

UNIVERSITY OF CALIFORNIA COOPERATIVE EXTENSION

**SAMPLE COSTS TO ESTABLISH AN ORCHARD AND PRODUCE
GUAVAS IN SAN DIEGO COUNTY, 2007**



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SAMPLE COSTS TO ESTABLISH AN ORCHARD AND PRODUCE GUAVAS IN SAN DIEGO COUNTY, 2007

INTRODUCTION

Guava (*Psidium guajava* L.) fruit consumption and marketing in San Diego County began ~in the mid- 1990's. The guava plant grows well on the hillsides, and rarely encounters pest problem. Plant establishment period is short; often production begins in one to two years after planting. The guava plant is sensitive to frost, showing damage at about 29 °F, the same as Hass avocados. Therefore, guava production in San Diego is mostly located in the western side of the county, within about 15 miles from the coast, and on higher slopes that have good air drainage is most suitable.

There are two classes of guavas in the market: Asian guavas, consumed mainly by people of the Asian origin. The fruits are usually large in size, harvested while the peel is still green, and eaten crunchy like an apple. They are marketed mainly through the Asian specialty grocery stores and farmers' markets. Tropical guavas mainly consumed by Hispanics are picked at a slightly more mature age showing some color on the peel, and are usually eaten when slightly soft. These guavas are marketed through Hispanic specialty grocery stores and farmers' markets.

This study presents production practices and sample costs to establish an orchard and produce guavas in San Diego County. Production practices discussed in this study are those operations considered typical for the area and may not apply to every situation. The purpose of this study is to serve as a guide for making production decisions, estimating potential returns, preparing budgets and evaluating production loans. Some of the tables in the Appendix included a blank "Your Costs" column for entering and comparing your farm costs with ours.

The farm production practices or operations and cost calculations considered in this study are described in the following assumptions. For additional information or explanations of the assumptions and calculations used in this study, please contact Eta Takele, the Area Farm Management advisor, or Ramiro Lobo and Gary Bender, Farm advisors in San Diego County. This study can be accessed from the following websites: the Farm Management Website of the University of California Cooperative Extension Program for Southern California at: <http://groups.ucanr.org/farmgt>, and University of California, Department of Agricultural and Resource Economics websites at Davis at: <http://coststudies.ucdavis.edu>.

ASSUMPTIONS: CULTURAL PRACTICES AND COST CALCULATIONS

The costs and prices for material, equipment, labor wages, and contract fees in this study are for the 2007 Calendar year.

The use of trade names in this report does not constitute an endorsement or recommendation by the University of California nor is any criticism implied by omission of other similar products.

Farm Size and Crop Characteristics. This study is based on a small size orchard, about 5 acres which is considered the typical size for Guava farms in San Diego County. However, the total farm size may include production of other crops in which case, guava production may be sharing the use of long term assets with other crops. In this study, we did not have information on the total farm size and production of other crops; therefore long term asset costs may be overstated.

Guavas are perennial crops with a production life of 30 or more years (Morton, 1987). In this study, we are assuming 30 years life for the orchard (i.e. four years of establishment and 26 years production). It should also be noted that the length of the establishment period may vary based on the size of the seedling at planting, climatic suitability of the growing area and cultural practices.

Land Preparation. Guava orchard can be established on land that was previously planted to other tree crops, in which case, some of the ground preparation may not be needed for the new guava orchard. In this study, however, establishment is assumed to be on a new ground in which case all the land preparation operations are undertaken from the beginning.

A new ground preparation for orchard development includes first clearing the land from any bushes or existing weeds. It is then harrowed, and thoroughly ploughed. Tree rows are usually marked on the contour and the irrigation system installed with irrigation lines on the contour. Total ground or land preparation is estimated to cost about \$ 1,150 per acre (Table 1).

Nursery and Propagation. Guava seedlings may not reproduce the exact varieties as planted. Production may differ in yield, taste and fruit flesh color from the planted variety. Growers, however, for economic reasons, may prefer to plant seedlings as the cost of propagation is expensive and involves a complicated process with a lot of detail work and management. Besides, grafting work is best done at the nursery and not in the field after planting. In this study, we assumed that ready-to-plant seedlings are purchased from a local nursery. Hence the costs associated with nursery and propagation is included in the cost of the ready-to-plant seedlings.

Planting. Plant spacing may vary among growers ranging from 80 to 436 trees per acre. The choices depend on the topography and contour of the field. For this study, we used a 15x 15 spacing (15 feet between plants within a row and 15 feet between rows) allowing 194 plants per acre.

Flagging the field for planting is estimated to cost \$43 per acre (calculated at a rate of one minute per flag and \$13.30/hour labor wage). Holes approximately 1 cubic foot size are dug for planting. Planting will then be done after 15-20 days. Digging a hole and planting a guava tree is estimated to take 10 minutes. Most growers use contract or hired labor to perform the planting operation. Careful handling and adequate watering are necessary at planting, followed by application of compost on the surface around each plant. The application of compost is estimated to take about 5 minutes per plant. Each plant costs \$10 (\$1,940 per acre). It is assumed that 2% of the trees will be replanted in the second year.

Most growers in San Diego County plant Tropic Pink Guava variety. This cultivar is high yielding, medium to a large size, green-yellow skin and pink in the inside. It has a pleasant

aroma and delicate flavor. For more information please refer to www.crfg.org/pubs/ff/guava.html. Planting is usually done in March or April.

Training and Pruning. Regular training and pruning is essential for the young fruit bearing trees. Training reduces the height and allows obtaining an open-centered tree with strong productive branches. Training begins within four months after planting. This allows maximum production of fruit as soon as possible. Training of each tree in the first year is estimated to take approximately five minutes per plant.

Most Guava plants produce lots of suckers which will have to be removed from the trunks up to 2 feet above the ground. Since Guava fruit bearing takes place on the new growth of the mature wood, growers usually keep an eye and monitor the balance between vegetative growth and mature wood for ensuring both current and future production.

Pruning begins in the second year. It takes about ten minutes per tree in the second and third years and fifteen minutes beginning year four. Pruning is one of the mechanisms used to stabilize fruit production from year to year and is usually performed in March.

Fertilization. Leaf analysis is used to determine the amount of fertilizer needed. Fertilizer need may vary depending on climatic conditions of the area being farmed. A sample of ten leaves picked at random from 10 trees is used for leaf analysis. Leaf analysis is done beginning the third year. The annual cost of leaf analysis is approximately \$10 per acre. Leaf analysis provides information that is used to determine fertilizer need, the presence of chloride and the level of heavy metals, as well as to determine the soil pH. Soil analysis is also performed every year starting in the third year and costs around \$2 per acre.

Guava growers in San Diego County apply CAN 17 fertilizer as a source of N nutrient. In the first year, fertilizer is applied one time per month from June to October. From the second year on, it is applied one time per month from February to October. The amount of fertilizer application increases with age of plants. Table A below provides the typical amounts of nitrogen (N) applied by age of the plant.

Table A. Pounds of N-Fertilizer Applied for Guavas Production in San Diego County

Year	Pounds of N Per Acre	Pounds of N Per Tree
1	20	0.10
2	40	0.21
3	60	0.31
4	80	0.41
Production	100	0.52

Irrigation. Guava plants are heat tolerant, therefore would survive the dry summers in California. However, it is important to apply deep watering. The ground may be allowed to dry to a depth of several inches before watering again. Monitoring is important for lack of moisture could delay bloom and cause the fruit to drop. Table B below shows the approximate amount of

water use for irrigation by plant age. Guava is irrigated one time per week every month, except in July and August when every other week one additional irrigation is applied.

In San Diego County, the average water cost is approximately \$54.20 per Acre Inch (\$650 per Acre Foot) for water and pumping: www.sdcwa.org/manage/awmp.phtml.

Table B. Irrigation Water Application Rates for Guava Production in San Diego County

Year	Acre Inches per Year
Year 1	6
Year 2	10
Year 3	16
Year 4	24
Production	24

Pest Managements. There are few pesticides registered in California for use in guavas. Fortunately, there are only few pests that are hazardous to the guava plant in San Diego County. Guavas grown in the more humid and tropical areas of Florida and Hawaii have more fungal and insects pests problems and therefore they must be regularly treated. For information and pesticide use permits, contact the local county agricultural commissioner's office or a *Pest Control Adviser (PCA)*. Written recommendations are required for many pesticides and are made by licensed PCAs. In addition, PCAs can be hired to monitor fields for pests and nutrition.

Insect. There are no insect pests in the farm we visited except for a little bit of whitefly (not much to require treatment). Ant control may be important. A new sugar water/boric acid bait station could be used. Overall, insect control cost is insignificant, therefore is not included in this study.

Nematodes. Root-knot nematodes can cause severe damage to the roots of young trees in sandy soils. Injury can be overcome to some degree by the use of fertilizer, drainage and irrigation. But so far there are no registered nematicides to use on Guava (Mark and Norman, 2002).

Weeds. Although individual weed species may vary from region to region within the state, predominant weed species are often grasses, sedges and pigweeds. In the first year, hand hoeing of weeds is performed one time per month in June and September which takes around one minute per plant per time. Beginning the second year, weeding is done one time a year in midsummer and is assumed to take one hour per acre. The farmers also use non-selective, post emergent herbicides. The most common herbicide applied in the San Diego orchard is Roundup (Glyphosate). Three strip sprays of Roundup at a rate of 0.5 pint per acre per treatment are applied to the trees in March, July and October beginning year 2. Spraying Roundup on the trunks of guava should be avoided.

Vertebrates. Gophers can cause major losses to tree roots and ground squirrels can cause erosion problems by tunneling through the soil. Gophers are managed with the use of poison bait (Wilco 1.8) applied every month at a rate of 2 pounds per acre per month except in October to December.

Squirell traps are placed twice a year (two traps per acre during March and October) in tunnels to trap the squirrels and growers usually drive through the orchard on ATVs for monitoring the progress. Traps are filled three times per month with bait (0.5 pound of bait each time) and labor time for filling the traps is estimated at 15 minutes per acre per time.

Harvesting, Hauling and Marketing. Since the fruit is soft, it requires considerable care during picking and handling. Picking in the study area is done by hand. For best flavor allow the fruit to moderately ripen on the tree; that is when the peel of fruit turns to yellow green. Harvesting the ripe fruit is done in 2 to 3 days interval; otherwise overripe fruit will be lost or be damaged with insect or disease infection. Once picked, the fruits if left in the sun will be spoiled. Hence the fruits are hauled to cold location or shade immediately.

Harvesting in San Diego starts at the end of October and peaks from January through March. Guava trees begin yielding small amount of fruit the second year after planting. In this study, the third year is when we begin recording fruit bearing. The annual estimated yield of Guava by age of tree is given in Table C below.

Table C. Estimated Annual Yield of Guava Production in San Diego County

Year	Pounds per Tree	Pounds per Acre	Total Yield Cartons*per Acre
3	10	1940	78
4	30	5820	233
Production	75	14550	582

* A carton is 25 pounds

Harvesting is usually done through contract labor. It is estimated that 125 pounds (5 cartons) will be picked per hour. Picking costs is calculated at a rate of \$2.65 per carton. Lugs are collected and transported to onsite shade. The shed should be cold enough to temporarily store the fruit. Then the fruit is transported to a nearby local packing. Transportation and hauling costs are estimated at \$0.65 per carton.

Selling or marketing costs will include the farmer market’s daily fee, delivery and/or shipping costs, bookkeeping and other related costs. Cost figures for these activities may vary widely. We estimate an overall average fee of \$0.80 per carton for packing and marketing activities.

Labor Costs: Wage rates for both the owner and hired labor are estimated at \$14.30 per hour for machine operator and \$13.30 per hour for non-machine labor. Labor wages include payroll taxes, workman compensation and other overhead costs associated with employment benefits.

Machinery Operating and Ownership Costs: Generally, a small farm of this size will not own a lot of machinery. Our study considers only an ATV and a weed wacker. As a general principle, however machinery costs are calculated as follows:

Equipment Operating Costs: Machinery repair costs are calculated using purchase prices, 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 horsepower and fuel type. According to the data from the USDA-NASS, the average prices for on-farm delivery of diesel and gasoline were \$2.30 and \$2.80 per gallon, respectively.

The fuel, lube, and repair costs per acre for each operation are determined by multiplying the total hourly operating cost of the equipments by the number of hours per acre needed to perform the operation. Formulas for calculating equipment operating costs can be obtained from many farm management books including the one we referenced in this study (Boehlje, Michael D., and Vernon R. Eidman. 1984. *Farm Management*, John Wiley and Sons. New York, New York).

Cash Overhead Costs: Cash overhead costs consist of all cash expenses that are incurred for conducting the business of guava farming. These are costs not accounted for in the production practices of establishing and growing guavas. These costs include interest on operating capital, property taxes, office expenses, liability and property insurances, sanitation services, equipment repairs, and management.

Interest on Operating Capital: In this cost study, the cost of borrowing or the opportunity cost (interest on operating capital) for money used in guava production is 10% (the approximate nominal interest rate) on all operating expenses. Nominal interest rate is the current short term charge set by financial institutions for operating loans.

Property Taxes: Real estate property taxes depend on the value of the property and local zoning ordinances. For this study, we calculated property taxes at 1.0% (the rate most counties commonly charge) of the value (price) of land. For non-real estate properties, property taxes are estimated at 1.00% of the average values of the properties. Average values equal the price of the property plus salvage value divided by two. Property taxes are then divided by the number of acres to obtain the per acre costs.

Property Insurance: Property insurances are charged annually at 0.71% of the average value of the properties. Property insurances are also divided by the number of acres to obtain the per acre costs.

Liability Insurance: Liability insurance costs for accidents on the farm vary by size of farm. The cost of liability insurance for a 5- 50 acres farm is approximately \$437 per year (\$87 per acre per year).

Field Sanitation: One sanitation facility mounted on a single trailer is assumed to be sufficient for 5 acres. The rental charge for the facility is \$145 per month (29 per acre per month) and will be used throughout the year. Sanitation cost for this study is estimated at \$348 per acre per year.

Office Expense: Expenses for office supplies, telephone, fax, internet, accounting, legal fees, utilities and miscellaneous administrative expenses are estimated at \$240 per acre per year.

Investment Repair: Annual repair and maintenance costs for farm buildings, tools and water reservoir are calculated at 2% of the price (value) of the investment. For irrigation system, annual maintenance and repair costs are calculated at 5% of the cost of the system.

Management/Supervisor Salaries: Management charges are not included in this study. We suggest that growers divide the returns after all costs between management and profit as they see fit.

Non-Cash Overhead Costs: Non-cash overhead costs, also referred to as ownership or fixed costs of farm assets including equipments, farm buildings, irrigation system, and farm tools are calculated using the capital recovery method. This method captures the combined cost of depreciation and interest on capital investment. The capital recovery method of estimating depreciation and interest on capital investments is equivalent to the annual payment on a loan used to purchase the investment with the down payment equal to the discounted salvage value.

The capital recovery method of calculating depreciation and interest on investment is more complex than other methods, but more accurately represents the annual costs of ownership because it takes the time value of money into account. The formula for calculating the annual capital recovery is:

$[(\text{Purchase Price} - \text{Salvage Value}) \times \text{Capital Recovery Factor}] + (\text{Salvage Value} \times \text{Interest Rate}).$

Where:

Salvage Value is an estimate of the remaining value of the investment at the end of its useful life. In this study, remaining values for farm machinery are calculated at 10% of their purchase prices. Other investments including irrigation systems, buildings, and miscellaneous equipments (fuel tanks and pumps) are assumed to depreciate fully with no remaining values.

Capital Recovery Factor is the amortization or the repayment factor for capital investments. The factor is the discounted present value calculated using the number of years of life of the investment and the interest charge on the money incurred to purchase it. Capital recovery factors by year and interest rate can be found listed in many farm management books including the one we use in our reference (Boehlje, Michael D., and Vernon R. Eidman. 1984. *Farm Management*. John Wiley and Sons. New York, New York).

Interest Rate: For this study, interest on capital investments is calculated at 7.25% the ten year average long-run rate of return of agricultural assets to current income (USDA-ERS-Economic Research Services data).

Following are the descriptions of the farm investments used in guava production.

Equipment: Very few types of equipment are used in this study because of the small farm size and because many of the production practices are labor intensive and done on contract basis. The farm complement includes ATV, Backpack Sprayer and a Weed Wacker. The value of these farm complements is estimated at 60% of current new prices to reflect the use of a mix of old and new equipment and machines in the farm. Capital recovery costs for machinery and equipment used in this study are shown in Table 6.

Irrigation System: The irrigation system is assumed to include an on-site reservoir for storing water supplied by the local district. It also includes pumps (new 15 horsepower booster pump

lifting water to about 20-feet); a filtration station; drip irrigation lines (installed before planting); a fertilizer injector system (installed at planting). The cost of the irrigation system including installation is estimated at \$1,200 per acre (\$6,000, for a 5 acre farm).

Building: Farm building includes a small farm shade of about 2,500 square feet metal buildings and sheds built on cement. Since guava is very susceptible to warm climate, the building is equipped with a cooling system. The building cost is estimated at \$10,000 for a 5-acre farm.

Shop tools: Shop tools needed in guava production include: pruning tools, a backpack sprayer, picking clips and lug boxes. Most farms have on farm fuel tanks. In this study, we included a 100-gallon fuel tank to service the five acres enterprise. Fuel tanks are situated on a cement containment pad to meet federal, state, and county regulations.

Land rent: In many cases, especially in California the value of land is influenced by a rapid urban development in which case the price of land is driven not by its agricultural value but by the speculative value of its future use. Some cost studies exclude the land rent in which case the bottom line figure of net returns can be referred as returns to management and land.

In this study, land rent is estimated at 7.25% (the ten year average long-run rate of return of agricultural assets to current income) of \$40,000 per acre land value.

Establishment Costs: The cumulative net cash costs incurred to develop trees to a commercial production is referred to as the establishment cost (trees investment cost). The establishment period of guava tree in this study is considered to be about four years. Therefore the establishment cost is the sum of all cash costs less the returns obtained during the four year period. The establishment cost is amortized over 26 years (the expected useful life of the orchard) to determine an annual capital recovery charge (opportunity cost of the investment plus depreciation of trees). The establishment cost estimate in this study is \$8,509 per acre or \$42,545 for five acres.

Crop Returns: Harvest of guava fruit in San Diego County begins mostly in the spring, and is at a time where the fruit from other areas is at a low supply in the market. Hence, fruit prices are relatively higher than other seasons. For this study, crop value is estimated at a grower price of \$1.93 per pound or \$48.25 per carton--Los Angeles Terminal Market weighted average price for guavas from January to March for the 2005 to 2007 seasons (Table D). Gross income estimates during the establishment and production years is given in Table E below. We assumed that all the fruits are sold fresh.

Crop prices and grower returns may, however, differ depending on several factors including the variety produced, the time of selling and the supply and demand condition of the market. Returns using various scenarios of price and yield combinations are provided in Table 8. Growers may choose the scenario that best reflects their specific situation. Crop values of the establishment years are used to offset costs.

Table D. Los Angeles Terminal Market Prices for Guavas (January-March, 2005-2007), Percentage of Crop Harvested and Marketed, and Weighted Average Price

Month	Price (\$/lb)			Average Price (\$/lb)	Percentage Share of Crop Marketed	Weighted Average Price (\$/lb)
	2005	2006	2007			
January	2.24	1.71	1.68	1.88	50	0.94
February	2.50	1.66	1.73	1.96	30	0.59
March	2.56	1.71	1.73	2.00	20	0.40
Total					100	1.93

Table E. Estimated Annual Yield and Gross Income of Guava Production in San Diego County, 2007

Year	Total Yield (Carton per Acre)	Gross Income (\$ per Acre)
3	78	3,764
4	233	11,242
Production	582	28,082

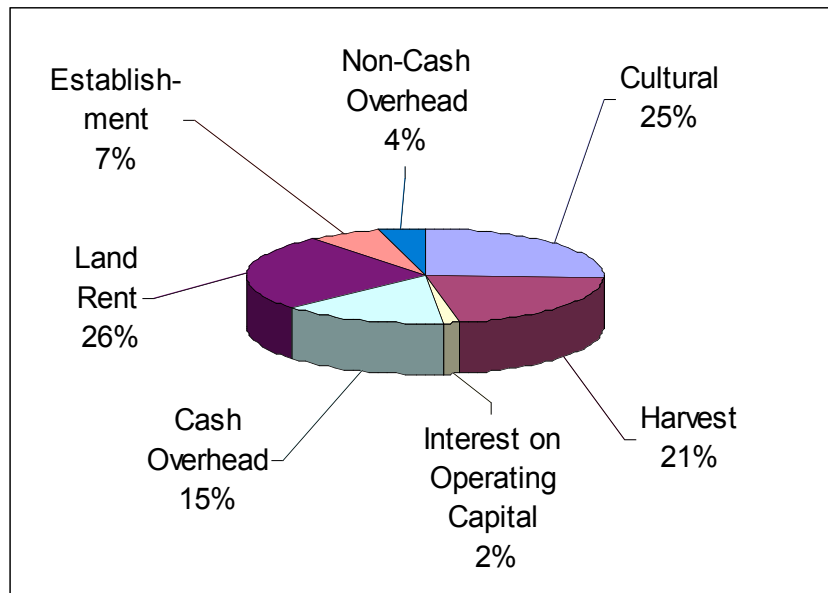
SUMMARY

Guava orchard establishment and production costs in this study are based on the most common or typical operations expressed by growers and farm advisors in San Diego County of California, but can vary depending upon management and cultural practices. Growers should adjust our costs in areas where they differ from us.

Our estimate of the total accumulated net cash costs of the first four years of a guava orchard establishment in San Diego County is \$8,509 per acre (Table 1). The annual production cost including harvesting (assuming 582 cartons per acre yield) is \$11,120 per acre or \$19.11 per carton. The production costs are presented in several tables. Table 2 shows costs by category; Table 3 by type of operation and Table 4 by type of production input. Due to rounding, the totals may not be exactly the same in all tables.

Figure 1 presents the proportion of production costs by category. It includes about 25% in cultural costs (such as pruning, pest control, fertilization, and irrigation), 21% harvest (picking, transport and hauling, and packing and marketing); 15% in cash overhead costs (liability insurance, leaf analysis, soil analysis, sanitation fee, office expenses, property taxes, property insurance and investment repairs); 26% in land rent 4% in non-cash overhead or annual ownership costs of equipments, buildings, tools, and irrigation system and 2% in interest on operating capital The amortization or the distribution of the tree establishment cost during the production period account for 7%.

Figure 1. Proportion of Guavas Production Costs in San Diego County, 2007



PROFIT ANALYSIS

To analyze profitability, we calculated the break-even level (cost per carton) as well as the gross and economic margins (Tables 6 and 7). A break-even level is calculated as the cost of production per acre divided by yield per acre. The market price less the break-even level (costs per carton) provides the margin of profit. Gross margin (gross returns less cash costs) is what growers often refer to as profit if there is no debt on the farming operation. It approximates the return to management and investment. If we deduct depreciation, it also approximates the taxable income of the investment. Economic profit or the net returns above all total costs including management can be zero or positive. A zero economic profit should not be alarming if all costs including the owners' labor and management are included in the production cost.

The break-even price for our production year yield assumption of 582 cartons per acre is \$19.11 per carton. The gross margin estimate using the same yield level and an average price of \$48.25 per carton is \$21,005 per acre. In this study, we did not calculate the economic returns because we did not include management charge. Information was not available for it.

Crop yield and prices received by growers may vary. Therefore, we provided break-even levels, gross margins and returns to management and profit calculated at various prices and yield levels (Table 8) for growers to pick the best scenario that best fits their situation.

ACKNOWLEDGEMENTS

The authors thank the growers in San Diego County who have been the main source of information for this study. We also thank those who participated in the review of this study and appreciate the secondary sources (research papers) that enhanced our understanding of the guava production.

TABLE I. SAMPLE COSTS PER ACRE TO ESTABLISH A GUAVA ORCHARD IN SAN DIEGO COUNTY, 2007

Operations	1st	2nd	3rd	4th
	Cost per acre (\$)			
LAND PREPARATION:				
Bush and weed removal	300			
Root Removal	400			
Rip Soil	250			
Ploughing	200			
TOTAL LAND PREPARATION COSTS	1150			
PRE-PLANT AND PLANT:				
Flag Field	43			
Guava Plants (194 plants/acre, 2% replacement in yr.2, \$10 per Plant)	1940	40		
Hole Digging and Planting	430	9		
Compost Application	215	4		
TOTAL PRE-PLANT AND PLANT COSTS	2628	53		
CULTURAL:				
Irrigate (1x/week every month, an extra irrigation every other week in July and August)	681	830	1155	1591
Fertilizer CAN 17 (1x/month from Feb.-Oct. in yr.2 on and 1x/month from June-Oct in yr.1)	21	42	64	85
Training and Pruning	215	430	430	645
Weed Control-Weeding	86	32	32	32
Weed Control-Roundup		46	46	46
Gopher Control	248	319	319	319
Squirrel Control	109	109	109	109
TOTAL CULTURAL COSTS	1360	1808	2155	2827
HARVEST:				
Picking			207	617
Transport and Hauling			51	151
Packing & Marketing			62	186
TOTAL HARVEST COSTS			320	954
Interest on operating Capital @10%	397	104	121	161
TOTAL OPERATING COSTS/ACRE	5535	1965	2596	3942
CASH OVERHEAD:				
Office Expense	240	240	240	240
Liability Insurance	87	87	87	87
Interest-Cash Overhead costs	75	75	76	76
Interest- Establishent costs		711	1137	1293
Leaf Analysis			10	10
Soil Analysis			2	2
Field Sanitation	348	348	348	348
Property Taxes	421	421	421	421
Property Insurance	300	301	301	301
Investment Repairs	106	106	106	106
TOTAL CASH OVERHEAD COSTS	1577	2289	2727	2883
TOTAL CASH COSTS/ACRE	7112	4254	5323	6825
Harvested Guava (in Carton)	0	0	78	233
Revenue from Sale @ \$48.25/Carton	0	0	3764	11242
NET CASH COSTS	7112	4254	1560	-4417
ACCUMULATED NET CASH COSTS	7112	11366	12926	8509
NON-CASH OVERHEAD:				
Fuel Tanks & Pumps	17	17	17	17
Irrigation System	99	99	99	99
Land	2900	2900	2900	2900
Shop Buildings	165	165	165	165
Shop Tools	10	10	10	10
Equipment	95	116	116	116
TOTAL NON-CASH OVERHEAD COSTS	3286	3307	3307	3307
TOTAL COSTS/ACRE	10398	7561	8630	10132
Harvested Guava (in Carton)	0	0	78	233
Revenue from Sale @ \$48.25/Carton	0	0	3764	11242
NET COSTS	10398	7561	4867	-1110
CUMULATIVE COSTS FOR ONE ACRE	10398	17959	22826	21716
CUMULATIVE COSTS FOR FIVE ACRES	51991	89797	114132	108582

TABLE 2. COSTS PER ACRE BY CATEGORY TO PRODUCE GUAVAS IN SAN DIEGO COUNTY, 2007

Operation	Operation	Cash and Labor Costs per Acre (\$)					Total Cost	Your Cost
	Time (Hrs/Ac)	Labor Cost	Fuel, Lube & Repairs	Material Cost	Custom/Rent			
CULTURAL:								
Irrigate	13.00	223	65	1303	0	1591		
Fertilizer CAN 17	0.00	0	0	106	0	106		
Pruning	48.50	645	0	0	0	645		
Weed Control-Weeding	1.00	17	15	0	0	32		
Weed Control-Roundup	3.00	40	0	6	0	46		
Gopher Control	9.00	120	0	200	0	320		
Squirrel Control	1.50	26	8	75	0	109		
TOTAL CULTURAL COSTS		1071	88	1690	0	2849		
HARVEST:								
Picking	0	0	0	0	1542	1542		
Transport and Hauling	0	0	0	0	378	378		
Packing & Marketing	0	0	0	0	466	466		
TOTAL HARVEST COSTS		0	0	0	2386	2386		
Interest on operating capital @ 10.00%						175		
TOTAL OPERATING COSTS/ACRE		1071	88	1690	2386	5410		
CASH OVERHEAD:								
Office Expense						240		
Liability Insurance						87		
Interest-Cash Overhead Cost						79		
Leaf Analysis						10		
Soil Analysis						2		
Field Sanitation						348		
Property Taxes						464		
Property Insurance						331		
Investment Repairs						106		
TOTAL CASH OVERHEAD COSTS						1667		
TOTAL CASH COSTS/ACRE						7077		
NON-CASH OVERHEAD:								
	Per Producing Acre			Capital Recovery				
Fuel Tanks & Pumps	200			17		17		
Irrigation System	1200			99		99		
Land	40000			2900		2900		
Shop Buildings	2000			165		165		
Shop Tools	120			10		10		
Establishment Cost	8509			736		736		
Equipment	1052			116		116		
TOTAL NON-CASH OVERHEAD COSTS		53081		4043		4043		
TOTAL COSTS/ACRE						11120		

TABLE 3. COSTS PER ACRE BY OPERATION TO PRODUCE GUAVAS IN SAN DIEGO COUNTY, 2007

OPERATION	Operation Time Hrs/A	Labor Cost	Material Cost	Custom/ Rent Cost	Costs/Acre (\$)				Operating Interest Cost	Total Cost	Your Cost	
					Equipment		Capital Recovery Cost	Cash Overhead (Tax & Insurance) Cost				Operating (Fuel, Lubricant & Repair) Cost
					Capital Recovery Cost	Cash Overhead Cost						
CULTURAL:												
Irrigate	13.00	223	1303	0	85.09	4.58	65	85	1766			
Fertilizer CAN17	0.00	0	106	0	0.00	0.00	0	6	112			
Pruning	48.50	645	0	0	0.00	0.00	0	32	677			
Weed Control-Weeding	1.00	17	0	0	20.81	0.87	15	2	56			
Weed Control-Roundup	3.00	40	6	0	0.00	0.00	0	2	48			
Gopher Control	9.00	120	200	0	0.00	0.00	0	21	341			
Squirrel Control	1.50	26	75	0	9.82	0.53	8	6	125			
TOTAL CULTURAL	76	1071	1690	0	116	6	88	154	3125			
HARVEST:												
Picking				1542				13	1555			
Transport and Hauling				378				3	381			
Packing & Marketing				466				4	470			
TOTAL HARVEST	0	0	0	2386	0	0	0	20	2406			
TOTAL OPERATING	76	1071	1690	2386	115.71	5.97	88	174	5531			
CASH OVERHEAD:												
Office Expense										240		
Liability Insurance										87		
Interest-Cash Overhead Cost										79		
Leaf Analysis										10		
Soil Analysis										2		
Field Sanitation										348		
Investment Property Tax										460		
Investment Property Insurance										329		
Investment Repairs										106		
TOTAL CASH OVERHEAD COSTS										1661		
NON-CASH OVERHEAD:												
	Unit Price				Capital Recovery							
	\$/Acre				Per Year (\$)							
Fuel Tanks & Pumps	200				17					17		
Irrigation System	1200				99					99		
Land	40000				2900					2900		
Shop Buildings	2000				165					165		
Shop Tools	120				10					10		
Establishment Cost	8509				736					736		
TOTAL NON-CASH OVERHEAD COSTS										3927		
TOTAL COSTS/ACRE										11119		

TABLE 4. COSTS AND RETURNS PER ACRE TO PRODUCE GUAVAS IN SAN DIEGO COUNTY, 2007

	Quantity/Acre	Unit	Price or Cost/Unit	Value or Cost/Acre	Your Cost
GROSS RETURNS					
Yield and Total Revenue	582	Crtm	48.25	28081.5	
TOTAL GROSS RETURNS FOR GUAVA				28082	
OPERATING COSTS:					
Water:					
Water - Pumped	24.04	AcIn	54.20	1303	
Fertilizer:					
Fertilizer CAN 17	587.97	lbs	0.18	106	
Herbicide:					
Roundup	1.5	pint	4.15	6	
Contract:					
Picking	582	crtm	2.65	1542	
Transport and Hauling	582	crtm	0.65	378	
Packing & Marketing	582	crtm	0.80	466	
Rodenticide:					
Wilco 1.8 Gopher	18	lbs	11.09	200	
Squerris Traps	4	acre	15.00	60	
Squirrel Bait	3	lbs	5.00	15	
Labor (machine)	18.0	nrs	14.50	266	
Labor (non-machine)	60.5	hrs	13.30	805	
Fuel- Gasoline	20.91	gal	2.80	59	
Fuel- Diesel	5.5	gal	2.30	13	
Lube				11	
Machinery Repair				5	
Interest on operating Capital @ 10%				175	
TOTAL OPERATING COSTS/ACRE				5409	
NET RETURNS ABOVE OPERATING COSTS/ACRE				22673	
CASH OVERHEAD:					
Office Expense				240	
Liability Insurance				87	
Interest-Cash Overhead Cost				79	
Leaf Analysis				10	
Soil Analysis				2	
Field Sanitation				348	
Property Taxes				464	
Property Insurance				331	
Investment Repairs				106	
TOTAL CASH OVERHEAD COSTS				1667	
TOTAL CASH COSTS/ACRE				7076	
NET RETURNS ABOVE TOTAL CASH COSTS/ACRE				21005	
NON-CASH OVERHEAD COSTS (CAPITAL RECOVERY):					
Fuel Tanks & Pumps				17	
Irrigation System				99	
Land				2900	
Shop Buildings				165	
Shop Tools				10	
Establishment Cost				736	
Equipment				116	
TOTAL NON-CASH OVERHEAD COSTS/ACRE				4044	
TOTAL COSTS/ACRE				11120	
NET RETURNS ABOVE TOTAL COSTS				16961	

Table 5. MONTHLY CASH COSTS PER ACRE TO PRODUCE GUAVAS IN SAN DIEGO COUNTY, 2007

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	TOTAL
Beginning Jan 07													
Ending Dec 07													
Cultural:													
Irrigate	122	122	122	122	122	122	183	183	122	122	122	122	1591
Fertilizer CAN 17		12	12	12	12	12	12	12	12	12			106
Pruning							645						645
Weed Control-Weeding							32						32
Weed Control-Roundup			15				15			15			46
Gopher Control	35	35	35	35	35	35	35	35	35				319
Squirrel Control			54							54			109
TOTAL CULTURAL COSTS	157	169	238	169	169	169	922	230	169	203	122	122	2848
Harvest Costs:													
Picking												1542	1542
Transport and Hauling												378	378
Packing & Marketing												466	466
TOTAL HARVEST COSTS												2386	2386
Interest on oper. capital	1	3	5	6	8	9	17	19	20	22	23	44	175
TOTAL OPERATING COSTS/ACRE	158	172	243	175	177	178	939	249	189	225	145	2552	5409
OVERHEAD:													
Office Expense			240										240
Liability Insurance			87										87
Interest-Cash Overhead Cost			80										80
Leaf Analysis			10										10
Soil Analysis									2				2
Field Sanitation			348										348
Property Taxes				232							232		464
Property Insurance				166							166		331
Investment Repairs	9	9	9	9	9	9	9	9	9	9	9	9	106
TOTAL CASH OVERHEAD COSTS	9	9	774	407	9	9	9	9	11	9	407	9	1668
TOTAL CASH COSTS/ACRE	167	181	1017	582	186	187	948	258	200	234	552	2561	7077

TABLE 6. BREAK-EVEN PRICE (\$ PER CARTON) ESTIMATES FOR GUAVA PRODUCTION IN SAN DIEGO COUNTY, 2007

Break-Even Prices (\$ per Carton) to Cover Costs Using our Yield Assumption					
Yield (Carton/acre)	Operating Costs		Cash Costs		Total Costs
582	9.29		12.16		19.10

TABLE 7. BREAK-EVEN YIELD (CARTON PER ACRE) ESTIMATES FOR GUAVA PRODUCTION IN SAN DIEGO COUNTY, 2007

Break-Even Yields (Carton per Acre) to Cover Costs Using our Price Assumption					
Price (\$/Carton)	Operating Costs		Cash Costs		Total Costs
48.25	112		147		230

TABLE 8. RANGE ANALYSIS: ANALYSIS OF COSTS AND RETURNS FOR PRODUCING GUAVAS AT VARYING YIELDS AND PRICES IN SAN DIEGO COUNTY, 2007

TABLE 8. RANGE ANALYSIS: ANALYSIS OF COSTS AND RETURNS FOR PRODUCING GUAVAS AT VARYING YIELDS AND PRICES IN SAN DIEGO COUNTY, 2007								
Total harvest cost (\$/Carton)	4.10							
		Yield (Carton/Acre)						
		407	466	524	582	640	698	757
OPERATING COSTS/ACRE:								
Cultural Costs (\$)		2849	2849	2849	2849	2849	2849	2849
Harvest Cost (\$)		1670	1909	2148	2386	2625	2863	3102
Interest on Operating Capital (\$)		151	159	167	175	183	191	199
TOTAL OPERATING COSTS/ACRE (\$)		4670	4917	5164	5410	5657	5903	6150
TOTAL OPERATING COSTS/CARTON (\$)		11.46	10.56	9.86	9.30	8.84	8.45	8.13
CASH OVERHEAD COSTS/ACRE (\$)		1667	1667	1667	1667	1667	1667	1667
TOTAL CASH COSTS/ACRE (\$)		6338	6584	6831	7078	7324	7571	7817
TOTAL CASH COSTS/CARTON (\$)		15.56	14.14	13.04	12.16	11.44	10.84	10.33
NON-CASH OVERHEAD COSTS/ACRE (\$)		4043	4043	4043	4043	4043	4043	4043
TOTAL COSTS/ACRE (\$)		10381	10627	10874	11121	11367	11614	11860
TOTAL COSTS/CARTON(\$)		25.48	22.83	20.76	19.11	17.76	16.63	15.68
NET RETURNS PER ACRE ABOVE OPERATING COSTS FOR GUAVAS IN SAN DIEGO COUNTY, 2007								
		Yield (Carton/Acre)						
		407	466	524	582	640	698	757
Price (\$/Carton)								
33.77		9088	10806	12525	14244	15963	17682	19400
38.60		11055	13055	15055	17055	19055	21055	23055
43.42		13019	15299	17580	19860	22141	24421	26702
48.25		14987	17548	20110	22671	25233	27794	30356
53.08		16954	19797	22640	25482	28325	31168	34010
57.90		18918	22041	25164	28288	31411	34534	37657
62.72		20882	24285	27689	31093	34497	37900	41304
NET RETURNS PER ACRE ABOVE CASH COSTS FOR GUAVAS IN SAN DIEGO COUNTY, 2007								
		Yield (Carton/Acre)						
		407	466	524	582	640	698	757
Price (\$/Carton)								
33.77		7420	9139	10858	12577	14295	16014	17733
38.60		9388	11958	14026	16145	18264	20383	22502
43.42		11352	14032	16112	18193	20473	22754	25034
48.25		13319	16181	18442	21004	23565	26127	28688
53.08		15287	18130	20972	23815	26658	29500	32343
57.90		17251	20374	23497	26620	29743	32867	35990
62.72		19214	22618	26022	29425	32829	36233	39636
NET RETURNS PER ACRE ABOVE TOTAL COSTS FOR GUAVAS IN SAN DIEGO COUNTY, 2007								
		Yield (Carton/Acre)						
		407	466	524	582	640	698	757
Price (\$/Carton)								
33.77		3377	5096	6815	8534	10252	11971	13690
38.60		5345	7345	9345	11345	13345	15344	17344
43.42		7309	9589	11869	14150	16430	18711	20991
48.25		9276	11838	14399	16961	19522	22084	24645
53.08		11244	14087	16929	19772	22615	25457	28300
57.90		13208	16331	19454	22577	25700	28824	31947
62.72		15171	18575	21979	25382	28786	32190	35593

**TABLE 9. WHOLE FARM EQUIPMENT, INVESTMENT, AND BUSINESS OVERHEAD COSTS
BASED ON A 5-ACRE GUAVA ORCHARD IN SAN DIEGO COUNTY, 2007**

EQUIPMENTS							
Year	Description	Price	Life (Year)	Capital Recovery	Cash Overhead Costs (\$)		
					Insurance	Taxes	Total
2007	ATV4WD	4500	7	791	18	25	834
2007	Weed Wacker	760	5	173	3	4	180
TOTAL COST		5260		964	21	29	1014
60% OF THE EQUIPMENT COSTS		3156		578	13	17	608
INVESTMENTS							
Description	Price	Life (Year)	Capital Recovery	Cash Overhead Costs (\$)			Total
				Insurance	Taxes	Repairs	
Establishment Costs	42545	26	3681	152	213	0	4046
Fuel Tanks & Pumps	1000	30	83	4	5	20	112
Irrigation System	6000	30	496	21	30	300	847
Land	200000	30	14500	1428	2000	0	17928
Shop Buildings	10000	30	826	36	50	200	1112
Shop Tools	600	30	50	2	3	12	67
TOTAL INVESTMENT COSTS		260145		19636	1643	2301	532
BUSINESS OVERHEAD							
Description	Units/ Farm	Unit		Price/ Units			Total Costs
Field Sanitation	5	acre		348			1740
Interest - Cash Overhead	5	acre		80			400
Leaf Analysis	5	acre		10			50
Soil Analysis	5	acre		2			10
Liability Insurance	5	acre		87			435
Office Expenses	5	acre		240			1200

Table 10. HOURLY COSTS FOR EQUIPMENT USED TO PRODUCE GUAVAS IN SAN DIEGO COUNTY, 2007											
			Cost per hour (\$)								
		Actual	Capital	Cash overhea cost			Operating expenses			Total cost	
		Hours	Recovery	Insurance	Taxes	Total	Repairs	Fuel&	Total		
Year	Description	Used					Lube	operating			
2007	ATV 4WD	79.70	5.95	0.13	0.19	0.32	0.33	4.22	4.55	10.82	
2007	Weed Wacker	5.50	18.92	0.33	0.46	0.79	0.02	13.22	13.24	32.95	

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