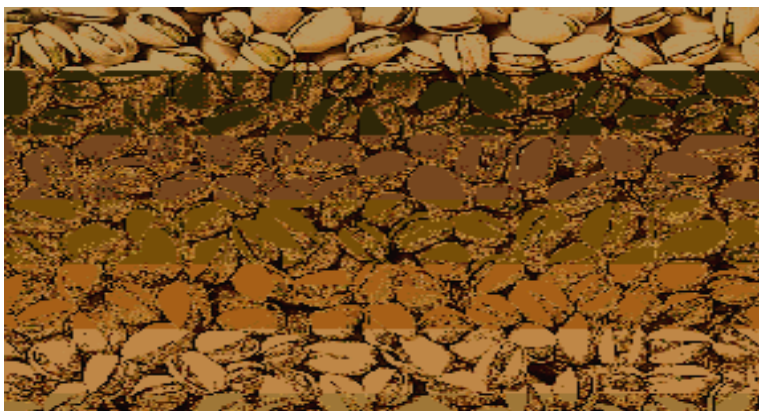

UNIVERSITY OF CALIFORNIA COOPERATIVE EXTENSION

SAMPLE COSTS
to ESTABLISH and PRODUCE
PISTACHIOS



SAN JOAQUIN VALLEY - 2000

Low-Volume Irrigation

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U.C. COOPERATIVE EXTENSION

SAMPLE COSTS FOR ESTABLISHING A PISTACHIO ORCHARD AND PRODUCING PISTACHIOS

Low-Volume Irrigation
San Joaquin Valley - 2000

INTRODUCTION

The sample costs for establishment of a pistachio orchard and production of pistachios in the San Joaquin Valley are presented in this study. The hypothetical farm used in this report consists of 100 acres; ninety-five acres of pistachios being established and five acres of roads and farmstead.

This study is intended as a guide only, and can be used in making production decisions, determining potential returns, preparing budgets and evaluating production loans. Practices described in this study are based on production procedures typically used for well managed orchards in this area. Some costs and practices detailed in this study may not be applicable to every situation whereas practices not listed may be required. Sample costs given for labor, materials, equipment and contract services are based on current figures. A *Your Cost* column is provided in Tables 2 and 3 to enter your actual costs for comparison with the sample costs.

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For information on calculations used for the study refer to the General Assumptions or call the Department of Agricultural and Resource Economics, Cooperative Extension, University of California, Davis, California, (530) 752-3589 or the pistachio farm advisors in the San Joaquin Valley. This study and others can be requested through the Department of Agricultural and Resource Economics, U.C. Davis, (530) 752-3589, downloaded from their website www.agecon.ucdavis.edu or from selected county Cooperative Extension offices.

U.C. COOPERATIVE EXTENSION

SAMPLE COSTS FOR ESTABLISHING A PISTACHIO ORCHARD AND PRODUCING PISTACHIOS

Low-Volume Irrigation San Joaquin Valley - 2000

GENERAL ASSUMPTIONS

The following is a description of some general assumptions pertaining to the sample costs of pistachio orchard establishment and production in the San Joaquin Valley. Practices described should not be considered recommendations by the University of California, but rather represent production procedures considered typical for a well managed orchard in the area. Some of these costs and practices may not be applicable to your situation nor used during every production year. Additional ones not indicated may be needed. Cultural practices for the production of pistachios vary by grower and region, and variations can be significant. The practices and inputs used in this cost study serve only as a sample or guide. These costs are represented 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 100 acres of land of which 95 acres are being planted to pistachio trees, and five acres are occupied by roads, irrigation systems, easements, and farmstead. Land costs range from \$1,500 to \$8,000 per acre. Land in this study is valued at \$4,000 per acre or \$4,211 per producing acre.

Trees. Trees are planted on 17' X 19' spacing, with 135 trees per acre. Because pistachios are dioecious, male and female trees need to be planted to the correct ratio. Current industry standard is 1 male tree to 24 female trees. Pistachio trees have a long production life if well maintained. The life of the orchard at planting in this study is estimated to be 40 years.

Kerman, the most widely grown cultivar, can be budded to several different rootstocks. In this study *Pistacia integerrima* rootstock is budded during the first year in mid-July. The trees on which the July buds failed to grow are rebudded in September. In the second season 2% of the trees are rebudded.

Irrigation System. The irrigation lines are laid on top of the ground prior to planting. Water is delivered under pressure to the orchard through a low-volume irrigation system. Low-volume spaghetti tube drip emitters spaced at one per tree during the first two years discharge one to two gallons per hour. In the third year low-volume micro sprinklers at one or two per tree replaces the drip emitters and discharges 6-10 gallons per hour. The efficiency of the drip irrigation system is assumed to be 85%. Labor required for irrigation involves turning the system on and monitoring the filtration system, irrigation lines, and emitters to insure they are functioning properly. The cost for the low-volume irrigation system includes the pump, filtration system, mainlines, laterals, hoses, micro-sprinklers, and installation. The irrigation system life is 40 years and its costs are shown in Tables 1, 2, 3, 4, and 5 as an investment.

ESTABLISHMENT CULTURAL PRACTICES

Land Preparation. The orchard is established on ground previously planted to row crops. Land preparation begins with a custom operator subsoiling 5 to 6 feet deep to break up any underlying hardpan which would affect root and water penetration. In this study, the subsoiler makes two passes down the tree row and a single pass six feet from each side of the tree row. This is followed by two passes with a stubble disc to break up the large clods. The ground is then disced and floated twice to smooth the surface. Ground preparation is done the year prior to planting and the costs are included in establishment year one.

Planting and Budding. Dormant nursery grown rootstocks are planted in January or February. Planting by a commercial planter begins by surveying the field and marking tree sites. Unbudded rootstocks are then planted. After planting, the stakes are spread in the field and the trees are staked. In July of the first year a commercial budder buds a scion pistachio bud onto the rootstock and warrants a guarantee that 95% of the buds will take. Buds that fail on surviving rootstock the first year are rebudded with two buds per tree in September. In the second year trees should be rebudded as soon as possible. Bud failure rate used for this study is 5% in the first year and 2% in the second.

Replants. Each year in years one and two, tree loss is 1% or less. Nursery budded trees or unbudded trees are replanted as soon as possible so that all trees are budded in the current year. Replants placed in older orchards will have a higher failure rate due to irrigation and gopher damage.

Training, Suckering, and Pruning. Five to seven days after budding the trees are notched and tipped to force the tree. After the bud has been forced, training (tying) and rootstock tipping (suckering) is done at 10 day intervals from mid July to the end of August thru the first two years. Dormant pruning begins in the winter of the first year and continues during the life of the orchard.

Pest Management. *Insects and Mites.* Treatment for various insects such as chinch bugs, darkling ground beetles, ants and other insects begins in the first year. These pests are controlled by an insecticide application in August. Insecticide treatments to control lygus bugs are applied in April and May. In July wettable sulfur is applied to control citrus flat mites. All treatments are applied using a grower-owned sprayer.

Disease. Botrytis, botryosphaeria, and alternaria occur at different times during the growing season and become serious concerns beginning in the fifth year with the production of the first crop. Treatment is to reduce the incidence of the diseases. Fungicide applications are made in April and in July/August. Areas of high humidity or higher disease pressure may require additional treatments.

Vertebrate Pest Management. Vertebrate pests present a continual management problem for pistachio orchards. Poison bait, fumigation, and/or trapping are used to control either gophers or ground squirrels. In this study, poison bait is placed either in a bait station or a burrow probe each year.

Weeds. Prior to planting a pre-emergence herbicide is sprayed in the tree row. Beginning in the first year, a pre-emergent winter strip spray is applied in the fall along the tree row. An in-season spot treatment using a contact herbicide is made three times during the spring and summer. The floor middles are disced and rolled three times.

Irrigation. Price of district water in the pistachio growing areas of the San Joaquin Valley ranges from \$20 to \$110 per acre-foot depending on the irrigation district. Variations in pumped water costs are dependent on fuel costs, well characteristics, and other irrigation factors. In this study, water for irrigation is estimated to cost \$50 per acre foot. The amount of water applied to the orchard during establishment and maturity varies. Average annual rainfall in this region accounts for 5 inches of the total water needs for the crop. This study assumes an 85% uniformity for the low-volume irrigation system. The applied water is shown in Table A.

Table A. Total Applied Water

Year	Acre-Feet/Year
1	0.2
2	0.9
3	1.6
4	1.6
5	2.3
6	2.3
7 +	3.7

Fertilization. Nitrogen is the major nutrient required for proper tree growth and optimum yields. UN-32 (32-0-0) is applied through the drip lines with the rate increased each year through the establishment years. During the first two years, boron is soil applied in August beneath the emitters and a foliar zinc is applied in late October to force dormancy. In years three to seven, zinc sulfate 36% and boron are applied as a delayed-dormant foliar spray in late February/early March. Copper sulfate, if needed, is applied in April. Cost study fertilizer rates from orchard establishment to maturity are shown in Table B. Soil samples should be taken prior to planting and evaluated for salinity. Water nitrogen content should be taken into consideration for the fertilization program.

Table B. Applied Nutrients for Pistachio Orchards in the San Joaquin Valley

Year	Lbs of Material/Acre		Lbs of N/Acre
	Zinc Sulfate (36%)	Boron	Nitrogen
1	40	25	0
2	40	5	33
3	40	5	66
4	40	5	100
5	40	5	135
6	40	5	135
7+	40	5	170

Establishment Costs. Cost to establish the orchard is used to determine non-cash overhead expenses, capital recovery, for the production years. The establishment cost is the sum of cash costs for land preparation, planting, trees, production expenses, and cash overhead for growing pistachio trees through the first year fruit is harvested. The *Total Accumulated Net Cash Cost* in the fifth year, shown in Table 1, represents the establishment cost per acre. For this study, this cost is \$6,732 per acre or \$639,540 for the 95 acre orchard. This establishment cost is depreciated beginning in the sixth year over the remaining 35 years of orchard life.

PRODUCTION CULTURAL PRACTICES

Pruning. Pruning is done by hand or mechanical hedger during the dormant season, usually in January and February. Top cuts are made with one to two large branch saw cuts to open the tree centers. Winter sanitation is also performed at this time and consists of removing any mummy nuts from the trees using a shaker. The nuts and prunings are raked into the row middles and shredded by a commercial brush shredder, leaving the residue on the orchard floor or incorporating by discing.

Fertilization. The nutritional program should be based on leaf analysis. Leaf samples are taken in August. Nitrogen is injected into the low-volume irrigation system from February through July. A foliar application of zinc and boron are applied in February.

Pest Management. Pesticides, rates, and cultural practices mentioned in this cost study are a few of those listed in the *UC Pest Management Guidelines, Pistachios*. For more information on pest identification, monitoring, and management visit the UC IPM website at www.ipm.ucdavis.edu. Written recommendations are required for many pesticides and are made by licensed pest control advisors. All pest management strategies need to be tailored to meet specific orchard requirements and should be discussed with a pest control advisor or the local farm advisor. For information concerning pesticide use permits, contact the local county Agricultural Commissioner's office.

Insect and Diseases. Major insect, mite, and disease pests in mature pistachio orchards include lygus bug, navel orangeworm, soft scale, stink bug, leaf footed plant bug, citrus flat mite, botrytis, alternaria, and botryosphaeria. Management practices for control of these pest is the same as those used during orchard establishment.

Botryosphaeria. Botryosphaeria Panicle and Shoot Blight (*Botryosphaeria dothidea*) called Bot can be a serious problem in some areas and/or years. It is a panicle and shoot disease which can affect the fruit by invading it and causing deterioration. Cost to control the disease with fungicides and pruning can range from \$200 to \$1,000 per acre. Pruning out infected clusters can be tedious and expensive. Benlate fungicide sprays (can be two sprays at one-half rate) at bloom for Botrytis control can also reduce Bot. In addition to the pruning, orchards with the disease may require several fungicide applications beginning in late May to early June and continuing until harvest. Costs for treating for Bot are shown in Table 5. Growers treating for Bot should add these costs to the cultural practices and overhead in Table 2.

Vertebrate Pest Management. Vertebrate (gopher) pest management practices are the same as those used during orchard establishment. In areas near foothills, birds are a problem, but control costs are not included in this study.

Weed Control. Weed control in a mature orchard is identical to the seventh year of establishment. A pre-emergent, winter strip spray is applied to the tree row in November. Weeds in the tree rows during the growing season are controlled with three spot sprays of a contact herbicide. Row middles are disced three times; April, June, and August.

Harvest. Pistachio trees typically reach full production by the 12th or 13th year. Commercial yields normally begin in the fifth or sixth year after the orchard is planted. In this study, harvest begins in the fifth year.

Pistachios are hand picked at the first harvest and the grower supplies the tractor, bins, trailer, and forklift. The contractor supplies the crew, tarps, and mallets. In subsequent years, the crop is custom harvested mechanically using a catch frame harvester. In this study the contractor charges \$1.25 per tree to harvest. The contractor loads the bins and transports them to the "staging area" where they are loaded into bottom dumps (trailers) furnished by the processor. The grower furnishes the forklift with a bin turner for emptying the bins into the trailer. The pistachios are hauled to the processor where they are weighed, hulled, dried, graded, and packed. Growers using their own equipment and crews to harvest should add the machinery and labor cost to Harvest costs in Tables 1, 2, and 3 and remove contract harvest charges.

Yields. Pistachios are an alternate bearing crop, having a high yield one year and a low yield the next year. Although an economic yield begins the fifth year, the alternate bearing cycle begins when the trees are between 10 to 12 years old. An average of the high-low yield cycle is used for the annual yield in this study and is shown in Tables 2, 3 and 7.

Yields are divided into three categories; clean in-shell splits, shelling stock/closed nuts (dark stain, stick tights and shell damaged nuts), and loose kernels. Blanks and other unmarketable nuts (such as severe lesion) are not included in the yields reported below. Each category makes up a percentage of the total yields shown in Table C. These yields are from the fifth year of orchard establishment to maturity and do not reflect alternate bearing.

Shelling stock yields reflect in-shell weights. The yields for shelling stock in Table C should be reduced 50% to reflect the weight paid for by the processor.

Table C. Annual yield per acre for San Joaquin Valley pistachios

Year	Net Pounds/Acre			
	Total Yield	Clean In-shell Splits	Shelling Stock In-shell	Loose Kernels
5	250	200	49	1
6	600	480	117	3
7	1,300	1040	254	7
8	1,500	1200	293	8
9+	2,000	1600	390	10

Returns. Prices received by growers for their marketable products vary by category. Usually, there are not enough loose kernels (<.5%) to affect a growers return. The first two categories yield approximately 80% and 20% , respectively. Estimated prices for the current year shown in Table D are used in this study so that a ranging analysis for different yields and prices can be calculated. Prices for clean in shell are for the total nut weight, whereas the price paid for shelling stock is for the weight of nut meats only.

Table D. Prices paid to growers for various pistachio grades

Grade	Clean In-shell splits	Shelling Stock/ Closed Nuts	Loose Kernels
\$/lb	\$1.15	\$0.53 [†]	\$0.53

[†] This price is based on kernel (nut meat) weight of shelling stock.

Assessments. Under a state marketing order, mandatory assessment fees are collected and administered by the California Pistachio Commission. Growers are charged the assessment to pay for industry research programs. The current assessment rate is \$0.035 per pound of clean, in-shell split nuts.

Labor. Hourly wages for workers are \$8.00, and \$6.00 per hour for skilled, and field workers respectively. Adding 34% for the employers share of federal and state payroll taxes, and other possible benefits gives the labor rates shown of \$10.72 per hour for skilled labor, and \$8.04 per hour for field labor. 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 repair.

Wages for management are not included as a cash cost. Any return above total costs is considered a return to management and risk. However, growers wanting to account for management may wish to add a fee. Currently, professional management costs for an orchard of this size in the region is about \$90 per acre. Three-quarters of pistachio growers hire professional management services. The manager makes all production decisions including cultural practices, pest management, and labor.

Risk. The risks associated with producing and marketing pistachios should not be minimized. Establishment of pistachio orchards and the equipment required to produce pistachios is capital intensive. A market channel should be determined before any pistachio orchards are planted.

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 pistachio production.

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, sanitation services, and equipment repairs.

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.

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 10.71% per year. A nominal interest rate is the typical market cost of borrowed funds.

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 0.723% of the average value of the assets over their useful life. Liability insurance covers accidents on the farm and costs \$455 for the entire farm.

Office Expense. Office and business expenses are estimated at \$60 per acre. These expenses include office supplies, telephones, bookkeeping, accounting, legal fees, road maintenance, etc. Cash overhead costs are included in Tables 1, 2, 3, 4, and 6.

Non-cash Overhead. Non-cash overhead is calculated as the capital recovery cost for equipment and other farm investments. Although farm equipment used in pistachio orchards in the San Joaquin Valley might be purchased new or used, this study shows the current purchase price for new equipment. The new purchase price is adjusted to 60% of new value to indicate a mix of new and used equipment. Annual ownership costs (Equipment and Investments) are shown in Tables 1, 2, 3, and 6. They represent the capital recovery cost for investments on an annual per acre basis.

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). Put another way, 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. The calculation for the annual capital recovery costs is as follows.

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

Salvage Value. Salvage value is an estimate of the remaining value of an investment at the end of its useful life. For farm machinery (e.g., 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 wearout 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 equal to the purchase price because land does not depreciate. The purchase price and salvage value for certain equipment and investments are shown in Table 6.

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 equipment.

Interest Rate. The interest rate of 7.08% used to calculate capital recovery cost is the USDA-ERS's ten year California average of the 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.

Equipment Cash Costs. 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 fuel, lubrication, and repairs. In allocating equipment costs on a per acre basis, the hourly charges are calculated first and shown in Table 7. 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 7 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.

Repair, Fuel, Lube: 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. Prices for on-farm delivery of diesel and gasoline are \$1.09 and \$1.49 per gallon, respectively.

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

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Table 1

U.C. COOPERATIVE EXTENSION
 SAMPLE COSTS PER ACRE TO ESTABLISH A PISTACHIO ORCHARD
 SAN JOAQUIN VALLEY - 2000

Year	Cost Per Acre						
	1st	2nd	3rd	4th	5th	6th	7th
Total Yield: Dry, In-Shell Pounds Per Acre					250	600	1,300
Planting Costs:							
Land Preparation - Subsoil	400						
Stubble Disc 2X	34						
Land Preparation - Disc & Float 2X	12						
Weed Control - Pre-emergence	67						
Trees: 135 Per Acre @ \$7.90ea.(1 in Year 2)	1,067	8					
Survey, Plant, & Mark Trees	88	1					
Spread Stakes & Stake Trees	808						
Field Bud Trees	128						
Notch and Tip Trees	14						
Rebud 5% in 1st Year & 2% in 2nd Year)	10	4					
TOTAL PLANTING COSTS	2,628	13					
Cultural Costs:							
Training & Suckering 3X	153	63	63	44			
Pruning	25	50	50	50	63	63	63
Shred Brush - Custom				20	20	20	20
Fertilize - Zinc & Boron	45	29	30	30	30	30	30
Irrigate	27	68	99	99	135	135	207
Fertilize - Nitrogen		10	19	29	39	39	49
Weed Control - Spot Spray 3X	21	21	21	21	21	21	21
Weed Control - Winter Residual Strip Spray	58	67	67	67	67	67	67
Weed Control - Disk Middles 3X	16	16	16	16	16	16	16
Disease Control - Foliar Sprays 2X					44	44	44
Insect Control - Lygus					22	22	22
Insect Control - Mites					9	9	9
Insect Control - Navel Orangeworm					41	41	41
Insect Control - Miscellaneous Insects	30	30	30	30	30	30	30
Rodent Control	7	7	7	7	7	7	7
Remove Stakes						54	
Pickup Truck Use	56	56	56	56	56	56	56
ATV Use	47	45	45	45	45	45	45
PCA/Consultant Service	5	5	5	5	5	5	5
Leaf Analysis	2	2	2	2	2	2	2
TOTAL CULTURAL COSTS	492	469	510	521	652	706	734
Harvest Costs:							
Hand Pick					175		
Shake & Catch						169	169
Dumping into trailers						17	17
California Pistachio Commission Assessment					7	16	36
TOTAL HARVEST COSTS					182	202	222
Interest On Operating Capital @ 10.71%	215	10	16	17	24	26	27
TOTAL OPERATING COSTS/ACRE	3,335	492	526	538	858	934	983

U.C. COOPERATIVE EXTENSION

Table 1. continued

Year	Cost Per Acre						
	1st	2nd	3rd	4th	5th	6th	7th
Yield: Field Run - Pounds Per Acre					250	600	1,300
Cash Overhead Costs:							
Office Expense	60	60	60	60	60	60	60
Liability Insurance	4	4	4	4	4	4	4
Sanitation Fees	7	7	7	7	7	7	7
Property Taxes	58	57	57	57	60	91	91
Property Insurance	42	42	41	41	44	66	66
Investment Repairs	77	77	77	77	77	77	77
TOTAL CASH OVERHEAD COSTS	248	247	246	246	252	305	305
TOTAL CASH COSTS/ACRE	3,583	739	772	784	1,110	1,239	1,288
INCOME/ACRE FROM PRODUCTION					257	616	1,334
NET CASH COSTS/ACRE FOR THE YEAR	3,583	739	772	784	854	623	
PROFIT/ACRE ABOVE CASH COSTS							46
ACCUMULATED NET CASH COSTS/ACRE	3,583	4,322	5,094	5,878	6,732	7,355	7,309
Capital Recovery Costs:							
Shop Building	39	39	39	39	39	39	39
Fuel Tanks & Pumps	6	6	6	6	6	6	6
Shop Tools	15	15	15	15	15	15	15
Nurse Tank - 1000 Gal	13	13	13	13	13	13	13
Low-Volume Irrigation System	112	112	112	112	112	112	112
Land - Pistachios	298	298	298	298	298	298	298
Establishment - Pistachios						524	524
Equipment	104	88	89	89	150	88	88
TOTAL INTEREST ON INVESTMENT	587	571	572	572	633	1,097	1,097
TOTAL COST/ACRE FOR THE YEAR	4,170	1,310	1,344	1,356	1,743	2,336	2,385
INCOME/ACRE FROM PRODUCTION					257	616	1,334
TOTAL NET COST/ACRE FOR THE YEAR	4,170	1,310	1,344	1,356	1,487	1,720	1,051
NET PROFIT/ACRE ABOVE TOTAL COST							
TOTAL ACCUMULATED NET COST/ACRE	4,170	5,480	6,824	8,180	9,667	11,387	12,438

Table 2.

U.C. COOPERATIVE EXTENSION
COST PER ACRE TO PRODUCE PISTACHIOS
SAN JOAQUIN VALLEY - 2000

Operation	Operation	Cash and Labor Costs per Acre					Total Cost	Your Cost
	Time (Hrs/A)	Labor Cost	Fuel,Lube & Repairs	Material Cost	Custom/Rent			
Cultural:								
Pruning	0.00	0	0	0	250	250		
Winter Sanitation	0.50	4	0	0	0	4		
Shred Brush	0.00	0	0	0	20	20		
Vertebrate Pest Control	0.52	4	0	3	0	7		
Fertilize - Zinc & Boron	0.25	3	3	24	0	30		
Irrigate	2.14	17	0	190	0	207		
Fertilize - Nitrogen	0.00	0	0	49	0	49		
Disease Control - Foliar Diseases 2X	0.19	2	2	73	0	77		
Weed Control - Spot Spray 3X	0.75	10	3	9	0	21		
Pest Control - Lygus	0.25	3	3	17	0	23		
Weed Control - Disc Middles 3X	0.74	9	7	0	0	16		
Pest Control - Mite	0.25	3	3	5	0	10		
Pest Control - Navel Orangeworm	0.25	3	3	36	0	42		
Pest Control - Various Insects	0.25	3	3	25	0	31		
Weed Control - Winter Strip Spray	0.25	3	1	63	0	67		
Pickup Truck Use	3.00	39	17	0	0	56		
ATV Use	3.00	39	6	0	0	45		
PCA/Consultant Service	0.00	0	0	0	5	5		
Leaf Analysis	0.00	0	0	0	2	2		
TOTAL CULTURAL COSTS	12.34	143	50	493	277	963		
Harvest:								
Harvest - Shake & Catch	0	0	0	0	162	162		
Harvest - Turning Bins into Trailer	0	0	0	0	17	17		
TOTAL HARVEST COSTS	0	0	0	0	179	179		
Assessment:								
California Pistachio Commission	0	0	0	56	0	56		
TOTAL ASSESSMENT COST				56		56		
Interest on operating capital @ 10.71%							43	
TOTAL OPERATING COSTS/ACRE		143	50	549	456	1,242		
TOTAL OPERATING COSTS/LB							0.62	
CASH OVERHEAD:								
Office Expense							60	
Liability Insurance							4	
Sanitation Service							7	
Property Taxes							91	
Property Insurance							66	
Investment Repairs							77	
TOTAL CASH OVERHEAD COSTS							304	
TOTAL CASH COSTS/ACRE							1,546	
TOTAL CASH COSTS/LB							0.77	

U.C. COOPERATIVE EXTENSION
Table 2. continued

NON-CASH OVERHEAD:	Per producing Acre	-- Annual Cost -- Capital Recovery	
Investment	Acre	Capital Recovery	
Buildings	411	39	39
Fuel Tanks & Pumps	69	6	6
Shop Tools	136	15	15
Nurse Tank - 1000G	99	13	13
Low-Volume Irrigation System	1,442	112	112
Land - Pistachios	4,211	298	298
Pistachio Establishment	6,732	524	524
Equipment	708	88	88
TOTAL NON-CASH OVERHEAD COSTS	13,807	1,096	1,096
TOTAL COSTS/ACRE			2,643
TOTAL COSTS/LB			1.32

Table 3.

U.C. COOPERATIVE EXTENSION
COSTS AND RETURNS PER ACRE TO PRODUCE PISTACHIOS
SAN JOAQUIN VALLEY - 2000

	Quantity/ Acre	Unit	Price or Cost/Unit	Value or Cost/Acre	Your Cost
GROSS RETURNS					
Clean Split	1,600.00	lb	1.15	1,840	
Shelling Stock/Loose Kernel	400.00	lb	0.53	212	
TOTAL GROSS RETURNS				2,052	
OPERATING COSTS					
Contract:					
Hand Prune	250.00	tree	1.00	250	
Leaf Analysis	1.00	acre	2.00	2	
Custom:					
Shred Brush	1.00	acre	20.00	20	
Harvest - Shake & Catch	135.00	tree	1.20	162	
PCA/Consultant Fee	1.00	acre	5.00	5	
Rodenticide:					
Rodent Bait	1.00	lb	2.81	3	
Fertilizer:					
Zinc Sulfate - 36%	40.00	lb	0.50	20	
Solubor	5.00	lb	0.81	4	
UN-32	170.00	lb N	0.29	49	
Irrigation:					
Water - SJV	44.42	acin	4.27	190	
Fungicide:					
Benlate 50 WP	32.00	oz	1.26	40	
Abound 2EC	13.85	floz	2.33	32	
Herbicide:					
Roundup Ultra	1.93	pint	5.68	11	
Goal 1.6E	3.36	pint	15.01	50	
Prowl 3.3 EC	3.36	pint	3.10	10	
Insecticide:					
Pounce 3.2EC	12.00	oz	1.45	17	
Guthion 50W	3.00	lb	12.00	36	
Sevin 80S	4.00	lb	6.25	25	
Miticide:					
Sulfur - Wettable	25.00	lb	0.18	5	
Rent:					
Forklift Rental	3.00	wk/ac	5.63	17	
Assessment:					
CA Pistachio Commission	1,600.00	lb	0.04	56	
Labor (machine)	11.01	hrs	10.72	118	
Labor (non-machine)	3.16	hrs	8.04	25	
Fuel - Gas	10.49	gal	1.49	16	
Fuel - Diesel	12.21	gal	1.09	13	
Lube				4	
Machinery repair				17	
Interest on operating capital @ 10.71%				43	
TOTAL OPERATING COSTS/ACRE				1,242	
TOTAL OPERATING COSTS/LB				0.62	
NET RETURNS ABOVE OPERATING COSTS				810	

U.C. COOPERATIVE EXTENSION
Table 3. Continued

CASH OVERHEAD COSTS:	
Office Expense	60
Liability Insurance	4
Sanitation Service	7
Property Taxes	91
Property Insurance	66
Investment Repairs	77
TOTAL CASH OVERHEAD COSTS/ACRE	304
TOTAL CASH COSTS/ACRE	1,546
TOTAL CASH COSTS/LB	0.62
NON-CASH OVERHEAD COSTS (CAPITAL RECOVERY):	
Buildings	39
Fuel Tanks & Pumps	6
Shop Tools	15
Nurse Tank - 1000G	13
Low-Volume Irrigation System	112
Land - Pistachios	298
Pistachio Establishment	524
Equipment	88
TOTAL NON-CASH OVERHEAD COST/ACRE	1,096
TOTAL COSTS/ACRE	2,643
TOTAL COSTS/LB	1.32
NET RETURNS ABOVE TOTAL COSTS	-591

Table 4.

U.C. COOPERATIVE EXTENSION
MONTHLY CASH COSTS PER ACRE TO PRODUCE PISTACHIOS
SAN JOAQUIN VALLEY - 2000

Beginning JAN 00	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	TOTAL
Ending DEC 00	00	00	00	00	00	00	00	00	00	00	00	00	00
Cultural:													
Pruning	125	125											250
Winter Sanitation		4											4
Shred Brush		20											20
Vertebrate Pest Control		2	2					2	2				7
Fertilize - Zinc & Boron		30											30
Irrigate		13		23	23	45	45	45		13			207
Fertilize - Nitrogen		10		10	10	10	10						49
Disease Control-Foliar				43			34						77
Weed Control-Spot Spray				7		7	7						21
Pest Control-Lygas				12	12								23
Weed Control-Disc Middles				5		5		5					16
Pest Control-Mite							10						10
Pest Control-Navel Orngwrm								42					42
Pest Control-Various								31					31
Weed Control-Strip Spray											67		67
Pickup Truck Use	5	5	5	5	5	5	5	5	5	5	5	5	56
ATV Use	4	4	4	4	4	4	4	4	4	4	4	4	45
PCA/Consultant Service	0	0	0	0	0	0	0	0	0	0	0	0	5
Leaf Analysis								2					2
TOTAL CULTURAL COSTS	134	212	11	109	53	76	115	136	11	21	76	8	963
Harvest:													
Harvest-Shake & Catch									162				162
Harvest-Turn bins									17				17
Assessment CPC									56				56
TOTAL HARVEST COSTS									235				235
Interest on oper. capital	1	3	3	4	5	5	6	8	10	-1	-1	0	43
TOTAL OPERATING COSTS/ACRE	135	215	14	113	58	82	121	144	255	21	76	8	1,242
TOTAL OPERATING COSTS/LB	0.07	0.11	0.01	0.06	0.03	0.04	0.06	0.07	0.13	0.01	0.04	0.00	0.62
OVERHEAD:													
Office Expense	5	5	5	5	5	5	5	5	5	5	5	5	60
Liability Insurance	4												4
Sanitation Service	1	1	1	1	1	1	1	1	1	1	1	1	7
Property Taxes		46					46						91
Property Insurance		33					33						66
Investment Repairs	6	6	6	6	6	6	6	6	6	6	6	6	77
TOTAL CASH OVERHEAD COSTS	16	91	12	12	12	12	91	12	12	12	12	11	304
TOTAL CASH COSTS/ACRE	151	306	26	125	70	94	212	156	267	33	88	20	1,546
TOTAL CASH COSTS/LB	0.08	0.15	0.01	0.06	0.04	0.05	0.11	0.08	0.13	0.02	0.04	0.01	0.77

Table. 5

U.C. COOPERATIVE EXTENSION
 COSTS PER ACRE for BOTRYOSPHEIRA CONTROL
 SAN JOAQUIN VALLEY - 2000

Operation	Operation	Cash and Labor Costs per Acre					Total Cost	Your Cost
	Time (Hrs/A)	Labor Cost	Fuel,Lube & Repairs	Material Cost	Custom/Rent			
Cultural:								
Botryosphaeria Pruning	67.5	543	0	0	0	543		
Spray Fungicide - Abound 3X	0.97	13	6	97	0	115		
Spray Fungicide - Elite 1X	0.32	4	2	32	0	38		
TOTAL CULTURAL COSTS	68.8	559	8	128	0	696		
Interest on operating capital @ 10.71%						50		
TOTAL OPERATING COSTS/ACRE		559	8	128	0	745		
CASH OVERHEAD:								
Property Taxes						1		
Property Insurance						1		
TOTAL CASH OVERHEAD COSTS						2		
TOTAL CASH COSTS/ACRE						748		
NON-CASH OVERHEAD:								
		Per producing Acre		Annual Cost				
Investment				Capital Recovery				
Equipment		231		28		28		
TOTAL NON-CASH OVERHEAD COSTS		231		28		28		
TOTAL COSTS/ACRE						776		

Table 6.

U.C. COOPERATIVE EXTENSION
WHOLE FARM ANNUAL EQUIPMENT, INVESTMENT, AND BUSINESS OVERHEAD COSTS
SAN JOAQUIN VALLEY - 2000

ANNUAL EQUIPMENT COSTS

Yr	Description	Price	Yrs Life	Salvage Value	Capital Recovery	Cash Overhead		Total
						Insur- ance	Taxes	
00	30 HP 2WD Tractor	17,699	12	4,425	1,992	80	111	2,182
00	90 HP 2WD Tractor	36,068	12	9,017	4,059	163	225	4,447
00	ATV	4,611	7	1,749	656	23	32	711
00	Disc - Tandem 12'	8,460	12	1,172	1,004	35	48	1,087
00	Orch.Sprayer 500 G	18,850	10	3,333	2,453	80	111	2,645
00	Pickup Truck 1/2 T	20,565	7	7,801	2,927	103	142	3,172
00	Ring Roller - 12'	2,336	10	413	304	10	14	328
00	Weed Sprayer 100 G	3,550	10	628	462	15	21	498
TOTAL		112,139		28,538	13,858	509	703	15,070
60% of New Cost *		67,283		17,123	8,315	305	422	9,042

*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	39,063	20		3,710	141	195	781	4,828
Fuel Tanks & Pumps	6,514	20	651	603	26	36	130	795
Land - Pistachios	400,000	40	400,000	28,320	2,892	4,000	0	35,212
Low-Volume Irrigation System	136,972	35		10,671	495	685	5,958	17,809
Nurse Tank - 1000G	9,358	10	936	1,270	37	51	187	1,545
Pistachio Establishment	639,540	35		49,826	2,312	3,198	0	55,335
Shop Tools	12,903	15	1,161	1,378	51	70	232	1,731
TOTAL INVESTMENT	1,244,350		402,748	95,778	5,954	8,235	7,288	117,256

ANNUAL BUSINESS OVERHEAD COSTS

Description	Units/		Price/ Unit	Total Cost
	Farm	Unit		
Liability Insurance	95	acre	3.98	378
Office Expense	95	acre	60.00	5,700
Sanitation Service	95	acre	6.54	621

Table 7.

U.C. COOPERATIVE EXTENSION
HOURLY EQUIPMENT COSTS
SAN JOAQUIN VALLEY - 2000

		COSTS PER HOUR							
Yr	Description	Actual Hours Used	Cash Overhead			Operating			Total Costs/hr
			Capital Recovery	Insur- ance	Taxes	Repairs	Fuel & Lube	Total Oper.	
00	30 HP 2WD Tractor	104.50	11.44	0.46	0.64	0.77	1.85	2.62	15.15
00	90 HP 2WD Tractor	227.40	10.71	0.43	0.59	1.57	5.54	7.11	18.85
00	ATV	285.00	1.38	0.05	0.07	0.34	1.71	2.05	3.54
00	Disc - Tandem 12'	70.10	8.60	0.30	0.41	1.33	0.00	1.33	10.63
00	Orch. Sprayer 500G	136.60	10.78	0.35	0.49	3.16	0.00	3.16	14.78
00	Pickup 1/2 Ton	285.00	6.16	0.22	0.30	1.50	4.28	5.78	12.46
00	Ring Roller - 12'	70.10	2.60	0.09	0.12	0.26	0.00	0.26	3.07
00	Weed Sprayer 100 G	95.00	2.92	0.10	0.13	0.94	0.00	0.94	4.09

Table 8.

U.C. COOPERATIVE EXTENSION
RANGING ANALYSIS
SAN JOAQUIN VALLEY - 2000

COSTS PER ACRE at VARYING YIELDS of Clean-in-shell Splits TO PRODUCE PISTACHIOS

	YIELD Clean-in-Shell Splits (lb/acre)						
	1,120	1,280	1,440	1,600	1,760	1,920	2,080
OPERATING COSTS/ACRE:							
Cultural Cost	963	963	963	963	963	963	963
Harvest Cost (+ assessment)	218	224	229	235	240	246	252
Interest on operating capital	43	43	43	43	43	44	44
TOTAL OPERATING COSTS/ACRE	1,225	1,230	1,236	1,242	1,247	1,253	1,259
TOTAL OPERATING COSTS/LB	1.09	0.96	0.86	0.78	0.71	0.65	0.61
CASH OVERHEAD COSTS/ACRE	304	304	304	304	304	304	304
TOTAL CASH COSTS/ACRE	1,529	1,535	1,540	1,546	1,552	1,557	1,563
TOTAL CASH COSTS/LB	1.37	1.2	1.07	0.97	0.88	0.81	0.75
NON-CASH OVERHEAD COSTS/ACRE	1,096	1,096	1,096	1,096	1,096	1,096	1,096
TOTAL COSTS/ACRE	2,626	2,631	2,637	2,643	2,648	2,654	2,659
TOTAL COSTS/LB	2.34	2.06	1.83	1.65	1.5	1.38	1.28

U.C. COOPERATIVE EXTENSION
Ranging Analysis continued

NET RETURNS PER ACRE ABOVE OPERATING COSTS FOR PISTACHIOS

PRICE (\$/lb)		YIELD (lb/acre)						
Clean Splits		1,120	1,280	1,440	1,600	1,760	1,920	2,080
	Shelling Stock							
0.80	0.37	-225	-88	49	186	323	461	598
0.92	0.42	-77	82	240	398	557	715	873
1.03	0.48	63	242	420	598	777	955	1,133
1.15	0.53	212	411	611	810	1,010	1,209	1,409
1.26	0.58	349	568	787	1,006	1,225	1,445	1,664
1.38	0.64	500	741	981	1,222	1,463	1,704	1,944
1.49	0.69	637	898	1,158	1,418	1,679	1,939	2,199

NET RETURNS ABOVE CASH COSTS FOR PISTACHIOS

PRICE (\$/lb)		YIELD (lb/acre)						
Clean Splits		1,120	1,280	1,440	1,600	1,760	1,920	2,080
	Shelling Stock							
0.80	0.37	-530	-392	-255	-118	19	156	293
0.92	0.42	-381	-223	-64	94	252	411	569
1.03	0.48	-241	-63	116	294	472	651	829
1.15	0.53	-93	107	306	506	705	905	1,105
1.26	0.58	44	264	483	702	921	1,140	1,359
1.38	0.64	196	436	677	918	1,159	1,399	1,640
1.49	0.69	333	593	854	1,114	1,374	1,635	1,895

NET RETURNS PER ACRE ABOVE TOTAL COST FOR PISTACHIOS

PRICE (\$/lb)		YIELD (lb/acre)						
Clean Splits		1,120	1,280	1,440	1,600	1,760	1,920	2,080
	Shelling Stock							
0.80	0.37	-1,626	-1,489	-1,352	-1,215	-1,077	-940	-803
0.92	0.42	-1,478	-1,319	-1,161	-1,003	-844	-686	-527
1.03	0.48	-1,338	-1,159	-981	-803	-624	-446	-267
1.15	0.53	-1,189	-990	-790	-591	-391	-191	8
1.26	0.58	-1,052	-833	-614	-395	-175	44	263
1.38	0.64	-901	-660	-419	-179	62	303	544
1.49	0.69	-764	-503	-243	17	278	538	799

Table 9.

U.C. COOPERATIVE EXTENSION
 COSTS AND RETURNS - BREAKEVEN ANALYSIS
 SAN JOAQUIN VALLEY - 2000

COSTS AND RETURNS - PER ACRE BASIS for PISTACHIOS

1	2	3	4	5	6	7
Gross Returns	Operating Costs	Net Returns Above Oper. Costs (1-2)	Cash Costs	Net Returns Above Cash Costs (1-4)	Cash Costs	Net Returns Above Total Costs (1-6)
2,052	1,242	810	1,546	506	2,643	-591

COSTS AND RETURNS - TOTAL ACREAGE for PISTACHIOS

1	2	3	4	5	6	7
Gross Returns	Operating Costs	Net Returns Above Oper. Costs (1-2)	Cash Costs	Net Returns Above Cash Costs (1-4)	Total Costs	Net Returns Above Total Costs (1-6)
194,940	117,969	76,971	146,880	48,067	250,965	-56,025

BREAKEVEN PRICES PER YIELD UNIT

Clean-in-shell Pistachios

Breakeven Price to Cover - \$/lb			
Base Yield lb/acre	Operating Costs	Cash Costs	Total Costs
1600	0.70	0.87	1.48

BREAKEVEN YIELD PER ACRE for PISTACHIOS

Breakeven Yield to Cover - lb/acre			
Base Price \$/lb	Operating Costs	Cash Costs	Total Costs
1.15	968	1,206	2,060