
UNIVERSITY OF CALIFORNIA COOPERATIVE EXTENSION

2013

SAMPLE COSTS TO ESTABLISH AND PRODUCE

ASPARAGUS

Fresh Asparagus



SAN JOAQUIN VALLEY – NORTH
SAN JOAQUIN COUNTY

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San Joaquin Valley – North 2013

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INTRODUCTION

Sample costs to establish and produce fresh asparagus in the northern 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. Practices described are based on those production practices considered typical for the crop and area, but will not apply to every farm. 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 farming 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 are available for many commodities. Current and archived studies can be downloaded from the Agricultural and Resource Economics website at UC Davis <http://coststudies.ucdavis.edu>, requested through the department by calling (530) 752-6887 or from your local UC Cooperative Extension office.

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ASSUMPTIONS

The assumptions refer to Tables 1 to 8 and pertain to sample costs to establish and produce asparagus in the northern San Joaquin Valley – San Joaquin County. The cultural practices described represent production operations and materials considered typical for a well-managed farm 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 weather, soil, insect and disease pressure. The study is intended 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 hypothetical farm consists of 600 non-contiguous acres farmed by the owner. Asparagus is being established on 200 acres, other vegetable crops are on 380 acres and roads, irrigation systems and farmstead occupy 20 acres.

Establishment Cultural Practices and Material Inputs (Table 1)

Land Preparation. The ground is disked twice, then ripped in two directions to a depth of 18-inches, plowed, disked twice again, and triplaned. Furrows are made for planting. The first furrowing uses three shovels and the second furrowing using two furrowing shovels and fertilizer application shanks.

Plants. No specific variety of asparagus is planted in this study. The cultivar typically planted in the region is UC157, but De Paoli is also planted.

Planting. Planting is done from December to April, January in this study. The asparagus is hand planted using one year old crowns on 60-inch beds and an inrow spacing of eight inches, giving a plant population of 13,000 plants per acre. The crowns are delivered to the edge of the field where the bins are loaded on to a bin trailer. A small tractor with the bin trailer containing the one year old crowns drives through the field. A 20 person crew – 10 on each side of the trailer - gathers crowns from the trailer and places the crowns at the bottom of the individual furrows walking backwards (backplant) so as not to step on the crowns. It is assumed that one person can plant 0.125 acres per hour. A pass with a tractor and disk is made to cover the crowns with a few inches of soil. As the plants grow, two additional passes (mid-February and early March) are made through the field to cover the plants, to form a bed and to cover the weeds for weed control.

Plant and Bed Management. Beginning in the first year the asparagus ferns are chopped in November or December. The beds are flattened using a finishing disk in two directions. Ridges are put up and the field flooded. In the second and subsequent years, the beds are flattened using the asparagus disk. In January, the beds are reestablished using the asparagus disk and furrows are made using furrowing shovels.

Fertilization. Fertilizer containing nitrogen (N), phosphorous (P) and potassium (K) as 4-10-10 is shanked in the bottom of the furrows prior to planting at a rate of 420 pounds per acre. Thereafter, N as UN32 is injected after harvest in June at 90 pounds of N per acre. Fertilizer applications will vary considerably amongst the soil types and whether the field is irrigated or not.

Irrigation. Beginning in the first year, the field is irrigated in March or April, then in June, July, and August and flooded in December. Beginning in the second year, the field is furrow irrigated in June, July, and flood irrigated in December. Ridges are made in the field for the flood irrigation. The water applied is supplied by the district at a cost of \$90 per acre per year.

Pest Management. The pesticides and rates mentioned in this cost study are listed in *UC Integrated Pest Management Guidelines, Asparagus*. See the Integrated Pest Management (IPM) website for other materials available.

Weeds. Weed pressure, materials and application timing will vary from season to season. In the first year, the newly planted asparagus crowns and small weeds are covered with 2 to 3 inches of soil two to three times (every 2 to 3 weeks) in January and February using a disk. The field is cultivated once per month from March through September. Lorox herbicide is applied in April and the field is hand weeded in July. In the second and subsequent years, Karmex herbicide is applied in January or February. Post-emergence herbicide sprays may be made later in the spring as needed (Roundup, Lorox and/or Karmex). The field is cultivated once per month from May through August. Fertilizer is applied during the June cultivation.

Insects/Diseases. In February of the second year, Ridomil is applied to the field for Phytophthora control. Asparagus rust (*Puccinia asparagi*) is treated with Rally and in the same application, aphid is treated with Fulfill (August). A second treatment for aphids is made in September or October using Lorsban.

Harvest. Harvest begins in the second year in March and the asparagus is cut two to ten times. Beginning in the third year, the harvest is from mid-February to mid-April and in the fourth year extends to late May. Each year the grower uses a 20 person crew. In the first harvest year, the grower uses one tractor and bin trailer for harvesting the asparagus. Beginning in the second harvest year, two tractors and bin trailers are used. A forklift is used for loading and unloading and a two-ton truck is used for delivering to the packing house.

Year	lb/acre
2	500-800
3	2,000 – 2,800
4+	4,000 – 5,600

Yields are from grower input

Production Cultural Practices and Material Inputs (Table 2 – 8)

Fertilization. The field is fertilized with UN32 in June after harvest at 90 pounds of N per acre. The fertilizer is injected during the June furrowing operation.

Irrigation. The field is furrow irrigated in June, July, and flood irrigated in December. In December, ridges are made in and around the field, and then the field is flooded for two weeks. It is assumed that approximately 1.5 acre feet are applied during the season and one acre foot during the winter flooding, over a two week period. Water use will vary amongst soil types. Crops grown on high water tables may not be irrigated or have a flood irrigation in the winter only. In the absence of a high water table, crops are normally irrigated after harvest two or three times during the summer and may have a furrow or flood irrigation in the winter. Water from winter rains is not taken into account. The water applied is supplied by the district at a cost of \$90 per acre per year.

Pest Management. The pesticides and rates mentioned in this cost study are listed in *UC Integrated Pest Management Guidelines, Asparagus*. For more information on other pesticides available, pest identification, monitoring, and management visit the UC IPM website at www.ipm.ucdavis.edu. Written recommendations are required for many pesticides and are made by licensed pest control advisers. For information and pesticide use permits, contact the local county Agricultural Commissioner's office. Adjuvants or surfactants may be recommended for use with some pesticides, but are not included in this study. Pesticide costs vary by location and grower volume. Pesticide costs in this study are taken from a single dealer and shown as full retail.

Pest Control Adviser (PCA). The PCA or crop consultant monitors the field for agronomic problems including pests and nutrition and writes pesticide recommendations. Growers may hire private PCAs or receive the service as part of a service agreement with an agricultural chemical and fertilizer company. No consultant is hired in this study.

Weeds. In January or February, Lorox and/or Karmex herbicide is applied using the growers spray rig and is mechanically or rainfall incorporated. The field is cultivated with a rolling cultivator and furrowed with shovels attached to the cultivator, once per month from late May through August. Fertilizer (UN32) is applied during the June cultivation. Post-emergence herbicide sprays are made in the spring, as needed (Roundup or other). In this study, Roundup is applied after harvest.

Diseases/Insects. In February, Ridomil is applied (banded) on the field for Phytophthora control. Asparagus rust is treated with Rally in August and in the same operation, aphids are treated with Fulfill. A second treatment for aphids is made in September or October using Lorsban.

Bed Management (winter). In November and/or December, the asparagus ferns are chopped using a flail mower. The residue is incorporated into the beds using the asparagus disk or a finishing disk. The beds are flattened and prepared for winter flooding. In January, the beds are reestablished using the asparagus disk or rolling cultivator. A second operation reestablishes the furrows.

Harvest. The crop is harvested by hand from mid-February to late-May. The field is harvested every third day the first week and every other day thereafter (sometimes daily during warm weather). It is assumed that one man can cut one acre in two hours (0.50 acres per hour) or 0.10 hours per acre for a 20 person crew. A tractor pulls a bin trailer holding five 1,000 pound bins through the field. A 20 person crew with 10 cutters on each side of the trailer moves through the field, dumping the cut asparagus in the bins. It takes two trailers per 20 person crew, two tractor drivers, and two loaders who work on the trailer being filled. Once the bins leave the field, they are weighed and the cutters are paid by the carton based on 28 pound equivalents. A forklift and driver are at the staging area for moving the bins and a flatbed truck for hauling to the packing shed. See Labor for cutter hourly labor and piece rate information.

Yields. Based on grower information, annual yields over the remaining life of the planting ranges from 4,000 to 5,600 pounds per acre. In this study to show a range of yields over a range of prices, 4,000 pounds per acre is used.

Returns. Based on the San Joaquin County Crop Report and current year's grower information, the average price over the last five years (2008-2012) is \$1.33 per pound.

Packing. The asparagus is delivered to the packing shed for cooling, grading, trimming and packing. Asparagus is packed in various size containers ranging from 11 pound to 30 pound cartons. For this study, costs are based on the 28 pound carton. The packing costs as reported by the growers are assumed to include the total per carton packing shed costs including the carton.

Assessments. The California Asparagus Commission assesses the fresh market asparagus at \$0.008 per pound or \$0.224 per 28 pound carton. A different rate is used for processing asparagus. The fresh market assessment is paid by the grower, but collected by the shipper and paid to the commission within two months of the sale.

Pickup. The study assumes business use mileage of 6,000 miles or one hour per acre per year for the pickup. The information is not taken from any specific data.

Labor, Equipment, and Interest

Labor. Hourly wages for workers are \$13.00 for machine operators and \$9.00 per hour non-machine labor. Adding 35% for the employer's share of federal and state payroll taxes, workers compensation insurance for truck crops and other possible benefits gives the labor rates shown of \$17.55 and \$12.15 per hour for machine labor and non-machine labor, respectively. Workers' compensation costs will vary among growers, but for this study the cost is based upon the average industry final rate as of March 1, 2013 (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. Cutters may be paid piece rate or hourly. In this study the cutters work as a team and are paid \$11.50 per 28- pound carton. Adding overhead, the cost is \$15.53 per 28-pound carton. With team cutting the total amount of asparagus cut is weighed at the packing house and divided by the number of people on the crew or team based on 28-pound carton equivalents. Early in the season when volume is low, cutters are paid by the hour. In this study, all cutter costs are piece rate or per carton.

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 and Biological Engineers (ASABE). Fuel and lubrication costs are also determined by ASABE equations based on maximum power takeoff (PTO) horsepower, and fuel type. Prices for on-farm delivery of diesel and gasoline are \$3.84 and \$4.07 per gallon, respectively. The cost includes a 7.5% local sales tax on diesel fuel and 7.5% sales tax on gasoline. Gasoline also includes federal and state excise tax, which are refundable for on-farm use when filing your income tax. The fuel, lube, and repair cost per acre for each operation in Table 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 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 2013.

Risk. The risks associated with crop production 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 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. Employee benefits, insurance, and payroll taxes are included in labor costs and not as a separate overhead item (see Labor).

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.

Asparagus Planting. Asparagus plantings are subject to property taxes beginning with the planting year. San Joaquin county imposes a per acre charge of approximately \$1,200 per acre, but land under the Williamson Act may have a lesser charge. For this study, the tax is a percentage of the Establishment Cost.

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 0.817% of the average value of the assets over their useful life. Liability insurance covers accidents on the farm and costs \$1,188 for the entire farm.

Office Expense. Office and business expenses are estimated at \$125 per acre. These expenses include office supplies, telephones, bookkeeping, accounting, legal fees, road maintenance, shop and office utilities and miscellaneous administrative costs.

Sanitation Services. Sanitation services provide portable toilets for the field and costs the asparagus acreage \$750 annually. This cost includes delivery and three months of weekly service during harvest. Toilets are also rented in the first year for a few weeks during planting and for a few weeks in the second year during the first harvest.

Supervisor/Management Salaries. Wages for management are not included as a cash cost. Any return above total costs is considered a return to management and risk.

Investment Repairs. Costs are calculated as 2% of the purchase price except the land on investments listed in Table 6.

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 and Biological Engineers (ASABE) based on equipment type and years of life. The life in years is estimated by dividing the wearout life, as given by ASABE 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 6.

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. An interest rate of 4.75% is used to calculate capital recovery. The rate will vary depending upon loan amount and other lending agency conditions, but is the basic suggested rate by a farm lending agency as of January 2013.

Building. The metal building(s) are on a cement slab and total approximately 2,400 square feet. The buildings are used for shops and equipment storage.

Land. Based on grower input, the value of the land is \$7,500 per acre. The value used in this study is \$7,500 per acre or \$7,758 per producing acre (580 acres). Cash rent during the establishment years is \$300 per acre and thereafter is \$300 or 10% of gross, whichever is higher.

Irrigation System. Water is received by gravity feed from the water district. Some growers may have a pumping cost and pumping equipment to pump the water from the river.

Fuel Tanks. Two 550-gallon fuel tanks are placed on stands in cement containment meeting Federal, State, and local regulations. Fuel is delivered to the equipment by gravity feed.

Tools. Includes shop tools/equipment, hand tools and field tools.

Bins. The grower owns 25 one-thousand pound plastic bins that are used in the harvesting operation.

Establishment Cost. Costs to establish the field are used to determine the non-cash overhead expenses, capital recovery, and interest on investment for the production years. The establishment cost is the sum of cash costs for land preparation, planting, plants, production expenses, and cash overhead for growing the crop through the first year of harvest less returns from production. The *Accumulated Net Cash Cost* in the second year shown in Table 1 represents the establishment cost per acre. For this study, this cost is \$2,266 per acre or \$453,200 for the 200-acres. Establishment cost is amortized beginning in the third year over the remaining 8 years of production. No cost is included in the calculation for investment repairs, but property taxes are included.

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 Table 6. 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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For information concerning the above or other University of California publications, contact UC ANR Communications, online at <http://anrcatalog.ucdavis.edu> your local county UC Cooperative Extension office.

UC COOPERATIVE EXTENSION
Table 1. COSTS PER ACRE TO ESTABLISH ASPARAGUS
 SAN JOAQUIN VALLEY - NORTH 2013

	Year:	Cost Per Acre			
		1st	2nd	3rd	*4th
Pounds Per Acre:		0	700	2,000	4,000
Cultural Costs:					
Land Prep: Disk 4X		31			
Land Prep: Rip 2X		68			
Land Prep: Plow		19			
Land Prep: Triplane		13			
Land Prep: Furrow		8			
Land Prep: Furrow/Fertilize (Yr 1, 4-10-10. Yr 3+ UN32)		76	82	82	82
Plant: (plants, labor, equipment)		761			
Plant: Cover Plants (3X)		27			
Weed: Cultivate/Furrow		45	19	19	19
Irrigate: (Yr 1, 5X. Yr 2+, 3X)		136	128	128	128
Weed: Spray (Yr 1, Lorox. Yr 2+, Karmex. Yr 3+ , Karmex & Roundup)		32	22	22	37
Weed: Hand		170			
Chop Ferns		15	15	15	15
Flatten Beds (Disk 2X)		20	20	20	20
Irrigation: Make ridges for flooding		1	1	1	1
Reestablish Beds			8	8	8
Reestablish/Clean Furrows			6	6	6
Insect/Disease: Aphid/Rust (Fulfill/Rally)			51	51	51
Insect: Aphid (Lorsban)			20	20	20
Disease: Phytophthora (Ridomil)				29	29
Pickup (business use)		37	37	37	37
TOTAL CULTURAL COSTS		1,459	409	438	453
Harvest Costs:					
Harvest - Cut Asparagus			416	1,457	2,801
Haul to Packer			3	6	48
Pack Asparagus			400	1,143	2,288
Assessment:			6	16	32
TOTAL HARVEST COSTS		0	825	2,623	5,169
Interest On Operating Capital @ 5.75%		73	7	13	54
TOTAL OPERATING COSTS/ACRE		1,532	1,241	3,074	5,676
Cash Overhead Costs:					
Office Expense		125	125	125	125
Liability Insurance		2	2	2	2
Sanitation Costs		1	1	4	4
Property Taxes		80	79	80	92
Property Insurance		2	1	2	11
Investment Repairs		4	4	4	4
TOTAL CASH OVERHEAD COSTS		213	211	217	238
TOTAL CASH COSTS/ACRE		1,745	1,452	3,290	5,914
INCOME/ACRE FROM PRODUCTION		0	931	2,660	5,320
NET CASH COSTS/ACRE FOR THE YEAR		1,745	521	630	594
PROFIT/ACRE ABOVE CASH COSTS		0	0	0	0
ACCUMULATED NET CASH COSTS/ACRE		1,745	2,266	2,896	3,491

UC COOPERATIVE EXTENSION

Table 1. continued

	Year:	Cost Per Acre			
		1st	2nd	3rd	4th
Pounds Per Acre:		0	700	2,000	4,000
Non-Cash Overhead (Capital Recovery Cost):					
Land		369	369	369	369
Buildings		9	9	9	9
Bins (25)		0	4	4	4
Fuel Tanks		1	1	1	1
Tools-Shop/Field		4	4	4	4
Establishment		0	0	0	347
Equipment		64	29	47	73
TOTAL CAPITAL RECOVERY COST		447	416	434	808
TOTAL COST/ACRE FOR THE YEAR		2,192	1,868	3,724	6,722
INCOME/ACRE FROM PRODUCTION		0	931	2,660	5,320
TOTAL NET COST/ACRE FOR THE YEAR		2,192	937	1,064	1,402
NET PROFIT/ACRE ABOVE TOTAL COST		0	0	0	0
TOTAL ACCUMULATED NET COST/ACRE		2,192	3,129	4,194	5,596

*See production year for complete list of operations and costs

UC COOPERATIVE EXTENSION
Table 2. COSTS PER ACRE TO PRODUCE ASPARAGUS
 San Joaquin Valley - North 2013

Operation	Operation Time (Hrs/A)	Cash and Labor Costs per acre					Total Cost	Your Cost
		Labor Cost	Fuel	Lube & Repairs	Material Cost	Custom/ Rent		
Cultural:								
Reestablish Beds	0.11	2	4	1	0	0	8	
Reestablish/Clean Furrows	0.09	2	3	1	0	0	6	
Disease: Phytophthora (Ridomil)	0.05	1	1	0	27	0	29	
Weed: Spray (Karmex)	0.05	1	1	0	20	0	22	
Cultivate & Furrow	0.41	9	8	3	0	0	19	
Cultivate/Furrow/Fertilize (UN32)	0.14	3	3	1	76	0	82	
Weed: Spray (Roundup)	0.05	1	1	0	12	0	15	
Irrigate: 3X (water & labor)	3.14	38	0	0	90	0	128	
Insect/Disease: Aphid/Rust (Fulfill/Rally)	0.05	1	1	0	49	0	51	
Insect: Aphid (Lorsban)	0.05	1	1	0	17	0	20	
Chop Ferns	0.22	5	8	3	0	0	15	
Flatten Beds	0.23	5	11	4	0	0	20	
Irrigate: Make ridges for flooding	0.02	0	0	0	0	0	1	
Pickup	1.00	21	12	4	0	0	37	
TOTAL CULTURAL COSTS	5.61	90	53	19	291	0	453	
Harvest:								
Harvest: (cut, equipment, forklift)	13.50	394	140	47	2,221	0	2,801	
Haul to Packer	0.99	21	19	8	0	0	48	
Pack	0.00	0	0	0	0	2,288	2,288	
Assessment	0.00	0	0	0	32	0	32	
TOTAL HARVEST COSTS	14.49	415	159	54	2,253	2,288	5,169	
Interest on operating capital @ 5.75%							54	
TOTAL OPERATING COSTS/ACRE	20.09	505	212	73	2,544	2,288	5,676	
CASH OVERHEAD:								
Office							125	
Liability Insurance							2	
Sanitation Service							4	
Property Taxes							92	
Property Insurance							11	
Investment Repairs							4	
TOTAL CASH OVERHEAD COSTS							238	
TOTAL CASH COSTS/ACRE							5,914	
NON-CASH OVERHEAD:								
	Per producing	Annual Cost						
	<u>Acres</u>	<u>Capital Recovery</u>						
Land	7,759	369						369
Buildings	138	9						9
Bins	33	4						4
Establishment	2,266	347						347
Shop/Field Tools	34	4						4
Fuel Tanks	11	1						1
Equipment	741	73						73
TOTAL NON-CASH OVERHEAD COSTS	10,982	808						808
TOTAL COSTS/ACRE							6,722	

UC COOPERATIVE EXTENSION
Table 3. COSTS AND RETURNS PER ACRE TO PRODUCE ASPARAGUS
 San Joaquin Valley - North 2013

	Quantity /Acre	Unit	Price or Cost/Unit	Value or Cost/Acre	Your Cost
GROSS RETURNS					
Asparagus	4,000.00	lb	1.33	5,320	
OPERATING COSTS					
Fungicide:					
Ridomil Gold EC	4.00	floz	6.71	27	
Rally 40 WSP	5.00	oz	5.50	28	
Herbicide:					
Karmex DF	2.00	lb	9.98	20	
Roundup Ultra	2.00	pt	6.19	12	
Labor:					
Harvest Piece Rate (\$11.50+OH)	143.00	crt	15.53	2,221	
Insecticide:					
Fulfill	2.75	oz	7.80	21	
Lorsban Advanced	2.00	pt	8.65	17	
Fertilizer:					
UN-32	90.00	lb N	0.84	76	
Irrigation:					
Water	1.00	acre	90.00	90	
Assessment:					
California Asparagus Commission	143.00	crt	0.22	32	
Custom:					
Packing	143.00	crt	16.00	2,288	
Labor (machine)	20.34	hrs	17.55	357	
Labor (non-machine)	12.14	hrs	12.15	148	
Fuel - Gas	0.00	gal	4.07	0	
Fuel - Diesel	55.21	gal	3.84	212	
Lube				32	
Machinery repair				42	
Interest on operating capital @ 5.75%				54	
TOTAL OPERATING COSTS/ACRE				5,676	
NET RETURNS ABOVE OPERATING COSTS				-356	
CASH OVERHEAD COSTS:					
Office				125	
Liability Insurance				2	
Sanitation Service				4	
Property Taxes				92	
Property Insurance				11	
Investment Repairs				4	
TOTAL CASH OVERHEAD COSTS/ACRE				238	
TOTAL CASH COSTS/ACRE				5,914	
NON-CASH OVERHEAD COSTS (Capital Recovery)					
Land				369	
Buildings				9	
Bins				4	
Establishment				347	
Shop/Field Tools				4	
Fuel Tanks				1	
Equipment				73	
TOTAL NON-CASH OVERHEAD COSTS/ACRE				808	
TOTAL COSTS/ACRE				6,722	
NET RETURNS ABOVE TOTAL COSTS				-1,402	

UC COOPERATIVE EXTENSION
Table 4. MONTHLY CASH COSTS PER ACRE TO PRODUCE ASPARAGUS
 San Joaquin Valley - North 2013

Beginning JAN 13	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	TOTAL
Ending DEC 13	13	13	13	13	13	13	13	13	13	13	13	13	
Cultural:													
Reestablish Beds	8												8
Reestablish/Clean Furrows	6												6
Disease: Phytophthora (Ridomil)		29											29
Weed: Spray (Karmex)		22											22
Cultivate & Furrow					6		6	6					19
Cultivate/Furrow/Fertilize (UN32)						82							82
Weed: Spray (Roundup)						15							15
Irrigate: 3X (water & labor)						34	34					61	128
Insect/Disease: Aphid/Rust (Fulfill/Rally)								51					51
Insect: Aphid (Lorsban)									20				20
Chop Ferns												15	15
Flatten Beds												20	20
Irrigate: Make ridges for flooding												1	1
Pickup	3	3	3	3	3	3	3	3	3	3	3	3	37
TOTAL CULTURAL COSTS	17	54	3	3	10	133	43	61	23	3	3	100	453
Harvest:													
Harvest: (cut, equipment, forklift)		328	939	923	610								2,801
Haul to Packer		5	16	16	11								48
Pack		272	768	752	496								2,288
Assessment		4	11	11	7								32
TOTAL HARVEST COSTS	0	610	1,733	1,702	1,124	0	0	0	0	0	0	0	5,169
Interest on operating capital @ 5.75%	0	3	12	20	25	-2	-1	-1	-1	-1	0	0	54
TOTAL OPERATING COSTS/ACRE	17	667	1,748	1,725	1,159	132	42	60	22	3	3	99	5,676
CASH OVERHEAD:													
Office	10	10	10	10	10	10	10	10	10	10	10	10	125
Liability Insurance	2												2
Sanitation Service	4												4
Property Taxes				46								46	92
Property Insurance		6						6					11
Investment Repairs	0	0	0	0	0	0	0	0	0	0	0	0	4
TOTAL CASH OVERHEAD COSTS	17	17	11	57	11	11	11	17	11	11	11	57	238
TOTAL CASH COSTS/ACRE	34	684	1,759	1,781	1,169	142	53	76	33	13	13	156	5,914

UC COOPERATIVE EXTENSION
Table 5. RANGING ANALYSIS
 San Joaquin Valley - North 2013

COSTS PER ACRE AT VARYING YIELDS TO PRODUCE ASPARAGUS

	YIELD (lbs/acre)						
	2,800	3,200	3,600	4,000	4,400	4,800	5,200
OPERATING COSTS							
Cultural Cost	453	453	453	453	453	453	453
Harvest Cost (Cut, haul, pack, assessment)	3,618	4,135	4,652	5,169	5,686	6,202	6,719
Interest on operating capital @ 5.75%	37	43	48	54	60	65	71
TOTAL OPERATING COSTS	4,108	4,631	5,153	5,676	6,198	6,721	7,243
Total Operating Costs/lb	1.47	1.45	1.43	1.42	1.41	1.40	1.39
CASH OVERHEAD COSTS							
TOTAL CASH COSTS	4,346	4,869	5,391	5,914	6,436	6,959	7,481
Total Cash Costs/lb	1.55	1.52	1.50	1.48	1.46	1.45	1.44
NON-CASH OVERHEAD COSTS							
TOTAL COSTS	5,154	5,677	6,199	6,722	7,244	7,767	8,289
Total Costs/lb	1.84	1.77	1.72	1.68	1.65	1.62	1.59

NET RETURNS PER ACRE ABOVE OPERATING COSTS

\$/lb	YIELD (lbs/acre)						
	2,800	3,200	3,600	4,000	4,400	4,800	5,200
1.03	-1,224	-1,335	-1,445	-1,556	-1,666	-1,777	-1,887
1.13	-944	-1,015	-1,085	-1,156	-1,226	-1,297	-1,367
1.23	-664	-695	-725	-756	-786	-817	-847
1.33	-384	-375	-365	-356	-346	-337	-327
1.43	-104	-55	-5	44	94	143	193
1.53	176	265	355	444	534	623	713
1.63	456	585	715	844	974	1,103	1,233

NET RETURNS PER ACRE ABOVE CASH COSTS

\$/lb	YIELD (lbs/acre)						
	2,800	3,200	3,600	4,000	4,400	4,800	5,200
1.03	-1,462	-1,573	-1,683	-1,794	-1,904	-2,015	-2,125
1.13	-1,182	-1,253	-1,323	-1,394	-1,464	-1,535	-1,605
1.23	-902	-933	-963	-994	-1,024	-1,055	-1,085
1.33	-622	-613	-603	-594	-584	-575	-565
1.43	-342	-293	-243	-194	-144	-95	-45
1.53	-62	27	117	206	296	385	475
1.63	218	347	477	606	736	865	995

NET RETURNS PER ACRE ABOVE TOTAL COSTS

\$/lb	YIELD (lbs/acre)						
	2,800	3,200	3,600	4,000	4,400	4,800	5,200
1.03	-2,270	-2,381	-2,491	-2,602	-2,712	-2,823	-2,933
1.13	-1,990	-2,061	-2,131	-2,202	-2,272	-2,343	-2,413
1.23	-1,710	-1,741	-1,771	-1,802	-1,832	-1,863	-1,893
1.33	-1,430	-1,421	-1,411	-1,402	-1,392	-1,383	-1,373
1.43	-1,150	-1,101	-1,051	-1,002	-952	-903	-853
1.53	-870	-781	-691	-602	-512	-423	-333
1.63	-590	-461	-331	-202	-72	57	187

UC COOPERATIVE EXTENSION
Table 6. WHOLE FARM ANNUAL EQUIPMENT, INVESTMENT AND BUSINESS OVERHEAD
 San Joaquin Valley - North 2013

ANNUAL EQUIPMENT COSTS

Yr	Description	Price	Yrs Life	Salvage Value	Capital Recovery	Cash Overhead			Total
						Insur- ance	Taxes		
13	145HP 4WD Tractor	153,548	15	29,893	13,133	749	917		14,799
13	200HP Trac Tractor	206,951	15	40,290	17,700	1,010	1,236		19,946
13	50HP 2WD Tractor #1	36,692	12	9,173	3,497	187	229		3,914
13	50HP 2WD Tractor #2	36,692	12	9,173	3,497	187	229		3,914
13	50HP Field Forklift	25,000	15	7,385	2,604	132	162		2,899
13	91HP Hi Clearance Tractor	60,367	15	11,752	5,163	295	361		5,818
13	Bin Trailer #1	2,200	3	915	513	13	16		541
13	Bin Trailer #2	2,200	3	915	513	13	16		541
13	Boom Sprayer 40 ft	7,000	15	672	631	31	38		701
13	Cultivator Rolling 15 ft	12,000	10	2,122	1,365	58	71		1,493
13	Disk Asparagus 15 ft	21,000	20	1,095	1,616	90	110		1,816
13	Disk Ridger 5 ft	2,500	15	240	225	11	14		250
13	Flail Shredder 15 ft	18,537	15	1,780	1,672	83	102		1,856
13	Furrow Bar 15 ft	2,500	20	130	192	11	13		216
13	Pickup 1/2 ton	32,000	10	9,452	3,334	169	207		3,710
13	Truck 16 ft bed, 16 bin	52,000	10	15,360	5,417	275	337		6,029
TOTAL		671,187	0	140,348	61,072	3,315	4,057		68,445
60% of New Cost *		402,712	0	84,209	36,643	1,989	2,434		41,067

*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	
INVESTMENT								
Buildings 2400 sqft	80,000	30		5,057	327	400	1,600	7,384
Bins (25)	6,500	10		832	27	33	130	1,021
Establishment-Asparagus	453,200	8		69,413	1,851	2,266	0	73,530
Land	4,500,000	30	4,500,000	213,750	0	45,000	0	258,750
Fuel Tanks (2-550 gal)	6,500	10		832	27	33	130	1,021
Tools - Shop/Field	20,000	10		2,559	82	100	400	3,140
TOTAL INVESTMENT	5,066,200		4,500,000	292,442	2,313	47,831	2,260	344,846

ANNUAL BUSINESS OVERHEAD COSTS

Description	Units/ Farm	Unit	Price/ Unit	Total Cost
Liability Insurance	580	acre	2.04	1,183
Office Expense	580	acre	125.00	72,500
Sanitation Service (3 months)	200	acre	3.75	750

UC COOPERATIVE EXTENSION
Table 7. HOURLY EQUIPMENT COSTS
 San Joaquin Valley - North 2013

Yr	Description	Actual Hours Used	Total Hours Used	COSTS PER HOUR							Total Costs/Hr
				Cash Overhead			Operating				
				Capital Recovery	Insur- ance	Taxes	Repairs	Fuel & Lube	Total Oper.		
13	145HP 4WD Tractor	93	1,066	7.39	0.42	0.52	8.76	32.31	41.07	49.40	
13	200HP Trac Tractor	51	1,066	9.96	0.57	0.70	11.96	44.57	56.53	67.76	
13	50HP 2WD Tractor #1	994	1,000	2.10	0.11	0.14	3.09	9.43	12.52	14.87	
13	50HP 2WD Tractor #2	990	1,000	2.10	0.11	0.14	3.09	9.43	12.52	14.87	
13	50HP Field Forklift	990	1,200	1.30	0.07	0.08	2.58	9.43	12.01	13.46	
13	91HP Hi Clearance Tractor	175	1,066	2.91	0.17	0.20	4.11	17.16	21.27	24.55	
13	Bin Trailer #1	900	1,000	0.31	0.01	0.01	0.35	0.00	0.35	0.68	
13	Bin Trailer #2	900	1,000	0.31	0.01	0.01	0.35	0.00	0.35	0.68	
13	Boom Sprayer 40 ft	49	100	3.79	0.19	0.23	1.86	0.00	1.86	6.07	
13	Cultivator Rolling 15 ft	110	200	4.09	0.17	0.21	2.57	0.00	2.57	7.04	
13	Disk Asparagus 15 ft	69	100	9.69	0.54	0.66	3.24	0.00	3.24	14.13	
13	Disk Ridger 5 ft	3	133	1.02	0.05	0.06	0.4	0.00	0.40	1.53	
13	Flail Shredder 15 ft	43	100	10.03	0.50	0.61	5.32	0.00	5.32	16.46	
13	Furrow Bar 15 ft	18	100	1.15	0.06	0.08	0.49	0.00	0.49	1.78	
13	Pickup 1/2 ton	200	200	10.00	0.51	0.62	4.07	11.52	15.59	26.72	
13	Truck 16 ft bed, 16 bin	198	200	16.25	0.83	1.01	7.91	19.20	27.11	45.20	

UC COOPERATIVE EXTENSION
Table 8. OPERATIONS WITH EQUIPMENT & MATERIALS
 San Joaquin Valley - North 2013

Operation	Operation Month	Tractor	Implement	Labor Type/ Material	Rate/ acre	Unit
Reestablish Beds	Jan	145HP 4WD Tractor	Disk Asparagus 15'	Equipment Operator Labor	0.14	hour
Clean Furrows	Jan	145HP 4WD Tractor	Furrow Bar 15'	Equipment Operator Labor	0.11	hour
Disease: Phytophthora (Ridomil)	Feb	91HP HC MFWD Tract	Boom Sprayer 40'	Equipment Operator Labor	0.06	hour
				Ridomil Gold EC	4.00	floz
Weed: Spray (Karmex)	Feb	91HP HC MFWD Tract	Boom Sprayer 40'	Equipment Operator Labor	0.06	hour
				Karmex DF	2.00	lb
Cultivate/Furrow	May	91HP HC MFWD Tract	CultivatorRollng15	Equipment Operator Labor	0.17	hour
	July	91HP HC MFWD Tract	CultivatorRollng15	Equipment Operator Labor	0.17	hour
	Aug	91HP HC MFWD Tract	CultivatorRollng15	Equipment Operator Labor	0.17	hour
Cultivate/Furrow/FertilizeUN32	June	91HP HC MFWD Tract	CultivatorRollng15	Equipment Operator Labor	0.17	hour
				UN-32	90.00	lb N
Weed: Spray (Roundup)	June	91HP HC MFWD Tract	Boom Sprayer 40'	Equipment Operator Labor	0.06	hour
				Roundup (4 lb material)	2.00	pt
Irrigate 3X	June			Non-Machine Labor	0.32	hour
				Water (surface)	0.33	acre
	July			Non-Machine Labor	0.32	hour
				Water (surface)	0.33	acre
	Dec			Non-Machine Labor	2.50	hours
				Water (surface)	0.34	acre
				Flood for 2 weeks		
Insect: Aphid,Rust(Rally,Fulfill)	Aug	91HP HC MFWD Tract	Boom Sprayer 40'	Equipment Operator Labor	0.06	hour
				Rally 40WSP/oz	5.00	oz
				Fulfill	2.75	oz
Insect: Aphid (Lorsban)	Sept	91HP HC MFWD Tract	Boom Sprayer 40'	Equipment Operator Labor	0.06	hour
				Lorsban Advanced	2.00	pt
Chop Ferns	Dec	145HP 4WD Tractor	Flail Shredder 15'	Equipment Operator Labor	0.26	hour
Flatten Beds (aspar disk) 2X	Dec	200HP Trac Tractor	Disk Asparagus 15'	Equipment Operator Labor	0.28	hour
Make Ridges for flooding	Dec	50HP 2WD Tractor 1	Disk Ridger 5'	Equipment Operator Labor	0.02	hour
Pickup	Dec		Pickup 1/2 Ton	Equipment Operator Labor	1.20	hours
Harvest	Feb	50HP 2WD Tractor 1	Bin Trailer #1	Non-Machine Labor	1.00	hour
				PickPieceRate/28lb	17.00	crt
	Feb	50HP 2WD Tractor 2	Bin Trailer #2	Non-Machine Labor		
	Mar	50HP 2WD Tractor 1	Bin Trailer #1	Non-Machine Labor	3.00	hours
				PickPieceRate/28lb	48.00	crt
				2 men on trailer		
	Mar	50HP 2WD Tractor 2	Bin Trailer #2	Non-Machine Labor		
	Apr	50HP 2WD Tractor 1	Bin Trailer #1	Non-Machine Labor	3.00	hours
				PickPieceRate/28lb	47.00	crt
				2 men on trailer		
	Apr	50HP 2WD Tractor 2	Bin Trailer #2	Non-Machine Labor		
	May	50HP 2WD Tractor 1	Bin Trailer #1	Non-Machine Labor	2.00	hours
				PickPieceRate/28lb	31.00	crt
				2 men on trailer		
Harvest Forklift	May	50HP 2WD Tractor 2	Bin Trailer #2	Non-Machine Labor		
	Feb	50HP Forklift		Equipment Operator Labor	0.60	hour
	Mar	50HP Forklift		Equipment Operator Labor	1.80	hours
	Apr	50HP Forklift		Equipment Operator Labor	1.80	hours
	May	50HP Forklift		Equipment Operator Labor	1.20	hours
Harvest Haul to Packer	Feb		Truck 16'bed 16bin	Equipment Operator Labor	0.13	hour
	Mar		Truck 16'bed 16bin	Equipment Operator Labor	0.40	hour
	Apr		Truck 16'bed 16bin	Equipment Operator Labor	0.40	hour
	May		Truck 16'bed 16bin	Equipment Operator Labor	0.26	hour
Harvest Pack	Feb			Packing/28lb	17.00	crt
	Mar			Packing/28lb	48.00	crt
	Apr			Packing/28lb	47.00	crt
	May			Packing/28lb	31.00	crt