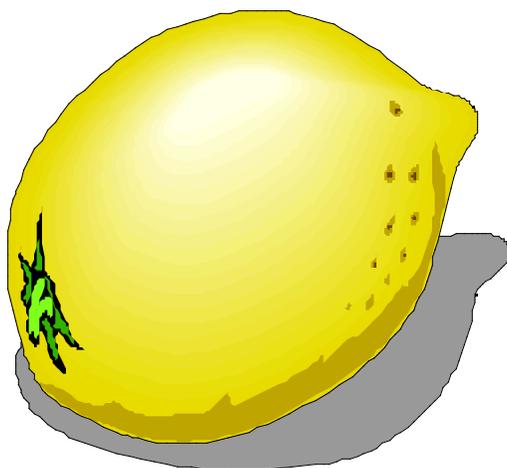


# Establishment and Production Costs

## Lemons San Diego County, 1998



By

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# **Establishment and Production Costs for Lemons San Diego County, 1998**

## **INTRODUCTION**

Detailed costs for lemon 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 lemon grove establishment and production in San Diego County. These production practices and costs are an amalgam 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 lemons. Open land is valued at \$10,500 per acre. Because only 18 of the 20 acres are planted to lemons, land is valued at \$11,550 per plantable acre.

### 2. TREES

Lemon trees are planted on a 20' x 20' 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 lemon trees are expected to begin yielding fruit at the end of the second year of establishment and then be productive for up to 28 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 28 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:** Frost control practices and costs are not included in this study. This is because in San Diego County, lemons generally are not grown in areas where frost damage is a concern.

#### 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 lemons are of Eureka variety and that 108 trees per acre are planted by contract labor. The cost is shown in Table 1.

**Pruning:** Pruning is one of the important cultural operations for the growth of lemon trees. Selective pruning is necessary beginning at a young age. Pruning is necessary to open the tree up to sunlight for interior fruit production and for more efficient pest control. 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.

Pruning is done annually by hand with a well-trained pruning crew. The crew selectively chooses which branches and shoots should be pruned back and removed. The cost per acre for pruning lemon trees increases through each year of establishment.

**Insect and Disease Management:** The primary pests in San Diego County for lemon production are the Citrus Bud Mite (CBM), silver mite and ants. The CBM causes an elongation or distortion of the fruit, decreasing its economic value. It also causes a stunting of the new growth. Treatment for CBM typically includes applications of Agrimeck and NR Oil once per year. The same treatment is used for silver mite or on “as needed” basis. Treatment for silver mite is usually done in early summer. 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 to anthills. It is applied twice a year, once in early spring and again in early summer.

Pesticide treatment for CBM should also control other insects such as thrips, red scale, aphids and black scale. However, if an infestation arises, growers may include other treatments as needed to protect trees from infestation and scarring of fruit.

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 poisonous bait, and the painting of tree trunks with liquid copper is used. The copper applied to the tree trunks acts as a fertilizer and provides a secondary benefit of controlling snails.

There are several pathogens that may attack lemon trees. In this study, we included Brown Rot treatment caused by the fungus Phytophthora. Brown Rot control may begin as early as the second year of establishment when fruit is first produced. However, in this study, it begins in the third year of establishment with an application of 3.5 lbs of Copper Sulfate per acre in an aqueous solution. Brown Rot control is done to protect the fruit from fungal spores that are splashed onto fruit during the rainy season.

**Grove Floor Management:** Weed control begins in the first year of establishment by spraying broadleaf and grass weeds in each tree row with Roundup. 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. Also, some hand weeding is done near the trunk of the trees during the first year of establishment.

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 applied during the establishment years is shown in **Table B**. Each year the fertilizer is applied four times in equal proportions, starting in February and ending in August.

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 is a combination of Zinc and Copper (also known as Kocide) applied in the fall. This application also has a benefit for frost protection.

**Table B. Pounds Of Nitrogen Fertilizer Applied During Lemon Grove Establishment**

Establishment Year	Pounds of N Per Tree	Pounds of N Per Acre
Year 1	0.10	10.80
Year 2	0.25	27.00
Year 3	0.50	54.00
Year 4	0.75	81.00
Year 5	1.25	135.00

**Vertebrate Pest Management:** Vertebrate pests require constant control in lemon 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 hillsides. 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 **\$8539** per acre or **\$153,702** for the 18 acre grove. The establishment cost is spread over 23 productive years.

## 5. PRODUCTION CULTURAL PRACTICES

**Pruning:** In San Diego County, a light skirt prune is done annually to remove low-hanging and unwanted branches. A heavy prune is done every three years to develop shoots and laterals, remove deadwood and create access for easy harvesting. As in the establishment, pruning is done by hand with a well-trained pruning crew. The prunings are placed in the row middles where they are chopped using a flail mower.

**Fertilization:** Nitrogen is applied at a rate of 2.0 pounds actual N per tree per year through the irrigation system. Also, 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.

**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:** Insect control in production years is the same as in establishment. Applications of Agrimeck and NR Oil are used to control CBM and silver mite. Lorsban is sprayed to control ant populations. Snail infestation is prevented with pruning of low-hanging limbs, in conjunction with the application of poisonous snail bait and the painting of tree trunks with liquid copper fertilizer.

**Disease Management:** Copper Sulfate, at an annual rate of 3.5 lbs. per acre, is used for Brown Rot control in the production years. Many growers will apply a second treatment if the rainy season is particularly heavy or long.

**Growth Regulators:** Gibberellic Acid may be applied to mature groves to delay harvesting, and to increase fruit size. In this study, Gibberellic Acid is applied using 20 grams a.i. (active ingredient) per acre.

Additionally, in San Diego County it is a common practice to spray Potassium Nitrate on lemons during the late summer months. It is believed that this practice allows the fruit to remain on the tree longer by delaying the maturation process of the lemon fruit. Potassium Nitrate is applied during the production years at a rate of 40 pounds per acre as a foliar spray.

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 many pesticides and are made by licensed pest control advisors (PCA). For pesticide regulatory information and pesticide use permits, contact the local county Agricultural Commissioner's office in San Diego. For additional production information contact the San Diego County citrus farm advisor.

## 6. YIELDS

Lemon trees can begin bearing fruit in the second 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 Lemons Per Acre in San Diego County**

Age of Tree	Boxes Per Acre <sup>1</sup>
Year 1	0
Year 2	0
Year 3	80
Year 4	216
Year 5	550
Year 6 +	850 (Average)

1) A box weighs approximately 50 pounds

## 7. HARVEST

Harvesting can start in the second or third year of planting. In this cost study, harvesting starts the third year and is done by a contracted labor crew. Picking consists of three to four times per year and is typically done from January through September. Hauling of fruit to the packing house can also be contracted through the packing house.

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 in which 60% of the fruit is packed and marketed fresh, 39% is used as juice, and 1% is discarded as rot. These averages are based on data from packing houses and the San Diego County Crop Statistics and Annual Report.

We used the following rates: \$3.10 per field box for picking, hauling, forklift use and field overhead, \$5.00 per field box for packing and marketing, \$0.35 per field box for juice handling and \$0.75 per field box for miscellaneous charges, which includes capital retention, washing, storage and door charge.

## 8. PRICES/RETURNS

We used a price/gross return of \$14.50 per field box as the basis of our analysis. This price is an average of information obtained from 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 lemon 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 lemon 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 labor wage 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.

**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 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 lemon 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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**University of California and the United States Department of Agriculture cooperating.**

Table 1.

U.C. COOPERATIVE EXTENSION  
 SAMPLE COSTS PER ACRE TO ESTABLISH A LEMON GROVE  
 SAN DIEGO COUNTY - 1998

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

Interest Rate: 9.50%  
 Trees/acre: 108

Year	Cost Per Acre				
	1st	2nd	3rd	4th	5th
Yield: 50 Pound Field Boxes Per Acre			80	216	550
<b>OPERATING COSTS:</b>					
Pre-Planting Costs:					
Land Preparation	800				
Total Pre-Planting Costs	800				
Planting Costs:					
Plant Trees	281				
Lemon Trees	945				
Total Pre-Planting Costs	1,226				
Replanting Costs:					
Replant Trees (@ 2%): Labor		8			
Trees - 3		26			
Total Replanting Costs:		34			
Cultural Costs: (Material & Labor & Fuel, Lube & Repair)					
Irrigation ( Labor & Water)	210	510	970	1,120	1,270
Fertilizer - Nitrogen	2	5	9	14	23
Foliar Spray - Zn Mn	13	14	15	15	16
Fall Foliar Spray - Kocide	13	13	15	16	18
Prune & Sucker Trees	54	81	108	135	162
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
Miticide Treatment		109	109	109	109
Vertebrate Control	10	10	10	10	10
Snail Bait		37	37	37	37
Paint Trunks		24	24	24	24
Brown Rot Control			16	16	16
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:	939	1,448	1,964	2,147	2,336
Harvest Costs:					
Pick, Haul & Field Overhead - \$3.10 per 50 Pound Field Box			248	670	1,705
Packing & Marketing - \$5.00 per 50 Pound Field Box - 60% of Crop			240	648	1,650
Juice - \$0.35 per 50 Pound Field Box - 39% of Crop			11	29	75
Miscellaneous Charges* - \$0.75 per 50 Pound Field Box			60	162	413
Total Harvest Costs:			559	1,509	3,843
Interest on Operating Capital @ 9.50%	222	79	107	124	153
<b>TOTAL OPERATING COSTS</b>	<b>3,187</b>	<b>1,561</b>	<b>2,630</b>	<b>3,780</b>	<b>6,332</b>
Cash Overhead Costs:					
Office Expense	56	56	56	56	56
Liability Insurance	20	20	20	20	20
Property Taxes	159	196	218	240	253
Property Insurance	113	140	156	171	180
Investment Repairs	222	222	222	222	222
<b>TOTAL CASH OVERHEAD COSTS</b>	<b>570</b>	<b>634</b>	<b>672</b>	<b>709</b>	<b>731</b>
<b>TOTAL CASH COSTS</b>	<b>570</b>	<b>634</b>	<b>672</b>	<b>709</b>	<b>731</b>
<b>INCOME FROM PRODUCTION</b>	<b>0</b>	<b>0</b>	<b>1,160</b>	<b>3,132</b>	<b>7,975</b>
<b>NET CASH COSTS FOR THE YEAR</b>	<b>570</b>	<b>634</b>	<b>-488</b>	<b>-2,423</b>	<b>-7,244</b>
<b>ACCUMULATED NET CASH COSTS</b>	<b>570</b>	<b>1,204</b>	<b>716</b>	<b>-1,707</b>	<b>-8,951</b>

U.C. COOPERATIVE EXTENSION  
Table 1. continued

Depreciation:					
Buildings	50	50	50	50	50
Fuel Tanks & Pumps	42	42	42	42	42
Shop Tools	42	42	42	42	42
Irrigation System	110	110	110	110	110
Equipment	143	143	143	143	143
<b>TOTAL DEPRECIATION</b>	<b>387</b>	<b>387</b>	<b>387</b>	<b>387</b>	<b>387</b>
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	462	462	462	462	462
Yearly Establishment		150	238	324	378
Equipment	42	42	42	42	42
<b>TOTAL INTEREST ON INVESTMENT</b>	<b>634</b>	<b>784</b>	<b>872</b>	<b>958</b>	<b>1,012</b>
<b>TOTAL COST FOR THE YEAR</b>	<b>1,347</b>	<b>1,561</b>	<b>1,687</b>	<b>1,810</b>	<b>1,886</b>
<b>INCOME FROM PRODUCTION</b>	<b>0</b>	<b>0</b>	<b>1,160</b>	<b>3,132</b>	<b>7,975</b>
<b>TOTAL NET COST FOR THE YEAR</b>	<b>1,347</b>	<b>1,561</b>	<b>527</b>	<b>-1,322</b>	<b>-6,089</b>
<b>TOTAL ACCUMULATED NET COST</b>	<b>1,347</b>	<b>2,908</b>	<b>3,435</b>	<b>2,113</b>	<b>-3,976</b>

\* Miscellaneous Charges include capital retention, washing, storage and door charge.

Table 2.

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

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

Interest Rate: 9.50%  
Yield per acre: 850 box

Operation	Operation Time (Hrs/A)	Cash and Labor Costs per Acre					Total Cost	Your Cost
		Labor Cost	Fuel,Lube & Repairs	Material Cost	Custom. Ren			
<b>Cultural:</b>								
Irrigation	7	70	0	1,800	0	1,870		
Fertilizer	0	0	0	37	0	37		
Foliar Spray	0.67	8	3	4	0	15		
Fall Foliar Spray	0.67	8	3	6	0	17		
Prune & Sucker	0.00	0	0	0	486	486		
Spot Spray Herbicide	0.50	6	0	11	0	17		
Pre-Emergent Herbicide	0.67	8	3	19	0	30		
Mow Middles	2.20	27	14	0	0	41		
Insecticide Treatment - Ants	1.33	16	6	30	0	52		
Miticide Treatment	0.67	8	3	91	0	103		
Vertebrate Pest Management	0.00	0	0	0	10	10		
Snail Bait	0.32	3	0	34	0	37		
Paint Tree Trunks	1.92	19	0	5	0	24		
Bordeaux Treatment	0.67	8	3	4	0	15		
Gibberellic Acid	0.67	8	3	36	0	47		
Leaf Analysis	0.00	0	0	0	5	5		
Pick-Up Truck	15.83	191	75	0	0	266		
ATV	15.83	191	19	0	0	210		
<b>TOTAL CULTURAL COSTS</b>	<b>48.94</b>	<b>572</b>	<b>134</b>	<b>2,076</b>	<b>501</b>	<b>3,282</b>		
<b>Harvest:</b>								
Harvest	0.00	0	0	5,939	0	5,939		
<b>TOTAL HARVEST COSTS</b>	<b>0.00</b>	<b>0</b>	<b>0</b>	<b>5,939</b>	<b>0</b>	<b>5,939</b>		
Interest on operating capital @ 9.50%						618		
<b>TOTAL OPERATING COSTS/ACRE</b>		<b>572</b>	<b>134</b>	<b>8,014</b>	<b>501</b>	<b>9,838</b>		
<b>CASH OVERHEAD:</b>								
Office Expense SDC						56		
Liability Ins. SDC						20		
Property Taxes						206		
Property Insurance						147		
Investment Repairs						222		
<b>TOTAL CASH OVERHEAD COSTS</b>						<b>650</b>		
<b>TOTAL CASH COSTS/ACRE</b>						<b>10,489</b>		
<b>NON-CASH OVERHEAD:</b>								
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		199		199		
Land - SDC Lemons		11,550				0		
SDC Lemon Estabmnt		8,539		551		551		
Equipment		1,909		192		192		
<b>TOTAL NON-CASH OVERHEAD COSTS</b>						<b>1,138</b>		
<b>TOTAL COSTS/ACRE</b>						<b>11,627</b>		

Table 3.

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

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

InterestRate: 9.50%

	Quantity /Acre	Unit	Price or Cost/Unit	Value or Cost/Acre	Your Cost
<b>GROSS RETURNS</b>					
LEMON	850	box	14.50	12,325	
<b>TOTAL GROSS RETURNS FOR LEMONS</b>				12,325	
<b>OPERATING COSTS</b>					
Water:					
Water	36.00	acin	50.00	1,800	
Fertilizer:					
Soluble N	216.00	lb N	0.17	37	
Zinc Sulfate	5.00	lb	0.46	2	
Manganese Sulfate	5.00	lb	0.37	2	
Copper	4.00	lb	1.40	6	
Custom:					
Prune & Sucker	108.00	tree	4.50	486	
Vertebrate Pest	1.00	acre	10.00	10	
Herbicide:					
Round-Up	25.60	oz	0.42	11	
Princep Caliber 90	4.00	lb	4.69	19	
Insecticide:					
Lorsban - Ants	4.00	pint	7.40	30	
Agrimeck - CBM	15.00	oz	5.47	82	
NR Oil - CBM	7.50	qt	1.25	9	
Snail Bait	20.00	lb	1.70	34	
Copper Count N	0.50	gal	9.21	5	
Fungicide:					
Copper Sulfate	3.50	lb	1.15	4	
Surfactant:					
Activator 90	1.00	oz	0.13	0	
Grwth Regltr:					
Gibberellic Acid	20.00	oz	1.81	36	
Contract:					
Leaf Analysis	1.00	acre	5.00	5	
Harvest:					
Pick & Haul	850.00	box	3.10	2,635	
Packing 60% Crop	510.00	box	5.00	2,550	
Juice 39% Crop	331.50	box	0.35	116	
Misc Charges	850.00	box	0.75	638	
Labor (machine)	47.64	hrs	10.05	479	
Labor (non-machine)	9.24	hrs	10.05	93	
Fuel - Gas	50.14	gal	1.20	60	
Fuel - Diesel	25.25	gal	0.85	21	
Lube				12	
Machinery repair				40	
Interest on operating capital @ 9.50%				618	
<b>TOTAL OPERATING COSTS/ACRE</b>				9,838	
<b>NET RETURNS ABOVE OPERATING COSTS</b>				2,487	

U.C. COOPERATIVE EXTENSION  
Table 3. continued

<b>CASH OVERHEAD COSTS:</b>	
Office Expense SDC	56
Liability Ins. SDC	20
Property Taxes	206
Property Insurance	147
Investment Repairs	222
<b>TOTAL CASH OVERHEAD COSTS/ACRE</b>	<b>650</b>
<b>TOTAL CASH COSTS/ACRE</b>	<b>10,489</b>
<b>NON-CASH OVERHEAD COSTS (CAPITAL RECOVERY):</b>	
Shop Building SDC	78
Shop Tools	59
Fuel Tanks & Pumps	59
Irrigation SDC	199
Land - SDC Lemons	0
SDC Lemon Estabmnt	551
Equipment	192
<b>TOTAL NON-CASH OVERHEAD COSTS/ACRE</b>	<b>1,138</b>
<b>TOTAL COSTS/ACRE</b>	<b>11,627</b>
<b>NET RETURNS ABOVE TOTAL COSTS</b>	<b>698</b>

Table 4.

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

Beginning JAN 98	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	TOTAL
Ending DEC 98	98	98	98	98	98	98	98	98	98	98	98	98	98
<b>Cultural:</b>													
Irrigation			108	158	208	260	360	360	260	158			1,870
Fertilizer		9		9		9		9					37
Foliar Spray					15								15
Fall Foliar Spray											17		17
Prune & Sucker			486										486
Spot Spray Herbicide					8			8					17
Pre-Emergent Herbicide		30											30
Mow Middles		4		4		7	7	7	7		4		41
Insecticide Treatment - A			26			26							52
Miticide Treatment									103				103
Vertebrate Pest Managemen	1	1	1	1	1	1	1	1	1	1	1	1	10
Snail Bait				37									37
Paint Tree Trunks					24								24
Bordeaux Treatment											15		15
Gibberellic Acid										47			47
Leaf Analysis									5				5
Pick-Up Truck	22	22	22	22	22	22	22	22	22	22	22	22	266
ATV	18	18	18	18	18	18	18	18	18	18	18	18	210
<b>TOTAL CULTURAL COSTS</b>	<b>40</b>	<b>83</b>	<b>660</b>	<b>248</b>	<b>296</b>	<b>343</b>	<b>408</b>	<b>426</b>	<b>416</b>	<b>245</b>	<b>76</b>	<b>40</b>	<b>3,282</b>
<b>Harvest:</b>													
Harvest	2,969				2,082				887				5,939
<b>TOTAL HARVEST COSTS</b>	<b>2,969</b>				<b>2,082</b>				<b>887</b>				<b>5,939</b>
Interest on oper. capital	24	24	30	32	50	53	56	60	70	72	73	73	618
<b>TOTAL OPERATING COSTS/ACRE</b>	<b>3,033</b>	<b>108</b>	<b>690</b>	<b>280</b>	<b>2,428</b>	<b>396</b>	<b>464</b>	<b>485</b>	<b>1,373</b>	<b>318</b>	<b>149</b>	<b>113</b>	<b>9,838</b>
<b>OVERHEAD:</b>													
Office Expense SDC												56	56
Liability Ins. SDC												20	20
Property Taxes		103					103						206
Property Insurance		73					73						147
Investment Repairs	19	19	19	19	19	19	19	19	19	19	19	19	222
<b>TOTAL CASH OVERHEAD COSTS</b>	<b>19</b>	<b>195</b>	<b>19</b>	<b>19</b>	<b>19</b>	<b>19</b>	<b>195</b>	<b>19</b>	<b>19</b>	<b>19</b>	<b>19</b>	<b>94</b>	<b>650</b>
<b>TOTAL CASH COSTS/ACRE</b>	<b>3,052</b>	<b>302</b>	<b>708</b>	<b>298</b>	<b>2,447</b>	<b>415</b>	<b>659</b>	<b>504</b>	<b>1,392</b>	<b>336</b>	<b>168</b>	<b>208</b>	<b>10,489</b>

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	Yrs Life	Salvage Value	Capital Recovery	Insur- ance	Taxes	Repairs	Total
INVESTMENT								
Fuel Tanks & Pumps	12,500	15	1,250	1,062	49	69	250	1,430
Irrigation SDC	61,800	28	6,180	3,585	242	340	3,100	7,267
Land - SDC Lemons	207,900				1,482	2,079	0	11,877
SDC Lemon Estabmnt	153,702	23	15,370	9,926	603	845	0	11,374
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	468,402		26,050	17,039	2,504	3,512	4,000	35,371

ANNUAL BUSINESS OVERHEAD COSTS

Description	Units/ Farm	Unit	Price/ Unit	Total Cost
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 LEMON - 1998

		COSTS PER HOUR							
		Actual	Cash Overhead			Operating			Total
Yr	Description	Hours Used	Capital Recovery	Insur- ance	Taxes	Repairs	Fuel & Lube	Total Oper.	Total Costs/Hr.
98	100G Backpack 3pnt	96.00	1.10	0.05	0.07	0.29	0.00	0.29	1.52
98	62 HP 2WD Tractor	149.20	7.20	0.40	0.56	1.12	2.98	4.10	12.26
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 AT VARYING YIELDS TO PRODUCE LEMON

	YIELD (BOX/ACRE)						
	700	750	800	850	900	950	1000
OPERATING COSTS/ACRE:							
Cultural Cost	3,282	3,282	3,282	3,282	3,282	3,282	3,282
Harvest Cost	4,891	5,240	5,589	5,939	6,288	6,637	6,987
Interest on operating capital	540	566	592	618	644	670	696
<b>TOTAL OPERATING COSTS/ACRE</b>	<b>8,712</b>	<b>9,088</b>	<b>9,463</b>	<b>9,838</b>	<b>10,214</b>	<b>10,589</b>	<b>10,964</b>
<b>TOTAL OPERATING COSTS/BOX</b>	<b>12.45</b>	<b>12.12</b>	<b>11.83</b>	<b>11.57</b>	<b>11.35</b>	<b>11.15</b>	<b>10.96</b>
CASH OVERHEAD COSTS/ACRE	650	650	650	650	650	650	650
<b>TOTAL CASH COSTS/ACRE</b>	<b>9,363</b>	<b>9,738</b>	<b>10,113</b>	<b>10,489</b>	<b>10,864</b>	<b>11,239</b>	<b>11,615</b>
<b>TOTAL CASH COSTS/BOX</b>	<b>13.38</b>	<b>12.98</b>	<b>12.64</b>	<b>12.34</b>	<b>12.07</b>	<b>11.83</b>	<b>11.61</b>
NON-CASH OVERHEAD COSTS/ACRE	1,600	1,600	1,600	1,600	1,600	1,600	1,600
<b>TOTAL COSTS/ACRE</b>	<b>10,963</b>	<b>11,338</b>	<b>11,713</b>	<b>12,089</b>	<b>12,464</b>	<b>12,839</b>	<b>13,215</b>
<b>TOTAL COSTS/BOX</b>	<b>15.66</b>	<b>15.12</b>	<b>14.64</b>	<b>14.22</b>	<b>13.85</b>	<b>13.52</b>	<b>13.21</b>

NET RETURN PER ACRE ABOVE OPERATING COSTS FOR LEMON

PRICE (DOLLARS/BOX)	YIELD (BOX/ACRE)						
	700	750	800	850	900	950	1,000
LEMON							
13.00	388	662	937	1,212	1,486	1,761	2,036
13.50	738	1,037	1,337	1,637	1,936	2,236	2,536
14.00	1,088	1,412	1,737	2,062	2,386	2,711	3,036
14.50	1,438	1,787	2,137	2,487	2,836	3,186	3,536
15.00	1,788	2,162	2,537	2,912	3,286	3,661	4,036
15.50	2,138	2,537	2,937	3,337	3,736	4,136	4,536
16.00	2,488	2,912	3,337	3,762	4,186	4,611	5,036

RANGING ANALYSIS  
Table 7. continued

NET RETURNS PER ACRE ABOVE CASH COSTS FOR LEMON

PRICE (DOLLARS/BOX)		YIELD (BOX/ACRE)					
LEMON	700	750	800	850	900	950	1,000
13.00	-263	12	287	561	836	1,111	1,385
13.50	87	387	687	986	1,286	1,586	1,885
14.00	437	762	1,087	1,411	1,736	2,061	2,385
14.50	787	1,137	1,487	1,836	2,186	2,536	2,885
15.00	1,137	1,512	1,887	2,261	2,636	3,011	3,385
15.50	1,487	1,887	2,287	2,686	3,086	3,486	3,885
16.00	1,837	2,262	2,687	3,111	3,536	3,961	4,385

NET RETURNS PER ACRE ABOVE TOTAL COSTS FOR LEMON

PRICE (DOLLARS/BOX)		YIELD (BOX/ACRE)					
LEMON	700	750	800	850	900	950	1,000
13.00	-1,863	-1,588	-1,313	-1,039	-764	-489	-215
13.50	-1,513	-1,213	-913	-614	-314	-14	285
14.00	-1,163	-838	-513	-189	136	461	785
14.50	-813	-463	-113	236	586	936	1,285
15.00	-463	-88	287	661	1,036	1,411	1,785
15.50	-113	287	687	1,086	1,486	1,886	2,285
16.00	237	662	1,087	1,511	1,936	2,361	2,785