1999

UNIVERSITY OF CALIFORNIA - COOPERATIVE EXTENSION

SAMPLE COSTS TO ESTABLISH AN OLIVE ORCHARD AND PRODUCE

*~ OLIVE OIL_*

NORTH COAST OF CALIFORNIA

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INTRODUCTION

This study includes detailed costs and underlying assumptions for establishing an olive orchard and producing olives in the North Coast of California for either pressing and marketing for oil or selling the fruit to an oil processor are presented in this study. The hypothetical farm used in this report is 20 acres, 15 of which are in olive production. Annual production costs are presented both for operations growing olives and producing olive oil (Tables 1-4) and operations for selling olives to processors (Tables 9-11). Tables 5 and 6 pertain to both types of operations.

This study is intended as a guide only. It can be used to make production decisions, determine potential returns, prepare budgets and evaluate production loans. Sample costs given for labor, materials, equipment and contract services are based on current figures. Costs and practices detailed in this study will not be applicable to every situation. A blank, *Your Cost*, column is provided to enter your actual costs on.

List of tables:

This and other studies can be obtained through the Department of Agricultural Economics, U.C. Davis (530-752-1515), or from selected county Cooperative Extension offices. For an explanation of calculations or assumptions used in this study refer to the attached General Assumptions or call the Department of Agricultural Economics, University of California - Davis, (530-752-3589).

ASSUMPTIONS

The following is a description of general assumptions pertaining to sample costs of establishing an olive orchard, production of olives for oil, and processing and marketing olive oil in the North Coast of California. Practices described are not recommendations by the University of California, but represent production procedures and materials considered typical of a well managed orchard. Some costs, practices, and materials may not be applicable to your situation nor used during every year. Additional ones not indicated may be needed. Establishment and cultural practices vary by grower and region; variations can be significant. These costs are on an annual, per acre basis. *The use of trade names 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.*

Land. The farm consists of 20 acres of land. Fifteen acres are planted to olives and the remaining five acres include roads, irrigation systems, unused land, and farmstead. Property costs $15,000 per acre. Land is not depreciated.

Labor. Hourly wages for workers are $9.80, and $7.35 per hour for skilled, and field workers respectively. Adding 34% for Workers Compensation, Social Security, Medicare insurance, and other possible benefits gives the labor rates shown of $13.13 per hour for skilled labor, and $9.85 per hour for field labor. Labor for operations involving machinery are 20% higher than the operation time given in Table 1 to account for the extra labor involved in equipment set up, moving, maintenance, work breaks, and repair.

Wages for management are not included as a cash overhead cost. Any return above total costs is considered a return to management.

Trees. Mission is the olive cultivar assumed in this study. Mission olives will produce between 40-45 gallons of oil per ton. Some of the cultivars representing the oil acreage historically planted in California include Mission, Sevillano, and Ascolano. Traditional European oil producing varieties that have been established in limited plantings in the region are Frantoio, Leccino, Pendolino, Maurino, Moraiolo, and Arbequina. The cost of European nursery stock can be twice that of Mission. A more inclusive list of oil producing varieties and their characteristics can be found in *Olive Production Manual, DANR Publication 3353*.

The trees are planted at 12' X 20' spacing, 180 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 60 years.

Irrigation. The water cost for irrigation is the pumping charge. The cost per acre-foot for water will vary by grower in this region depending on various well characteristics and other irrigation factors. In this study, water is calculated to cost $100 per acre-foot. Irrigation rates increase each year as the orchard matures and is shown for establishment and production years in Table A. One acre-foot of water is assumed to be available from rainfall.

Table A. Olive orchard water use

Year	Acre-Feet/Year
1	0.3
2	0.7
3	1.5
4+	2.5

Because the orchard is planted on sloped land, water is delivered to the orchard by microsprinklers in the tree row. The irrigation system is installed and completed before the trees are planted. The pump, filter station, mainlines, laterals, and risers have an expected useful life of 40 years. The life of the microsprinklers are estimated at 10 years. The irrigation system is considered an improvement to the property and is shown in the capital recovery sections of Tables 1-3 and 9 and the Investments section of Table 2.

ORCHARD ESTABLISHMENT CULTURAL PRACTICES AND MATERIAL INPUTS

Site Preparation. Olives grown in north coast counties are mainly planted on hillsides. Various county zoning ordinances require owners to manage erosion on disturbed soils on hillsides. In this study, an erosion control plan is developed by a professional engineer. County fees are paid and the control plan is implemented by a contract company.

Land preparation begins with shallow subsoiling the soil profile to 12–18 inches in order to break up any surface compaction which would affect root and water penetration. Subsoiling is performed by contract operators. The ground is disced twice to break up large clods of soil and smooth the soil in advance of planting the trees. All operations that prepare the orchard for planting are done in the year prior to planting. However, for this study, these costs are included with those incurred in the first year as shown in Table 1.

Planting. Planting the orchard starts by marking tree sites in spring. Holes are dug, trees planted. In the second year, one tree per acre will have to be replanted. Nursery trees should have a single trunk and three to four main scaffold branches developing.

Regular pruning, other than sucker removal, begins in the fourth year and hours required to perform this task, as well as costs, increase annually. Newly planted trees should have the 3-4 main scaffold branches developing at a height of approximately 36 inches. No shoots are allowed to develop below 36 inches. Pruning is performed in spring months.

Weed Management. A pre-emergent herbicide is applied immediately after planting. In spring and summer three applications of a contact herbicide are made to control perrenial weeds. In the first fall a residual herbicide is sprayed along the tree rows to control weeds the following growing season. During the summer of the second year a combination of residual herbicides are used to control weeds in the tree rows. Mowing the row middles to manage the orchard floor also starts the first year. The orchard is mowed three times each year; each mowing requires two passes with the mower.

Insect and Disease Management. During the developmental years, pest and disease controls are minimal in this study, and not needed until the fourth year. Peacock spot and olive knot are major diseases infecting leaves and shoots, causing defoliation and shoot death. In this study, copper is used to prevent these diseases. The copper/peacock spray is applied in the fall after harvest. Olive oil processors are generally unwilling to accept fruit treated with copper. Therefore, copper is custom applied after harvest in the fall. Control of insect pests is not required during the period of orchard establishment. Occasional control may be needed for black scale, but is not shown for the immature orchard in this report.

Fertilization. Nitrogen is the major nutrient required for proper tree growth and optimum yields. Young trees receive approximately 50% of the mature tree rate applied 3-4 times during the growing season. Nitrogen fertilizer is applied in a granular form (46% nitrogen), at increasing rates during orchard establishment. Annual rates of actual N are shown in Table B.

Table B. Applied nitrogen for olives

Year	Pounds of N	Pounds of urea
	---------- per acre ----------	
1	6	13
2	11	24
3	23	50
4	45	98
5+	*90	196

* Rate is applied every other year.

Establishment Cost. The establishment cost is the sum of cash costs for land preparation, planting, trees, production expenses, and cash overhead for growing olive trees through the first year oil is produced minus any returns from production. The *Total Accumulated Net Cash Cost* in the fourth year shown in Table 1, represents the establishment cost per acre. For this study, the cost is $7,765 per acre or $116,475 for the 15 acres planted to olives. Establishment cost is amortized over the remaining 56 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 strategy is critical to production and is dependent on several factors such as olive cultivar and planting density. In this study, pruning is done in the spring by hand. Prunings are placed in the row middles and shredded.

Fertilization. Mature tree nutrition is determined by leaf analysis in July. Nitrogen is applied at a rate of one pound of nitrogen every two years. In this study the cost fertilizer is shown as half the rate or 0.5 pound of N per tree annually. Fertilizer is in a granular form (urea – 46% nitrogen) and applied by hand in April.

Weed Control. Weeds in mature orchards are controlled with chemicals and mowing. Weeds within the tree rows are controlled with residual, pre-emergent herbicides applied in the fall. Different herbicides are used alternately each year. Three spot sprays of a contact herbicide manage weeds missed by residual herbicides. Row centers are mowed three times annually during the spring and summer.

Insect and Disease Management. One insect and two disease pests are treated. Black scale, an insect pest, requires occasional insecticide treatment. Adequate pruning controls this pest well. Only following cool years or in those orchards that have become too dense would insecticide treatment be required to reduce the population to manageable levels. Prevention of the fungal disease, peacock spot, and the bacterial disease, olive knot requires an annual spray of copper following harvest and prior to fall rains. In years of heavy rains a second application is made in the early spring.

For specific pesticide choices and rates consult the *UC IPM Olive Pest Management Guidelines, DANR Publication 3339* and *Olive Production Manual, DANR Publication 3353*. 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.

Equipment Cash Costs. Equipment costs are composed of three parts; capital recovery, cash overhead, and operating costs. The operating costs consist of fuel, lubrication, and repairs.

Repair costs are based on purchase price, annual hours of use, total hours of life, and repair coefficients formulated by the American Society of Agricultural Engineers (ASAE). Fuel and lubrication costs are also determined by ASAE equations based on maximum PTO hp, and type of fuel used. The fuel and repair cost per acre for each operation in Table 2 is determined by multiplying the total hourly operating cost in Table 6 for each piece of equipment used for the cultural practice by the number of hours per acre for that operation. Tractor time is 10% higher than implement time (Operation Time) for a given operation to account for fueling, moving equipment, and setup time. Prices for on-farm delivery of diesel and gasoline are $0.62 and $1.02 per gallon, respectively.

Harvest. Harvest starts in the fourth year by a contracted harvesting company. Costs for contracted harvest operations are based on fresh tons. Olives for oil are hand picked at the color change stage of purple/black skin and green flesh in December and January. Care must be taken when harvesting olives because damaged or groundfall fruit can spoil and develop undesired odors and flavors which are imparted to the oil. Frost can also damage olive fruit and lower oil quality. Maximum yield is reached in the six year.

Processing and Marketing. Processing olives for oil requires special equipment and expertise. Some oil producers also process their olives in their own facilities, but many do not. The two major options for growers without production facilities are to sell the olives to a processor or pay to have it processed and market the olive oil themselves. Both options are examined in this study. Costs and returns for oil which is produced and sold by the grower are shown in Tables 2-8 and the production costs and returns for olives sold to oil processors are presented in Tables 9-11. A description of the different processing procedures are described in the *Olive Production Manual, DANR Publication 3353* and *Producing Olive Oil in California DANR Publication 21516*.

Olive oil produced in California is marketed as a high quality product and sold for a premium price. This is because of the locally high cost of producing olives and competition from lower price imported olive oil that dominate the low and medium quality olive oil markets. Marketing costs include distribution, possible slotting fees and promotional materials. Selling olive oil in the gourmet market requires careful consideration. Product packaging and developing a market channel are essential to succeed in the competitive oil marketplace. In this study, the cost of processing and packaging is included as a cost of producing olive oil in the Processing and Marketing cost section of Tables 2-8. Marketing costs are shown as a separate expense under Processing and Marketing costs.

Yields. As noted in the previous section, olives begin bearing an economic crop in the fourth year after planting. In this study, olives yield 19% oil per fresh weight and the oil weighs 7.61 pounds per gallon. With a 90% extraction rate about 45 gallons of oil per ton of olives is produced. A case of olive oil consists of 12 - 500

milliliter bottles. Typical annual yields for olives are measured in tons per acre. Tonnage, oil, and case yields are shown in Table C.

Table C. Annual yield for establishment and production years

Year	Tons (Fresh Weight)	Gallons Oil	Cases
	---------- per acre ----------		
4	0.5	22.5	14.2
5	1.0	44.9	28.4
6	2.0	89.9	56.7
7+	2.5	112.4	70.9

Returns. Growers can market their olives in different ways. This study looks at two approaches; the grower processes and markets their oil (Tables 4-8) versus the grower selling raw olives to an oil processor (Tables 9-11). Returns, shown in Tables 7 and 10, will vary and the yields and prices used in this cost study are an estimate taking into consideration current situations. For grower processed and marketed oil, an estimated price of $120 per case of olive oil is used (Table 5). A range from $80 to $140 per case is used in Table 7.

Growers selling their olives for pressing typically receive in the range of $350 to $500 per ton and, on rare occasions, upwards of $1,000 per ton for certain olive varieties. A price of $500 per ton is used in Tables 9 and 11 which is similar to the price paid for canning olives. Table 10 includes a range from $350 to $650 per ton.

Risk. The risks associated with producing and marketing olive oil are significant. While this study makes every effort to model a production system based on typical, real world practices, it cannot fully represent financial, agronomic and market risks which affect the profitability and economic viability of olive 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.

OVERHEAD COSTS

Cash Overhead. Cash overhead consists of various cash expenses paid out during the year that are assigned to the whole farm and not to a particular operation. These costs include property taxes, interest on operating capital, office expense, liability and property insurance, management services, and equipment repairs. Cash overhead costs are found in Tables 1, 4-6, and 9.

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 5.

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 9.69% per year. A nominal interest rate is the going market cost of borrowed funds.

Management Fees. Professional management services are contracted by the orchard owner. These services include horticultural and pest management advising. A fee of $75 per acre is charged.

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 0.713% of the average value of the assets over their useful life. Liability insurance covers accidents on the farm and costs $469 for the entire farm.

Office Expense. Office and business expenses are estimated at $2000 annually. These expenses include office supplies, telephones, bookkeeping, accounting, legal fees, etc.

Capital Recovery Costs. Although farm equipment on olive orchards in the region might be purchased new or used, this 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. Annual ownership costs for equipment and other investments are shown in Tables 1, 2 , 4-5, and 9. They represent the capital recovery cost for investments on an annual per acre basis.

Capital recovery cost is the amount of money required each year to recover the difference between the purchase price and salvage value (unrecovered capital). Put another way, it is equivalent to the annual payment on a loan for the investment with the downpayment 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 calculation for annual capital recovery costs is as follows.

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

Salvage Value. Salvage value is an estimate of the remaining value of an investment at the end of its life. For farm machinery (e.g., tractors and implements) the remaining value is a percentage of the new cost of the investment (Boehlje and Eidman). The life in years is estimated by dividing the wear-out life, as given by the ASAE by the annual use in hours. Salvage value is calculated as:

$$\textit{New Price} \times \%\,\textit{Remaining Value}$$

Salvage value for other investments including irrigation systems, buildings, and miscellaneous equipment is zero. The salvage value for land is equal to the purchase price because land does not depreciate from use. The purchase price and salvage value for certain equipment and investments are shown in Table 5.

Capital Recovery Factor. Capital recovery factor is the amortization factor or annual payment whose present value at compound interest is 1. It is the function of the interest rate and years of life of the investment.*Interest Rate*. The interest rate of 7.40% used to calculate capital recovery cost is the USDA-ERS's ten year average of California's agricultural sector long-run rate of return to production assets from current income. 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.

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Table 1.

U.C. COOPERATIVE EXTENSION
SAMPLE COSTS PER ACRE TO ESTABLISH AN OLIVE ORCHARD
NORTH COAST OF CALIFORNIA - 1999

Labor Rate: $13.13/hr. machine labor
$9.85/hr. non-machine labor

Trees Per Acre: 180
Long Term Interest Rate: 7.4%

	Cost Per Acre					
Year	1st	2nd	3rd	4th	5th	6th
Fresh Tons Per Acre				0.5	1.0	2.0
Gallons Per Acre (19% oil & 90% extraction 1st press)				22.5	44.9	89.9
Planting Costs:						
Erosion Control Plan & Fees	$1,270					
Land Preparation - Erosion Control	200					
Land Preparation - Subsoil	125					
Land Preparation - Disc	50					
Trees: 180 Per Acre (1% in 2nd year)	724	$8				
Survey, Mark, Dig Holes & Plant	720	8				
Wrap Trees	224					
Weed Control - Pre-emergent Strip Spray	47					
TOTAL PLANTING COSTS	3,360	16				
Cultural Costs:						
Pruning And Suckering	11	17	$17	$180	$270	$360
Brush Disposal				21	21	21
Irrigate	38	78	158	258	258	258
Fertilizer - Nitrogen	12	13	16	18	22	22
Weed Control - Summer Residual Herbicide		47				
Weed Control - Spot Spray 3X	19	19	19	19	19	19
Weed Control - Mow Centers 3X	25	25	25	25	25	25
Weed Control - Dormant Residual Herbicide	25	35	11	11	11	11
Disease Control - Peacock Spot & Olive Knot				100	100	100
Pickup Truck Use	160	160	160	160	160	160
TOTAL CULTURAL COSTS	290	394	406	792	886	976
Harvest Costs:						
Hand Pick Olives				175	350	700
TOTAL HARVEST COSTS				175	350	700
Interest On Operating Capital @ 9.69%	363	17	22	38	39	32
TOTAL OPERATING COSTS/ACRE	4,013	427	428	1,005	1,275	1,708
Cash Overhead Costs:						
Office Expense	133	133	133	133	133	133
Liability Insurance	19	19	19	19	19	19
Management Fees	25	25	25	25	25	25
Property Taxes	173	174	173	181	181	181
Property Insurance	124	124	124	129	129	129
Investment Repairs	58	58	58	58	58	58
TOTAL CASH OVERHEAD COSTS	532	533	532	545	545	545
TOTAL CASH COSTS/ACRE	4,545	960	960	1,550	1,820	2,253
INCOME/ACRE FROM PRODUCTION				250	500	1,000
NET CASH COSTS/ACRE FOR THE YEAR	4,545	960	960	1,300	1,320	1,253
ACCUMULATED NET CASH COSTS/ACRE	4,545	5,505	6,465	7,765	9,085	10,338

Table 1. continued

	Cost Per Acre					
Year	1st	2nd	3rd	4th	5th	6th
Fresh Tons Per Acre				0.5	1.0	2.0
Gallons Per Acre (19% oil & 90% extraction 1st press)				22.5	44.9	89.9
Capital Recovery Cost:						
Land @ $15,000/Producing Acre	1,110	1,110	1,110	1,110	1,110	1,110
Shop Building	97	97	97	97	97	97
Irrigation System	80	80	80	80	80	80
Shop Tools	19	19	22	22	22	22
Pruning Tools	5	5	5	5	5	5
Equipment	247	247	233	388	388	388
TOTAL CAPITAL RECOVERY COST	1,558	1,558	1,547	1,702	1,702	1,702
TOTAL COST/ACRE FOR THE YEAR	6,103	2,518	2,507	3,252	3,522	3,955
TOTAL COST/CASE FOR THE YEAR				229	124	70
INCOME/ACRE FROM PRODUCTION				250	500	1,000
TOTAL NET COST/ACRE FOR THE YEAR	6,103	2,518	2,507	3,002	3,022	2,955
TOTAL ACCUMULATED NET COST/ACRE	6,103	8,621	11,128	14,130	17,152	20,107

ESTABLISHMENT YEAR PROCESSING AND MARKETING COSTS

	Cost Per Acre					
Year	1st	2nd	3rd	4th	5th	6th
Fresh Tons Per Acre				0.5	1.0	2.0
Gallons Per Acre (19% oil & 90% extraction 1st press)				22.5	44.9	89.9
Cases Per Acre (12 - 500 ml bottles per case)				14.2	28.4	56.7
Processing and Marketing Costs:						
Press, Process, Bottle, Label & Cork				675	1,358	2,713
Market Olive Oil				312	625	1,247
TOTAL PROCESSING AND MARKETING COSTS				987	1,983	3,960

U.C. COOPERATIVE EXTENSION

Table 2. WHOLE FARM ANNUAL EQUIPMENT, INVESTMENT, AND BUSINESS OVERHEAD COSTS FOR PRODUCING OLIVE OIL NORTH COAST OF CALIFORNIA - 1999

ANNUAL EQUIPMENT COSTS

Yr	Description	Price	Yrs Life	Salvage Value	Capital Recovery	- Cash Overhead - Insurance	Taxes	Total
99	55 HP 4WD Tractor	31,102	12	7,776	3,575	139	194	3,908
99	Mower - Flail 9'	7,372	10	1,304	976	31	43	1051
99	Pickup Truck - 1/2 Ton	18,200	7	6,904	2,636	90	126	2851
99	Weed Sprayer - 50 Gal	1,500	15	144	163	6	8	177
	TOTAL	58,174		16,128	7,351	265	372	7,988
	60% of New Cost *	34,904		9,677	4,411	159	223	4,793

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

ANNUAL INVESTMENT COSTS

Description	Price	Yrs Life	Salvage Value	Capital Recovery	--------- Cash Overhead --------- Insurance	Taxes	Repairs	Total
INVESTMENT								
Buildings	15,000	20		1,460	5	7	300	1,889
Irrigation System	15,350	40		1,205	5	7	450	1,787
Land	300,000	50	300,000	22,200	2,13	3,00		27,339
Olive Orchard Establishment	116,475	56		8,780	41	58		9,778
Pruning Tools	200	3	20	71	1	1	50	122
Shop Tools	3,000	15	300	326	1	1	70	424
TOTAL INVESTMENT	450,025		300,320	34,042	2,67	3,75	870	41,339

ANNUAL BUSINESS OVERHEAD COSTS

Description	Units/ Farm	Unit	Price/ Unit	Total Cost
Liability Insurance	20	Acre	19	378
Management Fee	15	Acre	75	1,125
Office Expense	15	Acre	400	6,000

Table 3. HOURLY EQUIPMENT COSTS FOR PRODUCING OLIVE OIL NORTH COAST - 1999

Yr	Description	Actual Hours Used	---------- COSTS PER HOUR ---------- Capital Recovery	-- Cash Overhead -- Insurance	Taxes	---------- Operating ---------- Repairs	Fuel & Lube	Total Oper.	Total Costs/Hr
99	55 HP 4WD Tractor	35.40	60.58	2.3	3.2	0.5	1.9	2.51	68.7
99	Mower - Flail 9'	17.20	34.08	1.0	1.5	3.0	0.0	3.0	39.6
99	Pickup Truck - 1/2 Ton	285.00	5.55	0.1	0.2	1.3	2.9	4.2	10.2
99	Weed Sprayer - 50 Gal	15.00	6.53	0.2	0.3	0.3		0.3	7.4

Table 4.

U.C. COOPERATIVE EXTENSION
COSTS PER ACRE TO PRODUCE OLIVE OIL
NORTH COAST - 1999

Labor Rate: $13.13/hr. machine labor
$9.85/hr. non-machine labor

Interest Rate: 9.69%
Yield per Acre: 71.0 Cases

Operation	Operation Time (Hrs/A)	Labor Cost	Fuel,Lube & Repairs	Material Cost	Custom/ Rent	Total Cost	Your Cost
		---------- Cash and Labor Costs per Acre ----------					
Cultural:							
Irrigate	0.80	8	0	250	0	258	
Weed Control - Spot Spray 3X	0.75	12	2	5	0	19	
Pruning & Sucker	0.00	0	0	0	360	360	
Weed Control - Mow Middles 3X	1.15	18	7	0	0	25	
Fertilizer - Nitrogen	1.00	10	0	13	0	22	
Brush Disposal	0.00	0	0	0	21	21	
Weed Control - Residual	0.25	4	1	18	0	23	
Disease Control - Peacock Spot	0.00	0	0	24	20	44	
Pickup Truck Use	8.00	126	34	0	0	160	
TOTAL CULTURAL COSTS	11.95	178	44	309	401	932	
Harvest:							
Hand Pick	0.00	0	0	0	875	875	
TOTAL HARVEST COSTS	0.00	0	0	0	875	875	
Process & Market:							
Press, Process, Bottle, Label & Cork	0.00	0	0	3,395	0	3,395	
Marketing	0.00	0	0	1,562	0	1,562	
TOTAL PROCESS & MARKET COSTS	0.00	0	0	4,957	0	4,957	
Interest on operating capital @ 9.69%						10	
TOTAL OPERATING COSTS/ACRE		178	44	5,267	1,276	6,774	
CASH OVERHEAD:							
Office Expense						133	
Liability Insurance						19	
Management Fee						25	
Property Taxes						189	
Property Insurance						134	
Investment Repairs						58	
TOTAL CASH OVERHEAD COSTS						558	
TOTAL CASH COSTS/ACRE						7,333	
CAPITAL RECOVERY COSTS (7.4% Interest Rate):							
		Per producing		-- Annual Cost --			
Investment:		Acre		Capital Recovery			
Land		15,000		1,110		1,110	
Buildings		1,000		97		97	
Irrigation System		1,023		80		80	
Shop Tools		200		22		22	
Pruning Tools		13		5		5	
Olive Orchard Establisment		7,765		585		585	
Equipment		1,905		233		233	
TOTAL CAPITAL RECOVERY COSTS		26,907		2,132		2,132	
TOTAL COSTS/ACRE						9,505	

U.C. COOPERATIVE EXTENSION

Table 5. COSTS AND RETURNS PER ACRE TO PRODUCE OLIVE OIL
NORTH COAST - 1999

Labor Rate: $13.13/hr. machine labor
$9.85/hr. non-machine labor

Interest Rate: 9.69%

	Quantity/Acre	Unit	Price or Cost/Unit	Value or Cost/Acre	Your Cost
GROSS RETURNS					
Olive Oil	71.00	Case	120.00	8,520	
TOTAL GROSS RETURNS FOR OLIVE OIL				8,520	
OPERATING COSTS					
Irrigation:					
Water	30.00	AcIn	8.33	250.00	
Herbicide:					
Roundup Ultra	0.60	Pint	7.84	5.00	
Karmex DF	2.00	Lb	4.84	10.00	
Princep Caliber 90	2.00	Lb	4.22	8.00	
Custom:					
Prune Trees	180.00	Tree	2	360.00	
Shred Brush	1.00	Acre	21	21.00	
Hand Pick Fruit	2.50	Ton	350	875.00	
Fertilizer:					
46-0-0	45.00	Lb N	0.279	13.00	
Fungicide:					
Kocide	8.00	Lb	2.99	24.00	
Contract:					
Ground Application	1.00	Acre	20	20.00	
Processing & Marketing:					
Press & Process	2.50	Ton	350	875.00	
Bottling Charge	71.00	Case	3.5	249.00	
Bottle	71.00	Case	25	1,775.00	
Label & Cork	71.00	Case	7	497.00	
Marketing Charge	71.00	Case	22	1,562.00	
Labor (machine)	12.18	Hrs	13.13	160.00	
Labor (non-machine)	1.80	Hrs	9.85	18.00	
Fuel - Gas	20.00	Gal	1.02	20.00	
Fuel - Diesel	6.36	Gal	0.62	4.00	
Lube				4.00	
Machinery repair				16.00	
Interest on operatingcapital @ 9.69%				10.00	
TOTAL OPERATING COSTS/ACRE				6,774.00	
NET RETURNS ABOVE OPERATING COSTS				1,746.00	
CASH OVERHEAD COSTS:					
Office Expense				133.00	
Liability Insurance				19.00	
Management Fee				25.00	
Property Taxes				189.00	
Property Insurance				134.00	
Investment Repairs				58.00	
TOTAL CASH OVERHEAD COSTS/ACRE				558.00	
TOTAL CASH COSTS/ACRE				7,333.00	
CAPITAL RECOVERY COSTS (7.4% Interest Rate):					
Land				1,110	
Buildings				97	
Irrigation System				80	
Shop Tools				22	
Pruning Tools				5	
Olive Orchard Establishment				585	
Equipment				233	
TOTAL CAPITAL RECOVERY COSTS/ACRE				2,132	
TOTAL COSTS/ACRE				9,505	
NET RETURNS ABOVE TOTAL COSTS				-985	

Table 6. U.C. COOPERATIVE EXTENSION
MONTHLY CASH COSTS PER ACRE TO PRODUCE OLIVE OIL
NORTH COAST OF CALIFORNIA - 1999

Beginning MAR 98 Ending FEB 99	MAR 98	APR 98	MAY 98	JUN 98	JUL 98	AUG 98	SEP 98	OCT 98	NOV 98	DEC 98	JAN 99	FEB 99	TOTAL
Cultural:													
Irrigate	18	23	33	38	51	46	28	18					258
Weed Control - Spot Spray	6	6		6									19
Pruning & Sucker		180	180										360
Weed Control - Mow Middle		8	8	8									25
Fertilizer - Nitrogen		22											22
Brush Disposal			21										21
Weed Control - Residual Herbicide								23					23
Disease Control - Peacock Spray										44			44
Pickup Truck Use	13	13	13	13	13	13	13	13	13	13	13	13	160
TOTAL CULTURAL COSTS	38	254	256	66	64	59	42	55	13	57	13	13	932
Harvest:													
Hand Pick										438	438		875
TOTAL HARVEST COSTS										438	438		875
Process & Market:													
Press, Process, Bottle, Label & Cork											3395		3395
Marketing											1562		1562
TOTAL PROCESS & MARKET COSTS											4,957		4,957
Interest on operating Capital 9.69% [1]	0	2	4	5	5	6	6	7	7	11	-44	0	10
TOTAL OPERATING COSTS/ACRE	38	256	260	71	70	65	48	61	20	506	5365	13	6774
CASH OVERHEAD:													
Office Expense	11	11	11	11	11	11	11	11	11	11	11	11	133
Liability Insurance	19												19
Management Fee	2	2	2	2	2	2	2	2	2	2	2	2	25
Property Taxes					94						94		189
Property Insurance					67						67		134
Investment Repairs	5	5	5	5	5	5	5	5	5	5	5	5	58
TOTAL CASH OVERHEAD COSTS	37	18	18	18	180	18	18	18	18	18	180	18	558
TOTAL CASH COSTS/ACRE	75	274	278	89	249	83	66	79	38	524	5544	31	7333

[1] Postharvest operation costs are discounted back to the time of the first harvest

Table 7.

U.C. COOPERATIVE EXTENSION
RANGING ANALYSIS
FOR PRODUCING OLIVE OIL
NORTH COAST OF CALIFORNIA - 1999

	YIELD(CASE/ACRE)						
	40	50	60	70	80	90	100
OPERATING COSTS/ACRE:							
Cultural Cost	932	932	932	932	932	932	932
Harvest, Process & Market Costs	3,286	4,107	4,929	5,750	6,572	7,393	8215
Interest on operating capital	28	22	17	11	5	0	-6
TOTAL OPERATING COSTS/ACRE	4,245	5,061	5,877	6,693	7,509	8,324	9140
TOTAL OPERATING COSTS/CASE	106	101	98	96	94	92	91
CASH OVERHEAD COSTS/ACRE	558	558	558	558	558	558	558
TOTAL CASH COSTS/ACRE	4,803	5,619	6,435	7,251	8,067	8,883	9699
TOTAL CASH COSTS/CASE	120	112	107	104	101	99	97
NON-CASH OVERHEAD COSTS/ACRE	2,132	2,132	2,132	2,132	2,132	2,132	2,132
TOTAL COSTS/ACRE	6,976	7,792	8,608	9,424	10,240	11,055	11,871
TOTAL COSTS/CASE	174	156	143	135	128	123	119

NET RETURNS PER ACRE ABOVE OPERATING COSTS FOR PRODUCING OLIVE OIL

PRICE (DOLLARS/CASE)	YIELD (CASES/ACRE)						
Olive Oil	40	50	60	70	80	90	100
80	-645	-561	-477	-393	-309	-224	-140
90	-245	-61	123	307	491	676	860
100	155	439	723	1,007	1,291	1,576	1,860
110	555	939	1,323	1,707	2,091	2,476	2,860
120	955	1,439	1,923	2,407	2,891	3,376	3,860
130	1,355	1,939	2,523	3,107	3,691	4,276	4,860
140	1,755	2,439	3,123	3,807	4,491	5,176	5,860

NET RETURNS PER ACRE ABOVE CASH COSTS FOR PRODUCING OLIVE OIL

PRICE (DOLLARS/CASE)	YIELD (CASES/ACRE)						
Olive Oil	40	50	60	70	80	90	100
80	-1,203	-1,119	-1,035	-951	-867	-783	-699
90	-803	-619	-435	-251	-67	117	301
100	-403	-119	165	449	733	1,017	1,301
110	-3	381	765	1,149	1,533	1,917	2,301
120	397	881	1,365	1,849	2,333	2,817	3,301
130	797	1,381	1,965	2,549	3,133	3,717	4,301
140	1,197	1,881	2,565	3,249	3,933	4,617	5,301

NET RETURNS PER ACRE ABOVE TOTAL COSTS FOR PRODUCING OLIVE OIL

PRICE (DOLLARS/CASE)	YIELD (CASES/ACRE)						
Olive Oil	40	50	60	70	80	90	100
80	-3,376	-3,292	-3,208	-3,124	-3,040	-2,955	-2,871
90	-2,976	-2,792	-2,608	-2,424	-2,240	-2,055	-1,871
100	-2,576	-2,292	-2,008	-1,724	-1,440	-1,155	-871
110	-2,176	-1,792	-1,408	-1,024	-640	-255	129
120	-1,776	-1,292	-808	-324	160	645	1,129
130	-1,376	-792	-208	376	960	1,545	2,129
140	-976	-292	392	1,076	1,760	2,445	3,129

Table 8.

U.C. COOPERATIVE EXTENSION
COSTS AND RETURNS / BREAKEVEN ANALYSIS
FOR PRODUCING OLIVE OIL
NORTH COAST OF CALIFORNIA - 1999

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)
Olive Oil	8,520	6,774	1,746	7,373	1,147	9,505	-985

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)
Olive Oil	127,800	101,616	26,184	110,594	17,206	142,581	-14,781

BREAKEVEN PRICES PER YIELD UNIT

			---------- Breakeven Price To Cover ----------		
CROP	Base Yield (Units/Acre)	Yield Units	Operating Costs	Cash Costs	Total Costs
			---------- $ per Yield Unit ----------		
Olive Oil	71	Case	95.41	103.84	133.88

BREAKEVEN YIELDS PER ACRE

			---------- Breakeven Yield To Cover ----------		
CROP	Yield Units	Base Price ($/Unit)	Operating Costs	Cash Costs	Total Costs
			---------- Yield Units /Acre ----------		
Olive Oil	Case	120	56.5	61.4	79.2

Table 9. U.C. COOPERATIVE EXTENSION
COSTS AND RETURNS PER ACRE TO PRODUCE
OLIVES SOLD FOR OIL
NORTH COAST OF CALIFORNIA - 1999

Labor Rate: $13.13/hr. machine labor
$9.85/hr. non-machine labor

Interest Rate: 9.69%

	Quantity/Acre	Unit	Price or Cost/Unit	Value or Cost/Acre	Your Cost
GROSS RETURNS					
Olives Sold For Oil	2.50	Ton	500.00	1,250	
TOTAL GROSS RETURNS FOR OLIVE SOLD FOR OIL				1,250	
OPERATING COSTS					
Irrigation:					
Water	30.00	AcIn	8.33	250	
Herbicide:					
Roundup Ultra	0.60	Pint	7.84	5	
Karmex DF	2.00	Lb	4.84	10	
Princep Caliber 90	2.00	Lb	4.22	8	
Custom:					
Prune Trees	80.00	Tree	2.00	360	
Shred Brush	1.00	Acre	21.00	21	
Hand Pick Fruit	2.50	Ton	350.00	875	
Fertilizer:					
46-0-0	45.00	Lb N	0.279	13	
Fungicide:					
Kocide	8.00	Lb	2.99	24	
Contract:					
Ground Application	1.00	Acre	20.00	20	
Labor (machine)	12.18	Hrs	13.13	160	
Labor (non-machine)	1.80	Hrs	9.85	18	
Fuel – Gas	20.00	Gal	1.02	20	
Fuel – Diesel	6.36	Gal	0.62	4	
Lube				4	
Machinery repair				16	
Interest on operatingcapital @ 9.69%				51	
TOTAL OPERATING COSTS/ACRE				1,857	
NET RETURNS ABOVE OPERATING COSTS				-607	
CASH OVERHEAD COSTS:					
Office Expense				133	
Liability Insurance				19	
Management Fee				25	
Property Taxes				189	
Property Insurance				134	
Investment Repairs				58	
TOTAL CASH OVERHEAD COSTS/ACRE				558	
TOTAL CASH COSTS/ACRE				2,415	
CAPITAL RECOVERY COSTS (7.4% Interest Rate):					
Land				1,110	
Buildings				97	
Irrigation System				80	
Shop Tools				22	
Pruning Tools				5	
Olive Orchard Establishment				585	
Equipment				233	
TOTAL CAPITAL RECOVERY COSTS/ACRE				2,132	
TOTAL COSTS/ACRE				4,588	
NET RETURNS ABOVE TOTAL COSTS				-3,338	

Table 10.

U.C. COOPERATIVE EXTENSION
RANGING ANALYSIS
OLIVES SOLD FOR OIL
NORTH COAST OF CALIFORNIA – 1999

COSTS PER ACRE AT VARYING YIELDS TO PRODUCE OLIVES SOLD FOR OIL

	YIELD (TON/ACRE)						
	1.75	2.00	2.25	2.50	2.75	3.00	3.25
OPERATING COSTS/ACRE:							
Cultural Cost	932	932	932	932	932	932	932
Harvest Cost	613	700	788	875	963	1,050	1,138
Interest on operating capital	51	51	51	51	51	51	51
TOTAL OPERATING COSTS/ACRE	1,595	1,682	1,770	1,857	1,945	2,032	2,120
TOTAL OPERATING COSTS/TON	911	841	787	743	707	677	652
CASH OVERHEAD COSTS/ACRE	558	558	558	558	558	558	558
TOTAL CASH COSTS/ACRE	2,153	2,240	2,328	2,415	2,503	2,590	2,678
TOTAL CASH COSTS/TON	1,230	1,120	1,035	966	910	863	824
NON-CASH OVERHEAD COSTS/ACRE	2,132	2,132	2,132	2,132	2,132	2,132	2,132
TOTAL COSTS/ACRE	4,326	4,413	4,501	4,588	4,676	4,763	4,851
TOTAL COSTS/TON	2,472	2,207	2,000	1,835	1,700	1,588	1,493

NET RETURNS PER ACRE ABOVE OPERATING COSTS FOR OLIVES SOLD FOR OIL

PRICE (DOLLARS/TON)	YIELD (TON/ACRE)						
Olives Sold For Oil	1.75	2.00	2.25	2.50	2.75	3.00	3.25
350	-982	-982	-982	-982	-982	-982	-982
400	-895	-882	-870	-857	-845	-832	-820
450	-807	-782	-757	-732	-707	-682	-657
500	-720	-682	-645	-607	-570	-532	-495
550	-632	-582	-532	-482	-432	-382	-332
600	-545	-482	-420	-357	-295	-232	-170
650	-457	-382	-307	-232	-157	-82	-7

NET RETURNS PER ACRE ABOVE CASH COSTS FOR OLIVES SOLD FOR OIL

PRICE (DOLLARS/TON)	YIELD (TON/ACRE)						
Olives Sold For Oil	1.75	2.00	2.25	2.50	2.75	3.00	3.25
350	-1,540	-1,540	-1,540	-1,540	-1,540	-1,540	-1,540
400	-1,453	-1,440	-1,428	-1,415	-1,403	-1,390	-1,378
450	-1,365	-1,340	-1,315	-1,290	-1,265	-1,240	-1,215
500	-1,278	-1,240	-1,203	-1,165	-1,128	-1,090	-1,053
550	-1,190	-1,140	-1,090	-1,040	-990	-940	-890
600	-1,103	-1,040	-978	-915	-853	-790	-728
650	-1,015	-940	-865	-790	-715	-640	-565

NET RETURNS PER ACRE ABOVE TOTAL COSTS FOR OLIVES SOLD FOR OIL

PRICE (DOLLARS/TON)	YIELD (TON/ACRE)						
Olives Sold For Oil	1.75	2.00	2.25	2.50	2.75	3.00	3.25
350	-3,713	-3,713	-3,713	-3,713	-3,713	-3,713	-3,713
400	-3,626	-3,613	-3,601	-3,588	-3,576	-3,563	-3,551
450	-3,538	-3,513	-3,488	-3,463	-3,438	-3,413	-3,388
500	-3,451	-3,413	-3,376	-3,338	-3,301	-3,263	-3,226
550	-3,363	-3,313	-3,263	-3,213	-3,163	-3,113	-3,063
600	-3,276	-3,213	-3,151	-3,088	-3,026	-2,963	-2,901
650	-3,188	-3,113	-3,038	-2,963	-2,888	-2,813	-2,738

Table 11.

U.C. COOPERATIVE EXTENSION
COSTS AND RETURNS / BREAKEVEN ANALYSIS
OLIVES SOLD FOR OIL
NORTH COAST OF CALIFORNIA - 1999

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 Sold For Oil	1,250	1,857	-607	2,456	-1,206	4,588	-3,338

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 Sold For Oil	18,750	27,859	-9,109	36,837	-18,087	68,824	-50,074

BREAKEVEN PRICES PER YIELD UNIT

CROP	Base (Units/Ac	Yield Units	Operating Costs	Cash Costs	Total Costs
			$ per Yield Unit		
Olives Sold For Oil	2.5	Ton	742.91	982.32	1,835.31

BREAKEVEN YIELDS PER ACRE

CROP	Yield Units	Base Price ($/Unit)	Operating Costs	Cash Costs	Total Costs
			Yield Units/Acre		
Olives Sold For Oil	Ton	500	3.7	4.9	9.2