
University of California Agriculture and Natural Resources
Cooperative Extension
UC Davis Department of Agricultural and Resource Economics

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SAMPLE COSTS TO PRODUCE AND HARVEST STRAWBERRIES



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

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INTRODUCTION

The sample costs to produce and harvest strawberries in Santa Cruz, Monterey, 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 and harvest procedures considered typical for this crop and area and may not apply to every farm. Sample costs for labor, materials, equipment, and custom services are based on current figures. A blank column, “Your Cost”, is provided to enter your actual costs on Tables 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, contact Mark Bolda, mpbolda@ucanr.edu, or Jeremy Murdock, Department of Agricultural and Resource Economics, University of California, Davis, coststudies@ucdavis.edu. Sample Cost of Production studies for many commodities are available and can be downloaded from the website <https://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 strawberries in the Central Coast Region - Santa Cruz, Monterey, and San Benito Counties. **Sample costs are given for tractors, fuel, repairs, labor, materials, and custom services and are based on current figures as of March 2024. Costs per acre can vary considerably depending upon many variables such as individual grower practices vs custom services, production location and weather conditions, land rent and taxes, soil type, water costs, pest pressures, material inputs, energy costs, and labor costs and availability.** Uncertainty about climate change and the regulatory environment may also impact the costs and returns studied here.

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 strawberry production information is available from the University of California Division of Agriculture and Natural Resources at <https://anrcatalog.ucanr.edu/Items.aspx?hierId=160100>. **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.**

Strawberries are also produced using organic methods along the Central coast, with roughly 13 percent of the crop produced and marketed as organic. Many of the same practices that are used in conventional strawberry production are also used in organic production. Differences between the two production systems are primarily, but not exclusively, found in approaches to crop fertilization and pest management. Additional details on costs and returns for organic strawberry production can be found at: <https://coststudies.ucdavis.edu/current/commodities/strawberries>.

Farm. This study assumes a farm operation size of 50 contiguous acres of rented land. Strawberries are planted on 45 acres; roads, the irrigation system, and on-farm buildings account for the remaining five acres. The grower rents the land, which is assumed to be fairly flat. Strawberries may also be planted on rolling hills or sloped land in the area. This may necessitate erosion prevention and control measures, as well as practices and equipment that differ from those used in this study; differing practices or equipment are not included here. Strawberries are often grown on land that was planted previously to vegetable crops in a strawberry – vegetable rotation, in part to assist with management of soilborne diseases.

Production Cultural Practices and Material Inputs

Land Preparation, Pre-Plant Fertilization, and Pre-Plant Irrigation. Prior to land preparation, and to help determine fertilization practices, two soil samples per 45 acres are taken for analysis. Strawberry ground is then disced a total of six times, subsoiled twice, chiseled twice and then sprinkler irrigated using 0.5 acre-inch of water to ensure adequate moisture for fumigation (see Fumigation and Alternatives section below). After fumigation, an additional 0.5 acre-inch of water is applied to further moisten the soil. Beds are then listed and shaped. A slow release 18-8-13 fertilizer (or similar complete fertilizer) is drilled pre-plant into the beds at the same time as shaping at a rate of 500 pounds per acre. Drip irrigation tape (two lines per bed) is installed, and beds are covered with a plastic mulch using a mulch laying implement.

Fumigation and Alternatives. The field is flat fumigated with a combination of chloropicrin and 1,3-dichloropropene for pest management purposes. Cost for a solid, tarped fumigation is estimated at \$5,028 per acre, which includes a fumigation permit. Some growers use bed-type fumigation practices, which differ in cost from a flat fumigation.

The strawberry industry continues to be very active in researching alternatives to the pre-plant flat fumigation treatment described above. Some success has been realized, for example with the use of metam potassium (KPAM) as a crop termination treatment at the end of the season, or with anaerobic soil disinfestation (ASD), which adds a carbon source such as rice bran to the soil pre-plant, followed by saturating the soil with water to create an anaerobic environment that is less hospitable to soil pathogens. Other promising research, for example the use of steam to disinfest soil of both pathogens and weeds, is ongoing.

Plant Establishment. A slotting implement is used to punch holes in the plastic mulch at appropriate intervals for strawberry transplanting. Several varieties such as Monterey, Cabrillo, and a number of proprietary varieties are suitable for production in the region, but no specific variety is assumed in this study. For this study strawberries are planted on 48-inch beds, two rows per bed at 15-inch plant spacing for a total of 17,424 plants per acre. Typically, five percent of the field, or 870 plants per acre is replanted in the weeks and months that follow because of poor planting and field conditions; replanting is included in the establishment costs. Planting takes approximately 40 hours per acre. Some growers use different bed widths and plant spacings; management practices may then also differ to accommodate production and harvest needs.

Post-Plant Fertilization. From March to September CN9, CAN 17, KNO₃, monopotassium phosphate or 6-30-30 is applied through the drip system. This study includes the use of CAN 17. Grower fertilizer programs and timing vary widely, but most will use a complete or NPK fertilizer, and nitrogen (N) fertilizers, depending upon seasonal nutrient requirements.

Post-Plant Irrigation. After planting, strawberries are sprinkler irrigated each day for one week, and then as needed on alternate days for another week using a total of 2.5 acre-inches of water. From March to September (seven months), strawberries are drip irrigated two to three times per week using a total of 24 acre-inches. A total of 27.5 acre-inches of water is used for the entire season. Effective rainfall is not taken into account. Water cost is estimated at \$360 per acre-foot or \$30 per acre-inch. **The total amount and cost of water may differ substantially in this area depending on factors such a seasonal conditions, soil type, well depth and pumping variables, water district or agency, and associated delivery or other fees and taxes.**

CropManage. Growers may now take advantage of real-time recommendations for efficient water use and nitrogen fertilizer applications by using UC ANR's CropManage: <https://cropmanage.ucanr.edu/>. CropManage, which is currently available at no cost to growers, may be especially helpful in decision-making, accurate documentation of material inputs, sustainable practices, and compliance with both state and regional regulatory programs (see Fertilizer and Irrigation Regulatory Programs section below). Commercially available software programs may also be used.

Pest Management. Information for specific pest management materials and the associated application rates can be found in the *UC Integrated Pest Management (IPM) Pest Management Guidelines for Strawberries*. For more information on pest identification, monitoring, and pest management materials visit the UC IPM website at: <https://ipm.ucanr.edu/agriculture/strawberry/> or contact your local UCCE farm advisor. 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 PCA monitors the field for pest problems and nutritional status. Growers may hire private consultants on a per acre basis or as part of an agreement with an agricultural chemical and fertilizer company. In this study cost for a PCA is included at an estimated cost of \$140 per acre.

Weed and Runner Removal. Fumigation provides some control of weeds. However, additional weed management, along with removal of strawberry plant runners is essential in strawberry production. Hand weeding is estimated at 7.5 hours per acre for 10 months during the production season and runner removal is estimated at 10 hours per acre for the same 10 months during the production season. Growers with different planting configurations and/or especially weedy fields may require a higher level of management and therefore higher costs.

The pesticide program shown in Table A represents a typical program for the region but can vary considerably; effectiveness of practices depends upon field and environmental conditions. Adjuvants are recommended for many pesticides for effective control but are not included here.

Diseases. Powdery mildew (*Podosphaera aphanis*), Botrytis fruit rot (*Botrytis cinerea*), and Anthracnose (*Colletotrichum spp.*) are the diseases treated in this study. Treatments are combined (tank mixed) with insect control applications. Fungicide treatments are made every 12 to 16 days through March and every 20 to 25 days thereafter ending in early September. Also, some growers may dip transplants in a fungicidal solution prior to planting as a preventative measure for disease.

Insects. Two-spotted spider mite (*Tetranychus urticae*), lygus bug (*Lygus hesperus*) and various lepidopterous larvae are the insects controlled in this study. To assist with the control of twospotted spider mite, the predatory mite *Phytoseiulus persimilis* is released four times, once in January, once in February and then twice in March, for a total rate of 80,000 mites per acre per year. Application time is estimated at one hour per acre per release. Lygus bug is considered to be one of the most challenging pests to manage in strawberries. Growers control this pest using material applications, which are combined with the fungicide treatments and shown in Table A. Some growers may also use a bug vacuum twice weekly from April to October to control lygus bug. Costs are estimated at \$1,642 per acre but are not included in this study (please see 2022 Sample Costs to Produce and Harvest Organic Strawberries for more information about this practice).

Harvest. The crop is harvested from April through early October with peak harvest in June and July. Based on weight, the percent of the crop harvested each month in this study is shown in Table B. Strawberries are harvested by hand and field sorted/packed into eight 1-pound clamshell containers per tray at an average seasonal cost of \$4.80 per tray. Other container types and sizes are used but are not included in this study. Harvest is managed by a foreman, who supervises one or more 35-person harvest crews depending upon seasonal production and yield. Harvest rate per person ranges from three to eight trays per hour, with the lower rate occurring early and late in the season. Harvest

also includes a fruit checker and a card puncher to ensure proper harvest and tray counts are recorded for each member of the harvest crew. A truck loader stacks harvested trays on flatbed trucks and drivers deliver strawberries to the cooler, which takes about one hour roundtrip. Each truck holds two to three pallets with 110 trays per pallet or 220 to 330 trays per load. Cooling cost varies by cooler and grower volume and in this study is estimated at \$1.00 per tray.

Table A. Disease and Insect Material Applications

MONTH	DISEASE			INSECTS		
	Botrytis	Mildew	Anthracnose	Mites	Caterpillars	Lygus
March	Captan	Rally	Pristine	Savey		
March				<i>Persimilis</i>		
April		Quadris	Quadris		Dipel	
April	Elevate	Rally			Success	
May	Captan	Thiolux		Acramite	Dipel	Rimon
May		Quadris				
June	Elevate	Rally		Acramite		Malathion
June	Captan	Thiolux				
July		Quadris				Beleaf
August		Thiolux		Danitol		Danitol
September		Thiolux				

RATES PER ACRE in study: (Not Recommendations - see label or your PCA)

Captan	4.0 lb	Beleaf	2.8 oz
Elevate	1.5 lb	Dipel	1.0 lb
Rally	5.0 oz	Malathion	2.0 pt
Thiolux	5.0 lb	Savey	6.0 oz
Quadris	12 floz	Success	5.0 floz
Acramite	1.0 lb	Rimon	11.0 floz
Danitol	16.0 oz	Pristine	23.0 oz.

Table B. Percent Crop Harvested by

	April	May	Jun	July	Aug	Sep	Oct
Fresh %	5	12	25	26	18	12	2

Assessments. Growers and shippers pay the California Strawberry Commission (CSC) an assessment per tray (eight 1-pound containers) for research and marketing activities. The current assessment is \$0.05 per tray, which is split equally between grower and shipper. Grower cost is therefore estimated at \$0.025 per tray.

Yields and Returns. Strawberry yield is measured in trays per acre. Average yield for fresh market fruit ranges from 7,000 to 12,000 trays per acre. This study assumes a yield of 9,000 trays containing eight 1-pound clamshells per acre. The weight ranges from 9.0 to 9.3 pounds per tray to account for some variance in fruit weight per tray and including the weight of the clamshells and trays.

The estimated unit price to growers is \$11 based on the 2021 to 2023 Salinas-Watsonville shipping point prices from the USDA Agricultural Marketing Service. Prices range from a low of \$7 to a high of \$18 depending on market conditions. In general, higher prices are seen early and late in the season when the volume of harvested product is low; lower prices are seen when peak season volumes are high. Estimated net returns to growers for a combination of yields and prices are shown in Table 4 Ranging Analysis.

Sales/Marketing. Selling costs for fresh market fruit are estimated at eight percent of the selling price or \$0.88 per tray (\$11 x 8%), which is shown on Tables 1 to 3.

Post-Harvest (Year End) Cleanup. After all harvest operations have been completed, strawberry plants are mowed, the plastic mulch and drip tape are removed, and disposed of at a landfill or recycling center. In this study a custom operator performs this service; it may also be handled by growers using their own equipment and labor. Growers may also have a crew walk the field to make sure all mulch has been removed from the field. The field is disced twice in preparation for the next crop.

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, 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 in this region vary considerably and depend on grower specific production practices, water and other input costs, and land rent and taxes.**

Labor, Equipment, and Interest

Labor. Labor rates are estimated at \$29.60 per hour for machine operators and \$24.42 for field labor, which includes overhead of 48 percent. The basic hourly wages are \$20.00 for machine operators and \$16.50 for field labor. The overhead includes the employers' share of federal and California state payroll taxes, workers' compensation insurance for strawberry crops (code 0079), and a percentage for other possible benefits. Workers' compensation costs will vary among growers, but for this study the cost is based upon the average industry rate as of September 2023. 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.

California Minimum Wage and Overtime Rules. In 2016 new minimum wage and overtime laws were passed in California that were gradually phased in over time. For 2024 minimum wage increased to \$16.00 per hour, a 3.2 percent increase over the 2023 minimum wage. Many growers may already pay wages that are higher than the state's legal requirement, as is shown in this study. In 2022 the new overtime law completed its multi-year phase in period for farming operations that employ 26 or more employees. Overtime wages are now required for work over 8 hours per day or 40 hours per week.

Federal H-2A Program. Growers may choose to use the H-2A guestworker visa program to employ workers. Rates of pay are determined by the highest applicable wage rates that are in effect at the time work is performed: the adverse effect wage rate (AEWR), the applicable prevailing wage, the agreed-upon collective bargaining rate, or the Federal or State statutory minimum wage (US Department of Labor). Growers also need to comply with other requirements associated with the H-2A program, including those for housing, meals, and transportation. Use of this program may result in labor costs that are higher than those shown in this study but may be necessary in order to assure a reliable supply of labor.

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 9.00 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 used in this study is considered a typical lending rate by a farm lending agency as of February 2024.

Equipment Operating Costs. Repair costs are based on purchase price, annual hours of use, total hours of life, and repair coefficients formulated by American Society of Agricultural and Biological Engineers (ASABE). Fuel and lubrication costs are also determined by ASABE equations based on maximum power takeoff (PTO) horsepower, and fuel type. Prices for on-farm delivery of red dye diesel and gasoline are \$5.18 (excludes excise taxes) and \$4.60 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 taxes, which are refundable for on-farm use when filing 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.

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

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 two on a per acre basis.

Insurance. Insurance for farm investments varies depending upon the assets included and the amount of coverage. Property insurance provides coverage for property loss and is charged at 0.710 percent of the average value of the assets over their useful life. Liability insurance covers accidents on the farm and each year is estimated at \$945 for the entire farm.

Office Expenses. Annual office and business expenses are estimated at \$800 per acre. Costs include, but are not limited to, a variety of administration and office expenses such as office supplies, telephones, bookkeeping, accounting, road maintenance, utilities, and other miscellaneous expenses.

Land Rent. Land rents in the three-county area range from \$500 to \$4,000 per acre per year. In this study land rent is assumed to be \$3,200 per acre per year. Land rent includes developed well(s) and irrigation system. In general, growers 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 nutrient management, growers may have in-house departments or staff specially dedicated to the supervision and management of these programs. **Associated costs will vary depending upon the farm size, staff time, and the complexity of operations.**

Food Safety. An estimated cost of \$112 per acre is included in this study. It includes participation in a third party (independent) audit of food safety practices.

Fertilizer and Irrigation Regulatory Programs. This study includes a cost of \$95 per acre for compliance and fees associated with current water quality and nutrient management regulatory programs: the State's Sustainable Groundwater Management Act (SGMA) and the Central Coast's Irrigated Lands Regulatory Program (ILRP). The estimated costs are for staff time to assist with sampling, data collection, recordkeeping, reporting, and administration. Fees associated with both SGMA's local Groundwater Sustainability Agency (GSA) and participation in a third-party entity to comply with ILRP's Central Coast (Region 3) Agricultural Order (Ag Order 4.0) are also estimated and included in the cost.

Field Sanitation. Sanitation services for the farm provide portable toilets with washing stations to the farm at an estimated cost of \$45 per acre. The cost includes double toilets with washbasins, delivery and pickup, and 12 months of servicing. Costs also include soap or other suitable cleaning agents, and single-use towels. Separate potable water and single-use drinking cups are also supplied.

Ranch Supervisor. The grower hires a supervisor to oversee some of the farm operations and work as needed when additional assistance is needed for cultural or harvest operations. The estimated cost for a supervisor is \$1,500 per acre. Larger operations may have multiple supervisory or management levels; associated costs will therefore differ.

Investment Repair. 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, with the exception of drip system repairs, which are 5 percent of the total costs and include materials and labor.

Non-Cash Overhead

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 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 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 and purchase price for land are the same 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. The interest rate of 8.25 percent used to calculate capital recovery. The rate will vary depending upon the size of the loan and other lending agency conditions but is the basic suggested rate by a farm lending agency as of February 2024.

Building and Tools. Estimated costs for a metal building, shop, and hand tools are included in the study. The value is estimated and does not represent any specific inventory.

Fuel Tanks. Two fuel tanks, one for diesel and one for gasoline, are located on the property. The tanks are set up in a cement containment pad that meets federal, state, and county regulations.

Irrigation System. The irrigation system is maintained by the landowner and assumed to be included in the land rental cost. In some cases the grower may be responsible for maintenance. The grower invests in and owns sprinkler pipe and drip system materials sufficient for irrigation needs. The grower also owns a trailer and other equipment needed for moving pipe and irrigation supplies to and from the field. Irrigation water is pumped from a well and delivered to the field through an underground pipe system. Main lines above ground are connected to the underground system to deliver water the irrigations. Additional information about irrigation practices is located in the Production Cultural Practices and Material Inputs section.

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 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 – UC DAVIS AGRICULTURAL AND RESOURCE ECONOMICS

TABLE 1. COSTS PER ACRE TO PRODUCE AND HARVEST STRAWBERRIES

Operation	Operation		Cash and Labor Costs per Acre					Total Cost	Your Cost
	Time (Hrs/A)	Labor Cost	Fuel	Lube & Repairs	Material Cost	Custom/Rent			
Cultural:									
Soil Samples (2 per 45 Acres)	0.00	0	0	0	0	5	5		
Disc 6X	0.98	35	66	24	0	0	125		
Subsoil 2X	1.50	53	102	35	0	0	190		
Chisel 2X	0.60	21	41	14	0	0	76		
Sprinkler Irrigation 2X (Pre-Plant)	1.30	78	15	4	30	0	128		
Fumigate (Flat - TIF Tarped)	0.00	0	0	0	0	5,028	5,028		
Tarp Retrieval/Disposal	0.00	0	0	0	0	112	112		
List/Shape 48" Beds	0.25	9	17	8	0	0	34		
Fertilize (Pre-Plant)	0.29	10	3	2	700	0	716		
Install Drip Tape/System	2.00	120	24	9	1,394	0	1,546		
Open Trench for Drip	0.10	16	1	0	0	0	17		
Grade Field Roads 2X	0.58	21	7	2	0	0	30		
Lay Mulch	2.00	266	24	13	516	0	818		
Punch Holes	1.50	53	18	6	0	0	77		
Plant (Includes 5% Replant)	40.00	977	0	0	3,659	0	4,636		
Roll Plants to Pack	0.20	7	2	1	0	0	10		
Sprinkler Irrigation (Post-Plant)	1.75	105	21	6	75	0	206		
Hand Weed	75.00	1,832	0	0	0	0	1,832		
Runner Removal	100.00	2,442	0	0	0	0	2,442		
Botrytis/Mildew/Mite/Anthracnose	0.58	21	9	4	208	0	242		
Release Persimilis (Predatory Mites)	4.00	98	0	0	680	0	778		
Drip Irrigate (Season)	10.50	256	0	0	720	0	976		
Fertigate (CAN 17)	0.00	0	0	0	161	0	161		
Botrytis/Mildew/Anthracnose	0.58	21	9	4	125	0	159		
Mildew/Anthracnose/Worms	0.58	21	9	4	54	0	87		
Botrytis/Mildew/Worms	1.17	41	18	8	157	0	224		
Botrytis/Mildew/Mites/Worms/Lygid	1.17	41	18	8	209	0	277		
Botrytis/Mildew/Mite/Lygid	1.17	41	18	8	255	0	322		
Mildew/Lygid	0.58	21	9	4	42	0	76		
Mildew/Mites/Lygid	0.58	21	9	4	31	0	65		
Mildew	0.58	21	9	4	5	0	39		
Year End Cleanup	0.00	0	0	0	0	560	560		
Disc 2X	0.33	12	22	8	0	0	42		
PCA	0.00	0	0	0	0	140	140		
Pickup Truck Use	1.71	61	20	9	0	0	89		
TOTAL CULTURAL COSTS	251.59	6,720	489	190	9,020	5,845	22,264		
Harvest:									
Harvest Strawberries	41.00	1,001	0	0	17,100	43,200	61,301		
Load/Haul	8.75	570	184	88	0	0	842		
Cool	0.00	0	0	0	0	9,000	9,000		
Market/Sales Fee	0.00	0	0	0	0	7,920	7,920		
Assessments - CSC	0.00	0	0	0	225	0	225		
TOTAL HARVEST COSTS	49.75	1,571	184	88	17,325	60,120	79,288		
Interest on Operating Capital at 9.00%							4,257		
TOTAL OPERATING COSTS/ACRE	301	8,291	674	277	26,345	65,965	105,809		

UC COOPERATIVE EXTENSION – UC DAVIS AGRICULTURAL AND RESOURCE ECONOMICS

TABLE 1. CONTINUED

Operation	Cash and Labor Costs per Acre							
	Operation Time (Hrs/A)	Labor Cost	Fuel	Lube &Repairs	Material Cost	Custom/ Rent	Total Cost	Your Cost
CASHOVERHEAD:								
Food Safety							112	
Land Rent							3,200	
Liability Insurance							19	
Office Expense							800	
Ranch Supervisor							1,500	
Field Sanitation							45	
Water & Nutrient Management Programs							95	
Property Taxes							47	
Property Insurance							3	
Investment Repairs							125	
TOTAL CASH OVERHEAD COSTS/ACRE							5,946	
TOTAL CASH COSTS/ACRE							111,755	
NON-CASH OVERHEAD:								
		<u>Per Producing Acre</u>		<u>Annual Cost Capital Recovery</u>				
Buildings		1,062		97			97	
Fuel Tanks		237		24			24	
Shop/Hand Tools		372		43			43	
Harvest Carts		25		6			6	
Lateral Lines		240		61			61	
Sprinkler Pipe		1,582		147			147	
Equipment		4,533		560			560	
TOTAL NON-CASH OVERHEAD COSTS		8,051		939			939	
TOTAL COSTS/ACRE							112,694	

Growing Costs = Total Cost – Harvest Cost. \$112,694 - \$79,288 = \$33,406

UC COOPERATIVE EXTENSION – UC DAVIS AGRICULTURAL AND RESOURCE ECONOMICS

TABLE 2. COSTS AND RETURNS PER ACRE TO PRODUCE AND HARVEST STRAWBERRIES

	Quantity/ Acre	Unit	Price or Cost/Unit	Value or Cost/Acre	Your Cost
GROSS RETURNS					
Strawberry	9,000	tray	11.00	99,000	
TOTAL GROSS RETURNS				99,000	
OPERATING COSTS					
Insecticide:				429	
Savey 50 DF	6.00	oz	13.75	83	
Dipel DF	2.00	lb	20.00	40	
Success	5.00	floz	9.02	45	
Acramite 50WS	2.00	lb	82.00	164	
Rimon 0.83 EC	11.00	floz	3.44	38	
Malathion 8	2.00	pint	12.38	25	
Beleaf 50SG	2.80	oz	2.98	8	
Danitol 2.4 EC	16.00	floz	1.63	26	
Fungicide:				657	
Captan 50W	16.00	lb	7.75	124	
Rally 40W	20.00	oz	5.85	117	
Pristine	46.00	oz	2.83	130	
Quadris	36.00	floz	2.80	101	
Elevate 50WDG	3.00	lb	55.00	165	
Thiolux (Micronized Sulfur)	20.00	lb	1.01	20	
Miticide:				680	
Persimilis (Mites)	80.00	thou	8.50	680	
Fertilizer:				861	
18-8-13	500.00	lb	1.40	700	
CAN 17 (lb)	350.00	lb	0.46	161	
Custom:				48,905	
Soil Analysis	0.06	each	84.00	5	
Fumigate - TIF Tarped	1.00	Acres	5000.00	5,000	
Fumigation Permit	1.00	acre	28.00	28	
Mulch Retrieval/Disposal	1.00	acre	112.00	112	
Harvest/Sort/Pack	9000.00	tray	4.80	43,200	
Year End Cleanup	1.00	acre	560.00	560	
Materials:				19,010	
Drip Tape	17424.00	foot	0.08	1,394	
Mulch Pins	4000.00	each	0.02	80	
Mulch 48"	10890.00	foot	0.04	436	
Trays/Clamshells	9000.00	each	1.90	17,100	
Water:				825	
Water- Central Coast	27.50	acin	30.00	825	
Plants:				3,659	
Strawberry Plants	18294.00	each	0.20	3,659	
Contract:				17,060	
Cool	9000.00	tray	1.00	9,000	
Market/Sales Fee	9000.00	tray	0.88	7,920	
PCA	1.00	acre	140.00	140	
Assessment:				225	
Strawberry Commission	9000.00	tray	0.03	225	
Labor				8,291	
Equipment Operator Labor	37.00	hrs	29.60	1,095	
Irrigation Labor	11.80	hrs	24.42	288	
Non-Machine Labor	272.25	hrs	24.42	6,648	
Equipment Operator Labor	8.75	hrs	29.60	259	
Machinery				951	
Fuel-Gas	44.38	gal	4.60	204	
Fuel-Diesel	90.63	gal	5.18	469	
Lube				101	
Machinery Repair				176	
Interest on Operating Capital @ 9.00%				4,257	
TOTAL OPERATING COSTS/ACRE				105,809	
TOTAL OPERATING COSTS/TRAY				12	
NET RETURNS ABOVE OPERATING COSTS				-6,809	

UC COOPERATIVE EXTENSION – UC DAVIS AGRICULTURAL AND RESOURCE ECONOMICS

TABLE 2. CONTINUED

	Quantity/ Acre	Unit	Price or Cost/Unit	Value or Cost/Acre	Your Cost
CASH OVERHEAD COSTS					
Food Safety				112	
Land Rent				3,200	
Liability Insurance				19	
Office Expense				800	
Ranch Supervisor				1,500	
Field Sanitation				45	
Water & Nutrient Management Programs				95	
Property Taxes				47	
Property Insurance				3	
Investment Repairs				125	
TOTAL CASH OVERHEAD COSTS/ACRE				5,946	
TOTAL CASH OVERHEAD COSTS/TRAY				1	
TOTAL CASH COSTS/ACRE				111,755	
TOTAL CASH COSTS/TRAY				12	
NET RETURNS ABOVE CASH COSTS				-12,755	
NON-CASH OVERHEAD COSTS (Capital Recovery)					
Buildings				97	
Fuel Tanks				24	
Shop/Hand Tools				43	
Harvest Carts				6	
Lateral Lines				61	
Sprinkler Pipe				147	
Equipment				560	
TOTAL NON-CASH OVERHEAD COSTS/ACRE				939	
TOTAL NON-CASH OVERHEAD COSTS/TRAY				0	
TOTAL COST/ACRE				112,694	
TOTAL COST/TRAY				13	
NET RETURNS ABOVE TOTAL COST				-13,694	

UC COOPERATIVE EXTENSION – UC DAVIS AGRICULTURAL AND RESOURCE ECONOMICS

TABLE 3. MONTHLY CASH COSTS PER ACRE TO PRODUCE AND HARVEST STRAWBERRIES

	AUG 23	SEP 23	OCT 23	NOV 23	DEC 23	JAN 24	FEB 24	MAR 24	APR 24	MAY 24	JUN 24	JUL 24	AUG 24	SEP 24	OCT 24	Total
Cultural:																
Soil Samples (2 per 45 Acres)	5															5
Disc 6X	125															125
Subsoil 2X		190														190
Chisel 2X		76														76
Sprinkler Irrigation 2X (Pre-Plant)		128														128
Fumigate (Flat - TIF Tarped)		5,028														5,028
Tarp Retrieval/Disposal		112														112
List/Shape 48" Beds		34														34
Fertilize (Pre-Plant)		716														716
Install Drip Tape/System		1,546														1,546
Open Trench for Drip		17														17
Grade Field Roads 2X		15						15								30
Lay Mulch		818														818
Punch Holes			77													77
Plant (Includes 5% Replant)			4,636													4,636
Roll Plants to Pack			10													10
Sprinkler Irrigation (Post-Plant)			206													206
Hand Weed					183	183	183	183	183	183	183	183	183	183	183	1,832
Runner Removal					244	244	244	244	244	244	244	244	244	244	244	2,442
Botrytis/Mildew/Mite/Anthracnose								242								242
Release Persimilis (Predatory Mites)						194	194	389								778
Drip Irrigate (Season)								127	142	142	142	142	142	142	142	976
Fertigate (CAN 17)								23	23	23	23	23	23	23	23	161
Botrytis/Mildew/Anthracnose								159								159
Mildew/Anthracnose/Worms									87							87
Botrytis/Mildew/Worms									224							224
Botrytis/Mildew/Mites/Worms/Lyigus										277						277
Botrytis/Mildew/Mite/Lyigus											322					322
Mildew/Lyigus												76				76
Mildew/Mites/Lyigus													65			65
Mildew														39		39
Year End Cleanup															560	560
Disc 2X															42	42
PCA															140	140
Pickup Truck Use	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	89
TOTAL CULTURAL COSTS	136	8,685	4,935	6	433	628	628	1,387	910	875	920	674	663	637	748	22,264
Harvest:																
Harvest Strawberries									3,088	7,358	15,295	15,922	11,025	7,358	1,255	61,301
Load/Haul									48	96	192	217	144	96	48	842
Cool									450	1,080	2,250	2,340	1,620	1,080	180	9,000
Market/Sales Fee									396	950	1,980	2,059	1,426	950	158	7,920
Assessments - CSC															225	225
TOTAL HARVEST COSTS	0	0	0	0	0	0	0	0	3,982	9,485	19,717	20,538	14,215	9,485	1,866	79,288
Interest on Operating Capital @9.00%	1	66	103	103	106	111	116	126	163	241	395	555	666	742	762	4,257
TOTAL OPERATING COSTS/ACRE	137	8,751	5,038	109	540	739	744	1,514	5,055	10,600	21,033	21,766	15,544	10,864	3,376	105,809

UC COOPERATIVE EXTENSION – UC DAVIS AGRICULTURAL AND RESOURCE ECONOMICS

TABLE 3. CONTINUED

	AUG 23	SEP 23	OCT 23	NOV 23	DEC 23	JAN 24	FEB 24	MAR 24	APR 24	MAY 24	JUN 24	JUL 24	AUG 24	SEP 24	OCT 24	Total	
CASH OVERHEAD																	
Food Safety															112	112	
Land Rent	213	213	213	213	213	213	213	213	213	213	213	213	213	213	213	213	3,200
Liability Insurance																19	19
Office Expense	67	67	67	67	67	67	67	67	67	67	67	67	67	67	67	67	800
Ranch Supervisor	125	125	125	125	125	125	125	125	125	125	125	125	125	125	125	125	1,500
Field Sanitation	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	45
Water & Nutrient Management Programs																95	95
Property Taxes							23									23	47
Property Insurance							2									2	3
Investment Repairs	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	125
TOTAL CASH OVERHEAD COSTS	416	416	416	416	416	416	441	416	416	416	416	441	416	416	642	5,946	
TOTAL CASH COSTS/ACRE	553	9,168	5,454	525	956	1,155	1,185	1,930	5,471	11,017	21,449	22,208	15,960	11,280	4,018	111,755	

UC COOPERATIVE EXTENSION – UC DAVIS AGRICULTURAL AND RESOURCE ECONOMICS

TABLE 4. RANGING ANALYSIS

COSTS PER ACRE AND PER TRAY AT VARYING YIELDS TO PRODUCE AND HARVEST STRAWBERRIES

	YIELD (TRAY)						
	6,000	7,000	8,000	9,000	10,000	11,000	12,000
OPERATING COSTS/ACRE:							
Cultural	22,264	22,264	22,264	22,264	22,264	22,264	22,264
Harvest	53,070	61,810	70,549	79,288	88,028	96,767	105,506
Interest on Operating Capital @ 9.00%	3,441	3,713	3,985	4,257	4,529	4,801	5,073
TOTAL OPERATING COSTS/ACRE	78,775	87,787	96,797	105,809	114,820	123,831	132,843
TOTAL OPERATING COSTS/TRAY	13.13	12.54	12.10	11.76	11.48	11.26	11.07
CASH OVERHEAD COSTS/ACRE	5,946	5,946	5,946	5,946	5,946	5,946	5,946
TOTAL CASH COSTS/ACRE	84,721	93,733	102,743	111,755	120,766	129,778	138,789
TOTAL CASH COSTS/TRAY	14.12	13.39	12.84	12.42	12.08	11.80	11.57
NON-CASH OVERHEAD COSTS/ACRE	939	939	939	939	939	939	939
TOTAL COSTS/ACRE	85,660	94,672	103,682	112,694	121,705	130,716	139,727
TOTAL COSTS/TRAY	14.00	14.00	13.00	13.00	12.00	12.00	12.00

Net Return Per Acre Above Operating Costs For Strawberries

PRICE (\$/tray)	YIELD (tray/acre)						
Strawberry	6,000	7,000	8,000	9,000	10,000	11,000	12,000
8.00	-30,775	-31,787	-32,797	-33,809	-34,820	-35,831	-36,843
9.00	-24,775	-24,787	-24,797	-24,809	-24,820	-24,831	-24,843
10.00	-18,775	-17,787	-16,797	-15,809	-14,820	-13,831	-12,843
11.00	-12,775	-10,787	-8,797	-6,809	-4,820	-2,831	-843
12.00	-6,775	-3,787	-797	2,191	5,180	8,169	11,157
14.00	5,225	10,213	15,203	20,191	25,180	30,169	35,157
16.00	17,225	24,213	31,203	38,191	45,180	52,169	59,157

Net Return Per Acre Above Cash Costs For Strawberries

PRICE (\$/tray)	YIELD (tray/acre)						
Strawberry	6,000	7,000	8,000	9,000	10,000	11,000	12,000
8.00	-36,721	-37,733	-38,743	-39,755	-40,766	-41,778	-42,789
9.00	-30,721	-30,733	-30,743	-30,755	-30,766	-30,778	-30,789
10.00	-24,721	-23,733	-22,743	-21,755	-20,766	-19,778	-18,789
11.00	-18,721	-16,733	-14,743	-12,755	-10,766	-8,778	-6,789
12.00	-12,721	-9,733	-6,743	-3,755	-766	2,222	5,211
14.00	-721	4,267	9,257	14,245	19,234	24,222	29,211
16.00	11,279	18,267	25,257	32,245	39,234	46,222	53,211

Net Return Per Acre Above Total Costs For Strawberries

PRICE (\$/tray)	YIELD (tray/acre)						
Strawberry	6,000	7,000	8,000	9,000	10,000	11,000	12,000
8.00	-37,660	-38,672	-39,682	-40,694	-41,705	-42,716	-43,727
9.00	-31,660	-31,672	-31,682	-31,694	-31,705	-31,716	-31,727
10.00	-25,660	-24,672	-23,682	-22,694	-21,705	-20,716	-19,727
11.00	-19,660	-17,672	-15,682	-13,694	-11,705	-9,716	-7,727
12.00	-13,660	-10,672	-7,682	-4,694	-1,705	1,284	4,273
14.00	-1,660	3,328	8,318	13,306	18,295	23,284	28,273
16.00	10,340	17,328	24,318	31,306	38,295	45,284	52,273

UC COOPERATIVE EXTENSION – UC DAVIS AGRICULTURAL AND RESOURCE ECONOMICS

TABLE 5. WHOLE FARM ANNUAL EQUIPMENT, INVESTMENT, AND BUSINESS OVERHEAD COSTS FOR STRAWBERRIES

ANNUAL EQUIPMENT COSTS

Yr	Description	Price	Yrs Life	Salvage Value	Capital Recovery	Cash Overhead		Total
						Insur- ance	Taxes	
24	205HP Crawler	350,000	15	68,139	39,056	148	2,091	41,295
24	42HP 4WD Tractor	50,400	15	9,812	5,624	21	301	5,946
24	Blade Rear 3 pt 6'	1,012	15	97	117	0	6	122
24	Chisel Spring 14'	9,800	15	941	1,128	4	54	1,186
24	Disc Offset 14'	23,545	10	4,164	3,265	10	139	3,413
24	Ripper-5 Shank 14'	11,664	10	2,063	1,617	5	69	1,691
24	Roller 8'	4,500	15	432	518	2	25	545
24	Sprayer 20' boom	3,920	4	1,443	871	2	27	900
24	Trailer-Pipe	2,322	20	129	238	1	12	251
24	55HP 2WD Tractor	66,000	15	12,849	7,365	28	394	7,787
24	Pickup Truck 1/2 T	38,880	7	14,749	5,891	19	268	6,179
24	Flatbed Truck - 1-1/2 Ton #1	62,650	10	18,506	8,180	29	406	8,614
24	Flatbed Truck - 1-1/2 Ton #2	62,650	10	18,506	8,180	29	406	8,614
24	Lister/Shaper - 3 Row	54,000	15	5,184	6,218	21	296	6,535
24	Fertilizer Drill - 3 Row	10,800	15	1,037	1,244	4	59	1,307
24	Drip Machine - 1 Row	3,780	15	363	435	1	21	457
24	Mulch Laying Machine - 2 Row	24,300	15	2,333	2,798	9	133	2,941
24	Punch Machine	5,400	15	518	622	2	30	654
TOTAL		785,623	-	161,264	93,367	336	4,734	98,437
70% of New Cost*		549,936	-	112,885	65,357	235	3,314	68,906

*Used to reflect a mix of new and used equipment

ANNUAL INVESTMENT COSTS

Description	Price	Yrs Life	Salvage Value	Capital Recovery	Cash Overhead			Total
					Insur- ance	Taxes	Repairs	
INVESTMENT								
Buildings	53,095	30	0	4,828	19	265	1,062	6,174
Fuel Tanks	11,850	20	830	1,212	5	63	237	1,517
Shop/Hand Tools	18,610	15	1,303	2,160	7	100	372	2,639
Harvest Carts	1,125	5	0	284	0	6	23	313
Lateral Lines	10,800	5	0	2,723	4	54	540	3,321
Sprinkler Pipe	71,210	20	35,605	6,632	38	534	3,561	10,765
TOTAL INVESTMENT	166,690	-	37,738	17,838	73	1,022	5,795	24,728

ANNUAL BUSINESS OVERHEAD COSTS

Description	Units/ Farm	Unit	Price/ Unit	Total Cost
Food Safety	50.00	acre	112.00	5,600
Land Rent	50.00	acre	3200.00	160,000
Liability Insurance	50.00	acre	18.90	945
Office Expense	50.00	acre	800.00	40,000
Ranch Supervisor	50.00	acre	1500.00	75,000
Field Sanitation	50.00	acre	45.00	2,250
Water & Nutrient Management Programs	50.00	acre	95.00	4,750

UC COOPERATIVE EXTENSION – UC DAVIS AGRICULTURAL AND RESOURCE ECONOMICS

TABLE 6. HOURLY EQUIPMENT COSTS FOR STRAWBERRIES

Yr	Description	Strawberries	Total	Cash Overhead			Operating			Total Costs/Hr.
		Hours Used	Hours Used	Capital Recovery	Insur- ance	Taxes	Lube& Repairs	Fuel	Total Oper.	
24	205HP Crawler	181	1066	25.65	0.10	1.37	18.73	61.63	80.36	107.48
24	42HP 4WD Tractor	481	1066	3.69	0.01	0.20	2.97	10.68	13.65	17.56
24	Blade Rear 3 pt 6'	31	100	0.82	0.00	0.04	0.14	0.00	0.14	1.00
24	Chisel Spring 14'	27	133	5.94	0.02	0.28	2.28	0.00	2.28	8.52
24	Disc Offset 14'	59	200	11.43	0.03	0.48	4.33	0.00	4.33	16.27
24	Ripper-5 Shank 14'	68	200	5.66	0.02	0.24	3.02	0.00	3.02	8.94
24	Roller 8'	9	133	2.73	0.01	0.13	0.57	0.00	0.57	3.44
24	Sprayer 20' boom	315	375	1.63	0.00	0.05	1.25	0.00	1.25	2.93
24	Trailer-Pipe	137	200	0.83	0.00	0.04	0.05	0.00	0.05	0.93
24	55HP 2WD Tractor	347	800	6.44	0.02	0.34	5.23	13.99	19.22	26.04
24	Pickup Truck 1/2 T	77	285	14.47	0.05	0.66	5.01	11.50	16.51	31.69
24	Flatbed Truck - 1-1/2 Ton #1	197	200	28.63	0.10	1.42	10.03	21.08	31.11	61.26
24	Flatbed Truck - 1-1/2 Ton #2	197	200	28.63	0.10	1.42	10.03	21.08	31.11	61.26
24	Lister/Shaper - 3 Row	11	133	32.73	0.11	1.56	12.11	0.00	12.11	46.51
24	Fertilizer Drill - 3 Row	13	100	8.71	0.03	0.41	3.01	0.00	3.01	12.16
24	Drip Machine - 1 Row	90	100	3.05	0.01	0.15	1.05	0.00	1.05	4.25
24	Fume/Plstc - 2 Row	90	133	14.73	0.05	0.70	3.09	0.00	3.09	18.56
24	Punch Machine	68	133	3.27	0.01	0.16	0.69	0.00	0.69	4.13