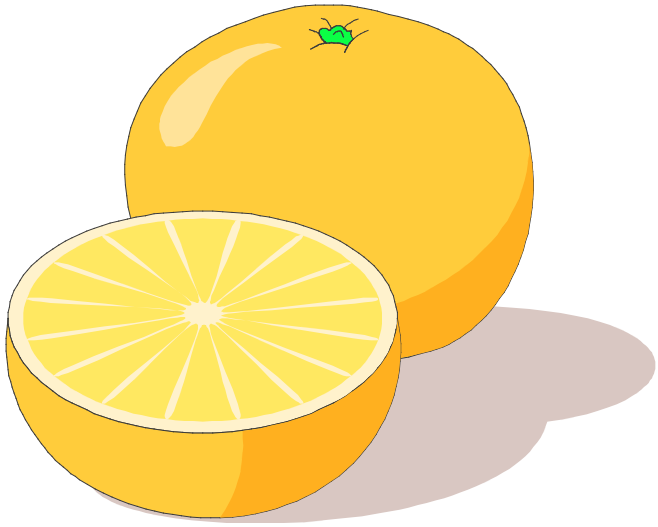
Establishment and Production Costs

Grapefruit

Western Riverside County, 1998



Etaferahu Takele
Area Farm Advisor, Agricultural Economics/Farm Management
University of California Cooperative Extension, Southern Region

And

Peggy Mauk
Farm Advisor, Subtropical Horticulture
University of California Cooperative Extension, Riverside County

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INTRODUCTION

Detailed costs for grapefruit grove establishment and production in Riverside County are presented in this study. The hypothetical grove used in this report consists of a total of 40 acres, 38 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 grapefruit grove establishment and production in Riverside County. These production practices and costs are an amalgamation of costs and practices obtained from a 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. Establishment Costs

Table 2. Production Costs

Table 3. Production Costs and Returns

Table 4. Monthly Cash Costs of production

Table 5. Whole Farm Equipment Prices and Investment Costs

Table 6. Hourly Equipment Costs

Table 7. Range Analysis

For questions, call the Southern Region Agricultural Economics/Farm Management Advisor, Etaferahu Takele, University of California Cooperative Extension, at (909) 683-6491 ext. 243 or call the Riverside County Subtropical Horticulture Farm Advisor, Peggy Mauk, (909) 683-6491 ext. 224.

ASSUMPTIONS

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

1. LAND

The grove is established on ground that is currently open land. The land is assumed to have decomposed granite to clay loam soils that are adequately drained and moderately fertile.

Value of land in southern California varies tremendously by region. In some parts of the Grapefruit production area in Riverside County, value of land has been indicated to be as high as $35,000 per acre. In this study, we assumed a value of $8,000 per acre for open land. Because only 38 of the 40 acres are planted to grapefruit, land is valued at $8,420 per planted acre. Readers are cautioned that the $8,000 we used in this study may be understating the value of land.

2. CULTURAL PRACTICES

The practices described below represent only the hypothetical grove in this study, which is based on typical practices for many groves in Riverside County. However, it may not apply to every situation.

Also, pesticides, rates, and cultural practices mentioned in this cost study are listed in the *University of California Integrated Pest Management Guideline for Citrus*. Written recommendations by licensed pest control advisors (PCA) are required for many pesticides. Information for pesticide regulation and pesticide use permits can be obtained from the local county Agricultural Commissioner's office in Riverside. For additional production information contact the Riverside County citrus farm advisor.

Land Preparation: The land is ripped twice with a three-foot ripper and then leveled with a land scraper followed by marking and layout. The approximate per acre custom cost of the operations include $300 for ripping and leveling, and $100 for marking and layout. All ground preparations are done in the year prior to planting, but costs are shown in the first year of establishment.

Fumigation with Methyl Bromide or Vapam has beneficial effects for controlling nematodes, diseases and weeds, especially in groves that are planted back to citrus. However, in this study, the cost of grove fumigation is not included.

Planting: In this study, we assumed a planting space of 12 x 24 foot spacing with 152 trees per acre. In the second year of establishment, we assumed that 2% of the original stand or 3 trees per acre would need replacement. Planting is done using contract labor.

Irrigation: The amount of irrigation water and costs in Riverside County varies greatly from region to region. Also, irrigation costs vary depending on if well or district water is used.

Grapefruit production in Riverside County is mainly that of Ruby Red and Star Ruby varieties. They are produced in the Coachella Valley and San Jacinto/ Temecula Valley. In this study, costs and cultural practices reflect the San Jacinto/Temecula Valley. An estimate of amount of water application by age of t is shown in Table A. Actual irrigation amounts will vary depending on the amount of rainfall and region. We made no assumptions about effective rainfall. Also we have not included irrigation that may be neede for several days for frost protection.

Typically irrigation in the San Jacinto/Temecula area begins in March and ends in November or December, although this varies greatly depending on the amount of rainfall.

In this study, district water is used for irrigation and is calculated at an average of $160 per acre-foot for th San Jacinto/Temecula area. In addition labor cost is included for irrigation operations such as turning the system on, monitoring and maintaining irrigation lines and sprinklers.

Table A. Applied Irrigation Water

Year	San Jacinto/Temecula Area
Year 1	6.00 Ac In
Year 2	9.00 Ac In
Year 3	13.00 Ac In
Year 4	24.00 Ac In
Year 5	36.00 Ac In
Year 6 +	48.00 Ac In

Pruning: Hand pruning normally begins in the second year of establishment. It is done annually until the trees reach age 5. Hand pruning of young trees will take about 5 minutes per tree. The operation consists of removing deadwood, which will facilitate the development of new shoots and laterals. This operation also creates access for easy harvest.

Hand pruning of trees of age six and older takes place about every fifth year and is estimated to cost $300 per acre. The annual cost of pruning is determined by prorating the cost over five years.

Mechanical hedging and trimming of grapefruit trees begin around age 11 where clippings are placed in the row middles and are chopped using a flail mower. Hedging and trimming is done about every 4 years. The cost of hedging and trimming is estimated at $150 per acre. The annual cost is determined by prorating the total cost over the productive life of the trees.

Insect and Disease Management: The primary pests affecting grapefruit production in Riverside County are ants and scales. They are controlled using Lorsban. It is applied once a year to the lower trunk of the tree, as well as the soil at the base of the trunk and directly to anthills. Lorsban is applied at 4 pints per acre for the four years of establishment and then 2 pints per acre from year four on.

Thrips can be a problem during the first few years of grapefruit grove establishment**.** Treatment for thrips typically includes an application of Dimethoate once or twice a year depending on the population. Sabadilla is another common insecticide used to treat thrip infestations. In this study we included an application of Dimethoate at 4 pints per acre per year.

In Western Riverside County, California red scale and brown garden snails are controlled using biological control agents. California red scale can be controlled by releasing *Aphytis melinus* at a rate of 40,000 per acre. Releases are made every 1 to 3 years at a cost of $70 per acre. For this study, we used an average of $70 every 2 years**.**

Brown garden snails can become a significant problem in Riverside County. Infestations can be prevented, or contained, using several methods. In this study growers use predatory decollate snails to control brown garden snails. Other common methods include applying poisonous bait and painting tree

trunks with liquid copper. In this study we included the cost of predatory decollate snails. Predatory decollate snails are released on an average of once every five years at a cost of $25 per acre.

Phytopthora root rot and gummosis are two fungal diseases common to citrus trees grown in Riverside County. A spot treatment of fungicide is applied to infected trees. Common fungicides used are Aliette and Ridomil. In this study we used a yearly fixed amount of two-thirds pound of Ridomil during both establishment and production. Treatment amounts can vary from year to year depending on the extent of infection.

In the production years, brown rot, caused by two species of the fungus *Phytophthora* is treated annually with copper sulfate. Copper sulfate is applied at a rate of 3 lbs per acre during the fourth year of establishment and 5 lbs per acre per year thereafter. Brown rot control is done to protect the fruit from fungal spores that are splashed onto fruit during the rainy season. This application also has a benefit for frost protection. Many growers in Western Riverside will apply a second treatment if the rainy season is particularly heavy or long.

Grove Floor Management: Weed control of broadleaf grasses begins in the first year of establishment by applying Roundup down each tree row. It 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. In the second year and continuing through mature production, spot sprays of Roundup (approximately 25 ounces per acre per year) are 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. The herbicide program assumes Karmex is the primary emphasis for weed control. If a grower relies solely on Roundup, the costs of weed control would be higher**.** In this study, we used Karmex applied once per year at 4 lbs per acre in the early spring starting in year 3.

Fertilization: Nitrogen (N) fertilizer is applied through the irrigation system. The approximate amount of fertilizer applied during the establishment and production years is shown in **Table B**. Fertilizer is generally applied throughout the year.

Table B. Pounds Of Nitrogen Fertilizer Applied During Grapefruit Grove Establishment and Production

Establishment Year	Pounds of N Per Tree	Pounds of N Per Acre
Year 1	0.25	38.00
Year 2	0.25	38.00
Year 3	0.50	76.00
Year 4	0.75	114.00
Year 5	1.50	228.00
Year 6+	2.00	304.00

Citrus trees grown in the southern region of California can be deficient in micronutrients. In this study, two foliar sprays of a micro-mineral fertilizer of zinc sulfate and manganese sulfate are annually applied to a new flush of leaves before they are fully expanded (i.e. at $^{2}/_{3}$ of expansion) in spring and late summer. The nutrients are applied at 2 lbs per acre in year one, 3 lbs per acre in year two, 4 lbs per acre

in year three and 5 lbs per acre from year four on. Also phosphorous acid is applied at 1 lb per acre per year from year 5 on.

Vertebrate Pest Management: Vertebrate pests require constant control in grapefruit groves. The principal pest is gophers. Gophers can cause severe damage to a tree by feeding on the root system and on the bark of the tree below the soil line.

Squirrels can cause erosion problems by tunneling through the soil, especially on hillsides. They may also occasionally gnaw on fruit and irrigation tubing. In this study, costs of trapping and baiting are included for controlling gopher and squirrel populations. We estimated about $10 per acre per year would be required for gopher and squirrel control.

Growth Regulators: 2, 4-D may be applied to mature groves for the delaying of harvest, and for increasing fruit size. In this study, 2,4-D is applied at a rate of 30 g.a.i. (grams active ingredient) per acre in December and May. The application of 2,4-D in spring is usually when the new crop size is at 3/4 inch diameter.

3. YIELDS

Grapefruit trees can begin bearing fruit in the third year after planting. We consider years 1 to 5 as establishment and in year 6, we presented an estimate of an average yield from year 6 to life of the grove. Yield is measured in boxes as shown in **Table C**.

Table C. Typical Yield of Grapefruit Per Acre in Riverside County

Age of Tree	Boxes Per Acre*
Year 1	0
Year 2	0
Year 3	76
Year 4	150
Year 5	500
Year 6 +	700

* A box weighs approximately 50 pounds

4. HARVEST AND MARKETING

Harvesting starts in the third or fourth year. In this study, harvesting is done using contracted labor. Harvesting consists of three to four picks per year and is typically done from January through September. Growers also contract hauling to a local packinghouse.

Charges for picking, hauling, packing and marketing are approximations obtained from several packinghouses in the region during the 1995 to 1998 seasons. Costs are based on an average distribution in which 46% of the fruit is packed and marketed fresh, 52% is used as juice and 2% is discarded as rot. These distributions are based on data from packinghouses and the Riverside County Agricultural Production Report.

We used the following rates: $1.30 per field box for picking, hauling, forklift use and field overhead, $3.70 per field box for packing and marketing, and $0.50 per field box for juice handling.

5. PRICES/RETURNS

We used a price/gross return of $5.25 per field box as a basis of our analysis. It is based on information obtained from packinghouses and the Riverside County Agricultural Production Report for 1995 to 1998 seasons. However, to cover a broader scenario of productivity and prices, we provided a range analysis in **Table 7.**

6. LABOR

Labor hours for machinery operation is calculated at 20% higher than the actual operation time to account for such activities as equipment setup, moving, maintenance and repair.

We used hourly wage rates of $9.25 for machine labor and $7.45 for non-machine labor. This is based on wages paid by the growers. Growers also pay for benefits including, Workers Compensation, Social Security, Medicare, insurance, and other possible benefits. In this study, we added 34% to the hourly wage to account for benefits. This brings the hourly rate to $12.40 for machine labor and $10.00 for non-machine labor.

7. MANAGEMENT

This study does not include management charges. Users of this cost study should include their own management charges.

8. CASH OVERHEAD

Interest On Operating Capital: Interest on operating capital is based on cash operating costs and is calculated monthly until harvest at a nominal rate of 10.00% per year. A nominal interest rate is the going market cost of borrowed funds.

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 at 1% of the value of land. County taxes are also calculated at 1% of the average value of equipment, buildings and improvements. Average value equals new cost plus salvage value divided by 2 on a per acre basis.

Property Insurance: Property insurance for farm investments vary depending on the assets included and the amount and type of coverage. In this study, property insurance is calculated at 0.713% 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: We included office and business expenses at $50 per acre. These expenses are to account for office supplies, telephone, computer, fax, copier, bookkeeping, accounting, legal fees, etc.

9. NON-CASH OVERHEAD

Non-cash overhead costs include depreciation and interest charged on equipment and other investments. Typically, farm equipment in Riverside County is a mixture of new and old equipment. To reflect such mix in this study, the current purchase price for new equipment is reduced by 40%.

Depreciation: Depreciation is a reduction in market value of investments due to wear, obsolescence, and age. Depreciation in this study is calculated on a straight-line basis, i.e. purchase price minus salvage value divided by years of life of ownership. The purchase price and years of life are shown in **Table 5**.

Interest On Investment: The interest charge for the use of capital in grapefruit production is calculated by multiplying the value of land and average investments in equipment, buildings, trees, etc. (described in **Table 5**) by 7.81%; the long-run average rate of return to California's agricultural production assets from current income. Average investment for equipment, building and improvements equals the new cost plus salvage value divided by 2.

10. EQUIPMENT OPERATING COSTS

Equipment operating costs consist of fuel, lubrication, and repairs. These costs are first calculated on a per hour basis and then converted to a per acre basis. The hourly charges are 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.

Fuel and repair costs per acre for each operation are determined by multiplying the number of hours required for each operation by the hourly operating costs for that piece of equipment. Operation times are determined based on the equipment width, speed of operation, and efficiency. Tractor time is calculated at 10% higher than implement time to account for setup.

Prices for fuel include on-farm delivery charges of $0.76 per gallon for diesel and $1.16 per gallon for gasoline.

11. 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 $7,488 per acre or $284,582 for the 38-acre grove. The establishment cost is spread over 35 productive years.

12. RISK

This study makes every effort to model a production system based on typical, real world practices of grapefruit production. However, it would not fully represent financial, agronomic, and market risks, which affect the profitability and economic viability, involved in all grapefruit production. Risk is caused by various sources of uncertainty such as insect damage, severe frost and disease that affect production, as well as a decrease in price, and increase in interest rates. Because of the risk involved, access to information on production practices, prices, and markets are crucial.

13. 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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University of California Cooperative Extension

Etaferahu Takele
Area Farm Advisor, Agriculture Economics
Southern Region
21150 Box Springs Road
Moreno Valley, CA 92557-8718
Phone: (909) 683-6491 x 243
Fax: (909) 788-2615
E-Mail: takele@ucrac1.ucr.edu

Peggy Mauk
Farm Advisor, Subtropical Horticulture
Riverside County
21150 Box Springs Road
Moreno Valley, CA 92557-8718
Phone: (909) 683-6491 x 224
Fax:(909) 788-2615
E-Mail: pamauk@ucdavis.edu

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U.C. COOPERATIVE EXTENSION

Table 1. SAMPLE COSTS PER ACRE TO ESTABLISH A GRAPEFRUIT GROVE

RIVERSIDE COUNTY - 1998

Labor Rates: $12.40/hr. Machine Trees/acre: 152

$10.00/hr. non-machine Long Term Interest Rate: 7.81%

	Cost Per Acre				
Year	1st	2nd	3rd	4th	5th
Yield: 50 Pound Field Boxes Per Acre			76	150	500
OPERATING COSTS:					
Pre-Planting Costs:					
Land Preparation - Clear Land	300				
Mark & Layout Grove	100				
Total Pre-Planting Costs	400				
Planting Costs:					
Plant Trees	380				
Grapefruit Tree	1,216				
Total Planting Costs	1,596				
Replanting Costs:					
Replant Trees: Labor		8			
Trees - 3		24			
Total Replanting Costs:		32			
Cultural Costs: (Materials & Labor & Fuel, Lube & Repair)					
Irrigation	148	188	251	398	558
Fertilization	5	5	9	14	28
Foliar Spray	24	25	26	27	27
Pruning		127	127	127	127
Chop Prunings					4
Herbicide - Roundup Row Spray	23	23			
Herbicide - Spot Spray		19	19	19	19
Herbicide - Pre-Emergent			24	24	24
Mow Middles					
Fungicide - Ridomil	15	15	15	19	21
Thrips Treatment	25	25	25	25	25
Biological Controls				40	40
Vertebrate Pest Control	10	10	10	10	10
Leaf Analysis	5	5	5	5	5
Ant Treatment	47	47	47	47	34
Pick-Up Truck Use	160	160	160	160	160
ATV Use	124	124	124	124	124
Total Cultural Costs:	586	773	842	1,039	1,206
Harvests Costs:					
Pick, Haul & Field Overhead - $1.30 per 50 Pound Field Box			99	195	650
Packing - $3.70 per 50 Pound Field Box - 46% Crop			130	255	851
Juice - $0.50 per 50 Pound Field Box - 52% Crop			20	39	130
Total Harvest Costs:			248	489	1,631
Interest on Operating Capital @ 10.00%	206	42	45	63	121
TOTAL OPERATING COSTS	2,788	847	1,135	1,591	2,958
Cash Overhead Costs:					
Liability Insurance	12	12	12	12	12
Office Expenses	50	50	50	50	50
Property Taxes	105	136	148	160	172
Property Insurance	75	97	106	114	123
Investment Repairs	87	87	87	87	87
TOTAL CASH OVERHEAD COSTS	329	382	403	423	444
TOTAL CASH COSTS	3,117	1,229	1,538	2,014	3,402
INCOME FROM PRODUCTION	0	0	399	788	2,625
NET CASH COSTS FOR THE YEAR	3,117	1,229	1,139	1,226	777
ACCUMULATED NET CASH COSTS	3,117	4,346	**5,485**	6,711	7,488

Table 1 continued

Depreciation:					
Shop Building	12	12	12	12	12
Shop Tools	20	20	20	20	20
Fuel Tanks & Pumps	20	20	20	20	20
Irrigation	34	34	34	34	34
Equipment	80	80	80	73	82
TOTAL DEPRECIATION	166	166	166	159	168
Interest on Investment:					
Shop Building	23	23	23	23	23
Shop Tools	14	14	14	14	14
Fuel Tanks & Pumps	14	14	14	14	14
Irrigation	64	64	64	64	64
Land	658	658	658	658	658
Establishment Costs		243	339	428	524
Equipment	45	45	45	45	48
TOTAL INTEREST ON INVESTMENT	818	1,061	1,157	1,246	1,345
TOTAL COST FOR THE YEAR	4,101	2,456	2,861	3,419	4,915
INCOME FROM PRODUCTION	0	0	399	788	2,625
TOTAL NET COST FOR THE YEAR	4,101	2,456	2,462	2,631	2,290
TOTAL ACCUMULATED NET COST	4,101	6,557	9,019	11,650	13,940

Table 2. U.S. COOPERATIVE EXTENSION
COSTS PER ACRE TO PRODUCE MATURE GRAPEFRUIT
RIVERSIDE COUNTY - 1998

OPERATION	Operation Time (Hrs/A)	Labor Cost	Fuel,Lube & Repairs	Material Cost	Custom/ Rent	Total Cost	Your Cost
		Cash and Labor Costs per Acre					
CULTURAL:							
Irrigation	7.75	78	0	641	0	718	
Prune Trees	0.00	0	0	0	60	60	
Hedge & Trim Trees	0.00	0	0	0	31	31	
Chop Brush	0.20	3	1	0	0	4	
Pre-Emergent Herbicicde	0.40	6	2	18	0	25	
Foliar Spray	0.80	12	5	5	0	22	
Fertilizer	0.00	0	0	37	0	37	
Spot Spray Herbicide	0.50	7	0	11	0	19	
Vertebrate Pest Management	0.00	0	0	0	10	10	
Ant Treatment	0.49	7	2	13	0	23	
Thrips Treatment	0.30	4	2	16	0	23	
Biological Control	0.00	0	0	0	40	40	
Leaf Analysis	0.00	0	0	0	5	5	
Growth Regulator	0.80	12	5	1	0	17	
Bordeaux Treatment	0.30	4	2	6	0	12	
Fungicide - Ridomil	0.25	4	0	12	0	15	
Pick-Up Truck	7.50	112	34	0	0	146	
ATV	7.50	112	9	0	0	120	
TOTAL CULTURAL COSTS	26.79	361	62	758	146	1,327	
HARVEST							
Harvest	0	0	0	2,283	0	2,283	
TOTAL HARVEST COSTS	0	0	0	2,283	0	2,283	
INTEREST on operating capital @ 10.00%						146	
TOTAL OPERATING COSTS/ACRE		361	62	3,042	146	3,757	
CASH OVERHEAD:							
Liability Ins. RC						12	
Office Exp Rc - 4						50	
Property Taxes						146	
Property Insurance						104	
Investment Repairs						87	
TOTAL CASH OVERHEAD COSTS						399	
TOTAL CASH COSTS/ACRE						4,156	
NON-CASH OVERHEAD							
INVESTMENT:		Per producing acre		Annual Costs Capital Recovery			
Shop Building Citr		526		43		43	
Shop Tools		329		37		37	
Fuel Tanks & Pumps		329		37		37	
Land RC Grapefruit		8,420				0	
Irrigation RC - 60		1,500		123		123	
RC Grapefruit Establishment		7,489		626		626	
Equipment		1,113		140		140	
TOTAL NON-CASH OVERHEAD COSTS		9,707		1,005		1,005	
TOTAL COSTS/ACRE						5,161	

Table 3. U.C. COOPERATIVE EXTENSION

COSTS AND RETURNS PER ACRE TO PRODUCE MATURE GRAPEFRUIT

RIVERSIDE COUNTY - 1998

Labor Rate: $ 12.40/hr. machine labor $ 10.00/hr. non-machine labor

Interest Rate: 10.00%

INCOME	Quantity per Acre	Unit	Price or Cost/Unit	Value or Cost/Acre	Your Cost
GROSS RETURNS					
Grapefruit	700.00	box	5.25	3,675	
TOTAL GROSS RETURNS FOR GRAPEFRUIT				3,675	
OPERATING COSTS					
Irrigation:					
Water	48.00	acIN	13.35	641	
Contract:					
Prune Trees	1.00	acre	60.00	60	
Hedge & Trim	1.00	acre	31.00	31	
Vertebrate Pest	1.00	acre	10.00	10	
Decollate Snails	1.00	acre	5.00	5	
Aphytis Melinus	1.00	acre	35.00	35	
Leaf Analysis	1.00	acre	5.00	5	
Herbicide:					
Karmex	4.00	lb	4.41	18	
Roundup -Spot Spry	25.00	oz	0.46	11	
Fertilizer:					
Zinc Sulfate	5.00	lb	0.44	2	
Manganese Sulfate	5.00	lb	0.38	2	
Phosphorous acid	1.00	lb	0.60	1	
Liquid N	304.00	lb N	0.12	37	
Insecticide:					
Lorsban - Ants	2.00	pint	6.50	13	
Dimethoate	4.00	pint	4.08	16	
Grwth Regltr:					
2, 4D	5.00	oz	0.11	1	
Fungicide:					
Copper Sulfate	5.00	lb	1.11	6	
Ridomil	0.67	lb	17.28	12	
Harvest:					
Pick, Haul etc.	700.00	box	1.30	910	
Packing	322.00	box	3.70	1,191	
Juice	364.00	box	0.50	182	
Labor (machine)	22.85	hrs	12.40	283	
Labor (non-machine)	7.75	hrs	10.00	78	
Fuel - Gas	23.73	gal	1.16	28	
Fuel - Diesel	11.01	gal	0.76	8	
Lube				5	
Machinery repair				21	
Interest on operating capital @ 10.00%				146	
TOTAL OPERATING COSTS/ACRE				3,757	
NET RETURNS ABOVE OPERATING COSTS				-82	

Table 3 continued

CASH OVERHEAD COSTS:	
Liability Ins. RC	12
Office Exp Rc - 4	50
Property Taxes	146
Property Insurance	104
Investment Repairs	87
TOTAL CASH OVERHEAD COSTS/ACRE	399
TOTAL CASH COSTS/ACRE	4,156
NON-CASH OVERHEAD COSTS (CAPITAL RECOVERY)	
Shop Building Citr	43
Shop Tools	37
Fuel Tanks & Pumps	37
Land RC GRAPEFRUIT	0
Irrigation RC - 60	123
RC Grapefruit Establishment	626
Equipment	140
TOTAL NON-CASH OVERHEAD COST/ACRE	1,005
TOTAL COSTS/ACRE	5,161
NET RETURNS ABOVE TOTAL COSTS	-1,486

Table 4. U.C. COOPERATIVE EXTENSION
MONTHLY CASH COSTS PER ACRE TO PRODUCE MATURE GRAPEFRUIT
RIVERSIDE COUNTY - 1998

Beginning FEB 97 Ending JAN 98	FEB 97	MAR 97	APR 97	MAY 97	JUN 97	JUL 97	AUG 97	SEP 97	OCT 97	NOV 97	DEC 97	JAN 98	TOTAL
Cultural:													
Irrigation		79	79	79	81	81	81	81	79	79			718
Prune Trees		60											60
Hedge & Trim Trees		31											31
Chop Brush		4											4
Pre-Emergent Herbicicde	25												25
Foliar Spray				13				9					22
Fertilizer	3	3	3	3	3	3	3	3	3	3	3		37
Spot Spray Herbicide					9		9						19
Vertebrate Pest Management	1	1	1	1	1	1	1	1	1	1	1		10
Ant Treatment		23											23
Thrips Treatment		23											23
Biological Control	4	4	4	4	4	4	4	4	4	4	4		40
Leaf Analysis								5					5
Growth Regulator				9							9		17
Bordeaux Treatment										12			12
Fungicide - Ridomil			15										15
Pick-Up Truck	13	13	13	13	13	13	13	13	13	13	13		146
ATV	11	11	11	11	11	11	11	11	11	11	11		120
TOTAL CULTURAL COSTS	57	251	126	132	123	113	123	127	111	123	41		1,327
Harvest:													
Harvest					571	571	571	571					2,283
TOTAL HARVEST COSTS					571	571	571	571					2,283
Interest on oper. capital	0	3	4	5	11	16	22	28	29	30	0		146
TOTAL OPERATING COSTS/ACRE	58	254	130	137	704	700	716	726	139	152	41		3,757
OVERHEAD:													
Liability Ins. RC											12		12
Office Exp Rc - 4											50		50
Property Taxes	73					73							146
Property Insurance	52					52							104
Investment Repairs	7	7	7	7	7	7	7	7	7	7	7	7	87
TOTAL CASH OVERHEAD COSTS	133	7	7	7	7	133	7	7	7	7	69	7	399
TOTAL CASH COSTS/ACRE	190	261	137	144	711	833	723	733	147	160	110	7	4,156

Table 5. U.C. COOPERATIVE EXTENSION

WHOLE FARM ANNUAL EQUIPMENT, INVESTMENT, AND BUSINESS OVERHEAD COSTS

RIVERSIDE COUNTY - 1998

ANNUAL EQUIPMENT COSTS

						Cash Overhead		
Yr	Description	Price	Yrs Life	Salvage Value	Capital Recovery	Insur-ance	Taxes	Total
98	62 HP 2WD Tractor	25,492	20	2,549	2,503	100	140	2,743
97	ATV 4WD	3,861	7	386	693	15	21	730
97	Herbie Sprayer	170	10	17	24	1	1	26
98	Mower - Flail 6'	3,500	25	350	318	14	19	351
98	Orch.Sprayer 500 G	17,055	15	1,706	1,906	67	94	2,066
97	Pickup Truck 1/2 T	17,160	7	1,716	3,081	67	94	3,243
98	Weed Sprayer 200 G	3,282	15	328	367	13	18	398
TOT	AL	70,520		7,052	8,891	277	388	9,556
60	% of New Cost *	42,312		4,231	5,335	166	233	5,733

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

ANNUAL INVESTMENT COSTS

					Cash Overhead			
Description	Price	Yrs Life	Salvage Value	Capital Recovery	Insur-ance	Taxes	Repairs	Total
INVESTMENT								
Fuel Tanks & Pumps	12,500	15	1,250	1,397	49	69	250	1,765
Irrigation RC - 60	57,000	40	5,700	4,660	224	313	2,400	7,597
Land RC GRAPEFRUIT	319,960				2,281	3,200	0	30,470
RC Grapefruit Establishment	284,582	35	28,458	23,776	1,116	1,565	0	26,457
Shop Building Citr	20,000	40	2,000	1,635	78	110	400	2,223
Shop Tools	12,500	15	1,250	1,397	49	69	250	1,765
TOTAL INVESTMENT	706,542		38,658	32,865	3,797	5,326	3,300	70,277

ANNUAL BUSINESS OVERHEAD COSTS

Description	Units/ Farm	Unit	Price/ Unit	Total Cost
Liability Ins. RC	1	Farm	455	455
Office Exp Rc - 4	38	Acre	50	1900

Table 6.

U.C. COOPERATIVE EXTENSION
HOURLY EQUIPMENT COSTS
RIVERSIDE COUNTY GRAPEFRUIT - 1998

			COSTS PER HOUR						
		Actual		CASH OVERHEAD			OPERATING		
Yr	Description	Hours Used	Capital Recovery	Insur-ance	Taxes	Repairs	Fuel & Lube	Total Oper.	Total Costs/Hr.
98	62 HP 2WD Tractor	137.6	10.91	0.44	0.61	0.98	2.66	3.64	15.6
97	ATV 4WD	285	1.46	0.03	0.04	0.28	0.89	1.17	2.71
97	Herbie Sprayer	28.5	0.5	0.01	0.02	0	0	0	0.54
98	Mower - Flail 6'	7.6	25.08	1.08	1.52	1.2	0	1.2	28.88
98	Orch.Sprayer 500 G	83.6	13.68	0.48	0.67	2.29	0	2.29	17.12
97	Pickup Truck 1/2 T	285	6.49	0.14	0.2	1.25	3.33	4.58	11.4
98	Weed Sprayer 200 G	33.9	6.49	0.23	0.32	0.44	0	0.44	7.48

Table 7.

U.C. COOPERATIVE EXTENSION
RANGE ANALYSIS
RIVERSIDE COUNTY - 1998

COSTS PER ACRE AT VARYING YIELD TO PRODUCE GRAPEFRUIT

	YIELD (BOX/ACRE)						
	490	560	630	700	770	840	910
OPERATING COSTS/ACRE:							
Cultural Cost	1,327	1,327	1,327	1,327	1,327	1,327	1,327
Harvest Cost	1,598	1,827	2,055	2,283	2,512	2,740	2,968
Interest on operating capital	120	129	137	146	155	163	172
TOTAL OPERATING COSTS/ACRE	3,046	3,283	3,520	3,757	3,994	4,230	4,467
TOTAL OPERATING COSTS/BOX	6.22	5.86	5.59	5.37	5.19	5.04	4.91
CASH OVERHEAD COSTS/ACRE	399	399	399	399	399	399	399
TOTAL CASH COSTS/ACRE	3,445	3,682	3,919	4,156	4,393	4,630	4,867
TOTAL CASH COSTS/BOX	7.03	6.58	6.22	5.94	5.71	5.51	5.35
NON-CASH OVERHEAD COSTS/ACRE	1,663	1,663	1,663	1,663	1,663	1,663	1,663
TOTAL COSTS/ACRE	5,108	5,345	5,582	5,819	6,056	6,293	6,530
TOTAL COSTS/BOX	10.42	9.54	8.86	8.31	7.86	7.49	7.18

NET RETURNS PER ACRE ABOVE OPERATING COSTS FOR GRAPEFRUIT

PRICE (DOLLARS/BOX) GRAPEFRUIT	YIELD (50 lb BOXES/ACRE)						
	490	560	630	700	770	840	910
$ 3.67	-1,248	-1,228	-1,208	-1,188	-1,168	-1,148	-1,128
$ 4.20	-988	-931	-874	-817	-760	-702	-645
$ 4.72	-733	-640	-546	-453	-359	-266	-172
$ 5.25	-473	-343	-212	-82	49	180	310
$ 5.78	-214	-46	122	289	457	625	792
$ 6.30	41	245	449	653	857	1,062	1,266
$ 6.82	296	536	777	1,017	1,258	1,498	1,739

RANGING ANALYSIS (Continued)

NET RETURNS ABOVE CASH COSTS FOR GRAPEFRUIT

PRICE (DOLLARS/BOX) GRAPEFRUIT	YIELD (50 lb BOXES/ACRE) 490	560	630	700	770	840	910
$ 3.67	-1,647	-1,627	-1,607	-1,587	-1,567	-1,547	-1,527
$ 4.20	-1,387	-1,330	-1,273	-1,216	-1,159	-1,102	-1,045
$ 4.72	-1,133	-1,039	-946	-852	-759	-665	-572
$ 5.25	-873	-742	-612	-481	-350	-220	-89
$ 5.78	-613	-445	-278	-110	58	225	393
$ 6.30	-358	-154	50	254	458	662	866
$ 6.82	-104	137	377	618	858	1,099	1,339

NET RETURNS PER ACRE ABOVE TOTAL COSTS FOR GRAPEFRUIT

PRICE (DOLLARS/BOX) GRAPEFRUIT	YIELD (50 lb BOXES/ACRE) 490	560	630	700	770	840	910
$ 3.67	-3,310	-3,290	-3,270	-3,250	-3,230	-3,210	-3,190
$ 4.20	-3,050	-2,993	-2,936	-2,879	-2,822	-2,765	-2,708
$ 4.72	-2,795	-2,702	-2,608	-2,515	-2,421	-2,328	-2,234
$ 5.25	-2,536	-2,405	-2,275	-2,144	-2,013	-1,883	-1,752
$ 5.78	-2,276	-2,108	-1,941	-1,773	-1,605	-1,438	-1,270
$ 6.30	-2,021	-1,817	-1,613	-1,409	-1,205	-1,001	-797
$ 6.82	-1,766	-1,526	-1,285	-1,045	-804	-564	-323