
UNIVERSITY OF CALIFORNIA COOPERATIVE EXTENSION

2009

**SAMPLE COSTS TO ESTABLISH AND
PRODUCE
FRESH MARKET
BLUEBERRIES**



San Joaquin Valley - South
Tulare County

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INTRODUCTION

Sample costs to produce blueberries in the southern San Joaquin Valley – Tulare County are presented in this study. The 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 practices described are based on production procedures considered typical for this crop and area, and may not apply to every farm. Sample costs for labor, materials, equipment and custom services are based on current figures. A blank column, "Your Cost", is provided to enter your actual costs on Tables 3 and 4.

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

Sample Cost of Production studies for many commodities from 1931 to the present are available and can be requested through the Department of Agricultural and Resource Economics, UC Davis, (530) 752-1517. Current studies and some archived studies can be downloaded from the department web site <http://coststudies.ucdavis.edu> or obtained from selected county UC Cooperative Extension offices.

ASSUMPTIONS

The following assumptions refer to calculations in Tables 1 to 9 beginning on page 11 and pertain to sample costs to establish and produce blueberries in the southern San Joaquin Valley – Tulare County. Practices described represent methods considered typical for blueberry production in the region. The costs, practices, and materials will not be applicable to all situations every production year. Cultural practices, materials, and blueberry production costs vary by grower and region, and differences can be significant. The practices and inputs used in the cost study serve as a guide only. **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.**

Farm. The farm consists of 80 contiguous acres. Blueberries are planted on 20 acres. Tree fruit orchards occupy 50 acres and roads, the irrigation system and farmstead account for ten acres. In this area, a few operations will rotate berry crops with vegetables and other row crops. The farm is managed by the owner.

Establishment Cultural Practices and Material Inputs

Tables 1- 2

Blueberries are a perennial crop that, when well managed, can produce for up to 25 years in some locations. The establishment period goes from land preparation through the first harvest. Land preparation begins early in the summer and the first harvest occurs almost two years later during late spring. For practical purposes, the establishment period is defined as the first 24 months beginning with land preparation. Plants are in full production four to six years after planting.

Land Preparation. Beginning several months prior to planting, soil samples are taken at two depths per 10 acres in the top 18 inches of soil to determine soil pH and soil nutrient levels. The soil is fumigated untarped by a custom fumigator. The field is acidified by a custom applicator, levees made, flood irrigated and then retested for pH level. If the field is not at the proper pH level, another acid application is made. Field is then sprayed for weeds, plowed (chiseled), disked twice (once to incorporate the fertilizer), fertilizer applied and the beds shaped using the grower's ridger and rolled to firm the berm.

Plants. Several low-chill requirement southern highbrush type varieties for early season production are available for planting in the region. The most common are Jewel and Star and the high yielding pollinator variety Emerald. Jewel or Star and Emerald are planted in a 1:1 ratio. Several new varieties are being tested and may soon be recommended for planting. Check with your local UCCE farm advisor.

Plant. A border disk is used for bed preparation (36 to 48 inches wide by 12 to 18 inches high). The blueberries are planted in the fall (October) on 11-foot rows with a between plant spacing of three feet resulting in 1,320 plants per acre. Three year old plants, 18 to 30 inches tall are purchased in one-gallon containers. The plants cost \$2.90 to \$3.40 each depending on number ordered plus shipping. The blueberry planting is assumed to have a 15 year economic life. Less than 1% of the plants are replanted in the second year except some clay soils may be 2% or greater.

Acidification. Blueberries are grown in soils with relatively low pH (5.0 with a variability of +/- 0.5), hence it is necessary to evaluate the initial soil pH and plan its adjustment by acidification. In the southern San Joaquin Valley adjustment is usually necessary since most soils have a pH between 6.7 and 7.5. In heavy-alkaline soils blueberry production is unfeasible. Soil analysis is done well ahead of the planting season since the acidification process can be slow and may need to be repeated. A custom operator does the initial acidification

three months before planting by spraying sulfuric acid at 8,000 pounds per acre (average rate in the region) on the entire field. Alternatively, soil sulfur may be applied, but this method works slower than sulfuric acid. Continuous monitoring of the soil pH is necessary to avoid reducing the pH too much. Irrigation water also needs to be acidified to a pH of 5.0. Irrigation water in Tulare County averages a pH of 7.7 and blueberries need 2.5 to 3.0 acre-feet of water per growing season; therefore, 75 to 100 gallons a year of sulfuric acid are necessary to adequately reduce irrigation water pH. Costs for 1,232 pounds (80 gallons) of acid are shown in this study.

Mulching. Various mulch materials to minimize weed growth and increase soil humidity are suitable for use in blueberries and research has not found in significant differences among them. The final choice depends upon relative cost. Materials available in this region are almond wood chips, pine shavings and pistachio shells. Wood chips are spread by the grower (truck and 3 men) over a three to five foot width, depending on the berm shape, immediately after planting at a rate of 100 cubic yards per acre to obtain a four-inch thick cover. Mulch material should be partially replenished every other year. Some growers use black plastic to cover the berms (two millimeters thick by five feet wide, 3,960 linear feet per acre). The use of plastic demands more labor during planting and may result in increased weed problems around the crown of the bush. The plastic has to be replaced every four to five years.

Fertilize. Soil samples are taken prior to land preparation for nutrient analysis. After acidification, the field is plowed (chiseled) and disked and beds are listed. Then rolled to pack the soil. Three-hundred pounds per acre of 15-15-15 are broadcast after plowing and incorporated with the disking operation. In the first spring after planting, UN32 is applied through the irrigation system at a rate of 40 pounds of nitrogen (N) per acre (20 lbs in March as growth begins and 20 lbs in July). In the second year, 75 pounds of N is applied over the season (June, July, August, September).

Irrigate. Blueberries have a shallow root system (18 inches), making irrigation management crucial for a successful crop. Drip hose at two lines per bed is laid down on the bed and later covered by mulch. Emitters on each line are 18 inches apart. Three men including the tractor driver layout the drip system. Drip hose is connected to the lateral lines and tested for leaks. The irrigation cost is for pumping and irrigation labor. In the first year the field is flooded applying six acre inches to move the acid into the soil, 1.5 acre inches are drip applied preplant (no acid applied) and 12 acre inches applied (with acid) from March through September. The most critical period for irrigation goes from fruit expansion (April) through harvest (June). In the second year, the field is irrigated from April through September. A total of 18 acre inches is applied during the second year.

Pollinate. Two hives (minimum of 10 frames per hive) per acre are placed in the field by a custom beekeeper in February of the second year.

Prune. In the first year after planting, by March all blooms are removed by hand to promote growth and plant vigor. The estimated operation time is one minute per plant or 22 hours per acre. In the second year the plants are pruned in July after harvest (22 hours) and in December (10 hours).

Pest Management. Pesticides mentioned in the study are commonly used, but are not recommendations.

Soil Fumigation. The soil is fumigated with a 2% methyl bromide, 98% chloropicrin mixture injected in a four to five foot strip (approximately 50% of acres) ovetop of the planting row using three shanks (1 in the middle, 2 on the edges). The operation is done at least three to four months prior to planting. The custom untarped application is \$2,400 per treated acre.

Weeds. Roundup at two pints per acre or Rely is applied to the field during land preparation in July prior to acidification. Weed control is especially important during the first two to three years. After planting, preemergent herbicides are applied with a boom sprayer on the edge of the rows and/or spot sprayed with a spot sprayer on an ATV. In the first year, Roundup is applied in May as a spot spray using the ATV and spot sprayer. In the first and subsequent years, the berms are weeded by hand three times and the middles mowed in the spring (late March). Beginning in the second year, preemergent herbicides, Devrinol and Surflan, are applied to the berm just prior to the rain (usually February or early March).

Diseases. Pristine (or Elevate, Serenade, OxiDate) is applied in February of the second year for Botrytis prevention. For international sales some product residues are not acceptable, so check your market prior to spraying fungicides or insecticides.

Insects/Birds. In the second year, Success or Delegate is applied once in July to control thrips. Bird control is done in May and June using flash tape, bird bombs and a person walking the field shooting a gun.

Harvest. Harvest begins in the second year. The harvest is assumed to yield approximately two pounds per plant or 2,640 pounds per acre (800 3.3 lb flats). The plants are harvested by hand. Because of the low yields the pickers are paid an hourly rate and assumed to take 264 man-hours per acre. See Harvest in production section for harvest description.

Production Cultural Practices and Material Inputs

Tables 3 – 9

Pollinate. Bees are needed for pollination, at a rate of two hives (minimum 10 frames per hive) per acre. Bee hives are set up by a contractor in February and removed at the end of March. The hives are competing with the almond growers and may be difficult to rent. The cost is \$165 per hive.

Prune. Pruning is done twice a year: in the summer after harvest (July, 22 hours) and in the winter (December, 40-65 hours). Pruning time in December depends on growth habit; hedged or deciduous plants require lesser hours and the evergreen plants the higher hours.

Fertilize. UN32 is applied through the drip system at an annual rate of 100 pounds of nitrogen (N) per acre in three or four equal amounts from April to September.

Mulching. About 20% (20 cuyd) of the mulch material is replenished every other year. The cost includes the 2-ton truck (1 hour) for hauling mulch to the field and 2 men (3 hours/acre) to spread. One half of the costs and 10% of the volume/costs are shown each year.

Irrigate. Depending on effective rainfall and available soil moisture, plants are irrigated twice per week from April through September (approximately 28 weeks). Total irrigation water during the season is approximately 36 acre inches (3.0 acre-feet). The cost of water includes pumping costs of \$400 per acre foot or \$33.33 per acre-inch plus labor. Surface or district water where applicable may be as low as \$35 per acre foot. In this study, the lines are flushed and repaired in April at the first irrigation. Irrigation time for the irrigator is estimated at 0.05 hours per acre per irrigation which includes checking the lines at each irrigation during the season. Additional irrigator time is allocated during the first irrigation for flushing and repair. Irrigation water is always acidified with sulfuric acid to the desired pH.

Pest Management. The pesticides and rates mentioned in this cost study are those commonly used by the growers in the area. For information on other pesticides available, pest identification, monitoring, and management contact your local UCCE farm advisor. Information and pesticide use permits are available through 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. Spray adjuvants are recommended for use with many pesticides, but are not accounted for in this study. Pesticide costs vary by location, brand, and volume purchased. Pesticide costs in this study are from a single dealer and shown as full retail.

Pest Control Adviser (PCA). A PCA monitors the field for crop growth and health, and identifies problems associated with pests, diseases, and nutritional status. Growers may hire private consultants on a per acre basis or as part of an agreement with an agricultural chemical and fertilizer company. No PCA is hired in this study

Weeds. In the spring (late March), the middles are mowed or sprayed. Hoeing is done on a regular basis. Weeding times will vary depending on weed population. A total of 18 weeding hours are shown for February, March and April. Timed with and prior to the rains in late winter, February or early March, preemergent herbicides, Devrinol and Surflan, are applied to the entire field (plant rows and middles).

Diseases. Pristine fungicide (or Elevate, Serenade, OxiDate) is applied in February and March for Botrytis prevention. For international sales some product residues are not acceptable, so check your market prior to spraying fungicides or insecticides.

Insects/Birds. Two applications of Success or Delegate are made in the summer (July) for thrip control. Bird damage can be a serious issue compromising an entire crop if no control method is adopted. Bird control is implemented from early May to late June. The method used in this study are two electronic cannons combined with flashing tapes and a person walking the field shooting a gun. The cannons need to be moved around to increase effectiveness.

Harvest. Harvest is from late April or early May until the end of June, usually over a five week period. Picking is done weekly by hand and requires a crew of approximately 10 people per acre. The fruit is collected in one-gallon plastic buckets at a rate of 10 pounds per hour and then brought to the end of the row and dumped into plastic crates. These, in turn, are loaded onto a truck and delivered to the cooling and packing facility. Packing sizes get progressively larger during the season, ranging from 4.4 ounce cups to 16 ounce clamshells. The grower pays \$0.95 per pound for cooling/packing services. The pickers are paid by the hour (\$8) plus an hourly bonus (\$2). Adding 33% overhead, the total picking cost is \$13.30 per hour.

Week	1	2	3	4	5
% Picked	18	20	30	24	6

Yields and Returns. Based on the Tulare County Agricultural Commissioner's 2007 Annual Crop Report, 2006 and 2007 yields averaged 8,408 and 10,970 pounds respectively. This study assumes an average marketable yield of 10,000 pounds (approximately 8.00 pounds per plant). The yield range is 7 to 10 pounds per plant for older varieties and 14 to 20 pounds per plant for the new varieties. The expected unit price to growers is \$3.00 per pound based on 70% (assumed to be farmgate price) of the 2008 season average of the USDA Agricultural Marketing Service, Los Angeles Terminal.

Pickup/ATV/Truck. The pickup is used for business and personal use. The grower uses the All Terrain Vehicle (ATV) for collecting the soil samples and is included in that cost. The ATV is also used to check the field, monitor the irrigation, and other miscellaneous use. The time and mileage use for the pickup and ATV operations are estimated and not taken from any specific data. The truck is used mainly during harvest to haul the picked fruit to the cooler and packing shed and is included in the harvest costs.

Labor, Equipment, and Interest Costs

Labor. The basic hourly wage for equipment operators is \$11.50 per hour and for general labor is \$8.00 per hour. In addition, the pickers receive bonus pay of \$2.00 per hour giving a piece rate pay of \$0.80 to \$1.25 per pound, higher early and late in season, lower during mid-season (more berries). Adding payroll overhead of 33% to the hourly wage gives labor rates of \$14.07 for equipment operators, \$10.72 per hour for general labor and \$13.30 per hour for picking labor. The overhead includes the employers' share of federal and California state payroll taxes, workers' compensation insurance for berry crops (code 0179), and a percentage for other possible benefits. Workers' compensation insurance costs will vary among growers, but for this study the cost is based upon the average industry final rate as of January 1, 2009 (California Department of Insurance, March 3, 2009, unreferenced). 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.

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 takeoff (PTO) horsepower, and fuel type. Prices for on-farm delivery of red dye diesel and gasoline are \$3.70 (excludes excise taxes) and \$3.36 per gallon, respectively. The cost includes a 2% local sales tax on diesel fuel, but does not include excise taxes. Gasoline costs include an 8% sales tax plus federal and state excise tax. Some federal excise tax can be refunded for on-farm use when filing your income tax. The costs are based on 2008 (July thru December) American Automobile Association (AAA) and Department of Energy (DOE) monthly data. 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 interest rate is the basic rate provided by a farm lending agency as of January 2009.

Risk. The risks associated with producing and marketing blueberries are considered high. 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 that affect the profitability and economic viability.

Cash Overhead

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.

Office Expense. Office and business expenses are estimated at \$500 per producing acre. These expenses include office supplies, telephones, bookkeeping, accounting, legal fees, road maintenance, utilities, and miscellaneous expenses.

Sanitation Services. Sanitation services provide a double portable toilet and single toilet with washing equipment and cost the farm \$3,136 annually for 8 months service. Regulations require one toilet and hand washing facility for each 20 employees of each sex, located within a quarter mile walk or if not feasible, at the closest point of vehicular access. Refer to Cal/OSHA Field Sanitation Standard, Section 3457, Title 8, California Code of Regulations.

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 vary 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 entire farm.

Investment Repairs. Annual repairs on investments (see Non-Cash Overhead) are calculated as 2% of new costs, except for Establishment Costs which are calculated at 0.5%.

Non-Cash Overhead

Non-Cash overhead, shown on an annual per acre basis, 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 Table 7.

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% used to calculate capital recovery cost is the effective long term interest rate effective January 1, 2009. The interest rate is provided by a local farm lending agency and will vary according to risk and amount of loan.

Shop/Hand/Harvest Tools. Shop, hand, and various small field tools are included in these costs including 160 one-gallon picking buckets plus miscellaneous picking equipment and supplies. Tools vary considerably from farm to farm and the cost does not represent any specific inventory.

Drip Irrigation System. The irrigation system includes the filtration system and laterals that connect to the drip line. Water is pumped through the filtration station into the main lines. Reusable telescoping lateral lines are buried at the edge of the blueberry field and are connected to the main and drip lines. The cost also includes the laterals for the other berries on the farm.

Irrigation Pump & Well. This study assumes that the grower refurbished the 40 HP electric pump and well that services the farm.

Sulfuric Acid Equipment. Includes equipment for acidification: 2,100 gallon single wall storage tank (\$1,800) pump (\$3,300), and water pH monitoring kit (\$400) to measure/control the amount of acid that needs to be applied.

Establishment Cost (Blueberries). Costs to establish the blueberries 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, drip tape, planting, plants, cash overhead and expenses for establishing the plants through the first production year. The Total Cash Cost on Table 1 represents the establishment cost. The establishment costs is \$12,734 per acre or \$254,677 for the 20 acres.

Equipment Costs. 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 in the Whole Farm Equipment, Investment and Business Overhead Tables. 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 BLUEBERRIES
 SAN JOAQUIN VALLEY - SOUTH 2009

	Cost Per Acre	
	Year:	1st 2nd
Pounds per Acre:	2,640	
Planting Costs:		
Fertilize: Soil Samples (2 per 10 acres)	14	
Fumigate: Custom (Methyl Bromide + Chloropicrin)	1,200	
Weed: Preplant (Roundup)	30	
Acidification: Custom (sulfuric acid)	1,220	
Irrigate: Leach Acid (make borders and flood)	202	
Land Prep: Chisel (plow)	5	
Fertilize: Broadcast (15-15-15)	114	
Land Prep: Disk 2X	13	
Land Prep: Make Berms	15	
Land Prep: Roll Berms	10	
Irrigate: Preplant (water & labor)	51	
Plant: Plants, Delivery, Planting	5,031	22
Mulch (included application)	982	
TOTAL PLANTING COSTS	8,887	22
Cultural Costs:		
Weed: Hoe	192	192
Irrigation: (water, labor & acid)	507	798
Fertilize: injected through drip (UN32)	32	60
Weed: Mow Middles	13	13
Weed: Spot Spray (Roundup)	12	
Weed: Spray Field (Devrinol/Surflan)		132
Prune: (summer & winter)		340
Insect: Thrips (Success)		54
Disease: Botrytis (Pristine)		78
Pollinate: Bee Hives		330
Bird: FlashTape, Birdbombs		186
ATV	43	43
Pickup	92	92
TOTAL CULTURAL COSTS	890	2,317
Harvest Costs:		
Pick (includes picking bonus)		3,511
Haul from field to cooler or market		75
Pack and Cool		2,508
TOTAL HARVEST COSTS		6,095
Interest On Operating Capital @ 5.75%	434	547
TOTAL OPERATING COSTS/ACRE	10,211	8,980
Cash Overhead Costs:		
Liability Insurance	9	9
Office Expense	500	500
Sanitation (Toilets)	45	45
Property Taxes	112	113
Property Insurance	12	13
Investment Repairs	51	55
TOTAL CASH OVERHEAD COSTS	728	735
TOTAL CASH COSTS/ACRE	10,939	9,715
INCOME/ACRE FROM PRODUCTION		7,920
NET CASH COSTS/ACRE FOR THE YEAR	10,939	1,795
PROFIT/ACRE ABOVE CASH COSTS		
ACCUMULATED NET CASH COSTS/ACRE	10,939	12,734

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Table 1. continued

	Cost Per Acre		
	Year:	1st	2nd
	Pounds per Acre:		2,640
Non-Cash Overhead (Capital Recovery):			
Buildings		59	59
Acid Equipment (tank, pump, meter)		26	26
Shop/Hand Tools		19	19
Drip Irrigation System		54	54
Well & Pump		49	49
Land		461	461
Crates (400)			37
Electronic Cannons (2)			10
Equipment		40	44
TOTAL INTEREST ON INVESTMENT		709	759
TOTAL COST/ACRE FOR THE YEAR		11,648	10,474
INCOME/ACRE FROM PRODUCTION			7,920
TOTAL NET COST/ACRE FOR THE YEAR		11,648	2,554
NET PROFIT/ACRE ABOVE TOTAL COST			
TOTAL ACCUMULATED NET COST/ACRE		11,648	14,203

X=number of times done as 2X=two times.

UC COOPERATIVE EXTENSION
Table 2. MATERIALS & CUSTOM WORK COSTS PER ACRE - ESTABLISHMENT YEARS
 SAN JOAQUIN VALLEY - SOUTH 2009

	Unit	\$/Unit	Year 1		Year 2	
			Total Per Acre			
			units	\$	units	\$
OPERATING COSTS						
Custom:						
Soil Analysis (nutrient)	each	35.00	0.20	7		
Soil Analysis (pH only)	each	13.00	0.20	3		
Sulfuric Acid Application	acre	20.00	1.00	20		
Fumigate	acre	2,400.00	0.50	1,200		
Bee Hives	each	165.00			2.00	330
Fertilizer/Amendments:						
15-15-15	lb	0.37	300.00	111		
UN32	lb N	0.80	40.00	32	75.00	60
Sulfuric Acid	lb	0.15	8,616.00	1,292	1,232.00	185
Mulch (woodchips)	cuyd	8.33	100.00	833		
Plant:						
Jewel (early variety)	each	3.40	660.00	2,244	2.00	7
Emerald (pollinator)	each	3.40	660.00	2,244	1.00	3
Ship/Haul Plants	each	0.25	1,320.00	330	3.00	1
Irrigation:						
Water-Pumped (flood)	acin	33.33	6.00	200		
Water-Pumped (preirrigate)	acin	33.33	1.50	50		
Water-Pumped (season)	acin	33.33	12.00	400	18.00	600
Herbicide:						
Roundup PowerMax	pint	12.00	2.50	30		
Devrinol 50DF	lb	13.35			8.00	107
Surflan 4AS	pint	4.63			4.00	19
Insecticide:						
Success	floz	6.50			6.00	39
Fungicide:						
Pristine	oz	3.13			20.00	63
Bird Control:						
Flash Tape	each	4.75			17.00	81
Bird Bombs	each	2.09			30.00	63
Harvest:						
Pack & Cool	lb	0.95			2,640.00	2,508
Picking Bonus (Labor)	hr	2.66			264.00	702
Labor (equipment)	hr	15.30	9.97	153	10.03	153
Labor (general)	hr	10.64	49.50	527	320.20	3,407
Fuel - Diesel	gal	3.70	19.78	73	20.59	76
Lube					11	11
Machinery repair					17	19
Interest					434	547
TOTAL OPERATING COSTS			10,211		8,980	

UC COOPERATIVE EXTENSION
Table 3. COSTS PER ACRE to PRODUCE BLUEBERRIES
 SAN JOAQUIN VALLEY - SOUTH 2009

Operation	Cash and Labor Cost per acre						Total Cost	Your Cost
	Operation Time (Hrs/A)	Labor Cost	Fuel,Lube & Repairs	Material Cost	Custom/Rent	Total Cost		
Cultural:								
Weed: Hoe by Hand 3X	18.00	192	0	0	0	192		
Disease: Botrytis (Pristine) 2X	0.83	15	15	125	0	156		
Pollinate: Bee Hives	0.00	0	0	0	330	330		
Weed: Winter Spray Field (Devrinol, Surflan)	0.18	3	3	125	0	132		
Weed: Mow Middles	0.34	6	6	0	0	12		
Irrigate: (water, labor, acid)	1.30	14	0	1,385	0	1,399		
Bird: Bird Control (Tape, Bombs, Shooting)	4.00	43	0	143	0	186		
Fertilize: through drip (UN32)	0.00	0	0	80	0	80		
Prune: (summer & winter)	87.00	926	0	0	0	926		
Insect: Thrips (Success) 2X	0.83	15	15	78	0	109		
Mulch: Replenishment (alternate years, 1/2 cost shown)	0.50	41	8	83	0	132		
ATV	3.75	69	18	0	0	87		
Pickup 1/2 ton	5.83	107	74	0	0	181		
TOTAL CULTURAL COSTS	122.57	1,431	140	2,020	330	3,921		
Harvest:								
Hand Pick (base wages + bonus)	1,000.00	10,640.00	0	2,660	0	13,300		
Haul	8.34	153.00	133	0	0	286		
Cool & Pack	0.00	0.00	0	9,500	0	9,500		
TOTAL HARVEST COSTS	1,008.34	10,793	133	12,160	0	23,086		
Interest on operating capital @ 5.75%						161		
TOTAL OPERATING COSTS/ACRE		12,224	273	14,180	330	27,168		
Cash Overhead:								
Liability Insurance						9		
Office Expense						500		
Sanitation (Toilets)						45		
Property Taxes						180		
Property Insurance						68		
Investment Repairs						115		
TOTAL CASH OVERHEAD COSTS						917		
TOTAL CASH COSTS/ACRE						28,084		
Non-Cash Overhead:								
		Per producing Acre		-- Annual Cost --		Capital Recovery		
Buildings		702		55		55		
Sulfuric Acid Equipment		275		26		26		
Shop/Hand Tools		214		19		19		
Crates		134		31		31		
Drip Irrigation System		571		54		54		
Well and Pump		714		49		49		
Land		9,714		461		461		
Blueberry Establishment		12,734		1,335		1,335		
Electronic Cannons		75		10		10		
Equipment		831		117		117		
TOTAL NON-CASH OVERHEAD COSTS		25,966		2,158		2,158		
TOTAL COSTS/ACRE						30,243		

UC COOPERATIVE EXTENSION
Table 4. COSTS and RETURNS PER ACRE to PRODUCE BLUEBERRIES
 SAN JOAQUIN VALLEY - SOUTH 2009

	Quantity/ Acre	Unit	Price or Cost/Unit	Value or Cost/Acre	Your Cost
GROSS RETURNS					
Blueberries	10,000.00	lb	3.00	30,000	
TOTAL GROSS RETURNS				30,000	
OPERATING COSTS					
Water:					
Water (pumped)	36.00	acin	33.33	1,200	
Amendments:					
Sulfuric Acid (15.4 lbs per gallon)	1,232.00	lb	0.15	185	
Mulch (woodchips)	10.00	cuyd	8.33	83	
Fertilizer:					
UN32	100.00	lb N	0.80	80	
Insecticide:					
Success	12.00	floz	6.50	78	
Herbicide:					
Devrinol 50DF	8.00	lb	13.35	107	
Surflan AS	4.00	pint	4.63	19	
Fungicide:					
Pristine	40.00	oz	3.13	125	
Custom:					
Bee Hives	2.00	hive	165.00	330	
Bird Control:					
Flash Tape	17.00	each	4.75	81	
Bird Bombs	30.00	each	2.09	63	
Harvest:					
Pick Berries (bonus pay)	1,000.00	hrs	2.66	2,660	
Cool & Pack	10,000.00	lb	0.95	9,500	
Labor (machine)	24.72	hrs	15.30	378	
Labor (non-machine)	1,113.30	hrs	10.64	11,846	
Fuel - Diesel	52.51	gal	3.70	194	
Lube				29	
Machinery repair				49	
Interest on operating capital @ 5.75%				161	
TOTAL OPERATING COSTS/ACRE				27,168	
NET RETURNS ABOVE OPERATING COSTS				2,832	
Cash Overhead Costs:					
Liability Insurance				9	
Office Expense				500	
Sanitation (Toilets)				45	
Property Taxes				180	
Property Insurance				68	
Investment Repairs				115	
TOTAL CASH OVERHEAD COSTS/ACRE				917	
TOTAL CASH COSTS/ACRE				28,084	
Non-Cash Overhead Costs (Capital Recovery)					
Buildings				55	
Sulfuric Acid Equipment				26	
Shop/Hand Tools				19	
Crates				31	
Drip Irrigation System				54	
Well and Pump				49	
Land				461	
Blueberry Establishment				1,335	
Electronic Cannons				10	
Equipment				117	
TOTAL NON-CASH OVERHEAD COSTS/ACRE				2,158	
TOTAL COSTS/ACRE				30,243	
NET RETURNS ABOVE TOTAL COSTS				-243	

UC COOPERATIVE EXTENSION
Table 5. MONTHLY CASH COSTS PER ACRE to PRODUCE BLUEBERRIES
 SAN JOAQUIN VALLEY - SOUTH 2009

Beginning JAN 09 Ending DEC 09	JAN 09	FEB 09	MAR 09	APR 09	MAY 09	JUN 09	JUL 09	AUG 09	SEP 09	OCT 09	NOV 09	DEC 09	TOTAL
Cultural:													
Weed: Hoe by Hand 3X		64	64	64									192
Disease: Botrytis (Pristine) 2X		78	78										156
Pollinate: Bee Hives		330											330
Weed: Winter-Spray Field (Devrinol, Surflan)		132											132
Weed: Mow Middles			13										13
Irrigate: (water, labor, acid)				234	233	233	233	233	233				1,399
Bird: Bird Control (Tape, Bombs, Shooting)					93	93							186
Fertilize: through drip (UN32)						20	20	20	20				80
Prune: (summer & winter)							234					692	926
Insect: Thrips (Success) 2X							109						109
Mulch: Replenishment (alternate years, 1/2 cost shown)										133			133
ATV	7	7	7	7	7	7	7	7	7	7	7	7	87
Pickup 1/2 ton	15	15	15	15	15	15	15	15	15	15	15	15	181
TOTAL CULTURAL COSTS	22	626	177	320	348	368	618	275	275	155	22	714	3,921
Harvest:													
Hand Pick					6,650	6,650							13,300
Haul					143	143							286
Cool & Pack					4,750	4,750							9,500
TOTAL HARVEST COSTS	0	0	0	0	11,543	11,543	0	0	0	0	0	0	23,086
Interest on operating capital @ 5.75%	0	3	4	5	62	120	-9	-7	-5	-4	-4	-4	161
TOTAL OPERATING COSTS/ACRE	22	629	181	326	11,954	12,031	609	269	270	151	18	710	27,168
Cash Overhead:													
Liability Insurance	9												9
Office Expense	42	42	42	42	42	42	42	42	42	42	42	42	500
Sanitation (Toilets)	4	4	4	4	4	4	4	4	4	4	4	4	45
Property Taxes	180												180
Property Insurance	68												68
Investment Repairs	10	10	10	10	10	10	10	10	10	10	10	10	115
TOTAL CASH OVERHEAD COSTS	312	55	55	55	55	55	55	55	55	55	55	55	917
TOTAL CASH COSTS/ACRE	335	684	236	381	12,008	12,086	663	324	325	206	73	765	28,084

UC COOPERATIVE EXTENSION
Table 6. RANGING ANALYSIS
 SAN JOAQUIN VALLEY - SOUTH 2009

COSTS PER ACRE AT VARYING YIELDS TO PRODUCE BLUEBERRIES

	YIELD (lbs/acre)							
	Fresh:	6,000	8,000	10,000	12,000	14,000	16,000	18,000
OPERATING COSTS/ACRE:								
Cultural Cost		3,921	3,921	3,921	3,921	3,921	3,921	3,921
Harvest Costs (pick, haul, pack, cool)		13,851	18,469	23,086	27,703	32,320	36,937	41,554
Interest on operating capital @ 5.75%		95	128	161	194	227	261	294
TOTAL Operating Costs/Acre		17,867	22,518	27,168	31,818	36,468	41,119	45,769
TOTAL Operating Costs/lb		2.98	2.81	2.72	2.65	2.60	2.57	2.54
CASH OVERHEAD COSTS/ACRE								
TOTAL Cash Costs/Acre		18,782	23,434	28,085	32,735	37,386	42,037	46,687
TOTAL Cash Costs/lb		3.13	2.93	2.81	2.73	2.67	2.63	2.59
NON-CASH OVERHEAD COSTS/ACRE								
TOTAL Costs/Acre		20,925	25,585	30,243	34,900	39,556	44,211	48,865
TOTAL Costs/lb		3.49	3.20	3.02	2.91	2.83	2.76	2.71

NET RETURNS PER ACRE ABOVE OPERATING COSTS

PRICE (\$/lb)	YIELD (lbs/acre)						
	Fresh	6,000	8,000	10,000	12,000	14,000	16,000
2.00	-5,867	-6,518	-7,168	-7,818	-8,468	-9,119	-9,769
2.50	-2,867	-2,518	-2,168	-1,818	-1,468	-1,119	-769
3.00	133	1,482	2,832	4,182	5,532	6,881	8,231
3.50	3,133	5,482	7,832	10,182	12,532	14,881	17,231
4.00	6,133	9,482	12,832	16,182	19,532	22,881	26,231
4.50	9,133	13,482	17,832	22,182	26,532	30,881	35,231
5.00	12,133	17,482	22,832	28,182	33,532	38,881	44,231

NET RETURNS PER ACRE ABOVE CASH COSTS

PRICE (\$/lb)	YIELD (lbs/acre)						
	Fresh	6,000	8,000	10,000	12,000	14,000	16,000
2.00	-6,782	-7,434	-8,085	-8,735	-9,386	-10,037	-10,687
2.50	-3,782	-3,434	-3,085	-2,735	-2,386	-2,037	-1,687
3.00	-782	566	1,915	3,265	4,614	5,963	7,313
3.50	2,218	4,566	6,915	9,265	11,614	13,963	16,313
4.00	5,218	8,566	11,915	15,265	18,614	21,963	25,313
4.50	8,218	12,566	16,915	21,265	25,614	29,963	34,313
5.00	11,218	16,566	21,915	27,265	32,614	37,963	43,313

NET RETURNS PER ACRE ABOVE TOTAL COSTS

PRICE (\$/lb)	YIELD (lbs/acre)						
	Fresh	6,000	8,000	10,000	12,000	14,000	16,000
2.00	-8,925	-9,585	-10,243	-10,900	-11,556	-12,211	-12,865
2.50	-5,925	-5,585	-5,243	-4,900	-4,556	-4,211	-3,865
3.00	-2,925	-1,585	-243	1,100	2,444	3,789	5,135
3.50	75	2,415	4,757	7,100	9,444	11,789	14,135
4.00	3,075	6,415	9,757	13,100	16,444	19,789	23,135
4.50	6,075	10,415	14,757	19,100	23,444	27,789	32,135
5.00	9,075	14,415	19,757	25,100	30,444	35,789	41,135

UC COOPERATIVE EXTENSION
Table 7. 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 55 HP MFWD Tractor	38,000	12	9,500	3,622	195	238	4,054
09 ATV 4WD	7,430	7	2,818	924	42	51	1,017
09 Mower-Rotary 5ft	3,722	15	336	337	17	20	374
09 Pickup 1/2 ton	28,000	5	12,549	4,140	166	203	4,509
09 Sprayer 300 gal for Disease/Insects	8,000	10	1,415	910	39	47	995
09 Truck 2-ton	32,000	5	14,342	4,732	190	232	5,153
09 Weed Sprayer 100 gal	4,100	10	725	466	20	24	510
TOTAL	121,252		41,685	15,130	668	815	16,612
60% of New Cost *	72,751		25,011	9,078	401	489	9,968

*Used to reflect a mix of new and used equipment

ANNUAL INVESTMENT COSTS

Description	Price	Yrs Life	Salvage Value	Capital Recovery	Cash Overhead			Total
					Insur- ance	Taxes	Repairs	
Acidification Equipment (tank, pump, pH kit)	5,500	15		521	23	28	110	681
Buildings (1500 sqft)	49,162	20		3,862	202	246	983	5,292
Crates (400)	9,400	5		2,156	39	47	0	2,242
Drip Irrigation	40,000	15		3,789	164	200	800	4,953
Cannons-Electronic (2)	1,500	10		192	6	8	30	236
Establishment (Blueberries)	254,677	13		26,705	1,044	1,273	1,273	30,296
Land	680,000	30	680,000	32,300	0	6,800	0	39,100
Shop / Field Tools	15,000	15	1,264	1,361	67	81	300	1,809
Well & Pump	50,000	25		3,459	205	250	1,000	4,914
TOTAL INVESTMENT	1,105,239		681,264	74,345	1,749	8,933	4,496	89,522

ANNUAL BUSINESS OVERHEAD COSTS

Description	Units/ Farm	Unit	Price/ Unit	Total Cost
Liability Insurance	70	acre	8.87	621
Office Expense	70	acre	500.00	35,000
Sanitation Fees	70	acre	44.80	3,136

UC COOPERATIVE EXTENSION
Table 8. HOURLY EQUIPMENT COSTS
 SAN JOAQUIN VALLEY - SOUTH 2009

Yr Description	Actual Hours Used	COSTS PER HOUR						
		Cash Overhead				Operating		
		Capital Recovery	Insur- ance	Taxes	Repairs	Fuel & Lube	Total Oper.	Total Costs/Hr.
09 55 HP MFWD Tractor	1,000	2.15	0.12	0.14	1.74	13.58	15.32	17.73
09 ATV 4WD	285	1.94	0.09	0.11	0.55	4.25	4.80	6.93
09 Mower-Rotary 5 ft	133	1.52	0.08	0.09	1.73	0.00	1.73	3.42
09 Pickup 1/2 ton	390	6.38	0.26	0.31	2.09	10.64	12.73	19.68
09 Sprayer 300 gal for Disease/Insects	208	2.62	0.11	0.14	1.38	0.00	1.38	4.25
09 Truck 2-ton	400	7.10	0.29	0.35	3.16	12.76	15.92	23.66
09 Weed Sprayer 100 gal	150	1.87	0.08	0.10	1.10	0.00	1.10	3.15

UC COOPERATIVE EXTENSION
Table 9. PRODUCTION OPERATIONS WITH EQUIPMENT and MATERIALS
 SAN JOAQUIN VALLEY - SOUTH 2009

Operation	Operation Month	Tractor	Implement	Field Labor Hr/Acre	Material	Broadcast Rate/acre	Unit
Weed: Hoe	Feb			6.00			
	Mar			6.00			
	Apr			6.00			
Weed: Moa	Mar	55HP	Mower				
Weed: Winter (spray field)	Feb	55HP	Weed Sprayer		Devrinol	8.00	lb
					Surflan	4.00	pint
Disease: Botrytis	Feb	55HP	Sprayer		Pristine	20.00	oz
	Mar	55HP	Sprayer		Pristine	20.00	oz
Pollinate	Feb	Custom			Hives	2.00	hives
Irrigate	Apr			0.30	Water	6.00	acin
					Sulfuric Acid	205.33	lb
	May			0.20	Water	6.00	acin
					Sulfuric Acid	205.33	lb
	Jun			0.20	Water	6.00	acin
					Sulfuric Acid	205.33	lb
	Jul			0.20	Water	6.00	acin
					Sulfuric Acid	205.33	lb
	Aug			0.20	Water	6.00	acin
					Sulfuric Acid	205.33	lb
	Sept			0.20	Water	6.00	acin
				Sulfuric Acid	205.33	lb	
Bird Control	May			2.00	Flash Tape	8.50	each
					Bird Bombs	15.00	each
	Jun			2.00	Flash Tape	8.50	each
					Bird Bombs	15.00	each
Fertilize: through drip	Jun				UN32	25.00	lb N
	Jul				UN32	25.00	lb N
	Aug				UN32	25.00	lb N
	Sep				UN32	25.00	lb N
Prune	Jul			22.00			
	Dec			65.00			
Insect: Thrips	Jul	55HP	Sprayer		Success	6.00	floz
	Jul	55HP	Sprayer		Success	6.00	floz
Mulch Replacement	Oct	Truck 2 ton		3.00	Mulch	10.00	cuyd
Harvest Pick	May			500.00			
Harvest Cool & Pack	May				Pack & Cool		
Harvest Haul	May	Truck 2 ton					
Harvest Pick	Jun			500.00			
Harvest Cool & Pack	Jun				Pack & Cool		
Harvest Haul	Jun	Truck 2 ton					