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Celery Production: Sample Costs and Profitability Analysis

Based on 1999 Data Collected in Ventura County, California

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This study presents sample costs of production for fresh-market celery developed in Ventura County, California, in 1999, but the methodology we used to analyze costs, profits, and investments can easily be modified to address individual situations in production areas throughout California. Tables 1 and 2 include a “Your cost” column where growers can enter their own costs for comparison with ours. Also note that because of rounding, the totals given in tables 1 through 6 may differ slightly from the sums of their constituent numbers.

We based our study on certain assumptions that we developed from information on production practices and costs gathered from growers and agricultural institutions in the area. This is one of a series of six reports on vegetable crop production that are based on Ventura County data.

As a grower or other agriculture professional, you can benefit from this report in many ways. It can help you make production decisions, determine potential returns, prepare budgets, evaluate production loans, and analyze policies.

A discussion of the assumptions and calculation methods used in this study is provided in the text. Cultural practice and cost data are presented in detail in six tables:

[Table 1. Costs per acre to produce celery](#)

[Table 2. Costs and returns per acre to produce celery](#)

[Table 3. Monthly cash costs per acre to produce celery](#)

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[Part A. Costs per acre and per carton at varying yields](#)

[Part B. Returns per acre above operating costs](#)

[Part C. Returns per acre above all cash costs \(gross margin\)](#)

[Part D. Returns per acre above total costs \(returns to management\)](#)

[Table 5. Farm equipment and investment values and annual costs](#)

[Table 6. Farm equipment actual hours of use and hourly costs](#)

STUDY ASSUMPTIONS

This report is based on a 1,300-acre vegetable farm, the average size of farm for the growers we interviewed. Most land used for vegetable crops in Ventura County produces two or more crops a year. Each crop is planted and harvested several times a year, so planting, harvesting, and selling of vegetable crops are year-round activities for growers, farm workers, and sellers.

We calculated our costs assuming that at least two crops are produced on each acre, resulting in a total of 2,600 acres of farmed land per year. For our study, the crops grown on the farm include broccoli, bell pepper, celery, spinach, loose leaf-lettuce, and cilantro (we have issued a report similar to this one for each of these crops). This crop mix is not present, of course, on every farm in Ventura County, but several farms in our interview pool did produce all six crops.

The growing period for each crop varies depending on time of planting. Consequently, production costs—particularly for irrigation, disease and pest management, and overhead—would be expected to vary. We based our study on an average growth period of minimum and maximum days. Prices used for materials, equipment, contract services, and labor wages (unless otherwise specified) are for the year 1999.

CULTURAL PRACTICES AND PRODUCTION INPUTS

Land preparation. Different types of fields and management preferences require different types of land preparation. Most growers in our interview pool performed several operations including multiple discing (five times in this study), ripping the soil (maybe twice) to break up any underlying compacted soil, plowing, leveling using a triplane, chiseling, furrowing, listing, and shaping beds. Preplant fertilizer was applied together with listing operation once before the ground was shaped and rolled into beds and a second time afterward. The ground is preirrigated at the end of the preplant period.

Stand establishment. Celery is grown primarily in the central coast and the south coast of California. The primary varieties produced in Ventura County are Conquistador, Matador, and Sonora. All varieties have similar cultural, harvesting, and marketing requirements.

Transplanting rates vary depending on spacing. For this study, we assumed a rate of approximately 45,000 transplants per acre. A transplanted bed consists of two rows to the bed with bed centers 40 inches apart and transplants 7 inches apart within the row.

Weed management. Many growers in Ventura County use selective herbicides that can be applied either preplant or postplant to control a wide range of grass and broadleaf weeds. In this study, herbicide application is included during the growing period.

Fertilization. As mentioned previously, preplant fertilizer of nitrogen and phosphorous is applied. The first preplant fertilization is applied together with the listing before the ground is shaped and rolled into beds. The second is applied after the beds are formed.

Fertilizer applications during the growth period include mostly nitrogen and are applied via the furrow irrigation system. The amount and type of fertilizer we included in this study are based on an average of what most growers applied.

Irrigation: Prior to transplanting and during root establishment, irrigation is applied via a sprinkler system. Growers can purchase or rent sprinkler irrigation systems. We calculated costs for this study based on ownership of an existing sprinkler irrigation system. Celery requires frequent irrigation due to the shallow nature of its roots. Inadequate irrigation can lead to a calcium deficiency known as blackheart, which causes adverse effects to the marketability of the produce.

Growers can irrigate a field one portion at a time, moving pumps, pipes, and fittings manually from field to field. For this study, we assumed that sufficient pumps, pipes, and fittings are available to irrigate 430 acres at a time. Pipes are transported using a trailer and a tractor. Spreading the pipes takes 90 minutes of manual labor per acre. Removing pipes takes about the same amount of time.

After roots have been established, growers change to a furrow irrigation system. Irrigation labor for inspection and maintenance of the system is estimated at about 30 minutes per acre per irrigation for sprinklers, and about 20 minutes per acre per irrigation for furrow irrigation.

Energy use for pumping includes both diesel fuel and electric power, depending on the irrigation system. The amount of diesel and electricity consumption depends on pump horsepower (hp). In our study, we used 100 hp for a diesel pump and 70 hp for an electric pump. We estimated that 21 gallons per acre of diesel and about 694 kilowatts (kW) of electricity per acre would be needed during the production period for celery.

The cost of water to irrigate crops varies greatly from region to region in Ventura County, and also depends on whether district or well water is used. The farm in this study is in the Oxnard plains where growers use both well and district water. We calculated the water cost at \$82 per acre-foot. This rate is a weighted average for pumping costs and district charges assuming that one-third of the water comes from wells and the remaining two-thirds from districts. Irrigation in celery production commonly uses about 30 to 36 acre-inches of water.

Pest and disease management. Insects that can affect celery production include worms, aphids, and serpentine leafminers (*Liomyza trifolii*). Most of these pests can be treated at the larval stage. Growers usually rotate insecticides in order to slow potential pest resistance. Written recommendations from State of California-licensed pest control advisors are required for pesticide use. For information and pesticide use permits, contact your county Agricultural Commissioner's office. You can also find pest management information from the University of California on the UC Statewide Integrated Pest Management Project website, <http://www.ipm.ucdavis.edu>.

Depending on the region, a number of diseases may infect celery during any phase of growth. In Ventura County, the most common diseases affecting celery are early blight (*Cercospora aplii*) and Fusarium yellows. Treating celery seeds with hot water can prevent early blight in transplants. Fusarium yellows have been a significant problem in the Oxnard plains. The disease is a permanent resident in infected soils and can significantly reduce yields. Control of Fusarium yellows can be achieved through the use of resistant or tolerant cultivars.

HARVEST AND SELL

Celery is field-packed in cartons. Each carton typically contains 36 to 48 celery stalks and weighs 60 pounds. After the celery is packed, it is quickly transported to a storage facility where it is cooled and palletized at scientifically recommended temperatures.

Harvesting costs in this study include cartons, picking and packing, loading, and hauling the crop to the nearest cooling facility. Harvesting cost estimates obtained from our interviews include \$1.15 for the carton itself, \$0.85 per carton for picking and packing, and \$0.75 per carton for loading and hauling. Selling costs are estimated at \$0.50 per carton.

We did not include cooling costs because we did not get sufficient information on how much or for how long growers pay for using cooling facilities.

INTEREST ON OPERATING CAPITAL

We calculated interest on operating capital at a nominal rate of 10 percent per year. Interest on operating capital reflects the costs of borrowing money or an opportunity cost for using in-house funds. Interest on operating capital is charged until income is received from the crop at harvest. A nominal interest rate is the current market cost of borrowed funds during the production year.

DISPOSING OF CROP RESIDUE

After harvest, the field is disced twice to incorporate all crop residues into the soil.

CASH OVERHEAD COSTS

Land rent. Land rental contracts and charges for agricultural production can range widely by region and also depend on the availability of well water on the property. In Ventura County, if there is a well on the property the landlord often pays for the pump, the permanent parts of the irrigation facilities, and the costs of maintaining the well. The grower is generally responsible for the costs of energy needed to pump water.

Most of the growers we interviewed rented land with wells that provide a portion of their farms' water requirements. We do not have sufficient data, however, to compare land rents for properties with and without well water. We suggest that growers evaluate the value and costs associated with well water and take this into account when determining an appropriate cost for land rent.

This study assumes an average cash rent of \$1,320 per acre per year (\$110 per acre per month). Using a 5-month average growth period from land preparation to harvest, the celery enterprise is charged a rent of \$550 per acre per crop.

Property taxes. Counties charge a base property tax rate of 1 percent on the assessed value of the property, including equipment, buildings, and improvements. Special assessment districts in some counties charge additional taxes on property. For this study, we calculated county taxes at 1 percent of the value of the property.

Insurance. Growers also carry insurance for property protection, which is typically calculated at 0.713 percent of the average value of assets. In addition, a farm of the size specified in this report would carry liability insurance of \$1,040 per year to cover accidents on the entire farm.

Supervisors, foremen, and management. Interview information indicated that the size of farm we used in this study would require an average of about three employees who are supervisors or foremen. Wages are estimated at \$110 per acre per year. For the 5-month growth period, the celery enterprise is charged \$45 per acre per crop for supervisors and foremen.

Most growers in the survey did not provide management costs, and the wide variations in wages and salaries for professional managers make it difficult to approximate a typical situation. We suggest that, once all production costs have been subtracted from receipts, the residual should be referred to as returns to management.

Office expenses. Expenses in this category include office supplies, telephone service, operating costs for a fax machine, photocopier, and computer, bookkeeping, accounting, legal fees, and so on. Our interview average of office expenses is about \$360 per acre per year. For the 5 months of celery crop production, office expenses are around \$150 per acre per crop.

NON-CASH OVERHEAD COSTS

We calculated the non-cash overhead or ownership costs of assets (including farm equipment and other investments like an irrigation system, buildings, a fuel tank, and pumps) using the capital recovery method. This method helps growers calculate an annual amount of money to charge the enterprise so that the value of assets will be recovered within a specified period of time at a designated rate of interest. The rate of interest used to calculate ownership cost is 7.40 percent—California’s long-term average return rate on agricultural production assets from current income. Because farms use a mix of old and new equipment, we evaluated the value of the equipment complement at 60 percent of new prices.

EQUIPMENT OPERATING CASH COSTS

Equipment operating cash costs for fuel, lubrication, and repairs are calculated using formulas and coefficients developed by the American Society of Agricultural Engineers (ASAE). Repair costs are based on purchase price, annual hours of use, total hours of life, and repair coefficients formulated by the ASAE. Fuel and lubrication costs are also determined by ASAE equations based on machinery horsepower (maximum PTO hp) and type of fuel used. Fuel costs are calculated using average (1996 to 1999 period), on-farm delivery prices of \$0.72 per gallon for diesel and \$1.20 per gallon for gasoline. The cost of energy for electric irrigation pumps is \$0.105 per KW.

LABOR

Labor includes owner and hired operator labor with the same wage rate. Hourly labor wages are \$7.50 per hour for machine operators and \$6.25 per hour for non-machine workers. These wages are averages based on data from the growers we interviewed. Growers also pay 20 to 34 percent for benefits, which include Workers Compensation, Social Security, Medicare insurance, and other possible benefits. In this study, we assumed an additional 34 percent for benefits, which brings the labor rate to about \$10.00 per hour for machine operators and \$8.40 per hour for non-machine workers.

We calculated 20 percent additional labor time for machinery operation than the time estimated for actual operation. This percentage accounts for the setup, moving, maintenance, and repair of equipment.

PRICES AND YIELDS

Growers did not provide sufficient data on yield or prices, so we used average prices and yields provided by Ventura County Agricultural Crop Reports for the 1995 to 1999 period (table A) to estimate gross returns. The county crop reports use free on board (f.o.b.) prices to estimate growers’ returns. These prices include harvesting and packing costs, but growers’ prices may be different if they incur postharvest costs such as selling and cooling.

Table A. Harvested acreage, average yield, and average prices for celery, Ventura County, 1995–1999

Year	Harvested acreage	Cartons per acre*	Price per carton (\$)
1995	10,341	1,172	11.57
1996	10,152	1,199	7.22
1997	9,232	1,158	8.83
1998	11,923	1,161	8.50
1999	11,300	1,247	8.04
Approximate average	10,590	1,190	8.80

*One carton equals 60 pounds.

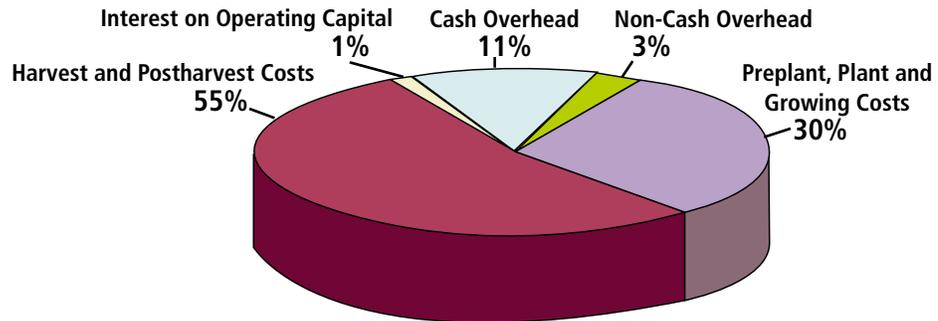
SUMMARY OF COSTS

Our sample estimate of the total cost of celery production in Ventura County is \$7,082 per acre (tables 1 and 2). Table 1 presents costs by type of activity, and table 2 presents costs by type of input.

The pie graph on page 6 shows the breakdown of costs. It consists of about 30 percent for land preparation, planting, and growing costs, 55 percent for harvest and postharvest costs, 11 percent for cash overhead, 1 percent for interest on operating capital, and 3 percent for non-cash overhead costs. Land preparation, planting, and growing costs include fuel, lube, and

machinery repairs, as well as materials and labor for all production practices. Harvesting costs in this study include the cost of the cartons, picking and packing, loading, hauling to the nearest cooling facility, and selling. Postharvest costs include two discings. Cash overhead costs include land rent, office expenses, liability insurance, supervisor and foremen wages, property taxes and insurance, and investment repairs.

Figure 1. Proportion of production costs for celery, Ventura County, 1999.



PROFITABILITY ANALYSIS

We analyzed profitability using break-even costs per carton and gross and economic margins. Break-even costs allow growers to compare expected market prices with the unit cost of production.

Gross margin (or returns above cash costs) is what growers often refer to as *profit* if there is no debt on the farming operation. It approximates the return to management and investment. If you deduct depreciation, it also approximates taxable income.

Economic profit (or returns above total cost, including management) is a very useful measure of how attractive the enterprise is for potential investors and entrants into the business. Economic profit can be positive or zero. A zero economic profit should not be alarming if all costs, including the owners' labor and management costs, are included (and assumed paid) in the production cost. In this study, we do not include management charges, so the return after all costs are deducted reflects return to management.

Given the assumptions upon which we based this cost study, the break-even price for the 5-year county average yield of 1,190 cartons per acre is estimated at about \$5.80 per carton to cover all cash costs and \$5.95 per carton to cover total costs (table 4, part A). At the same time, the break-even yield for the county average price of \$8.80 per carton is about 784 cartons per acre for cash costs and 805 cartons per acre for total costs. Break-even price is calculated as the cost of production per acre divided by the yield per acre. Break-even yield is calculated as the cost of production divided by the price per carton.

Gross margin for the county average yield and price is estimated at \$3,569 per acre (table 4, part C). This is calculated as gross returns (price times yield) minus cash costs of production. Returns to management for the county average yield and price are estimated at \$3,390 per acre (table 4, part D). This figure is calculated as gross returns minus total (cash and non-cash) costs of production.

Crop yield and prices received by growers, however, vary depending on several factors. For example, selling and cooling costs influence prices, depending on whether the costs are incurred by the grower or by the buyer.

We have provided a range analyses of price and yield variations on profitability so that each grower can find figures that best match his or her specific situation. The range analyses include break-even prices at various yield as well as gross margins and returns to management at various yield and price combinations. The gross margin and returns to management ranges are analyzed at increments of \$0.10 per carton for prices and 50 cartons per acre for yield (table 4, parts A through D).

Table 1. Costs per acre to produce celery, Ventura County, 1999 (labor rates: \$10.00/hr for machine labor, \$8.40/hr for non-machine labor; interest rate: 10.00%)

Operation	Operation time (hrs/ac)	Costs per acre (\$)					Total cost	Your cost (\$)
		Labor cost	Fuel, lube, & repairs	Material cost	Custom/rent			
Preplant:								
Disc 2x	0.38	5	5	0	0	9	_____	
Rip 2x	0.57	7	1	0	0	8	_____	
Plow	0.21	3	3	0	0	6	_____	
Disc 3x	0.57	7	8	0	0	15	_____	
Landplane 3x	0.55	7	6	0	0	13	_____	
Chisel	0.25	3	4	0	0	7	_____	
List and preplant fertilize	0.17	3	2	100	0	106	_____	
Shape beds & roll	0.23	3	2	0	0	5	_____	
Sprinkler setup (machine & labor)	0.20	15	1	0	0	16	_____	
Preplant fertilizer	0.48	6	4	26	0	36	_____	
Preplant irrigation (sprinkler)	0.90	8	0	5	0	13	_____	
Fuel/electricity for irrigation pumps (preplant)	0	0	0	4	0	4	_____	
TOTAL PREPLANT COSTS	4.51	65	36	135	0	236	_____	
Plant:								
Transplant (plant & labor)	0.22	3	0	765	240	1,008	_____	
TOTAL PLANT COSTS	0.22	3	0	765	240	1,008	_____	
Growing:								
Irrigate 3x (sprinkler)	1.35	11	0	31	0	42	_____	
Fuel/electricity for irrigation pumps (growing)	0	0	0	24	0	24	_____	
Sprinkler removal (machine & labor)	0.20	15	1	0	0	16	_____	
Weed management 1x	0.21	2	2	8	0	12	_____	
Furrow setup (labor)	0.40	3	0	0	0	3	_____	
Irrigate 6x (furrow)	1.80	15	0	176	0	191	_____	
Electricity for irrigation pump (growing)	0	0	0	61	0	61	_____	
Fertilize	0.48	6	4	200	0	210	_____	
Disease management 5x & pest management 5x	1.03	12	9	174	0	195	_____	
Pest management 3x	0.62	7	4	82	0	93	_____	
Cultivate 2x	0.46	6	5	0	0	10	_____	
Pickup truck	1.60	19	8	0	0	27	_____	
TOTAL GROWING COSTS	8.15	98	32	754	0	884	_____	

Continued

Table 1. Continued

Operation	Operation time (hrs/ac)	Costs per acre (\$)					Total cost	Your cost (\$)
		Labor cost	Fuel, lube, & repairs	Material cost	Custom/rent			
Harvest & Sell:								
Harvest & sell	0	0	0	3,868	0	3,868	_____	
TOTAL HARVEST & SELL COSTS	0	0	0	3,868	0	3,868	_____	
Disposing of Crop Residue:								
Postharvest disc 2x	0.38	5	5	0	0	9	_____	
TOTAL DISPOSING OF CROP RESIDUE COSTS	0.38	5	5	0	0	9	_____	
Interest on operating capital @ 10.00%						97	_____	
TOTAL OPERATING COSTS/ACRE		170	73	5,522	240	6,102	_____	
Cash Overhead:								
Land rent						550	_____	
Office expense						150	_____	
Liability insurance						0	_____	
Supervisors & foreman						45	_____	
Property taxes						6	_____	
Property insurance						4	_____	
Investment repairs						45	_____	
TOTAL CASH OVERHEAD COSTS						801	_____	
TOTAL CASH COSTS/ACRE						6,903	_____	
				Costs per producing acre (\$)	Annual cost: capital recovery (\$)	Total cost (\$)	Your cost (\$)	
Non-cash Overhead:								
Investment								
Shop building				23	3	3	_____	
Shop tools				12	1	1	_____	
Fuel tanks & pumps				15	2	2	_____	
Irrigation pump				333	46	46	_____	
Sprinklers and pipes				549	76	76	_____	
Equipment				207	52	52	_____	
TOTAL NON-CASH OVERHEAD COSTS				1,139	179	179	_____	
TOTAL COSTS/ACRE						7,082	_____	

Table 2. Costs and returns per acre to produce celery, Ventura County, 1999 (labor rates: \$10.00/hr for machine labor, \$8.40/hr for non-machine labor; interest rate: 10.00%)

	Quantity per acre	Unit	Price or cost per unit (\$)	Value or cost per acre (\$)	Your cost (\$)
Gross Returns	1,190.00	carton	8.80	10,472	_____
TOTAL GROSS RETURNS FOR CELERY				10,472	_____
Operating Costs:					
Water:					
Water	30.99	acre-inch	6.83	212	_____
Fuel (pump):					
Booster pump fuel	21.00	gallon	0.72	15	_____
Electricity (pump):					
Low-pressure pump	694.20	kilowatt	0.105	73	_____
Fertilize:					
Ammonium sulfate (preplant)	200.00	pound	0.131	26	_____
16-16-16 (preplant)	400.00	pound	0.25	100	_____
16-16-16 (growing)	800.00	pound	0.25	200	_____
Transplant:					
Transplant plugs	45,000.00	plant	0.017	765	_____
Custom:					
Custom transplant	1.00	acre	240.00	240	_____
Weed management	1.00	acre	8.00	8	_____
Disease management	1.00	acre	108.00	108	_____
Pest management	1.00	acre	147.00	147	_____
Harvest & sell:					
Cartons	1,190.00	carton	1.15	1,369	_____
Pick & pack	1,190.00	carton	0.85	1,012	_____
Load & haul	1,190.00	carton	0.75	893	_____
Sell	1,190.00	carton	0.50	595	_____
Labor (machine)	10.58	hour	10.00	106	_____
Labor (non-machine)	7.61	hour	8.40	64	_____
Fuel:					
Gasoline	4.00	gallon	1.20	5	_____
Diesel	43.87	gallon	0.72	32	_____
Lube				5	_____
Machinery repair				31	_____
Interest on operating capital @ 10.00%				97	_____
TOTAL OPERATING COSTS/ACRE				6,102	_____
NET RETURNS ABOVE OPERATING COSTS				4,370	_____

Continued

Table 2. *Continued*

	Quantity per acre	Unit	Price or cost per unit (\$)	Value or cost per acre (\$)	Your cost (\$)
Cash Overhead Costs:					
Land rent				550	_____
Office expense				150	_____
Liability insurance				0	_____
Supervisors & foreman				45	_____
Property taxes				6	_____
Property insurance				4	_____
Investment repairs				45	_____
TOTAL CASH OVERHEAD COSTS/ACRE				801	_____
TOTAL CASH COSTS/ACRE				6,903	_____
Non-cash Overhead Costs (Capital Recovery):					
Shop building				3	_____
Shop tools				1	_____
Fuel tanks & pumps				2	_____
Irrigation pump				46	_____
Sprinklers & pipes				76	_____
Equipment				52	_____
TOTAL NON-CASH OVERHEAD COSTS/ACRE				179	_____
TOTAL COSTS/ACRE				7,082	_____
NET RETURNS ABOVE TOTAL COSTS				3,390	_____

Table 3. Monthly cash costs per acre to produce celery, Ventura County, 1999

Operation	Costs per acre (\$)					Total
	Month 1	Month 2	Month 3	Month 4	Month 5	
Preplant:						
Disc 2x	9					9
Rip 2x	8					8
Plow	6					6
Disc 3x	15					15
Landplane 3x	13					13
Chisel	7					7
List and preplant fertilize	106					106
Shape beds & roll	5					5
Sprinkler setup (machine & labor)	16					16
Preplant fertilize	36					36
Preplant irrigation (sprinkler)	13					13
Fuel/electricity for irrigation pumps (preplant)	4					4
TOTAL PREPLANT COSTS	236					236
Plant:						
Transplant		1,008				1,008
TOTAL PLANT COSTS		1,008				1,008
Growing:						
Irrigate 3x (sprinkler)		42				42
Fuel/electricity for irrigation pumps (growing)		24				24
Sprinkler removal (machine & labor)		16				16
Weed management 1x		12				12
Furrow setup (labor)		3				3
Irrigate 6x (furrow)		32	64	64	32	191
Electricity for irrigation pumping (growing)		10	20	20	10	61
Fertilize			210			210
Disease management 5x & pest management 5x		90	24	81		195
Pest management 3x			52	41		93
Cultivate 2x		5	5			10
Pickup truck	5	5	5	5	5	27
TOTAL GROWING COSTS	5	239	381	211	47	884
Harvest & Sell:						
Harvest & sell					3,868	3,868
TOTAL HARVEST & SELL COSTS					3,868	3,868
Disposing of Crop Residue:						
Postharvest disc 2x					9	9
TOTAL DISPOSING OF CROP RESIDUE COSTS					9	9
Interest on operating capital @ 10.00%	2	12	16	17	50	97
TOTAL OPERATING COSTS/ACRE	244	1,259	397	228	3,974	6,102

Continued

Table 3. *Continued*

Operation	Costs per acre (\$)					Total
	Month 1	Month 2	Month 3	Month 4	Month 5	
Cash Overhead:						
Land rent	110	110	110	110	110	550
Office expense	30	30	30	30	30	150
Liability insurance	0	0	0	0	0	0
Supervisors & foreman	9	9	9	9	9	45
Property taxes	3				3	6
Property insurance	2				2	4
Investment repairs	9	9	9	9	9	45
TOTAL CASH OVERHEAD COSTS	163	158	158	158	163	801
TOTAL CASH COSTS/ACRE	408	1,417	555	386	4,137	6,903

Table 4. Range analyses of celery production costs and returns, Ventura County, 1999

	Costs per acre (\$) for various cartons-per-acre yields						
	1,040	1,090	1,140	1,190	1,240	1,290	1,340
Part A. Costs per Acre and per Carton at Varying Yields							
Operating costs/acre:							
Preplant cost	236	236	236	236	236	236	236
Plant cost	1,008	1,008	1,008	1,008	1,008	1,008	1,008
Growing cost	884	884	884	884	884	884	884
Harvest & sell cost	3,380	3,542	3,705	3,868	4,030	4,192	4,355
Disposing of crop residue cost	9	9	9	9	9	9	9
Interest on operating capital	93	95	96	97	99	100	101
TOTAL OPERATING COSTS/ACRE	5,610	5,774	5,938	6,102	6,266	6,430	6,594
TOTAL OPERATING COSTS/CARTON	5.39	5.30	5.21	5.13	5.05	4.98	4.92
CASH OVERHEAD COSTS/ACRE	801	801	801	801	801	801	801
TOTAL CASH COSTS/ACRE	6,411	6,575	6,739	6,903	7,067	7,231	7,394
TOTAL CASH COSTS/CARTON	6.16	6.03	5.91	5.80	5.70	5.61	5.52
NON-CASH OVERHEAD COSTS/ACRE	179	179	179	179	179	179	179
TOTAL COSTS/ACRE	6,590	6,754	6,918	7,082	7,246	7,409	7,573
TOTAL COSTS/CARTON	6.34	6.20	6.07	5.95	5.84	5.74	5.65
Part B. Returns per Acre above Operating Costs							
Price (\$/carton):							
\$8.50	3,230	3,491	3,752	4,013	4,274	4,535	4,796
\$8.60	3,334	3,600	3,866	4,132	4,398	4,664	4,930
\$8.70	3,438	3,709	3,980	4,251	4,522	4,793	5,064
\$8.80	3,542	3,818	4,094	4,370	4,646	4,922	5,198
\$8.90	3,646	3,927	4,208	4,489	4,770	5,051	5,332
\$9.00	3,750	4,036	4,322	4,608	4,894	5,180	5,466
\$9.10	3,854	4,145	4,436	4,727	5,018	5,309	5,600
Part C. Returns per Acre above All Cash Costs (gross margin)							
Price (\$/carton):							
\$8.50	2,429	2,690	2,951	3,212	3,473	3,734	3,996
\$8.60	2,533	2,799	3,065	3,331	3,597	3,863	4,130
\$8.70	2,637	2,908	3,179	3,450	3,721	3,992	4,264
\$8.80	2,741	3,017	3,293	3,569	3,845	4,121	4,398
\$8.90	2,845	3,126	3,407	3,688	3,969	4,250	4,532
\$9.00	2,949	3,235	3,521	3,807	4,093	4,379	4,666
\$9.10	3,053	3,344	3,635	3,926	4,217	4,508	4,800
Part D. Returns per Acre above Total Costs (returns to management)							
Price (\$/carton):							
\$8.50	2,250	2,511	2,772	3,033	3,294	3,556	3,817
\$8.60	2,354	2,620	2,886	3,152	3,418	3,685	3,951
\$8.70	2,458	2,729	3,000	3,271	3,542	3,814	4,085
\$8.80	2,562	2,838	3,114	3,390	3,666	3,943	4,219
\$8.90	2,666	2,947	3,228	3,509	3,790	4,072	4,353
\$9.00	2,770	3,056	3,342	3,628	3,914	4,201	4,487
\$9.10	2,874	3,165	3,456	3,747	4,038	4,330	4,621

Table 5. Farm equipment and investment values and annual costs based on 2,600 annual farmed acres, Ventura County, 1999

Equipment	Value: 1999 price (\$)	Life (yrs)	Salvage value (\$)	Costs			
				Capital recovery (\$)	Annual cash overhead (\$)		Total annual costs (\$)
					Insurance	Taxes	
120 HP Tractor 4WD (#1)	75,180	6	7,518	14,927	295	413	15,636
120 HP Tractor 4WD (#2)	75,180	5	7,518	17,236	295	413	17,944
120 HP Tractor 4WD (#3)	75,180	6	7,518	14,927	295	413	15,636
200 HP 4WD Tractor	135,500	6	13,550	26,904	531	745	28,181
45 HP 2WD Tractor	23,030	10	2,303	3,176	90	127	3,393
Bed shaper	8,900	3	890	3,140	35	49	3,224
Chisel – 14' (#1)	2,270	3	227	801	9	12	822
Chisel – 14' (#2)	2,270	3	227	801	9	12	822
Cultivator – 4-row 40" (#1)	7,130	3	713	2,516	28	39	2,583
Cultivator – 4-row 40" (#2)	7,130	3	713	2,516	28	39	2,583
Disc – 21' (#1)	16,510	5	1,651	3,785	65	91	3,941
Disc – 21' (#2)	16,510	5	1,651	3,785	65	91	3,941
Disc – 21' (#3)	16,510	5	1,651	3,785	65	91	3,941
Disc – 21' (#4)	16,510	5	1,651	3,785	65	91	3,941
Disc – 21' (#5)	16,510	5	1,651	3,785	65	91	3,941
Disc – 21' (#6)	16,510	5	1,651	3,785	65	91	3,941
Disc – 21' (#7)	16,510	5	1,651	3,785	65	91	3,941
Lister (#1)	6,000	4	600	1,653	24	33	1,710
Lister (#2)	6,000	4	600	1,653	24	33	1,710
Pickup truck 1/2 ton (#1)	17,160	2	1,716	8,716	67	94	8,878
Pickup truck 1/2 ton (#2)	17,160	2	1,716	8,716	67	94	8,878
Pickup truck 1/2 ton (#3)	17,160	2	1,716	8,716	67	94	8,878
Pickup truck 1/2 ton (#4)	17,160	2	1,716	8,716	67	94	8,878
Pickup truck 1/2 ton (#5)	17,160	2	1,716	8,716	67	94	8,878
Plow – 6-bottom	12,000	3	180	4,550	43	61	4,655
Shank injector	3,000	4	180	853	11	16	881
Sprayer 600 gallon (#1)	100,000	5	22,926	50,794	392	550	23,868
Sprayer 600 gallon (#2)	100,000	5	22,926	50,794	392	550	23,868
Subsoiler – 12' (#1)	6,490	2	649	3,297	25	36	3,358
Subsoiler – 12' (#2)	6,490	2	649	3,297	25	36	3,358
Trailer	2,000	2	200	1,016	8	11	1,035
Triplane – 14' (#1)	18,230	5	1,823	4,179	71	100	4,351
Triplane – 14' (#2)	18,230	5	1,823	4,179	71	100	4,351
Triplane – 14' (#3)	18,230	5	1,823	4,179	71	100	4,351
TOTAL EQUIPMENT	909,810		89,841	231,729	3,564	4,998	240,291
60% OF NEW COST*	545,886		53,905	139,038	2,138	2,999	144,175

Investment	Value: 1999 price (\$)	Life (yrs)	Salvage value (\$)	Costs				
				Capital recovery (\$)	Annual cash overhead (\$)		Total annual costs (\$)	
					Insurance	Taxes		Repairs
Fuel tanks & pumps	38,100	15	3,810	4,142	149	210	1,828	6,329
Irrigation pump	866,666	10	86,667	119,529	3,399	4,767	41,599	169,293
Shop building	60,000	15	6,000	6,524	235	330	2,880	9,969
Shop tools	30,000	15	3,000	3,262	118	165	1,440	4,984
Sprinklers & pipes	1,427,530	10	142,753	196,883	5,598	7,851	68,521	278,853
TOTAL INVESTMENT	2,422,296		242,230	330,340	9,499	13,323	116,268	469,429

*Used to reflect a mix of new and used equipment.

Table 5. *Continued*

Business Overhead	Enterprise/ farm size	Unit	Price per unit (\$)	Total cost (\$)
Land rent	2,600	acre	550	1,430,000
Liability insurance	2,600	acre	0.40	1,040
Office expense	2,600	acre	150	390,000
Supervisors & foreman	2,600	acre	45	117,000

Table 6. Farm equipment actual hours of use and hourly costs based on 2,600 annual farmed acres, Ventura County, 1999

Equipment	Actual hours of use	Costs per hour (\$)					Total costs per hour
		Capital recovery	Cash overhead		Operating		
			Insurance	Taxes	Repairs	Fuel & lube	
120 HP Tractor 4WD (#1)	2,500	3.58	0.07	0.10	1.89	5.77	11.41
120 HP Tractor 4WD (#2)	3,000	3.45	0.06	0.08	1.91	5.77	11.27
120 HP Tractor 4WD (#3)	2,500	3.58	0.07	0.10	1.89	5.77	11.41
200 HP 4WD Tractor	2,600	6.21	0.12	0.17	3.54	9.61	19.65
45 HP 2WD Tractor	1,200	1.59	0.05	0.06	1.03	1.83	4.55
Bed shaper	670	2.81	0.03	0.04	1.53	0	4.42
Chisel – 14' (#1)	740	0.65	0.01	0.01	0.44	0	1.11
Chisel – 14' (#2)	740	0.65	0.01	0.01	0.44	0	1.11
Cultivator – 4-row 40" (#1)	740	2.04	0.02	0.03	1.39	0	3.49
Cultivator – 4-row 40" (#2)	740	2.04	0.02	0.03	1.39	0	3.49
Disc – 21' (#1)	500	4.54	0.08	0.11	3.65	0	8.38
Disc – 21' (#2)	500	4.54	0.08	0.11	3.65	0	8.38
Disc – 21' (#3)	500	4.54	0.08	0.11	3.65	0	8.38
Disc – 21' (#4)	500	4.54	0.08	0.11	3.65	0	8.38
Disc – 21' (#5)	500	4.54	0.08	0.11	3.65	0	8.38
Disc – 21' (#6)	500	4.54	0.08	0.11	3.65	0	8.38
Disc – 21' (#7)	500	4.54	0.08	0.11	3.65	0	8.38
Lister (#1)	500	1.98	0.03	0.04	2.60	0	4.65
Lister (#2)	500	1.98	0.03	0.04	2.60	0	4.65
Pickup truck 1/2 ton (#1)	1,000	5.23	0.04	0.06	1.29	3.45	10.06
Pickup truck 1/2 ton (#2)	1,000	5.23	0.04	0.06	1.29	3.45	10.06
Pickup truck 1/2 ton (#3)	1,000	5.23	0.04	0.06	1.29	3.45	10.06
Pickup truck 1/2 ton (#4)	1,000	5.23	0.04	0.06	1.29	3.45	10.06
Pickup truck 1/2 ton (#5)	1,000	5.23	0.04	0.06	1.29	3.45	10.06
Plow – 6-bottom	610	4.48	0.04	0.06	1.82	0	6.40
Shank injector	500	1.02	0.01	0.02	0.63	0	1.69
Sprayer 600 gallon (#1)	2,000	6.88	0.12	0.17	4.80	3.31	15.27
Sprayer 600 gallon (#2)	2,000	6.88	0.12	0.17	4.80	3.31	15.27
Subsoiler – 12' (#1)	840	2.35	0.02	0.03	1.28	0	3.68
Subsoiler – 12' (#2)	840	2.35	0.02	0.03	1.28	0	3.68
Trailer	1,000	0.61	0.01	0.01	0.35	0	0.97
Triplane – 14' (#1)	540	4.64	0.08	0.11	2.74	0	7.57
Triplane – 14' (#2)	540	4.64	0.08	0.11	2.74	0	7.57
Triplane – 14' (#3)	540	4.64	0.08	0.11	2.74	0	7.57

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