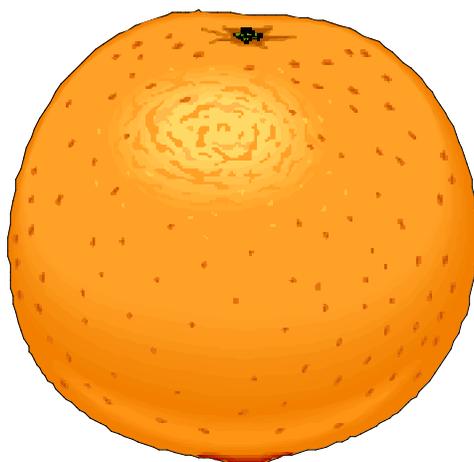


Establishment and Production Costs

Valencia Oranges San Diego County, 1998



By

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INTRODUCTION

Detailed costs for Valencia orange grove establishment and production in San Diego County are presented in this study. The hypothetical grove used in this report consists of a total of 20 acres, 18 of which are being either newly established, or replanted, and the remaining two acres are in buildings and roads.

We base this study on assumptions of production practices and costs that are considered typical for Valencia orange grove establishment and production in San Diego County. These production practices and costs are an amalgamation of costs and practices obtained from survey of growers and other agricultural institutions in the region. Sample costs given for labor, materials, equipment and contract services are based on 1998 prices. This study is intended as a guide. It can be used in making production decisions, determining potential returns, preparing budgets and evaluating production loans.

Costs are presented in seven tables. All costs are presented on a per acre basis.

- Table 1. Grove Establishment Costs**
- Table 2. Production Costs**
- Table 3. Production Costs And Returns**
- Table 4. Production Monthly Cash Costs**
- Table 5. Whole Farm Equipment List, Prices, and Annual Investment and Business Overhead Costs**
- Table 6. Hourly Equipment Costs**
- Table 7. Analysis Of Costs And Returns At A Range of Prices And Yields**

A blank *Your Cost* column is provided to enter your actual costs in **Tables 2 and 3**.

For an explanation of calculations used for the study refer to the attached General Assumptions, call the Southern Regional Farm Management Economics Advisor, Etaferahu Takele, University of California Cooperative Extension, at (909) 683-6491 ext. 243 or call the San Diego County Subtropical Horticulture Farm Advisor, Gary Bender, (619) 694-2856.

ASSUMPTIONS

The following is a description of the assumptions used in the preparation of this cost study.

1. LAND

The grove is comprised of 20 acres of Valencia oranges. Open land is valued at \$7,500 per acre. Because only 18 of the 20 acres are planted to oranges, land is valued at \$8,250 per plantable acre.

2. TREES

Orange trees are planted on a 20'x20' spacing with 108 trees per acre. In the second year of establishment, 2% of the original stand, or 3 trees per acre, will be replanted. The orange trees are expected to begin yielding fruit in the third year of establishment and then be productive for up to 40 years.

3. IRRIGATION & FROST PROTECTION

Irrigation: Water to the tree is applied through micro-sprinklers that are placed one per tree. The underground portion of the irrigation system is installed prior to planting. The sprinklers are placed at the time of planting. The cost for the irrigation system includes the cost of a filtration system, PVC irrigation lines, valves, risers, sprinklers and installation. The life of the irrigation system is estimated at 30 years.

The cost of water to irrigate crops in San Diego County varies greatly from region to region within the county. Also, it varies whether a well or district water is used. In this study, district water is used for irrigation and is calculated at \$600.00 per acre-foot. Labor required for irrigation involves turning the system on, monitoring and maintaining irrigation lines and sprinklers. The amount of irrigation water applied varies by age of trees as shown in **Table A**. Typically irrigation begins in March and lasts until October, although this varies greatly depending on the amount of rainfall. In this study, no assumption is made about effective rainfall.

Table A. Applied Irrigation Water

Year	Yearly Water Applications
Year 1	3 Ac In
Year 2	9 Ac In
Year 3	18 Ac In
Year 4	21 Ac In
Year 5	24 Ac In
Year 6 +	36 Ac In

Frost Protection System: Wind machines and orchard heaters are used for frost protection. In this study, each wind machine serves an area of ten acres. In addition, orchard heaters are used at about 30 per acre. The cost of diesel fuel for the orchard heaters is spread over eight years. Water is also used as an aid against frost damage.

The cost of purchasing and installing the wind machines and orchard heaters is shown in **Table 5**. Other costs related to frost protection include the yearly maintenance and upkeep for the wind machines and orchard heaters and diesel fuel for the orchard heaters. These costs are shown in the cultural costs for frost control.

4. ESTABLISHMENT CULTURAL PRACTICES

This grove is established on ground that is currently open land. The land is assumed to be slightly hilly with sandy loam soils that are adequately drained and moderately fertile. The practices described below represent only the hypothetical grove in this study. These are typical practices for many groves in San Diego County, but may not apply to every situation.

Land Preparation: In this operation, the land is cleared of trees and leveled using a bulldozer tractor with a land scraper attachment. This is done using a custom operator at \$800 per acre.

Planting: This study assumes that 108 trees per acre are planted by contract labor. The cost is shown in Table 1.

Pruning: Orange trees will normally develop a spherical canopy during their establishment growth. Therefore, only light pruning is done during the establishment years to develop the structure of the tree. Removing low-hanging branches also helps to lessen the threat of infestation of ants and snails and helps to increase water distribution from the mini-sprinklers.

Insect and Disease Management: Ants are the primary pest of Valencia oranges in San Diego County and can be controlled with several insecticides. In this study, ants are treated with Lorsban applied to the lower trunk of the tree, as well as the soil at the base of the trunk and anthills. It is applied twice a year, once in early spring and again in early summer.

Snails can also become a significant problem in San Diego County. Infestations can be prevented or contained using several methods. In this study, a combination of treatments which include poisonous bait and painting of tree trunks with liquid copper is used. Copper applied to tree trunks serves as a fertilizer as well as providing a secondary benefit of controlling snails.

Brown Rot, a fungal disease common to citrus, is not considered a significant problem in Valencia orange production in San Diego County. Therefore, in this study, Brown Rot cultural practices and costs are not included.

Grove Floor Management: Weed control begins in the first year of establishment by spraying broadleaf and grass weeds in each tree row with Roundup. Roundup is applied at 1 quart per acre during years one and two of grove establishment. It is important not to spray Roundup on the trunks of young trees. Also, some hand weeding is done near the trunk of the trees during the first year of establishment.

Beginning in the second year and throughout establishment, a spot spray of Roundup, (at approximately 13 ounces per acre per year) is used to control sporadic weed growth.

Starting in the third year of establishment, and continuing through mature production, a pre-emergent herbicide is used to control weeds in the tree rows. In this study, Princep Caliber 90 is applied once per year in the early spring.

Native weeds and grasses in the tree row middles are used as a cover crop in San Diego County. The tree row middles are mowed once every other month in the spring, winter and fall, and twice per month during the summer months. The native grasses and weeds are maintained to provide a habitat for beneficial insects and aid in erosion prevention.

Fertilization: Nitrogen (N) fertilizer is applied in all years of grove establishment through the irrigation system. The amount of fertilizer application during the establishment years is shown in **Table B**. Each year the fertilizer is applied four times in equal proportions in February, June, August and October.

Table B. Pounds Of Nitrogen Fertilizer Applied During Valencia Orange Grove Establishment

Establishment Year	Pounds of N Per Tree	Pounds of N Per Acre
Year 1	0.10	10.80
Year 2	0.20	21.60
Year 3	0.30	32.40
Year 4	0.50	54.00
Year 5	0.75	81.00

Citrus trees grown in the south coast region of California can often be deficient in micro-nutrients. In this study, we included two foliar sprays of micro-mineral fertilizers. The first is a mixture of Zinc Sulfate and Manganese Sulfate, applied in the spring. The second spray, a combination of Zinc and Copper (also known as Kocide) is applied in the fall.

Vertebrate Pest Management: Vertebrate pests require constant control in orange groves. The principal pest is gophers. Gophers can cause severe damage to a tree by feeding on the root system and the bark of tree below the soil line. In this study, costs of trapping and baiting are included for controlling gopher populations.

Squirrels can also cause erosion problems by their extensive tunneling, especially on hill sides. They may also occasionally gnaw on fruit and irrigation tubing. Control for squirrels included in this study are trapping, fumigants and/or baiting.

Establishment Cost: The establishment period included five years in our study. This is because trees are assumed not to reach mature production until year six. This is different from the establishment years in the United States Tax Code which includes only through year four of establishment. For tax purposes growers should consult the Farmer's Tax Guide or a Tax Accountant. For this study the total Accumulated Net Cash Cost on **Table 1** in the fifth year, represents the establishment cost. The cost is **\$9510** per acre or **\$171,180** for the 18 acre grove. The establishment cost is spread over 35 productive years.

5. PRODUCTION CULTURAL PRACTICES

Pruning: During the production period, the pruning of Valencia orange trees consists primarily of the skirt pruning of low-hanging branches. This allows water from sprinklers to reach the outer edge of the tree canopy and help in the development of tree feeder root system. Also, hedging and topping is done by machine. This procedure often begins sometime between the tenth and fifteenth year. Topping of the trees provides for a convenient picking height and allows for greater sunlight to reach into the canopy of the tree. The prunings are placed in the row middles where they are chopped using a flail mower.

Fertilization: Nitrogen is applied at a rate of 1.0 pound actual N per tree per year through the irrigation system. As in the establishment period, the grove in this study is sprayed with a foliar spray of Zinc Sulfate and Manganese Sulfate in the spring and a foliar spray of Kocide in the fall. Kocide, a copper compound, also aids in frost protection of leaves and fruit.

An application of potassium nitrate on Valencia oranges is a common cultural practice in San Diego County. It is believed that this practice decreases the creasing and puffing of fruit, and, thereby, increases its marketability. A foliar spray of potassium nitrate is applied at a rate of 40 pounds per acre per year.

Grove Floor Management: Weeds in the tree row are controlled using a pre-emergent herbicide, such as Princep Caliber 90 once a year. Occasional weed growth is treated with a spot spray of Roundup using approximately 25 ounces per acre per year. As in the establishment period, tree row middles are mowed.

Insect Management: As in the establishment period, ants are controlled with applications of Lorsban. Snail infestation is prevented in several ways including pruning of low-hanging limbs, the application of poisonous snail bait and the painting of tree trunks with liquid copper fertilizer.

Pesticides, rates, and cultural practices mentioned in this cost study are a few of those listed in the *University of California Integrated Pest Management Guideline for Citrus*. Written recommendations are required for all pesticides and are made by licensed pest control advisors (PCA). For pesticide regulatory information and pesticide use permits, contact the county Agricultural Commissioner's office in San Diego. For additional production information contact the San Diego County citrus farm advisor.

6. YIELDS

Valencia orange trees begin bearing fruit in the third year after planting. We consider years 1 to 5 as establishment and year 6+ as mature production. Yield is measured in boxes as shown in **Table C**. A box weighs approximately 50 pounds.

Table C. Typical Yield of Valencia Oranges Per Acre in San Diego County.

Age of Tree	Boxes ¹ Per Acre
Year 1	0
Year 2	0
Year 3	80
Year 4	250
Year 5	500
Year 6 +	800 (average)

1) A box weighs 50 pounds

7. HARVEST

Harvesting starts in the third year. In this cost study, harvesting is done by contracted labor crew. Hauling to a local packing house is also contracted by the grower. For growers that use their own crews, the actual costs must be reflected in the harvesting and hauling sections of **Tables 1** and **2**.

Harvesting of Valencia oranges is generally done from the middle of May through the middle of September. Typically growers pick their crop once and occasionally two times. We considered one harvest in July.

In this study, charges for picking, hauling, packing and marketing are approximations obtained from several packing houses in the region during the 1995 to 1998 seasons. Costs are based on an average that 65% of the fruit is packed and marketed fresh, 35% is used as juice. These averages are based on data from packing houses and the San Diego County Crop Statistics and Annual Report.

We used the following rates: \$2.00 per field box for picking, hauling, forklift use and field overhead, \$2.75 per field box for packing and marketing and \$0.35 per field box for juice handling.

8. PRICES/RETURNS

We used a price / gross return of \$9.75 per field box as the basis of analysis. This price is an average of some packing houses during the 1995 to 1998 seasons. However, to cover a broader scenario of productivity and prices, we provided a range analysis in **Table 7**.

9. RISK

The risks associated with orange grove establishment and production should be noted. 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 Valencia orange production. Risk is caused by various sources of uncertainty which include production, price, and financing. Examples of these risks are insect damage, severe frost, disease, a decrease in price, and increase in interest rates. Because of the risk involved, access to information on production practices, prices, and markets is crucial.

10. LABOR

In this study we used an hourly rate of \$7.50 per hour for both machine and non-machine workers. This is based on average wages paid by the growers in this study. Growers also pay for benefits including, Workers Compensation, Social Security, Medicare, insurance, and other possible benefits. In this study, growers surveyed showed that benefits increased labor wages by 34%. This brings the labor rate to \$10.05 per hour for both machine and non-machine workers.

Labor hours for machinery operation include time for equipment setup, moving, maintenance and repair. Therefore an additional 20% is added on machinery hours to account for such activities.

11. CASH OVERHEAD

Cash overhead consists of various cash expenses paid out during the year that are assigned to the whole farm. These costs include property taxes, interest on operating capital, office expense, liability and property insurance, sanitation services, and equipment repairs. Cash overhead costs are found in **Tables 1, 2, 3, 4, and 5**.

Property Taxes: Counties charge a base property tax 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 at 1% of the average value of the property. Average value for equipment, buildings and improvements equals new cost plus salvage value divided by 2 on a per acre basis (with the exception of land.)

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 9.50% per year. A nominal interest rate is the going 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 0.713% of the average value of the assets over their useful life. Liability insurance covers accidents on the farm and costs \$359 for the entire farm.

Office Expense: Office and business expenses are estimated at \$50 per acre. These expenses include office supplies, telephone, computer, fax, copier, bookkeeping, accounting, legal fees, etc.

12. NON-CASH OVERHEAD

Non-cash overhead is comprised of depreciation and interest charged on equipment and other investments. Typically, farm equipment in San Diego County is a mixture of new and old equipment. In this study, the current purchase price for new equipment is reduced by 40% to indicate a mix of new and used equipment. Annual equipment and investment costs are shown in **Tables 1, 2, 3, and 5**. They represent the per acre depreciation and interest costs for -each investment on an annual basis.

Depreciation: Depreciation is a reduction in market value of investments due to wear, obsolescence, and age, and is on a straight line basis. Annual depreciation is calculated as

purchase price minus salvage value divided by years of ownership of the investment. The purchase price and years of life are shown in **Table 5**.

Interest On Investment: The interest charge for the use of capital in Valencia orange production is calculated by multiplying the value of land and the average investment in equipment, buildings, trees, etc. (described in **Table 5**) by the real cost of capital in current dollars. The real cost of capital used in this study is the long run average of 4%. Average investment for equipment, building and improvements equals the new cost plus salvage value divided by 2.

13. 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 the equipment costs on a per acre basis, the hourly charges are calculated first and shown in **Table 6**. 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 for a given operation to account for setup time. Prices for on-farm delivery of diesel and gasoline are \$0.85 and \$1.20 per gallon, respectively.

14. ADDENDUM

1. Due to rounding, totals may be slightly different from the sum of components.
2. The per acre equipment costs in **Table 1** reflect both the value and the level of use (hours and years of use) of the machinery complement. Therefore this cost could be different from the per acre value of the machinery complement in **Table 4**.

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ACKNOWLEDGMENT

We express our appreciation to those growers and other cooperators who provided data for the development of this cost study. 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.

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Table 1.

U.C. COOPERATIVE EXTENSION
 SAMPLE COSTS PER ACRE TO ESTABLISH A VALENCIA ORANGE GROVE
 VENTURA COUNTY - 1998

Labor Rates: \$10.05/hr. machine
 \$10.05/hr. non-machine

Trees/acre: 108
 Long Term Interest Rate: 7.81%

Year	Cost Per Acre				
	1st	2nd	3rd	4th	5th
Yield: 50 Pound Field Boxes Per Acre			80	250	500
OPERATING COSTS:					
Pre-Planting Costs:					
Land Preparation	800				
Total Pre-Planting Costs	800				
Planting Costs:					
Plant Trees	281				
Orange Trees	945				
Total Planting Costs	1,226				
Replanting Costs:					
Replant Trees (@ 2%): Labor		6			
Trees - 3		28			
Total Replanting Costs:		34			
Cultural Costs:					
Irrigation (Labor & Water)	210	510	970	1,120	1,270
Fertilizer - Nitrogen	2	4	6	9	14
Foliar Spray - Zn Mn	13	14	15	15	16
Fall Foliar Spray - Kocide	13	13	15	16	18
Prune & Sucker Trees	54	59	65	70	76
Weed Control - Row Spray	25	25			
Weed Control - Spot Spray		8	8	8	8
Weed Control - Row Spray, Pre-Emergent			31	31	31
Weed Control - Mow Middles	41	41	41	41	41
Insecticide Treatment - Ants	54	54	54	54	54
Vertebrate Control	10	10	10	10	10
Snail Bait		37	37	37	37
Paint Tree Trunks		24	24	24	24
Frost Control	29	29	29	29	29
Leaf Analysis	5	5	5	5	5
Pickup Truck Use	295	295	295	295	295
ATV Use	217	217	217	217	217
Total Cultural Costs:	968	1,345	1,822	1,981	2,145
Harvest Costs:					
Pick, Haul & Field Overhead - \$2.00 per 50 Pound Field Box			160	500	1,000
Packing and Marketing - \$2.75 per 50 Pound Field Box - 65% of Crop			143	447	894
Juice - \$0.50 per 50 Pound Field Box - 35% of Crop			14	44	88
Total Harvest Costs:			317	991	1,982
Interest on Operating Capital @ 9.50%	242	69	94	108	124
TOTAL OPERATING COSTS	3,236	1,448	2,233	3,080	4,251
Cash Overhead Costs:					
Office Expense	56	56	56	56	56
Liability Insurance	20	20	20	20	20
Property Taxes	138	176	197	218	232
Property Insurance	98	125	140	156	165
Investment Repairs	266	266	266	266	266
TOTAL CASH OVERHEAD COSTS	578	643	679	716	739
TOTAL CASH COSTS	3,814	2,091	2,912	3,796	4,990
INCOME FROM PRODUCTION	0	0	780	2,438	4,875
NET CASH COSTS FOR THE YEAR	3,814	2,091	2,132	1,358	115
ACCUMULATED NET CASH COSTS	3,814	5,905	8,037	9,395	9,510

Table 1. continued

Year	Cost Per Acre				
	1st	2nd	3rd	4th	5th
Depreciation:					
Buildings	50	50	50	50	50
Fuel Tanks & Pumps	42	42	42	42	42
Shop Tools	42	42	42	42	42
Irrigation System	77	77	77	77	77
Wind Machines	46	46	46	46	46
Orchard Heaters	3	3	3	3	3
Equipment	143	143	143	143	143
TOTAL DEPRECIATION	403	403	403	403	403
Interest on Investment:					
Buildings	24	24	24	24	24
Fuel Tanks & Pumps	15	15	15	15	15
Shop Tools	15	15	15	15	15
Irrigation System	76	76	76	76	76
Land	330	330	330	330	330
Yearly Establishment		153	236	321	376
Wind Machines	45	45	45	45	45
Orchard Heaters	3	3	3	3	3
Equipment	42	42	42	42	42
TOTAL INTEREST ON INVESTMENT	550	703	786	871	926
TOTAL COST FOR THE YEAR	4,767	3,197	4,101	5,070	6,319
INCOME FROM PRODUCTION	0	0	780	2,438	4,875
TOTAL NET COST FOR THE YEAR	4,767	3,197	3,321	2,632	1,444
TOTAL ACCUMULATED NET COST	4,767	7,964	11,285	13,917	15,361

Table 2.

U.C. COOPERATIVE EXTENSION
 COSTS PER ACRE TO PRODUCE VALENCIA ORANGES
 SAN DIEGO COUNTY - 1998

Labor Rate: \$ 10.05/hr machine labor
 \$10.05/hr non-machine labor

Interest Rate: 9.50%
 Yield per acre: 800 box

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:								
Irrigation	7.00	70	0	1,800	0	1,870		
Fertilizer	0.00	0	0	18	0	18		
Foliar Spray	0.67	8	3	4	0	15		
Fall Foliar Spray	0.67	8	3	6	0	17		
Pruning	0.00	0	0	0	81	81		
Pre-Emergent Herbicide	0.67	8	3	19	0	30		
Spot Spray Herbicide	0.50	6	0	11	0	17		
Mow Middles	2.20	27	14	0	0	41		
Insecticide Treatment - Ants	1.33	16	6	30	0	52		
Snail Bait	0.32	3	0	34	0	37		
Paint Tree Trunks	1.92	19	0	5	0	24		
Potassium Nitrate	0.67	8	3	12	0	23		
Vertebrate Pest Management	0.00	0	0	0	10	10		
Leaf Analysis	0.00	0	0	0	5	5		
Frost Protection	0.00	0	0	0	29	29		
Pick-Up Truck	15.83	191	75	0	0	266		
ATV	15.83	191	19	0	0	210		
TOTAL CULTURAL COSTS	47.61	556	127	1,938	125	2,746		
Harvest:								
Harvest	0.00	0	0	3,170	0	3,170		
TOTAL HARVEST COSTS	0.00	0	0	3,170	0	3,170		
Interest on operating capital @ 9.50%						45		
TOTAL OPERATING COSTS/ACRE		556	127	5,108	125	5,961		
CASH OVERHEAD:								
Office Expense SDC						56		
Liability Ins. SDC						20		
Property Taxes						190		
Property Insurance						135		
Investment Repairs						266		
TOTAL CASH OVERHEAD COSTS						667		
TOTAL CASH COSTS/ACRE						6,628		
NON-CASH OVERHEAD:								
Investment		Per producing Acre		Annual Cost		Capital Recovery		
Shop Building SDC		1,111		78		78		
Shop Tools		694		59		59		
Fuel Tanks & Pumps		694		59		59		
Irrigation SDC		3,433		170		170		
SDC Wind Machines		2,056		102		102		
Land - SDC Oranges		8,250				0		
SDC Orchard Heaters		125		6		6		
SDC VO Establishment		9,510		497		497		
Equipment		1,909		192		192		
TOTAL NON-CASH OVERHEAD COSTS		27,783		1,162		1,162		
TOTAL COSTS/ACRE						7,790		

Table 3.

U.C. COOPERATIVE EXTENSION
COSTS AND RETURNS PER ACRE TO PRODUCE ORANGE
SAN DIEGO COUNTY - 1998

Labor Rate: \$ 10.05/hr. machine labor Interest Rate: 9.50%
\$ 10.05/hr. non-machine labor

Quantity/Acre	Unit	Price or Cost/Unit	Value or Cost/Acre	Your Cost
GROSS RETURNS				
ORANGE	800	box	9.75	7,800
TOTAL GROSS RETURNS FOR ORANGE				7,800
OPERATING COSTS				
Water:				
Water	36.00	acin	50.00	1,800
Fertilizer:				
Soluble N	108.00	lb N	0.17	18
Zinc Sulfate	5.00	lb	0.46	2
Manganese Sulfate	5.00	lb	0.37	2
Copper	4.00	lb	1.40	6
Custom:				
Pruning - Skirt	108.00	tree	0.75	81
Vertebrate Pest	1.00	acre	10.00	10
Frost Protection	1.00	acre	13.33	13
Herbicide:				
Princep Caliber 90	4.00	lb	4.69	19
Round-Up	25.60	oz	0.42	11
Insecticide:				
Lorsban - Ants	4.00	pint	7.40	30
Snail Bait	20.00	lb	1.70	34
Coppr Count N	0.50	gal	9.21	5
Grwth Regltr:				
Potassium Nitrate	40.00	lb	0.30	12
Contract:				
Leaf Analysis	1.00	acre	5.00	5
Orchard Heater	1.00	acre	16.00	16
Harvest:				
Pick, Haul & Field Overhead	800.00	box	2.00	1,600
Packing & Marketing	520.00	box	2.75	1,430
Juice	280.00	box	0.50	140
Labor (machine)	46.04	hrs	10.05	463
Labor (non-machine)	9.24	hrs	10.05	93
Fuel - Gas	50.14	gal	1.20	60
Fuel - Diesel	20.78	gal	0.85	18
Lube				12
Machinery repair				38
Interest on operating capital @ 9.50%				45
TOTAL OPERATING COSTS/ACRE				5,961
NET RETURNS ABOVE OPERATING COSTS				1,839
CASH OVERHEAD COSTS:				
Office Expense SDC				56
Liability Ins. SDC				20
Property Taxes				190
Property Insurance				135
Investment Repairs				266
TOTAL CASH OVERHEAD COSTS/ACRE				667
TOTAL CASH COSTS/ACRE				6,628

Table 4.

U.C. COOPERATIVE EXTENSION
MONTHLY CASH COSTS PER ACRE TO PRODUCE ORANGE
SAN DIEGO COUNTY - 1998

Beginning FEB 97	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	JAN	TOTAL
Ending JAN 98	97	97	97	97	97	97	97	97	97	97	97	98	
Cultural:													
Irrigation		108	158	208	260	360	360	260	158				1,870
Fertilizer	5	5	5	5									18
Foliar Spray				15									15
Fall Foliar Spray								17					17
Pruning			81										81
Pre-Emergent Herbicide	30												30
Spot Spray Herbicide				8			8						17
Mow Middles	4		4		7	7	7	7		4			41
Insecticide Treatment - A		26			26								52
Snail Bait			37										37
Paint Tree Trunks				24									24
Potassium Nitrate						23							23
Vertebrate Pest Managemen	1	1	1	1	1	1	1	1	1	1	1		10
Leaf Analysis								5					5
Frost Protection											29		29
Pick-Up Truck	24	24	24	24	24	24	24	24	24	24	24		266
ATV	19	19	19	19	19	19	19	19	19	19	19		210
TOTAL CULTURAL COSTS	82	182	328	304	338	435	420	333	202	48	73		2,746
Harvest:													
Harvest						3,170							3,170
TOTAL HARVEST COSTS						3,170							3,170
Interest on oper. capital	1	2	5	7	10	38	-7	-4	-3	-2	-2		45
TOTAL OPERATING COSTS/ACRE	83	184	333	311	347	3,643	413	329	199	46	72		5,961
OVERHEAD:													
Office Expense SDC											56		56
Liability Ins. SDC											20		20
Property Taxes	95					95							190
Property Insurance	68					68							135
Investment Repairs	22	22	22	22	22	22	22	22	22	22	22	22	266
TOTAL CASH OVERHEAD COSTS	185	22	22	22	22	185	22	22	22	22	98	22	667
TOTAL CASH COSTS/ACRE	268	207	355	333	370	3,828	435	351	221	68	170	22	6,628

Table 5.

U.C. COOPERATIVE EXTENSION
 WHOLE FARM ANNUAL EQUIPMENT, INVESTMENT, AND BUSINESS OVERHEAD COSTS
 SAN DIEGO COUNTY - 1998

ANNUAL EQUIPMENT COSTS

Yr	Description	Price	Yrs Life	Salvage Value	Capital Recovery	Cash Overhead		Total
						Insur- ance	Taxes	
98	100G Backpack 3pnt	2,080	15	208	177	8	11	196
98	62 HP 2WD Tractor	25,492	20	2,549	1,790	100	140	2,030
97	ATV 4WD	3,861	7	386	594	15	21	631
98	Herbie Sprayer	170	10	17	20	1	1	21
98	Mower - Flail 6'	3,500	25	350	216	14	19	249
98	Mower - Rotary 5'	5,000	25	500	308	20	28	355
97	Pickup Truck 1/2 T	17,160	7	1,716	2,642	67	94	2,803
TOTAL		57,263		5,726	5,746	225	315	6,286
60% of New Cost*		34,358		3,436	3,448	135	189	3,771

*Used to reflect a mix of new and used equipment

ANNUAL INVESTMENT COSTS

Description	Price	Years Life	Salvage Value	Capital Recovery	Cash Overhead			Total
					Insur- ance	Taxes	Repairs	
INVESTMENT								
Fuel Tanks & Pumps	12,500	15	1,250	1,062	49	69	250	1,430
Irrigation SDC	61,800	40	6,180	3,057	242	340	3,100	6,740
Land - SDC Oranges	148,500				1,059	1,485	0	8,484
SDC Orchard Heatsrs	2,250	40	225	111	9	12	45	178
SDC VO Estabment	171,180	35	17,118	8,939	671	941	0	10,552
SDC Wind Machines	37,000	40	3,700	1,830	145	203	740	2,919
Shop Building SDC	20,000	20	2,000	1,404	78	110	400	1,993
Shop Tools	12,500	15	1,250	1,062	49	69	250	1,430
TOTAL INVESTMENT	465,730		31,723	17,466	2,303	3,230	4,785	33,724

ANNUAL BUSINESS OVERHEAD COSTS

Description	Units/		Price/ Unit	Total Cost
	Farm	Unit		
Liability Ins. SDC	1	Farm	367	367
Office Expense SDC	20	Acre	50	1,000

Table 6.

U.C. COOPERATIVE EXTENSION
HOURLY EQUIPMENT COSTS
SAN DIEGO COUNTY ORANGE - 1998

		COSTS PER HOUR							
		Actual Hours Used	Cash Overhead			Operating		Total Oper.	Total Costs/Hr.
Yr	Description		Capital Recovery	Insur- ance	Taxes	Repairs	Fuel & Lube		
98	100G Backpack 3pnt	72.00	1.47	0.07	0.10	0.29	0.00	0.29	1.93
98	62 HP 2WD Tractor	122.80	8.75	0.49	0.69	1.12	2.98	4.10	14.02
97	ATV 4WD	285.00	1.25	0.03	0.04	0.29	0.92	1.21	2.54
98	Herbie Sprayer	9.00	1.30	0.04	0.06	0.00	0.00	0.00	1.41
98	Mower - Flail 6'	3.60	35.94	2.29	3.21	1.37	0.00	1.37	42.80
98	Mower - Rotary 5'	36.00	5.13	0.33	0.46	1.96	0.00	1.96	7.88
97	Pickup Truck 1/2 T	285.00	5.56	0.14	0.20	1.27	3.45	4.72	10.62

Table 7.

U.C. COOPERATIVE EXTENSION
RANGING ANALYSIS
SAN DIEGO COUNTY - 1998

COSTS PER ACRE PER ACRE AT VARYING YIELDS TO PRODUCE ORANGE

	YIELD (BOX/ACRE)						
	650	700	750	800	850	900	950
OPERATING COSTS/ACRE:							
Cultural Cost	2,746	2,746	2,746	2,746	2,746	2,746	2,746
Harvest Cost	2,576	2,774	2,972	3,170	3,368	3,566	3,764
Interest on operating capita	40	42	43	45	46	48	50
TOTAL OPERATING COSTS/ACRE	5,362	5,561	5,761	5,961	6,160	6,360	6,560
TOTAL OPERATING COSTS/BOX	8.25	7.94	7.68	7.45	7.25	7.07	6.91
CASH OVERHEAD COSTS/ACRE	667	667	667	667	667	667	667
TOTAL CASH COSTS/BOX	9.28	8.90	8.57	8.28	8.03	7.81	7.61
NON-CASH OVERHEAD COSTS/ACRE	1,492	1,492	1,492	1,492	1,492	1,492	1,492
TOTAL COSTS/ACRE	7,521	7,720	7,920	8,120	8,319	8,519	8,719
TOTAL COSTS/BOX	11.57	11.03	10.56	10.15	9.79	9.47	9.18

NET RETURNS PER ACRE ABOVE OPERATING COSTS FOR ORANGE

PRICE (DOLLARS/BOX)	YIELD (BOX/ACRE)						
	650	700	750	800	850	900	950
ORANGE							
8.25	1	214	426	639	852	1,065	1,278
8.75	326	564	801	1,039	1,277	1,515	1,753
9.25	651	914	1,176	1,439	1,702	1,965	2,228
9.75	976	1,264	1,551	1,839	2,127	2,415	2,703
10.25	1,301	1,614	1,926	2,239	2,552	2,865	3,178
10.75	1,626	1,964	2,301	2,639	2,977	3,315	3,653
11.25	1,951	2,314	2,676	3,039	3,402	3,765	4,128

Table 7. continued

NET RETURNS PER ACRE ABOVE CASH COSTS FOR ORANGE

PRICE (DOLLARS/BOX)	YIELD (BOX/ACRE)							
	ORANGE	650	700	750	800	850	900	950
8.25	-666	-453	-241	-28	185	398	611	
8.75	-341	-103	134	372	610	848	1,086	
9.25	-16	247	509	772	1,035	1,298	1,561	
9.75	309	597	884	1,172	1,460	1,748	2,036	
10.25	634	947	1,259	1,572	1,885	2,198	2,511	
10.75	959	1,297	1,634	1,972	2,310	2,648	2,986	
11.25	1,284	1,647	2,009	2,372	2,735	3,098	3,461	

NET RETURNS ABOVE TOTAL COSTS FOR ORANGE

PRICE (DOLLARS/BOX)	YIELD (BOX/ACRE)							
	ORANGE	650	700	750	800	850	900	950
8.25	-2,158	-1,945	-1,733	-1,520	-1,307	-1,094	-881	
8.75	-1,833	-1,595	-1,358	-1,120	-882	-644	-406	
9.25	-1,508	-1,245	-983	-720	-457	-194	69	
9.75	-1,183	-895	-608	-320	-32	256	544	
10.25	-858	-545	-233	80	393	706	1,019	
10.75	-533	-195	142	480	818	1,156	1,494	
11.25	-208	155	517	880	1,243	1,606	1,969	