UNIVERSITY OF CALIFORNIA COOPERATIVE EXTENSION

2010

SAMPLE COSTS TO ESTABLISH AND PRODUCE

POMEGRANATES

SAN JOAQUIN VALLEY - SOUTH

Furrow Irrigation

Kevin R. Day	UC Cooperative Extension Farm Advisor, Tulare and Kings Counties
Karen M. Klonsky	UC Cooperative Extension Economist, Department of Agricultural and Resource Economics, UC Davis
Richard L. De Moura	Staff Research Associate, Department of Agricultural and Resource Economics, UC Davis

UNIVERSITY OF CALIFORNIA COOPERATIVE EXTENSION

SAMPLE COSTS TO ESTABLISH AND PRODUCE POMEGRANATES
San Joaquin Valley -2010

STUDY CONTENTS

ASSUMPTIONS 3
Establishment Cultural Practices and Material Inputs 3
Production Cultural Practices and Material Inputs 5
Cash Overhead 7
Non-Cash Overhead 8
REFERENCES 10
Table 1. Costs Per Acre to Establish A Pomegranate Orchard 11
Table 2. Materials and Custom Costs Per Acre to Establish A Pomegranate Orchard 13
Table 3. Costs per acre to Produce Pomegranates 14
Table 4. Costs and Returns Per Acre to Produce Pomegranates 15
Table 5. Monthly Cash Cost Per Acre to Produce Pomegranates 16
Table 6. Ranging Analysis 17
Table 7. Whole Farm Annual Equipment, Investment, Business Overhead Costs 18
Table 8. Hourly Equipment Costs 19
Table 9. Operations With Equipment 20

INTRODUCTION

Sample costs to establish an orchard and produce pomegranates in the southern San Joaquin Valley are presented in this study. This study is intended as a guide only, and can be used to make production decisions, determine potential returns, prepare budgets and evaluate production loans. The production practices described in this study are those considered typical for growing pomegranates in the San Joaquin Valley, but they will not apply to every situation. Sample costs for labor, materials, equipment, and custom services are based on current figures. A blank column, "Your Costs", in Tables 3 and 4 is provided to enter your farm costs.

The hypothetical farm operation, production practices, overhead, and calculations are described under the assumptions. For additional information or an explanation of the calculations used in the study, call the Department of Agricultural and Resource Economics, University of California, Davis, (530) 752-3589 or your local UC Cooperative Extension office.

Sample Cost of Production Studies for many commodities can be downloaded at http://coststudies.ucdavis.edu, requested through the Department of Agricultural and Resource Economics, UC Davis, (530) 752-4424 or obtained from the local county UC Cooperative Extension offices. Some archived studies are also available on the website.

ASSUMPTIONS

The assumptions refer to Tables 1 to 9 and pertain to sample costs to establish and produce pomegranates in the southern San Joaquin Valley. The cultural practices shown represent production operations and materials considered typical of a well-managed orchard in the region. Costs, materials, and practices in this study will not apply to all farms. The study is intended as a guide only. Timing of and types of cultural practices will vary among growers within the region and from season to season due to variables such as variety, weather, soil, and insect and disease pressure. **The use of trade names and cultural practices 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 or cultural practices.**

Land. The farm consists of 100 contiguous acres; 20 acres are being planted to pomegranates and will reach maturity in six to seven years. Other orchard and vine crops are grown on 75 acres; the remaining five acres are roads and farmstead. The owner farms the orchard.

Orchard Establishment Cultural Practices and Material Inputs

Tables 1 and 2

Site Preparation. This orchard is established on ground that has been previously planted to other tree, field or row crops. The land is assumed to be deep, well drained, and either a class I or II soil. The orchard site allows for a uniform water flow (i.e. flood or furrow irrigation). Custom operators begin land preparation by deep ripping the soil profile four to five feet deep in order to break up any underlying hardpan or mix stratified soils that would affect root penetration and water infiltration. Following ripping, the ground is disked three times, then flood irrigated, laser leveled once and floated twice. The land is again disced for weed control in November and February. For purposes of this report all land preparation is included in the first year costs.

Trees. No specific variety is grown in this study, but the common varieties grown in the region are Foothill Early, that is harvested beginning mid to late August, Early Wonderful that is harvested in early September and Wonderful, that is harvested beginning in mid to late September. Wonderful is the preferred variety for processing due to the more intensely red color, and higher quality, of its juice. The bareroot trees in this study are planted on an 18-foot X 18-foot (tree x row) spacing, 134 trees per acre. Some new plantings are being planted on closer spacings. The life of the orchard at the time of planting in this study is estimated to be 25 years.

Plant. Planting the orchard starts in March, after the danger of killing frost has decreased, by marking tree sites, digging holes, planting, and pruning (headedback). Immediately after planting, berms are put up in the tree row. In the second year, 1% of the trees or two trees per acre are planted to replace dead and/or weak trees. The nursery furnishes these trees free and the grower incurs the replanting costs.

Prune/Sucker. In the first year, the new trees are topped (headedback) at planting and suckers originating from below ground are removed in June. Regular pruning and suckering begins in January of the second year with additional suckering in June. Beginning in the third year, the January prunings and the June pruned suckers are placed in the row middles and shredded with the grower's equipment. Depending upon the amount of prunings produced, shredding may not be needed after every pruning or suckering. Pomegranates produce many suckers from the base of the tree and in this instance are removed to form a single trunk; however, some growers favor multiple trunks to provide some indemnification against frost events.

Irrigation. Water costs include water at $4.00 per acre-inch ($48 per acre-foot) and irrigation labor at 1.0 hour per irrigation. Price per acre-foot for water will vary depending on the irrigation district, and/or various well characteristics, and other irrigation factors. Assuming 80% irrigation efficiency, the amount of water applied to the orchard during the establishment period is shown in Table A. Applied water values are substantially greater than the actual tree water requirement due to application inefficiency. In addition to the 10-acre inches applied the first year, 10 acre-inches were applied during land preparation after ripping to settle the ground. Water is delivered to the orchard from the well or district ditch through an underground pipe and flood valve system to furrows along the tree rows. No assumption is made about effective rainfall. If leveling costs will be excessive, pressurized irrigation systems should be considered which do not require leveling. Irrigation furrows are made with the grower's tractor and crowder implement after planting to establish a permanent tillage reduced irrigation system.

Table A. Total Water Applied

Year	Acre-inches per Year
1	10.00
2	15.00
3	27.50
4	37.50
5	45.00

Fertilization. Nitrogen is the major nutrient required for proper tree growth and optimum yields. Nitrogen fertilizer (calcium nitrate) is applied by hand during the first two years and the amount applied increases each year up to the fourth year. Beginning in the third year, the fertilizer is applied with the grower's tractor and a broadcast spreader that is furnished by the fertilizer dealer. Annual rates of actual N applied in this study are shown in Table B.

Table B. Applied Nitrogen

Year	Pounds of N/Acre
1	16.75
2	26.80
3	44.22
4+	100.00

Pest Management. The number of pesticides available for pomegranates is limited. Pesticides mentioned in the study are those commonly used.

Weeds. The tree row (berm) is sprayed with Surflan immediately after the berm is made and again in January of the second year. Beginning in the third season the berms (tree row) are sprayed during the dormant season (January) with the preemergent herbicides, Goal and Surflan. The irrigation furrows (middles) are sprayed with Roundup four to six times per year – February, April, June, July, September. Five percent of the acreage is also spot sprayed in May and July with Roundup. The irrigation furrows are cleaned once each year with the grower's tractor and crowder or center sweeps.

Insects. Insects treated in this study beginning in the third year are mites (flat mite [*Brevipalpus lewisi*]), and worms (omnivorous leaf roller [*Platynola stultana*]). Lannate (or phosphate soap) is applied for aphid control in April. Dusting Sulfur (or wettable) for mite control is applied twice, once in May and once in June. Also, Dipel for worm control is applied in July. The grower makes all applications.

Disease. Not commonly affected by any serious diseases. Pomegranates can and will get both *Botrytis* and *Alternaria* (heart rot), but there are currently no registered controls for either.

Harvest. Harvest starts in the third leaf. Harvest costs will vary according to yield. The crop is harvested by hand and hauled to the packing shed for cooling, storing, and selling. Crew sizes will vary, but a crew of 10 is assumed in this study for the third and fourth years with the grower furnishing one tractor with a bin trailer. Thereafter, a crew of 20 is assumed and the grower furnishes two tractors and two bin trailers.

Table C. Annual Pomegranate Yield

Year	*Boxes/acre
3	75
4	150
5	225
6	300
7+	400

*Boxes = 28 lbs.

Yields and Returns. Although Pomegranates begin bearing an economic crop in the third year after planting, yield maturity is not reached until the sixth year. Typical annual yields for the common varieties are shown in Table C.

Production Cultural Practices and Material Inputs – Mature Trees

Tables 3 – 9

Prune & Sucker. Pruning and suckering are done by hand in the winter months, January. The prunings are placed in the middles and shredded by the grower. The trees are suckered again in June and depending upon how many suckers are removed, shredding may be needed. For this study, it is assumed that shredding is needed. In some areas, some growers of fresh market fruit will summer prune 3 – 6 weeks before harvest to improve fruit color; after which, the prunings are shredded

Irrigation. The cost includes water pumping or district costs at $4.00 per acre-inch ($48 per acre-foot) and irrigation labor at one hour per acre per irrigation. Price per acre-foot for water will vary depending on the irrigation district, and/or various well characteristics, and other irrigation factors. The irrigation period is typically from April through early September. The trees are irrigated a total of 9 times (1X each in April, May, September and 2X in June, July, August). Care should be taken not to irrigate late into the fall as this can delay the onset of dormancy or stimulate late-season growth, both of which can make trees more susceptible to cold temperature damage. Additional irrigations may be needed in March for frost protection or during the winter if temperatures are predicted to drop below approximately 23-25 degrees Fahrenheit. The trees are assumed to have a seasonal consumptive water use of 36 acre-inches. Typically furrow irrigation is only 80% efficient so 45 acre-inches is applied to the orchard. Water is delivered to the orchard from the well or district ditch through an underground pipe and flood valve system to furrows along the tree rows. No assumption is made about effective rainfall.

Fertilization. Nitrogen (N) fertilizer (calcium nitrate) is applied in March or April at 75-125 of N per acre. The grower spreads the fertilizer with a spreader furnished free by the fertilizer company. Experimental evidence suggests that applications of potassium or phosphorous are of little to no benefit to mature trees.

Leaf Sampling. Leaf sampling for nutritional analyses is not included in this study since there are no established critical guidelines. Comparative samples between good and poor areas may be of benefit in some instances.

Pest Management. For information on pesticides available, pest identification, monitoring, and management contact your UC Cooperative Extension Farm Advisor or local Pest Control Adviser. For information and pesticide use permits, contact the local county Agricultural Commissioner's office. **Pesticides mentioned in this study are used to calculate rates and costs. Although growers commonly use the pesticides mentioned, other pesticides may be available.** Materials for pomegranates are limited. Adjuvants are recommended for use with many pesticides for effective control, but the adjuvants and their costs are not included in this study. Pesticide costs may vary by location, brand, and grower volume. Pesticide costs in this study are taken from a single dealer and shown as full retail.

Pest Control Adviser (PCA). Written recommendations are required for many commercially applied pesticides and are written by licensed pest control advisers. In addition the PCA will monitor the field for agronomic problems including pests, diseases, and nutritional status. Growers may hire private PCA's or receive the service as part of a service agreement with an agricultural chemical and fertilizer company. The grower has a full service agreement with the company.

Weed. Weeds are controlled in the tree rows (berm) during the winter (January) with residual pre-emergence herbicides – Goal and Surflan combination. In May and July, the grower uses an ATV and sprayer to apply Roundup as a spot spray (weedy spots) in the tree row. Irrigation furrows made in the first year are cleaned once each year with the crowder or similar type implement. The weeds are controlled in the row middles (furrows) during the spring and summer – February, April, June, July, September – by chemical mowing (Roundup).

Insects. Insects treated in this study are mites (flat mite [*Brevipalpus lewisi*]), and worms (omnivorous leaf roller [*Platynola stultana*]). Lannate (or insecticidal soaps) is applied for aphid control in April or May and Dusting Sulfur, preferred, (or wettable sulfur) for flat mite control is applied twice by ground, once in May and once in June. Also, Dipel for worm control is applied in July or August. The grower makes all applications.

Diseases. Pomegranates are not commonly affected by any serious diseases. They can and will get both *Botrytis* and *Alternaria* (heart rot), especially in years or locations with wet/rainy conditions during bloom, but there are currently no registered controls for either.

Harvest. The pomegranate orchard reaches full maturity in the seventh year. The harvests costs will vary according to yield. The grower's picking crew (20 pickers) using ladders and bags supplied by an independently owned and operated packing shed harvests the crop. The grower furnishes two tractors and trailers for moving the bins around the field. The picked fruit is placed into half-ton plastic or wooden field bins. The plastic field bins can hold approximately 1,000 pounds of fruit, but in reality bins are filled to 800 to 900 pounds. Typically, the field packouts are in the 60% to 80% range, with 80% being used in this study. The fruit is hauled to the packing shed by a contract hauler for $5.50 per bin. The shed packs, palletizes, cools and sells (10% of grower price) the fruit under a contract with the grower. Packing charges are assumed to be $4.50 to $5.00 per box. The crop is harvested two to three times (two times in this study) for the fresh fruit market.

Yields. Average annual fresh-market yields for pomegranates are measured in boxes per acre. The weight of a box of pomegranates in this study is 28 pounds. The average annual yield over the remaining life of the orchard in this study is 300 boxes per acre. Average county yields for fresh market pomegranates are shown in Table D. The averages include all pomegranate varieties and orchards in various stages of production. Industry box sizes can vary and yield by box conversions will be required. Yields can be considerably greater if fruit is destined for processing since smaller and cosmetically blemished fruit can be utilized.

Table D. Average County Yields for Pomegranates

Year	Tons/Acre [1]	Boxes/Acre [2]
2004	4.66	333
2005	4.20	300
2006	3.28	234
2007	4.01	286
2008	4.15	296

[1] Source: Ag Commissioner Crop Reports Fresno, Tulare [2] Boxes weigh 28 pounds

Returns. An estimated price of $18.00 per 28-pound box is based on the Fresno and Tulare Counties' Ag Commissioner annual crop report over the last five years and is used in this study to determine income over a range of prices and yields. Return prices for fresh market pomegranates at different yields and prices are shown in Table 6. Although not considered in this study, growers may have the option to sell the culls or entire crop for juice. Currently, there is not a stable juice market and prices vary considerably between seasons.

Pickup/ATV. The study assumes a business use mileage of 150 miles per acre per year or 15,000 miles for the farm. The ATV is used for spot spraying and is included in those specific costs. Use of the ATV for monitoring the orchard and checking the irrigation is shown under the ATV operation and assumes a use of 3-hours per acre.

Labor. Labor rates of $20.40 per hour for machine operators and $10.88 for general labor includes payroll overhead of 36%. The basic hourly wages are $15.00 for machine operators and $8.00 for general labor. The overhead includes the employers' share of federal and California state payroll taxes, workers' compensation insurance for orchard/fruit crops (code 0016), and a percentage for other possible benefits. Workers' compensation costs will vary among growers, but for this study the cost is based upon the average industry final rate as of January 2010 (California Department of Insurance). Labor for operations involving machinery are 20% higher than the operation time given in Table 3 to account for the extra labor involved in equipment set up, moving, maintenance, work breaks, and field repair.

Wages for management are not included as a cash cost. Any return above total costs is considered a return to management and risk. However, growers wanting to account for management may wish to add a fee. The manager makes all production decisions including cultural practices, action to be taken on pest management recommendations, and labor.

Equipment Operating Costs. Repair costs are based on purchase price, annual hours of use, total hours of life, and repair coefficients formulated by American Society of Agricultural Engineers (ASAE). Fuel and lubrication costs are also determined by ASAE equations based on maximum Power Take Off (PTO) horsepower, and fuel type. Prices for on-farm delivery of diesel and gasoline are $2.04 (excludes excise tax) and $2.67 per gallon, respectively. The cost includes a 2.5% local sales tax on diesel fuel and 7.5% sales tax on gasoline. The fuel prices are the 2009 average costs derived from the Energy Information Administration monthly data. Gasoline also includes federal and state excise tax, which are refundable for on-farm use when filing your income tax. The fuel, lube, and repair cost per acre for each operation in Table 3 is determined by multiplying the total hourly operating cost in Table 8 for each piece of equipment used for the selected operation by the hours per acre. Tractor time is 10% higher than implement time for a given operation to account for setup, travel and down time.

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 5.75% per year. A nominal interest rate is the typical market cost of borrowed funds. The interest cost of post harvest operations is discounted back to the last harvest month using a negative interest charge. The rate will vary depending upon various factors, but the rate in this study is considered a typical lending rate by a farm lending agency as of January 2010.

Risk. Production risks should not be minimized. 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.

Cash Overhead Costs

Cash overhead consists of various cash expenses paid out during the year that are assigned to the whole farm and not to a particular operation.

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 as 1% of the average value of the property. Average value equals new cost plus salvage value divided by 2 on a per acre basis.

Insurance. Insurance for farm investments varies depending on the assets included and the amount of coverage. Property insurance provides coverage for property loss and is charged at 0.767% of the average value

of the assets over their useful life. Liability insurance covers accidents on the farm and costs $581 for the 100-acre farm or $6.12 per producing acre (95 acres).

Office Expense. Office and business expenses are estimated at $75.00 per producing acre (95 acres). These expenses include office supplies, telephones, bookkeeping, accounting, legal fees, shop and office utilities, and miscellaneous administrative charges. The cost is a general estimate and not based on any actual data.

Sanitation Services. Sanitation services provide double portable toilets, washbasins, soap, and towels for the orchard and cost the farm $256 per month. The monthly service charge is an average of four to six California sanitation companies and locations. The cost includes delivery and 5 months of weekly service. The sanitation costs are estimated and not based on any specific data. Growers using contract labor may not have a cost because many labor contractors provide their own sanitation facilities.

Management/Supervisor Salaries. The grower farms the orchard; therefore no salaries are included for management. Returns above costs are considered a return to management.

Investment Repairs. Annual maintenance is calculated as two percent of the purchase price.

Non-Cash Overhead

Non-cash overhead is calculated as the capital recovery cost for equipment and other farm investments.

Capital Recovery Costs. Capital recovery cost is the annual depreciation and interest costs for a capital investment. It is the amount of money required each year to recover the difference between the purchase price and salvage value (unrecovered capital). It is equivalent to the annual payment on a loan for the investment with the down payment equal to the discounted salvage value. This is a more complex method of calculating ownership costs than straight-line depreciation and opportunity costs, but more accurately represents the annual costs of ownership because it takes the time value of money into account (Boehlje and Eidman). The formula for the calculation of the annual capital recovery costs is ((Purchase Price – Salvage Value) x Capital Recovery Factor) + (Salvage Value x Interest Rate).

Salvage Value. Salvage value is an estimate of the remaining value of an investment at the end of its useful life. For farm machinery (tractors and implements) the remaining value is a percentage of the new cost of the investment (Boehlje and Eidman). The percent remaining value is calculated from equations developed by the American Society of Agricultural Engineers (ASAE) based on equipment type and years of life. The life in years is estimated by dividing the wear out life, as given by ASAE by the annual hours of use in this operation. For other investments including irrigation systems, buildings, and miscellaneous equipment, the value at the end of its useful life is zero. The salvage value for land is the purchase price because land does not depreciate. The purchase price and salvage value for equipment and investments are shown in the tables.

Capital Recovery Factor. Capital recovery factor is the amortization factor or annual payment whose present value at compound interest is 1. The amortization factor is a table value that corresponds to the interest rate used and the life of the machine.

Interest Rate. The interest rate of 4.75% is used to calculate capital recovery. The rate will vary depending upon loan size and other lending agency conditions. The rate is the suggested rate by a farm lending agency in January 2010.

Establishment Cost. Costs to establish the orchard are used to determine capital recovery expenses, depreciation, and interest on investment for the production years. Establishment cost is the sum of the costs for land preparation, planting, trees, cash overhead and production expenses for growing the trees through the first year that pomegranates are harvested minus any returns from production. In Table 1, the Total Accumulated Net Cash Cost in the third year represents the establishment cost. For this study the cost is $3,448 per producing acre or $68,960 for the 20-acre orchard. The establishment cost is spread over the remaining 22 producing years of the 25 years of orchard life.

Irrigation System. For this study**,** the orchard is irrigated down furrows that are chemically mowed several times during the growing season. Water is delivered to the orchard from the district ditch or deep well and distributed to the orchard by way of underground mainlines and valves. The irrigation system is installed before the orchard is planted. The life of the irrigation system is estimated at 25 years. The irrigation system is considered an improvement to the property and is shown in the capital recovery sections in the tables. Pressurized (micro-sprinkler) systems may be used in some orchards, but the initial capital costs are higher.

Land. The orchard is established on ground previously planted to deciduous trees or vines. Field or row cropland costs range from $2,000 to $5,500 per acre (Trends in Ag and Land Lease Values). Land in this study is valued at $3,750 per acre or $3,947 per producing acre. Land values with tree crops (includes the tree value) range from $4,500 to $9,000 per acre.

Building. The buildings total 1,800 square feet and are metal building/buildings on a cement slab.

Tools. This includes shop tools, hand tools, and miscellaneous field tools such as pruning tools.

Fuel Tanks. Two 500-gallon fuel tanks using gravity feed are on metal stands. The tanks are setup in a cement containment pad that meets federal, state, and county regulations.

Equipment. Farm equipment is purchased new or used, but the study shows the current purchase price for new equipment. The new purchase price is adjusted to 60% to indicate a mix of new and used equipment. Annual ownership costs for equipment and other investments are shown in the Whole Farm Annual Equipment, Investment, and Business Overhead Costs table. 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 repairs, fuel, and lubrication and are discussed under operating costs.

Table Values. Due to rounding, the totals may be slightly different from the sum of the components.

REFERENCES

Agricultural Commissioner. *Annual Crop Reports, Fresno* and *Tulare Counties, 2004 – 2008.* Ag Commissioner Office, Fresno, California and Ag Commissioner Office, Tulare, California.

American Society of Agricultural Engineers. 1992. *American Society of Agricultural Engineers Standards Yearbook*. St. Joseph, MI.

American Society of Farm Managers and Rural Appraisers. 2009. *Trends in Agricultural Land & Lease Values*. California Chapter of the American Society of Farms Managers and Rural Appraisers. Woodbridge, CA.

Boehlje, Michael D., and Vernon R. Eidman. 1984. *Farm Management*. John Wiley and Sons. New York, NY

California State Board of Equalization. *Fuel Tax Division Tax Rates*. Internet accessed January 2005. http://www.boe.ca.gov/sptaxprog/spftdrates.htm.

Day, Kevin R., Harry L. Andris, Karen M. Klonsky, and Richard L. De Moura. 2005. *Sample Cost to Establish and Produce Pomegranates, Southern San Joaquin Valley – 2005*. UC Cooperative Extension, University of California, Department of Agricultural and Resource Economics, Davis, CA.

Doanes. 1984. *Facts and Figures for Farmers.* 1984. Doane Publishing, St. Louis, MO.

Energy Information Administration. 2009. *Weekly Retail on Highway Diesel and Gasoline Prices*. Internet accessed January 2010. http://tonto.eis.doe.gov/oog/info/wohdp.

Fulton, Allan, and Blake Sanden. 2001. *Site Evaluation and Soil Physical Modification.* Reprint provided by Blake Sanden UCCE Farm Advisor, Kern County.

UC COOPERATIVE EXTENSION

Table 1. COSTS PER ACRE TO ESTABLISH A PROMEGRANATE ORCHARD

SAN JOAQUIN VALLEY – South 2010

	Cost Per Acre			
Year:	1st	2nd	3rd	4th
Yield: 28 Pound Boxes			75	150
Planting Costs:				
Land Prep: Deep Rip (Custom)	115			
Land Prep: Disc 5X (Custom)	100			
Irrigate: Make Borders	8			
Irrigate: water & labor	64			
Land Prep: Level (Custom)	210			
Land Prep: Float 2X (Custom)	24			
Plant: Layout, Plant, Top Trees (Contract Labor)	80	1		
Trees: 134 Per Acre @ $3.35/tree (bareroot)	449	7		
Plant: Make Berms	8			
TOTAL PLANTING COSTS	1,058	8		
Cultural Costs:				
Weed: Dormant Strip (Yr 1-2, Surflan. Yr 3, Surflan, Goal)	52	52	72	72
Weed: Spray Middles 5X (4X Yr. 1) (Roundup)	73	91	91	91
Irrigation: Furrow Middles	5	5	5	5
Irrigate 9X (water & labor)	138	158	208	248
Prune: Sucker Trees (Summer)	12	24	49	49
Fertilizer: N (15.5-0-0)	33	49	78	115
Prune: Prune & Sucker Trees (Winter)		49	97	170
Weed: Spot Spray (Roundup)		6	6	12
Prune: Shred Prunings			13	35
Insect: Aphid (Lannate)			52	52
Insects: Mites (Sulfur Dust)			74	74
Insects: Worms (Dipel)			44	44
Pickup Truck Use	169	169	169	169
ATV	78	78	78	78
TOTAL CULTURAL COSTS	560	682	1,037	1,215
Harvest Costs:				
Pick Fruit			103	205
Haul to Shed			17	39
Pack Fruit			356	713
Sell Fruit			135	270
TOTAL HARVEST COSTS			611	1,226
Interest On Operating Capital @ 5.75%	69	19	34	44
TOTAL OPERATING COSTS/ACRE	1,687	709	1,682	2,485
CASH OVERHEAD COSTS:				
Office Expense	75	75	75	75
Liability Insurance	6	6	6	6
Sanitation Fees	13	13	13	13
Property Taxes	101	101	102	102
Property Insurance	9	9	9	10
Investment Repairs	35	35	35	35
TOTAL CASH OVERHEAD COSTS	240	239	241	241
TOTAL CASH COSTS/ACRE	1,927	949	1,922	2,726
INCOME/ACRE FROM PRODUCTION			1,350	2,700
NET CASH COSTS/ACRE FOR THE YEAR	1,927	949	572	26
PROFIT/ACRE ABOVE CASH COSTS			0	0
ACCUMULATED NET CASH COSTS/ACRE	1,927	2,875	**3,448**	3,474

UC COOPERATIVE EXTENSION

Table 1. CONTINUED

SAN JOAQUIN VALLEY – South 2010

	Cost Per Acre			
Year:	1st	2nd	3rd	4th
Yield: 28 Pound Boxes			75	150
NON-CASH OVERHEAD (Capital Recovery Cost):				
Buildings	50	50	50	50
Land	425	425	425	425
Fuel Tank & Pump	4	4	4	4
Shop Tools	14	14	14	14
Furrow Irrigation System	57	57	57	57
Equipment	53	52	64	69
TOTAL NON-CASH OVERHEAD COSTS	603	602	613	619
TOTAL COST/ACRE FOR THE YEAR	2,529	1,550	2,536	3,345
INCOME/ACRE FROM PRODUCTION			1,350	2,700
TOTAL NET COST/ACRE FOR THE YEAR	2,529	1,550	1,186	645
NET PROFIT/ACRE ABOVE TOTAL COST			0	0
TOTAL ACCUMULATED NET COST/ACRE	2,529	4,080	5,266	5,910

UC COOPERATIVE EXTENSION

Table 2. MATERIALS AND CUSTOM WORK COSTS PER ACRE - ESTABLISHMENT YEARS

SAN JOAQUIN VALLEY – South 2010

			Year 1		Year 2		Year 3		Year 4	
			Total Per Acre							
	Unit	$/Unit	units	$	units	$	units	$	units	$
OPERATING COSTS										
Custom:										
Deep Rip	acre	115.00	1.00	115						
Disk	acre	20.00	5.00	100						
Laser Level	acre	210.00	1.00	210						
Float	acre	12.00	2.00	24						
Layout, Plant, Top	tree	0.60	134.00	80						
Replant	tree	1.00			2.00	2				
Haul Bins	bin	5.50					3.00	17	7.00	39
Pack Fruit	box	4.75					75.00	356	150.00	713
Sell Fruit @ 10% Sales Price	box	1.80					75.00	135	150.00	270
Tree/Tree Aids:										
Pomegranate Tree	tree	3.35	134.00	449	2.00	7				
Irrigation:										
Water (preirrigate)	acin	4.00	10.00	40						
Water (growing season)	acin	4.00	10.00	40	15.00	60	27.50	110	37.50	150
Fertilizer:										
Calcium Nitrate (15.5-0-0)	lb N	1.63	16.75	27	26.80	44	44.22	72	67.00	109
Herbicide:										
Goal 2XL	pint	17.25					2.00	35	2.00	35
Surflan 4 AS	pint	14.51	3.00	44	3.00	44	2.00	29	2.00	29
Roundup Ultra Max	pint	9.50	4.00	38	5.10	48	5.10	48	5.20	49
Insecticide:										
Dusting Sulfur 98	lb	0.55					100.00	55	100.00	55
Dipel DF	lb	15.65					2.00	31	2.00	31
Lannate SP	lb	39.62					1.00	40	1.00	40
Labor (machine)	hrs	20.40	11.93	243	12.03	245	15.12	308	16.80	343
Labor (non-machine)	hrs	10.88	12.88	140	16.25	177	29.80	324	43.86	477
Fuel - Gas	gal	2.67	0.91	2	0.97	3	0.97	3	1.03	3
Fuel - Diesel	gal	2.04	20.36	42	19.24	39	26.13	53	30.58	62
Lube				7		6		8		10
Machinery repair				17		16		23		27
Operating Interest @ 5.75%				69		19		34		44
Total Operating Costs/Acre				1,687		710		1,682		2,485

UC COOPERATIVE EXTENSION

Table 3. COSTS PER ACRE TO PRODUCE POMEGRANATES

SAN JOAQUIN VALLEY - South 2010

	Operation	Cash and Labor Costs per Acre					
Operation	Time (Hrs/A)	Labor Cost	Fuel, Lube & Repairs	Material Cost	Custom/ Rent	Total Cost	Your Cost
Cultural:							
Weed: Dormant Strip (Surflan, Goal)	0.28	7	2	64	0	72	
Prune: Prune & Sucker Trees (winter)	26.80	292	0	0	0	292	
Prune: Shred Brush 2X	0.86	21	14	0	0	35	
Weed: Spray Middles 5X (Roundup)	1.41	35	9	48	0	91	
Weed: Furrow Middles (clean/reshape furrows)	0.14	3	2	0	0	5	
Irrigate: Furrow 9X (water & labor)	9.00	98	0	180	0	278	
Insect: Aphids (Lannate)	0.31	7	5	40	0	52	
Fertilize: N (15.5-0-0)	0.21	5	1	163	0	169	
Weed: Spot Spray 2X (Roundup) ATV	0.40	10	1	2	0	12	
Insect: Mites (Dusting Sulfur) 2X	0.61	15	4	55	0	74	
Prune: Sucker Trees (summer)	4.50	49	0	0	0	49	
Insect: Worms (Dipel)	0.31	7	5	31	0	44	
Pickup: Farm Use	5.00	122	47	0	0	169	
ATV: Irrigation & General Field Use	3.00	73	4	0	0	78	
TOTAL CULTURAL COSTS	52.83	745	94	582	0	1,420	
Harvest:							
Pick Fruit	2.00	533	38	0	0	571	
Haul To Shed	0.00	0	0	0	99	99	
Pack Fruit	0.00	0	0	0	1,900	1,900	
Sell @ 10% of Returns	0.00	0	0	0	720	720	
TOTAL HARVEST COSTS	2.00	533	38	0	2,719	3,290	
Interest on operating capital @ 5.75%						67	
TOTAL OPERATING COSTS/ACRE		1,278	131	582	2,719	4,777	
CASH OVERHEAD:							
Office Expense						75	
Liability Insurance						6	
Sanitation Fees						13	
Property Taxes						120	
Property Insurance						23	
Investment Repairs						52	
TOTAL CASH OVERHEAD COSTS						290	
TOTAL CASH COSTS/ACRE						5,067	
NON-CASH OVERHEAD:		Per producing Acre		Annual Cost Capital Recovery			
Buildings		632		50		50	
Fuel Tanks		47		4		4	
Shop Tools		158		14		14	
Irrigation System - Flood		900		57		57	
Orchard Establishment		3,448		256		256	
Land		8,947		425		425	
Equipment		713		79		79	
TOTAL NON-CASH OVERHEAD COSTS		14,845		884		884	
TOTAL COSTS/ACRE						5,951	

UC COOPERATIVE EXTENSION

Table 4. COSTS AND RETURNS PER ACRE TO PRODUCE POMEGRANATES

SAN JOAQUIN VALLEY - South 2010

	Quantity/ Acre	Unit	Price or Cost/Unit	Value or Cost/Acre	Your Cost
GROSS RETURNS					
Pomegranate	400.00	box	18.00	7,200	
OPERATING COSTS					
Herbicide:					
Surflan 4 AS	2.00	pint	14.51	29	
Goal 2 XL	2.00	pint	17.25	35	
Roundup Ultra Max	5.20	pint	9.50	49	
Irrigate:					
Water	45.00	acin	4.00	180	
Fertilizer:					
Calcium Nitrate (15.5-0-0)	100.00	lb N	1.63	163	
Insecticide:					
Lannate SP	1.00	lb	39.62	40	
Dusting Sulfur 98	100.00	lb	0.55	55	
Dipel DF	2.00	lb	15.65	31	
Custom/Contract:					
Haul Fruit (field to packing shed)	18.00	bin	5.50	99	
Pack Fruit	400.00	box	4.75	1,900	
Sell @ 10% of Returns	400.00	box	1.80	720	
Labor (machine)	19.82	hrs	20.40	404	
Labor (non-machine)	80.30	hrs	10.88	874	
Fuel - Gas	1.02	gal	2.67	3	
Fuel - Diesel	40.34	gal	2.04	82	
Lube				13	
Machinery repair				33	
Interest on operating capital @ 5.75%				67	
TOTAL OPERATING COSTS/ACRE				4,777	
NET RETURNS ABOVE OPERATING COSTS				2,423	
CASH OVERHEAD COSTS:					
Office Expense				75	
Liability Insurance				6	
Sanitation Fees				13	
Property Taxes				120	
Property Insurance				23	
Investment Repairs				52	
TOTAL CASH OVERHEAD COSTS/ACRE				290	
TOTAL CASH COSTS/ACRE				5,067	
NON-CASH OVERHEAD COSTS (Capital Recovery)					
Buildings				50	
Fuel Tanks				4	
Shop Tools				14	
Irrigation System - Flood				57	
Orchard Establishment				256	
Land				425	
Equipment				79	
TOTAL NON-CASH OVERHEAD COSTS/ACRE				884	
TOTAL COSTS/ACRE				5,951	
NET RETURNS ABOVE TOTAL COSTS				1,249	

UC COOPERATIVE EXTENSION

Table 5. MONTHLY CASH COSTS PER ACRE TO PRODUCE POMEGRANATES

SAN JOAQUIN VALLEY - South 2010

Beginning JAN 10	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	TOTAL
Ending DEC 10	10	10	10	10	10	10	10	10	10	10	10	10	
Cultural:													
Weed: Dormant Strip (Surflan, Goal)	72												72
Prune: Prune & Sucker Trees (winter)	292												292
Prune: Shred Brush 2X	18					18							35
Weed: Spray Middles 5X (Roundup)		18		18		18	18		18				91
Weed: Furrow Middles (clean/reshape furrows)				5									5
Irrigate: Furrow 9X (water & labor)				26	26	67	67	62	31				278
Insect: Aphid (Lannate)				52									52
Fertilize: N (15.5-0-0)					169								169
Weed: Spot Spray 2X (Roundup) ATV					6		6						12
Insect: Mites (Dusting sulfur) 2X					37	37							74
Prune: Sucker Trees (summer)						49							49
Insect: Worms (Dipel)							44						44
Pickup: Farm Use	14	14	14	14	14	14	14	14	14	14	14	14	169
ATV: Irrigation & General Field Use	8	8	8	8	8	8	8	8	8	8			78
TOTAL CULTURAL COSTS	403	40	22	123	260	210	157	84	71	22	14	14	1,420
Harvest:													
Pick Fruit									285	285			571
Haul To Shed									50	50			99
Pack Fruit									950	950			1,900
Sell @ 10% of Returns									360	360			720
TOTAL HARVEST COSTS									1,645	1,645			3,290
Interest on operating capital @ 5.75%	2	2	2	3	4	5	6	6	14	22	0	0	67
TOTAL OPERATING COSTS/ACRE	405	42	24	126	264	215	163	90	1,730	1,689	14	14	4,777
CASH OVERHEAD:													
Office Expense	6	6	6	6	6	6	6	6	6	6	6	6	75
Liability Insurance		6											6
Sanitation Fees		13											13
Property Taxes	60						60						120
Property Insurance	12						12						23
Investment Repairs	4	4	4	4	4	4	4	4	4	4	4	4	52
TOTAL CASH OVERHEAD COSTS	82	30	11	11	11	11	82	11	11	11	11	11	290
TOTAL CASH COSTS/ACRE	487	72	35	137	275	226	245	100	1,741	1,700	25	25	5,067

UC COOPERATIVE EXTENSION

Table 6. RANGING ANALYSIS

SAN JOAQUIN VALLEY – South 2010

COSTS PER ACRE AT VARYING YIELDS TO PRODUCE POMEGRANATES

	YIELD (28 lb box/acre)							
	250	300	350	400	450	500	550	600
OPERATING COSTS:								
Cultural Cost	1,420	1,420	1,420	1,420	1,420	1,420	1,420	1,420
Harvest: Pick & Haul	419	502	586	670	753	837	921	1,005
Pack & Sell	1,638	1,965	2,292	2,620	2,947	3,275	3,603	3,931
Interest on operating capital @ 5.75%	58	61	64	67	70	73	76	79
TOTAL OPERATING COSTS/ACRE	3,535	3,948	4,362	4,777	5,190	5,605	6,020	6,435
Total Operating Costs/box	14.14	13.16	12.46	11.94	11.53	11.21	10.95	10.73
CASH OVERHEAD COSTS/ACRE	290	290	290	290	290	290	291	291
TOTAL CASH COSTS/ACRE	3,825	4,238	4,652	5,067	5,480	5,895	6,311	6,726
Total Cash Costs/box	15.30	14.13	13.29	12.67	12.18	11.79	11.48	11.21
NON-CASH OVERHEAD COSTS/ACRE	880	882	883	884	886	887	888	890
TOTAL COSTS/ACRE	4,705	5,120	5,535	5,951	6,366	6,782	7,199	7,616
Total Costs/box	18.82	17.07	15.82	14.88	14.15	13.56	13.09	12.69

NET RETURNS PER ACRE ABOVE OPERATING COSTS

PRICE	YIELD (28 lb box/acre)							
$/box	250	300	350	400	450	500	550	600
12.00	-535	-348	-162	23	210	395	580	765
14.00	-35	252	538	823	1,110	1,395	1,680	1,965
16.00	465	852	1,238	1,623	2,010	2,395	2,780	3,165
18.00	965	1,452	1,938	2,423	2,910	3,395	3,880	4,365
20.00	1,465	2,052	2,638	3,223	3,810	4,395	4,980	5,565
22.00	1,965	2,652	3,338	4,023	4,710	5,395	6,080	6,765
24.00	2,465	3,252	4,038	4,823	5,610	6,395	7,180	7,965

NET RETURNS PER ACRE ABOVE CASH COSTS

PRICE	YIELD (28 lb box/acre)							
$/box	250	300	350	400	450	500	550	600
12.00	-825	-638	-452	-267	-80	105	289	474
14.00	-325	-38	248	533	820	1,105	1,389	1,674
16.00	175	562	948	1,333	1,720	2,105	2,489	2,874
18.00	675	1,162	1,648	2,133	2,620	3,105	3,589	4,074
20.00	1,175	1,762	2,348	2,933	3,520	4,105	4,689	5,274
22.00	1,675	2,362	3,048	3,733	4,420	5,105	5,789	6,474
24.00	2,175	2,962	3,748	4,533	5,320	6,105	6,889	7,674

NET RETURNS PER ACRE ABOVE TOTAL COSTS

PRICE	YIELD (28 lb box/acre)							
$/box	250	300	350	400	450	500	550	600
12.00	-1,705	-1,520	-1,335	-1,151	-966	-782	-599	-416
14.00	-1,205	-920	-635	-351	-66	218	501	784
16.00	-705	-320	65	449	834	1,218	1,601	1,984
18.00	-205	280	765	1,249	1,734	2,218	2,701	3,184
20.00	295	880	1,465	2,049	2,634	3,218	3,801	4,384
22.00	795	1,480	2,165	2,849	3,534	4,218	4,901	5,584
24.00	1,295	2,080	2,865	3,649	4,434	5,218	6,001	6,784

UC COOPERATIVE EXTENSION

Table 7. WHOLE FARM ANNUAL EQUIPMENT, INVESTMENT, AND BUSINESS OVERHEAD COSTS

SAN JOAQUIN VALLEY - South 2010

ANNUAL EQUIPMENT COSTS

						Cash Overhead		
Yr	Description	Price	Yrs Life	Salvage Value	Capital Recovery	Insur-ance	Taxes	Total
10	40 HP 2WD Tractor	14,941	15	2,909	1,278	68	89	1,436
10	80 HP MFWD Tractor	55,307	15	10,767	4,730	253	330	5,314
10	All Terrain Vehicle	6,500	7	2,466	808	34	45	887
10	Bin Trailer #1	1,970	15	189	178	8	11	197
10	Bin Trailer #2	1,970	15	189	178	8	11	197
10	Crowder – 16-20’	3,500	20	182	269	14	18	302
10	Duster – 3 point	5,000	10	884	569	23	29	621
10	Mower/Chopper - 8'	8,200	10	1,450	932	37	48	1,018
10	Orchard Sprayer 500 gal	22,800	10	4,032	2,593	103	134	2,830
10	Pickup Truck - 3/4 ton	32,000	7	12,139	3,978	169	221	4,368
10	Spot Sprayer ATV 20 gal	511	10	90	58	2	3	63
10	Weed Sprayer 100 G	3,424	10	606	389	15	20	425
TOTAL		156,123		35,903	15,960	736	960	17,656
		93,674		21,542	9,576	442	576	10,594

*Used to reflect a mix of new and used equipment

ANNUAL INVESTMENT COSTS

					Cash Overhead			
Description	Price	Yrs Life	Salvage Value	Capital Recovery	Insurance	Taxes	Repairs	Total
INVESTMENT								
Buildings 1,800 sqft	60,000	20		4,713	230	300	1,200	6,443
Orchard Establishment	68,960	22		5,120	264	345	347	6,076
Irrigation System	85,500	25		5,404	328	428	1,710	7,870
Fuel Tanks 2-500 gal	4,500	20		353	17	23	90	483
Land	850,000	25	850,000	40,375	0	8,500	0	48,875
Shop Tools	15,000	15	1,200	1,364	62	81	300	1,807
TOTAL INVESTMENT	1,083,960		851,200	57,330	902	9,676	3,647	71,555

ANNUAL BUSINESS OVERHEAD COSTS

Description	Units/ Farm	Unit	Price/ Unit	Total Cost
Liability Insurance	95	acre	6.12	581
Office Expense	95	acre	75.00	7,125
Sanitation Fees	95	acre	13.47	1,280

UC COOPERATIVE EXTENSION

Table 8. HOURLY EQUIPMENT COSTS

SAN JOAQUIN VALLEY - South 2010

			COSTS PER HOUR						
		Actual		Cash Overhead		Operating			
Yr	Description	Hours Used	Capital Recovery	Insur-ance	Taxes	Repairs	Fuel & Lube	Total Oper.	Total Costs/Hr.
10	40 HP 2WD Tractor	800	0.96	0.05	0.07	0.29	4.61	4.90	5.98
10	80 HP MFWD Tractor	800	3.55	0.19	0.25	2.47	9.22	11.69	15.68
10	All Terrain Vehicle	285	1.77	0.07	0.09	0.48	0.92	1.40	3.33
10	Bin Trailers #1	166	0.64	0.03	0.04	0.28	0.00	0.28	0.99
10	Bin Trailers #2	166	0.64	0.03	0.04	0.28	0.00	0.28	0.99
10	Crowder – 16-20’	100	1.62	0.08	0.11	0.92	0.00	0.92	2.73
10	Duster 3 point	200	1.70	0.07	0.09	0.86	0.00	0.86	2.72
10	Mower/Chopper - 8'	200	2.79	0.11	0.14	3.46	0.00	3.46	6.50
10	Orchard prayer 500 gal	200	7.77	0.31	0.40	3.92	0.00	3.92	12.40
10	Pickup Truck - 3/4 ton	285	8.37	0.36	0.46	2.36	7.04	9.40	18.59
10	Spot Sprayer ATV 20 gal	150	0.23	0.01	0.01	0.14	0.00	0.14	0.39
10	Weed Sprayer 100 G	150	1.56	0.06	0.08	0.92	0.00	0.92	2.62

UC COOPERATIVE EXTENSION

Table 9. POMEGRANATE OPERATIONS WITH EQUIPMENT

SAN JOAQUIN VALLEY – South 2010

Operation	Operation Month	Tractor	Implement	Field Labor Hr/Acre	Material	Broadcast Rate/acre	Unit
Weed: Dormant Strip	December	40HP 2WD	Weed Sprayer		Surflan	2.00	pt
					Goal	2.00	pt
Weed: Spray Middles 5X	February	40HP 2WD	Weed Sprayer		Roundup	1.00	pt
	April	40HP 2WD	Weed Sprayer		Roundup	1.00	pt
	June	40HP 2WD	Weed Sprayer		Roundup	1.00	pt
	July	40HP 2WD	Weed Sprayer		Roundup	1.00	pt
	September	40HP 2WD	Weed Sprayer		Roundup	1.00	pt
Weed: Spot Spray	May	ATV	ATV Sprayer		Roundup	0.10	pt
	July	ATV	ATV Sprayer		Roundup	0.10	pt
Weed: Furrow Middles	April	80HP MFWD	Crowder				
Insect: Aphid	April	80HP MFWD	Orchard Sprayer		Lannate	1.00	lb
Prune and Sucker: Hand	January			26.80	Labor	26.80	hrs
Sucker	June			4.50	Labor	4.50	hrs
Prune: Shred Brush	January	80HP MFWD	Mower/Chopper				
	June	80HP MFWD	Mower/Chopper				
Insect: Mites	May	40HP 2WD	Duster		Dusting Sulfur	50.00	lbs
	June	40HP 2WD	Duster		Dusting Sulfur	50.00	lbs
Insect: Worms	July	80HP MFWD	Orchard Sprayer		Dipel	2.00	lbs
Irrigate	April			1.00	Water	3.75	acin
	May			1.00	Water	3.75	acin
	June			2.00	Water	11.25	acin
	July			2.00	Water	11.25	acin
	August			2.00	Water	10.00	acin
	September			1.00	Water	5.00	acin
Fertilize: Nitrogen	May	40HP 2WD	Fert Co Spreader		Ca Nitrate	100.00	lbs N
Harvest: Pick Fruit	Sept	40HP 2WD	Bin Trailer #1	20.00			
		80HP MFWD	Bin Trailer #2				
	August	40HP 2WD	Bin Trailer #1	20.00			
		80HP MFWD	Bin Trailer #2				
Harvest: Haul	Sept	Custom			9 bins	5.50	bin
	Oct	Custom			9 bins	5.50	bin
Pack Fruit	Sept	Custom			200 boxes	4.75	box
	Oct	Custom			200 boxes	4.75	box