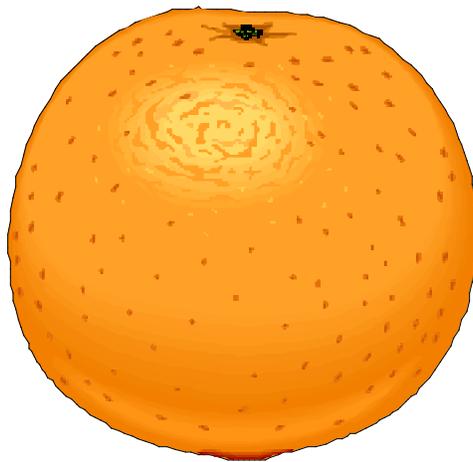


Establishment and Production Costs

Navel Oranges

Western Riverside County, 1998



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Establishment and Production Costs for Navel Oranges Riverside County, 1998

INTRODUCTION

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

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

Table 1. Establishment Costs

Table 2. Production Costs

Table 3. Production Costs and Returns

Table 4. Monthly Cash Costs of Production

Table 5. Farm Equipment Prices and Investment Costs

Table 6. Hourly Equipment Costs

Table 7. Range Analysis

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

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 Navel orange 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 Navel oranges, 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, 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 12x24 foot 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 and cost of water to irrigate crops in Riverside County vary greatly from region to region. Also, costs vary depending on if well or district water is used.

Navel orange production in Riverside County is mainly in the Riverside, Hemet and Corona Districts. The amount of irrigation water applied varies by age of trees as shown in **Table A**. Typically irrigation begins in March and ends in December, although this varies greatly depending on the amount of rainfall and region. We made no assumptions about effective rainfall. Also we have not included irrigation that may be needed for several days for frost protection.

Table A. Applied Irrigation Water

| Year | Yearly Water Applications |
|----------|---------------------------|
| Year 1 | 6.00 Ac In |
| Year 2 | 9.00 Ac In |
| Year 3 | 13.00 Ac In |
| Year 4 | 24.00Ac In |
| Year 5 | 36.00 Ac In |
| Year 6 + | 48.00 Ac In |

We assumed a combination of well and district water for irrigation and is calculated at an average of \$160 per acre-foot. In addition, labor cost is included for turning the system on, monitoring and maintaining irrigation lines and sprinklers.

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/acre. The annual cost of pruning is determined by prorating the cost over five years.

Mechanical hedging and trimming of Navel orange trees begin at 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/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 Navel orange production in Riverside County are thrips and ants. Treatment for thrips typically includes an application of Dimethoate once or twice a year depending on the population. Dimethoate is applied at 4 pints per acre per year during both the establishment and production years. Sabadilla is another common insecticide used to treat thrips infestations.

Ants are controlled with 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/acre for the first four years of establishment and then 2 pints/acre from year five on. Another navel orange insect pest (the costs of which are not included in this study) is the whitefly.

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/acre. Releases are made every 1 to 3 years at a cost of \$70/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 average once every five years at a cost of \$25/acre.

Phytophthora 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-third pounds per acre per year of Ridomil application during both establishment and production. Treatment amounts can vary from year to year depending on the extent of infection.

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 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. Also, some hand weeding is done near the trunk of the trees during the first year of establishment.

In the second year and throughout 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. Herbicide program assumes Krovar 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, Krovar is applied once per year at 4 lbs. per acre in the early spring.

Growers differ in their practices of maintaining tree row middles depending on their location. Some growers maintain cover crop in row middles up to mature production, others keep their tree row middles bare. In this study we assumed bare middles, therefore no cover crop maintenance was included.

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**. Each year the fertilizer is applied three times in equal proportions, twice in the spring and once in late summer.

Table B. Pounds Of Nitrogen Fertilizer Applied in Navel Orange 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 | 1.00 | 152.00 |
| Year 6+ | 1.25 | 190.00 |

Citrus trees grown in the southern region of California can often 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 the leaves are fully expanded (i.e. at $\frac{2}{3}$ expansion) in spring and late summer. The nutrients are applied at 2 lbs./acre in year one, 3 lbs./acre in year two, 4 lbs./acre in year three and 5 lbs./acre from year four on. Potassium Nitrate is applied at the rate of 40 lbs./acre during production and phosphorous acid is applied at 1 lb./acre/year from year 5 on.

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

Squirrels can also cause erosion problems by tunneling through the soil, especially on hillsides as well as occasionally gnawing on fruit and irrigation tubing. In this study, trapping and baiting are used to control 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 to delay harvest, which also increases fruit size. In this study, 2,4-D is applied at a rate of 15 g. a.i (grams actual ingredient) per acre in December.

3. YIELD

Navel orange trees begin bearing fruit in the fourth 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.

Table C. Typical Yield of Navel Oranges Per Acre in Riverside County

| Age of Tree | Boxes Per Acre* |
|-------------|-----------------|
| Year 1 | 0 |
| Year 2 | 0 |
| Year 3 | 76 |
| Year 4 | 152 |
| Year 5 | 360 |
| Year 6 + | 500 (Average) |

*A box weighs approximately 50 pounds

4. HARVEST AND MARKETING

Harvesting starts in the third year. In this study, harvesting is done using contracted labor crew. 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 that 61% of the fruit is packed and marketed fresh, 36% is used as juice and 3% is discarded as rot. These averages are based on data from packinghouses and the Riverside County Agricultural Production Report.

We used the following rates: \$1.65 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 for juice handling.

5. PRICES/RETURNS

We used a price/gross return of \$6.60 per field box as a basis of our analysis. It is based on information obtained from some 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 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, we added 34% to the hourly wages to account for benefits. This brings the hourly rate to \$12.40 for machine labor and \$10.00 for non-machine workers.

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 older 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 navel orange 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 \$8,257 per acre or \$313,766 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. However, it would not fully represent financial, agronomic, and market risks, which affect the profitability and economic viability, involved in Navel orange 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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Table 1. SAMPLE COSTS PER ACRE TO ESTABLISH A NAVEL ORANGE GROVE
RIVERSIDE COUNTY

| Year | Cost Per Acre | | | | |
|--|---------------|------------|--------------|--------------|--------------|
| | 1st | 2nd | 3rd | 4th | 5th |
| Yield: 50 Pound Field Boxes Per Acre | | | 76 | 152 | 360 |
| OPERATING COSTS: | | | | | |
| Pre-Planting Costs: | | | | | |
| Land Preparation - Clear Land | 300 | | | | |
| Mark & Layout Grove | 100 | | | | |
| Total Pre-Planting Costs | 400 | | | | |
| Planting Costs: | | | | | |
| Plant Trees | 380 | | | | |
| Orange 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 | 215 | 255 | 309 | 456 | 616 |
| Fertilization | 5 | 5 | 9 | 14 | 18 |
| Foliar Spray | 24 | 25 | 26 | 27 | 27 |
| Pruning | | 127 | 127 | 127 | 187 |
| Chop Prunings | | | | | 4 |
| Herbicide - Field Spray | 23 | 23 | | | |
| Herbicide - Spot Spray | | 7 | 19 | 19 | 19 |
| Herbicide - PreEmergent | | | 56 | 56 | 56 |
| Thrips Treatment | 25 | 25 | 25 | 25 | 25 |
| Disease Treatment | 15 | 15 | 15 | 19 | 21 |
| 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: | 653 | 828 | 932 | 1,129 | 1,346 |
| Harvests Costs: | | | | | |
| Pick, Haul & Field Overhead - \$1.65 per 50 Pound Field Box | | | 125 | 297 | 594 |
| Packing - \$3.70 per 50 Pound Field Box - 61% Crop | | | 170 | 403 | 814 |
| Juice - \$0.50 per 50 Pound Field Box - 36% Crop | | | 14 | 33 | 65 |
| Total Harvest Costs: | | | 309 | 733 | 1,473 |
| Interest on Operating Capital @ 10.00% | 209 | 43 | 106 | 146 | 206 |
| TOTAL OPERATING COSTS | 2,858 | 903 | 1,347 | 2,008 | 3,025 |

Table 1. SAMPLE COSTS PER ACRE TO ESTABLISH A NAVEL ORANGE GROVE (cont.)
RIVERSIDE COUNTY

| Year | 1st | 2nd | 3rd | 4th | 5th |
|---|--------------|--------------|--------------|---------------|---------------|
| Yield: 50 Pound Field Boxes Per Acre | | | 76 | 152 | 360 |
| Cash Overhead Costs: | | | | | |
| Liability Insurance | 12 | 12 | 12 | 12 | 12 |
| Office Expenses | 50 | 50 | 50 | 50 | 50 |
| Property Taxes | 105 | 137 | 150 | 162 | 177 |
| Property Insurance | 75 | 97 | 107 | 116 | 126 |
| Investment Repairs | 87 | 87 | 87 | 87 | 87 |
| TOTAL CASH OVERHEAD COSTS | 329 | 383 | 406 | 427 | 452 |
| TOTAL CASH COSTS | 3,187 | 1,286 | 1,753 | 2,435 | 3,477 |
| INCOME FROM PRODUCTION | 0 | 0 | 502 | 1,003 | 2,376 |
| NET CASH COSTS FOR THE YEAR | 3,187 | 1,286 | 1,251 | 1,432 | 1,101 |
| ACCUMULATED NET CASH COSTS | 3,187 | 4,473 | 5,724 | 7,156 | 8,257 |
| 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 | 80 | 82 |
| TOTAL DEPRECIATION | 166 | 166 | 166 | 166 | 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 | | 249 | 349 | 447 | 559 |
| Equipment | 45 | 45 | 45 | 45 | 48 |
| TOTAL INTEREST ON INVESTMENT | 818 | 1,067 | 1,167 | 1,265 | 1,380 |
| TOTAL COST FOR THE YEAR | 4,171 | 2,519 | 3,086 | 3,866 | 5,025 |
| INCOME FROM PRODUCTION | 0 | 0 | 502 | 1,003 | 2,376 |
| TOTAL NET COST FOR THE YEAR | 4,171 | 2,519 | 2,584 | 2,863 | 2,649 |
| TOTAL ACCUMULATED NET COST | 4,171 | 6,690 | 9,274 | 12,137 | 14,786 |

Table 2. COSTS PER ACRE TO PRODUCE NAVEL ORANGES
RIVERSIDE COUNTY

Labor Rate: \$12.40/hr. machine labor

\$10.00 /hr. non-machine labor

Yield per Acre: 500.00 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 | | |
| Cultural: | | | | | | | |
| Irrigation | 13.52 | 135 | 0 | 641 | 0 | 776 | |
| Pruning | 0.00 | 0 | 0 | 0 | 60 | 60 | |
| Topping & Hedging | 0.00 | 0 | 0 | 0 | 31 | 31 | |
| Chop Brush & Prunings | 0.20 | 3 | 1 | 0 | 0 | 4 | |
| Herbicide - Pre-Emergent | 0.40 | 6 | 3 | 48 | 0 | 56 | |
| Foliar Spray | 0.80 | 12 | 11 | 5 | 0 | 27 | |
| Fertilizer | 0.00 | 0 | 0 | 23 | 0 | 23 | |
| Bordeaux Treatment | 0.30 | 4 | 4 | 6 | 0 | 14 | |
| Postassium Nitrate | 0.40 | 6 | 5 | 11 | 0 | 22 | |
| Herbicide - Spot Spray | 0.50 | 0 | 0 | 12 | 0 | 19 | |
| Vertebrate Pest Management | 0.00 | 0 | 0 | 0 | 10 | 10 | |
| Biological Controls | 0.00 | 0 | 0 | 0 | 40 | 40 | |
| Ant Treatment | 0.49 | 7 | 3 | 13 | 0 | 23 | |
| Thrips Treatment | 0.30 | 4 | 4 | 16 | 0 | 25 | |
| Disease Treatment | 0.25 | 4 | 0 | 12 | 0 | 15 | |
| Leaf Analysis | 0.00 | 0 | 0 | 0 | 5 | 5 | |
| Growth Regulator | 0.40 | 6 | 5 | 0 | 0 | 11 | |
| Pick-Up Truck | 7.50 | 112 | 48 | 0 | 0 | 160 | |
| ATV | 7.50 | 112 | 12 | 0 | 0 | 124 | |
| TOTAL CULTURAL COSTS | 32.56 | 419 | 96 | 786 | 146 | 1,446 | |
| Harvest: | | | | | | | |
| Harvest | 0.00 | 0 | 0 | 2,044 | 0 | 2,044 | |
| TOTAL HARVEST COSTS | 0.00 | 0 | 0 | 2,044 | 0 | 2,044 | |
| Interest on operating capital @ 10.00% | | | | | | 247 | |
| TOTAL OPERATING COSTS/ACRE | | 419 | 96 | 2,829 | 146 | 3,736 | |
| TOTAL OPERATING COSTS/BOX | | | | | | 7 | |
| CASH OVERHEAD: | | | | | | | |
| Liability Insurance | | | | | | 12 | |
| Office Expense | | | | | | 50 | |
| Property Taxes | | | | | | 151 | |
| Property Insurance | | | | | | 107 | |
| Investment Repairs | | | | | | 87 | |
| TOTAL CASH OVERHEAD COSTS | | | | | | 407 | |
| TOTAL CASH COSTS/ACRE | | | | | | 4,143 | |
| TOTAL CASH COSTS/BOX | | | | | | 8 | |

Table 2. COSTS PER ACRE TO PRODUCE NAVEL ORANGES, (cont.)
RIVERSIDE COUNTY

Labor Rate: \$12.40/hr. machine labor Interest Rate: 10.00%
\$10.00 /hr. non-machine labor Yield per Acre: 500.00 Boxes

| NON-CASH OVERHEAD: | Per | | Annual Cost | Total |
|--------------------------------------|---------------|--------------|-----------------|--------------|
| | Producing | Depreciation | | |
| Investment: | Acre | | Interest @7.81% | Cost |
| Shop Building | 526 | 12 | 23 | 34 |
| Shop Tools | 329 | 20 | 14 | 34 |
| Fuel Tanks & Pumps | 329 | 20 | 14 | 34 |
| Land | 8,420 | | 658 | 658 |
| Irrigation | 1,500 | 34 | 64 | 98 |
| Establishment Costs | 8,257 | 212 | 355 | 567 |
| Equipment | <u>1,113</u> | <u>82</u> | <u>48</u> | <u>130</u> |
| TOTAL NON-CASH OVERHEAD COSTS | 20,475 | 380 | 175 | 1,555 |
| TOTAL COSTS/ACRE | | | | 5,698 |
| TOTAL COSTS/BOX | | | | 11 |

Table 3. COSTS AND RETURNS PER ACRE TO PRODUCE NAVEL ORANGES
RIVERSIDE COUNTY

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

Interest Rate: 10.00%

| | Quantity/Acre | Unit | Price or Cost/Unit | Value or Cost/Acre | Your Cost |
|--|---------------|------|-----------------------|-----------------------|--------------|
| GROSS RETURNS: | 500 | Box | 6.60 | 3300 | |
| OPERATING COSTS: | | | | | |
| Water: | | | | | |
| Water | 48.00 | AcIn | 13.35 | 641.00 | |
| Contract: | | | | | |
| Prune | 1.00 | Acre | 60.00 | 60.00 | |
| Topping & Hedging | 1.00 | Acre | 31.00 | 31.00 | |
| Vertebrate Pest | 1.00 | Acre | 10.00 | 10.00 | |
| Decollate Snails | 1.00 | Acre | 5.00 | 5.00 | |
| Aphytis Melinus | 1.00 | Acre | 35.00 | 35.00 | |
| Leaf Analysis | 1.00 | Acre | 5.00 | 5.00 | |
| Herbicide: | | | | | |
| Krovar | 4.00 | Lb | 11.99 | 48.00 | |
| Roundup -Spot Spry | 25.00 | Oz | 0.46 | 12.00 | |
| Fertilizer: | | | | | |
| Zinc Sulfate | 5.00 | Lb | 0.44 | 2.00 | |
| Manganese Sulfate | 5.00 | Lb | 0.38 | 2.00 | |
| Phosphorous acid | 1.00 | Lb | 0.60 | 1.00 | |
| Liquid N | 190.00 | Lb N | 0.12 | 23.00 | |
| Potassium Nitrate | 40.00 | Lb | 0.28 | 11.00 | |
| Fungicide: | | | | | |
| Copper Sulfate | 5.00 | Lb | 1.11 | 6.00 | |
| Ridomil | 0.67 | Lb | 17.28 | 12.00 | |
| Insecticide: | | | | | |
| Lorsban - Ants | 2.00 | Pint | 6.50 | 13.00 | |
| Dimethoate | 4.00 | Pint | 4.08 | 16.00 | |
| Growth Regulator: | | | | | |
| 2, 4D | 1.25 | Oz | 0.11 | 0.00 | |
| Harvest: | | | | | |
| Pick & Haul | 500.00 | Box | 1.65 | 825.00 | |
| Packing - 61% Crop | 305.00 | Box | 3.70 | 1129.00 | |
| Juice - 36% Crop | 180.00 | Box | 0.50 | 90.00 | |
| Labor (machine) | 22.85 | hrs | 12.40 | 283.00 | |
| Labor (non-machine) | 13.52 | hrs | 10.00 | 135.00 | |
| Fuel - Gas | 23.73 | gal | 1.16 | 28.00 | |
| Fuel - Diesel | 11.01 | gal | 0.76 | 8.00 | |
| Lube | | | | 5.00 | |
| Machinery repair | | | | 55.00 | |
| Interest on operating capital @ 10.00% | | | | 247.00 | |
| TOTAL OPERATING COSTS/ACRE | | | | 3736.00 | |
| TOTAL OPERATING COSTS/BOX | | | | 7.47 | |
| NET RETURNS ABOVE OPERATING COSTS | | | | -436.00 | |

Table 3. COSTS AND RETURNS PER ACRE TO PRODUCE NAVEL ORANGES, (cont.)
RIVERSIDE COUNTY

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

Interest Rate: 10.00%

CASH OVERHEAD COSTS:

| | |
|---------------------------------------|--------------|
| Liability Insurance | 12 |
| Office Expense | 50 |
| Property Taxes | 151 |
| Property Insurance | 107 |
| Investment Repairs | 87 |
| TOTAL CASH OVERHEAD COSTS/ACRE | 407 |
| TOTAL CASH COSTS/ACRE | 4,143 |
| TOTAL CASH COSTS/BOX | 8 |

NON-CASH OVERHEAD COSTS (DEPRECIATION & INTEREST):

| | |
|---|---------------|
| Shop Building | 34 |
| Shop Tools | 34 |
| Fuel Tanks & Pumps | 34 |
| Land | 658 |
| Irrigation | 98 |
| Establishment Costs | 567 |
| Equipment | 130 |
| TOTAL NON-CASH OVERHEAD COSTS/ACRE | 1,555 |
| TOTAL COSTS/ACRE | 5,698 |
| TOTAL COSTS/BOX | 11 |
| NET RETURNS ABOVE TOTAL COSTS | -2,398 |

Table 4. MONTHLY CASH COSTS PER ACRE TO PRODUCE NAVEL ORANGES
RIVERSIDE COUNTY

| Beginning: FEB 97 | FEB 97 | MAR 97 | APR 97 | MAY 97 | JUN 97 | JUL 97 | AUG 97 | SEP 97 | OCT 97 | NOV 97 | DEC 97 | JAN 98 | FEB 98 | MAR 98 | APR 98 | MAY 98 | JUN 98 | JUL 98 | SUM |
|------------------------------|------------|-------------|-------------|-------------|-------------|------------|-------------|------------|-------------|-------------|-------------|------------|------------|-------------|------------|-------------|------------|------------|--------------|
| Ending: JUL 98 | | | | | | | | | | | | | | | | | | | |
| Cultural: | | | | | | | | | | | | | | | | | | | |
| Irrigation | | 74 | 74 | 74 | 83 | 83 | 83 | 83 | 74 | 74 | 74 | | | | | | | | 776 |
| Pruning | | 60 | | | | | | | | | | | | | | | | | 60 |
| Topping & Hedging | | 31 | | | | | | | | | | | | | | | | | 31 |
| Chop Brush & Prunings | | 4 | | | | | | | | | | | | | | | | | 4 |
| Herbicide - Pre-Emergent | 56 | | | | | | | | | | | | | | | | | | 56 |
| Foliar Spray | | | | 13 | | | | 14 | | | | | | | | | | | 27 |
| Fertilizer | | | 8 | 8 | | | | 8 | | | | | | | | | | | 23 |
| Bordeaux Treatment | | | | | | | | | | 14 | | | | | | | | | 14 |
| Postassium Nitrate | | | | | | | | | | | 22 | | | | | | | | 22 |
| Herbicide - Spot Spray | | | | 9 | | | 10 | | | | | | | | | | | | 19 |
| Vertebrate Pest Managmnt | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 10 |
| Biological Controls | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 40 |
| Ant Treatment | | 23 | | | | | | | | | | | | | | | | | 23 |
| Thrips Treatment | | 25 | | | | | | | | | | | | | | | | | 25 |
| Disease Treatment | | 15 | | | | | | | | | | | | | | | | | 15 |
| Leaf Analysis | | | | | | | | 5 | | | | | | | | | | | 5 |
| Growth Regulator | | | | | | | | | | | 11 | | | | | | | | 11 |
| Pick-Up Truck | 9 | 9 | 9 | 9 | 9 | 9 | 9 | 9 | 9 | 9 | 9 | 9 | 9 | 9 | 9 | 9 | 9 | 9 | 160 |
| ATV | 7 | 7 | 7 | 7 | 7 | 7 | 7 | 7 | 7 | 7 | 7 | 7 | 7 | 7 | 7 | 7 | 7 | 7 | 124 |
| TOTL CULTURAL COSTS | 75 | 251 | 100 | 123 | 101 | 101 | 111 | 128 | 93 | 107 | 126 | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 1,446 |
| Harvest: | | | | | | | | | | | | | | | | | | | |
| Harvest | | | | | | | | | | | 40 | 512 | 512 | 817 | 101 | 61 | | | 2,044 |
| TOTAL HARVEST COSTS | | | | | | | | | | | 40 | 512 | 512 | 817 | 101 | 61 | | | 2,044 |
| Interest on oper. cap@10% | 1 | 3 | 4 | 5 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 16 | 20 | 27 | 28 | 29 | 29 | 29 | 247 |
| TOTL OPER. COSTS/ACRE | 76 | 254 | 104 | 127 | 107 | 108 | 118 | 136 | 102 | 116 | 178 | 546 | 550 | 863 | 148 | 108 | 47 | 48 | 3,736 |
| TOTL OPER. COSTS/BOX | 0.2 | 0.51 | 0.21 | 0.25 | 0.21 | 0.2 | 0.24 | 0.3 | 0.2 | 0.23 | 0.36 | 1.1 | 1.1 | 1.73 | 0.3 | 0.22 | 0.1 | 0.1 | 7.47 |
| OVERHEAD: | | | | | | | | | | | | | | | | | | | |
| Liability Insurance | | | | | | | | | | | 12 | | | | | | | | 12 |
| Office Expense | | | | | | | | | | | 50 | | | | | | | | 50 |
| Property Taxes | 75 | | | | | 75 | | | | | | | | | | | | | 151 |
| Property Insurance | 54 | | | | | 54 | | | | | | | | | | | | | 107 |
| Investment Repairs | 7 | 7 | 7 | 7 | 7 | 7 | 7 | 7 | 7 | 7 | 7 | 7 | 7 | | | | | | 87 |
| TOTL CASH OVRHD COST | 136 | 7 | 7 | 7 | 7 | 136 | 7 | 7 | 7 | 7 | 69 | 7 | | | | | | | 407 |
| TOTL CASH COSTS/ACRE | 212 | 261 | 111 | 135 | 114 | 244 | 126 | 143 | 109 | 124 | 247 | 553 | 550 | 863 | 148 | 108 | 47 | 48 | 4,143 |
| TOTL CASH COSTS/BOX | 0.4 | 0.52 | 0.22 | 0.27 | 0.23 | 0.5 | 0.25 | 0.3 | 0.22 | 0.25 | 0.49 | 1.1 | 1.1 | 1.73 | 0.3 | 0.22 | 0.1 | 0.1 | 8.29 |

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

| ANNUAL EQUIPMENT COSTS | | | | | | | |
|------------------------|---------------|-------------|-------------------|--------------|---------------|------------|--------------|
| Description | Price | Yrs Life | Non-Cash Overhead | | Cash Overhead | | Total |
| | | | Depreciation | Interest | Insurance | Taxes | |
| INVESTMENT | | | | | | | |
| 98 62 HP 2WD Tractor | 25,492 | 20 | 1,147 | 1,095 | 100 | 140 | 2,482 |
| 97 ATV 4WD | 3,861 | 7 | 496 | 166 | 15 | 21 | 699 |
| 97 Herbie Sprayer | 170 | 10 | 15 | 7 | 1 | 1 | 24 |
| 98 Mower - Flail 6' | 3,500 | 25 | 126 | 150 | 14 | 19 | 309 |
| 98 Orch.Sprayer 500 G | 17,055 | 15 | 1,023 | 733 | 67 | 94 | 1,917 |
| 97 Pickup Truck 1/2 T | 17,160 | 7 | 2,206 | 737 | 67 | 94 | 3,105 |
| 98 Weed Sprayer 200 G | 3,282 | 15 | 197 | 141 | 13 | 18 | 369 |
| TOTAL | 70,520 | | 5,211 | 3,029 | 277 | 388 | 8,905 |
| 60% of New Cost * | 42,312 | | 3,127 | 1,818 | 166 | 233 | 5,343 |

* 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 | |
| INVESTMENT | | | | | | | | |
| Fuel Tanks & Pumps | 12,500 | 15 | 750 | 537 | 49 | 69 | 250 | 1,655 |
| Irrigation | 57,000 | 40 | 1,282 | 2,448 | 224 | 313 | 2,400 | 6,668 |
| Land | 319,960 | | | 24,989 | 2,281 | 3,200 | 0 | 30,470 |
| Establishment Costs | 313,766 | 35 | 8,068 | 13,478 | 1,230 | 1,726 | 0 | 24,502 |
| Shop Building | 20,000 | 40 | 450 | 859 | 78 | 110 | 400 | 1,898 |
| Shop Tools | 12,500 | 15 | 750 | 537 | 49 | 69 | 250 | 1,655 |
| TOTAL INVESTMENT | 735,726 | | 11,301 | 42,848 | 3,912 | 5,486 | 3,300 | 66,847 |

| ANNUAL BUSINESS OVERHEAD COSTS | | | | |
|--------------------------------|----------------|------|----------------|---------------|
| Description | Units/ Farm | Unit | Price/ Unit | Total Cost |
| Liability Insurance | 1 | Farm | 455 | 455 |
| Office Expense | 38 | Acre | 50 | 1900 |

Table 6. HOURLY EQUIPMENT COSTS
RIVERSIDE COUNTY

| Yr Description | COSTS PER HOUR | | | | | | | | |
|-----------------------|-------------------|-------------------|----------|---------------|-------|---------|-------------|-------------|-----------------|
| | Actual Hours Used | Non-Cash Overhead | | Cash Overhead | | | Operating | | Total Costs/Hr. |
| | | Depreciation | Interest | Insurance | Taxes | Repairs | Fuel & Lube | Total Oper. | |
| 98 62 HP 2WD Tractor | 137.60 | 5.00 | 4.77 | 0.44 | 0.61 | 1.53 | 2.66 | 4.19 | 15.01 |
| 97 ATV 4WD | 285.00 | 1.05 | 0.35 | 0.03 | 0.04 | 0.70 | 0.89 | 1.59 | 3.06 |
| 97 Herbie Sprayer | 28.50 | 0.32 | 0.15 | 0.01 | 0.02 | 0.00 | 0.00 | 0.00 | 0.51 |
| 98 Mower - Flail 6' | 7.60 | 9.95 | 11.87 | 1.08 | 1.52 | 1.26 | 0.00 | 1.26 | 25.68 |
| 98 Orch.Sprayer 500 G | 83.60 | 7.34 | 5.26 | 0.48 | 0.67 | 8.56 | 0.00 | 8.56 | 22.31 |
| 97 Pickup Truck 1/2 T | 285.00 | 4.64 | 1.55 | 0.14 | 0.20 | 3.11 | 3.33 | 6.44 | 12.98 |
| 98 Weed Sprayer 200 G | 33.90 | 3.48 | 2.49 | 0.23 | 0.32 | 1.64 | 0.00 | 1.64 | 8.17 |

Table 7. RANGING ANALYSIS OF COSTS AND RETURNS TO PRODUCE NAVEL ORANGES
RIVERSIDE COUNTY

| | COSTS PER ACRE AT VARYING YIELDS TO PRODUCE NAVEL ORANGES | | | | | | |
|--|---|--------------|--------------|--------------|--------------|--------------|--------------|
| | YIELD (BOXES/ACRE) | | | | | | |
| | 350 | 400 | 450 | 500 | 550 | 600 | 650 |
| OPERATING COST/ACRE | | | | | | | |
| Cultural Cost | 1,446 | 1,446 | 1,446 | 1,446 | 1,446 | 1,446 | 1,446 |
| Harvest Cost | 1,430 | 1,635 | 1,839 | 2,044 | 2,248 | 2,452 | 2,657 |
| Interest on operating capital @ 10.00% | 218 | 227 | 237 | 247 | 256 | 266 | 276 |
| TOTAL OPERATING COSTS/ACRE | 3,094 | 3,308 | 3,522 | 3,736 | 3,951 | 4,165 | 4,379 |
| TOTAL OPERATING COSTS/BOX | 8.84 | 8.27 | 7.83 | 7.47 | 7.18 | 6.94 | 6.74 |
| CASH OVERHEAD COSTS/ACRE | | | | | | | |
| CASH OVERHEAD COSTS/ACRE | 407 | 407 | 407 | 407 | 407 | 407 | 407 |
| TOTAL CASH COSTS/ACRE | 3,501 | 3,715 | 3,929 | 4,143 | 4,357 | 4,571 | 4,785 |
| TOTAL CASH COSTS/BOX | 10 | 9.29 | 8.73 | 8.29 | 7.92 | 7.62 | 7.36 |
| NON-CASH OVERHEAD COSTS/ACRE | | | | | | | |
| NON-CASH OVERHEAD COSTS/ACRE | 1,555 | 1,555 | 1,555 | 1,555 | 1,555 | 1,555 | 1,555 |
| TOTAL COSTS/ACRE | 5,056 | 5,270 | 5,484 | 5,698 | 5,912 | 6,126 | 6,340 |
| TOTAL COSTS/BOX | 14.45 | 13.18 | 12.19 | 11.4 | 10.75 | 10.21 | 9.75 |

| NET RETURNS PER ACRE ABOVE OPERATING COSTS FOR NAVEL ORANGES | | | | | | | |
|---|--------------------|--------|--------|--------|--------|--------|--------|
| PRICE (\$ PER BOX) | YIELD (BOXES/ACRE) | | | | | | |
| | 350 | 400 | 450 | 500 | 550 | 600 | 650 |
| 4.62 | -1,477 | -1,460 | -1,443 | -1,426 | -1,410 | -1,393 | -1,376 |
| 5.28 | -1,246 | -1,196 | -1,146 | -1,096 | -1,047 | -997 | -947 |
| 5.94 | -1,015 | -932 | -849 | -766 | -684 | -601 | -518 |
| 6.60 | -784 | -668 | -552 | -436 | -321 | -205 | -89 |
| 7.26 | -553 | -404 | -255 | -106 | 42 | 191 | 340 |
| 7.92 | -322 | -140 | 42 | 224 | 405 | 587 | 769 |
| 8.58 | -91 | 124 | 339 | 554 | 768 | 983 | 1,198 |

| NET RETURNS PER ACRE ABOVE CASH COSTS FOR NAVEL ORANGES | | | | | | | |
|--|--------------------|--------|--------|--------|--------|--------|--------|
| PRICE (\$ PER BOX) | YIELD (BOXES/ACRE) | | | | | | |
| | 350 | 400 | 450 | 500 | 550 | 600 | 650 |
| 4.62 | -1,884 | -1,867 | -1,850 | -1,833 | -1,816 | -1,799 | -1,782 |
| 5.28 | -1,653 | -1,603 | -1,553 | -1,503 | -1,453 | -1,403 | -1,353 |
| 5.94 | -1,422 | -1,339 | -1,256 | -1,173 | -1,090 | -1,007 | -924 |
| 6.60 | -1,191 | -1,075 | -959 | -843 | -727 | -611 | -495 |
| 7.26 | -960 | -811 | -662 | -513 | -364 | -215 | -66 |
| 7.92 | -729 | -547 | -365 | -183 | -1 | 181 | 363 |
| 8.58 | -498 | -283 | -68 | 147 | 362 | 577 | 792 |

| NET RETURNS PER ACRE ABOVE TOTAL COSTS FOR NAVEL ORANGES | | | | | | | |
|---|--------------------|--------|--------|--------|--------|--------|--------|
| PRICE (\$ PER BOX) | YIELD (BOXES/ACRE) | | | | | | |
| | 350 | 400 | 450 | 500 | 550 | 600 | 650 |
| 4.62 | -3,439 | -3,422 | -3,405 | -3,388 | -3,371 | -3,354 | -3,337 |
| 5.28 | -3,208 | -3,158 | -3,108 | -3,058 | -3,008 | -2,958 | -2,908 |
| 5.94 | -2,977 | -2,894 | -2,811 | -2,728 | -2,645 | -2,562 | -2,479 |
| 6.60 | -2,746 | -2,630 | -2,514 | -2,398 | -2,282 | -2,166 | -2,050 |
| 7.26 | -2,515 | -2,366 | -2,217 | -2,068 | -1,919 | -1,770 | -1,621 |
| 7.92 | -2,284 | -2,102 | -1,920 | -1,738 | -1,556 | -1,374 | -1,192 |
| 8.58 | -2,053 | -1,838 | -1,623 | -1,408 | -1,193 | -978 | -763 |

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