
UNIVERSITY OF CALIFORNIA COOPERATIVE EXTENSION

2009

**SAMPLE COSTS TO
ESTABLISH AND PRODUCE
PLUMS**

Fresh Market



SAN JOAQUIN VALLEY - SOUTH
Furrow Irrigation

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INTRODUCTION

Sample costs to establish a plum orchard and produce fresh market plums 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 plums 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 2 and 3 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) 752-1515 or obtained from the local county UC Cooperative Extension offices. Some archived studies are also available on the website.

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ASSUMPTIONS

The assumptions refer to Tables 1 to 8 and pertain to sample costs to establish and produce plums 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. 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. Ten acres are being planted to plums and will reach maturity in seven years. Other orchard and vine crops are grown on 85 acres; the remaining five acres are roads and farmstead. The owner farms the orchard.

Orchard Establishment Cultural Practices and Material Inputs (Table 1)

Crop Season is December to November

Land (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 four to five feet deep 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 to prepare the ground for the preplant fumigation. The field is fumigated solid untarped with methyl bromide by a custom applicator. After fumigation, borders are put up for an irrigation to settle the tilled ground. When the soil has dried, the site is laser leveled followed by two passes with an orchard float. For purposes of this report all land preparation is included in the first year costs.

Trees. No specific plum varieties or rootstocks are planted in this study. Cultivars that are representative of the costs incurred in this study include: Owen T, Friar and Angeleno. Common rootstocks available are Nemaguard, Citation and Lovell. Currently, the Friar (July harvest) and Angeleno (September harvest) varieties account for approximately 11% of the acreage and 16% of the plum crop in the southern San Joaquin Valley. The trees for this study are planted on a 14-foot X 18-foot (tree x row) spacing, 172 trees per acre. The life of the orchard at the time of planting is estimated to be 20 years.

Plant. Planting the orchard starts in January by marking tree sites, digging holes, planting, and placing tree wraps on the trunk. Immediately after planting, berms are put up in the tree row. In the second year, 2% of the trees or three 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/Thin. New trees are topped at planting and regular pruning begins in December, which is the beginning of the second season. The prunings are placed in the row middles and shredded with the grower's equipment. Fruit thinning by hand begins in the third year and the time increases each year as the yields increase.

Irrigation. Water costs include water at \$4.00 per acre-inch (\$48 per acre-foot) and irrigation labor at 0.94 hours 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 amount of water applied to the orchard during the establishment period increases each year and is shown in Table A. In addition to the 20-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 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.

Year	Acre-inches per Year
1	20
2	24
3	30
4	36
5	44

Pollinate. Beginning in the fourth year, beehives at one-hive per acre are placed in the field for crop pollination. Most plums require cross-pollination to set commercially viable crops and in this study it is assumed that 11% of the trees in the orchard are pollenizers that are not commercially harvested.

Fertilization. Nitrogen (N) is the major nutrient required for proper tree growth and optimum yields. Nitrogen fertilizer (calcium nitrate) is applied by hand and the amount applied increases each year up to the fourth year. Beginning in the fourth year, UN32 fertilizer is applied with the grower’s tractor pulling an applicator, loaned by the fertilizer company. Annual rates of actual N are shown in Table B. Neutral Zinc at five pounds per acre in the second year and ten pounds per acre thereafter is applied each year with the dormant spray. Zinc sulfate at five pounds per acre in the first year and at 10 pounds per acre in subsequent years is foliar applied in the fall (October). Leaf samples for nutrient analysis are taken beginning in June or July of the fourth year.

Year	Pounds of N/Acre
1	43
2	65
3	72
4+	125

Pest Management. The pesticides and rates mentioned in this cost study as well as other materials available are listed in *UC Integrated Pest Management Guidelines, Plums* available online at www.imp.ucdavis.edu. Pesticides mentioned in the study are commonly used, but are not recommendations.

Weeds. The tree row (berm) is sprayed with Surflan immediately after the berm is made. Beginning in the second season the berms (tree row) are sprayed during the dormant season (December) with 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 or twice each year (once in this study) with the crowder or with an orchard brush rake. Afterwards, beginning in the third year, the cleanings (brush) are shredded.

Insects. Insects treated in this study are peach twig borer (PTB), San Jose scale, katydids, codling moth (CM), mites and aphids. A dormant spray – Oil and Diazinon (with zinc) – is applied in December/January at the beginning of the second establishment year and in subsequent years to control PTB, scale, mites and aphids. Acramite insecticide for mite control is applied in July. Beginning in the third year, Imidan insecticide is applied in April for worm (CM) control and suppression of katydids.

Disease. Beginning in the third year, Orbit fungicide is applied at full bloom in February for brown rot blossom blight, jacket rot and powdery mildew. Although this is a common practice among many growers, it is not a UC recommendation.

Harvest. Harvest starts in the third establishment year. Harvest costs will vary according to yield. The crop is harvested by hand and hauled to a packing shed for cooling, storing, and selling. The grower furnishes one tractor and bin trailer for the first harvest and two tractors and trailers in the following years.

Year	Boxes/acre
3	100
4	250
5	500
6	700
7+	900

Boxes = 28 lbs

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

Production Cultural Practices and Material Inputs – Mature Trees Crop Season is December to November

Prune/Thin. Pruning is done by hand in the winter months, December and January. Fruit is thinned by hand in April and/or May.

Irrigation. The cost includes water pumping or district costs at \$4.00 per acre-inch (\$48 per acre-foot) and irrigation labor at 0.94 hours 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 late March through mid September or early October depending on harvest dates. The trees are assumed to have a seasonal consumptive water use of 36 acre-inches. The irrigation efficiency is approximately 82%; therefore a total of 44 acre-inches is applied during the year. No assumption is made about effective rainfall. 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. The furrows are cleaned every year in the spring using a brush rake. The trash or cleanings from the furrow are then shredded.

Fertilization. Nitrogen (N) fertilizer is applied in the spring and in the fall following harvest. In this study nitrogen is applied at a rate of 125 pounds of N per acre split equally between March and September. A foliar application of zinc sulfate at 10 pounds per acre is applied in the autumn (October) at leaf fall, and neutral zinc at 10 pounds per acre is applied in the winter with the dormant spray. The majority of the growers in the area apply zinc during the dormant season only. Friar is a weaker variety than Angeleno; therefore, a differential in fertilization may be necessary but is not addressed in this study.

Leaf Sampling. Leaf - tissue samples - sampling for nutritional analysis are taken in June or July and the fertilizers applied according to the recommendations. The samples are collected and analyzed by a commercial lab and costs \$75 per sample or \$7.50 per acre (one sample per 10 acres)

Pollinate. Most fresh-market Japanese plums are self-unfruitful and require cross-pollination to set a commercial crop. Therefore plantings usually consist of two or more varieties in any of several layouts and densities. Friar and Owen T are considered to be easy-to-set varieties and Angeleno is considered to be an average setting variety. However, to enhance pollination, growers will place up to one hive per acre in the field during the mature production years. In the more difficult-to-set varieties, growers will place as many as two hives per acre to ensure maximum pollination. A minimum strength hive for fruit and nut tree pollination is a hive with six frames of bees and a queen that is laying eggs. For further information on pollination needs for specific varieties contact your local Cooperative Extension office.

Pest Management. The pesticides and rates mentioned in this cost study are listed in *UC Integrated Pest Management Guidelines, Plums*. For information on other pesticides available, pest identification, monitoring, and management visit the UC IPM website at www.ipm.ucdavis.edu. 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, many other pesticides are available. Check with your PCA and/or the UC IPM website for current recommendations.** 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 PCAs 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 (December/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 or twice each year with the crowder or orchard brush rake and the cleanings (brush) are shredded. The weeds are controlled in the row middles (furrows) during the spring and summer – February, April, June, July, September – by chemical mowing (Roundup).

Insects. A dormant spray –Dormant Oil, Diazinon (with zinc) – is applied in the winter to control pests, eggs, and diseases – peach twig borer (PTB), mites, scale, aphids. In season preharvest sprays are applied to protect the crop from such pests as codling moth, peach twig borer, leaf rollers, mites and fruit rot. Imidan for worm control (PTB or CM and katydid suppression) is applied in April. Acramite insecticide is applied in July for mite control.

Diseases. Orbit fungicide is applied at full bloom in February for brown rot blossom blight, jacket rot and powdery mildew. Although this is a common practice among many growers, it is not a UC recommendation.

Harvest. The orchard reaches maturity in the seventh year. The harvests costs will vary according to yield. In late July, the grower’s picking crew using ladders and picking bags supplied by an independently owned and operated packing shed harvests the crop. The packer also furnishes the bins and 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 hold approximately 850 to 900 pounds of fruit. Typically, the field packouts are in the 60% to 80% range, but are not accounted for in this study; therefore the bins hauled represents marketable fruit only. 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 \$4.25 per box.

Yields. Average annual yields for Friar and Angeleno varieties are measured in boxes per acre. The weight of a box of plums in this study is 28 pounds. An average annual yield over the remaining life of the orchard is 900 boxes per acre. Average county yields for fresh market plums are shown in Table E. The averages include all plum varieties and orchards in various stages of production.

Year	Tons/Acre ¹	Boxes/Acre ²
2004	6.45	461
2005	7.55	539
2006	7.22	515
2007	7.46	533
2008	8.27	591

¹ Source: Ag Commissioner Crop Reports Fresno, Tulare ² Boxes weigh

Returns. An estimated average price over the last few years of \$12.00 per box based on grower and marketer input is used to determine income over a range of prices and yields. Return prices for fresh market plums at different yields and prices are shown in Table 5.

Assessments: The California Tree Fruit Agreement (CTFA) assesses fees on boxes of plums sold. The current fee for plums is \$0.065 per 28-pound box equivalent. The CTFA conducts research and marketing programs to benefit producers of peaches, plums, and nectarines.

Pickup/ATV. The study assumes business use mileage of 900 miles or three hours per acre per year for the pickup. 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 2.7-hours per acre.

Labor, Equipment and Interest

Labor. Labor rates of \$20.70 per hour for machine operators and \$11.04 for general labor includes payroll overhead of 38%. 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 2009 (California Department of Insurance, unreferenced). Labor for operations involving machinery are 20% higher than the operation time given in Table 2 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 the 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 \$3.70 (excludes excise taxes) and \$3.36 per gallon, respectively. The fuel prices are the average costs from July through December 2008 derived from American Automobile Association (AAA) and Energy Information Administration monthly data. The cost includes a 2.25% sales tax for diesel fuel, and federal and excise taxes plus an 8% sales tax on gasoline. The federal and state excise tax on gasoline used on the farm can be refunded for on-farm use when filing your income tax. The fuel, lube, and repair cost per acre for each operation in the "Cost Per Acre to Produce" table is determined by multiplying the total hourly operating cost in the "Hourly Equipment Costs" table for each piece of equipment used from the Operation Time (Hrs/A) column 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 2009.

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 of plum production.

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 0.82% of the average value of the assets over their useful life. Liability insurance covers accidents on the farm and costs \$621 for the 100 acre farm or \$6.54 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 \$235 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 $((\text{Purchase Price} - \text{Salvage Value}) \times \text{Capital Recovery Factor}) + (\text{Salvage Value} \times \text{Interest Rate})$.

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 size of loan and other lending agency conditions, but is a suggested rate by a farm lending agency in January 2009.

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 plums 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 \$7,524 per producing acre or \$75,240 for the 10-acre orchard. The establishment cost is spread over the remaining 17 producing years of the 20 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 life of the irrigation system is estimated at 30 years. Pressurized (micro-sprinkler) systems are also used in some orchards, but the initial capital costs are higher. The irrigation system is installed before the orchard is planted. The irrigation system is considered an improvement to the property and is shown in the capital recovery sections in the tables.

Land. The orchard is established on ground previously planted to deciduous trees or vines. Field or row cropland costs range from \$5,000 to \$12,000 per acre. Land in this study is valued at \$8,500 per acre or \$8,947 per producing acre. Land values with tree crops (includes the tree value) range from \$7,000 to \$14,000 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.

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UC COOPERATIVE EXTENSION
Table 1. COSTS PER ACRE TO ESTABLISH A PLUM ORCHARD
 SAN JOAQUIN VALLEY - South 2009

	Cost Per Acre						
	Year:	1st	2nd	3rd	4th	5th	6th
Yield: 28 Pound Boxes Per Acre:				100	250	500	700
Planting Costs:							
Land Prep: Deep Rip (custom)		115					
Land Prep: Disc 3X		60					
Land Prep: Fumigate Solid Untarped (custom)		2,000					
Land Prep: Make Irrigation Borders		9					
Irrigate: (water & labor)		65					
Land Prep: Level (custom)		210					
Land Prep: Float 2X		24					
Plant: Layout, Plant, Wrap Trees		232	5				
Trees: 172 per acre		1,230					
Plant: Make Berms		9					
TOTAL PLANTING COSTS		3,954	5				
Cultural Costs:							
Weed: Dormant Strip (Yr 1, Surflan. Yr 2+, Surflan, Goal)		54	74	74	74	74	74
Irrigate: Make Furrows Yr 1, Clean Furrows Yr 2+		6	6	5	5	5	5
Weed: Spray Middles (Yr 1, 4X. Yr 2+, 5X) (Roundup)		78	98	98	98	98	98
Irrigate 12X (water & labor)		204	220	244	268	300	300
Fertilize: N Yr 1-3 (Yr 1-3, CaNO3. Yr 4+, UN32)		83	119	130	87	87	87
Fertilize: Fall Zinc (Zinc Sulfate)		19	24	24	24	24	24
Prune: Hand			55	127	253	380	570
Prune: Shred Brush (Yr 1, 1X. Yr 2+, 2X)			16	41	41	41	41
Insect: Dormant (Oil, Diazinon). Fertilize: Zn			114	125	125	125	125
Insect: Mites (Acramite)			84	84	84	84	84
Weed: Spot Spray (Roundup)			6	13	13	13	13
Disease: Brown Rot @ Bloom (Orbit)				34	34	34	34
Thin: Hand Thin Fruit				104	215	442	787
Insect: Codling Moth (Imidan)				67	67	67	67
Pollinate: Bees (hives)					150	150	150
Fertilize: Leaf Samples & Analysis					8	8	8
Pickup Truck Use		120	120	120	120	120	120
ATV		72	72	72	72	72	72
TOTAL CULTURAL COSTS		636	1,008	1,361	1,737	2,122	2,658
Harvest Costs:							
Pick Fruit				146	376	751	1,052
Haul to Shed				17	44	94	127
Pack Fruit				425	1,063	2,125	2,975
Sell				120	300	600	840
TOTAL HARVEST COSTS				707	1,782	3,570	4,993
Assessment Costs:							
California Tree Fruit Agreement				7	16	33	46
TOTAL ASSESSMENT COSTS				7	16	33	46
Interest On Operating Capital @ 5.75%		265	36	28	45	64	86
TOTAL OPERATING COSTS/ACRE		4,855	1,050	2,103	3,580	5,788	7,783

UC COOPERATIVE EXTENSION
Table 1. CONTINUED
 SAN JOAQUIN VALLEY - South 2009

	Cost Per Acre						
	Year:	1st	2nd	3rd	4th	5th	6th
Yield: 28 Pound Boxes Per Acre:				100	250	500	700
Cash Overhead Costs:							
Office Expense		75	75	75	75	75	75
Liability Insurance		7	7	7	7	7	7
Sanitation Fees		12	12	12	112	12	12
Property Taxes		100	101	102	102	102	103
Property Insurance		9	9	10	10	11	11
Investment Repairs		35	35	35	35	35	35
TOTAL CASH OVERHEAD COSTS		238	239	240	341	242	243
TOTAL CASH COSTS/ACRE		5,093	1,288	2,343	3,921	6,030	8,025
INCOME/ACRE FROM PRODUCTION				1,200	3,000	6,000	8,400
NET CASH COSTS/ACRE FOR THE YEAR		5,093	1,288	1,143	921	30	
PROFIT/ACRE ABOVE CASH COSTS							375
ACCUMULATED NET CASH COSTS/ACRE		5,093	6,381	7,524	8,445	8,475	8,100
Non-Cash Overhead (Capital Recovery):							
Buildings		50	50	50	50	50	50
Fuel Tanks		4	4	4	4	4	4
Shop & Field Tools		14	14	14	14	14	14
Flood Irrigation System		57	57	57	57	57	57
Land		425	425	425	425	425	425
Equipment		39	48	60	65	78	79
TOTAL NON-CASH OVERHEAD COST/ACRE		589	597	610	615	627	628
TOTAL COST/ACRE FOR THE YEAR		5,682	1,886	2,953	4,536	6,657	8,654
INCOME/ACRE FROM PRODUCTION				1,200	3,000	6,000	8,400
TOTAL NET COST/ACRE FOR THE YEAR		5,682	1,886	1,753	1,536	657	254
NET PROFIT/ACRE ABOVE TOTAL COST							
TOTAL ACCUMULATED NET COST/ACRE		5,682	7,567	9,320	10,856	11,513	11,767

UC COOPERATIVE EXTENSION
Table 2. COSTS PER ACRE TO PRODUCE PLUMS
 SAN JOAQUIN VALLEY - South 2009

Operation	Cash and Labor Costs per Acre						Total Cost	Your Cost
	Operation Time (Hrs/A)	Labor Cost	Fuel, Lube & Repairs	Material Cost	Custom/Rent	Total Cost		
Cultural:								
Weed: Dormant Strip (Surflan, Goal)	0.28	7	3	64	0	74		
Prune: Trees	64.00	707	0	0	0	707		
Prune: Shred Brush (prunings & furrow cleanings)	0.86	21	20	0	0	41		
Insect: Dormant (Oil, Diazinon). Fertilize: Zinc	0.31	8	7	110	0	125		
Disease: Blossom Blight @ Bloom (Orbit)	0.31	8	7	20	0	34		
Weed: Spray Middles 5X (Roundup)	1.41	35	15	48	0	98		
Pollinate: Hives	0.00	0	0	0	150	150		
Fertilize: N split application (UN32)	0.42	10	4	80	0	94		
Thin: Fruit by Hand	143.00	1,579	0	0	0	1,579		
Insect: Worms-CM (Imidan)	0.31	8	7	53	0	67		
Weed: Rake (clean) Furrows	0.11	3	2	0	0	5		
Irrigate 12X (water & labor)	11.25	124	0	176	0	300		
Weed: Spot Spray 2X (Roundup) ATV	0.40	10	1	2	0	13		
Fertilize: Leaf Samples & Analysis	0.00	0	0	0	8	8		
Insect: Mites (Acramite)	0.31	8	7	69	0	84		
Fertilize: Fall Zinc (zinc sulfate)	0.31	8	7	9	0	24		
Pickup: Farm Use	3.00	75	45	0	0	120		
ATV: Irrigation & General Field Use	2.70	67	4	0	0	72		
TOTAL CULTURAL COSTS	228.98	2,676	131	629	158	3,593		
Harvest:								
Pick Fruit	4.50	1,217	135	0	0	1,352		
Haul To Shed	0.00	0	0	0	165	165		
Pack Fruit	0.00	0	0	0	3,825	3,825		
Sell	0.00	0	0	0	1,080	1,080		
TOTAL HARVEST COSTS	4.50	1,217	135	0	5,070	6,422		
Assessment:								
CTFA Assessment	0	0	0	59	0	59		
TOTAL ASSESSMENT COSTS	0	0	0	59	0	59		
Interest on operating capital @ 5.75%						109		
TOTAL OPERATING COSTS/ACRE		3,893	266	688	5,228	10,183		
CASH OVERHEAD:								
Office Expense						75		
Liability Insurance						7		
Sanitation Fees						12		
Property Taxes						141		
Property Insurance						42		
Investment Repairs						35		
TOTAL CASH OVERHEAD COSTS						312		
TOTAL CASH COSTS/ACRE						10,495		
NON-CASH OVERHEAD:								
	Per producing		Annual Cost					
	Acres		Capital Recovery					
Buildings	632		50			50		
Fuel Tanks	47		4			4		
Shop Tools	158		14			14		
Irrigation System	900		57			57		
Orchard Establishment	7,524		655			655		
Land	8,947		425			425		
Equipment	830		85			85		
TOTAL NON-CASH OVERHEAD COSTS	19,038		1,289			1,289		
TOTAL COSTS/ACRE						11,784		

UC COOPERATIVE EXTENSION
Table 3. COSTS AND RETURNS PER ACRE TO PRODUCE PLUMS
 SAN JOAQUIN VALLEY - South 2009

	Quantity/ Acre	Unit	Price or Cost/Unit	Value or Cost/Acre	Your Cost
GROSS RETURNS					
Fresh Plums (28 lb boxes)	900.00	box	12.00	10,800	
TOTAL GROSS RETURNS				10,800	
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	
Fungicide:					
Orbit	4.00	floz	4.88	20	
Insecticide:					
Superior Oil (Dormant)	6.00	gal	7.90	47	
Diazinon 50 W	4.00	lb	10.45	42	
Imidan 70WSB	4.25	lb	12.39	53	
Acramite 50	1.00	lb	69.17	69	
Fertilizer:					
UN 32 (32-0-0)	125.00	lb N	0.64	80	
Neutral Zinc	10.00	lb	2.10	21	
Zinc Sulfate 36%	10.00	lb	0.88	9	
Irrigation:					
Water	44.00	acin	4.00	176	
Custom/Contract:					
Leaf Sampling & Analysis	0.10	each	75.00	8	
Pollination (Hives)	1.00	each	150.00	150	
Haul - Custom	30.00	bin	5.50	165	
Pack Fruit	900.00	box	4.25	3,825	
Sell (10% of Return Price)	900.00	box	1.20	1,080	
Assessment:					
CTFA Assessment	900.00	box	0.07	59	
Labor (machine)	23.66	hrs	20.70	490	
Labor (non-machine)	308.25	hrs	11.04	3,403	
Fuel - Gas	0.93	gal	3.36	3	
Fuel - Diesel	53.56	gal	3.70	198	
Lube				30	
Machinery repair				35	
Interest on operating capital @ 5.75%				109	
TOTAL OPERATING COSTS/ACRE				10,183	
NET RETURNS ABOVE OPERATING COSTS				617	
CASH OVERHEAD COSTS:					
Office Expense				75	
Liability Insurance				7	
Sanitation Fees				12	
Property Taxes				141	
Property Insurance				42	
Investment Repairs				35	
TOTAL CASH OVERHEAD COSTS/ACRE				312	
TOTAL CASH COSTS/ACRE				10,495	

UC COOPERATIVE EXTENSION
Table 3. CONTINUED
 SAN JOAQUIN VALLEY - South 2009

	Quantity/ Acre	Unit	Price or Cost/Unit	Value or Cost/Acre	Your Cost
NON-CASH OVERHEAD COSTS (Capital Recovery)					
Buildings				50	
Fuel Tanks				4	
Shop Tools				14	
Irrigation System				57	
Orchard Establishment				655	
Land				425	
Equipment				85	
TOTAL NON-CASH OVERHEAD COSTS/ACRE				1,289	
TOTAL COSTS/ACRE				11,784	
NET RETURNS ABOVE TOTAL COSTS				-984	

UC COOPERATIVE EXTENSION
Table 4. MONTHLY CASH COSTS PER ACRE TO PRODUCE PLUMS
 SAN JOAQUIN VALLEY - South 2009

Beginning DEC 08	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	TOTAL
Ending NOV 09	08	09	09	09	09	09	09	09	09	09	09	09	
Cultural:													
Weed: Dormant Strip (Surflan, Goal)	74												74
Prune: Trees	353	353											707
Prune: Shred Brush (prunings & furrow cleanings)		21			21								41
Insect: Dormant (Oil, Diazinon). Fertilize: Zinc		125											125
Disease: Blossom Blight @ Bloom (Orbit)			34										34
Weed: Spray Middles 5X (Roundup)			20		20		20	20		20			98
Pollinate: Hives			150										150
Fertilize: N split application (UN32)				47						47			94
Thin: Fruit by Hand					1,579								1,579
Insect: Worms-CM (Imidan)					67								67
Weed: Rake (clean) Furrows					5								5
Irrigate 12X (water & labor)				26	49	83	57	45	22	18			300
Weed: Spot Spray 2X (Roundup) ATV						6		6					13
Fertilize: Leaf Samples & Analysis							8						8
Insect: Mites (Acramite)								84					84
Fertilize: Fall Zinc (zinc sulfate)											24		24
Pickup: Farm Use	10	10	10	10	10	10	10	10	10	10	10	10	120
ATV: Irrigation & General Field Use	7	7	7	7	7	7	7	7	7	7	7	7	72
TOTAL CULTURAL COSTS	443	515	220	90	1,757	106	100	171	39	101	40	10	3,593
Harvest:													
Pick Fruit								1,352					1,352
Haul To Shed								165					165
Pack Fruit								3,825					3,825
Sell								1,080					1,080
TOTAL HARVEST COSTS								6,422	0				6,422
Assessment:													
CTFA Assessment								59					59
TOTAL ASSESSMENT COSTS								59	0	0	0	0	59
Interest on operating capital @ 5.75%	2	5	6	6	15	15	15	47	-1	-1	0	0	109
TOTAL OPERATING COSTS/ACRE	445	520	226	96	1,771	121	116	6,699	38	101	40	10	10,183
CASH OVERHEAD:													
Office Expense	6	6	6	6	6	6	6	6	6	6	6	6	75
Liability Insurance			7										7
Sanitation Fees			12										12
Property Taxes		70						70					141
Property Insurance		21						21					42
Investment Repairs	3	3	3	3	3	3	3	3	3	3	3	3	35
TOTAL CASH OVERHEAD COSTS	8	63	15	8	8	8	8	63	8	8	8	7	312
TOTAL CASH COSTS/ACRE	453	583	241	104	1,779	129	124	6,762	46	109	48	17	10,495

UC COOPERATIVE EXTENSION
Table 5. RANGING ANALYSIS
 SAN JOAQUIN VALLEY – South 2009

COSTS PER ACRE AT VARYING YIELD TO PRODUCE PLUMS

	YIELD (28 lb box/acre)						
	750	800	850	900	950	1,000	1,050
OPERATING COSTS:							
Cultural Cost	3,593	3,593	3,593	3,593	3,593	3,593	3,593
Harvest: Pick & Haul	1,264	1,349	1,433	1,517	1,602	1,686	1,770
Pack & Sell	4,088	4,360	4,632	4,905	5,177	5,450	5,723
Assessment	49	52	55	59	62	65	68
Interest on operating capital	104	105	107	109	111	112	114
<i>TOTAL OPERATING COSTS/ACRE</i>	9,098	9,459	9,820	10,183	10,545	10,906	11,268
<i>Total Operating Costs/box</i>	12.13	11.82	11.55	11.31	11.10	10.91	10.73
CASH OVERHEAD COSTS/ACRE							
<i>TOTAL CASH COSTS/ACRE</i>	9,409	9,771	10,132	10,495	10,857	11,218	11,580
<i>Total Cash Costs/box</i>	12.55	12.21	11.92	11.66	11.43	11.22	11.03
NON-CASH OVERHEAD COSTS/ACRE							
<i>TOTAL COSTS/ACRE</i>	10,695	11,058	11,420	11,784	12,148	12,510	12,873
<i>Total Costs/box</i>	14.26	13.82	13.44	13.09	12.79	12.51	12.26

NET RETURNS PER ACRE ABOVE OPERATING COSTS

PRICE \$/box	YIELD (28 lb box/acre)						
	750	800	850	900	950	1,000	1,050
8.00	-3,098	-3,059	-3,020	-2,983	-2,945	-2,906	-2,868
9.00	-2,348	-2,259	-2,170	-2,083	-1,995	-1,906	-1,818
10.00	-1,598	-1,459	-1,320	-1,183	-1,045	-906	-768
11.00	-848	-659	-470	-283	-95	94	282
12.00	-98	141	380	617	855	1,094	1,332
13.00	652	941	1,230	1,517	1,805	2,094	2,382
14.00	1,402	1,741	2,080	2,417	2,755	3,094	3,432

NET RETURNS PER ACRE ABOVE CASH COSTS

PRICE \$/box	YIELD (28 lb box/acre)						
	750	800	850	900	950	1,000	1,050
8.00	-3,409	-3,371	-3,332	-3,295	-3,257	-3,218	-3,180
9.00	-2,659	-2,571	-2,482	-2,395	-2,307	-2,218	-2,130
10.00	-1,909	-1,771	-1,632	-1,495	-1,357	-1,218	-1,080
11.00	-1,159	-971	-782	-595	-407	-218	-30
12.00	-409	-171	68	305	543	782	1,020
13.00	341	629	918	1,205	1,493	1,782	2,070
14.00	1,091	1,429	1,768	2,105	2,443	2,782	3,120

NET RETURNS PER ACRE ABOVE TOTAL COSTS

PRICE \$/box	YIELD (28 lb box/acre)						
	750	800	850	900	950	1,000	1,050
8.00	-4,695	-4,658	-4,620	-4,584	-4,548	-4,510	-4,473
9.00	-3,945	-3,858	-3,770	-3,684	-3,598	-3,510	-3,423
10.00	-3,195	-3,058	-2,920	-2,784	-2,648	-2,510	-2,373
11.00	-2,445	-2,258	-2,070	-1,884	-1,698	-1,510	-1,323
12.00	-1,695	-1,458	-1,220	-984	-748	-510	-273
13.00	-945	-658	-370	-84	202	490	777
14.00	-195	142	480	816	1,152	1,490	1,827

UC COOPERATIVE EXTENSION
Table 6. WHOLE FARM ANNUAL EQUIPMENT, INVESTMENT, AND BUSINESS OVERHEAD COSTS
 SAN JOAQUIN VALLEY - South 2009

ANNUAL EQUIPMENT COSTS

Yr	Description	Price	Yrs Life	Salvage Value	Capital Recovery	Cash Overhead		Total
						Insur- ance	Taxes	
09	40 HP 2WD Tractor	14,941	15	2,909	1,278	73	89	1,440
09	80 HP MFWD Tractor	55,307	15	10,767	4,730	271	330	5,332
09	All Terrain Vehicle (ATV)	6,500	7	2,466	808	37	45	890
09	Bin Trailers #1	1,970	15	189	178	9	11	197
09	Bin Trailers #2	1,970	15	189	178	9	11	197
09	Brush Rake 18'	6,175	20	322	475	27	32	534
09	Mower/Chopper - 8'	8,200	10	1,450	932	40	48	1,020
09	Orch. Sprayer 500 gal	22,800	10	4,032	2,593	110	134	2,837
09	Pickup Truck - 3/4 ton	32,000	7	12,139	3,978	181	221	4,380
09	Spot Sprayer ATV 20 gal	511	10	90	58	2	3	64
09	Weed Sprayer 100 G	3,424	10	606	389	17	20	426
TOTAL		153,798		35,159	15,597	775	945	17,317
60% of New Cost *		92,279		21,095	9,358	465	567	10,390

*Used to reflect a mix of new and used equipment

ANNUAL INVESTMENT COSTS

Description	Price	Yrs Life	Salvage Value	Capital Recovery	Cash Overhead			Total
					Insurance	Taxes	Repairs	
INVESTMENT								
Buildings 1,800 sqft	60,000	20		4,713	246	300	1,200	6,459
Fuel Tanks 2-500 gal	4,500	20		353	18	23	90	484
Irrigation System	85,500	30		5,404	351	428	1,710	7,892
Land	850,000	20	375,000	40,375	0	8,500	0	48,875
Orchard Establishment	75,240	17		6,550	308	376	0	7,234
Shop Tools	15,000	15	1,200	1,364	66	81	300	1,812
TOTAL INVESTMENT	1,090,240	122	376,200	58,760	990	9,707	3,300	72,757

ANNUAL BUSINESS OVERHEAD COSTS

Description	Units/		Price/ Unit	Total Cost
	Farm	Unit		
Liability Insurance	95	acre	6.54	621
Office Expense	95	acre	75.00	7,125
Sanitation Fees	95	acre	12.36	1,174

UC COOPERATIVE EXTENSION
Table 7. HOURLY EQUIPMENT COSTS
 SAN JOAQUIN VALLEY - South 2009

Yr	Description	COSTS PER HOUR							Total Costs/Hr.	
		Actual Hours Used	Capital Recovery	Cash Overhead			Operating			Total Oper.
				Insur- ance	Taxes	Repairs	Fuel & Lube			
09	40 HP 2WD Tractor	800	0.96	0.05	0.07	0.67	8.36	9.03	10.11	
09	80 HP MFWD Tractor	800	3.55	0.20	0.25	1.06	16.72	17.78	21.78	
09	All Terrain Vehicle (ATV)	285	1.70	0.08	0.09	0.48	1.16	1.64	3.51	
09	Bin Trailers #1	166	0.64	0.03	0.04	0.28	0.00	0.28	0.99	
09	Bin Trailers #2	166	0.64	0.03	0.04	0.28	0.00	0.28	0.99	
09	Brush Rake 18'	125	2.28	0.13	0.16	0.84	0.00	0.84	3.41	
09	Mower/Chopper - 8'	200	2.80	0.12	0.15	3.46	0.00	3.46	6.53	
09	Orch. Sprayer 500 gal	200	7.77	0.33	0.40	3.92	0.00	3.92	12.42	
09	Pickup Truck - 3/4 ton	285	8.37	0.38	0.46	2.36	12.76	15.12	24.33	
09	Spot Sprayer ATV 20 gal	150	0.23	0.01	0.01	0.14	0.00	0.14	0.39	
09	Weed Sprayer 100 G	150	1.56	0.07	0.08	0.92	0.00	0.92	2.63	

UC COOPERATIVE EXTENSION
Table 8. OPERATIONS WITH EQUIPMENT & MATERIALS
 SAN JOAQUIN VALLEY - South 2009

Operation	Operation Month	Equipment		Labor Hrs.	Material	Broadcast Rate/acre	Unit
		Tractor	Implement				
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: Rake Furrows	April	80HP MFWD	Brush Rake				
Prune: Hand	December			32.00			
	January			32.00			
Prune: Shred Brush	January	80HP MFWD	Mower/Chopper				
Prune: Shred Brush/Cleanings	April	80HP MFWD	Mower/Chopper				
Pollination	February				Bee Hives	1.00	acre
Thin Fruit	April			143.00			
Insect: Dormant. Fertilize: Dormant	January	80HP MFWD	Orchard Sprayer		Oil	6.00	gal
					Diazinon	4.00	lb
					Neutral Zinc	10.00	lb
Disease: Bloom	February	80HP MFWD	Orchard Sprayer		Orbit	4.00	floz
Insect: Worms (Codling Moth)	April	80HP MFWD	Orchard Sprayer		Imidan	4.25	lbs
Insect: Mites	July	80HP MFWD	Orchard Sprayer		Acramite	1.00	lb
Irrigate:	March			0.94	Water	4.00	acin
	April			1.88	Water	7.00	acin
	May			2.82	Water	13.00	acin
	June			1.88	Water	9.00	acin
	July			1.88	Water	6.00	acin
	August			0.94	Water	3.00	acin
	September			0.91	Water	2.00	acin
Fertilize: Nitrogen Split	March	40HP 2WD	Fertilizer Rig (loaned)		UN32	62.50	lbs N
	September	40HP 2WD	Fertilizer Rig (loaned)		UN32	62.50	lbs N
Fertilize: Fall Zinc	October	80HP MFWD	Orchard Sprayer		Zinc Sulfate	10.00	lbs
Fertilize: Leaf Sampling & Analysis	June	Custom			Analysis	7.50	acin
Harvest: Pick Fruit	July	40HP 2WD	Bin Trailer	90.00			
		80HP MFWD	Bin Trailer				
Harvest: Haul	July	Custom			30	5.50	bin
Pack Fruit	July	Custom			900	4.25	box