

UNIVERSITY OF CALIFORNIA COOPERATIVE EXTENSION

2011

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

TABLE OLIVES



SACRAMENTO VALLEY

William H. Krueger

Karen M. Klonsky

Richard L. De Moura

UC Cooperative Extension Farm Advisor, Glenn & Tehama Counties

UC Cooperative Extension Economist, Department of Agricultural and Resource Economics, UC Davis

UC Cooperative Extension Staff Research Associate, Department of Agricultural and Resource Economics, UC Davis

INTRODUCTION

The sample costs to establish a high density olive orchard and produce table olives in the Sacramento Valley – Glenn, Tehama and Butte Counties are presented in this study. **The high density system is new to California and its long term performance is not known.** It would typically consist of 150 to 250 trees per acre. The study includes assumptions and costs for establishing an orchard and for producing olives after establishment and also assumes the adaptation of mechanical harvest. 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 high density olive orchards in the Sacramento Valley and do not reflect cost and operations based on any specific orchard. 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.

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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, 530-752-3589 or the local UC Cooperative Extension office.

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, 530-752-3589 or obtained from the local county UC Cooperative Extension offices. Archived studies are also available on the website.

ASSUMPTIONS

The following assumptions pertain to sample costs to establish a high density olive orchard and produce table olives in the Sacramento Valley – Glenn, Tehama and Butte Counties. The high density system (202 trees per acre in this case) is still fairly 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 40 contiguous acres. The olive orchard is established on 35 acres and the remaining five acres are used for roads, the irrigation system, unused land, and farmstead.

Establishment Cultural Practices and Material Inputs

Table 1

Site Preparation. The orchard site is bare ground with resident vegetation. Preparation begins in the fall by subsoiling to a depth of 3-4 feet twice in a crossing pattern to break up compaction. The ground is then disced twice with a stubble disc to break up large clods. Two passes with a finishing disc are made in the fall to further reduce the dirt clod size and smooth the surface. Two passes are also made in the spring prior to planting. Custom operators perform the subsoiling and discing work. In the spring the orchard is laid out, ridges made, trellis and drip line installed and trees planted. 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.

Trees. The Manzanillo variety is the current table variety being planted in the area, although Sevillano is the olive cultivar that historically accounted for the majority of the acreage in the Sacramento Valley and currently makes up about 50% of the acreage in Glenn and Tehama Counties. In Butte County the predominant variety is Mission. Production costs should not vary significantly between varieties with the exception of chemical thinning costs that are rarely if ever used for Sevillano. Although the orchard is considered Manzanillo about 10% of the trees are the Sevillano variety and serve as pollinators. Olive trees have a long production life and in this study, the life is estimated to be 25 years. The trees for this study cost \$6.00 each. Costs will vary depending on variety, tree size, and quantity purchased. A more inclusive list of varieties and their characteristics can be found in the *Olive Production Manual*.

Planting. In the spring (April), the tree sites are marked by a global positioning (gps) system and 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 12 feet in-row by 18 feet between rows or 202 trees per acre. In olive producing areas with significant Sevillano plantings, pollinator rows should not be necessary. In isolated areas, cross pollinator rows (one every 200 feet) should be planted. It is estimated that two percent of the trees will need to be replaced in the second year.

Trellis System. The trellis is installed in the first year and consists of one 12 gauge horizontal wire which supports a bamboo stake supporting the trees during the first few years of mechanical harvest. In addition, 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. 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.

The trellis may or may not be necessary for this system, but is being used in most new plantings. Without a trellis, it would be necessary to stake individual trees which may have a similar cost.

Training. 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 and growth originating below 30 to 36 inches on the trunk is removed frequently to develop a smooth trunk suitable for mechanical harvest with a trunk shaker. Prunings are placed in the row middles and shredded during the first mowing.

First Year. Four ties of the tree to the stake are made during the first growing season and cuts are made to choose the central leader for each tree during a tying pass.

Second Year. Two additional ties are made in the second year. Suckers and branches originating below 24 inches are removed. Trees are topped at about ten feet to encourage side branching.

Third Year. Suckers and branches originating below 30 to 36 inches are removed. Some larger side branches can be left the first three years to help fill the space in the row and produce more fruit early.

Fourth Year. Regular spring (April) pruning begins in the fourth year. Suckers and any shoots arising from below about 30 to 36 inches are pruned off. Branches protruding in the middles are cut back and/or pushed back into the tree row by placing them on the other side of the trellis wire.

Irrigation. A drip irrigation system is used and irrigation costs include district water, pumping, and labor. 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 \$75.96 per acre-foot (\$6.33 per acre inch). The trees are irrigated from March/April to September/October. Irrigation rates, shown in Table A, increase each year as the orchard develops vegetatively up through year four. The cost of the irrigation system is in the Non-Cash Overhead Costs section of this study.

Year	Acre-inches/yr
1	8
2	16
3	24
4+	36

Insect and Disease Management. Control of insects and other diseases during the orchard establishment period in olive orchards are normally minimal. Copper sprays are used to prevent peacock spot and olive knot. These are major olive diseases that infect leaves and shoots, causing defoliation and shoot death. Control begins in the first year with a fall spray (Kocide) in October. Beginning in the fourth year two sprays are applied (March and November). Olive orchards should be monitored for olive fruit flies to indicate need for treatments. Olive fruit fly control begins in the third year from mid May to October; weekly applications of GF-120 are made to alternate rows.

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.

After planting, strip or spot applications with Gramoxone or Roundup are applied to control weeds within the tree row, two feet out on each side of the trees. Roundup at low rates on very small weeds is used 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 Roundup is made in the late fall or early winter. Good weed control is important to prevent competition with young trees for nutrients and water.

Fertilization. Nitrogen (N), the major nutrient required for proper tree growth and optimum yields. UN32 is injected through the drip from April to October. Nitrogen is applied at increasing rates during orchard establishment as shown in Table B. Amount of material applied depends on the percentage of actual nitrogen in each product and need, as determined by annual tissue (leaf) analysis.

Year	Lbs N
1	20
2	40
3	60
4+	100

Harvest. Olives are hand harvested in October in the third year (first production year) and mechanically in the fourth and successive years. A custom operator/contractor harvests the crop using either a trunk or canopy shaker. All costs for the harvest operations are on a tonnage basis. A charge of \$350 per ton for hand harvest and \$150 per ton for mechanical harvest is used for harvest costs. Hauling is additional.

Yields. Manzanillo olives are assumed to be at full bearing from the sixth year on. The mature yield is estimated as the average annual yield over the remaining orchard life. Estimated annual yields for olives are measured in tons per acre and are shown in Table C.

Year	Expected Tons	Harvested Tons
3	0.5	0.50
4	3.0	2.40
5	4.0	3.60
6+	5.0	4.00

Mechanical harvest is still in the experimental stage and assumed to be 80% efficient with 20% of the fruit remaining on the tree.

Production Cultural Practices and Material Inputs Tables 2-8

Pruning. Pruning is critical to production and is dependent on several factors such as olive cultivar and planting density. It is common to prune in the spring by hand. Trees are maintained at a 14-foot height and six foot wide canopy. Opening the tree canopy by pruning helps to control black scale. Prunings are stacked in the row middles and shredded.

Irrigation. A mature Manzanillo orchard will use 38 acre-inches of water annually and this study assumes that 6 acre-inches is from effective rainfall. Total applied water through the irrigation system is 36 acre-inches to account for system inefficiency. District water plus irrigation labor and the pumping cost for pressurizing the drip irrigation system accounts for the water cost of \$6.33 per acre-inch or \$75.96 per acre-foot. Price per acre-foot for water will vary from grower to grower in this region depending on the irrigation district and pumping costs. Water is applied from March to October.

Fertilization. Nitrogen (N) as UN-32 is split equally and applied through the drip system from March to October. In this study, 100 pounds of N per acre are applied annually. Mature tree nutrition is determined by leaf analysis in July (cost not shown).

Pest Management. The pesticides and rates mentioned in this cost study are listed in *UC Integrated Pest Management Guidelines, Olives*. For more information on other pesticides available, pest identification, monitoring, and management visit the above UC IPM website at <http://www.ipm.ucdavis.edu/PMG/crops-agriculture.html>. For information and pesticide use permits,

contact the local county agricultural commissioner's office. Many pesticides require or suggest the use of various adjuvants, but these costs are not included in the study.

Pest Control Adviser (PCA). Written recommendations are required for many pesticides and are made by licensed Pest Control Advisers. In addition the PCA will monitor the field for agronomic problems including pests and nutrition. Growers may hire private PCAs or receive the service as part of a service agreement with an agricultural chemical and fertilizer company. The grower pays \$25 per acre for a PCA.

Weeds/Orchard Floor Management. Weeds in the tree rows are controlled with herbicides. Two strip or spot sprays using a foliar herbicide (Roundup) are applied each year during the growing season. Surflan, Goal and Roundup are applied in the fall (October). In addition to shredding in the middles, vegetation in the row middles is mowed four times from April through September.

Insects. Because the olives are destined for the table market, protective sprays are applied to prevent any olive fruit fly damage. In this study, olive fruit fly is sprayed 19 times during the growing season, mid May through September and once after harvest in October/November. The liquid insecticide for olive fruit fly is applied to every other row each week and all rows post harvest. A McPhail trap baited with Torula yeast tablets is also used at a density of one trap per ten acres. The traps are checked every week for the pest during the same 20 weeks that the insecticide is used.

Black scale, an insect pest, requires an occasional chemical treatment. In orchards where the trees are pruned adequately and do not allow the canopy to become dense, chemical control is seldom necessary. Treatment may be required following cool years or in orchards that have canopies that have become too crowded. This study does not include any treatment for black scale.

Disease. The fungal disease, peacock spot damages leaves and the bacterial disease, olive knot, damages shoots and branches. Their prevention requires two copper (Kocide) sprays - the first in March for olive knot and the second following harvest and prior to fall rains for peacock spot.

Thinning. Chemical fruit thinning is usually done twelve to eighteen days after full bloom. Naphthalene acetic acid (Liqui-Stik) is applied in May or early June. Thinning is generally not needed every year, therefore this study includes a treatment once every two years with one-half of the cost allocated to the crop each year. Fruit thinning is needed when olives set fruit in large quantities. Thinning improves fruit size, quality, uniformity, and promotes regular bearing each year. Application timing is critical to achieve the best results.

Harvest. Olives are mechanically harvested in October by a custom harvester using either a trunk or canopy shaker. All costs for contracted/custom harvest operations are on a tonnage basis. A charge of \$150 per ton is used for harvest and \$12 per ton for hauling. Mechanical harvest is still in the experimental stage and assumed to be 80% efficient with 20% of the fruit remaining on the tree. Growers may need or want to hand harvest the remaining olives on the tree until efficiency increases.

Yields. Manzanillo olives are assumed to be at full bearing from the sixth year on. The mature yield is estimated as the average annual harvested yield over the remaining orchard life. Typical annual yields for olives are measured in tons per acre and are shown in Table C.

Returns. An estimated price of \$900 per ton of Manzanillo olives is used in this study so that a ranging analysis for different yields and prices can be calculated. Returns, shown in Table 5, will vary and the yields and prices used in this study are estimated, based on current markets.

Assessments. The California Olive Committee (COC) under a federal marketing order collects a mandatory assessment fee. These assessments are charged to the processor to pay for olive marketing order administration, research, and market development. Growers do not directly pay the assessment.

Labor, Equipment, and Interest

Labor. Labor rates of \$14.28 per hour for machine operators and \$10.88 for general labor includes payroll overhead of 36%. The basic hourly costs for labor are \$10.50 for machine operators and \$8.00 for general labor. The overhead includes the employers' share of federal and California state payroll taxes, workers' compensation insurance for orchards (code 0016), 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, 2011 (California Department of Insurance). Labor for operations involving machinery are 20% 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 Engineers (ASAE). Fuel and lubrication costs are also determined by ASAE equations based on maximum power takeoff (PTO) horsepower, and fuel type. Prices for on-farm delivery of diesel and gasoline are \$2.60 and \$3.10 per gallon, respectively. The cost includes a 2.5% local sales tax on diesel fuel and 7.5% 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 Table 2 is determined by multiplying the total hourly operating cost in Table 8 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.

Interest on Operating Capital. Interest on operating capital is based on cash operating costs and is calculated monthly until harvest at a nominal rate of 5.75% per year. A nominal interest rate is the typical market cost of borrowed funds. The interest cost of post harvest operations is discounted back to the last harvest month using a negative interest charge. The rate will vary depending upon various factors, but the rate in this study is considered a typical lending rate by a farm lending agency as of January 2011.

Risk. The risks associated with planting a high density olive oil orchard to produce and market table olives are significant. While this study makes every effort to model a production system based on typical, real world practices. The high density system is 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. *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

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 equipment operating costs, property taxes, interest on operating capital, office expense, liability and property insurance, or management services.

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 7.

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 7.75% of the average value of the assets over their useful life. Liability insurance covers accidents on the farm and costs \$587 for the farm.

Office Expense. Office and business expenses are estimated at \$6,500 annually. These expenses include office supplies, telephones, bookkeeping, accounting, legal fees, regulatory fees, etc.

Sanitation Services. Sanitation services provide portable toilets for the orchard and cost the farm \$768 annually. The cost includes a double toilet, delivery and 3 months of weekly service.

Non-Cash Overhead Costs

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

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 Engineers (ASAE) based on equipment type and years of life. The life in years is estimated by dividing the wear out life, as given by ASAE by the annual hours of use in this operation. For other investments including irrigation systems, buildings, and miscellaneous equipment, the value at the end of its useful life is zero. The salvage value for land is the purchase price because land does not depreciate. The purchase price and salvage value for equipment and investments are shown in Table 7.

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 5.75% is used to calculate capital recovery. The rate will vary depending upon size of loan and other lending agency conditions, but is a suggested rate by a farm lending agency in January 2011.

Buildings. The metal building(s) are on a cement slab and total approximately 400 square feet. The buildings are used for shops and equipment storage.

Land. Bare crop land value is estimated at \$6,000 per acre. Because only 35 of the 40 acres are planted with olives, the land is valued at \$6,857 per producing acre.

Shop/Field Tools. This includes shop tools and equipment, hand tools, and miscellaneous field tools including pruning equipment and ladders. The cost is assumed and not based on any collected data.

Irrigation System. The drip system and labor for installing it are included in the costs. Also included are the filters, laterals, and booster pump.

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 a crop is produced, minus any returns. In this study, production begins the third year. The *Total Accumulated Net Cash Cost* in the third year shown in Table 1 represents the establishment cost per acre. The cost is \$4,609 per acre or \$161,315 for the 35 acres planted to olives. Establishment cost is amortized over the remaining 22 years that the orchard is assumed to be in production. Establishment cost is used to determine the non-cash overhead and orchard capital recovery expense for production years.

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 participated in the development of this study by providing specific costs and practices.

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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.

UC COOPERATIVE EXTENSION
Table 1. COSTS PER ACRE TO ESTABLISH A HIGH-DENSITY OLIVE ORCHARD
 SACRAMENTO VALLEY - 2011

	Cost Per Acre				
	Year:	1st	2nd	3rd	4th
	Tons:			0.50	2.40
Planting Costs:					
Land Prep: Subsoil 2X		225			
Land Prep: Stubble Disc 2X		25			
Land Prep: Finish Disc 4X		50			
Plant: Survey and Mark Orchard (GPS)		30			
Land Prep: Make Ridges		10			
Trellis: Materials & Labor (custom) & Plant		1,000			
Plant: Dig & Plant Trees (Replants in Yr 2)			0		
Tree: (202 trees)		1,212		24	
Plant: Wrap Trees (labor & wraps)		52		22	
TOTAL PLANTING COSTS		2,604	47		
Cultural Costs:					
Weed: Mow Middles 4X		28	28	28	28
Irrigate: (water & labor)		58	110	161	237
Fertilize: N (UN-32)		22	38	53	83
Train/Prune: (Yrs 1-3, train & tie trees. Yr 4+, prune)		26	24	11	174
Weed: Strip/Spot Spray (Roundup) 2X		28	28	28	28
Disease: Olive Knot & Peacock (Kocide) (Yr 1-3, fall. Yr 4, spring & fall)		32	32	32	65
Weed: Dormant Strip Spray (Goal, Roundup)		45	45	45	45
Prune: Shred Prunings (custom)					30
Insect: Olive Fruit Fly (traps & yeast bait)					26
Insect: Olive Fruit Fly (GF-120)					278
PCA					25
Pickup Use		10	10	10	10
ATV Use		8	8	8	8
TOTAL CULTURAL COSTS		258	324	376	1,036
Harvest Costs:					
Harvest Olives (Yr 3, hand. Yr 4, mechanical)				175	360
Transportation: Olives				6	29
TOTAL HARVEST COSTS				181	389
Interest On Operating Capital @ 5.75%		127	11	7	25
TOTAL OPERATING COSTS/ACRE		2,989	381	564	1,449
Cash Overhead Costs:					
Liability Insurance		17	17	17	17
Office Expense		186	186	186	186
Sanitation (portable toilets)		22	22	22	22
Property Taxes		93	93	93	93
Property Insurance		19	19	19	19
Investment Repairs		39	39	39	39
TOTAL CASH OVERHEAD COSTS		375	375	375	375
TOTAL CASH COSTS/ACRE		3,364	756	939	1,824
INCOME/ACRE FROM PRODUCTION				450	2,160
NET CASH COSTS/ACRE FOR THE YEAR		3,364	756	489	
ACCUMULATED NET CASH COSTS/ACRE		3,364	4,120	4,609	4,273
Non-Cash Overhead Costs (Capital Recovery):					
Shop Buildings		96	96	96	96
Fuel Tanks (gravity feed)		4	4	4	4
Land		326	326	326	326
Irrigation (drip system)		51	51	51	51
Shop/Pruning Tools		9	9	9	9
Equipment		196	196	196	196
TOTAL NON-CASH OVERHEAD		680	680	680	680
TOTAL COST/ACRE FOR THE YEAR		4,044	1,437	1,619	2,504
INCOME/ACRE FROM PRODUCTION				450	2,160
TOTAL NET COST/ACRE FOR THE YEAR		4,044	1,437	1,169	344
TOTAL ACCUMULATED NET COST/ACRE		4,044	5,481	6,650	6,994

UC COOPERATIVE EXTENSION
Table 2. COSTS PER ACRE TO PRODUCE TABLE OLIVES
 SACRAMENTO VALLEY 2011

Operation	Operation Time (Hrs/A)	Cash and Labor Costs per Acre					Total Cost	Your Cost
		Labor Cost	Fuel, Lube & Repairs	Material Cost	Custom/ Rent			
Cultural:								
Irrigate: (water & labor)	0.80	9	0	228	0	237		
Fertilize: Nitrogen (UN32)	0.80	9	0	74	0	83		
Disease: Olive & Peacock (Kocide)	0.85	15	14	36	0	65		
Prune: Hand (spring)	16.00	174	0	0	0	174		
Prune: Shred Prunings (custom)	0.00	0	0	0	30	30		
Insect: (McPhail Traps & Yeast) 20X	0.95	10	0	15	0	26		
Insect: Olive Fruit Fly (GF120) 20X	4.23	72	71	134	0	278		
Thin: Thin Fruit Spray (Liqui-Stik) (alt. yrs.)	0.21	4	4	41	0	49		
Weed: Strip or Spot Spray (Roundup) 2X	0.43	7	6	15	0	28		
Weed: Mow Middles 4X	0.79	14	14	0	0	28		
Weed: Dormant Strip (Goal, Roundup, Surflan)	0.22	4	3	76	0	83		
PCA	0.00	0	0	0	25	25		
Pickup Truck Use	0.41	7	3	0	0	10		
ATV Use	0.41	7	1	0	0	8		
TOTAL CULTURAL COSTS	26.10	331	117	620	55	1,123		
Harvest:								
Harvest (mechanical)	0.00				600	600		
Transport Olives	0.00				48	48		
TOTAL HARVEST COSTS	0.00	0	0	0	648	648		
Interest on operating capital @ 5.75%						26		
TOTAL OPERATING COSTS/ACRE		331	117	620	703	1,797		
Cash Overhead:								
Liability Insurance						17		
Office Expense						186		
Sanitation (field toilets)						22		
Property Taxes						116		
Property Insurance						36		
Investment Repairs						62		
TOTAL CASH OVERHEAD COSTS						439		
TOTAL CASH COSTS/ACRE						2,236		
NON CASH OVERHEAD (Capital Recovery):								
		Per producing Acre		Annual Cost Capital Recovery				
Buildings		1,266		96		96		
Fuel Tanks/Gravity Feed		57		4		4		
Land		6,857		326		326		
Irrigation Drip System		800		51		51		
Shop/Pruning Tools		100		9		9		
Olive Orchard Establishment		4,609		342		342		
Equipment		2,008		196		196		
TOTAL CAPITAL RECOVERY COSTS		15,698		1,022		1,022		
TOTAL COSTS/ACRE						3,259		

UC COOPERATIVE EXTENSION
Table 3. COSTS AND RETURNS PER ACRE TO PRODUCE TABLE OLIVES
 SACRAMENTO VALLEY 2011

	Quantity/Acre	Unit	Price or Cost/Unit	Value or Cost/Acre	Your Cost
GROSS RETURNS					
Table Olives	4.00	ton	900.00	3,600	
OPERATING COSTS					
Irrigation:					
Water	36.00	acin	6.33	228	
Fertilizer:					
UN32	100.00	lb N	0.74	74	
Herbicide:					
Surflan AS	2.66	pint	14.52	39	
Roundup UltraMax	2.76	pint	8.01	22	
Goal 2XL	1.85	pint	16.38	30	
Fungicide:					
Kocide 101	10.00	lb	3.62	36	
Insecticide/Traps/Bait:					
McPhail Trap	0.20	each	1.35	0	
Torula Yeast Tablet	0.60	lb	25.00	15	
GF-120	140.00	floz	0.96	134	
Thinning Aid:					
Liqui-Stik	36.00	floz	1.15	41	
Custom/Contract:					
Shred Prunings	1.00	acre	30.00	30	
Harvest (mechanical)	4.00	ton	150.00	600	
Haul Olives	4.00	ton	12.00	48	
Pest Control Adviser (PCA)	1.00	acre	25.00	25	
Labor (machine)	9.05	hrs	14.28	129	
Labor (non-machine)	18.55	hrs	10.88	202	
Fuel - Gas	0.95	gal	3.10	3	
Fuel - Diesel	27.28	gal	2.60	71	
Lube				11	
Machinery repair				32	
Interest on operating capital @ 5.75%				26	
TOTAL OPERATING COSTS/ACRE				1,797	
NET RETURNS ABOVE OPERATING COSTS				1,803	
CASH OVERHEAD COSTS:					
Liability Insurance				17	
Office Expense				186	
Sanitation (field toilets)				22	
Property Taxes				116	
Property Insurance				36	
Investment Repairs				62	
TOTAL CASH OVERHEAD COSTS/ACRE				439	
TOTAL CASH COSTS/ACRE				2,236	
CAPITAL RECOVERY COSTS (4.75% Interest Rate):					
Buildings				96	
Fuel Tanks/Gravity Feed				4	
Land				326	
Irrigation Drip System				51	
Shop/Pruning Tools				9	
Olive Orchard Establishment				342	
Equipment				196	
TOTAL CAPITAL RECOVERY COSTS/ACRE				1,022	
TOTAL COSTS/ACRE				3,259	
NET RETURNS ABOVE TOTAL COSTS				341	

UC COOPERATIVE EXTENSION
Table 4. MONTHLY PER ACRE CASH COSTS TO PRODUCE TABLE OLIVES
 SACRAMENTO VALLEY 2011

Beginning JAN 11	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	TOTAL
Ending DEC 11	11	11	11	11	11	11	11	11	11	11	11	11	
Cultural:													
Irrigate: (water & labor)			14	20	30	37	42	41	39	14			237
Fertilize: Nitrogen (UN32)			10	10	10	10	10	10	10	10			83
Disease: Olive & Peacock (Kocide)			32							32			65
Prune: Hand (spring)				174									174
Prune: Shred Prunings				30									30
Insect: (McPhail Traps & Yeast) 20X					10	3	3	3	3	3			26
Insect: Olive Fruit Fly (GF120) 20X					28	56	56	56	56	28			278
Thin: Thin Fruit Spray (Liqui-Stik) (alt. yrs.)					49								49
Weed: Strip or Spot Spray (Roundup) 2X					14				14				28
Weed: Mow Middles 4X						7	7	7	7				28
Weed: Dormant Strip (Goal, Roundup, Surflan)											83		83
PCA			3	3	3	3	3	3	3	3	3		25
Pickup Truck Use	1	1	1	1	1	1	1	1	1	1	1	1	10
ATV Use	1	1	1	1	1	1	1	1	1	1	1	1	8
TOTAL CULTURAL COSTS	2	2	61	239	145	118	122	121	134	92	87	2	1,123
Harvest:													
Harvest (mechanical)										600			600
Transport Olives										48			48
TOTAL HARVEST COSTS										648			648
Interest on operating capital @ 5.75%	0	0	0	1	2	3	3	4	5	8	0	0	26
TOTAL OPERATING COSTS/ACRE	2	2	61	240	147	120	126	125	138	748	87	2	1,797
CASH OVERHEAD:													
Liability Insurance	17												17
Office Expense	15	15	15	15	15	15	15	15	15	15	15	15	186
Sanitation (field toilets)			2	2	2	2	2	2	2	2	2		22
Property Taxes	58						58						116
Property Insurance	18						18						36
Investment Repairs	5	5	5	5	5	5	5	5	5	5	5	5	62
TOTAL CASH OVERHEAD COSTS	113	21	23	23	23	23	99	23	23	23	23	21	439
TOTAL CASH COSTS/ACRE	115	22	84	263	171	144	225	148	161	771	110	22	2,236

UC COOPERATIVE EXTENSION
Table 5. RANGING ANALYSIS
 SACRAMENTO VALLEY 2011

	Yield (tons/acre)						
	1.00	2.00	3.00	4.00	5.00	6.00	7.00
OPERATING COSTS/ACRE:							
Cultural Cost	1,123	1,123	1,123	1,123	1,123	1,123	1,123
Harvest Cost (pick & haul)	162	324	486	648	810	972	1134
Interest on operating capital @ 5.75%	24	24	25	26	27	28	28
TOTAL OPERATING COSTS/ACRE	1,309	1,471	1,634	1,797	1,960	2,123	2,285
TOTAL OPERATING COSTS/ton	1,309	736	545	449	392	354	326
CASH OVERHEAD COSTS/ACRE							
TOTAL CASH COSTS/ACRE	1,748	1,910	2,073	2,236	2,399	2,562	2,724
TOTAL CASH COSTS/ton	1,748	955	691	559	480	427	389
NON-CASH OVERHEAD COSTS/ACRE							
TOTAL COSTS/ACRE	2,771	2,933	3,096	3,259	3,422	3,585	3,747
TOTAL COSTS/ton	2,771	1,467	1,032	815	684	598	535

NET RETURNS ABOVE OPERATING COSTS

PRICE \$/ton	Yield (tons/acre)						
	1.00	2.00	3.00	4.00	5.00	6.00	7.00
600	-709	-271	166	603	1,040	1,477	1,915
700	-609	-71	466	1,003	1,540	2,077	2,615
800	-509	129	766	1,403	2,040	2,677	3,315
900	-409	329	1,066	1,803	2,540	3,277	4,015
1,000	-309	529	1,366	2,203	3,040	3,877	4,715
1,100	-209	729	1,666	2,603	3,540	4,477	5,415
1,200	-109	929	1,966	3,003	4,040	5,077	6,115

NET RETURNS ABOVE CASH COSTS

PRICE \$/ton	Yield (tons/acre)						
	1.00	2.00	3.00	4.00	5.00	6.00	7.00
600	-1,148	-710	-273	164	601	1,038	1,476
700	-1,048	-510	27	564	1,101	1,638	2,176
800	-948	-310	327	964	1,601	2,238	2,876
900	-848	-110	627	1,364	2,101	2,838	3,576
1,000	-748	90	927	1,764	2,601	3,438	4,276
1,100	-648	290	1,227	2,164	3,101	4,038	4,976
1,200	-548	490	1,527	2,564	3,601	4,638	5,676

NET RETURNS ABOVE TOTAL COSTS

PRICE \$/ton	Yield (tons/acre)						
	1.00	2.00	3.00	4.00	5.00	6.00	7.00
600	-2,171	-1,733	-1,296	-859	-422	15	453
700	-2,071	-1,533	-996	-459	78	615	1,153
800	-1,971	-1,333	-696	-59	578	1,215	1,853
900	-1,871	-1,133	-396	341	1,078	1,815	2,553
1,000	-1,771	-933	-96	741	1,578	2,415	3,253
1,100	-1,671	-733	204	1,141	2,078	3,015	3,953
1,200	-1,571	-533	504	1,541	2,578	3,615	4,653

UC COOPERATIVE EXTENSION
Table 6. COSTS AND RETURNS / BREAKEVEN ANALYSIS
 SACRAMENTO VALLEY 2011

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)
Table Olives	3,600	1,797	1,803	2,236	1,364	3,259	341

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)
Table Olives	126,000	62,908	63,092	78,269	47,731	114,056	11,944

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 -----					
Table Olives	4.0	ton	449.34	559.06	814.68

CROP	Yield Units	Base Price (\$/Unit)	----- Breakeven Yield To Cover -----		
			Operating Costs	Cash Costs	Total Costs
----- Yield Units /Acre -----					
Table Olives	ton	900	2.0	2.5	3.6

UC COOPERATIVE EXTENSION
Table 7. WHOLE FARM ANNUAL EQUIPMENT, INVESTMENT AND BUSINESS OVERHEAD COSTS
 SACRAMENTO VALLEY 2011

ANNUAL EQUIPMENT COSTS

Yr	Description	Price	Yrs Life	Salvage Value	Capital Recovery	- Cash Overhead -		Total
						Insur- ance	Taxes	
11	75HP 4WD Tractor	48,103	16	8,616	3,988	220	284	4,492
11	ATV 4WD	7,942	7	3,013	987	42	55	1,084
11	Mower-Flail 9'	9,882	10	1,748	1,124	45	58	1,227
11	Orchard Sprayer 250 gal	21,102	20	1,100	1,623	86	111	1,820
11	Pickup -1/2 ton	26,190	7	9,935	3,256	140	181	3,576
11	Weed Sprayer 100 gal	3,947	10	698	449	18	23	490
TOTAL		117,166		25,110	11,427	551	711	12,689
60% of New Cost *		70,300		15,066	6,856	331	427	7,614

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

ANNUAL INVESTMENT COSTS

Description	Price	Yrs Life	Salvage Value	Capital Recovery	Cash Overhead			Total
					Insur- ance	Taxes	Repairs	
INVESTMENT								
Buildings (400 sqft)	44,315	20	4,432	3,343	189	244	731	4,507
Orchard Establishment	161,315	22		11,977	625	807	806	14,215
Fuel Tanks (gravity feed)	2,000	30		126	8	10	40	184
Irrigation System	28,000	30		1,770	109	140	560	2,578
Land	240,000	40	240,000	11,400	0	2,400	0	13,800
Shop/Pruning Tools	3,500	15	350	315	15	19	47	396
TOTAL INVESTMENT	479,130		244,782	28,932	945	3,620	2,184	35,681

ANNUAL BUSINESS OVERHEAD COSTS

Description	Units/ Farm	Unit	Price/ Unit	Total Cost
Liability Insurance	35	acre	16.77	587
Office Expense	35	acre	185.71	6,500
Sanitation (Toilets)	35	acre	21.94	768

UC COOPERATIVE EXTENSION
Table 8. HOURLY EQUIPMENT COSTS
 SACRAMENTO VALLEY 2011

Yr	Description	COSTS PER HOUR							
		Actual Hours Used	Cash Overhead			Operating			Total Costs/Hr
			Capital Recovery	Insur- ance	Taxes	Repairs	Fuel & Lube	Total Oper.	
11	75HP 4WD Tractor	259	9.23	0.51	0.66	1.22	11.01	12.23	22.63
11	ATV 4WD	14	41.57	1.79	2.31	0.59	2.38	2.97	48.64
11	Mower-Flail 9'	28	24.32	0.98	1.26	4.16	0.00	4.16	30.72
11	Orchard Sprayer 250 gal	185	5.26	0.28	0.36	3.43	0.00	3.43	9.33
11	Pickup -1/2 ton	14	137.08	5.89	7.61	1.94	5.94	7.88	158.46
11	Weed Sprayer 100 gal	23	11.81	0.47	0.61	1.06	0.00	1.06	13.95

UC COOPERATIVE EXTENSION
Table 9. OPERATIONS WITH EQUIPMENT & MATERIALS
 SACRAMENTO VALLEY 2011

Operation	Month	Tractor	Implement	Labor Hrs/Acre	Material	Broadcast Rate/Acre	Material Unit	
Cultural:								
Prune	March	Labor		16.00				
Insect: Olive Fly (alternate row every week)	May	75 HP	Orchard Sprayer		GF120	14.00	floz	
	June	75 HP	Orchard Sprayer		GF120	14.00	floz	
	July	75 HP	Orchard Sprayer		GF120	14.00	floz	
	August	75 HP	Orchard Sprayer		GF120	14.00	floz	
	September	75 HP	Orchard Sprayer		GF120	14.00	floz	
	October	75 HP	Orchard Sprayer		GF120	14.00	floz	
Insect Olive Fly (all rows)	November	75HP	Orchard Sprayer		GF120	14.00	floz	
Insect: McPhail Traps	May	Labor		0.70	McPhail Trap	0.20	each	
					Torula Yeast	0.10	lb	
	June	Labor		0.10	Torula Yeast	0.10	lb	
	July	Labor		0.10	Torula Yeast	0.10	lb	
	August	Labor		0.10	Torula Yeast	0.10	lb	
	September	Labor		0.10	Torula Yeast	0.10	lb	
	October	Labor		0.10	Torula Yeast	0.10	lb	
	Irrigate	March	Labor		0.10	Water	2.00	acin
		April	Labor		0.10	Water	3.00	acin
		May	Labor		0.10	Water	4.50	acin
June		Labor		0.10	Water	5.75	acin	
July		Labor		0.10	Water	6.50	acin	
August		Labor		0.10	Water	6.25	acin	
September		Labor		0.10	Water	6.00	acin	
October		Labor		0.10	Water	2.00	acin	
Fertilize: N through drip		March	Labor			UN32	12.50	lbs
		April	Labor			UN32	12.50	lbs
	May	Labor			UN32	12.50	lbs	
	June	Labor			UN32	12.50	lbs	
	July	Labor			UN32	12.50	lbs	
	August	Labor			UN32	12.50	lbs	
	September	Labor			UN32	12.50	lbs	
	October	Labor			UN32	12.50	lbs	
	Prune: Shred Prunings	April	Custom					
	Weed: Mow Middles 4X	June	75HP	Mower Flail				
July		75HP	Mower Flail					
August		75HP	Mower Flail					
September		75HP	Mower Flail					
Weed: Strip or Spot Spray	May	75HP	Weed Sprayer		Roundup	0.92	pint	
	September	75HP	Weed Sprayer		Roundup	0.92	pint	
Harvest: Mechanical	October	Contract						
Transportation: Olives	October	Contract						
Weed: Dormant Strip	November	75HP	Weed Sprayer		Goal	1.85	pint	
					Roundup	0.92	pint	
					Surflan	2.86	pint	
Disease: Peacock Spot & Olive Knot	March	75HP	Weed Sprayer		Kocide 101	5.00	lb	
	October	75HP	Weed Sprayer		Kocide 101	5.00	lb	
Thinning Spray (alternate years)	May	75HP	Orchard Sprayer		Liqui-Stik	36	floz	