
**University of California Cooperative Extension
Agriculture and Natural Resources – Agricultural Issues Center**

2015

**SAMPLE COSTS TO PRODUCE AND HARVEST
ORGANIC SPINACH**

High Density, Sprinkler Irrigated, 80-inch Beds



CENTRAL COAST REGION

Monterey, Santa Cruz, and San Benito Counties

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UNIVERSITY OF CALIFORNIA COOPERATIVE EXTENSION
AGRICULTURE AND NATURAL RESOURCES – AGRICULTURAL ISSUES CENTER

SAMPLE COSTS TO PRODUCE AND HARVEST ORGANIC SPINACH - 2015

Central Coast– Monterey, Santa Cruz, and San Benito Counties

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INTRODUCTION

The sample costs to produce and harvest organic spinach in the Central Coast Region – Monterey, Santa Cruz, and San Benito Counties – are presented in this study. The study is intended as a guide only, and can be used to make production decisions, determine potential returns, prepare budgets, and evaluate production loans. The practices described are based on production procedures considered typical for this crop and area, but will not apply to every situation. Sample costs for labor, materials, equipment, and custom services are based on current figures. A blank column titled “Your Cost” is provided to enter your actual costs on Tables 1 and 2.

The hypothetical farm operation, production practices, overhead, and calculations are described under assumptions. For additional information or explanation of calculations used in the study call the Department of Agricultural and Resource Economics, University of California, Davis, (530) 752-4651, Laura Tourte, UC Cooperative Extension Santa Cruz County, (831) 763-8005, Richard Smith, UC Cooperative Extension Monterey County, (831) 759-7357, or the UC Cooperative Extension office in your county.

Current “Sample Cost of Production Studies” for many commodities can be downloaded at <http://coststudies.ucdavis.edu>. Archived studies are also available on the website.

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ASSUMPTIONS

The following assumptions refer to Tables 1 to 6 and pertain to sample costs to produce and harvest organic spinach for the Central Coast Region – Monterey, Santa Cruz, and San Benito Counties. Sample costs are given for tractor, fuel, repairs, labor, materials, and custom services, and are based on current figures. *Costs per acre can vary considerably depending upon many variables including individual grower, production location and weather conditions, land rent and taxes, soil type, water costs, pest pressures, material inputs, and energy costs.* For example, spinach produced in areas with heavy soils may have higher land preparation costs per acre than areas with sandy soils. Areas with sandy soils, in turn, will likely have higher water use and irrigation costs per acre than areas with heavy soils.

The practices and costs used in this study may not be applicable to all situations or used in each production year. Individual growers may use this study as a template and modify it to more accurately reflect their own situations. Additional spinach production information for California is available online from the University of California Division of Agriculture and Natural Resources at: <http://anrcatalog.ucdavis.edu/pdf/7212.pdf>. **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.**

Organic production, as defined by the USDA's Organic Food Production Act of 1990 as amended (U.S.C. 6501 et seq.), is a "production system that is managed in accordance with the Act and associated regulations to respond to site-specific conditions by integrating cultural, biological, and mechanical practices that foster cycling of resources, promote ecological balance, and conserve biodiversity."

Growers are required to be registered with the State of California and certified by a federally accredited certifying agent on an annual basis to market products as organic. To gain organic status growers must farm on land to which no synthetically formulated fertilizers and/or pesticides have been applied for a minimum of three years. During the three year transition from conventional to organic production, growers report incurring additional costs. This study assumes that the operation is both registered and certified organic, therefore costs associated with the transition period are not included here. In this area organic farmers generally use a systems management approach to farming by including a suite of production practices such as crop rotation, diversification, cover crops, and additions of organic matter such as compost to help build soil fertility and manage pests.

Farm. This study assumes a farm operation of 1,000 non-contiguous acres of rented land. Roads and buffer zones comprise roughly six percent of the acreage. Organic spinach for the salad market is planted on a total of 200 acres each year and is rotated with other leafy green or salad mix crops to assist with pest management and for long-term improvements to soil fertility. Spinach is grown March through November along the Central Coast and because of its short plant-to-harvest cropping cycle up to three crops per acre per year can be produced. Small blocks of 10 to 15 acres are planted each week and harvested between 25 and 35 days later so that there is a continuous supply for the market. It can be grown on a variety of soil types provided that the soil has good structure and drainage. Land rents for row crops range from a low of \$350 to a high of \$3,000 per acre per year in the area. For this study, an annual rental rate of \$2,400 per acre is assumed, with one-third of that cost or \$800 assigned to each spinach crop.

Production Cultural Practices and Material Inputs

Land Preparation and Planting. Prior to land preparation, and to help determine fertilization practices, two soil samples per 15 acres planted to spinach are taken for analysis. In this study, land preparation is assumed to begin in March and includes disking (four times), subsoiling (twice), and land and laser leveling (once each for every 3 crops). Compost is then custom applied at the rate of four tons per acre (or one and one-third tons for each spinach crop), the acreage chiseled (a total of four times), and disced (twice). Beds are then listed, pre-irrigated with 2 acre-inches of water, and then cultivated (twice) with a rolling cultivator (Lilliston). Beds are then shaped with a power mulcher, and spinach is direct-seeded using an 80-inch 3-bed spider planting system. Spinach varieties are selected for their resistance to the disease downy mildew, and for the clip or salad market. This study assumes a flat leaf variety is planted at the rate of 100 pounds or four million seeds per acre.

Fertilizers/Soil Amendments. In addition to the compost applied during the tillage operations noted above, a pelleted chicken manure and blood meal (4-4-2) is applied after-planting at the rate of 2,500 pounds per acre. This supplies roughly 100 pounds of N to the crop. Fertilization practices will vary from grower to grower and location to location.

Irrigation. For this study, the estimated cost of pumped water is \$216 per acre-foot, or \$18 per acre-inch. Water costs vary considerably in the area depending upon the water district or agency, delivery, associated fees, and pumping variables and for 2015 were as high as \$435 per acre-foot in the area. In 2016 costs may be even higher because of drought conditions and water availability. In addition to the 2 acre-inches of water applied as a pre-plant irrigation, 2 acre-inches are applied to germinate the crop after planting. During the remainder of the growing period, the crop is sprinkler irrigated using an additional 4 acre-inches of water for a seasonal total of 8 acre-inches of water. Labor costs include time to set up and monitor the sprinkler system for proper function. Total water use will vary depending upon factors such as irrigation method, soil type, weather, and the time of the year the crop is planted.

Pest Management. Information for specific pest management materials and the associated application rates can be found in the UC Integrated Pest Management (IPM) Guidelines, Spinach. For more information on pest identification, monitoring, and pest management materials visit the spinach UC IPM website at <http://www.ipm.ucdavis.edu/PMG/selectnewpest.spinach.html>. Written recommendations are required for many commercially applied pesticides and are made by licensed pest control advisers. For information and pesticide use permits, contact your local county Agricultural Commissioner's office.

Pest Control Adviser (PCA). A Pest Control Adviser (PCA) monitors the field for insects, diseases, beneficial insects, and production needs to determine the necessary management practices. The cost for a PCA in this study is \$30 per acre.

Weeds. In addition to the pre-plant (Lilliston) cultivations, the furrows are cultivated mechanically (once). Hand weeding takes place once 15 days after planting and once prior to machine harvest. Diseased plants may also be culled during hand weeding operations. The pre-harvest weeding operation is necessary to satisfy market requirements for weed-free product. In this study, the total hand weeding cost is estimated at \$400 per acre. Hand weeding costs vary widely in the area and depend on location, weed populations, and pressure.

Insects/Diseases. Fields are monitored for a variety of insects including leaf miners, thrips, and lepidopterous pests. Diseases such as downy mildew (pathogen: *Bremia lactucae*) and damping-off

(*Pythium* species) can cause substantial damage and crop loss in organic spinach production. Growers plant resistant varieties as one management strategy for downy mildew. However, susceptibility increases as new races develop, with significant yield losses possible. Another strategy to manage downy mildew is the use of organically acceptable materials such as hydrogen peroxide or copper products. These materials carry restrictions for organic production and depending upon the level of disease pressure, may provide limited or no control. *Pythium* is managed using good water and irrigation practices. Because of the variation in insect and disease pressures from year to year and location to location, costs for a generic pest management program are included in this study.

Harvest. Organic spinach for the clip or salad market is harvested between 25 and 35 days after planting. In this study harvest is assumed to be performed by a custom operator; growers who own harvest equipment will perform their own operations. Spinach is packed into 20-pound totes during harvest operations; total costs to harvest, pack, and palletize the product are estimated at \$0.20 per pound. After harvest, totes are transported to a salad plant for cooling and processing. Transportation cost depends on the distance to the salad plant; in this example it is included in the harvest cost. For this study costs for cooling and processing are borne by the salad plant and not the grower.

Yield/Overplanting. Yield for high-density planted organic spinach is estimated to range from 5,000 to 8,000 pounds per acre. The representative yield used in this study is 6,500 pounds per acre. Actual yield depends upon many variables including production conditions and location. Yield for organic spinach may be lower than for conventional production because of limited pest management options; when pest pressure is severe, the crop may be plowed under and a complete loss. Growers often overplant, or plant additional acreage each season to ensure that there is sufficient marketable product at harvest. **To account for the expenses associated with overplanting, this study includes 10 percent higher costs for cultural, certification, and cash overhead on a per acre basis as shown on Tables 1 to 6.**

Returns. Price for organic clip or bulk spinach is estimated to range from \$0.70 to \$1.30 per pound. Price will fluctuate depending on market conditions. Table 4 provides more information on yield and price ranges, including sample net returns above indicated costs.

California State Registration and Organic Certification. Each grower pays annual organic registration and certification fees. Cost depends upon gross income, inspection fees, and the complexity of the operation. For this study, cost for state registration and organic certification is estimated at \$14 per acre and includes inspection fees by an accredited certifying agent.

Growing Costs. Some growers along the Central Coast of California prefer to focus on growing costs and therefore separate total harvest costs from total cash costs, and equipment depreciation and replacement costs. For this study, growing costs are noted at the bottom of Table 1, and are calculated by subtracting total harvest costs from total costs. Growing costs depend upon many variables including location and grower.

Labor, Interest, and Equipment

Labor. The labor rates used in this study are \$21.70 per hour for machine operators and \$16.10 for general labor, which includes overhead of 40 percent. The basic hourly wages are \$15.50 for machine operators and \$11.50 for general labor. The overhead includes the employers' share of federal and California state payroll taxes, workers' compensation insurance for truck crops (code 0172), and a percentage for other possible benefits. Workers' compensation insurance costs will vary among growers,

but for this study the cost is based upon the average industry rate as of January 1, 2015. Labor for operations involving machinery are 20 percent higher than the operation time given in Table 1 to account for the extra labor involved in equipment set up, moving, maintenance, work breaks, and field repair.

Because of labor constraints and on-farm operational needs, some growers may employ workers using the H-2A visa program or use contract labor for some operations. When using either one of these two approaches, base rates, overhead, and compliance with housing, meals, transportation, and other requirements will vary, and may result in labor costs that are higher than those used in this study.

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 percent 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 2015.

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 take off, (PTO) horsepower, and fuel type. Prices for on-farm delivery of red dye diesel and gasoline are \$2.70 (excludes excise tax) and \$3.25 per gallon, respectively. The cost includes a 2 percent local sales tax on diesel fuel and 8 percent sales tax on gasoline. Gasoline costs also include federal and state excise taxes, which are refundable for on-farm use when filing your income taxes. The fuel, lube, and repair cost per acre for each operation in Table 1 is determined by multiplying the total hourly operating cost in Table 6 for each piece of equipment used for the selected operation by the hours per acre. Tractor time is 10 percent higher than implement time for a given operation to account for setup, travel, and down time.

Pickup Truck. This study includes a cost for use of a pickup truck for business purposes.

Risk. The risks associated with producing and marketing an organic spinach crop are considered high. While this study makes every effort to model a production system based on typical, real world practices, it cannot fully represent production, financial, market, legal, and human resource risks that ultimately affect the profitability and economic viability of fresh market organic vegetable production. Crop insurance is one tool that growers may use to protect against loss. The market for fresh vegetables is volatile for both price and quantity. A market channel should be determined before any organic spinach production begins.

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. Because overhead costs are farm and ranch specific, costs will vary among growers. In most cases, costs are apportioned based on the number of crops per acre per year.

Property Taxes. Counties charge a base property tax rate of 1 percent 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 percent of the average value of the property. Average value equals new cost plus salvage value divided by 2 on a per acre basis.

Insurance. Insurance for farm investments varies depending on the assets included and the amount of coverage. Property insurance provides coverage for property loss and is charged at 0.843 percent of the average value of the assets over their useful life. Liability insurance covers accidents and other potential farm related liabilities and costs \$13 per acre for each crop.

Office Expense. Annual office and business expenses are estimated at \$700 per acre. Because three crops are produced each year per acre, one-third of this cost, or \$233, is assumed for the spinach crop studied here. Costs include, but are not limited to, a variety of administration and office expenses, a ranch supervisor, telephones, supplies, utilities, bookkeeping, and accounting. Some growers have one or more additional sub-foremen for various aspects of their operations. Costs for additional foremen are not included here.

Land Rent. Land rents for Monterey, Santa Cruz, and San Benito Counties range from \$350 to \$3,000 per acre per year. In this study, land rent is assumed to be \$2,400 per acre, or \$800 per acre for each organic spinach crop. However, rents can vary substantially within the area. Land rent includes developed wells and irrigation system. In general, growers in the region are responsible for the portion above ground such as the pump, and the landowner is responsible for what is below ground, such as the well running dry.

Food Safety and Regulatory Programs. To ensure the safety of fresh products, accommodate buyer requests, and comply with regulatory programs such as those for water and air quality, growers now have in-house departments and/or staff specially dedicated to supervision and management of these programs. Part of a food safety program is participation in third party (independent) audits. Costs associated with food safety programs vary depending upon the farm and inspection circumstances and are estimated at \$80 per acre per year or \$27 per acre per crop in this study. In addition, a cost of \$80 per acre per year or \$27 per acre per crop is included for management and compliance with regulatory programs.

Management Salaries. Wages for managers are not included as a cash cost. Any returns above total costs are considered a return to management.

Field Sanitation. Sanitation services provide portable toilets and washbasins for the farm. The cost includes a double toilet with washbasins, delivery and pickup, and two months of weekly servicing. Costs also include soap or other suitable cleansing agents and single-use towels. Separate potable water and single-use drinking cups are also supplied. Growers using contract labor may not have a separate sanitation cost.

Investment Repairs. Repair costs are the annual maintenance costs for investments in non-cash overhead. For this study annual repairs are calculated as 2 percent of the new cost.

Non-Cash Overhead

Non-cash overhead costs, shown on an annual per-acre basis, are 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 wear out life, as given by ASABE, by the annual hours of use in the 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 equal to the purchase price because land does not depreciate. The purchase price and salvage value for equipment and investments are shown in Table 5.

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 percent 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 2015.

Building. The metal building or buildings are on a cement slab and comprise 2,400 square feet.

Tools. This includes shop and field tools used on the farm. The value is estimated and does not represent any specific data.

Fuel Tanks. Two 300-gallon fuel tanks, one for diesel and one for gasoline, are on metal stands. The tanks are setup in a cement containment pad that meets federal, state, and county regulations.

Irrigation System/Trailers. The irrigation system is maintained by the landowner and assumed to be included in the land rental cost. The grower invests in and owns sprinkler pipe sufficient for irrigation needs. The grower also owns trailers and equipment needed for moving pipe and other irrigation supplies to and from the field. Irrigation water is pumped from a well and delivered to the fields through an underground pipe system. Main lines above ground are connected to the underground system to deliver water for the sprinkler and drip irrigations. In this study, water is pumped from a depth of 120 feet in a 500-foot well and the grower pays the pumping cost.

Equipment. Farm equipment is purchased when it is both new and used. This study shows the current purchase price for new equipment, which is then adjusted to 70 percent to reflect a mix of new and used equipment. Seventy percent indicates a relatively high percentage of new equipment because of machinery upgrades that are currently necessary to meet air quality requirements. Annual ownership costs for equipment and other investments are shown in Table 5. Equipment costs are composed of three parts: non-cash overhead, cash overhead, and operating costs. Both of the overhead factors have been discussed in previous sections. The operating costs consist of repairs, fuel, and lubrication and are discussed under operating costs.

Table Values. Due to rounding, the totals may be slightly different from the sum of the components.

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UC COOPERATIVE EXTENSION-AGRICULTURAL ISSUES CENTER
TABLE 1. COSTS PER ACRE TO PRODUCE AND HARVEST ORGANIC SPINACH*
 Central Coast-2015

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:								
Soil Samples (2 per 15 Ac)	0.00	0	0	0	0	7	7	
Compost + Spread (1X per 3 Crops)	0.00	0	0	0	80	8	88	
Disc & Roll 6X	1.99	52	70	52	0	0	174	
Subsoil 2X	1.31	34	46	24	0	0	105	
Chisel 4X	1.77	46	63	40	0	0	149	
Land Plane (1X per 2 Crops)	0.20	5	7	5	0	0	17	
Laser Level (1X per 2 Crops)	0.00	0	0	0	0	22	22	
List Beds 1X	0.14	4	5	3	0	0	11	
Sprinkler Setup & Pre-Irrigation	0.17	20	2	1	39	0	62	
Cultivate (Lilliston) 2X	0.47	12	6	5	0	0	23	
Power Mulch & Shape Beds	0.49	13	13	9	0	0	34	
Plant (Spider Planter)	0.28	7	7	10	1,980	0	2,004	
Fertilize (4-4-2)	0.00	0	0	0	550	22	572	
Sprinkler Setup & Irrigate	0.22	70	2	1	119	0	192	
Hand Weeding 2X	0.00	440	0	0	0	0	440	
Cultivate Furrows	0.34	9	4	3	0	0	16	
Pest Management	0.00	0	0	0	275	99	374	
PCA	0.00	0	0	0	0	33	33	
Pickup Use	0.37	10	3	1	0	0	14	
TOTAL CULTURAL COSTS	7.68	722	228	153	3,043	191	4,336	
Harvest:								
Harvest/Packing/Transporting	0.00	0	0	0	0	1,300	1,300	
TOTAL HARVEST COSTS	0.00	0	0	0	0	1,300	1,300	
Certification:								
Organic Certification	0.00	0	0	0	15	0	15	
TOTAL CERTIFICATION COSTS	0.00	0	0	0	15	0	15	
Interest on Operating Capital at 5.75%							31	
TOTAL OPERATING COSTS/ACRE	8	722	228	153	3,058	1,491	5,682	

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TABLE 1. CONTINUED

Central Coast-2015

Operation	Operation	Cash and Labor Costs per Acre					Total Cost	Your Cost
	Time (Hrs/A)	Labor Cost	Fuel	Lube & Repairs	Material Cost	Custom/Rent		
CASH OVERHEAD:								
Liability Insurance							14	
Office Expense							256	
Sanitation Fees							3	
Land Rent							880	
Food Safety							30	
Regulatory Programs							30	
Property Taxes							8	
Property Insurance							7	
Investment Repairs							2	
TOTAL CASH OVERHEAD COSTS/ACRE							1,230	
TOTAL CASH COSTS/ACRE							6,912	
NON-CASH OVERHEAD:								
		Per Producing Acre		Annual Cost		Capital Recovery		
Shop Building		100		8			8	
Fuel Tanks & Pumps		7		0			0	
Tools		15		1			1	
Sprinkler Pipe (200 Acres)		757		48			48	
Collapsible Spinach Totes (1,000)		11		2			2	
Equipment		1,225		159			159	
TOTAL NON-CASH OVERHEAD COSTS							219	
TOTAL COSTS/ACRE							7,131	

* Cultural, certification, and cash overhead costs are calculated at 10 percent higher in Tables 1 to 6 to account for expenses associated with overplanting.

TOTAL COSTS PER ACRE - HARVEST COSTS PER ACRE = GROWING COSTS PER ACRE

\$7,131-\$1,300=\$5,831

UC COOPERATIVE EXTENSION-AGRICULTURAL ISSUES CENTER
TABLE 2. MATERIAL AND INPUT COSTS PER ACRE TO PRODUCE AND HARVEST ORGANIC SPINACH
 Central Coast-2015

	Quantity/ Acre	Unit	Price or Cost/Unit	Value or Cost/Acre	Your Cost
OPERATING COSTS					
Fertilizer:				630	
Compost	1.46	ton	55.00	80	
4-4-2 (Chicken Manure-Blood Meal)	1.37	ton	400.00	550	
Custom:				1,458	
Soil Samples	1.10	acre	6.00	7	
Haul/Spread Compost	0.36	acre	20.00	8	
Laser Level	0.36	acre	60.00	22	
Spread Fertilizer (4-4-2)	1.10	acre	20.00	22	
Air Application	2.20	acre	45.00	99	
Harvest/Pack/Palletize	1.00	acre	1300.00	1,300	
*Pest Management:				275	
Pest Management				275	
Water:				158	
Water-Pumped	8.80	acin	18.00	158	
Seed:				1,980	
Organic Spinach	4.40	million	450.00	1,980	
Contract:				33	
PCA fee	1.10	acre	30.00	33	
Organic Registration/Certification:				15	
Organic Certification	1.10	acre	14.00	15	
Labor:				722	
Equipment Operator Labor	9.22	hrs	21.70	200	
Non-Machine Labor	32.35	hrs	16.10	522	
Machinery:				381	
Fuel-Gas	0.83	gal	3.25	3	
Fuel-Diesel	76.07	gal	2.70	225	
Lube				34	
Machinery Repair				118	
Interest on Operating Capital @ 5.75%				30	
TOTAL MATERIAL AND INPUT COSTS/ACRE				5,682	

*Pest management programs vary depending on annual production conditions and pest pressure.

UC COOPERATIVE EXTENSION-AGRICULTURAL ISSUES CENTER
TABLE 3. MONTHLY CASH COSTS PER ACRE TO PRODUCE AND HARVEST ORGANIC SPINACH
 Central Coast-2015

	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	JAN	FEB	Total
	15	15	15	15	15	15	15	15	15	15	16	16	
Cultural:													
Soil Samples (2 per 15 Ac)	7												7
Compost+Spread (1X per 3 Crops)	88												88
Disc & Roll 6X	174												174
Subsoil 2X	105												105
Chisel 4X	149												149
Land Plane (1X per 2 Crops)	17												17
Laser Level (1X per 2 Crops)	22												22
List Beds 1X	11												11
Sprinkler Setup & Pre-Irriga20	62												62
Cultivate (Lilliston) 2X	23												23
Power Mulch & Shape Beds	34												34
Plant (Spider Planter)		2,004											2,004
Fertilize (4-4-2)		572											572
Sprinkler Setup & Irrigate		192											192
Hand Weeding 2X		440											440
Cultivate Furrows		16											16
Pest Management		374											374
PCA		33											33
Pickup Use	1	1	1	1	1	1	1	1	1	1	1	1	14
TOTAL CULTURAL COSTS	693	3,632	1	1	1	1	1	1	1	1	1	1	4,336
Harvest:													
Harvest/Packing/Transporting		1,300											1,300
TOTAL HARVEST COSTS	0	1,300	0	0	0	0	0	0	0	0	0	0	1,300
Certification:													
Organic Certification		15											15
TOTAL CERTIFICATION COSTS	0	15	0	0	0	0	0	0	0	0	0	0	15
Interest on Operating Capital @ 5.75%	3	27	0	0	0	0	0	0	0	0	0	0	31
TOTAL OPERATING COSTS/ACRE	696	4,974	1	1	1	1	1	1	1	1	1	1	5,682
CASH OVERHEAD													
Liability Insurance	1	1	1	1	1	1	1	1	1	1	1	1	14
Office Expense	21	21	21	21	21	21	21	21	21	21	21	21	256
Sanitation Fees	2	2											3
Land Rent	880												880
Food Safety	30												30
Regulatory Programs	30												30
Property Taxes		4									4		8
Property Insurance		3									3		7
Investment Repairs	0	0	0	0	0	0	0	0	0	0	0	0	2
TOTAL CASH OVERHEAD COSTS	964	32	23	23	23	23	23	23	23	23	30	23	1,230
TOTAL CASH COSTS/ACRE	1,660	5,005	24	24	24	24	24	24	24	24	31	24	6,912

UC COOPERATIVE EXTENSION-AGRICULTURAL ISSUES CENTER

TABLE 4. RANGING ANALYSIS – ORGANIC SPINACH

Central Coast-2015

COSTS PER ACRE AND PER LB AT VARYING YIELDS TO PRODUCE AND HARVEST ORGANIC SPINACH

	YIELD (lbs./acre)						
	5,000	5,500	6,000	6,500	7,000	7,500	8,000
OPERATING COSTS/ACRE:							
Cultural	4,336	4,336	4,336	4,336	4,336	4,336	4,336
Harvest	1,001	1,105	1,196	1,300	1,404	1,495	1,599
Certification	15	15	15	15	15	15	15
Interest on Operating Capital @ 5.75%	29	29	30	30	31	31	32
TOTAL OPERATING COSTS/ACRE	5,381	5,486	5,577	5,682	5,786	5,878	5,982
TOTAL OPERATING COSTS/LB	1.08	1.00	0.93	0.87	0.83	0.78	0.75
CASH OVERHEAD COSTS/ACRE	1,230	1,230	1,230	1,230	1,230	1,230	1,230
TOTAL CASH COSTS/ACRE	6,612	6,716	6,808	6,912	7,017	7,108	7,212
TOTAL CASH COSTS/LB	1.32	1.22	1.13	1.06	1.00	0.95	0.90
NON-CASH OVERHEAD COSTS/ACRE	219	219	219	219	219	219	219
TOTAL COSTS/ACRE	6,830	6,935	7,026	7,131	7,235	7,327	7,431
TOTAL COSTS/LB	1.37	1.26	1.17	1.10	1.03	0.98	0.93

Net Return per Acre above Operating Costs for Organic Spinach

PRICE (\$/lb)	YIELD (lbs./acre)						
Organic	5,000	5,500	6,000	6,500	7,000	7,500	8,000
0.70	-1,881	-1,636	-1,377	-1,132	-886	-628	-382
0.80	-1,381	-1,086	-777	-482	-186	122	418
0.90	-881	-536	-177	168	514	872	1,218
1.00	-381	14	423	818	1,214	1,622	2,018
1.10	119	564	1,023	1,468	1,914	2,372	2,818
1.20	619	1,114	1,623	2,118	2,614	3,122	3,618
1.30	1,119	1,664	2,223	2,768	3,314	3,872	4,418

Net Return per Acre above Cash Costs for Organic Spinach

PRICE (\$/lb)	YIELD (lbs./acre)						
Organic	5,000	5,500	6,000	6,500	7,000	7,500	8,000
0.70	-3,112	-2,866	-2,608	-2,362	-2,117	-1,858	-1,612
0.80	-2,612	-2,316	-2,008	-1,712	-1,417	-1,108	-812
0.90	-2,112	-1,766	-1,408	-1,062	-717	-358	-12
1.00	-1,612	-1,216	-808	-412	-17	392	788
1.10	-1,112	-666	-208	238	683	1,142	1,588
1.20	-612	-116	392	888	1,383	1,892	2,388
1.30	-112	434	992	1,538	2,083	2,642	3,188

Net Return per Acre above Total Costs for Organic Spinach

PRICE (\$/lb)	YIELD (lbs./acre)						
Organic	5,000	5,500	6,000	6,500	7,000	7,500	8,000
0.70	-3,330	-3,085	-2,826	-2,581	-2,335	-2,077	-1,831
0.80	-2,830	-2,535	-2,226	-1,931	-1,635	-1,327	-1,031
0.90	-2,330	-1,985	-1,626	-1,281	-935	-577	-231
1.00	-1,830	-1,435	-1,026	-631	-235	173	569
1.10	-1,330	-885	-426	19	465	923	1,369
1.20	-830	-335	174	669	1,165	1,673	2,169
1.30	-330	215	774	1,319	1,865	2,423	2,969

UC COOPERATIVE EXTENSION-AGRICULTURAL ISSUES CENTER
TABLE 5. WHOLE FARM ANNUAL EQUIPMENT, INVESTMENT, AND BUSINESS OVERHEAD COSTS FOR ORGANIC SPINACH
 Central Coast-2015

ANNUAL EQUIPMENT COSTS

Yr	Description	Price	Yrs. Life	Salvage Value	Capital Recovery	Cash Overhead		Total
						Insur-ance	Taxes	
15	205 HP 4WD Tractor	350,000	7	132,768	43,509	2,035	2,414	47,958
15	Disc - Offset 21'	42,500	5	13,844	7,231	237	282	7,750
15	Subsoiler 3-Shank, 32"	3,509	5	1,143	597	20	23	640
15	Chisel 20'	20,000	5	6,515	3,403	112	133	3,647
15	Triplane 24'X40'	35,000	10	6,189	3,980	174	206	4,359
15	Lister/Shaper 3-80" Rows	8,500	5	2,769	1,446	47	56	1,550
15	85 HP 4WD Tractor	102,967	8	35,934	11,974	585	695	13,254
15	Lilliston Cultivator 20'	18,500	10	3,272	2,104	92	109	2,304
15	Mulch Tiller 21'	42,224	10	7,467	4,801	209	248	5,259
15	Pickup Truck 1/2 T	28,000	5	12,549	4,140	171	203	4,514
15	Trailer-Pipe #2	1,950	20	108	150	9	10	169
15	Trailer-Pipe #1	1,950	20	108	150	9	10	169
15	150 HP4WD Tractor	225,000	15	43,804	19,244	1,133	1,344	21,721
15	Spider Planter 30 lines-80" Rows	75,000	4	27,605	14,600	432	513	15,545
15	Cultivator-3 Row	9,500	10	1,680	1,080	47	56	1,183
TOTAL		964,600	-	295,754	118,408	5,312	6,302	130,022
70% of New Cost*		675,220	-	207,028	82,886	3,719	4,411	91,016

*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								
Shop Building	100,000	20	10,000	7,545	464	550	200	8,758
Fuel Tanks-Overhead	6,500	20	650	490	30	36	130	686
Tools	15,000	15	1,500	1,350	70	83	300	1,802
Sprinkler Pipe	757,100	20	378,500	47,718	4,787	5,678	1,514	59,697
Spinach Totes	10,500	5	0	2,408	44	53	210	2,715
TOTAL INVESTMENT	889,100	-	390,650	59,511	5,394	6,399	2,354	73,658

ANNUAL BUSINESS OVERHEAD COSTS*

Description	Units/ Farm	Unit	Price/ Unit	Total Cost
Liability Insurance	200	acre	14	2,800
Office Expense	200	acre	256	51,200
Field Sanitation	200	acre	3	600
Land Rent	200	acre	880	176,000
Food Safety Program	200	acre	30	6,000
Regulatory Program	200	acre	30	6,000

* Includes 10 percent higher costs to account for expenses associated with overplanting.

UC COOPERATIVE EXTENSION-AGRICULTURAL ISSUES CENTER
TABLE 6. HOURLY EQUIPMENT COSTS FOR ORGANIC SPINACH
 Central Coast-2015

Yr	Description	Spinach	Total	Cash Overhead			Operating		Total Oper.	Total Costs/Hr.
		Hours Used	Hours Used	Capital Recovery	Insur- ance	Taxes	Lube& Repairs	Fuel		
15	205 HP 4WD Tractor	1191	2285	13.33	0.62	0.74	15.95	32.12	48.08	62.77
15	Disc - Offset 21'	398	400	12.65	0.42	0.49	8.45	0.00	8.45	22.01
15	Subsoiler 3-Shank, 32"	262	400	1.04	0.03	0.04	0.95	0.00	0.95	2.07
15	Chisel 20'	354	400	5.95	0.20	0.23	5.08	0.00	5.08	11.46
15	Triplane 24'X40'	40	300	9.29	0.41	0.48	6.28	0.00	6.28	16.45
15	Lister/Shaper 3-80" Rows	126	400	2.53	0.08	0.10	1.16	0.00	1.16	3.87
15	85 HP 4WD Tractor	252	2000	4.19	0.20	0.24	4.94	11.27	16.21	20.85
15	Lilliston Cultivator 20'	94	200	7.36	0.32	0.38	4.44	0.00	4.44	12.50
15	Mulch Tiller 21'	97	200	16.81	0.73	0.87	5.65	0.00	5.65	24.05
15	Pickup Truck 1/2 T	73	400	7.25	0.30	0.35	3.66	8.13	11.78	19.68
15	Trailer-Pipe #2	34	200	0.52	0.03	0.04	0.00	0.00	0.00	0.59
15	Trailer-Pipe #1	34	200	0.52	0.03	0.04	0.00	0.00	0.00	0.59
15	150 HP4WD Tractor	167	1050	12.83	0.76	0.90	10.11	23.50	33.62	48.10
15	Spider Planter 30 lines-80" Rows	55	375	27.25	0.81	0.96	25.43	0.00	25.43	54.45
15	Cultivator-3 Row	68	200	3.78	0.16	0.20	2.37	0.00	2.37	6.52