
UNIVERSITY OF CALIFORNIA COOPERATIVE EXTENSION

2004

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) 752-4424 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 Operating Costs (Table 1)

Crop Season is December to November

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 slip plowing the soil profile to four to five feet deep in the tree row and subsoiling the middles 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 and slip plowing, 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. The Friar plum variety is planted in this study. The Friar variety accounts 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 (vine x row) spacing, 172 trees per acre. The life of the orchard at the time of planting in this study 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 \$3.00 per acre-inch (\$36 per acre-foot) and irrigation labor at 0.15 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.

Fertilization. Nitrogen is the major nutrient required for proper tree growth and optimum yields. Nitrogen fertilizer (ammonium nitrate) is applied by hand and the amount applied increases each year up to the fourth year. Beginning in the fourth year, the fertilizer is applied with the grower's tractor and broadcast spreader. In some locations, the fertilizer company furnishes the spreader and the grower will not own a spreader. Annual rates of actual N are shown in Table B. Neutral Zinc at five pounds per acre in the first 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 applied in the fall (October).

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 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 or twice each year (once in this study) with the grower's tractor and crowder or center sweeps.

Insects. Insects treated in this study are peach twig borer (PTB), San Jose scale, katydids, codling moth (CM), mites and aphids. A dormant spray – Dormant Oil, 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, Break 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.

Table D. Annual Plum Yields

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 after planting, yield maturity is not reached until the seventh year. Typical annual yields for the common varieties are shown in Table D.

Production Cultural Operating Costs – 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 \$3.00 per acre-inch (\$36 per acre-foot) and irrigation labor at 0.93 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 early October. 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. 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 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.

Leaf Sampling. Leaf - tissue samples - sampling for nutritional analyses are not included in this study but should be taken in June or July and the fertilizers applied according to the recommendations.

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 is considered to be an easy-to-set 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 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 (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 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. 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. Break 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. The grower's picking crew using ladders and buckets 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 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 \$3.25 per box.

Yields. Average annual yields for Friar 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
1999	7.14	510
2000	7.05	503
2001	7.23	516
2002	7.04	503
2003	7.87	562

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

Returns. An estimated average price over the last few years of \$10.00 per box is based on grower input and is used in this study 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 \$0.195 per 28-pound box equivalent. The CTFA conducts research, inspection, and marketing programs to promote peaches, plums, and nectarines.

Pickup/ATV. The study assumes business use mileage of 4,640 miles 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 3-hours per acre.

Labor. Labor rates of \$14.10 per hour for machine operators and \$9.52 for general labor includes payroll overhead of 41%. The basic hourly wages are \$10.00 for machine operators and \$6.75 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 5, 2004 (California Department of Insurance). 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 Agriculture Engineers (ASAE). Fuel and lubrication costs are also determined by ASAE equations based on maximum power takeoff (PTO) horsepower, and fuel type. Prices for on-farm delivery of diesel and gasoline are \$1.45 and \$1.88 per gallon, respectively. The fuel prices are averaged based on four California delivery locations plus \$0.24 per gallon, which is one-half the difference between the high and low price for regular gasoline in 2003 from the California State Automobile Association Monthly Survey. The cost includes a 2.25% sales tax (effective September 2001) on diesel fuel and 7.25% sales tax on gasoline. Gasoline also includes federal and state excise tax, which can be refunded for on-farm use when filing your income tax. The fuel, lube, and repair cost per acre for each operation in Table 2 is determined by multiplying the total hourly operating cost in Table 7 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 6.89% 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.

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. These costs include property taxes, interest on operating capital, office expense, liability and property insurance, sanitation services, equipment repairs, and management.

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 0.676% of the average value of the assets over their useful life. Liability insurance covers accidents on the farm and costs \$645 for the 100 acre farm or \$6.45 per acre

Office Expense. Office and business expenses are estimated at \$65.00 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 \$144 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 6.23% used to calculate capital recovery cost is the USDA-ERS's ten-year average of California's agricultural sector long-run rate of return to production assets from current income. It is used to reflect the long-term realized rate of return to these specialized resources that can only be used effectively in the agricultural sector.

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 sixth year represents the establishment cost. For this study the cost is \$5,416 per producing acre or \$54,160 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 \$2,000 to \$5,500 per acre. 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 250-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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Table 1. SAMPLE COSTS PER ACRE TO ESTABLISH A PLUM ORCHARD
 SAN JOAQUIN VALLEY – South 2004

Year	Cost Per Acre					
	1st	2nd	3rd	4th	5th	6th
Yield: 28 Pound Boxes Per Acre			100	250	500	700
Planting Costs: (Bold = reference in assumptions)						
Land Preparation: Slip Plow (Custom)	350					
Land Preparation: Disc 3X (Custom)	60					
Land Preparation: Fumigate Solid Untarped (Custom)	1,100					
Land Preparation: Put Up Borders	5					
Irrigate	54					
Land Preparation: Level (Custom)	125					
Land Preparation: Float 2X (Custom)	18					
Plant: Layout, Plant Trees (Custom)	112	3				
Trees: 172 Per Acre	1,092					
TOTAL PLANTING COSTS	2,922	3				
Cultural Costs:						
Weed: Dormant Strip (tree row) Spray (Yr 1, Surflan. Yr 2+ ,Surflan, Goal)	45	65	65	65	65	65
Prune: Trees		48	109	218	327	491
Prune: Shred Prunings		10	13	13	13	13
Insect: Dormant Spray (Oil, Diazinon). Fertilizer: (Neutral Zinc)		61	66	66	66	66
Weed: Spray Middles 5X (4X Yr. 1) (Roundup)	59	73	73	73	73	73
Pollination: Bee Hives				50	50	50
Disease: Bloom Spray – Blossom Blight (Break)			29	29	29	29
Thin Fruit: Hand			89	185	381	679
Weed: Furrow Middles	4	4	4	4	4	4
Irrigate 12X	172	185	205	224	250	250
Insect: Worms (Imidan)			47	47	47	47
Insect: Mites (Acramite)		97	97	97	97	97
Fertilizer: Nitrogen	29	31	42	66	67	67
Weed: Spot Spray (Roundup)		4	9	10	10	10
Weed: Put Up Berms		5				
Fertilizer: Fall Foliar Zinc (Zinc sulfate)	11	14	14	14	14	14
Pickup: Business Use	73	73	73	73	73	73
ATV: Irrigation & other	49	49	49	49	49	49
TOTAL CULTURAL COSTS	447	714	984	1,282	1,614	2,076
Harvest Costs:						
Pick Fruit			87	247	497	696
Haul to Shed			16	38	94	126
Pack Fruit			325	813	1,625	2,275
Sell			100	250	500	700
TOTAL HARVEST COSTS			528	1,348	2,716	3,797
Assessment Costs:						
California Tree Fruit Agreement			20	49	98	136
TOTAL ASSESSMENT COSTS			20	49	98	136
Interest On Operating Capital @ 6.89%	213	26	24	39	58	80
TOTAL OPERATING COSTS/ACRE	3,582	743	1,556	2,718	4,486	6,089

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Table 1. continued

Year	Cost Per Acre					
	1st	2nd	3rd	4th	5th	6th
Yield: 28 Pound Boxes Per Acre			100	250	500	700
Cash Overhead Costs:						
Office Expense	65	65	65	65	65	65
Liability Insurance	7	7	7	7	7	7
Sanitation Fees	8	8	8	8	8	8
Property Taxes	47	48	48	49	49	50
Property Insurance	5	5	6	6	7	7
Investment Repairs	22	22	22	22	22	22
TOTAL CASH OVERHEAD COSTS	154	155	156	157	158	159
TOTAL CASH COSTS/ACRE	3,736	898	1,712	2,875	4,644	6,248
INCOME/ACRE FROM PRODUCTION			930	2,325	4,650	6,510
NET CASH COSTS/ACRE FOR THE YEAR	3,736	898	782	550	0	0
PROFIT/ACRE ABOVE CASH COSTS			0	0	6	262
ACCUMULATED NET CASH COSTS/ACRE	3,736	4,634	5,416	5,966	5,960	5,698
Non-Cash Overhead Costs (Capital Recovery):						
Shop Building	42	42	42	42	42	42
Land	246	246	246	246	246	246
Plum Establishment						
Fuel Tank & Pump	3	3	3	3	3	3
Shop Tools	13	13	13	13	13	13
Furrow Irrigation System	34	34	34	34	34	34
Equipment	41	50	59	68	80	89
TOTAL NON-CASH OVERHEAD COST/ACRE	380	388	397	406	418	427
TOTAL COST/ACRE FOR THE YEAR	4,116	1,286	2,109	3,281	5,062	6,675
INCOME/ACRE FROM PRODUCTION			930	2,325	4,650	6,510
TOTAL NET COST/ACRE FOR THE YEAR	4,116	1,286	1,179	956	412	165
NET PROFIT/ACRE ABOVE TOTAL COST	0	0	0	0	0	0
TOTAL ACCUMULATED NET COST/ACRE	4,116	5,402	6,581	7,537	7,949	8,114

UC COOPERATIVE EXTENSION
Table 2. COSTS PER ACRE TO PRODUCE PLUMS
 SAN JOAQUIN VALLEY - South 2004

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: (bold = reference in assumptions)							
Weed: Dormant Strip – Tree Row (Surflan, Goal)	0.28	5	1	59	0	65	
Prune: Trees	64.00	609	0	0	0	609	
Prune: Shred Brush	0.43	7	5	0	0	13	
Insect: Dormant (Oil, Diazinon). Fertilizer: (zinc)	0.31	5	4	57	0	66	
Disease: Bloom – Blossom Blight (Break)	0.31	5	4	19	0	29	
Weed: Spray Middles 5X (Roundup)	1.41	24	7	43	0	73	
Pollinate: Bee Hives	0.00	0	0	0	50	50	
Fertilize: Nitrogen (split application)	0.42	17	3	57	0	77	
Thin: Fruit by Hand	143.00	1,361	0	0	0	1,361	
Insect: Worms-CM (Imidan)	0.31	5	4	38	0	47	
Weed: Furrow (Clean) Middles	0.14	2	1	0	0	4	
Irrigate 12X	11.25	107	0	143	0	250	
Weed: Spot Spray 2X (Roundup) ATV	0.40	7	0	2	0	9	
Insect: Mites (Acramite)	0.31	5	4	88	0	97	
Fertilize: Fall (Zinc sulfate)	0.31	5	4	5	0	14	
Pickup: Business Use	3.00	51	22	0	0	73	
ATV: Irrigation & General Field Use	2.70	46	3	0	0	49	
TOTAL CULTURAL COSTS	228.55	2,262	64	510	50	2,886	
Harvest:							
Pick Fruit (Hand Pick = 74.2 hrs/acre)	*3.71	832	62	0	0	894	
Haul To Shed	0.00	0	0	0	165	165	
Pack Fruit	0.00	0	0	0	2,925	2,925	
Sell	0.00	0	0	0	900	900	
TOTAL HARVEST COSTS	3.71	832	62	0	3,990	4,885	
Assessment:							
CTFA Assessment	0	0	0	175	0	175	
TOTAL ASSESSMENT COSTS	0	0	0	175	0	175	
Interest on operating capital @ 6.89%						103	
TOTAL OPERATING COSTS/ACRE		3,094	126	686	4,040	8,048	
CASH OVERHEAD:							
Office Expense						65	
Liability Insurance						7	
Sanitation Fees						8	
Property Taxes						77	
Property Insurance						26	
Investment Repairs						22	
TOTAL CASH OVERHEAD COSTS						204	
TOTAL CASH COSTS/ACRE						8,252	

*Equipment hours

UC COOPERATIVE EXTENSION

Table 2. continued

Operation	Operation	Cash and Labor Costs per Acre					Total Cost	Your Cost
	Time (Hrs/A)	Labor Cost	Fuel, Lube & Repairs	Material Cost	Custom/Rent			
NON-CASH OVERHEAD:	Per producing Acre							
					Annual Cost			
					Capital Recovery			
Buildings		474			42		42	
Fuel Tanks		37			3		3	
Shop Tools		126			13		13	
Irrigation System		450			34		34	
Plum Establishment		5,416			526		526	
Land		3,947			246		246	
Equipment		827			99		99	
TOTAL NON-CASH OVERHEAD COSTS		11,277			962		962	
TOTAL COSTS/ACRE							9,214	

UC COOPERATIVE EXTENSION
Table 3. COSTS AND RETURNS PER ACRE TO PRODUCE PLUMS
 SAN JOAQUIN VALLEY - South 2004

	Quantity/ Acre	Unit	Price or Cost/Unit	Value or Cost/Acre	Your Cost
GROSS RETURNS					
Plum	900.00	box	10.00	9,000	
OPERATING COSTS					
Herbicide:					
Surflan 4 AS	2.00	pint	13.07	26	
Goal 2 XL	2.00	pint	16.45	33	
Roundup Ultra Max	5.20	pint	8.56	45	
Fungicide:					
Break EC	4.00	oz	4.84	19	
Insecticide:					
Dormant Oil Plus	6.00	gal	3.59	22	
Diazinon 50 W	4.00	lb	6.45	26	
Imidan 70WSB	4.25	lb	8.99	38	
Acramite 50WS (miticide)	1.00	lb	87.69	88	
Fertilizer:					
Ammonium Nitrate 34-0-0	125.00	lb N	0.46	57	
Neutral Zinc	10.00	lb	0.94	9	
Zinc Sulfate 36%	10.00	lb	0.46	5	
Irrigation:					
Water	44.00	acin	3.25	143	
Custom/Contract:					
Pollinate-Bee Hives	1.00	acre	50.00	50	
Haul Fruit from field	30.00	bin	5.50	165	
Pack Fruit	900.00	box	3.25	2,925	
Sell (10% of Return Price)	900.00	box	1.00	900	
Assessment:					
CTFA Assessment	900.00	box	0.20	175	
Labor (machine)	21.27	hrs	14.10	300	
Labor (non-machine)	293.45	hrs	9.52	2,794	
Fuel - Gas	0.92	gal	1.88	2	
Fuel - Diesel	46.68	gal	1.45	68	
Lube				10	
Machinery repair				47	
Interest on operating capital @ 6.89%				103	
TOTAL OPERATING COSTS/ACRE				8,048	
NET RETURNS ABOVE OPERATING COSTS				952	
CASH OVERHEAD COSTS:					
Office Expense				65	
Liability Insurance				7	
Sanitation Fees				8	
Property Taxes				77	
Property Insurance				26	
Investment Repairs				22	
TOTAL CASH OVERHEAD COSTS/ACRE				204	
TOTAL CASH COSTS/ACRE				8,252	

UC COOPERATIVE EXTENSION
Table 3 continued

	Quantity/		Price or	Value or	Your
	Acre	Unit	Cost/Unit	Cost/Acre	Cost
NON-CASH OVERHEAD COSTS (Capital Recovery)					
Buildings				42	
Fuel Tanks				3	
Shop Tools				13	
Irrigation System				34	
Plum Establishment				526	
Land				246	
Equipment				99	
TOTAL NON-CASH OVERHEAD COSTS/ACRE				962	
TOTAL COSTS/ACRE				9,214	
NET RETURNS ABOVE TOTAL COSTS				-241	

UC COOPERATIVE EXTENSION
Table 4. MONTHLY CASH COSTS PER ACRE TO PRODUCE PLUMS
 SAN JOAQUIN VALLEY - South 2004

Beginning DEC 03	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	TOTAL
Ending NOV 04	03	04	04	04	04	04	04	04	04	04	04	04	
Cultural: (bold = reference in assumptions)													
Weed: Dormant Strip Tree Row (Surflan, Goal)	65												65
Prune: Trees	305	305											609
Prune: Shred Prunings		13											13
Insect: Dormant (Oil, Diazinon). Fertilizer: (Neutral Zinc)		66											66
Disease: Bloom-Blossom Blight (Break)			29										29
Weed: Spray Middles 5X (Roundup)			15		15		15	15		15			73
Pollinate: Bee Hives			50										50
Fertilize: Nitrogen (split application)				38						38			77
Thin: Fruit by Hand					1,361								1,361
Insect: Worms- CM (Imidan)					47								47
Weed: Furrow Middles)					4								4
Irrigate 12X					51	51	51	51	47				250
Weed: Spot Spray 2X (Roundup) ATV						4		4					9
Insect: Mites (Acramite)								97					97
Fertilize: Fall Foliar Zinc (Zinc sulfate)											14		14
Pickup: Farm Use	6	6	6	6	6	6	6	6	6	6	6	6	73
ATV: Irrigation & General Field Use	4	4	4	4	4	4	4	4	4	4	4	4	49
TOTAL CULTURAL COSTS	380	394	104	49	1,488	66	76	177	58	64	24	6	2,886
Harvest:													
Pick Fruit								894					894
Haul To Shed								165					165
Pack Fruit								2,925					2,925
Sell								900					900
TOTAL HARVEST COSTS								4,885					4,885
Assessment:													
CTFA Assessment								175					175
TOTAL ASSESSMENT COSTS								175					175
Interest on operating capital @ 6.89%	2	4	5	5	14	14	15	45	-1	-1	0	0	103
TOTAL OPERATING COSTS/ACRE	382	398	109	54	1,502	80	91	5,282	57	63	24	6	8,048

UC COOPERATIVE EXTENSION

Table 4. continued

Beginning DEC 03	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	TOTAL
Ending NOV 04	03	04	04	04	04	04	04	04	04	04	04	04	
CASH OVERHEAD:													
Office Expense	5	5	5	5	5	5	5	5	5	5	5	5	65
Liability Insurance			7										7
Sanitation Fees	1	1	1	1	1	1	1	1	1	1	1		8
Property Taxes		38						38					77
Property Insurance		13						13					26
Investment Repairs	2	2	2	2	2	2	2	2	2	2	2	2	22
TOTAL CASH OVERHEAD COSTS	7	59	22	7	7	7	7	59	7	7	7	7	204
TOTAL CASH COSTS/ACRE	390	457	130	61	1,509	87	98	5,340	64	70	31	13	8,252

UC COOPERATIVE EXTENSION
Table 5. RANGING ANALYSIS
 SAN JOAQUIN VALLEY - 2004

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	2,886	2,886	2,886	2,886	2,886	2,886	2,886
Harvest: Pick & Haul	883	942	1,000	1,059	1,118	1,177	1,236
Pack & Sell	3,188	3,400	3,612	3,825	4,037	4,250	4,463
Assessment	146	156	166	175	185	195	205
Interest on operating capital	98	100	101	103	105	106	108
TOTAL OPERATING COSTS/ACRE	7,201	7,484	7,765	8,048	8,331	8,614	8,898
<i>Total Operating Costs/box</i>	9.60	9.36	9.14	8.94	8.77	8.61	8.47
CASH OVERHEAD COSTS/ACRE	203	204	204	204	204	204	204
TOTAL CASH COSTS/ACRE	7,404	7,688	7,969	8,252	8,535	8,818	9,102
<i>Total Cash Costs/box</i>	9.87	9.61	9.38	9.17	8.98	8.82	8.67
NON-CASH OVERHEAD COSTS/ACRE	956	958	960	962	964	966	968
TOTAL COSTS/ACRE	8,360	8,646	8,929	9,214	9,499	9,784	10,070
<i>Total Costs/box</i>	11.15	10.81	10.50	10.24	10.00	9.78	9.59

NET RETURNS PER ACRE ABOVE OPERATING COSTS

PRICE \$/box	YIELD (box/acre)						
	750	800	850	900	950	1,000	1,050
7.00	-1,951	-1,884	-1,815	-1,748	-1,681	-1,614	-1,548
8.00	-1,201	-1,084	-965	-848	-731	-614	-498
9.00	-451	-284	-115	52	219	386	552
10.00	299	516	735	952	1,169	1,386	1,602
11.00	1,049	1,316	1,585	1,852	2,119	2,386	2,652
12.00	1,799	2,116	2,435	2,752	3,069	3,386	3,702
13.00	2,549	2,916	3,285	3,652	4,019	4,386	4,752

NET RETURNS PER ACRE ABOVE CASH COST

PRICE \$/box	YIELD (box/acre)						
	750	800	850	900	950	1,000	1,050
7.00	-2,154	-2,088	-2,019	-1,952	-1,885	-1,818	-1,752
8.00	-1,404	-1,288	-1,169	-1,052	-935	-818	-702
9.00	-654	-488	-319	-152	15	182	348
10.00	96	312	531	748	965	1,182	1,398
11.00	846	1,112	1,381	1,648	1,915	2,182	2,448
12.00	1,596	1,912	2,231	2,548	2,865	3,182	3,498
13.00	2,346	2,712	3,081	3,448	3,815	4,182	4,548

NET RETURNS PER ACRE ABOVE TOTAL COST

PRICE \$/box	YIELD (box/acre)						
	750	800	850	900	950	1,000	1,050
7.00	-3,110	-3,046	-2,979	-2,914	-2,849	-2,784	-2,720
8.00	-2,360	-2,246	-2,129	-2,014	-1,899	-1,784	-1,670
9.00	-1,610	-1,446	-1,279	-1,114	-949	-784	-620
10.00	-860	-646	-429	-214	1	216	430
11.00	-110	154	421	686	951	1,216	1,480
12.00	640	954	1,271	1,586	1,901	2,216	2,530
13.00	1,390	1,754	2,121	2,486	2,851	3,216	3,580

UC COOPERATIVE EXTENSION
Table 6. WHOLE FARM ANNUAL EQUIPMENT, INVESTMENT, AND BUSINESS OVERHEAD COSTS
 SAN JOAQUIN VALLEY - South 2004

ANNUAL EQUIPMENT COSTS

Yr	Description	Price	Yrs Life	Salvage Value	Capital Recovery	Cash Overhead			Total
						Insur- ance	Taxes		
04	40 HP 2WD Tractor	14,263	15	2,777	1,373	58	85		1,516
04	80 HP MFWD Tractor	54,532	15	10,616	5,251	220	326		5,797
04	All Terrain Vehicle	5,790	7	2,196	786	27	40		853
04	Bin Trailers W/Bin #1	10,500	7	2,679	1,579	45	66		1,690
04	Bin Trailers W/Bin #2	10,500	7	2,679	1,579	45	66		1,690
04	Crowder - 13'	3,500	15	336	352	13	19		384
04	Fertilizer Spreader	12,000	15	1,152	1,206	44	66		1,316
04	Mower/Chopper - 8'	6,713	10	1,187	833	27	40		899
04	Orchard Sprayer 500 gal	19,741	10	3,491	2,449	79	116		2,644
04	Pickup Truck - 3/4 ton	32,000	7	12,139	4,343	149	221		4,713
04	Spot Sprayer ATV 20 gal	511	10	90	63	2	3		68
04	Weed Sprayer 100 G	3,424	10	606	425	14	20		459
TOTAL		173,474		39,948	20,239	723	1,068		22,029
60% of New Cost *		104,084		23,969	12,144	433	640		13,217

*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	45,000	20		3,997	152	225	900	5,274
Fuel Tanks 2-250 gal	3,500	20	350	302	13	19	70	404
Irrigation System	42,750	30		3,183	144	214	855	4,396
Land	375,000	20	375,000	23,363	0	3,750	0	27,113
Plum Establishment	54,160	17		5,255	183	271	0	5,709
Shop Tools	12,000	15	1,200	1,204	45	66	240	1,554
TOTAL INVESTMENT	532,410		376,550	37,302	537	4,545	2,065	44,449

ANNUAL BUSINESS OVERHEAD COSTS

Description	Units/ Farm	Unit	Price/ Unit	Total Cost
Liability Insurance	100	acre	6.45	645
Office Expense	95	acre	65.00	6,175
Sanitation Fees	95	acre	7.58	720

UC COOPERATIVE EXTENSION
Table 7. HOURLY EQUIPMENT COSTS
 SAN JOAQUIN VALLEY - South 2004

Yr Description	COSTS PER HOUR							Total Costs/Hr.
	Actual Hours Used	Cash Overhead			Operating			
		Capital Recovery	Insur- ance	Taxes	Repairs	Fuel & Lube	Total Oper.	
04 40 HP 2WD Tractor	798.0	1.03	0.04	0.06	0.26	3.28	3.54	4.68
04 80 HP MFWD Tractor	799.9	3.94	0.17	0.24	2.34	6.55	8.89	13.24
04 All Terrain Vehicle	285.0	1.65	0.06	0.08	0.43	0.65	1.08	2.87
04 Bin Trailers W/Bin #1	381.5	2.48	0.07	0.10	1.57	0.00	1.57	4.22
04 Bin Trailers W/Bin #2	381.5	2.48	0.07	0.10	1.57	0.00	1.57	4.22
04 Crowder - 13'	132.5	1.59	0.06	0.09	0.92	0.00	0.92	2.66
04 Fertilizer Spreader	80.2	9.02	0.33	0.49	4.51	0.00	4.51	14.35
04 Mower/Chopper - 8'	200.3	2.50	0.08	0.12	2.78	0.00	2.78	5.47
04 Orchard prayer 500 gal	200.4	7.34	0.24	0.35	3.34	0.00	3.34	11.26
04 Pickup Truck - 3/4 ton	285.0	9.14	0.31	0.46	2.35	5.00	7.35	17.27
04 Spot Sprayer ATV 20 gal	150.0	0.25	0.01	0.01	0.14	0.00	0.14	0.41
04 Weed Sprayer 100 G	149.9	1.70	0.05	0.08	0.91	0.00	0.91	2.75

UC COOPERATIVE EXTENSION
Table 8. PLUM OPERATIONS WITH EQUIPMENT
 SAN JOAQUIN VALLEY – South 2004

Operation	Operation			Material	Broadcast		
	Month	Tractor	Implement		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/Clean Middles	April	80HP MFWD	Crowder				
Prune: Hand	December			Labor	32.00	hrs	
	January			Labor	32.00	hrs	
Prune: Shred Prunings	January	80HP MFWD	Mower/Chopper				
Thin Fruit	April			Labor	143.00	hrs	
Pollinate	Feb	Custom		Bee Hives	1.00	acre	
Insect: Dormant. Fertilize: Dormant	January	80HP MFWD	Orchard Sprayer	Dormant Oil	6.00	gal	
				Diazinon	4.00	lb	
				Neutral Zinc	10.00	lb	
Disease: Bloom	February	80HP MFWD	Orchard Sprayer	Break	4.00	floz	
Insect: Worms-CM	April	80HP MFWD	Orchard Sprayer	Imidan	4.25	lbs	
Insect: Mites	July	80HP MFWD	Orchard Sprayer	Acramite	1.00	lb	
Irrigate	March			Water	3.66	acin	
	April			Water	3.70	acin	
	May			Water	4.88	acin	
	June			Water	9.76	acin	
	July			Water	8.54	acin	
	August			Water	6.10	acin	
	September			Water	3.70	acin	
	October			Water	3.66	acin	
	Fertilize: Nitrogen Split	March	40HP 2WD	Fertilizer Spreader	Ammonium Nitrate	75.50	lbs N
		September	40HP 2WD	Fertilizer Spreader	Ammonium Nitrate	75.50	lbs N
Fertilize: Fall Zinc	October	80HP MFWD	Orchard Sprayer	Zinc Sulfate	10.00	lbs	
Harvest: Pick Fruit	July	40HP 2WD	Bin Trailer w/bins	Picking Labor	74.20	hrs	
		80HP MFWD	Bin Trailer w/bins				
Harvest: Haul	July	Custom		30 Bins	5.50	bin	
Pack Fruit	July	Custom		900 Boxes	3.25	box	