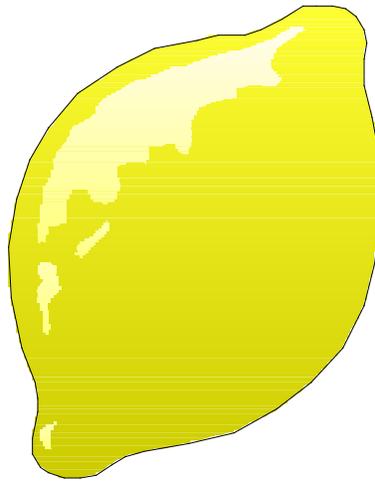


# **Establishment and Production Costs**

## **Lemons Ventura County, 1997**



**By**

**Etaferahu Takele  
Area Farm Advisor, Farm Management Economics**

**Nicholas Sakovich  
Citrus Farm Advisor, Ventura County**

**&**

**Delos Walton  
Staff Research Associate, Farm Management Economics**

# **Establishment and Production Costs for Lemons Ventura County, 1997**

## **INTRODUCTION**

Detailed costs for lemon grove establishment and production in Ventura County are presented in this study. The hypothetical grove used in this report consists of a total of 50 acres, 48 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 Ventura County. These production practices and costs do not reflect the exact values or practices of any grower or shipper, but are rather an amalgamation of costs and practices in the region. Sample costs given for labor, materials, equipment and contract services are based on 1996/97 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.

<b>Table 1.</b>	<b>Costs Per Acre To Establish A Lemon Grove</b>
<b>Table 2.</b>	<b>Costs Per Acre To Produce Lemons</b>
<b>Table 3.</b>	<b>Costs And Returns</b>
<b>Table 4.</b>	<b>Monthly Cash Costs</b>
<b>Table 5.</b>	<b>Whole Farm Equipment List, Prices, and Annual Investment and Business Overhead Costs</b>
<b>Table 6.</b>	<b>Hourly Equipment Costs</b>
<b>Table 7.</b>	<b>Ranging Analysis Of Costs And Returns</b>

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 Area Farm Management Economics Advisor, Etaferahu Takele, University of California Cooperative Extension, Moreno Valley, California, (909) 683-6491 ext. 243 or call the Ventura County Citrus Farm Advisor, Nicholas Sakovich, (805) 645-1469.

## ASSUMPTIONS

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

### 1. LAND

The grove is comprised of 50 acres of lemons. Land is valued at \$22,500 per acre. Because only 48 of the 50 acres are planted to lemons, land is valued at \$23,400 per plantable acre.

### 2. TREES

Lemon trees are planted on a 16'x20' spacing with 136 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 in the second year of establishment and then be productive for up to 40 years.

### 3. IRRIGATION & FROST PROTECTION

**Irrigation:** A micro-irrigation system is used. 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 hoses and sprinklers are placed at the time of planting. The cost for the irrigation system includes the cost of a pump, filtration system, hoses, sprinklers and installation. The life of the filtration system, hoses and sprinklers is estimated at 40 years. Tubing and pump changes take place at 20 years.

The cost of water to irrigate crops in Ventura County varies greatly from region to region within the county. In this study, water is calculated to cost \$190.00 per acre-foot. Labor required for irrigation involves turning the system on and monitoring the irrigation lines to make sure that irrigation lines and sprinklers are functioning properly. No assumption is made about effective rainfall. Typically irrigation begins in April and lasts until October, although this varies greatly depending on the amount of rainfall. The amount of irrigation water applied varies by age of trees as shown in **Table A**.

**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	20 Ac In
Year 5	24 Ac In
Year 6 +	30 Ac In

**Frost Protection System:** In Ventura County, wind machines are used for frost control. Each wind machine serves an area of ten acres. Water is also used as an aid against frost damage. In this study wind machines are used as the principal instrument for frost protection.

The cost of purchasing and installing the wind machine is shown in **Table 4**. Other costs related to wind machines include \$100 per month stand-by charge by the local power

company and \$50 per machine per year for maintenance and upkeep. The most critical time of the year for frost control is from December through January, but frost has been known to occur as early as October, and as late as April. In actual practice the cost of frost protection will vary from year to year. For example, there has been no threat of frost since the freeze of 1990-1991 and the wind machines have remained idle since then. In this study, the costs of frost protection include standby and maintenance charges.

#### **4. ESTABLISHMENT CULTURAL PRACTICES**

This grove is established on ground that is currently planted to tree fruit, which are to be removed. 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 Ventura County, but may not apply to every situation.**

**Grove Conversion And Site Preparation:** The existing trees are removed in the summer prior to planting. Tree removal is performed by contract or custom operators. The site is then subsoiled to break up underlying soil layers. This process aids root and water penetration, and also pulls up roots from the previous trees which can harbor disease. After subsoiling, the ground is disced twice to break up large clods and smooth the soil. The land is then leveled using a triplane. **The grove site is *not* fumigated. Fumigation with Methyl Bromide will have beneficial effects for controlling diseases, weed seeds, and nematodes, however, it is rarely done because of its high cost.** All ground preparations are done in the year prior to planting, but costs are shown in the first year of establishment.

**Planting:** Initially, the land is surveyed by a professional crew. Then the tree sites are marked using lime or gypsum in the early spring just prior to planting. In this study, 136 trees per acre are planted.

**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.

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 each year, up to year six, and remains constant in the years thereafter. Trees are also topped to keep picking costs down. Topping and hedging may also be done mechanically.

**Insect, Disease and Nematode Management:** Ranchers in Ventura County typically use a combination of conventional and biological methods to control insect threats to their crops.

Recently, the primary pest in Ventura County has been the Citrus Bud Mite (CBM). 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 an oil spray, such as NR 415 Oil.

During grove establishment, oil applications may or may not be needed on young trees. However, infestations may arise and treatments may include an oil spray or other spray as

needed. In this study, we applied a single oil spray in years three and five of the establishment period. Treatments for other insects such as thrips, red scale, aphids and black scale are not included in this study, however growers may include these treatments as they are needed to protect trees from infestation and scarring.

Biological control using beneficial insects has become a standard part of lemon pest control programs in Ventura County. These insects include wasps such as *Aphytis Sp.*, *Helvolus Metaphycus* and decollate snails, *Rumina*. The cost for beneficial insects consists of a cooperative insectary membership fee and a charge for services based on the number of trees per acre. In this study with 136 trees, we used \$50 per acre per year for membership and service charges.

Decollate snails are a natural predator of the brown garden snails. Decollate snails eat young to partially grown brown snails along with decaying leaves, fallen fruit and emerging seedlings. Decollate snails are not known to feed on healthy fruit or leaves. Once sufficient colonization levels have been established, the orchards may well remain free of any significant brown snail infestation.

To protect against soil borne fungal diseases, newly planted trees are treated with a fungicide. An application of Ridomil is used at a rate of 0.02 ounces per tree three times in the first two years of establishment via the irrigation system.

There are several pathogens that may attack lemon trees. This study included the treatment of Brown Rot only. Brown Rot control may begin in the third year with an application of 3 lbs. Copper Sulfate and 4.5 lbs. Lime 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.

Nematodes also cause significant problems in lemon groves. These microscopic invertebrate pests interfere with the tree's nutrient absorption by burrowing into, and living in, the lemon tree's root system. Chronic infection leads to decreased fruit size and retarded growth. Nematodes can be diagnosed by taking soil samples from the soil around suspected infected trees. Treatment involves using a nematicide such as Nemacur, which can be applied through the irrigation system. In this study, Nemacur is used at 2 gallons per acre in year's one, two, four and five of establishment.

**Grove Floor Management:** Weed control begins in the first year of establishment by spraying between trees in each row with Roundup applied at 1 quart per acre per year. Beginning in the second year of establishment, a spot spray, also using Roundup, follows later in the year to control sporadic weed growth using approximately 13 ounces per acre per year.

**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 five 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-minerals. In this study, we included a foliar spray of Zinc Sulfate and Manganese Sulfate.

**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	13.60
Year 2	0.20	27.20
Year 3	0.30	40.80
Year 4	0.40	54.40
Year 5	0.68	92.48

**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. Trapping and baiting are effective strategies to 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. Squirrel populations can be controlled by 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 **\$3,351** per acre or **\$160,848** for the 48 acre grove. The establishment cost is spread over 35 productive years.

## 5. PRODUCTION CULTURAL PRACTICES

**Pruning:** Pruning is done annually and comprises the removal of deadwood and selecting desired branches for the development of shoots and laterals for the coming season. Thinning and shortening of unwanted branches form a low spreading tree with easy access for 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 mower.

**Fertilization:** Nitrogen is applied at a rate of 1.10 pounds 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.

**Grove Floor Management:** Early summer weeds in the tree rows are treated with a herbicide spray of 1 quart of Roundup per acre per year. Occasional weed growth is treated with a spot spray of Roundup using approximately 25 ounces per acre per year.

**Insect Management:** For lemons, a typical minimal spray program may include one oil spray for California red scale and one spray for thrips. CBM, the most prevalent pest in the area, is controlled with the red scale spray. In this study we used a custom insecticide spray application in the summer for thrips using Veratran and an insecticide spray application in the fall for CBM and red scale using a combination of oil and Lorsban. However, more than one treatment may be required to fully contain and manage a grove's insect population. Additional applications may also be needed for black scale. Biological control methods are also continued throughout the production years.

**Disease and Nematode Management:** Copper Sulfate and Lime, at an annual rate of 3 lbs. and 4.5 lbs. respectively, are 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.

Nematodes may be a problem in mature groves. In this study no treatment for nematodes is included in the production years because many growers choose not to treat.

**Growth Regulators:** Gibberellic Acid may be applied to mature groves for the delaying of harvesting, which also increases fruit size. In this study, Gibberellic Acid is custom applied using 20 grams ai per acre.

Pesticides, rates, and cultural practices mentioned in this cost study are a few of those listed in the *UC IPM 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 Ventura. For additional production information contact the Ventura County citrus farm advisor.

## **6. HARVEST**

Harvesting starts in the second or third year. In this cost study, harvesting starts the second year and is done by contracted labor crew. Hauling to a local packing house is also contracted by the grower.

Harvesting consists of three to four picks per year and is typically done from January through September.

Lemon growers are assessed fees to pay for industry programs and for participating in marketing cooperatives. These fees are collected at the packing house from the growers' pack-out.

In this study, growers are charged \$2.50 for picking and hauling. No packing and assessment fees are included since we used packing house door prices instead of Freight On Board (F.O.B.) prices to calculate returns.

## 7. YIELDS & RETURNS

Lemon trees can begin bearing fruit in the second year after planting. Full production is reached in the sixth year. 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 Ventura County**

Age of Tree	Boxes Per Acre <sup>1</sup>
Year 1	0
Year 2	140
Year 3	270
Year 4	550
Year 5	780
Production Starting Year 6	900 (Average)

1) A box weighs approximately 50 pounds

**Returns:** The Ventura County Agricultural Commissioner's Office uses F.O.B. prices in its yearly Annual Crop Report. These prices ranged from \$8.20 per box to \$19.01 per box from 1990 to 1995. **Table D** shows the average annual yields and F.O.B. prices for lemons grown in Ventura County from 1990 to 1995. In this study, returns are calculated using packing house door prices, i.e. the six year average F.O.B. price (\$12.70) minus the packing, handling and marketing costs. Currently, charges for packing, handling and marketing in Ventura County approximated \$5.10 per box. Therefore we used an approximate average packing house door price of \$7.60 (\$12.70 - \$5.10) per box as the basis of our analysis. However, to cover a broader scenario of productivity and prices, we provided a range analysis in **Table 7**.

**Table D. Average Yield Per Acre and Prices Per Field Box for Lemons  
Ventura County, 1990 - 1995<sup>1</sup>**

Year	Field Box / Acre	Price Per 50 Pound Field Box (F.O.B.)
1990	638	19.01
1991	608	14.97
1992	867	8.20
1993	728	12.24
1994	709	10.51
1995	667	11.11
Average	703	12.67

1) Ventura County Annual Crop Report, 1990-1995

## 8. 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.

## 9. LABOR

Hourly wage for workers is \$8.65 per hour for both machine and non-machine workers. This is based on 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 \$11.70 per hour for both machine and non-machine workers. The labor for operations involving machinery are 20% higher than the operation time to account for the extra labor involved in equipment set up, moving, maintenance and repair.

## 10. 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 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 equals new cost plus salvage value divided by 2 on a per acre basis.

**Interest On Operating Capital:** Interest on operating capital is based on cash operating costs and is calculated monthly until harvest at a nominal rate of 11.61% 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 \$650 for the entire farm.

**Office Expense:** Office and business expenses are estimated at \$100 per acre. These expenses include office supplies, telephone, computer, fax, copier, bookkeeping, accounting, legal fees, etc.

## 11. NON-CASH OVERHEAD

Non-cash overhead is comprised of depreciation and interest charged on equipment and other investments. Typically, farm equipment in Ventura County is mostly old. 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 cost is a charge for the use of capital in lemon production. It 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 equals the new cost plus salvage value divided by 2.

## 12. 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 \$1.15 and \$1.20 per gallon, respectively.

## 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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Table 1. SAMPLE COSTS PER ACRE TO ESTABLISH A LEMON GROVE  
VENTURA COUNTY, 1997

Year	Cost Per Acre				
	1st	2nd	3rd	4th	5th
<b>Yield: 50 Pound Field Boxes Per Acre</b>		<b>140</b>	<b>270</b>	<b>550</b>	<b>780</b>
<b>OPERATING COSTS:</b>					
<b>Pre-Planting Costs:</b>					
Tree Removal	150				
Land Preparation: Subsoil & Disc	11				
Land Preparation: Level	5				
Plant Trees	272				
Lemon Trees	1258				
<b>Total Pre-Planting Costs</b>	<b>1696</b>	<b>0</b>	<b>0</b>		
<b>Replanting Costs:</b>					
Replant Trees (@ 2%): Labor		6			
Trees - 3		28			
<b>Total Replanting Costs:</b>	<b>0</b>	<b>34</b>	<b>0</b>		
<b>Cultural Costs:</b>					
Irrigate	71	166	308	340	403
Fertilizer - Nitrogen	2	5	7	9	16
Fungicide	44	44			
Prune & Sucker Trees	102	102	222	222	496
Weed Control - Row Spray	33	33	33	33	33
Weed Control - Spot Spray		9	9	9	9
Chop Brush		44	44	44	44
Insecticide			54		57
Leaf Analysis	5	5	5	5	5
Biological Control	50	50	50	50	50
Nematicide	166	166	0	166	166
Vertebrate Control	10	10	10	10	10
Frost Control	126	126	126	126	126
Brown Rot Control			24	24	24
Foliar Spray - ZnMn	26	26	26	26	26
Pickup Truck Use	113	113	113	113	113
ATV Use	89	89	89	89	89
<b>Total Cultural Costs:</b>	<b>837</b>	<b>988</b>	<b>1120</b>	<b>1266</b>	<b>1667</b>
<b>Harvest Costs:</b>					
Pick & Haul - \$2.50 per 50 Pound Field Box		350	675	1375	1950
<b>Total Harvest Costs:</b>		<b>350</b>	<b>675</b>	<b>1375</b>	<b>1950</b>
<b>Interest on Operating Capital @ 11.61%</b>	<b>212</b>	<b>62</b>	<b>72</b>	<b>86</b>	<b>122</b>
<b>TOTAL OPERATING COSTS</b>	<b>2745</b>	<b>1434</b>	<b>1867</b>	<b>2727</b>	<b>3739</b>

Table 1. SAMPLE COSTS PER ACRE TO ESTABLISH A LEMON GROVE (cont.)  
VENTURA COUNTY, 1997

Year	Cost Per Acre				
	1st	2nd	3rd	4th	5th
<b>Yield: 50 Pound Field Boxes Per Acre</b>		<b>140</b>	<b>270</b>	<b>550</b>	<b>780</b>
<b>Cash Overhead Costs:</b>					
Office Expense	100	100	100	100	100
Liability Insurance	14	14	14	14	14
Property Taxes	271	303	320	321	320
Property Insurance	193	216	228	229	228
Investment Repairs	138	138	138	138	138
<b>TOTAL CASH OVERHEAD COSTS</b>	<b>716</b>	<b>771</b>	<b>800</b>	<b>802</b>	<b>800</b>
<b>TOTAL CASH COSTS</b>	<b>3461</b>	<b>2205</b>	<b>2667</b>	<b>3529</b>	<b>4539</b>
<b>INCOME FROM PRODUCTION</b>	<b>0</b>	<b>1050</b>	<b>2025</b>	<b>4125</b>	<b>5850</b>
<b>NET CASH COSTS FOR THE YEAR</b>	<b>3461</b>	<b>1155</b>	<b>642</b>		
<b>PROFIT ABOVE CASH COSTS</b>				<b>596</b>	<b>1311</b>
<b>ACCUMULATED NET CASH COSTS</b>	<b>3461</b>	<b>4616</b>	<b>5258</b>	<b>4662</b>	<b>3351</b>
<b>Depreciation:</b>					
Buildings	48	48	48	48	48
Fuel Tanks & Pumps	16	16	16	16	16
Shop Tools	16	16	16	16	16
Irrigation System	56	56	56	56	56
Wind Machines	60	60	60	60	60
Equipment	140	121	163	121	163
<b>TOTAL DEPRECIATION</b>	<b>336</b>	<b>317</b>	<b>359</b>	<b>317</b>	<b>359</b>
<b>Interest on Investment:</b>					
Buildings	17	17	17	17	17
Fuel Tanks & Pumps	6	6	6	6	6
Shop Tools	6	6	6	6	6
Irrigation System	34	34	34	34	34
Land - Ventura County	936	936	936	936	936
Yearly Establishment		138	185	210	186
Wind Machines	37	37	37	37	37
Equipment	48	39	59	39	59
<b>TOTAL INTEREST ON INVESTMENT</b>	<b>1084</b>	<b>1213</b>	<b>1280</b>	<b>1285</b>	<b>1281</b>
<b>TOTAL COST FOR THE YEAR</b>	<b>4881</b>	<b>3735</b>	<b>4306</b>	<b>5131</b>	<b>6179</b>
<b>INCOME FROM PRODUCTION</b>	<b>0</b>	<b>1050</b>	<b>2025</b>	<b>4125</b>	<b>5850</b>
<b>TOTAL NET COST FOR THE YEAR</b>	<b>4881</b>	<b>2685</b>	<b>2281</b>	<b>1006</b>	<b>329</b>
<b>TOTAL ACCUMULATED NET COST</b>	<b>4881</b>	<b>7566</b>	<b>9847</b>	<b>10853</b>	<b>11182</b>

Table 2. COSTS PER ACRE TO PRODUCE LEMONS

VENTURA COUNTY, 1997

Labor Rate: \$11.70/hr. machine labor

Interest Rate: 11.61%

\$11.70/hr. non-machine labor

Yield per Acre: 900.00 Boxes

Operation	Operation Time (Hrs/A)	Cash and Labor Costs per Acre				Total Cost	Your Cost
		Labor Cost	Fuel, Lube & Repairs	Material Cost	Custom/ Rent		
<b>Cultural:</b>							
Irrigation	2.00	23	0	475	0	498	
Prune & Sucker	0.00	0	0	0	475	475	
Chop Brush	2.00	28	16	0	0	44	
Herbicide	0.50	7	13	13	0	33	
Foliar Spray	0.50	7	13	6	0	26	
Fertilizer	0.00	0	0	25	0	25	
Bordeaux Treatment	0.50	7	13	4	0	24	
Spot Spray Herbicide	0.44	6	1	12	0	19	
Vertebrate Pest Management	0.00	0	0	0	10	10	
Insecticide Treatment	0.00	0	0	0	300	300	
Leaf Analysis	0.00	0	0	0	5	5	
Gibberellic Acid	0.00	0	0	0	55	55	
Biological Control	0.00	0	0	0	50	50	
Frost Protection	0.10	1	0	0	125	126	
Pick-Up Truck	5.70	80	37	0	0	117	
ATV	5.70	80	9	0	0	89	
<b>TOTAL CULTURAL COSTS</b>	<b>17.44</b>	<b>240</b>	<b>102</b>	<b>535</b>	<b>1,020</b>	<b>1,897</b>	
<b>Harvest:</b>							
Harvest ( Pick & Haul )	0.00	0	0	2,250	0	2,250	
<b>TOTAL HARVEST COSTS</b>	<b>0.00</b>	<b>0</b>	<b>0</b>	<b>2,250</b>	<b>0</b>	<b>2,250</b>	
Interest on operating capital @11.61%						326	
<b>TOTAL OPERATING COSTS/ACRE</b>		<b>240</b>	<b>102</b>	<b>2,785</b>	<b>1,020</b>	<b>4,473</b>	
<b>TOTAL OPERATING COSTS/BOX</b>						<b>5</b>	
<b>CASH OVERHEAD:</b>							
Office Expense						100	
Liability Insurance						14	
Property Taxes						287	
Property Insurance						205	
Investment Repairs						138	
<b>TOTAL CASH OVERHEAD COSTS</b>						<b>743</b>	
<b>TOTAL CASH COSTS/ACRE</b>						<b>5,216</b>	
<b>TOTAL CASH COSTS/BOX</b>						<b>6</b>	
<b>NON-CASH OVERHEAD:</b>							
Investment:	<u>Per</u>	<u>Annual Cost</u>					
	<u>Producing</u>	<u>Acres</u>	<u>Depreciation</u>	<u>Interest @ 4%</u>			
Shop Building	794	48		17		65	
Shop Tools	260	16		6		21	
Fuel Tanks & Pumps	260	16		6		21	
Irrigation	1,563	56		34		91	
Wind Machines	1,667	60		37		97	
Land	23,400			936		936	
Grove Establishment	3,351	86		74		160	
Equipment	1,766	121		39		160	
<b>TOTAL NON-CASH OVERHEAD COSTS</b>	<b>33,061</b>	<b>402</b>		<b>1,149</b>		<b>1,551</b>	
<b>TOTAL COSTS/ACRE</b>						<b>6,767</b>	
<b>TOTAL COSTS/BOX</b>						<b>8</b>	

Table 3. COSTS AND RETURNS PER ACRE TO PRODUCE LEMONS

VENTURA COUNTY, 1997

Labor Rate: \$ 11.70/hr. machine labor

Interest Rate: 11.61%

\$ 11.70/hr. non-machine labor

	Quantity/Acre	Unit	Price or Cost/Unit	Value or Cost/Acre	Your Cost
<b>GROSS RETURNS:</b>	900	Box	7.60	6840	
<b>OPERATING COSTS:</b>					
Water:					
Water	30.00	AcIn	15.83	475	
Custom:					
Prune & Sucker	1.00	Acre	475	475	
Vertebrate Pest	1.00	Acre	10	10	
Budmite Treatment	1.00	Acre	200	200	
Thrips Treatment	1.00	Acre	100	100	
Gibberellic Acid	1.00	Acre	55	55	
Biological Control	1.00	Acre	50	50	
Frost Protection	1.00	Acre	125	125	
Herbicide:					
Roundup - Row Spray	1.00	Qt	13.25	13	
Roundup - Spot Spray	25.60	Oz	0.45	12	
Fertilizer:					
Zinc Sulfate	8.00	Lb	0.35	3	
Manganese Sulfate	8.00	Lb	0.38	3	
Soluble N	150.00	Lb N	0.17	25	
Fungicide:					
Copper Sulfate Foliar Spray	3.00	Lb	1.11	3	
Lime Foliar Spray	4.50	Lb	0.153	1	
Contract:					
Leaf Analysis	1.00	Acre	5	5	
Harvest:					
Pick & Haul	900.00	Box	2.50	2250	
Labor (machine)	18.41	hrs	11.70	215	
Labor (non-machine)	2.10	hrs	11.70	25	
Fuel - Gas	18.53	gal	1.20	22	
Fuel - Diesel	12.55	gal	1.15	14	
Lube				5	
Machinery repair				60	
Interest on operating capital @ 11.61%				326	
<b>TOTAL OPERATING COSTS/ACRE</b>				4473	
<b>TOTAL OPERATING COSTS/BOX</b>				5	
<b>NET RETURNS ABOVE OPERATING COSTS</b>				2367	
<b>CASH OVERHEAD COSTS:</b>					
Office Expense				100	
Liability Insurance				14	
Property Taxes				287	
Property Insurance				205	
Investment Repairs				138	
<b>TOTAL CASH OVERHEAD COSTS/ACRE</b>				743	
<b>TOTAL CASH COSTS/ACRE</b>				5216	
<b>TOTAL CASH COSTS/BOX</b>				6	

Table 3. COSTS AND RETURNS PER ACRE TO PRODUCE LEMONS, (cont.)  
 VENTURA COUNTY, 1997

Labor Rate: \$ 11.70/hr. machine labor  
 \$ 11.70/hr. non-machine labor

Interest Rate: 11.61%

**NON-CASH OVERHEAD COSTS (DEPRECIATION & INTEREST):**

Shop Building	65
Shop Tools	21
Fuel Tanks & Pumps	21
Irrigation VCL	91
Wind Machines	97
Land	936
Grove Establishment	160
Equipment	160
<b>TOTAL NON-CASH OVERHEAD COSTS/ACRE</b>	<b>1551</b>
<b>TOTAL COSTS/ACRE</b>	<b>6767</b>
<b>TOTAL COSTS/BOX</b>	<b>7.52</b>
<b>NET RETURNS ABOVE TOTAL COSTS</b>	<b>73</b>

Table 4. MONTHLY CASH COSTS PER ACRE TO PRODUCE LEMONS  
VENTURA COUNTY, 1997

Beginning :	JAN 97	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	TOTAL
Ending :	DEC 97	97	97	97	97	97	97	97	97	97	97	97	97	
<b>Cultural:</b>														
Irrigation					71	71	71	71	71	71	71			498
Prune & Sucker			475											475
Chop Brush				44										44
Herbicide							33							33
Foliar Spray						26								26
Fertilizer			6		6		6		6					25
Bordeaux Treatment												24		24
Spot Spray Herbicide						9			9					19
Vertebrate Pest Management							10							10
Insecticide Treatment							100			200				300
Leaf Analysis										5				5
Gibberellic Acid											55			55
Biological Control							50							50
Frost Protection													126	126
Pick-Up Truck		10	10	10	10	10	10	10	10	10	10	10	10	117
ATV		7	7	7	7	7	7	7	7	7	7	7	7	89
<b>TOTAL CULTURAL COSTS</b>		17	24	492	139	123	288	88	104	294	143	41	143	1897
<b>Harvest:</b>														
Harvest		1125				788				338				2250
<b>TOTAL HARVEST COSTS</b>		1125				788				338				2250
Interest on operating capital		11	11	16	17	26	29	30	31	37	38	39	40	326
<b>TOTAL OPERATING COSTS/ACRE</b>		1153	35	508	156	937	317	118	135	668	182	80	184	4473
<b>TOTAL OPERATING COSTS/BOX</b>		1.28	0.04	0.56	0.17	1.04	0.35	0.13	0.15	0.74	0.20	0.09	0.20	4.97
<b>Overhead:</b>														
Office Expense													100	100
Liability Insurance					14									14
Property Taxes			144					144						287
Property Insurance			102					102						205
Investment Repairs		11	11	11	11	11	11	11	11	11	11	11	11	138
<b>TOTAL CASH OVERHEAD COSTS</b>		11	257	11	25	11	11	257	11	11	11	11	111	743
<b>TOTAL CASH COSTS/ACRE</b>		1165	292	520	181	949	328	376	147	679	193	91	295	5216
<b>TOTAL CASH COSTS/BOX</b>		1.29	0.32	0.58	0.20	1.05	0.36	0.42	0.16	0.75	0.21	0.10	0.33	5.80

Table 5. WHOLE FARM EQUIPMENT LIST, PRICES, ANNUAL INVESTMENT, AND BUSINESS OVERHEAD COSTS  
VENTURA COUNTY, 1997

ANNUAL EQUIPMENT COSTS							
Description	Price	Yrs Life	Non-Cash Overhead		Cash Overhead		Total
			Depreciation	Interest	Insurance	Taxes	
97 55 HP 4WD Tractor	31,102	12	2,333	684	122	171	3,310
97 ATV 4WD	3,861	7	496	85	15	21	618
97 ATV 4WD & sprayer	7,430	10	669	163	29	41	902
97 Mower/Chopper - 8'	6,713	10	604	148	26	37	815
97 Pickup Truck 1/2 Ton	17,160	7	2,206	378	67	94	2,745
97 Sprayer SP 300G	75,000	20	3,375	1,650	294	413	5,732
<b>TOTAL</b>	<b>141,266</b>		<b>9,683</b>	<b>3,108</b>	<b>554</b>	<b>777</b>	<b>14,122</b>
60% of New Cost *	84,760		5,810	1,865	332	466	8,473

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

ANNUAL INVESTMENT COSTS								
Description	Price	Yrs Life	Non-Cash Overhead		Cash Overhead			Total
			Depreciation	Interest	Insurance	Taxes	Repairs	
<b>INVESTMENT</b>								
Frost Alarms	200	15	12	4	1	1	4	22
Fuel Tanks & Pumps	12,500	15	750	275	49	69	250	1,393
Irrigation	75,000	25	2,700	1,650	294	413	3,750	8,807
Land	1,123,200			44,928	8,008	11,232	0	64,168
Pruning Equipment	450	15	27	10	2	2	9	50
Shop Building	38,100	15	2,286	838	149	210	762	4,245
Shop Tools	12,500	15	750	275	49	69	250	1,393
Grove Establishment	160,848	35	4,136	3,539	631	885	0	9,190
Wind Machines	80,000	25	2,880	1,760	314	440	1,600	6,994
<b>TOTAL INVESTMENT</b>	<b>1,502,798</b>		<b>13,541</b>	<b>53,279</b>	<b>9,497</b>	<b>13,321</b>	<b>6,625</b>	<b>96,262</b>

ANNUAL BUSINESS OVERHEAD COSTS				
Description	Units/ Farm	Unit	Price/ Unit	Total Cost
Liability Insurance	1.00	Each	650.00	650
Office Expense	48.00	Acre	100.00	4,800

Table 6. HOURLY EQUIPMENT COSTS  
VENTURA COUNTY, 1997

Yr Description	Actual Hours Used	COSTS PER HOUR							Total Costs/Hr.
		Non-Cash Overhead		Cash Overhead			Operating		
		Depreciation	Interest	Insurance	Taxes	Repairs	Fuel & Lube	Total Oper.	
97 55 HP 4WD Tractor	105.60	13.25	3.89	0.69	0.97	1.55	3.57	5.12	23.93
97 ATV 4WD	273.60	1.09	0.19	0.03	0.05	0.70	0.92	1.62	2.98
97 ATV 4WD & sprayer	23.20	17.27	4.22	0.75	1.06	0.89	1.38	2.27	25.57
97 Mower/Chopper - 8'	96.00	3.78	0.92	0.16	0.23	2.41	0.00	2.41	7.51
97 Pickup Truck 1/2 T	273.60	4.84	0.83	0.15	0.21	3.11	3.45	6.56	12.58
97 Sprayer SP 300G	79.20	25.57	12.50	2.23	3.12	18.03	5.29	23.32	66.74

Table 7. RANGING ANALYSIS OF COSTS AND RETURNS TO PRODUCE LEMONS  
VENTURA COUNTY, 1997

COSTS PER ACRE AT VARYING YIELDS TO PRODUCE LEMONS							
	YIELD (BOXES/ACRE)						
	750	800	850	900	950	1,000	1050
<b>OPERATING COSTS/ACRE:</b>							
Cultural Cost	1,897	1,897	1,897	1,897	1,897	1,897	1,897
Harvest Cost	1,875	2,000	2,125	2,250	2,375	2,500	2,625
Interest on operating capital	292	303	314	326	337	349	360
TOTAL OPERATING COSTS/ACRE	4,064	4,200	4,337	4,473	4,609	4,746	4,882
TOTAL OPERATING COSTS/BOX	5.42	5.25	5.10	4.97	4.85	4.75	4.65
<b>CASH OVERHEAD COSTS/ACRE</b>							
	743	743	743	743	743	743	743
TOTAL CASH COSTS/ACRE	4,807	4,944	5,080	5,216	5,353	5,489	5,625
TOTAL CASH COSTS/BOX	6.41	6.18	5.98	5.80	5.63	5.49	5.36
<b>NON-CASH OVERHEAD COSTS/ACRE</b>							
	1,551	1,551	1,551	1,551	1,551	1,551	1,551
TOTAL COSTS/ACRE	6,358	6,494	6,631	6,767	6,903	7,040	7,176
TOTAL COSTS/BOX	8.48	8.12	7.80	7.52	7.27	7.04	6.83

NET RETURNS PER ACRE ABOVE OPERATING COSTS FOR LEMONS							
PRICE (\$ PER BOX)	YIELD (BOXES/ACRE)						
	750	800	850	900	950	1,000	1,050
6	511	680	848	1,017	1,186	1,354	1,523
7	886	1,080	1,273	1,467	1,661	1,854	2,048
7	1,261	1,480	1,698	1,917	2,136	2,354	2,573
8	1,636	1,880	2,123	2,367	2,611	2,854	3,098
8	2,011	2,280	2,548	2,817	3,086	3,354	3,623
9	2,386	2,680	2,973	3,267	3,561	3,854	4,148
9	2,761	3,080	3,398	3,717	4,036	4,354	4,673

NET RETURNS PER ACRE ABOVE CASH COSTS FOR LEMONS							
PRICE (\$ PER BOX)	YIELD (BOXES/ACRE)						
	750	800	850	900	950	1,000	1,050
6	-232	-64	105	274	442	611	780
7	143	336	530	724	917	1,111	1,305
7	518	736	955	1,174	1,392	1,611	1,830
8	893	1,136	1,380	1,624	1,867	2,111	2,355
8	1,268	1,536	1,805	2,074	2,342	2,611	2,880
9	1,643	1,936	2,230	2,524	2,817	3,111	3,405
9	2,018	2,336	2,655	2,974	3,292	3,611	3,930

NET RETURNS PER ACRE ABOVE TOTAL COSTS FOR LEMONS							
PRICE (\$ PER BOX)	YIELD (BOXES/ACRE)						
	750	800	850	900	950	1,000	1,050
6	-1,783	1,614	-1,446	-1,277	-1,108	-940	-771
7	-1,408	1,214	-1,021	-827	-633	-440	-246
7	-1,033	-814	-596	-377	-158	60	279
8	-658	-414	-171	73	317	560	804
8	-283	-14	254	523	792	1,060	1,329
9	92	386	679	973	1,267	1,560	1,854
9	467	786	1,104	1,423	1,742	2,060	2,379

To simplify our information, trade name and products have been used. No endorsement of named products is intended nor is criticism implied of similar products which are not mentioned.

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## **University of California Cooperative Extension - Southern Region**

**Etaterahu Takele**  
Area Farm Advisor, Agriculture Economics  
UCCE - Southern Region  
21150 Box Springs Road  
Moreno Valley, CA 92557-8708  
Phone : (909) 683-6491 x 243  
Fax : (909) 788-2615

**Nicholas Sakovich**  
Farm Advisor, Citrus Crops  
UCCE - Ventura County  
669 County Square Drive, #100  
Ventura, CA 93003-5401  
Phone : (805) 645-1469  
Fax : (805) 645-1474

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