
UNIVERSITY OF CALIFORNIA COOPERATIVE EXTENSION

2002

SAMPLE COSTS TO ESTABLISH
A MANDARIN ORCHARD AND PRODUCE

MANDARINS

Satsuma Variety



SIERRA NEVADA FOOTHILLS
Placer – Nevada Counties

Prepared by:

Cindy E. Fake

Karen A. Klonsky

Richard L. De Moura

UCCE Farm Advisor, Placer and Nevada Counties

UCCE Extension Specialist, Department of Agricultural and Resource
Economics, UC Davis

Research Associate, Department of Agricultural and Resource Economics, UC
Davis

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SAMPLE COST TO ESTABLISH A MANDARIN ORCHARD

AND PRODUCE MANDARINS (Satsuma)

Sierra Nevada Foothills – Placer/Nevada Counties 2002

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INTRODUCTION

Sample costs to establish a mandarin orchard and produce mandarins under sprinkler irrigation in the Sierra Nevada Foothills, Placer – Nevada counties are presented in this study. The 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 production practices considered typical for the crop and area, but will not apply to every situation. Sample costs for labor, materials, equipment and custom services are based on current figures. A blank column, “Your Costs”, in Tables 2 and 3 is provided for entering your farm costs.

The hypothetical farm operation, production practices, overhead, and calculations are described under the assumptions. For additional information or an explanation of the calculations used in the study call the Department of Agricultural and Resource Economics, University of California, Davis, (530) 752-3589 or your local UC Cooperative Extension office.

Sample Cost of Production Studies for many commodities are available and can be requested through the Department of Agricultural and Resource Economics, UC Davis, (530) 752-3589. Current studies can be obtained from selected county UC Cooperative Extension offices or downloaded from the department website at <http://coststudies.ucdavis.edu>.

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ASSUMPTIONS

The assumptions refer to Tables 1 to 7 and pertain to sample costs to establish a mandarin orchard and produce mandarins in the Sierra Nevada Foothills – Placer and Nevada counties. Practices described are not University of California recommendations, but represent production practices and materials considered typical of a well-managed orchard in the Placer – Nevada county region. The costs, materials, and practices shown in this study will not apply to all situations. Establishment and production cultural practices vary by grower and the differences can be significant. **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 hypothetical farm consists of 20 contiguous acres purchased for a homesite and small farm. The homeowner grower is establishing mandarins on 10 acres. Five acres are available for other crops and five acres consist of home, shop and packing shed, and irrigation system. The 10-acre orchard is established on land suitable for mandarin production and with no more than a 15% slope.

Establishment Operating Costs

Trees. Satsuma Mandarins on Trifoliolate rootstock are planted at 198 trees per acre. For this study plant spacing is 20-foot X 11-foot. Depending on the type of planting – square, hedgerow, triangle -- planting densities may range from 150 to 500 trees per acre. The trees are alternate bearing (produce a heavy crop followed by minimal production). The life of the orchard at the time of planting is estimated to be 40 years.

Land Preparation. A custom operator rips the ground 36 to 48 inches deep. The grower disks two times, then floats two times. All operations that prepare the orchard for planting are done the year prior to planting, but costs are shown in the first year.

Planting, Training, and Pruning. Contract labor marks the tree rows, plants, prunes and wraps the trees. The grower rents a soil auger to dig the holes. Pruning, training, and suckering begins the first year and labor time required for pruning may increase in the subsequent years. The grower continuously suckers the trees each year through year four and then begins maintenance pruning. It is assumed 1% of the trees will be replanted in the second year.

Fertilization. The only fertilizer applied during the first year is an agriform starter tablet (20-10-05) placed in the tree hole at planting. Nitrogen (N) applied from the second through fourth year is one-quarter pound per tree, and increases to one-half pound in the fifth year and one-pound in the eighth year. Phosphorous (P) and potassium (K) are also needed and supplied by using an NPK fertilizer. From the second year through fourth year, 6-20-20 XB (XB contains micronutrients) fertilizer is applied in January and April, and 15-15-15 in June and September. Beginning in the fifth year, 15-15-15 is applied in January, low biuret urea, manganese and zinc sulfate are applied prior to bloom in February, 6-20-20 XB in April and September.

Leaf Analysis. Leaf samples for nutrient analysis are taken in September every other year, beginning in the fourth year. One or two samples (one in this study) per 10 acres at 40 spots or locations per sample are taken for N, P, K, Zn and B analysis. Also, if using well water, analysis should be done periodically to determine

nitrate availability. Fertilizer rates in this study are a combination of typical nutrient requirements and nutrient use in the area, but do not take into account soil and water nitrogen.

Irrigation. Water is delivered from the irrigation district, stored and pumped from the reservoir through a filtration system into micro-sprinklers. Most growers in the area use solid set, but new plantings are using micro-sprinklers and thus used in the study. Water costs are the district water and reservoir pumping costs. The district delivers water for 6 months. Water and costs for the establishment years are shown in Table A. The AcIn Cost = monthly cost X 6 months divided by acin/yr. No assumption is made about effective rainfall, evaporation, or runoff.

Table A. Applied Water

Year	AcIn/Y1	Monthly Cost	AcIn Cost
1-4	12	42.53	21.26
5-7	24	79.42	29.71
8+	36	109.17	18.20

Pest Management. The pesticides and rates mentioned in this cost study as well as other materials available are listed in *UC Integrated Pest Management Guidelines, Citrus*. Pesticides mentioned in the study are commonly used, but are not recommendations.

Weeds. During the first year, the row middles are mowed five times -- one time per month from June through October. In the second year, the orchard is mowed eight times – one time per month from March through October. One strip spray (Roundup) is applied to the tree row between April and October. In the third year, the mowing continues, and two strip sprays are applied.

Insects. Scale may be a problem and is controlled with an application of summer oil (415 Oil) in July. Scale is not a problem every year, but on the average will occur once every two years starting the second or third year. Therefore, one-half of the cost is charged to the operation each year beginning in the third year. Thrips and earwig treatments may be required when the trees start producing, but these pests have not been problems in the area. It is assumed that the oil treatment in July provides some thrip control. Reduced label rates are applied to the young trees in the early years because of the small tree size – 25% rate in year 3, 50% rate years 4 to 5, 75 % rate years 6 to 7.

Diseases. None treated.

Vertebrates. Gophers can cause major losses to trees. Gophers are managed with the use of poison bait applied once per month from May to October. Deer fencing is necessary in many areas during the period of tree establishment in order to prevent excessive damage to the trees.

Harvest. Fruit produced in the second and third year is picked by the grower and discarded. Beginning in the fourth year, the fruit is picked into lugs or bins. Growers use family labor, local labor, or some may hire contract labor. Estimated picking time for three to five year old trees is 10 to 15 minutes per tree per season. The grower furnishes shears, picking bags and ladders. If a labor contractor is used, the contractor furnishes the harvesting tools. The fruit is delivered to the onsite packing shed

Table B. Estimated Annual Yields

Year	lbs/tree	lbs/acre	cartons*/acre	% No. 1s
4	11	2,228	89	20
5	35	6,910	276	30
6	36	7,059	282	40
7	52	10,207	408	50
8	94	18,592	744	60
9	153	30,200	1,208	70
10	117	23,161	926	80
11	154	30,517	1,221	80
12+	135	26,730	1,069	80

*25 lbs

Yields and Returns. Satsuma Mandarins begin bearing an economic crop in the fourth year. The fruit, based upon texture, appearance and size, is graded into Number ones and twos. Appearance is the basic difference between the two grades. Most fruit are number twos from the fourth to seventh year. The estimated yields and grading percents shown in Table B were calculated from local grower information and yield data from the Lindcove Field Research Station in Tulare County. From the data presented, the effects of alternate bearing are seen beginning in the ninth or tenth year, but may not be true in all situations.

Production Operating Costs

Pruning. The grower does maintenance pruning throughout the year.

Irrigation. Water is pumped from a reservoir, through an infiltration system into micro-sprinklers. In this study water costs \$18.19 per acre-inch for district water plus \$3.09 per acre-inch for pumping. A total of thirty-six acre-inches of water is applied to the orchard. No assumption is made about effective rainfall, evaporation, and runoff. Many growers in the area use overhead sprinklers, but new orchards are being established with micro-sprinklers.

Fertilization. Mature trees require one pound of nitrogen per tree. An NPK fertilizer, 15-15-15 is ground applied in January, low biuret urea plus zinc sulfate and manganese sulfate are applied as a foliar spray prior to bloom in February, 6-20-20 XB is ground applied in June and September.

Leaf Analysis. Leaf samples for nutrient analysis are taken in September every other year. In this study, one sample per 10 acres is taken for complete analysis and one-half of the cost is charged each year. Also, if using well water, water analysis should be done periodically to determine nitrate availability. Fertilizer rates in this study do not take into account soil and water nitrogen.

Pest Management. The pesticides and rates mentioned in this cost study are listed in *UC Integrated Pest Management Guidelines, Citrus*. For more information on other pesticides available, pest identification, monitoring, and management visit the UC IPM website at www.ipm.ucdavis.edu. For information and pesticide use permits, contact the local county agricultural commissioner's office.

Pest Control Adviser (PCA). Written recommendations are required for many pesticides and are made by licensed pest control advisers. In addition the PCA will monitor the field for agronomic problems including pests and nutrition. Growers may hire private PCA's or receive the service as part of a service agreement with an agricultural chemical and fertilizer company.

Weeds. The orchard is mowed eight times – one time per month from March through October. Two strip sprays (Roundup) are applied to the tree row between April and October.

Diseases. Brown rot and citrus blast may occasionally be a problem at which time a copper/zinc sulfate spray may be needed.

Insects. Scale can be a problem and is controlled with an application of summer oil (415 Oil) in July. Scale is not a problem every year, but on the average will occur once every two years. Therefore, one-half of

the cost is charged to the operation each year. Thrips may occasionally be a problem, but treatments occur only rarely because most fruit is sold locally and minor thrips damage has little effect on the direct market price.

Vertebrates. Gophers can cause major losses to trees. Gophers are managed with the use of poison bait applied once per month from May to October. The grower uses the ATV to deliver the bait.

Harvest. The fruit is picked three to five times from November through December. Estimated picking time for six to 10-year-old trees is one-hour per season. Older trees may take up to five-hours per season. In this study, it is assumed that the each picker picks three lugs or 120 pounds per hour. Fruit is picked into lugs or bins. One of the pickers drives the tractor and lug box trailer that holds 20 boxes to the onsite packing shed. Each round-trip takes approximately 10 minutes. Growers use family labor and/or local labor to harvest the crop.

Yields and Returns. Growers in the region estimate yields for mature trees at 150 to 200 pounds per tree and a reduction of 50% or more during the alternate or off year. In this study, an average yield of 135 pounds per tree over the two years is used to calculate returns. Returns over a range of prices and yields are shown in Table 7. Yields are shown in 25-pound cartons per acre and are based on tree yields of 90, 105, 120, 135, 150, 165, and 180 pounds and 198 trees per acre. Based on texture, appearance and size, the fruit is graded into number ones and twos. Returns on number ones are \$1.00 per pound (\$25/carton) and \$0.50 per pound (\$12.50/carton) for number twos.

Packing. The grower has a small packing shed on site. Packing costs include the sorting, packing and carton costs.

Marketing. Many growers in the area market their own produce. Selling or marketing costs will include advertising other than Placer Grown of which the grower is a member, delivery and/or shipping costs, bookkeeping and other related costs. These costs are not included in the study. Some pickup (vehicle) costs under cultural practices may be related to local deliveries. Over a ten-week period, approximately 10% of the crop will be delivered to stores for resale.

Assessment. The Citrus Research Board charges \$0.0235 per 55-pound box delivered to a packer or processor. Most growers market their own citrus, so no assessment is paid. The Placer Grown Organization charges \$40 per grower for local marketing.

Pickup/ATV. The study assumes business use mileage of 3,000 miles per year for the pickup. The pickup is used in the general operation of the ranch as well as some produce deliveries to local markets. The ATV is used for spot spraying, baiting ants and gophers and is included in those costs. Additional ATV use for checking the orchard, diseases and irrigation system is shown as an operation.

Labor. Hourly wages for workers are \$11.50 for machine operators and \$10.00 per hour non-machine labor. Adding 34% for the employers share of federal and state payroll taxes, insurance, and other possible benefits gives the labor rates shown of \$15.41 and \$13.40 per hour for machine labor and non-machine labor, respectively. Labor for operations involving machinery are 20% higher than the operation time given in Table 2 to account for the extra labor involved in equipment set up, moving, maintenance, work breaks, and field repair.

Equipment Operating Costs. Repair costs are based on purchase price, annual hours of use, total hours of life, and repair coefficients formulated by ASAE. Fuel and lubrication costs are also determined by ASAE equations based on maximum PTO horsepower, and fuel type. Prices for on-farm delivery of diesel and gasoline are \$1.26 and \$1.51 per gallon, respectively. 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 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.

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 7.40% per year. A nominal interest rate is the typical market cost of borrowed funds. The interest cost of post harvest operations is discounted back to the last harvest month using a negative interest charge.

Risk. The risks associated with crop production should not be minimized. 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 profitability and economic viability.

Cash Overhead Costs

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

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 two on a per acre basis.

Insurance. Insurance for farm investments varies depending on the assets included and the amount of coverage. Property insurance provides coverage for property loss and is charged at 0.660% of the average value of the assets over their useful life. Liability insurance covers accidents on the farm and costs \$409 for the entire farm.

Office Expense. Office and business expenses are estimated at \$300 per acre. These expenses include office supplies, telephones, bookkeeping, accounting, legal fees, shop and office utilities, and miscellaneous administrative charges.

Management/Supervisor Salaries. The grower farms the orchard; therefore no salaries are included for management. Returns above costs are considered a return to management.

Investment Repairs. Annual maintenance is calculated as two percent of the purchase price.

Non-Cash Overhead Costs

Non-cash overhead is calculated as the capital recovery cost for equipment and other farm investments.

Capital Recovery Costs. Capital recovery cost is the annual depreciation and interest costs for a capital investment. It is the amount of money required each year to recover the difference between the purchase price and salvage value (unrecovered capital). It is equivalent to the annual payment on a loan for the investment with the down payment equal to the discounted salvage value. This is a more complex method of calculating ownership costs than straight-line depreciation and opportunity costs, but more accurately represents the annual costs of ownership because it takes the time value of money into account (Boehlje and Eidman). The formula for the calculation of the annual capital recovery costs is $((\text{Purchase Price} - \text{Salvage Value}) \times \text{Capital Recovery Factor}) + (\text{Salvage Value} \times \text{Interest Rate})$.

Salvage Value. Salvage value is an estimate of the remaining value of an investment at the end of its useful life. For farm machinery (tractors and implements) the remaining value is a percentage of the new cost of the investment (Boehlje and Eidman). The percent remaining value is calculated from equations developed by the American Society of Agricultural Engineers (ASAE) based on equipment type and years of life. The life in years is estimated by dividing the wear out life, as given by ASAE by the annual hours of use in this operation. For other investments including irrigation systems, buildings, and miscellaneous equipment, the value at the end of its useful life is zero. The salvage value for land is the purchase price because land does not depreciate. The purchase price and salvage value for equipment and investments are shown in Table 5.

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 6.41% 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. This represents the long-term interest rate of return that can only be used effectively in the agricultural sector.

Establishment Cost. Costs to establish the orchard are used to determine capital recovery expenses, depreciation, and interest on investment for the production years. Establishment cost is the sum of the costs for land preparation, planting, trees, cash overhead and production expenses for growing the trees through the first year that mandarins are harvested minus any returns from production. The Total Accumulated Net Cash Cost on Table 1, in the fourth year represents the establishment cost. For this study the cost is \$9,692 per acre or \$96,920 for the 10-acre orchard. The establishment cost is spread over the remaining 36 years of the 40 years the orchard is in production. Establishment costs in this study are based on typical basic operations, but can vary considerably, depending upon terrain, soil type, local regulations, and other factors. For example, development on marginal soils will require additional land preparation and soil amendments. Management/Development companies will have additional labor costs.

Irrigation System. A reservoir is built on the site to store water from the water district. A new 15 horsepower booster pump, and filtration/injector station is installed along with the irrigation system at planting. The reservoir, pumps, filtration station, fertilizer injector system, micro-sprinklers and the labor to install the components are included in the irrigation system cost. Micro-sprinkler lines are laid out after planting. The pump is lifting the water 20-feet. The irrigation system is considered an improvement to the property and has a 40-year life.

Land. Land in this study is valued at \$30,000 per acre.

Building. The building complex is assumed to be 1,800 square feet of metal buildings and sheds on cement slabs. The building complex includes a packing shed area.

Tools. This includes shop and packing shed equipment and tools, hand tools, and miscellaneous field tools - pruning, picking - and lug boxes. The value is an approximation and not based on a specific inventory.

Fuel Tanks. One 100-gallon fuel tank using gravity feed is on metal stands. The tank is setup in a cement containment pad that meets federal, state, and county regulations.

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 40% 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) or your local county Cooperative Extension office.

UC COOPERATIVE EXTENSION
Table 1. SAMPLE COSTS TO ESTABLISH A MANDARIN ORCHARD
 Sierra Nevada Foothills – Placer and Nevada Counties 2002

	Costs Per Acre					
	Year:	1st	2nd	3rd	4th	5th
Cartons (25 lb) per acre No. 1s:					18	83
Cartons (25 lb) per acre No. 2s:					71	193
Planting Costs:						
Land Preparation - Subsoil 2X		250				
Land Preparation - Disc 2X		16				
Land Preparation - Float 2X		14				
Mark Tree Rows		83				
Layout, Plant, Stake, Wrap Trees, Fertilize		406	4			
Trees: 198 Per Acre (1% Replant In 2nd Year)		1,881	19			
Paint And Put Trunk Guards Trees						
TOTAL PLANTING COSTS		2,650	23			
Cultural Costs:						
Training, Pruning, & Suckering			11	11	11	11
Weed Control - Tree Rows			3	6	6	6
Disease Control - Scale 1/2 cost each year				13	18	18
Fertilize Low Biuret Urea/Zn/Mn						22
Vertebrate Control -Gopher			30	30	30	30
Fertilizer			112	112	112	136
Weed Control - Mow Middle 5X Yr 1, 8X Yr 2+		18	41	41	41	41
Irrigate		379	379	379	379	469
Pickup Truck Use		238	238	238	238	238
ATV Truck Use		42	84	84	84	85
Leaf Analysis					16	16
TOTAL CULTURAL COSTS		677	898	914	935	1,072
Harvest Costs:						
Pick					442	482
Haul					22	31
Pack					131	408
Assessments					4	4
TOTAL HARVEST COSTS					599	925
Interest On Operating Capital @ 7.40%		124	43	42	46	54
TOTAL OPERATING COSTS/ACRE		3,451	964	956	1,580	2,051
Cash Overhead Costs:						
Office Expense		300	300	300	300	300
Liability Insurance		20	20	20	20	20
Property Taxes		345	346	346	347	347
Property Insurance		228	227	228	229	229
Investment Repairs		126	126	126	126	126
TOTAL CASH OVERHEAD COSTS		1,019	1,017	1,020	1,022	1,022
TOTAL CASH COSTS/ACRE		4,470	1,981	1,976	2,602	3,073
INCOME/ACRE FROM PRODUCTION					1,338	4,488
NET CASH COSTS/ACRE FOR THE YEAR		4,470	1,981	1,976	1,265	
PROFIT/ACRE ABOVE CASH COSTS						1,415
ACCUMULATED NET CASH COSTS/ACRE		4,470	6,451	8,427	9,692	8,277

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Table 1. continued

	Year	Costs Per Acre				
		1st	2nd	3rd	4th	5th
Cartons (25 lb) per acre No. 1s					18	83
Cartons (25 lb) per acre No. 2s					71	193
Non-Cash Overhead Costs:						
Shop Building		273	273	273	273	273
Land		1,923	1,923	1,923	1,923	1,923
Fuel Tanks		13	13	13	13	13
Shop/Packing Shed/Field Tools		56	56	56	56	56
Sprinkler Irrigation System		140	140	140	140	140
Equipment		233	216	244	263	263
TOTAL NON-CASH OVERHEAD COST/ACRE		2,638	2,621	2,649	2,668	2,668
TOTAL COST/ACRE FOR THE YEAR		7,108	4,602	4,625	5,270	5,741
INCOME/ACRE FROM PRODUCTION					1,338	4,488
TOTAL NET COST/ACRE FOR THE YEAR		7,108	4,602	4,625	3,933	1,254
NET PROFIT/ACRE ABOVE TOTAL COST						
TOTAL ACCUMULATED NET COST/ACRE		7,108	11,710	16,335	20,268	21,521

UC COOPERATIVE EXTENSION
Table 2. COST PER ACRE TO PRODUCE MANDARINS
 SIERRA NEVADA FOOTHILLS - 2002

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:								
Prune: Maintenance Pruning	0.80	11	0	0	0	11		
Weed: Mow Middle 8X	1.77	33	9	0	0	41		
Irrigate	21.60	289	0	766	0	1,056		
Weed: Spray Tree Rows	0.20	4	0	2	0	6		
Fertilize 15-15-15	0.03	1	0	64	0	64		
Fertilize LowBiuret/Zn/Mn	0.46	8	2	16	0	27		
Fertilize 6-20-20 XB	0.05	1	0	244	0	245		
Pest: Gopher 6X	1.20	22	1	5	0	28		
Insect: Scale (alternate yrs. 0.5 cost/yr)	0.23	7	1	18	0	26		
Pickup Truck Use	10.00	185	53	0	0	238		
ATV Use	4.40	81	3	0	0	84		
Fertilizer: Leaf Samples	0.15	2	0	15	0	17		
TOTAL CULTURAL COSTS	40.89	644	69	1,130	0	1,843		
Harvest:								
Pick Fruit 4X	248.00	3,323	0	0	0	3,323		
Haul	5.57	103	21	0	0	124		
Packing Shed	19.00	255	0	1,336	0	1,591		
Assessments	0.00	0	0	4	0	4		
TOTAL HARVEST COSTS	272.57	3,681	21	1,340	0	5,042		
Interest on operating capital @ 7.40%							118	
TOTAL OPERATING COSTS/ACRE		4,325	90	2,470	0	7,003		
TOTAL OPERATING COSTS/Carton							6.55	
CASH OVERHEAD:								
Office Expense							300	
Liability Insurance							20	
Property Taxes							395	
Property Insurance							261	
Investment Repairs							126	
TOTAL CASH OVERHEAD COSTS							1,102	
TOTAL CASH COSTS/ACRE							8,106	
TOTAL CASH COSTS/Carton							7.58	
NON-CASH OVERHEAD:								
		Per producing		Annual Cost				
Investment		Acres		Capital Recovery				
Buildings		3,600		273			273	
Fuel Tanks		150		13			13	
Shop Tools		550		56			56	
Land		30,000		1,923			1,923	
Irrigation System		2,000		140			140	
Establishment Cost		9,692		696			696	
Equipment		2,500		263			263	
TOTAL NON-CASH OVERHEAD COSTS		48,492		3,364			3,364	
TOTAL COSTS/ACRE							11,469	
TOTAL COSTS/Carton							10.73	

UC COOPERATIVE EXTENSION
Table 3. COSTS AND RETURNS PER ACRE TO PRODUCE MANDARINS
 SIERRA NEVADA FOOTHILLS - 2002

Quantity/Acre		Unit	Price or Cost/Unit	Value or Cost/Acre	Your Cost
GROSS RETURNS					
#1s	855.00	crt	25.00	21,375	
#2s	214.00	crt	12.50	2,675	
TOTAL GROSS RETURNS	1,069.00	crt		24,050	
OPERATING COSTS					
Irrigation:					
Water-Pumping Costs	36.00	acin	3.09	111	
Water-District	36.00	acin	18.19	655	
Herbicide:					
Roundup Ultra	0.26	pint	6.75	2	
Fertilizer:					
15-15-15	330.00	lb	0.19	64	
Urea Low Biuret	69.30	lb N	0.03	2	
Zinc Sulfate 36%	5.00	lb	2.50	13	
Techmangan (MnSO4)	5.00	lb	0.40	2	
6-20-20 XB	1,320.00	lb	0.19	244	
Leaf Analysis	0.50	each	30.00	15	
Rodenticide:					
Wilco 1.8 Gopher	1.50	lb	3.59	5	
Insecticide:					
Spray Oil 415	5.00	gal	3.50	18	
Miscellaneous:					
Carton 25 lb	1,069.00	25 lb crt	1.25	1,336	
Assessment:					
Placer Grown	1.00	acre	4.00	4	
Labor (machine)	28.68	hrs	15.41	442	
Labor (non-machine)	289.77	hrs	13.40	3,883	
Fuel - Gas	26.24	gal	1.51	40	
Fuel - Diesel	17.30	gal	1.26	22	
Lube				9	
Machinery repair				19	
Interest on operating capital @ 7.40%				118	
TOTAL OPERATING COSTS/ACRE				7,004	
TOTAL OPERATING COSTS/Carton				6.55	
NET RETURNS ABOVE OPERATING COSTS				17,047	
CASH OVERHEAD COSTS:					
Office Expense				300	
Liability Insurance				20	
Property Taxes				395	
Property Insurance				261	
Investment Repairs				126	
TOTAL CASH OVERHEAD COSTS/ACRE				1,103	
TOTAL CASH COSTS/ACRE				8,106	
TOTAL CASH COSTS/Carton				7.58	

UC COOPERATIVE EXTENSION
Table 3. continued

Quantity/Acre	Unit	Price or Cost/Unit	Value or Cost/Acre	Your Cost
NON-CASH OVERHEAD COSTS				
Buildings			273	
Fuel Tanks			13	
Shop Tools			56	
Land			1,923	
Irrigation System			140	
Establishment Cost			694	
Equipment			263	
TOTAL NON-CASH OVERHEAD COSTS/ACRE			3,364	
TOTAL COSTS/ACRE			11,469	
TOTAL COSTS/Carton			10.73	
NET RETURNS ABOVE TOTAL COSTS			12,581	

UC COOPERATIVE EXTENSION
Table 4. MONTHLY CASH COSTS PER ACRE TO PRODUCE MANDARINS
 SIERRA NEVADA FOOTHILLS - 2002

Beginning JAN 02	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	TOTAL
Ending DEC 02	02	02	02	02	02	02	02	02	02	02	02	02	
Cultural:													
Prune: Maintenance Pruning					11								11
Weed: Mow Middle 8X			5	5	5	5	5	5	5	5			41
Irrigate				88	176	176	176	176	176	88			1,056
Weed: Spray Tree Rows					3		3						6
Fertilize 15-15-15	64												64
Fertilize LowBiuret/Zn/Mn		27											27
Fertilize 6-20-20 XB						123			123				245
Pest: Gopher 8X					5	5	5	5	5	5			28
Disease: Scale (alternate years 0.5 cost/yr)							26						26
Pickup Truck Use	20	20	20	20	20	20	20	20	20	20	20	20	238
ATV Use	7	7	7	7	7	7	7	7	7	7	7	7	84
Fertilizer Leaf Samples									17				17
TOTAL CULTURAL COSTS	91	54	32	120	227	336	242	213	353	125	27	27	1,843
Harvest:													
Pick Fruit 4X											1,662	1,662	3,323
Haul											62	62	124
Packing Shed											795	796	1,591
Assessments												4	4
TOTAL HARVEST COSTS											2,519	2,524	5,042
Interest on operating capital	1	1	1	2	3	5	7	8	10	11	27	42	118
TOTAL OPERATING COSTS/ACRE	92	55	33	122	229	341	248	221	363	136	2,572	2,593	7,003
TOTAL OPERATING COSTS/Cartron	0.09	0.05	0.03	0.11	0.21	0.32	0.23	0.21	0.34	0.13	2.41	2.43	6.55
OVERHEAD:													
Office Expense	25	25	25	25	25	25	25	25	25	25	25	25	300
Liability Insurance	2	2	2	2	2	2	2	2	2	2	2	2	20
Property Taxes	198						198						395
Property Insurance	130						130						261
Investment Repairs	10	10	10	10	10	10	10	10	10	10	10	10	126
TOTAL CASH OVERHEAD COSTS	365	37	37	37	37	37	365	37	37	37	37	37	1,103
TOTAL CASH COSTS/ACRE	457	92	70	159	267	378	613	258	400	173	2,607	2,630	8,106
TOTAL CASH COSTS/Cartron	0.43	0.09	0.07	0.15	0.25	0.35	0.57	0.24	0.37	0.16	2.44	2.46	7.58

UC COOPERTIVE EXTENSION
Table 5. WHOLE FARM ANNUAL EQUIPMENT, INVESTMENT, AND BUSINESS OVERHEAD COSTS
 SIERRA NEVADA FOOTHILLS - 2002

ANNUAL EQUIPMENT COSTS

Description	Price	Yrs Life	Salvage Value	Capital Recovery	- Cash Overhead -			Total
					Insur- ance	Taxes		
02 40 HP 2WD Tractor	22,500	20	2,887	1,952	84	127		2,163
02 ATV 4WD	5,100	20	654	443	19	29		490
02 Mower-Rotary 5'	4,075	20	212	362	14	21		397
02 Pickup Truck 1/2 Ton	19,065	7	7,232	2,614	87	131		2,833
02 Sprayer-20 gal	250	15	24	25	1	1		28
02 Sprayer Orchard PTO/wand	8,000	20	417	710	28	42		780
02 Bin/Box Trailer	3,500	20	182	311	12	18		341
TOTAL	62,490		12,460	6,569	247	375		7,191
40% of New Cost *	24,996		4,984	2,628	99	150		2,876

* 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	
Buildings	36,000	30		2,731	119	180	720	3,750
Establishment Cost	96,920	36		6,956	320	485	0	7,760
Fuel Tank	1,500	40	150	131	5	8	30	175
Land	600,000	40	600,000	38,460	3,960	6,000	0	48,420
Tools/Equipment	5,500	15	550	559	20	30	110	719
Irrigation System	20,000	40		1,399	66	100	400	1,965
TOTAL INVESTMENT	759,920		600,700	50,236	4,490	6,803	1,260	62,789

ANNUAL BUSINESS OVERHEAD COSTS

Description	Units/		Price/ Unit	Total Cost
	Farm	Unit		
Liability Insurance	20	acre	20.45	409
Office Expense	10	acre	400.00	4,000

UC COOPERATIVE EXTENSION
Table 6. HOURLY EQUIPMENT COSTS
 SIERRA NEVADA FOOTHILLS - 2002

Yr Description	COSTS PER HOUR								Total Costs/Hr.
	Actual Hours Used	Cash Overhead			Operating			Total Oper.	
		Capital Recovery	Insur- ance	Taxes	Repairs	Fuel & Lube			
02 40 HP 2WD Tractor	88.2	8.85	0.38	0.58	0.60	2.85	3.45		13.26
02 ATV 4WD	58.8	4.05	0.15	0.22	0.32	0.35	0.67		5.09
02 Mower-Rotary 5'	17.7	8.17	0.32	0.48	1.14	0.00	1.14		10.12
02 Pickup Truck 1/2 Ton	100.0	10.46	0.35	0.53	0.93	4.34	5.27		16.60
02 Sprayer-20g	2.0	5.19	0.18	0.28	0.04	0.00	0.04		5.70
02 Sprayer Orchard PTO with wand	6.9	41.34	1.62	2.45	0.83	0.00	0.83		46.24
02 Trailer for Bin/Box	55.7	2.23	0.09	0.13	0.00	0.00	0.00		2.45

UC COOPERATIVE EXTENSION
Table 7. RANGING ANALYSIS
 SIERRA NEVADA FOOTHILLS - 2002

COSTS PER ACRE AT **VARYING YIELDS** TO PRODUCE MANDARINS

	YIELD (25 lb cartons/acre)						
	713	832	950	1,069	1,188	1,307	1,426
OPERATING COSTS/ACRE:							
Cultural Cost	1,843	1,843	1,843	1,843	1,843	1,843	1,843
Harvest Cost (includes packing)	3,913	4,292	4,663	5,038	5,413	5,792	6,168
Assessment Cost	4	4	4	4	4	4	4
Interest on operating capital	106	110	114	118	122	126	130
TOTAL OPERATING COSTS/ACRE	5,866	6,249	6,624	7,003	7,382	7,765	8,145
TOTAL OPERATING COSTS/ton	8.23	7.51	6.97	6.55	6.21	5.94	5.71
CASH OVERHEAD COSTS/ACRE							
TOTAL CASH COSTS/ACRE	6,969	7,352	7,727	8,106	8,485	8,868	9,248
TOTAL CASH COSTS/ton	9.77	8.84	8.13	7.58	7.14	6.79	6.49
NON-CASH OVERHEAD COSTS/ACRE							
TOTAL COSTS/ACRE	10,332	10,715	11,090	11,469	11,848	12,231	12,611
TOTAL COSTS/ton	14.49	12.88	11.67	10.73	9.97	9.36	8.84

NET RETURNS PER ACRE **ABOVE OPERATING COSTS** for MANDARINS

PRICE (\$/carton)		YIELD (25 lb cartons/acre)						
#1s	#2s	570	666	760	855	950	1,046	1,141
		143	166	190	214	238	261	285
17.50	8.75	5,360	6,859	8,339	9,832	11,326	12,824	14,316
20.00	10.00	6,964	8,731	10,476	12,237	13,998	15,765	17,525
22.50	11.25	8,568	10,604	12,614	14,642	16,671	18,706	20,734
25.00	12.50	10,172	12,476	14,751	17,047	19,343	21,648	23,943
27.50	13.75	11,775	14,349	16,889	19,452	22,016	24,589	27,151
30.00	15.00	13,379	16,221	19,026	21,857	24,688	27,530	30,360
32.50	16.25	14,983	18,094	21,164	24,262	27,361	30,471	33,569

NET RETURNS PER ACRE **ABOVE CASH COSTS** for MANDARINS

PRICE (\$/carton)		YIELD (25 lb cartons/acre)						
#1s	#2s	570	666	760	855	950	1,046	1,141
		143	166	190	214	238	261	285
17.50	8.75	4,257	5,756	7,236	8,729	10,223	11,721	13,213
20.00	10.00	5,861	7,628	9,373	11,134	12,895	14,662	16,422
22.50	11.25	7,465	9,501	11,511	13,539	15,568	17,603	19,631
25.00	12.50	9,069	11,373	13,648	15,944	18,240	20,545	22,840
27.50	13.75	10,672	13,246	15,786	18,349	20,913	23,486	26,048
30.00	15.00	12,276	15,118	17,923	20,754	23,585	26,427	29,257
32.50	16.25	13,880	16,991	20,061	23,159	26,258	29,368	32,466

NET RETURNS PER ACRE **ABOVE TOTAL COSTS** for MANDARINS

PRICE (\$/carton)		YIELD (25 lb cartons/acre)						
#1s	#2s	570	666	760	855	950	1,046	1,141
		143	166	190	214	238	261	285
17.50	8.75	894	2,393	3,873	5,366	6,860	8,358	9,850
20.00	10.00	2,498	4,265	6,010	7,771	9,532	11,299	13,059
22.50	11.25	4,102	6,138	8,148	10,176	12,205	14,240	16,268
25.00	12.50	5,706	8,010	10,285	12,581	14,877	17,182	19,477
27.50	13.75	7,309	9,883	12,423	14,986	17,550	20,123	22,685
30.00	15.00	8,913	11,755	14,560	17,391	20,222	23,064	25,894
32.50	16.25	10,517	13,628	16,698	19,796	22,895	26,005	29,103