
UNIVERSITY OF CALIFORNIA COOPERATIVE EXTENSION

2007

SAMPLE COSTS TO ESTABLISH AND PRODUCE

ASPARAGUS



SAN JOAQUIN VALLEY – NORTH
SAN JOAQUIN COUNTY

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INTRODUCTION

Sample costs to establish and produce 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 some archived studies can be downloaded from the Agricultural and Resource Economics website at UC Davis <http://coststudies.ucdavis.edu>. These studies as well as other archived studies not on the website can be requested through the department by calling (530) 752-1517.

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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. Small acreages of Apollo, Atlas and Purple Passion, a specialty variety may be 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 10 inches, giving a plant population of 10,454 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 \$55 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 (Lorox and/or Karmex). The field is cultivated once per month from May through August. Fertilizer is applied during the June cultivation, which is shown as a separate operation in the tables.

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 Di-Syston (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.

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 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 is applied during the June cultivation, which is shown as a separate operation in the tables. Post-emergence herbicide sprays may be made in the spring, as needed (Lorox or other).

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 Di-Syston. 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 30 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 (2001-2006) is \$1.05 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 30 pound carton. The packing costs as reported by the growers are assumed to include the total per carton packing shed costs.

Assessments. The California Asparagus Commission assesses the fresh market asparagus at \$0.007 per pound. 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 \$10.50 for machine operators and \$8.85 per hour non-machine labor. Adding 38% 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 \$14.49 and \$12.21 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 January 1, 2005 (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 \$6.50 per 30 pound crate equivalent. Adding overhead, the cost is \$8.97 per 30-pound crate. 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 30 pound crate 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 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 \$2.30 and \$2.80 per gallon, respectively. The cost includes a 2% local sales tax on diesel fuel and 8% 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 10.00% 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 2007.

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 0.714% of the average value of the assets over their useful life. Liability insurance covers accidents on the farm and costs \$1,038 for the entire farm.

Office Expense. Office and business expenses are estimated at \$100 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 Engineers (ASAE) based on equipment type and years of life. The life in years is estimated by dividing the wearout 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 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 7.25% 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 2007.

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 \$3,500 to \$4,000 per acre. The value used in this study is \$4,000 per acre or \$4,138 per producing acre (580 acres). Cash rent ranges from \$200 for open ground to \$250 for asparagus ground.

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 \$1,713 per acre or \$342,600 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.

REFERENCES

- American Society of Agricultural Engineers. (ASAE). 1992. *American Society of Agricultural Engineers Standards Yearbook*. St. Joseph, MO.
- Boehlje, Michael D., and Vernon R. Eidman. 1984. *Farm Management*. John Wiley and Sons. New York, NY.
- California Chapter of the American Society of Farm Managers and Rural Appraisers. 2006. *Trends in Agricultural Land and Lease Values*. California Chapter of the American Society of Farm Managers and Rural Appraisers, Inc. Woodbridge, CA.
- California State Automobile Association. 2007. *Gas Price Survey 2006*. AAA Public Affairs, San Francisco,
- California State Board of equalization. *Fuel Tax Division Tax Rates*. Internet accessed January 2007. <http://www.boe.ca.gov/sptaxprog/spfdrates.htm>
- Doanes Editors. *Facts and Figures for Farmers*. 1977. Doane Publishing, St. Louis, MO. P 292.
- Energy Information Administration. 2006. *Weekly Retail on Highway Diesel Prices*. Internet accessed January 2007. <http://tonto.eia.doe.gov/oog/info/wohdp>
- Mullen, Robert, Keith S. Mayberry, Franklin F. Laemmlen. 1998. *Asparagus Production in California*. University of California, Division of Agriculture and Natural Resources. Publication 7234.
- University of California Statewide Integrated Pest Management Program. *UC Pest Management Guidelines, Asparagus*. 2006. University of California, Davis, CA. <http://www.ipm.ucdavis.edu>

For information concerning the above or other University of California publications, contact UC DANR Communications Services at 1-800-994-8849, online at www.ucop.edu, or your local county UC Cooperative Extension office.

UC COOPERATIVE EXTENSION
Table 1. COSTS PER ACRE TO ESTABLISH ASPARAGUS
 SAN JOAQUIN VALLEY - NORTH 2007

	Year:	Cost Per Acre			
		1st	2nd	3rd	*4th
	Pounds Per Acre:	700	2,000	4,000	
Cultural Costs:					
Land Prep: Disk 4X		21			
Land Prep: Rip 2X		46			
Land Prep: Plow		13			
Land Prep: Triplane		9			
Land Prep: Furrow		5			
Land Prep: Furrow/Fertilize (Yr 1, 4-10-10. Yr 3+, UN32)		54	46	46	46
Plant: (plants, labor, equipment)		630			
Plant: Cover Plants (3X)		20			
Weed: Cultivate/Furrow		32	14	14	14
Irrigate: (Yr 1, 5X. Yr 2+, 3X)		101	93	93	93
Weed: Spray (Yr 1, Lorox. Yr 2+, Karmex)		22	14	14	14
Weed: Hand		171			
Bed Mgmt: Chop Ferns		10	10	10	10
Bed Mgmt: Flatten Beds (Disk 2X)		13	13	13	13
Irrigation: Make ridges for flooding (cost is less than \$1/acre)		0	0	0	0
Bed Mgmt: Reestablish Beds			5	5	5
Bed Mgmt: Reestablish/Clean Furrows			4	4	4
Insect/Disease: Aphid/Rust (Rally/Disyston)			46	46	46
Insect: Aphid (Lorsban)			14	14	14
Disease: Phytophthora (Ridomil)				28	28
Pickup: (business use)		28	28	28	28
TOTAL CULTURAL COSTS		1,177	288	317	317
Harvest Costs:					
Cut Asparagus (labor & equipment)			229	872	1,650
Haul to Packer			2	5	9
Pack Asparagus			331	965	1,915
Assessments			5	14	28
TOTAL HARVEST COSTS			567	1,856	3,602
Interest On Operating Capital @ 10.00%		101	8	14	65
TOTAL OPERATING COSTS/ACRE		1,278	864	2,186	3,984
Cash Overhead Costs:					
Office Expense		100	100	100	100
Liability Insurance		2	2	2	2
Sanitation Costs		1	1	4	4
Property Taxes		46	44	45	53
Property Insurance		3	2	2	9
Investment Repairs		4	4	4	4
TOTAL CASH OVERHEAD COSTS		154	152	157	172
TOTAL CASH COSTS/ACRE		1,432	1,016	2,343	4,155
INCOME/ACRE FROM PRODUCTION		0	735	2,100	4,200
NET CASH COSTS/ACRE FOR THE YEAR		1,432	281	243	0
PROFIT/ACRE ABOVE CASH COSTS		0	0	0	45
ACCUMULATED NET CASH COSTS/ACRE		1,432	1,713	1,956	1,911

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Table 1. continued

	Cost Per Acre				
	Year:	1st	2nd	3rd	4th
	Pounds Per Acre:	700	2,000	4,000	
Non-Cash Overhead (Capital Recovery Cost):					
Land		300	300	300	300
Buildings		11	11	11	11
Bins (25)		0	2	2	2
Fuel Tanks		2	2	2	2
Tools-Shop/Field		5	5	5	5
Equipment		61	30	42	55
TOTAL CAPITAL RECOVERY COST		379	350	363	375
TOTAL COST/ACRE FOR THE YEAR		1,811	1,366	2,706	4,530
INCOME/ACRE FROM PRODUCTION		0	735	2,100	4,200
TOTAL NET COST/ACRE FOR THE YEAR		1,811	631	606	330
NET PROFIT/ACRE ABOVE TOTAL COST		0	0	0	0
TOTAL ACCUMULATED NET COST/ACRE		1,811	2,442	3,047	3,378

*See production year for complete list of operations and costs

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Table 2. COSTS PER ACRE TO PRODUCE ASPARAGUS
 San Joaquin Valley - North 2007

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:								
Bed Mgmt: Reestablish Beds	0.11	2	3	0	0	5		
Bed Mgmt: Reestablish/Clean Furrows	0.09	2	3	0	0	4		
Disease: Phytophthora (Ridomil)	0.05	1	1	27	0	28		
Weed: Spray (Karmex)	0.05	1	1	12	0	14		
Weed: Cultivate & Furrow	0.41	7	7	0	0	14		
Weed/Fertilize: Cultivate/Furrow/Fertilize (UN32)	0.14	2	2	41	0	46		
Irrigate: 3X (water & labor)	3.14	38	0	55	0	93		
Insect/Disease: Aphid/Rust (Di-Syston/Rally)	0.05	1	1	44	0	46		
Insect: Aphid (Lorsban)	0.05	1	1	13	0	14		
Bed Mgmt: Chop Ferns	0.22	4	7	0	0	10		
Bed Mgmt: Flatten Beds	0.23	4	9	0	0	13		
Irrigate: Make ridges for flooding	0.02	0	0	0	0	0		
Pickup: Business Use	1.00	17	10	0	0	28		
TOTAL CULTURAL COSTS	5.56	80	44	192	0	317		
Harvest:								
Harvest: (labor + equipment)	13.50	345	113	1,193	0	1,650		
Haul to Packer	0.25	4	5	0	0	9		
Pack	0.00	0	0	0	1,915	1,915		
Assessment	0.00	0	0	28	0	28		
TOTAL HARVEST COSTS	13.75	349	117	1,221	1,915	3,602		
Interest on operating capital @ 10.00%						65		
TOTAL OPERATING COSTS/ACRE		429	161	1,413	1,915	3,984		
CASH OVERHEAD:								
Office						100		
Liability Insurance						2		
Sanitation Service						4		
Property Taxes						54		
Property Insurance						9		
Investment Repairs						4		
TOTAL CASH OVERHEAD COSTS						172		
TOTAL CASH COSTS/ACRE						4,156		
Non-cash Overhead:								
		Per producing Acre		Annual Cost Capital Recovery				
Land		4,138		300		300		
Buildings		138		11		11		
Bins		15		2		2		
Establishment		1,713		290		290		
Tools-Show/Field		34		5		5		
Fuel Tanks		11		2		2		
Equipment		470		55		55		
TOTAL NON-CASH OVERHEAD COSTS		6,520		665		665		
TOTAL COSTS/ACRE						4,821		

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Table 3. COSTS AND RETURNS PER ACRE TO PRODUCE ASPARAGUS
 San Joaquin Valley - North 2007

	Quantity /Acre	Unit	Price or Cost/Unit	Value or Cost/Acre	Your Cost
GROSS RETURNS					
Fresh Asparagus	4,000.00	lb	1.05	4,200	
OPERATING COSTS					
Fungicide:					
Ridomil Gold EC	4.00	floz	6.71	27	
Rally 40 WSP	5.00	oz	5.16	26	
Herbicide:					
Karmex DF	2.00	lb	6.05	12	
Labor:					
Harvest Piece Rate (\$6.50 + 38% OH)	133.00	crt	8.97	1,193	
Insecticide:					
Di-Syston 8	1.00	pt	18.42	18	
Lorsban 4E	2.00	pt	6.29	13	
Fertilizer:					
UN-32	90.00	lb N	0.46	41	
Irrigation:					
Water (District or Surface Water)	1.00	acre	55.00	55	
Assessment:					
California Asparagus Commission (\$0.007/lb)	133	crt	0.21	28	
Custom:					
Packing	133.00	crt	14.40	1,915	
Labor (machine)	19.40	hrs	14.49	281	
Labor (non-machine)	12.14	hrs	12.21	148	
Fuel - Gas	0.00	gal	2.80	0	
Fuel - Diesel	51.30	gal	2.30	118	
Lube				18	
Machinery repair				26	
Interest on operating capital @ 10.00%				65	
TOTAL OPERATING COSTS/ACRE				3,984	
NET RETURNS ABOVE OPERATING COSTS				216	
CASH OVERHEAD COSTS:					
Office				100	
Liability Insurance				2	
Sanitation Service				4	
Property Taxes				54	
Property Insurance				9	
Investment Repairs				4	
TOTAL CASH OVERHEAD COSTS/ACRE				172	
TOTAL CASH COSTS/ACRE				4,156	
NON-CASH OVERHEAD COSTS (Capital Recovery)					
Land				300	
Buildings				11	
Bins				2	
Establishment				290	
Tools-Shop/Field				5	
Fuel Tanks				2	
Equipment				55	
TOTAL NON-CASH OVERHEAD COSTS/ACRE				665	
TOTAL COSTS/ACRE				4,821	
NET RETURNS ABOVE TOTAL COSTS				-621	

crt = 30 lb crate

UC COOPERATIVE EXTENSION
Table 4. MONTHLY CASH COSTS PER ACRE TO PRODUCE ASPARAGUS
 San Joaquin Valley - North 2007

Beginning JAN 07	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	TOTAL
Ending DEC 07	07	07	07	07	07	07	07	07	07	07	07	07	
Cultural:													
Bed Mgmt: Reestablish Beds	5												5
Bed Mgmt: Reestablish/Clean Furrows	4												4
Disease: Phytophthora (Ridomil)			28										28
Weed: Spray (Karmex)		14											14
Weed: Cultivate & Furrow					5		5	5					14
Weed/Fertilize: Cultivate/Furrow/Fertilize (UN32)						46							46
Irrigate: 4X (water & labor)						22	22					49	93
Insect/Disease: Aphid/Rust (Disyston/Rally)								46					46
Insect: Aphid (Lorsban)									14				14
Bed Mgmt: Chop Ferns												10	10
Bed Mgmt: Flatten Beds												13	13
Irrigate: Make ridges for flooding												0	0
Pickup (business use)	2	2	2	2	2	2	2	2	2	2	2	2	28
TOTAL CULTURAL COSTS	12	45	2	2	7	70	29	53	17	2	2	76	317
Harvest:													
Harvest: (labor + equipment)		183	550	550	367								1,650
Haul to Packer		1	3	3	2								9
Pack		213	638	638	426								1,915
Assessment		3	9	9	6								28
TOTAL HARVEST COSTS	0	400	1,201	1,201	801	0	0	0	0	0	0	0	3,602
Interest on operating capital @ 10.00%	0	4	14	24	31	-2	-1	-1	-1	-1	-1	-1	65
TOTAL OPERATING COSTS/ACRE	12	449	1,217	1,227	838	68	28	52	16	2	2	75	3,983
OVERHEAD:													
Office	8	8	8	8	8	8	8	8	8	8	8	8	100
Liability Insurance		2											2
Sanitation Service				4									4
Property Taxes				27								27	54
Property Insurance		4						4					9
Investment Repairs	0	0	0	0	0	0	0	0	0	0	0	0	4
TOTAL CASH OVERHEAD COSTS	9	15	9	39	9	9	9	13	9	9	9	36	172
TOTAL CASH COSTS/ACRE	21	464	1,225	1,266	847	77	36	65	24	10	10	110	4,156

UC COOPERATIVE EXTENSION

Table 5. RANGING ANALYSIS

San Joaquin Valley - North 2007

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	317	317	317	317	317	317	317
Harvest Cost (labor + equipment)	1,188	1,342	1,496	1,650	1,804	1,958	2,112
Haul to Packer	6	7	8	9	10	11	12
Pack	1,341	1,532	1,724	1,915	2,107	2,298	2,490
Assessment	20	22	25	28	31	34	36
Interest on operating capital	44	51	58	65	71	78	85
TOTAL OPERATING COSTS	2,916	3,271	3,628	3,984	4,340	4,696	5,052
Total Operating Costs/lb	1.04	1.02	1.01	1.00	0.99	0.98	0.97
CASH OVERHEAD COSTS							
CASH OVERHEAD COSTS	172	172	172	172	172	172	172
TOTAL CASH COSTS	3,088	3,443	3,800	4,156	4,512	4,868	5,224
Total Cash Costs/lb	1.10	1.08	1.06	1.04	1.03	1.01	1.00
NON-CASH OVERHEAD COSTS							
NON-CASH OVERHEAD COSTS	663	664	665	665	666	666	667
TOTAL COSTS	3,751	4,107	4,465	4,821	5,178	5,534	5,891
Total Costs/lb	1.34	1.28	1.24	1.21	1.18	1.15	1.13

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
0.75	-816	-871	-928	-984	-1,040	-1,096	-1,152
0.85	-536	-551	-568	-584	-600	-616	-632
0.95	-256	-231	-208	-184	-160	-136	-112
1.05	24	89	152	216	280	344	408
1.15	304	409	512	616	720	824	928
1.25	584	729	872	1,016	1,160	1,304	1,448
1.35	864	1,049	1,232	1,416	1,600	1,784	1,968

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
0.75	-988	-1,043	-1,100	-1,156	-1,212	-1,268	-1,324
0.85	-708	-723	-740	-756	-772	-788	-804
0.95	-428	-403	-380	-356	-332	-308	-284
1.05	-148	-83	-20	44	108	172	236
1.15	132	237	340	444	548	652	756
1.25	412	557	700	844	988	1,132	1,276
1.35	692	877	1,060	1,244	1,428	1,612	1,796

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
0.75	-1,651	-1,707	-1,765	-1,821	-1,878	-1,934	-1,991
0.85	-1,371	-1,387	-1,405	-1,421	-1,438	-1,454	-1,471
0.95	-1,091	-1,067	-1,045	-1,021	-998	-974	-951
1.05	-811	-747	-685	-621	-558	-494	-431
1.15	-531	-427	-325	-221	-118	-14	89
1.25	-251	-107	35	179	322	466	609
1.35	29	213	395	579	762	946	1,129

UC COOPERATIVE EXTENSION
Table 6. WHOLE FARM ANNUAL EQUIPMENT, INVESTMENT AND BUSINESS OVERHEAD
 San Joaquin Valley - North 2007

ANNUAL EQUIPMENT COSTS

Yr	Description	Price	Yrs Life	Salvage Value	Capital Recovery	Cash Overhead		Total
						Insur- ance	Taxes	
07	145HP 4WD Tractor	91,161	15	17,747	9,475	389	545	10,408
07	200HP Trac Tractor	170,169	15	33,129	17,687	726	1,016	19,429
07	50HP 2WD Tractor #1	17,500	12	4,375	1,992	78	109	2,179
07	50HP 2WD Tractor #2	17,500	12	4,375	1,992	78	109	2,179
07	50HP Field Forklift	25,000	15	7,385	3,072	116	162	3,350
07	91HP Hi Clearance Tractor	44,969	15	8,755	4,674	192	269	5,134
07	Bin Trailer #1	2,200	3	915	558	11	16	585
07	Bin Trailer #2	2,200	3	915	558	11	16	585
07	Boom Sprayer 40 ft	7,000	15	672	755	27	38	820
07	Cultivator Rolling 15 ft	8,200	10	1,450	1,077	34	48	1,160
07	Disk Asparagus 15 ft	17,500	20	912	1,662	66	92	1,820
07	Disk Ridger 5 ft	2,500	15	240	269	10	14	293
07	Flail Shredder 15 ft	13,314	15	1,278	1,435	52	73	1,560
07	Furrow Bar 15 ft	1,500	20	78	143	6	8	156
07	Pickup 1/2 ton	32,000	10	9,452	3,933	148	207	4,288
07	Truck 16 ft bed, 16 bin	52,000	15	10,123	5,405	222	311	5,937
TOTAL		507,713		107,038	55,673	2,184	3,059	60,915
		302,828		64,223	33,404	1,310	1,835	36,549

*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	
Buildings 2400 sqft	80,000	30		6,610	286	400	1,600	8,895
Bins (25)	3,000	10		432	11	15	60	518
Establishment-Asparagus	342,600	8		57,932	1,223	1,713	0	60,868
Land	2,400,000	30	2,400,000	174,000	0	24,000	0	198,000
Fuel Tanks (2-550 gal)	6,500	10		936	23	33	130	1,122
Tools - Shop/Field	20,000	10		2,881	71	100	400	3,452
TOTAL INVESTMENT	2,852,100		2,400,000	242,790	1,614	26,261	2,190	272,854

ANNUAL BUSINESS OVERHEAD COSTS

Description	Units/ Farm	Unit	Price/ Unit	Total Cost
Liability Insurance	580	acre	1.79	1,038
Office Expense	580	acre	100.00	58,000
Sanitation Service (3 months)	200	acre	3.75	750

UC COOPERATIVE EXTENSION
Table 7. HOURLY EQUIPMENT COSTS
 San Joaquin Valley - North 2007

Yr	Description	COSTS PER HOUR							Total Costs/Hr.
		Actual Hours Used	Cash Overhead			Operating			
			Capital Recovery	Insur- ance	Taxes	Repairs	Fuel & Lube	Total Oper.	
07	145HP 4WD Tractor	1,066	5.33	0.22	0.31	2.17	22.26	24.43	30.29
07	200HP Trac Tractor	1,066	9.96	0.41	0.57	4.06	30.70	34.76	45.70
07	50HP 2WD Tractor #1	1,000	1.20	0.05	0.07	0.76	6.49	7.25	8.57
07	50HP 2WD Tractor #2	1,000	1.20	0.05	0.07	0.76	6.49	7.25	8.57
07	50HP Field Forklift	1,200	1.54	0.06	0.08	1.12	6.49	7.61	9.29
07	91HP Hi Clearance Tractor	1,036	2.71	0.11	0.16	1.07	11.82	12.89	15.87
07	Bin Trailer #1	1,000	0.33	0.01	0.01	0.34	0.00	0.34	0.69
07	Bin Trailer #2	1,000	0.33	0.01	0.01	0.34	0.00	0.34	0.69
07	Boom Sprayer 40 ft	100	4.52	0.16	0.23	1.81	0.00	1.81	6.72
07	Cultivator Rolling 15 ft	172	3.75	0.12	0.17	1.67	0.00	1.67	5.71
07	Disk Asparagus 15 ft	69	14.46	0.57	0.80	2.52	0.00	2.52	18.35
07	Disk Ridger 5 ft	133	1.21	0.04	0.06	0.38	0.00	0.38	1.69
07	Flail Shredder 15 ft	100	8.59	0.31	0.44	3.58	0.00	3.58	12.92
07	Furrow Bar 15 ft	100	0.85	0.03	0.05	0.28	0.00	0.28	1.21
07	Pickup 1/2 ton	200	11.80	0.44	0.62	2.29	7.93	10.22	23.08
07	Truck 16 ft bed, 16 bin	133	19.17	0.72	1.01	4.93	13.22	18.15	39.05

UC COOPERATIVE EXTENSION
Table 8. OPERATIONS WITH EQUIPMENT & MATERIAL INPUTS
 San Joaquin Valley - North 2007

Operation	Operation Month	Equipment Tractor	Implement	Non-Mach	Broadcast Material	Broadcast Rate/acre	Unit
				Labor hrs/acre			
Cultural:							
Reestablish Beds	Jan	145HP 4WD	Disk-Asparagus				
Reestablish/Clean Furrows	Jan	145HP 4WD	Furrow Bar				
Disease: Phytophthora	Feb	91HP HC	Boom Sprayer		Ridomil	4.00	floz
Weed: Spray	Mar	91HP HC	Boom Sprayer		Karmex	2.00	lb
Harvest: Cut	Feb-May	50HP 2WD #1 50HP 2WD #2 50HP Forklift	Bin Trailer #1 Bin Trailer #2	4.00	Piece Rate	133.00	crt
Harvest: Haul to Packer	Feb-May	Truck					
Harvest: Pack	Feb-May	Custom					
Cultivate/Furrow	Apr	91HP HC	Cultivator-Rolling				
	May	91HP HC	Cultivator-Rolling				
Cultivate/Furrow/Fertilize	June	91HP HC	Cultivator-Rolling		UN32	90.00	lb N
Cultivate/Furrow	July	91HP HC	Cultivator-Rolling				
	Aug	91HP HC	Cultivator-Rolling				
Irrigate (water cost is per acre)	June			0.32	Water	.033	acre
	July			0.32	Water	0.33	acre
	Dec			2.50	Water	0.33	acre
Insect/Disease: Aphid/Rust	Aug	91HP HC	Boom Sprayer		Di-System Rally	1.00 5.00	pt oz
Insect: Aphid	Sept	91HP HC	Boom Sprayer		Lorsban	2.00	pt
Chop Ferns	Dec	145HP 4WD	Flail Shredder				
Flatten Beds	Dec	200HP Trac	Disk-Asparagus				
Make Ridges for Flooding	Dec	50HP 2WD	Disk-Ridger				