
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 SACRAMENTO 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 Sacramento Valley of California are presented in this study. The super-high density system is 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 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, 530-752-2414 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 San Joaquin 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 Sacramento Valley of California. The super-high density system 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 120 acres of land. The olive orchard is established on 110 acres and the remaining 10 acres are used for roads, the irrigation system, unused land, and farmstead. In the Sacramento Valley property costs for land used to grow olives for oil production range from \$4,000 to \$5,000 per acre. In this study \$5,000 per acre is used.

Trees. The cost of trees for this study is \$4.00 per tree. Costs will vary depending on variety, tree size, and quantity purchased. A more inclusive list of oil producing varieties and their characteristics can be found in the *Olive Production Manual*. Olive oil cultivars will produce 30 to 50 gallons of oil per ton. Super-high density olive trees can be planted at spacings ranging from 3' within the row to 14' between rows. The most common spacings are 4' X 12' and 5' X 13'. This study uses trees planted on a 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 25 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 \$75.96 per acre-foot. Irrigation rates, shown in Table A, increase each year as the orchard develops vegetatively up through year four. Once mature (trees have filled their allotted space), water use declines under controlled deficit irrigation strategy that is used to manage growth and control fruit moisture content. Because the orchard is planted on uneven ground and not leveled, water is delivered to the orchard by driplines to two, one gallon per hour emitters per tree. For irrigation purposes, the orchard is made up of two 55 acre blocks for irrigation efficiency and management. The cost of the irrigation system is in the Non-Cash Overhead Costs section of this study.

Table A. Annual water applications

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

Labor. Labor rates of \$14.14 per hour for machine operators and \$10.96 for general labor includes payroll overhead of 37%. The basic hourly costs for labor are \$10.32 for machine operators and for \$8.00 general labor. The current minimum wage is \$7.50 per hour. On January 1, 2008 it will increase to \$8.00 per hour and this cost study uses the wage increase to account for a known cost change. 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). 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 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 more passes are made with a finishing disc to further reduce the dirt clod size and smooth the surface. Custom operators perform the subsoiling and discing 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 so the tree rows are in a north to south orientation. The drip irrigation system is laid on the ground. Seven-foot bamboo stakes are placed in the ground where the trees will be planted. The holes are dug and the trees planted. Later the trees are tied with green tape to the bamboo stakes. The trees are spaced 5 feet in-row by 13 feet between rows or 670 trees per acre. Trees that die are replanted in the first year. It is estimated that two percent of the trees will need to be replaced in the 2nd year.

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

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

First Year. 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 18 to 21 inches are removed.

Third Year. Suckers and branches originating below 18 to 21 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, but are removed in the fourth year to avoid excessive shading.

Fourth Year. Regular spring (April) pruning begins in the fourth year. Side branches larger than about ½ inch in diameter are removed with hand shears. Suckers and any shoots arising from below about 18 to 21 inches are pruned off. 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. Also beginning in the fourth year trees are topped at seven feet in the summer with a hedging machine to maintain a height of about 8-10 feet for the mechanical harvester.

Insect and Disease Management. Copper sprays are used to prevent 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 one in March and one in November. Control of insects and other

diseases during the orchard establishment period in olive orchards are normally minimal. Rarely, black scale control may be needed. The olive fruit fly has not become a significant pest in super-high density orchards as it has in other orchards, but olive orchards should be monitored for flies to indicate need for treatments. No sprays are made for olive fruit fly in this study.

Weed Management. Orchard floors are managed differently within and between the tree rows. Resident vegetation is allowed to grow between the tree rows to maintain a cover crop. This vegetation in the row middles is mowed four times during the growing season in all years, starting in the first year.

Immediately after planting a strip application of Surflan and Goal is applied to prevent weed germination within the tree row, two feet out on each side of the trees. This will effectively prevent the growth of most weeds, but will not cause phytotoxicity if there is some contact with the young trees. Four-foot wide strip sprays with Roundup are usually necessary within the tree row to clean up later emerging weeds during the growing season. When the trees get larger and older the strip spray treatment includes an application of Surflan alone in the spring. Roundup at low rates on very small weeds is used by itself during the summer until harvest (at higher rates, milk cartons should be used to protect the trees from spray contact). An application of Goal plus 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. (see table B).

Year	Weed control	
	Mowing	Herbicide treatments
1	Mow 4X	Strip spray: Surflan + Goal 1X Strip spray: Roundup 4X
2+	Mow 4X	Strip spray: Surflan 1X Strip spray: Roundup 3X Strip spray: Goal + Roundup 1X

Fertilization. Nitrogen is the major nutrient required for proper tree growth and optimum yields. Young trees receive liquid nitrogen fertilizer through the drip irrigation system at increasing rates during orchard establishment as shown in Table C. Rates are for actual nitrogen and K₂O. In the first two years the nitrogen is delivered as CAN 17. Amount of material applied depends on the percentage of actual nitrogen in each product and need, as determined by annual tissue (leaf) analysis. 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 per acre every other year.

Year	Range of N	N	K ₂ O
1	60 – 77	60	0
2	60 – 80	70	0
3	80 – 105	80	0
4+	80 – 105	80	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 \$5,680 per acre or \$624,800 for the 110 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.

PRODUCTION CULTURAL PRACTICES AND MATERIAL INPUTS

Pruning. Pruning manipulates tree growth to facilitate mechanical harvest and to maintain fruit production. Hand pruning, topping, and skirt pruning are done every year. The prunings are placed in the row middles and shredded. All skirt pruning and topping are contracted.

Fertilization. A combination of fertilizers is used to apply 80 to 120 pounds of actual nitrogen per acre to the trees through the drip irrigation system. Actual rates should be determined by annual tissue (leaf) analysis. Potassium as potassium sulfate is dissolved in water and injected through the drip system 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 in the fall or winter with multiple applications of a contact herbicide and one spot spray during the growing season. Row middles are mowed four times during the spring and summer.

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

Disease Management. Verticillium wilt kills olive trees. Olive orchards should not be planted on ground with a history of Verticillium wilt problems or that has recently been farmed to cotton or other Verticillium hosts. To prevent the 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.

Harvest. Harvest starts in the third year and is done by a contracted harvesting company. Costs for contracted harvest operations are set by various terms and can range from \$250 to \$385 per acre. In this study, a rate of \$300 per acre is charged. A hauling cost to the grower is also charged by a separate company. 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. An over-the-row harvester is employed to shake fruit off the trees and convey olives into field bins. Harvested olives are taken straight from the field for immediate processing. Care must be taken when harvesting olives so that the skin of the fruit is not broken nor the flesh excessively bruised.

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 and oil yields per acre

Year	Tons of fruit (Fresh weight)	Range of oil (Gallons) <small>per acre</small>	Oil extracted (Gallons)
3	2.7	108 – 119	113.4
4	4.0	160 – 176	168.0
5+	5.0	200 – 220	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. The value of raw olives on the farm depends primarily on the variety and the condition of the fruit.

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 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

(All Tables)

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.

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 \$661 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, etc.

Sanitation Services. Sanitation services provide portable toilets for the orchard and cost the farm \$399 annually. The cost includes a double toilet, delivery and 3 months of weekly service.

NON-CASH OVERHEAD COSTS

(Tables 1-3 and 5-9)

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, even though land values will probably rise considerably over the 25 year life span of the orchard.

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, 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.

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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.

Table 1.

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

Labor Rate: \$14.14/hr. machine labor
 \$10.96/hr. non-machine labor

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

Year	Cost Per Acre			
	1st	2nd	3rd	4th
Tons Per Acre			2.7	4.0
Gallons Per Acre			113.4	168.0
Planting Costs:				
Land Preparation - Subsoil: Contract	200			
Land Preparation - Stubble Disc 2X	20			
Land Preparation - Finish Disc 2X	20			
Land Preparation - Pull Ridges	10			
Survey, Mark, Dig & Plant Orchard	84			
Trees: 670 Per Acre	2,680			
Wrap Trees	113			
Install Trellis System	510			
Replant (2% in 2nd year)	0	75		
TOTAL PLANTING COSTS	3,637	75	0	0
Cultural Costs:				
Weed Control - Pre-emergent Spray	65			
Winter/Spring Pruning/Sucker/Training	132	88	22	132
Irrigate	59	110	161	237
Fertilize - Nitrogen	56	62	46	46
Fertilize - Potassium (Every Other Year Starting 4th Year)				35
Weed Control - Spray Tree Rows 4X	55	55	55	55
Weed Control - Mow Middles 4X	20	26	26	26
Pest Control - Olive Knot & Peacock Spot Spray	24	48	48	48
Weed Control - Spot Spray		5	5	5
Skirt Prune Trees (Every Year Starting 4th Year)				45
Top Prune Trees (Every Year Starting 4th Year)				20
Pickup Truck Use	63	63	63	63
ATV Use	51	51	51	51
TOTAL CULTURAL COSTS	525	508	477	763
Harvest Costs:				
Harvest - Over-The-Row Machine			300	300
Haul Fruit			53	78
TOTAL HARVEST COSTS			353	378
Postharvest Costs:				
Disease Control - Olive Knot & Peacock Spray	24	48	48	48
Weed Control - Dormant Strip Spray	71	71	71	71
TOTAL POSTHARVEST COSTS	95	119	119	119
Interest On Operating Capital @ 10.00%	379	26	23	32
TOTAL OPERATING COSTS/ACRE	4,636	728	972	1,292
Cash Overhead Costs:				
Liability Insurance	6	6	6	6
Office Expense	59	59	59	59
Sanitation Fees	4	4	4	4
Property Taxes	66	66	66	94
Property Insurance	47	47	47	67
Investment Repairs	53	53	53	53
TOTAL CASH OVERHEAD COSTS	235	235	235	283
TOTAL CASH COSTS/ACRE	4,871	963	1,207	1,575
INCOME/ACRE FROM PRODUCTION			1,361	2,016
NET CASH COSTS/ACRE FOR THE YEAR	4,871	963	0	0
PROFIT/ACRE ABOVE CASH COSTS			154	441
ACCUMULATED NET CASH COSTS/ACRE	4,871	5,834	5,680	5,239

U.C. COOPERATIVE EXTENSION
Table 1. continued

Year	Cost Per Acre			
	1st	2nd	3rd	4th
Tons Per Acre			2.7	4.0
Gallons Per Acre			113.4	168.0
Capital Recovery Cost:				
Shop Building - 1,800 SqFt	35	35	35	35
Super-High Density Olive Orchard Establishment				524
Fuel Tanks: 1-100 & 1-250 Gallon	4	4	4	4
Land @ \$5,000 Per Acre	363	363	363	363
Drip Irrigation System	142	142	142	142
Shop Tools	3	3	3	3
Equipment	77	78	78	78
TOTAL CAPITAL RECOVERY COST	624	625	625	1,149
TOTAL COST/ACRE FOR THE YEAR	5,495	1,588	1,898	2,724
INCOME/ACRE FROM PRODUCTION			1,361	2,016
TOTAL NET COST/ACRE FOR THE YEAR	5,495	1,588	537	708
TOTAL ACCUMULATED NET COST/ACRE	5,495	7,083	7,620	8,262

Table 2.

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

Labor Rate: \$14.14/hr. machine labor
 \$10.96/hr. non-machine labor

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

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	0.80	9	0	152	0	161		
Fertilizer - Nitrogen	0.80	9	0	37	0	46		
Fertilizer - Potassium	0.80	9	0	13	0	22		
Spring Pruning	20.00	219	0	0	0	219		
Weed Control - Strip Spray 4X	1.09	18	14	37	0	69		
Weed Control - Mow Middles 4X	0.79	13	13	0	0	26		
Disease Control - Olive Knot & Peacock Spray	0.35	6	6	36	0	48		
Weed Control - Spot Spray	0.22	4	3	1	0	7		
Skirt Prune Trees (Every Year Starting 4th Year)	0.00	0	0	0	45	45		
Top Prune Trees (Every Year Starting 4th Year)	0.00	0	0	0	20	20		
Pickup Truck Use	2.59	44	19	0	0	63		
ATV Use	2.59	44	7	0	0	51		
TOTAL CULTURAL COSTS	30.03	375	61	276	65	777		
Harvest:								
Harvest - Over-The-Row Machine	0.00	0	0	0	300	300		
Haul Fruit to Processor	0.00	0	0	0	98	98		
TOTAL HARVEST COSTS	0.00	0	0	0	397	397		
Postharvest:								
Disease Control - Olive Knot & Peacock Spray	0.35	6	6	36	0	48		
Weed Control - Residual Weed Spray	0.22	4	3	65	0	71		
TOTAL POSTHARVEST COSTS	0.57	10	8	101	0	119		
Interest on Operating Capital @ 10.00%						47		
TOTAL OPERATING COSTS/ACRE		385	70	377	463	1,340		
CASH OVERHEAD:								
Liability Insurance						6		
Office Expense						59		
Sanitation Fee						4		
Property Taxes						94		
Property Insurance						67		
Investment Repairs						53		
TOTAL CASH OVERHEAD COSTS						283		
TOTAL CASH COSTS/ACRE						1,623		
NON-CASH OVERHEAD:								
Investment		Per producing		-- Annual Cost --				
		<u> Acre</u>		<u>Capital Recovery</u>				
Shop Building - 1,800 SqFt		403		35		35		
SHD Olive Orchard Establishment Cost		5,680		524		524		
Fuel Tanks: 1-100 & 1-250 Gallon		44		4		4		
Land @ \$5,000 Per Acre		5,000		363		363		
Drip Irrigation System		1,645		142		142		
Shop Tools		32		3		3		
Equipment		639		74		74		
TOTAL NON-CASH OVERHEAD COSTS		13,443		1,140		1,150		
TOTAL COSTS/ACRE						2,773		

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 FOR OLIVES FOR OIL					
Tons Per Acre or	5.0	Ton	504.00		
Gallons Per Acre	210.0	Gal	12.00	<u>2,520</u>	
TOTAL GROSS RETURNS FOR OLIVES FOR OIL				<u>2,520</u>	
OPERATING COSTS					
Water:					
Water - Pumped	24.00	AcIn	6.33	152	
Fertilizer:					
UN-32	80.00	Lb N	0.461	37	
Potassium Sulfate	75.04	Lb	0.174	13	
Herbicide:					
Roundup Ultra Max	5.52	Pint	8.01	44	
Prowl	0.20	Pint	4.62	1	
Surflan AS	1.85	Pint	14.52	27	
Goal 2 XL	1.85	Pint	16.38	30	
Fungicide:					
Kocide 101	20.00	Lb	3.62	72	
Custom:					
Skirt Pruning	1.00	Acre	45.00	45	
Top Pruning	1.00	Acre	20.00	20	
Hauling	5.00	Ton	19.50	98	
Contract:					
Harvest-Mechanical	1.00	Acre	300.00	300	
Labor (machine)	9.84	Hrs	14.14	139	
Labor (non-machine)	22.40	Hrs	10.96	246	
Fuel - Gas	6.05	Gal	2.80	17	
Fuel - Diesel	12.22	Gal	2.30	28	
Lube				7	
Machinery repair				18	
Interest on Operating Capital @ 10.00%				<u>47</u>	
TOTAL OPERATING COSTS/ACRE				<u>1,340</u>	
NET RETURNS ABOVE OPERATING COSTS				<u>1,180</u>	
CASH OVERHEAD COSTS:					
Liability Insurance				6	
Office Expense				59	
Sanitation Fee				4	
Property Taxes				94	
Property Insurance				67	
Investment Repairs				<u>53</u>	
TOTAL CASH OVERHEAD COSTS/ACRE				<u>283</u>	
TOTAL CASH COSTS/ACRE				<u>1,623</u>	
NON-CASH OVERHEAD COSTS (CAPITAL RECOVERY):					
Buildings: 1,800 SqFt				35	
SHD Olive Orchard Establishment Cost				524	
Fuel Tanks: 1-100 & 1-250 Gallon				4	
Land @ \$5,000 Per Acre				363	
Drip Irrigation System				142	
Shop Tools				3	
Equipment				<u>80</u>	
TOTAL NON-CASH OVERHEAD COST/ACRE				<u>1,150</u>	
TOTAL COSTS/ACRE				<u>2,773</u>	
NET RETURNS ABOVE TOTAL COSTS				<u>-253</u>	

Table 4.

UC COOPERATIVE EXTENSION
MONTHLY CASH COSTS to PRODUCE 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:													
Irrigate			7	14	26	33	30	30	14	7			161
Fertilizer - Nitrogen			6	6	6	6	6	6	6	6			46
Fertilizer - Potassium			3	3	3	3	3	3	3	3			22
Spring Pruning				219									219
Weed Control – Strip Spray 4X				14	14	14	14		14				69
Weed Control – Mow Middles 4X				7	7	7			7				26
Disease Control – Olive Knot & Peacock Spray				48									48
Weed Control - Spot Spray					7								7
Mechanically Skirt Prune Trees - Every Year							45						45
Mechanically Top Prune Trees - Every Year							20						20
Pickup Truck Use	5	5	5	5	5	5	5	5	5	5	5	5	63
ATV Use	<u>4</u>	<u>4</u>	<u>4</u>	<u>4</u>	<u>4</u>	<u>4</u>	<u>4</u>	<u>4</u>	<u>4</u>	<u>4</u>	<u>4</u>	<u>4</u>	<u>51</u>
TOTAL CULTURAL COSTS	9	9	25	319	72	71	126	47	52	25	9	9	777
Harvest:													
Harvest - Over-The-Row Machine										150	150		300
Haul Fruit to Processor										<u>49</u>	<u>49</u>		<u>98</u>
TOTAL HARVEST COSTS										199	199		397
Postharvest:													
Disease Control – Olive Knot & Peacock Spray											50		50
Weed Control - Residual Weed Spray											<u>71</u>		<u>71</u>
TOTAL POSTHARVEST COSTS											121		121
Interest on Operating Capital @ 10.00%	0	0	0	3	4	4	5	6	6	8	11	0	47
TOTAL OPERATING COSTS/ACRE	10	10	26	322	76	75	132	53	58	232	338	9	1,340
OVERHEAD:													
Liability Insurance	6												6
Office Expense			7	7	7	7	7	7	7	7	7		59
Sanitation Fee		4											4
Property Taxes	47						47						94
Property Insurance	34						34						67
Investment Repairs	<u>4</u>	<u>4</u>	<u>4</u>	<u>4</u>	<u>4</u>	<u>4</u>	<u>4</u>	<u>4</u>	<u>4</u>	<u>4</u>	<u>4</u>	<u>4</u>	<u>53</u>
TOTAL CASH OVERHEAD COSTS	91	8	11	11	11	11	92	11	11	11	11	4	283
TOTAL CASH COSTS/ACRE	100	18	37	333	87	86	223	64	69	243	349	14	1,623

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	75HP 4WD 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 - 500 Gallon	23,576	10	4,169	3,097	99	139	3,335
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		119,640		28,179	14,692	528	739	15,959
60% of New Cost *		71,784		16,907	8,815	317	443	9,575

* 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								
Buildings: 1,800 SqFt	44,315	25	4,432	3,821	174	244	731	4,970
SHD Olive Orchard Establishment Cost	624,800	22		57,662	2,231	3,124	0	63,016
Fuel Tanks: 1-100 & 1-250 Gallon	4,817	25	482	415	19	26	80	541
Drip Irrigation System	181,000	25	18,100	15,607	711	996	4,978	22,291
Land @ \$5,000 Per Acre	600,000	25	600,000	43,500	4,284	6,000	0	53,784
Shop Tools	3,500	25	350	302	14	19	47	382
TOTAL INVESTMENT	1,458,432		623,364	121,307	7,433	10,409	5,836	144,984

ANNUAL BUSINESS OVERHEAD COSTS				
Description	Units/ Farm	Unit	Price/ Unit	Total Cost
Liability Insurance	120	Acre	5.51	661
Office Expense	110	Acre	59.09	6,500
Sanitation Fee	110	Acre	3.63	399

Table 6.

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

Description	COSTS PER HOUR							Total Costs/Hr.
	Actual	- Cash Overhead -			----- Operating -----		Total Oper.	
	Hours Used	Capital Recovery	Insur- ance	Taxes	Repairs	Fuel & Lube		
75HP 4WD Tractor	365.1	8.01	0.33	0.47	1.13	9.74	10.87	19.68
ATV 4WD	284.9	2.40	0.08	0.12	0.58	2.15	2.73	5.33
Mower - Flail 9'	87.1	8.94	0.29	0.40	4.03	0.00	4.03	13.66
Orchard Sprayer - 500 Gallon	77.7	23.93	0.77	1.07	3.94	0.00	3.94	29.71
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	167.1	1.86	0.06	0.08	1.04	0.00	1.04	3.05

Table 7.

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

	YIELD(TONS/ACRE)						
	3.5	4.0	4.5	5.0	5.5	6.0	6.5
OPERATING COSTS/ACRE:							
Cultural Cost	777	777	777	777	777	777	777
Harvest Cost	368	386	388	397	407	417	427
Postharvest Cost	119	119	119	119	119	119	119
Interest on Operating Capital	47	47	47	47	47	47	47
TOTAL OPERATING COSTS/ACRE	1,311	1,328	1,330	1,340	1,350	1,360	1,370
TOTAL OPERATING COSTS/TON	374	302	296	268	245	227	211
CASH OVERHEAD COSTS/ACRE							
TOTAL CASH COSTS/ACRE	1,593	1,611	1,613	1,623	1,633	1,643	1,653
TOTAL CASH COSTS/TON	455	366	358	325	297	274	254
NON-CASH OVERHEAD COSTS/ACRE							
TOTAL COSTS/ACRE	2,743	2,761	2,763	2,773	2,783	2,793	2,803
TOTAL COSTS/TON	784	628	614	555	506	465	431

NET RETURNS PER ACRE ABOVE OPERATING COSTS FOR SUPER-HIGH DENSITY 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							
378.00	12	335	371	550	729	908	1,087
420.00	159	520	560	760	960	1,160	1,360
462.00	306	704	749	970	1,191	1,412	1,633
504.00	453	889	938	1,180	1,422	1,664	1,906
546.00	600	1,074	1,127	1,390	1,653	1,916	2,179
588.00	747	1,259	1,316	1,600	1,884	2,168	2,452
630.00	894	1,444	1,505	1,810	2,115	2,420	2,725

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							
378.00	-270	52	88	267	446	625	804
420.00	-123	237	277	477	677	877	1,077
462.00	24	422	466	687	908	1,129	1,350
504.00	171	607	655	897	1,139	1,381	1,623
546.00	318	791	844	1,107	1,370	1,633	1,896
588.00	465	976	1,033	1,317	1,601	1,885	2,169
630.00	612	1,161	1,222	1,527	1,832	2,137	2,442

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							
378.00	-1,420	-1,098	-1,062	-883	-704	-525	-346
420.00	-1,273	-913	-873	-673	-473	-273	-73
462.00	-1,126	-728	-684	-463	-242	-21	200
504.00	-979	-543	-495	-253	-11	231	473
546.00	-832	-359	-306	-43	220	483	746
588.00	-685	-174	-117	167	451	735	1,019
630.00	-538	11	72	377	682	987	1,292

Table 8.

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

	YIELD (GALLONS/ACRE)						
	147.9	168.0	189.0	210.0	231.0	252.0	273.0
OPERATING COSTS/ACRE:							
Cultural Cost	777	777	777	777	777	777	777
Harvest Cost	368	378	388	397	407	417	427
Postharvest Cost	119	119	119	119	119	119	119
Interest on Operating Capital	47	47	47	47	47	47	47
TOTAL OPERATING COSTS/ACRE	1,311	1,321	1,330	1,340	1,350	1,360	1,370
TOTAL OPERATING COSTS/GALLON	8.92	7.86	7.04	6.38	5.85	5.40	5.02
CASH OVERHEAD COSTS/ACRE	282	282	282	282	282	282	282
TOTAL CASH COSTS/ACRE	1,593	1,603	1,613	1,623	1,633	1,643	1,652
TOTAL CASH COSTS/GALLON	10.84	9.54	8.53	7.73	7.07	6.52	6.05
NON-CASH OVERHEAD COSTS/ACRE	1,151	1,151	1,151	1,151	1,151	1,151	1,151
TOTAL COSTS/ACRE	2,744	2,754	2,764	2,774	2,784	2,794	2,804
TOTAL COSTS/GALLON	18.67	16.39	14.62	13.21	12.05	11.09	10.27

NET RETURNS PER ACRE ABOVE OPERATING COSTS FOR SUPER-HIGH DENSITY OLIVES FOR OIL

PRICE (DOLLARS/GALLON)	YIELD (GALLONS/ACRE)						
	147.9	168.0	189.0	210.0	231.0	252.0	273.0
Olive Oil							
9.00	12	191	371	550	729	908	1,087
10.00	159	359	560	760	960	1,160	1,360
11.00	306	527	749	970	1,191	1,412	1,633
12.00	453	695	938	1,180	1,422	1,664	1,906
13.00	600	863	1,127	1,390	1,653	1,916	2,179
14.00	747	1,031	1,316	1,600	1,884	2,168	2,452
15.00	894	1,199	1,505	1,810	2,115	2,420	2,725

NET RETURNS PER ACRE ABOVE CASH COSTS TO PRODUCE OLIVES FOR OIL

PRICE (DOLLARS/GALLON)	YIELD (GALLONS/ACRE)						
	147.9	168.0	189.0	210.0	231.0	252.0	273.0
Olive Oil							
9.00	-270	52	88	267	446	625	804
10.00	-123	237	277	477	677	877	1,077
11.00	24	422	466	687	908	1,129	1,350
12.00	171	607	655	897	1,139	1,381	1,623
13.00	318	791	844	1,107	1,370	1,633	1,896
14.00	465	976	1,033	1,317	1,601	1,885	2,169
15.00	612	1,161	1,222	1,527	1,832	2,137	2,442

NET RETURNS PER ACRE ABOVE TOTAL COSTS TO PRODUCE OLIVES FOR OIL

PRICE (DOLLARS/GALLON)	YIELD (GALLONS/ACRE)						
	147.9	168.0	189.0	210.0	231.0	252.0	273.0
Olive Oil							
9.00	-1,420	-1,098	-1,062	-883	-704	-525	-346
10.00	-1,273	-913	-873	-673	-473	-273	-73
11.00	-1,126	-728	-684	-463	-242	-21	200
12.00	-979	-543	-495	-253	-11	231	473
13.00	-832	-359	-306	-43	220	483	746
14.00	-685	-174	-117	167	451	735	1,019
15.00	-538	11	72	377	682	987	1,292

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	1,344	1,176	1,627	893	2,771	-251

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	277,200	147,893	129,307	178,950	98,250	304,791	-27,591

BREAKEVEN PRICES PER TON					
CROP	Base Yield (Units/Acre)	Yield Units	Breakeven Price to Cover		
			Operating Costs	Cash Costs	Total Costs
Olives for Oil	5.0	Ton	268.90	325.36	554.17

BREAKEVEN TONS PER ACRE					
CROP	Yield Units	Base Price (\$/Unit)	Breakeven Yield to Cover		
			Operating Costs	Cash Costs	Total Costs
Olives for Oil	Ton	504.00	2.7	3.2	5.5

BREAKEVEN PRICES PER GALLON					
CROP	Base Yield (Units/Acre)	Yield Units	Breakeven Price to Cover		
			Operating Costs	Cash Costs	Total Costs
Olives for Oil	210.0	Gallon	6.38	7.73	13.21

BREAKEVEN GALLONS PER ACRE					
CROP	Yield Units	Base Price (\$/Unit)	Breakeven Yield to Cover		
			Operating Costs	Cash Costs	Total Costs
Olives for Oil	Gallon	12.00	111.7	135.2	231.2

Table 10.

UC COOPERATIVE EXTENSION
DETAIL BY OPERATION
SACRAMENTO VALLEY - 2007
ARBEQUINA VARIETY

Operation	Operation Month	Tractor/ Power Unit	Implement	Material	Broadcast Rate/acre	Material Unit
Cultural:						
Irrigate	March			Water	1.00	AcIn
	April			Water	2.00	AcIn
	May			Water	4.00	AcIn
	June			Water	5.00	AcIn
	July			Water	4.50	AcIn
	August			Water	4.50	AcIn
	September			Water	2.00	AcIn
	October			Water	1.00	AcIn
Fertilizer - Nitrogen - Injected into Irrigation System	March			UN-32	10.00	Lbs
	April			UN-32	10.00	Lbs
	May			UN-32	10.00	Lbs
	June			UN-32	10.00	Lbs
	July			UN-32	10.00	Lbs
	August			UN-32	10.00	Lbs
	September			UN-32	10.00	Lbs
	October			UN-32	10.00	Lbs
Fertilizer - Potassium - Every Other Year - Injected into Irrigation System	March			Potassium sulfate	9.38	Lbs
	April			Potassium sulfate	9.38	Lbs
	May			Potassium sulfate	9.38	Lbs
	June			Potassium sulfate	9.38	Lbs
	July			Potassium sulfate	9.38	Lbs
	August			Potassium sulfate	9.38	Lbs
	September			Potassium sulfate	9.38	Lbs
	October			Potassium sulfate	9.38	Lbs
Spring Pruning	April	Labor				
Weed Control - Strip Spray 4X	April	75 HP 4WD Tractor	Weed Sprayer - 100 Gallon	Roundup Ultra Max	0.92	Pint
	May	75 HP 4WD Tractor	Weed Sprayer - 100 Gallon	Roundup Ultra Max	0.92	Pint
	July	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'			
	September	75 HP 4WD Tractor	Mower - Flail 9'			
Disease Control - Olive Knot & - Peacock Spot Spray 2X	April	75 HP 4WD Tractor	Orchard Sprayer - 500 Gallon	Kocide 101	10.00	Lbs
	November	75 HP 4WD Tractor	Orchard Sprayer - 500 Gallon	Kocide 101	10.00	Lbs
Weed Control- Spot Spray	May	75 HP 4WD Tractor	Weed Sprayer - 100 Gallon	Prowl	0.20	Pint
Skirt Prune Trees (Every Year)	July			Custom		
Top Prune Trees (Every Year)	July			Custom		
Harvest	October			Contract		
	November					
Haul Fruit to Processor	October			Custom		
	November					
Weed Control - Winter Strip Spray	November	75 HP 4WD Tractor	Weed Sprayer - 100 Gallon	Surflan AS	1.85	Pint
				Goal 2XL	1.85	Pint
				Roundup Ultra Max	0.92	Pint
Pickup Truck Use	Annual	Pickup 1/2 ton				
ATV Use	Annual	ATV 4WD				