													
Harvest								350					350
Haul Fruit to Processor								50					50
<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>400</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>400</b>
<b>Post-Harvest:</b>													
Pests- Disease/Olive Knot									46				46
Pests- Weeds/Pre-emergent									98				98
<b>TOTAL POSTHARVEST 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>144</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>144</b>
Interest on Operating Capital @ 4.25%	0	1	1	1	1	2	2	3	-1	0	0	0	10
<b>TOTAL OPERATING COSTS/ACRE</b>	<b>49</b>	<b>128</b>	<b>62</b>	<b>97</b>	<b>77</b>	<b>32</b>	<b>45</b>	<b>434</b>	<b>155</b>	<b>12</b>	<b>12</b>	<b>12</b>	<b>1,115</b>
<b>CASH OVERHEAD</b>													
Liability Insurance							7						7
Office Expense	8	8	8	8	8	8	8	8	8				75
Sanitation Fee													14
Property Taxes							41				41		83
Property Insurance											7		7
Investment Repairs	3	3	3	3	3	3	3	3	3	3	3	3	35
<b>TOTAL CASH OVERHEAD COSTS</b>	<b>11</b>	<b>11</b>	<b>11</b>	<b>11</b>	<b>11</b>	<b>11</b>	<b>59</b>	<b>11</b>	<b>11</b>	<b>3</b>	<b>51</b>	<b>3</b>	<b>220</b>
<b>TOTAL CASH COSTS/ACRE</b>	<b>61</b>	<b>139</b>	<b>74</b>	<b>109</b>	<b>88</b>	<b>43</b>	<b>104</b>	<b>445</b>	<b>166</b>	<b>15</b>	<b>63</b>	<b>15</b>	<b>1,335</b>

UC COOPERATIVE EXTENSION-AGRICULTURAL ISSUES CENTER  
**Table 5. RANGING ANALYSIS – GALLONS OF OLIVE OIL**  
 SACRAMENTO VALLEY – 2016

COSTS PER ACRE AND PER GAL AT VARYING YIELDS TO PRODUCE OLIVE OIL

	YIELD (GAL)						
	147.00	168.00	189.00	210.00	231.00	252.00	273.00
<b>OPERATING COSTS/ACRE:</b>							
Cultural	561	561	561	561	561	561	561
Harvest	385	390	395	400	405	410	415
Post-Harvest	144	144	144	144	144	144	144
Interest on Operating Capital @ 4.25%	10.17	10.19	10.21	10.23	10.24	10.26	10.28
<b>TOTAL OPERATING COSTS/ACRE</b>	<b>1,100</b>	<b>1,105</b>	<b>1,110</b>	<b>1,115</b>	<b>1,120</b>	<b>1,125</b>	<b>1,130</b>
<b>TOTAL OPERATING COSTS/GAL</b>	<b>7.48</b>	<b>6.58</b>	<b>5.87</b>	<b>5.31</b>	<b>4.85</b>	<b>4.46</b>	<b>4.14</b>
<b>CASH OVERHEAD COSTS/ACRE</b>	<b>220</b>	<b>220</b>	<b>220</b>	<b>220</b>	<b>220</b>	<b>220</b>	<b>220</b>
<b>TOTAL CASH COSTS/ACRE</b>	<b>1,320</b>	<b>1,325</b>	<b>1,330</b>	<b>1,335</b>	<b>1,340</b>	<b>1,345</b>	<b>1,350</b>
<b>TOTAL CASH COSTS/GAL</b>	<b>8.98</b>	<b>7.89</b>	<b>7.04</b>	<b>6.36</b>	<b>5.80</b>	<b>5.34</b>	<b>4.94</b>
<b>NON-CASH OVERHEAD COSTS/ACRE</b>	<b>611</b>	<b>611</b>	<b>611</b>	<b>611</b>	<b>611</b>	<b>611</b>	<b>611</b>
<b>TOTAL COSTS/ACRE</b>	<b>1,931</b>	<b>1,936</b>	<b>1,941</b>	<b>1,946</b>	<b>1,951</b>	<b>1,956</b>	<b>1,961</b>
<b>TOTAL COSTS/GAL</b>	<b>13.00</b>	<b>12.00</b>	<b>10.00</b>	<b>9.00</b>	<b>8.00</b>	<b>8.00</b>	<b>7.00</b>
Net Return per Acre above Operating Costs for Olive Oil							
PRICE (\$/gal)	YIELD (gal/acre)						
OliveOil	147.00	168.00	189.00	210.00	231.00	252.00	273.00
13.00	811	1,079	1,347	1,615	1,883	2,151	2,419
14.00	958	1,247	1,536	1,825	2,114	2,403	2,692
15.00	1,105	1,415	1,725	2,035	2,345	2,655	2,965
16.00	1,252	1,583	1,914	2,245	2,576	2,907	3,238
17.00	1,399	1,751	2,103	2,455	2,807	3,159	3,511
18.00	1,546	1,919	2,292	2,665	3,038	3,411	3,784
19.00	1,693	2,087	2,481	2,875	3,269	3,663	4,057
Net Return per Acre above Cash Costs for Olive Oil							
PRICE (\$/gal)	YIELD (gal/acre)						
OliveOil	147.00	168.00	189.00	210.00	231.00	252.00	273.00
13.00	591	859	1,127	1,395	1,663	1,931	2,199
14.00	738	1,027	1,316	1,605	1,894	2,183	2,472
15.00	885	1,195	1,505	1,815	2,125	2,435	2,745
16.00	1,032	1,363	1,694	2,025	2,356	2,687	3,018
17.00	1,179	1,531	1,883	2,235	2,587	2,939	3,291
18.00	1,326	1,699	2,072	2,445	2,818	3,191	3,564
19.00	1,473	1,867	2,261	2,655	3,049	3,443	3,837
Net Return per Acre above Total Costs for Olive Oil							
PRICE (\$/gal)	YIELD (gal/acre)						
OliveOil	147.00	168.00	189.00	210.00	231.00	252.00	273.00
13.00	-20	248	516	784	1,052	1,320	1,588
14.00	127	416	705	994	1,283	1,572	1,861
15.00	274	584	894	1,204	1,514	1,824	2,134
16.00	421	752	1,083	1,414	1,745	2,076	2,407
17.00	568	920	1,272	1,624	1,976	2,328	2,680
18.00	715	1,088	1,461	1,834	2,207	2,580	2,953
19.00	862	1,256	1,650	2,044	2,438	2,832	3,226

UC COOPERATIVE EXTENSION-AGRICULTURAL ISSUES CENTER  
**Table 6. WHOLE FARM EQUIPMENT, INVESTMENT, AND BUSINESS OVERHEAD COSTS**  
 SACRAMENTO VALLEY – 2016

ANNUAL EQUIPMENT COSTS

Yr.	Description	Price	Years Life	Salvage Value	Capital Recovery	Cash Overhead		Total
						Insurance	Taxes	
16	ATV 4WD	8,350	7	3,167	974	5	58	1,037
16	Orch. Sprayer 500 G	26,000	10	4,598	2,778	13	153	2,944
16	Pickup Truck - 1/2	28,000	7	10,621	3,267	16	193	3,476
16	Weed Sprayer 100 G	5,646	10	998	603	3	33	639
16	85hp 4WD Tractor	68,100	15	13,258	5,344	34	407	5,785
16	Mower- Flail 8'	8,950	10	1,583	956	4	53	1,014
TOTAL		145,046	-	34,226	13,923	76	896	14,895
60% of New Cost*		87,028	-	20,535	8,354	45	538	8,937

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

ANNUAL INVESTMENT COSTS

Description	Price	Years Life	Salvage Value	Capital Recovery	Cash Overhead			Total
					Insurance	Taxes	Repairs	
INVESTMENT								
Buildings 1,800SqF	54,000	30	0	3,029	23	270	1,080	4,401
Establishment SHDO	484,330	22	0	32,719	204	2,422	0	35,345
Fuel Tanks: 1000 Gallon	6,514	20	651	446	3	36	130	615
Irrigation- Single Drip Line	132,000	40	0	6,423	56	660	2,640	9,779
Land Olives	600,000	25	600,000	22,500	506	6,000	0	29,006
Shop Tools Olive	3,500	25	350	209	2	19	70	300
TOTAL INVESTMENT	1,280,344	-	601,001	65,327	793	9,407	3,920	79,446

ANNUAL BUSINESS OVERHEAD COSTS

Description	Units/ Farm	Unit	Price/ Unit	Total Cost
Liability Insurance	120.00	Acre	6.60	792
Office Expense	110.00	Acre	75.00	8,250
Sanitation Fee	110.00	Acre	13.68	1,505

UC COOPERATIVE EXTENSION-AGRICULTURAL ISSUES CENTER  
**Table 7. HOURLY EQUIPMENT COSTS**  
 SACRAMENTO VALLEY – 2016

Yr.	Description	Olive Oil	Total	Cash Overhead			Operating			Total Costs/Hr.
		Hours Used	Hours Used	Capital Recovery	Insurance	Taxes	Lube & Repairs	Fuel	Total Oper.	
16	ATV 4WD	285	285	2.05	0.01	0.12	0.89	1.85	2.69	4.87
16	Orchard Sprayer 500 G	77	200	8.33	0.04	0.46	4.53	0.00	4.53	13.36
16	Pickup Truck - 1/2	285	285	6.88	0.03	0.41	2.76	4.62	7.26	14.58
16	Weed Sprayer 100 G	72	150	2.41	0.01	0.13	1.53	0.00	1.53	4.09
16	85hp 4WD Tractor	205	1066	3.01	0.02	0.23	3.30	10.39	13.45	16.70
16	Mower- Flail 8'	38	200	2.87	0.01	0.16	3.82	0.00	3.82	6.86

UC COOPERATIVE EXTENSION-AGRICULTURAL ISSUES CENTER  
**Table 8. OPERATIONS WITH EQUIPMENT & MATERIALS**  
 SACRAMENTO VALLEY – 2016

Operation	Operation Month	Tractor	Implement	Labor Type/ Material	Rate/ acre	Unit	
Irrigate	Mar			Irrigation Labor	0.10	hour	
				Water-Pumped	2.25	AcIn	
	Apr			Irrigation Labor	0.10	hour	
				Water-Pumped	2.25	AcIn	
	May			Irrigation Labor	0.10	hour	
				Water-Pumped	2.25	AcIn	
	June			Irrigation Labor	0.10	hour	
				Water-Pumped	2.25	AcIn	
	July			Irrigation Labor	0.10	hour	
				Water-Pumped	2.25	AcIn	
Fertigate- UAN 32	Aug			Irrigation Labor	0.10	hour	
				Water-Pumped	2.25	AcIn	
	Sept			Irrigation Labor	0.10	hour	
				Water-Pumped	2.25	AcIn	
	Oct			Irrigation Labor	0.10	hour	
				Water-Pumped	2.25	AcIn	
	Mar			Non-Machine Labor	0.10	hour	
				UAN-32	8.00	Lb N	
	Apr			Non-Machine Labor	0.10	hour	
				UAN-32	8.00	Lb N	
Fertigate- KCL	May			Non-Machine Labor	0.10	hour	
				UAN-32	8.00	Lb N	
	June			Non-Machine Labor	0.10	hour	
				UAN-32	8.00	Lb N	
	July			Non-Machine Labor	0.10	hour	
				UAN-32	8.00	Lb N	
	Mar			Non-Machine Labor	0.10	hour	
				KCL(0-0-12)	16.00	Lb K	
	Apr			Non-Machine Labor	0.10	hour	
				KCL(0-0-12)	16.00	Lb K	
Pruning- Mechanical Pests- Weeds/Mow	May			Non-Machine Labor	0.10	hour	
				KCL(0-0-12)	16.00	Lb K	
	June			Non-Machine Labor	0.10	hour	
				KCL(0-0-12)	16.00	Lb K	
	July			Non-Machine Labor	0.10	hour	
				KCL(0-0-12)	16.00	Lb K	
	Apr			Mechanical Hedging	1.00	Acre	
	Apr	85hp 4WD Tractor	Mower- Flail 8'	Equipment Operator Labor	0.21	hour	
	June	85hp 4WD Tractor	Mower- Flail 8'	Equipment Operator Labor	0.21	hour	
	Pests- Disease/Olive Knot	Apr	85hp 4WD Tractor	Orch.Sprayer 500 G	Equipment Operator Labor	0.42	hour
				Kocide 3000	4.00	Lb	
Nov		85hp 4WD Tractor	Orch.Sprayer 500 G	Equipment Operator Labor	0.42	hour	
				Kocide 3000	4.00	Lb	
Pests- Weeds/Strip Spray		May	85hp 4WD Tractor	Weed Sprayer 100 G	Equipment Operator Labor	0.26	hour
					Roundup Ultra Max	0.92	Pint
		Sept	85hp 4WD Tractor	Weed Sprayer 100 G	Equipment Operator Labor	0.26	hour
					Roundup Ultra Max	0.92	Pint
Pruning- Mechanical Leaf Tissue Analysis Pruning- Mechanical		June			Mechanical Skirting	1.00	Acre
		July			Leaf Analysis	0.02	Each
	July			Mechanical Topping	1.00	Acre	
	July		Pickup Truck - 1/2	Non-Machine Labor			
Pickup Truck Use ATV Use Harvest	July		ATV 4WD	Equipment Operator Labor	3.11	hours	
	Oct			Non-Machine Labor			
				Harvest-Mechanical	1.00	Acre	
	Oct			Hauling	5.00	Ton	
Haul Fruit to Processor Pests- Disease/Olive Knot	Apr	85hp 4WD Tractor	Orch.Sprayer 500 G	Equipment Operator Labor	0.42	hour	
				Kocide 3000	4.00	Lb	
	Nov	85hp 4WD Tractor	Orch.Sprayer 500 G	Equipment Operator Labor	0.42	hour	
				Kocide 3000	4.00	Lb	
Pests-Weeds/Pre-emergent	Nov	85hp 4WD Tractor	Weed Sprayer 100 G	Equipment Operator Labor	0.26	hour	
				Goal 2XL	64.00	FLOz	
				Surflan AS	4.00	Pint	