
UNIVERSITY OF CALIFORNIA COOPERATIVE EXTENSION

2007

**SAMPLE COSTS TO ESTABLISH
A SUPER-HIGH DENSITY OLIVE ORCHARD
AND PRODUCE**

OLIVE OIL



Picture by Paul M. Vossen

IN THE SAN JOAQUIN VALLEY – 2007

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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 San Joaquin Valley of California are presented in this study. The super-high-density system is still fairly new to California and its long term performance is not known. The study includes assumptions and costs for establishing an orchard and for producing olives after establishment. This study is intended as a guide only, and can be used to make production decisions, determine potential returns, prepare budgets and evaluate production loans. Practices described are based on those production procedures currently being used for super-high density olive oil orchards in the San Joaquin Valley. Sample costs for labor, materials, equipment and custom services are based on current figures. Some costs and practices presented in this study may not be applicable to your situation. A blank column, “*Your Costs*,” is provided in Tables 2 and 3 to enter your costs.

STUDY CONTENTS

INTRODUCTION	2
ASSUMPTIONS	3
Orchard Establishment Cultural Practices and Material Inputs	4
Production Cultural Practices and Material Inputs	5
Cash Overhead Costs.....	7
Non-Cash Overhead Costs.....	8
REFERENCES	10
Table 1. SAMPLE COSTS PER ACRE TO ESTABLISH A SUPER-HIGH DENSITY OLIVE ORCHARD	11
Table 2. COSTS PER ACRE TO PRODUCE SUPER-HIGH DENSITY OLIVES FOR OIL	13
Table 3. COSTS AND RETURNS PER ACRE TO PRODUCE SUPER-HIGH DENSITY OLIVES FOR OIL	14
Table 4. MONTHLY CASH COSTS – SUPER-HIGH DENSITY OLIVES FOR OIL	15
Table 5. WHOLE FARM EQUIPMENT, INVESTMENT, AND BUSINESS OVERHEAD COSTS	16
Table 6. HOURLY EQUIPMENT COSTS	17
Table 7. RANGING ANALYSIS - GALLONS	18
Table 8. RANGING ANALYSIS - TONS	19
Table 9. COSTS AND RETURNS/BREAKEVEN ANALYSIS	20
Table 10. DETAILS BY OPERATION	21

The hypothetical farm operations, production practices, overhead, and calculations are described under the assumptions. For additional information or an explanation of the calculations used in the study, call the Department of Agricultural and Resource Economics, University of California, Davis, 530-752-2414 or the local UC Cooperative Extension office. An additional cost of production study is also available: “*Sample Costs to Establish a Super-High Density Olive Orchard and Produce Olive Oil in the Sacramento Valley – 2007*”.

Sample Cost of Production Studies for many commodities can be downloaded at <http://coststudies.ucdavis.edu>, requested through the Department of Agricultural and Resource Economics, UC Davis, 530-752-1517 or obtained from the local county UC Cooperative Extension offices. Some archived studies are also available on the website.

ASSUMPTIONS

The following assumptions pertain to sample costs to establish a super-high density olive orchard and produce olives for oil in the San Joaquin Valley of California. The super-high-density system is new to California and its long term performance is not known. Some costs, practices, and materials may not be applicable to your situation nor used every year. Additional practices not indicated may be needed. Establishment and cultural practices vary by grower and region, and variations can be significant. These costs are on an annual, per acre basis. *The use of trade names and cultural practices in this report does not constitute an endorsement or recommendation by the University of California nor is any criticism implied by omission of other similar products or cultural practices.*

Land. The hypothetical farm consists of 85 acres of land. The olive orchard is established on 80 acres and the remaining five acres are used for roads, the irrigation system, unused land, and farmstead. In the San Joaquin Valley property costs for land used for olive oil production range from \$6,000 to \$12,000 per acre. In this study \$10,000 per acre is used.

Trees. The olive cultivar used in this study is Arbequina because it is the best adapted to the super-high-density system and over-the-row mechanical harvest. Only Arbequina, Arbosana, and Koroneiki are well adapted to the super-high-density system due to their growth habits. The cost of trees for this study is \$4.00 per tree. Costs will vary depending on variety, tree size, and quantity purchased, and payment plan. A more inclusive list of oil producing varieties and their characteristics can be found in the *Olive Production Manual*. Super-high density olive orchards have been planted at various densities such as 4' X 12' or 907 trees per acre. In this study the trees are planted on 5' X 13' spacing, 670 trees per acre. Olive trees have a long production life if they are well maintained. The life of the orchard at the time of planting in this study is estimated to be 40 years.

Irrigation. The water cost for irrigation is the pumping charge. 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 \$56.04 per acre-foot. Irrigation rates, shown in Table A, increase each year as the orchard matures until year four. Mature trees use less water under a controlled deficit irrigation

Table A. Annual water applications

Year	Acre-inches/year	Acre-feet/year
1	8	0.67
2	16	1.33
3	24	2.00
4	36	3.00
5+	24	2.00

program to manage vegetative vigor and fruit water content. Water is delivered to the orchard by driplines to two, one-half gallon per minute inline emitters per tree. For irrigation purposes, the orchard is made up of two 40 acre blocks for irrigation efficiency and management. The cost of the irrigation system is in the Non-Cash Overhead Costs section of this study.

Labor. Labor rates of \$13.44 per hour for machine operators and \$10.96 for general labor includes payroll overhead of 37%. The basic hourly costs for labor are \$9.81 for machine operators and for \$8.00 general labor. The overhead includes the employers' share of federal and California state payroll taxes, workers' compensation insurance for vineyards (code 0040), and a percentage for other possible benefits. Workers' compensation insurance costs will vary among growers, but for this study the cost is based upon the average industry final rate as of January 1, 2007 (California Department of Insurance). On January 1, 2008 the minimum wage will increase to \$8.00 per hour and this cost study uses the wage increase to account for a known cost change. Labor for operations involving machinery are 20% higher than the operation time given in Table 1, 2, and 4 to account for the extra labor involved in equipment set up, moving, maintenance, work breaks, and field repair.

ESTABLISHMENT CULTURAL PRACTICES AND MATERIAL INPUTS

Site Preparation. Land is bare ground with resident vegetation. Preparation begins in the fall by discing twice with a stubble disc to break up the ground. The land is then subsoiled to a depth of 36–42 inches twice in a crossing pattern to break up compaction. Two more passes are made with a finishing disc to further reduce the dirt clod size and smooth the surface. The orchard ground is leveled after primary tillage is finished. Custom operators perform the subsoiling, discing, and leveling work. 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 with the tree rows in a north to south orientation. The drip irrigation system is laid on the ground for pre-irrigation to help soften the ground for digging. Seven-foot bamboo stakes are placed in the ground next to where the trees will be planted. The holes are quickly 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 13 feet between rows or 670 trees per acre. Trees that die are replanted in the first year. Two percent of the trees are estimated to be replaced.

Trellis System. After the trees have been planted the trellis system is installed in the first year. The trellis consists of two horizontal wires which supports a bamboo stake that helps support 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. Two strands of 12-gauge wire are strung between the two end posts to keep the trees aligned for mechanical harvesting. Every 50 feet a eight-foot, metal T-post is placed into the ground and the 12-gauge wires are 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 wires for training the tree upwards.

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

First Year. Seven ties of the tree to the stake are made during the first growing season. Two cuts are made to choose the central leader for each tree. One cut is made during a tying pass.

Second Year. Hand tying continues as the tree grows up the stake. The only pruning is to remove side branches below 24 inches and any suckers arising from the roots.

Third Year. Tying and training continue and suckers or shoots arising from below 24 inches are pruned off. Some larger side branches can be left the first three years to help fill the space and produce more fruit early, but are pruned by hand in the fourth year to avoid excessive shading.

Fourth Year. Tree skirts are pruned starting in the summer of the fourth year with a sickle bar to allow for good catch frame seal around the lower trunks during harvest and to avoid foliage contact with weed control sprays. Skirt pruning is done every year. Some larger side branches can be left the first three years to help fill the space and produce more fruit early, but are pruned by hand in the fourth year to avoid excessive shading. Also beginning in the fourth year trees are topped in the summer every year with a topping machine to maintain a height of about nine feet for the mechanical harvester.

Disease Management. Control of diseases during the orchard establishment period in olive orchards normally are minimal. Copper is used to treat peacock spot and olive knot. These are the major olive diseases that infect leaves and shoots, causing defoliation and shoot death. Control begins in the first year with two sprays in February and November. Verticillium wilt is a pathogen that is normally lives in contaminated soils. It can not be effectively managed before or after planting, consequently olive trees should not be planted in ground that has recently grown highly susceptible crops such as cotton, eggplant, peppers, potato, or tomato.

Insect Management. Regular control of the olive fruit fly is necessary once fruiting begins. The full rate of pesticide is applied on a per acre basis as a preventive treatment with insecticide bait sprays. Treatments are made during the growing season from June until harvest in October and one is applied in November for a total of six sprays. In this study 10% of the acreage is treated to control black scale.

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 four times during the growing season in all years, starting in the first year.

Immediately after planting a mixture of Prowl and Roundup is applied to prevent weed germination in a six foot wide strip (3 ft. 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. The pre-emergent herbicide Prowl is only used the first two years during young tree establishment. Field bindweed and other later emerging weeds are controlled in this orchard with spot treatments of Roundup. When the trees get larger the strip spray treatments include applications of Roundup plus Goal during the growing season. An application of Goal and Surflan in the late fall or early winter is used to control dormant season weeds. Good weed control is important to prevent competition with young trees for nutrients and water. (see table B).

Year	Weed control	
	Mowing	Herbicide treatments
1	Mow 4X	Residual spray: Prowl + Roundup 1X Strip spray: Roundup 7X Dormant spray: Goal + Roundup 1X
2	Mow 4X	Residual spray: Prowl + Roundup 1X Strip spray: Roundup 4X Dormant spray: Goal + Surflan 1X
3+	Mow 4X	Strip spray: Roundup 3X Spot spray: Roundup 1X Dormant spray: Suflan + Goal 1X

Fertilization. Nitrogen is the major nutrient required for proper tree growth and optimum yields. Young trees receive liquid nitrogen (N) fertilizer through the drip irrigation system. In years three and four N rates decrease as shown in Table C. Rates are for actual nitrogen. Amounts of material applied depends on the percentage of actual nitrogen in each product. Potassium in the form of potassium sulfate is dissolved and injected into the drip irrigation system starting the fourth year and applied monthly during the irrigation season at a rate of 150 pounds of K₂O per acre every other year.

Year	N	K ₂ O
	----- pounds per acre -----	
1	100	0
2	100	0
3	38	0
4+	45	150

Establishment Cost. 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 *Total Accumulated Net Cash Cost* in the third year shown in Table 1, represents the establishment cost per acre. For this study, the cost is \$6,726 per acre or

\$538,080 for the 80 acres planted to olives. Establishment cost is amortized over the remaining 40 years that the orchard is assumed to be in production. Establishment cost is used to determine the non-cash overhead, orchard capital recovery expense for production years.

PRODUCTION CULTURAL PRACTICES AND MATERIAL INPUTS

Pruning. Pruning manipulates tree growth to facilitate mechanical harvest and to maintain fruit production. The prunings are placed in the row middles and shredded. Skirt pruning and topping are done every other year so only half of the annual cost shows in the annual production cost tables. All skirt pruning and topping are contracted out. Hand pruning in the ON year is heavier than the OFF production year. An average of 20 hours per acre is used in this study, but that varies depending on variety, tree vigor, and other factors.

Fertilization. Nitrogen is applied at a rate of 45 pounds of actual nitrogen per acre to the trees through the drip irrigation system. Potassium as potassium sulfate is dissolved in water and injected on the orchard at a rate of 150 pounds of material per acre every other year.

Pest Management. For specific pesticide choices and rates consult the *UC IPM Pest Management Guidelines for Olives* and the *Olive Production Manual*. For more information on pest identification, monitoring, and management visit the UC IPM website at <http://www.ipm.ucdavis.edu/PMG/crops-agriculture.html>. Written recommendations are required for many pesticides and are made by licensed pest control advisors. For information and pesticide use permits, contact the local county agricultural commissioner's office. Contact your county Farm Advisor for additional production information.

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 (Goal and Surflan) during the orchard's dormant season and a contact herbicide (Roundup) is applied multiple times as new and persistent weeds emerge. During the growing season a single spot spray is made within the tree row on 5% of the acreage. Row centers are mowed four times during the spring and summer.

Insect Control. The orchard is monitored for olive fruit fly. Regular control of the olive fruit fly is necessary once fruiting begins. Olive fruit fly is treated with a bait application of spinosad (GF-120) five times from June thru October. A post harvest treatment is made in November for a total of six applications.

Black scale is occasionally a concern to olive growers and is indicated in this study by treating 10% of the acreage. Pruning will control the black scale insect in most years. Following cool years or in orchards that have become dense, an increased insecticide program may be required to reduce the population to manageable levels.

Disease Management. To prevent the fungal disease, peacock spot, and 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. No reliable treatment exists for Verticillium wilt.

Harvest. Harvest starts in the third year and is done by a contracted harvesting company. Costs for contracted harvest operations in this study are based on a set rate of \$250 per acre. Olives for oil are mechanically picked at the color change stage of yellow-green to red-purple skin color with white-green flesh in October to December. A pull-behind, over-the-row harvester is employed to shake the fruit off of the trees and convey them into a bottom-dump gondola. Harvested olives are unloaded into trailer bins

pulled by semi truck and 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.

Yields. 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. This study uses both tons and gallons of oil as units for the crop and return price. In this study, mature olive orchards yield 5.0 tons per acre and 15 to 17% oil per fresh weight (olive oil weighs 7.58 pounds per gallon and there are 2,000 pounds per ton). Arbequina olives produce about 40 to 45 gallons of oil per ton of olives. For this study, 42 gallons per ton (16% oil content) is used. Typical annual yields for olives are measured in tons per acre, but some processors are paying growers on the basis of gallons of oil produced. 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. Annual olive yield tonnage and gallons are shown in Table D.

Table D. Annual olive fruit and oil yields per acre

Year	Tons of fruit (Fresh weight)	Oil extracted (Gallons)
----- per acre -----		
3	2.0	84.0
4	4.5	189.0
5+	5.0	210.0

Returns and Prices. Because olives are grown for oil the processor normally pays growers in dollars per gallon of oil. However, in this study a price of \$504 per ton and \$12 per gallon is used in Tables 7, 8, and 9 for these oil olives. Table 7 includes a range from \$378 to \$630 per ton while table 8 includes a price range of \$9 to \$15 per gallon. Most 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. Because the industry is so new there is no basis for historical prices. The value of raw olives on the farm depends primarily on the variety, condition of the fruit, and supply and demand.

Risk. The risks associated with planting a super-high-density olive oil orchard to produce and market olives for oil are significant. While this study makes every effort to model a production system based on typical, real world practices. The super-high-density system is essentially new to California and its long term sustainability is not known. The study cannot fully represent financial, agronomic and market risks, which affect the profitability and economic viability of olives for oil production. *A market channel should be determined before olives are planted and brought into production.* Though, not used in this study, crop insurance is a risk management tool available to growers.

CASH OVERHEAD COSTS

(Tables 1-7)

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

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-take-off (PTO) horsepower, and fuel type. Prices for on-farm delivery of diesel and gasoline are \$2.30 and \$2.80 per gallon, respectively. Fuel costs are derived from American Automobile Association (AAA) and Energy Information Administration (EIA) 2006 monthly data. The cost includes a 2% local sales tax on diesel fuel and 8% sales tax on gasoline. Gasoline also includes federal and state excise tax, which are refundable for on-farm use when filing your income tax. The fuel, lube, and repair cost per acre for each

operation in Tables 1, 2, 3, and 4 are 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% higher than implement time for a given operation to account for setup, travel and down time.

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

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 10.00% per year. A nominal interest rate is the typical rate for borrowed funds.

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

Insurance. Insurance for farm investments vary depending on the assets included and the amount of coverage. Property insurance provides coverage for property loss and is charged at 7.14% of the average value of the assets over their useful life. Liability insurance covers accidents on the farm and costs \$539 for the farm.

Office Expense. Office and business expenses are estimated at \$5,700 annually. These expenses include office supplies, telephones, bookkeeping, accounting, legal fees, etc.

Sanitation Services. Sanitation services provide portable toilets for the orchard and cost the farm \$400 annually. The cost includes a double toilet, delivery and 3 months of weekly service.

NON-CASH OVERHEAD COSTS

(Tables 1-3,5-7)

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 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:

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

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.

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. The interest rate of 7.25% used to calculate capital recovery cost is an interest rate from an agricultural lender. It is used to reflect the long-term realized rate of return to these specialized resources that can only be used effectively in the agricultural sector. In other words, the next best alternative use for these resources is in another agricultural enterprise.

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 24-acre inches to the orchard from a 300-foot well, pumping from a 100 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, fertilizers injectors and mainlines have an expected useful life of 40 years. The life of the drip irrigation lines and emitters is estimated at 10 years. The irrigation system is considered an improvement to the property and is shown in the capital recovery or investment sections of the tables.

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% 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 provided information for this study.

REFERENCES

- American Society of Agricultural Engineers. 1994. *American Society of Agricultural Engineers Standards Yearbook*. Russell H. Hahn and Evelyn E. Rosentreter (ed.) St. Joseph, MO. 41st edition.
- Boehlje, Michael D., and Vernon R. Eidman. 1984. *Farm Management*. John Wiley and Sons. New York, NY
- California State Automobile Association. 2007. Gas Price Survey 2006. AAA Public Affairs, San Francisco, CA
- California State Board of Equalization. Fuel Tax Division Tax Rates. Internet accessed January 2007. <http://www.boe.ca.gov/sptaxprog/spftdrates.htm>
- Energy Information Administration. 2006. Weekly Retail on Highway Diesel Prices. Internet accessed January 2007. <http://tonto.eia.doe.gov/oog/info/wohdp>
- Sibbett, G. Steven and Joseph Connell. 1994. *Producing Olive Oil in California*. Pub. 21516. University of California, Division of Agriculture and Natural Resources. Oakland, CA.
- Statewide IPM Project. 1990. *UC Pest Management Guidelines, Olive*. In M. L. Flint (ed.) *UC IPM pest management guidelines*. Pub. 3339. IPM Education and Publ. University of California, Agriculture and Natural Resources. Oakland, CA. <http://www.ipm.ucdavis.edu/IPMPROJECT/pestmgmt.html>. Internet accessed May, 2007.
- University of California. 2007. *Olive Production Manual*. Pub. 3353. University of California, Division of Agriculture and Natural Resources. Oakland, CA. 2nd edition.
- Vossen, Paul M., Joseph H. Connell, Karen M. Klonsky, and Pete Livingston. 2004. *Sample Costs to Establish a Super-High Density Olive Orchard and Produce Olive Oil – Sacramento Valley*. University of California, Cooperative Extension. Department of Agricultural and Resource Economics. Davis, CA. <http://coststudies.ucdavis.edu>. Internet accessed September, 2007.
- Vossen, Paul M., Joseph H. Connell, William H. Krueger, Karen M. Klonsky, and Pete Livingston. 2007. *Sample Costs to Establish a Super-High Density Olive Orchard and Produce Olive Oil in the Sacramento Valley – 2007*. University of California, Cooperative Extension. Department of Agricultural and Resource Economics. Davis, CA. <http://coststudies.ucdavis.edu>. Internet accessed October, 2007.

For information concerning the above mentioned University of California publications contact UC DANR Communications Services (1-800-994-8849), <http://anrcatalog.ucdavis.edu/InOrder/Shop/Shop.asp>, or your local county Cooperative Extension office.

Table 1.

UC COOPERATIVE EXTENSION
 COSTS PER ACRE TO ESTABLISH A SUPER HIGH DENSITY OIL OLIVE ORCHARD
 SACRAMENTO VALLEY - 2007
 ARBEQUINA VARIETY

Labor Rate: \$14.24/hr. machine labor
 \$11.04/hr. non-machine labor

Trees Per Acre: 670
 Long Term Interest Rate: 7.25%

Year	Cost Per Acre			
	1st	2nd	3rd	4th
Gallons Per Acre or			84.0	189.0
Tons Per Acre			2.0	4.5
Planting Costs:				
Land Preparation - Subsoil 2X	200			
Land Preparation - Stubble Disc 2X	20			
Land Preparation - Finish Disc 2X	20			
Land Preparation - Level Ground	125			
Survey & Mark Orchard	30			
Dig & Plant Orchard	54			
Trees: 670 Per Acre	2,680			
Wrap Trees	113			
Install Trellis System	575			
Replant (2% in 2nd year)	0	57		
TOTAL PLANTING COSTS	3,817	57		
Cultural Costs:				
Weed Control - Pre-emergent Herbicide Spray	22			
Winter/Spring Pruning/Training	132	99	33	219
Irrigate 8X	46	83	121	121
Fertilize - Nitrogen	87	87	26	30
Fertilize - Potassium				35
Weed Control - Mow Middles 4X	19	19	19	19
Pest Control - Olive Knot & Peacock Spot Spray	31	49	49	49
Weed Control - Spray Tree Rows	55	75	75	75
Disease Control - Black Scale on 10% of Acreage	14	14	14	14
Insect Control - Olive Fruit Fly Spray 5X			133	133
Top Prune Trees (Starting 4thYear)				20
Skirt Prune Trees (Starting 4th Year)				45
ATV Use	67	67	67	67
Pickup Truck Use	83	83	83	83
TOTAL CULTURAL COSTS	556	576	620	910
Harvest Costs:				
Harvest - Mechanical			250	250
Haul Fruit			39	78
TOTAL HARVEST COSTS			289	328
Postharvest Costs:				
Disease Control - Olive Knot & Peacock Spray	31	49	49	49
Weed Control - Dormant Strip Spray	71	63	63	63
Insect Control - Olive Fruit Fly Spray	0	0	27	27
TOTAL POSTHARVEST COSTS	102	112	139	139
Interest On Operating Capital @ 10.00%	432	36	27	43
TOTAL OPERATING COSTS/ACRE	4,908	782	1,076	1,421
Cash Overhead Costs:				
Office Expense	71	71	71	71
Liability Insurance	6	6	6	6
Sanitation Fees	5	5	5	5
Property Taxes	123	123	123	156
Property Insurance	87	87	87	111
Investment Repairs	31	31	31	31
TOTAL CASH OVERHEAD COSTS	323	323	323	380
TOTAL CASH COSTS/ACRE	5,231	1,105	1,399	1,801
INCOME/ACRE FROM PRODUCTION			1,008	2,268
NET CASH COSTS/ACRE FOR THE YEAR	5,231	1,105	391	
PROFIT/ACRE ABOVE CASH COSTS				467
ACCUMULATED NET CASH COSTS/ACRE	5,231	6,336	6,726	6,259

U.C. COOPERATIVE EXTENSION
Table 1. continued

Year	Cost Per Acre			
	1st	2nd	3rd	4th
Gallons Per Acre or			84.0	189.0
Tons Per Acre			2.0	4.5
Capital Recovery Cost:				
Shop Building - 1,800 SqFt	52	52	52	52
Fuel Tanks: 1-100 & 1-250 Gallon	6	6	6	6
Land @ \$10,000 Per Acre	770	770	770	770
Drip Irrigation System	97	97	97	97
Shop Tools	11	11	11	11
Olive Orchard Establishment Cost				527
Equipment	102	102	102	102
TOTAL CAPITAL RECOVERY COST	1,038	1,038	1,038	1,565
TOTAL COST/ACRE FOR THE YEAR	6,269	2,143	2,437	3,366
INCOME/ACRE FROM PRODUCTION			1,008	2,268
TOTAL NET COST/ACRE FOR THE YEAR	6,269	2,143	1,429	1,098
TOTAL ACCUMULATED NET COST/ACRE	6,269	8,412	9,840	10,938

Table 2.

UC COOPERATIVE EXTENSION
 COSTS to PRODUCE SUPER-HIGH DENSITY OLIVES for OIL
 SACRAMENTO VALLEY – 2007
 ARBEQUINA VARIETY

Labor Rate: \$14.24/hr. machine labor
 \$11.04/hr. non-machine labor

Trees Per Acre: 670
 Long Term Interest Rate: 7.25%

Operation	Operation	Cash and Labor Costs per Acre					Total Cost	Your Cost
	Time (Hrs/A)	Labor Cost	Fuel, Lube & Repairs	Material Cost	Custom/Rent			
Cultural:								
Weed Control - Sprig Spray 3X	0.65	10	8	22	0	41		
Hand Prune Trees	20.00	219	0	0	0	219		
Irrigate	0.80	9	0	112	0	121		
Fertilizer - Nitrogen	0.80	9	0	21	0	30		
Fertilizer - Potassium (1 of 2 Years)	0.40	4	0	13	0	17		
Weed Control - Mow Middles 4X	0.59	10	10	0	0	19		
Disease Control - Olive Knot & Peacock Spray	0.42	7	6	36	0	49		
Weed Control - Spot Spray @ 5% of Acreage	0.04	1	1	1	0	2		
Disease Control - Black Scale @ 10% of Acreage	0.42	7	6	0	0	14		
Insect Control - Olive Fruit Fly 5X	2.12	34	32	67	0	133		
Top Prune Trees	0.00	0	0	0	20	20		
Skirt Prune Trees	0.00	0	0	0	45	45		
Pickup Truck Use	3.56	57	26	0	0	83		
ATV Use	<u>3.56</u>	<u>57</u>	<u>10</u>	<u>0</u>	<u>0</u>	<u>67</u>		
TOTAL CULTURAL COSTS	33.37	425	99	272	65	861		
Harvest:								
Harvest - Mechanical	0.00	0	0	0	250	250		
Haul Olives to Press	<u>0.00</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>78</u>	<u>78</u>		
TOTAL HARVEST COSTS	0.00	0	0	0	328	328		
Postharvest:								
Disease Control - Olive Knot & Peacock Spray	0.42	7	6	36	0	49		
Weed Control - Residual Weed Spray	0.22	3	3	57	0	63		
Insect Control - Olive Fruit Fly	<u>0.42</u>	<u>7</u>	<u>6</u>	<u>13</u>	<u>0</u>	<u>27</u>		
TOTAL POSTHARVEST COSTS	1.06	17	16	107	0	140		
Interest on Operating Capital @ 10.00%						40		
TOTAL OPERATING COSTS/ACRE		442	115	379	393	1,369		
CASH OVERHEAD:								
Liability Insurance						6		
Office Expense						71		
Sanitation Fees						5		
Property Taxes						150		
Property Insurance						107		
Investment Repairs						<u>31</u>		
TOTAL CASH OVERHEAD COSTS						370		
TOTAL CASH COSTS/ACRE						1,739		
NON-CASH OVERHEAD:								
		Per producing		-- Annual Cost --				
Investment		<u>Acres</u>		<u>Capital Recovery</u>				
Shop Building - 1,800 SqFt		554		52		52		
Fuel Tanks: 1-100 & 1-250 Gallon		60		6		6		
Land @ \$10,000 Per Acre		10,000		725		725		
Drip Irrigation System		1,259		97		97		
Shop Tools		112		11		11		
Olive Orchard Establishment Cost		6,726		527		527		
Equipment		<u>879</u>		<u>102</u>		<u>102</u>		
TOTAL NON-CASH OVERHEAD COSTS		19,589		1,519		1,519		
TOTAL COSTS/ACRE						3,258		

Table 3.

UC COOPERATIVE EXTENSION
 COSTS and RETURNS to PRODUCE SUPER-HIGH DENSITY OLIVES for OIL
 SACRAMENTO VALLEY – 2007
 ARBEQUINA VARIETY

	Quantity/Acre	Unit	Price or Cost/Unit	Value or Cost/Acre	Your Cost
GROSS RETURNS					
Olive Oil	210	Gallons	12.00	<u>2,520</u>	
TOTAL GROSS RETURNS FOR OLIVE OIL				<u>2,520</u>	
OPERATING COSTS					
Herbicide:					
Roundup Ultra Max	2.85	Pint	8.01	23	
Surflan AS	1.85	Pint	14.52	27	
Goal 2 XL	1.85	Pint	16.38	30	
Water:					
Water - Pumped	24.00	AcIn	4.67	112	
Fertilizer:					
UN-32	45.04	Lb N	0.461	21	
Potassium Sulfate	75.04	Lb	0.174	13	
Fungicide:					
Kocide 101	20.00	Lb	3.62	72	
Insecticide:					
Narrow Range Oil	0.15	Gal	2.96	0	
GF-120	84.00	FLOz	0.958	80	
Custom:					
Top Pruning	1.00	Acre	20.00	20	
Skirt Pruning	1.00	Acre	45.00	45	
Harvest-Mechanical	1.00	Acre	250.00	250	
Haul Fruit	4.00	Ton	19.50	78	
Labor (machine)	14.92	Hrs	13.44	201	
Labor (non-machine)	22.00	Hrs	10.96	241	
Fuel - Gas	8.32	Gal	2.80	23	
Fuel - Diesel	21.52	Gal	2.30	49	
Lube				11	
Machinery repair				31	
Interest on Operating Capital @ 10.00%				<u>40</u>	
TOTAL OPERATING COSTS/ACRE				<u>1,369</u>	
NET RETURNS ABOVE OPERATING COSTS				<u>1,151</u>	
CASH OVERHEAD COSTS:					
Liability Insuranc				6	
Office Expense				71	
Sanitation Fees				5	
Property Taxes				150	
Property Insurance				107	
Investment Repairs				<u>31</u>	
TOTAL CASH OVERHEAD COSTS/ACRE				<u>370</u>	
TOTAL CASH COSTS/ACRE				<u>1,739</u>	
NON-CASH OVERHEAD COSTS (CAPITAL RECOVERY):					
Buildings: 1,800 SqFt				52	
Fuel Tanks: 1-100 & 1-250 Gallon				6	
Land @ \$10,000 Per Acre				725	
Drip Irrigation System				97	
Shop Tools				11	
Olive Orchard Establishment Cost				527	
Equipment				<u>102</u>	
TOTAL NON-CASH OVERHEAD COST/ACRE				<u>1,519</u>	
TOTAL COSTS/ACRE				<u>3,258</u>	
NET RETURNS ABOVE TOTAL COSTS				<u>-738</u>	

Table 4.

UC COOPERATIVE EXTENSION
MONTHLY CASH COSTS – SUPER-HIGH DENSITY OLIVES for OIL
SACRAMENTO VALLEY - 2007
ARBEQUINA VARIETY

Beginning: JAN 07	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	TOTAL
Ending: DEC 07	07	07	07	07	07	07	07	07	07	07	07	07	
Cultural:													
Weed Control - Strip Spray 3X			14			14			14				41
Hand Prune Trees			110	110									219
Irrigate		6	10	20	24	22	22	10	6				121
Fertilizer - Nitrogen		4	4	4	4	4	4	4	4	4			30
Fertilizer - Potassium (1 Of 2 Years)		2	2	2	2	2	2	2	2	2			17
Weed Control - Mow Middles 4X				6	6	6							19
Disease Control - Olive Knot & Peacock Spray				49									49
Weed Control - Spot Spray @ 5% of Acreage						2							2
Disease Control - Black Scale @ 10% of Acreage						14							14
Insect Control - Olive Fruit Fly 5X						27	27	27	27	27			133
Top Prune Trees							20						20
Skirt Prune Trees								45					45
Pickup Truck Use	7	7	7	7	7	7	7	7	7	7	7	7	83
ATV Use	<u>6</u>	<u>6</u>	<u>6</u>	<u>6</u>	<u>6</u>	<u>6</u>	<u>6</u>	<u>6</u>	<u>6</u>	<u>6</u>	<u>6</u>	<u>6</u>	<u>67</u>
TOTAL CULTURAL COSTS	13	13	147	194	45	105	87	112	69	51	13	13	861
Harvest:													
Harvest - Mechanical										250			250
Haul Olives to Press										<u>78</u>			<u>78</u>
TOTAL HARVEST COSTS										328			328
Postharvest:													
Disease Control - Olive Knot & Peacock Spray										49			49
Weed Control - Residual Weed Spray										63			63
Insect Control - Olive Fruit Fly											<u>27</u>		<u>27</u>
TOTAL POSTHARVEST COSTS										113	27		140
Interest on Operating Capital @ 10.00%	0	0	1	3	3	4	5	6	7	11	0	0	40
TOTAL OPERATING COSTS/ACRE	13	13	149	197	48	110	92	118	76	502	39	12	1,369
OVERHEAD:													
Liability Insurance	6												6
Office Expense	6	6	6	6	6	6	6	6	6	6	6	6	71
Sanitation Fees			5										5
Property Taxes	75						75						150
Property Insurance	54						54						107
Investment Repairs	<u>3</u>	<u>3</u>	<u>3</u>	<u>3</u>	<u>3</u>	<u>3</u>	<u>3</u>	<u>3</u>	<u>3</u>	<u>3</u>	<u>3</u>	<u>3</u>	<u>31</u>
TOTAL CASH OVERHEAD COSTS	143	8	13	8	8	8	137	8	8	8	8	8	370
TOTAL CASH COSTS/ACRE	156	21	162	206	56	118	229	127	84	511	47	21	1,739

Table 5.

UC COOPERATIVE EXTENSION
WHOLE FARM ANNUAL EQUIPMENT, INVESTMENT, and BUSINESS OVERHEAD COSTS
SACRAMENTO VALLEY - 2007
ARBEQUINA VARIETY

ANNUAL EQUIPMENT COSTS

		- Cash Overhead -						
Yr	Description	Price	Yrs Life	Salvage Value	Capital Recovery	Insur- ance	Taxes	Total
07	75 HP 2WD Tractor	48,103	16	8,616	4,874	202	284	5,360
07	ATV 4WD	7,942	7	3,013	1,141	39	55	1,235
07	Mower - Flail 9'	9,882	10	1,748	1,298	42	58	1,398
07	Orchard Sprayer - 250 Gallon	21,102	20	1,100	2,005	79	111	2,195
07	Pickup Truck - 1/2 Ton	26,190	7	9,935	3,763	129	181	4,072
07	Weed Sprayer - 100 Gallon	3,947	10	698	519	17	23	558
TOTAL		117,166		25,110	13,599	508	711	14,819
60% of New Cost *		70,300		15,066	8,160	305	427	8,891

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

ANNUAL INVESTMENT COSTS

		----- Cash Overhead -----						
Description	Price	Yrs Life	Salvage Value	Capital Recovery	Insur- ance	Taxes	Repairs	Total
INVESTMENT								
Shop Building - 1,800 SqFt	44,315	20	4,432	4,159	174	244	731	5,308
Olive Orchard Establishment Cost	538,080	37		42,176	1,921	2,690	0	46,787
Fuel Tanks: 1-100 & 1-250 Gallon	4,817	20	482	452	19	26	80	578
Drip Irrigation System	100,692	40	10,069	7,726	395	554	1,385	10,060
Land @ \$10,000 Per Acre	850,000	40	850,000	61,625	6,069	8,500	0	76,194
Shop Tools	8,955	20	896	841	35	49	246	1,171
TOTAL INVESTMENT	1,546,859		865,879	116,979	8,613	12,064	2,442	140,098

ANNUAL BUSINESS OVERHEAD COSTS

Description	Units/ Farm	Unit	Price/ Unit	Total Cost
Liability Insurance	85	Acre	6.34	539
Office Expense	80	Acre	71.25	5,700
Sanitation Fees	80	Acre	5.00	400

Table 6.

UC COOPERATIVE EXTENSION
 HOURLY EQUIPMENT COSTS
 SACRAMENTO VALLEY - 2007
 ARBEQUINA VARIETY

Description	COSTS PER HOUR							Total Costs/Hr.
	Actual	- Cash Overhead -			----- Operating -----			
	Hours Used	Capital Recovery	Insur- ance	Taxes	Repairs	Fuel & Lube	Total Oper.	
75 HP 2WD Tractor	467.5	6.26	0.26	0.36	1.13	9.74	10.87	17.75
ATV 4WD	284.9	2.40	0.08	0.12	0.58	2.15	2.73	5.33
Mower - Flail 9'	47.5	16.39	0.52	0.73	4.03	0.00	4.03	21.68
Orchard Sprayer - 250 Gallon	304.6	3.95	0.16	0.22	3.22	0.00	3.22	7.55
Pickup Truck - 1/2 Ton	284.9	7.92	0.27	0.38	1.91	5.37	7.28	15.85
Weed Sprayer - 100 Gallon	72.9	4.27	0.14	0.19	1.04	0.00	1.04	5.64

Table 7.

UC COOPERATIVE EXTENSION
RANGING ANALYSIS - GALLONS
SACRAMENTO VALLEY - 2007
ARBEQUINA VARIETY

COSTS PER ACRE AT VARYING YIELDS TO PRODUCE OLIVE OIL							
	YIELD(GALLONS/ACRE)						
	147	168	189	210	231	252	273
OPERATING COSTS/ACRE:							
Cultural Cost	861	861	861	861	861	861	861
Harvest Cost	305	312	320	328	336	344	351
Postharvest Cost	140	140	140	140	140	140	140
Interest on Operating Capital	40	40	40	40	40	40	40
TOTAL OPERATING COSTS/ACRE	1,345	1,353	1,361	1,369	1,377	1,385	1,392
TOTAL OPERATING COSTS/GAL	9.15	8.05	7.20	6.52	5.96	5.49	5.10
CASH OVERHEAD COSTS/ACRE	370	370	370	370	370	370	370
TOTAL CASH COSTS/ACRE	1,715	1,723	1,731	1,739	1,747	1,755	1,762
TOTAL CASH COSTS/GAL	11.67	10.26	9.16	8.28	7.56	6.96	6.46
NON-CASH OVERHEAD COSTS/ACRE	1,519	1,519	1,519	1,519	1,519	1,519	1,519
TOTAL COSTS/ACRE	3,234	3,242	3,250	3,258	3,266	3,274	3,281
TOTAL COSTS/GAL	22.00	19.30	17.20	15.51	14.14	12.99	12.02

NET RETURNS PER ACRE ABOVE OPERATING COSTS TO PRODUCE OLIVES FOR OIL							
PRICE (DOLLARS/GALLON)	YIELD (GALLONS/ACRE)						
	147	168	189	210	231	252	273
Olives For Oil			----- \$/Acre -----				
9.00	-22	159	340	521	702	883	1,065
10.00	125	327	529	731	933	1,135	1,338
11.00	272	495	718	941	1,164	1,387	1,611
12.00	419	663	907	1,151	1,395	1,639	1,884
13.00	566	831	1,096	1,361	1,626	1,891	2,157
14.00	713	999	1,285	1,571	1,857	2,143	2,430
15.00	860	1,167	1,474	1,781	2,088	2,395	2,703

NET RETURNS PER ACRE ABOVE CASH COSTS TO PRODUCE OLIVES FOR OIL							
PRICE (DOLLARS/GALLON)	YIELD (GALLONS/ACRE)						
	147	168	189	210	231	252	273
Olives For Oil			----- \$/Acre -----				
9.00	-392	-211	-30	151	332	513	695
10.00	-245	-43	159	361	563	765	968
11.00	-98	125	348	571	794	1,017	1,241
12.00	49	293	537	781	1,025	1,269	1,514
13.00	196	461	726	991	1,256	1,521	1,787
14.00	343	629	915	1,201	1,487	1,773	2,060
15.00	490	797	1,104	1,411	1,718	2,025	2,333

NET RETURNS PER ACRE ABOVE TOTAL COSTS TO PRODUCE OLIVES FOR OIL							
PRICE (DOLLARS/GALLON)	YIELD (GALLONS/ACRE)						
	147	168	189	210	231	252	273
Olives For Oil			----- \$/Acre -----				
9.00	-1,911	-1,730	-1,549	-1,368	-1,187	-1,006	-824
10.00	-1,764	-1,562	-1,360	-1,158	-956	-754	-551
11.00	-1,617	-1,394	-1,171	-948	-725	-502	-278
12.00	-1,470	-1,226	-982	-738	-494	-250	-5
13.00	-1,323	-1,058	-793	-528	-263	2	268
14.00	-1,176	-890	-604	-318	-32	254	541
15.00	-1,029	-722	-415	-108	199	506	814

Table 8.

UC COOPERATIVE EXTENSION
RANGING ANALYSIS - TONS
SACRAMENTO VALLEY - 2007
ARBEQUINA VARIETY

COSTS PER ACRE AT VARYING YIELDS TO PRODUCE OLIVE OIL							
	YIELD(TONS/ACRE)						
	3.5	4.0	4.5	5.0	5.5	6.0	6.5
OPERATING COSTS/ACRE:							
Cultural Cost	861	861	861	861	861	861	861
Harvest Cost	305	312	320	328	336	344	351
Postharvest Cost	140	140	140	140	140	140	140
Interest on Operating Capital	40	40	40	40	40	40	40
TOTAL OPERATING COSTS/ACRE	1,345	1,353	1,361	1,369	1,377	1,385	1,392
TOTAL OPERATING COSTS/TON	384	338	302	274	250	231	214
CASH OVERHEAD COSTS/ACRE	370	370	370	370	370	370	370
TOTAL CASH COSTS/ACRE	1,715	1,723	1,731	1,739	1,747	1,755	1,762
TOTAL CASH COSTS/ TON	490	431	385	348	318	292	271
NON-CASH OVERHEAD COSTS/ACRE	1,519	1,519	1,519	1,519	1,519	1,519	1,519
TOTAL COSTS/ACRE	3,234	3,242	3,250	3,258	3,266	3,274	3,281
TOTAL COSTS/ TON	924	811	722	652	594	546	505

NET RETURNS PER ACRE ABOVE OPERATING COSTS TO PRODUCE OLIVES FOR OIL								
PRICE (DOLLARS/TON)	YIELD (TONS/ACRE)							
	3.5	4.0	4.5	5.0	5.5	6.0	6.5	
Olives For Oil								
			----- \$/Acre -----					
378.00	-22	159	340	521	702	883	1,065	
420.00	125	327	529	731	933	1,135	1,338	
462.00	272	495	718	941	1,164	1,387	1,611	
504.00	419	663	907	1,151	1,395	1,639	1,884	
546.00	566	831	1,096	1,361	1,626	1,891	2,157	
588.00	713	999	1,285	1,571	1,857	2,143	2,430	
630.00	860	1,167	1,474	1,781	2,088	2,395	2,703	

NET RETURNS PER ACRE ABOVE CASH COSTS TO PRODUCE OLIVES FOR OIL								
PRICE (DOLLARS/TON)	YIELD (TONS/ACRE)							
	3.5	4.0	4.5	5.0	5.5	6.0	6.5	
Olives For Oil								
			----- \$/Acre -----					
378.00	-392	-211	-30	151	332	513	695	
420.00	-245	-43	159	361	563	765	968	
462.00	-98	125	348	571	794	1,017	1,241	
504.00	49	293	537	781	1,025	1,269	1,514	
546.00	196	461	726	991	1,256	1,521	1,787	
588.00	343	629	915	1,201	1,487	1,773	2,060	
630.00	490	797	1,104	1,411	1,718	2,025	2,333	

NET RETURNS PER ACRE ABOVE TOTAL COSTS TO PRODUCE OLIVES FOR OIL								
PRICE (DOLLARS/TON)	YIELD (TONS/ACRE)							
	3.5	4.0	4.5	5.0	5.5	6.0	6.5	
Olives For Oil								
			----- \$/Acre -----					
378.00	-1,911	-1,730	-1,549	-1,368	-1,187	-1,006	-824	
420.00	-1,764	-1,562	-1,360	-1,158	-956	-754	-551	
462.00	-1,617	-1,394	-1,171	-948	-725	-502	-278	
504.00	-1,470	-1,226	-982	-738	-494	-250	-5	
546.00	-1,323	-1,058	-793	-528	-263	2	268	
588.00	-1,176	-890	-604	-318	-32	254	541	
630.00	-1,029	-722	-415	-108	199	506	814	

Table 9.

UC COOPERATIVE EXTENSION
 COSTS and RETURNS/BREAKEVEN ANALYSIS
 SACRAMENTO VALLEY – 2007
 ARBEQUINA VARIETY

COSTS AND RETURNS - PER ACRE BASIS

Crop	1. Gross Returns	2. Operating Costs	3. Net Returns Above Oper. Costs (1-2)	4. Cash Costs	5. Net Returns Above Cash Costs (1-4)	6. Total Costs	7. Net Returns Above Total Costs (1-6)
Olives for Oil	2,520	1,369	1,151	1,739	781	3,258	-738

COSTS AND RETURNS - TOTAL ACREAGE

Crop	1. Gross Returns	2. Operating Costs	3. Net Returns Above Oper. Costs (1-2)	4. Cash Costs	5. Net Returns Above Cash Costs (1-4)	6. Total Costs	7. Net Returns Above Total Costs (1-6)
Olives for Oil	201,600	109,509	92,091	139,110	62,490	260,624	-59,024

BREAKEVEN PRICES PER YIELD UNIT

CROP	Base Yield (Units/Acre)	Yield Units	Breakeven Price to Cover		
			Operating Costs	Cash Costs	Total Costs
\$ per Yield Unit					
Olives for Oil	210.0	Gal	6.52	8.28	15.51

BREAKEVEN YIELD PER ACRE

CROP	Yield Units	Base Price (\$/Unit)	Breakeven Yield to Cover		
			Operating Costs	Cash Costs	Total Costs
Yield Units/Acre					
Olives for Oil	Gal	12.00	114.1	144.9	271.5

BREAKEVEN PRICES PER YIELD UNIT

CROP	Base Yield (Units/Acre)	Yield Units	Breakeven Price to Cover		
			Operating Costs	Cash Costs	Total Costs
\$ per Yield Unit					
Olives for Oil	5.0	Ton	273.77	347.78	651.56

BREAKEVEN YIELDS PER ACRE

CROP	Yield Units	Base Price (\$/Unit)	Breakeven Price to Cover		
			Operating Costs	Cash Costs	Total Costs
Yield Units per Acre					
Olives for Oil	Ton	504.00	2.7	3.5	6.5

Table 10.

UC COOPERATIVE EXTENSION
DETAILS BY OPERATIONS
SACRAMENTO VALLEY - 2007
ARBEQUINA VARIETY

Operation	Operation Month	Tractor/ Power Unit	Implement	Material	Broadcast Rate/acre	Material Unit
Cultural:						
Hand Prune Trees	March	Labor			10.00	Hour
	April	Labor			10.00	Hour
Irrigate	March	Labor		Water	3.00	AcIn
	April	Labor		Water	3.00	AcIn
	May	Labor		Water	3.00	AcIn
	June	Labor		Water	3.00	AcIn
	July	Labor		Water	3.00	AcIn
	August	Labor		Water	3.00	AcIn
	September	Labor		Water	3.00	AcIn
	October	Labor		Water	3.00	AcIn
Fertilizer - Nitrogen - Injected into Irrigation System	March	Labor		UN-32	5.63	Lbs
	April	Labor		UN-32	5.63	Lbs
	May	Labor		UN-32	5.63	Lbs
	June	Labor		UN-32	5.63	Lbs
	July	Labor		UN-32	5.63	Lbs
	August	Labor		UN-32	5.63	Lbs
	September	Labor		UN-32	5.63	Lbs
	October	Labor		UN-32	5.63	Lbs
Fertilizer - Potassium - Injected into Irrigation System	March	Labor		Potassium Sulfate	9.38	Lbs
	April	Labor		Potassium Sulfate	9.38	Lbs
	May	Labor		Potassium Sulfate	9.38	Lbs
	June	Labor		Potassium Sulfate	9.38	Lbs
	July	Labor		Potassium Sulfate	9.38	Lbs
	August	Labor		Potassium Sulfate	9.38	Lbs
	September	Labor		Potassium Sulfate	9.38	Lbs
	October	Labor		Potassium Sulfate	9.38	Lbs
Weed Control - Strip Spray 3X	March	75 HP 4WD Tractor	Weed Sprayer - 100 Gallon	Roundup Ultra Max	0.92	Pint
	June	75 HP 4WD Tractor	Weed Sprayer - 100 Gallon	Roundup Ultra Max	0.92	Pint
	September	75 HP 4WD Tractor	Weed Sprayer - 100 Gallon	Roundup Ultra Max	0.92	Pint
Weed Control - Mow Middles 4X	April	75 HP 4WD Tractor	Mower - Flail 9'			
	May	75 HP 4WD Tractor	Mower - Flail 9'			
	June	75 HP 4WD Tractor	Mower - Flail 9'			
	July	75 HP 4WD Tractor	Mower - Flail 9'			
Disease Control - Olive Knot & - Peacock Spot Spray 2X - Postharvest	April	75 HP 4WD Tractor	Orchard Sprayer - 250 Gallon	Kocide 101	10.00	Lbs
	October	75 HP 4WD Tractor	Orchard Sprayer - 250 Gallon	Kocide 101	10.00	Lbs
Weed Control - - Spot Spray on 5% of Acreage	June	75 HP 4WD Tractor	Weed Sprayer - 100 Gallon	Roundup Ultra Max	0.09	Pint
Insect Control - Olive Fruit Fly 6X	June	75 HP 4WD Tractor	Orchard Sprayer - 250 Gallon	GF-120	14.00	FIOz
	July	75 HP 4WD Tractor	Orchard Sprayer - 250 Gallon	GF-120	14.00	FIOz
	August	75 HP 4WD Tractor	Orchard Sprayer - 250 Gallon	GF-120	14.00	FIOz
	September	75 HP 4WD Tractor	Orchard Sprayer - 250 Gallon	GF-120	14.00	FIOz
	October	75 HP 4WD Tractor	Orchard Sprayer - 250 Gallon	GF-120	14.00	FIOz
- Postharvest	October	75 HP 4WD Tractor	Orchard Sprayer - 250 Gallon	GF-120	14.00	FIOz
Insect Control - - Black Scale (On 10% of Acreage)	June	75 HP 4WD Tractor	Orchard Sprayer - 250 Gallon	Narrow Spectrum Oil	0.15	Gal
Top Prune Trees	July			Custom		
Skirt Prune Trees	August			Custom		
Harvest	October			Custom		
Haul Fruit to Processor	October			Custom		
Weed Control - Dormant Strip Spray - Postharvest	October	75 HP 4WD Tractor	Weed Sprayer - 100 Gallon	Goal 2 XL	1.85	Pint
				Surflan AS	1.85	Pint
ATV Use	Annual	ATV - 4WD				
Pickup Truck Use	Annual	Pickup Truck - 1/2 Ton				