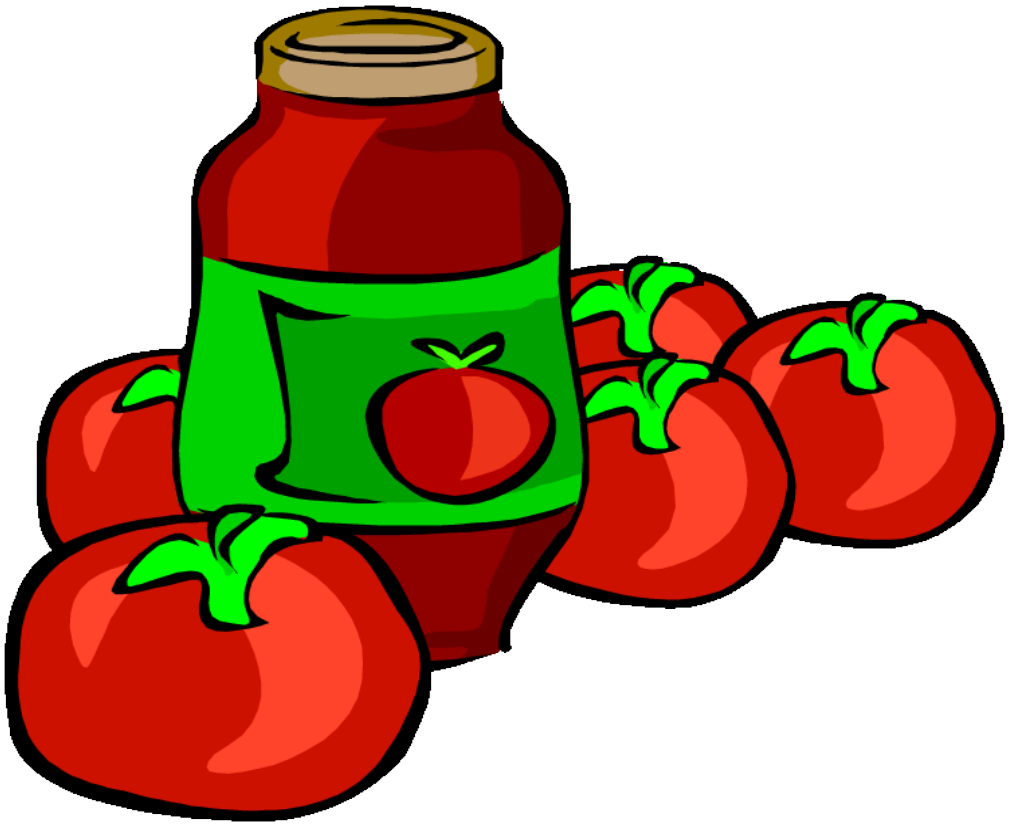
UNIVERSITY OF CALIFORNIA COOPERATIVE EXTENSION
AGRICULTURE AND NATURAL RESOURCES
AGRICULTURAL ISSUES CENTER
UC DAVIS DEPARTMENT OF AGRICULTURAL AND RESOURCE ECONOMICS

SAMPLE COSTS TO PRODUCE PROCESSING TOMATOES



SUB-SURFACE, DRIP IRRIGATED (SDI)
IN THE SACRAMENTO VALLEY & NORTHERN DELTA-2017

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STUDY CONTENTS

Acknowledgements. The authors thank the many individuals who furnished information for this study. Additional thanks go to the growers and industry people who gathered to provide their support and input.

INTRODUCTION

The sample costs to produce transplanted processing tomatoes under sub-surface, drip irrigation (SDI), in the Sacramento Valley and northern Delta are presented in this study. This study is intended as a guide only, and can be used to make production decisions, estimate potential returns, prepare budgets and evaluate production loans. Practices described are based on production practices considered typical for the crop and area, but will not apply to every situation. A blank column titled "Your Cost", is provided in Tables 1 and 2 to enter your estimated costs.

For an explanation of calculations used in the study refer to the section titled Assumptions. For more information contact Donald Stewart; University of California Agriculture and Natural Resources, Agricultural Issues Center, Department of Agricultural and Resource Economics, at 530-752-4651 or destewart@ucdavis.edu. You can contact the local UCCE Farm Advisor, Gene Miyao at emmiyao@ucdavis.edu or Brenna Aegerter at bjaegerter@ucanr.edu.

Sample Costs of Production Studies for many commodities are available at http://coststudies.ucdavis.edu/. Archived studies are also available on the website.

ASSUMPTIONS

Assumptions in Tables 1 to 7 pertain to sample costs to produce transplanted processing tomatoes under sub-surface drip irrigation (SDI), in the Sacramento Valley and northern Delta. Input prices and interest rates are based on January 2017 values. Practices described are not recommendations by the University of California, but represent production practices considered typical of a well-managed farm for this crop and area. Some of the costs and practices listed may not be applicable to all situations nor used during every production year and/or additional practices not indicated may be needed. Processing tomato cultural practices and material input costs will vary by grower and region, and can be significant. The practices and inputs used in the cost study serve as a guide only. The costs are shown on an annual, per acre basis. **The use of trade names 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.**

Farm. The hypothetical field and row-crop farm consists of 3,500 non-contiguous acres of rented land at 12% of gross tomato revenue for this budget. Tomatoes are transplanted on 1,000 acres, all sub-surface drip irrigated as two-thirds of the local tomato acreage is estimated to be sub-surface drip irrigated. Twenty-five hundred acres are planted to other rotational crops including alfalfa hay, field corn, safflower, sunflower, vine seed and/or wheat. The grower also owns various farm investments including a shop and an equipment yard. In this report, practices completed on less than 100% of the acres are denoted as a percentage of the total tomato crop acreage.

Cultural Practices and Material Inputs

Land Preparation. In the fall, bed tillage equipment is used to maintain semi-permanent beds on 80% of the acreage (800 acres) with the drip tape in place. Furrows are chiseled to 15-inches and rolled. Subsequently, a 3-row Performer® shallowly chisels, tills and reshapes the beds while avoiding disturbance of the drip tape.

On 20% of the acres, drip tape (200 acres) is removed after a five-year life expectancy and is included as a post-harvest cost. On these acres, in the fall (August through November) preceding tomato cropping, primary tillage operations are: stubble disc and roll (with a heavy roller); sub-soil to a 30-inch depth in two passes and roll in the same pass; medium-duty disc and ring roll in the same pass; smooth in two passes with a triplane; and finally, shape beds on five-foot centers with a six-bed lister. To maintain surface grade on some of the acres where the drip tape is replaced, one fifth of 20% (40 acres) is custom laser leveled each year ahead of the bulk of fall tillage. The drip tape is installed at 10 – 12" depth below the soil surface (1 tape/bed, 5 beds/pass), with beds re-shaped in the same operation. Drip tape is reconnected after hand-digging to water supply hoses connected to underground PVC main lines. Drip lines at the terminal ends are trimmed and plugged with in-line valves.

Transplanting. Planting is spread over a 10-week period to meet contracted weekly delivery schedules at harvest. Seedlings are transplanted in double-lines per bed at 8,720 plants per acre. All of the 1,000 acres are custom planted with greenhouse-grown transplants. The grower supplies the seed to the greenhouse operation to grow the transplants. Additional seed (15% above the quantity for the desired number of transplants) is needed to compensate for imperfect germination and for non-useable, damaged seedlings.

Fertilization. In the fall, ahead of listing beds, soil amendment gypsum at 3 tons per acre is custom broadcast on 20% of the acres. After beds are listed, muriate of potash (0-0-62) is sidedressed at 250 lbs. per acre on 40% of the acreage. Prior to transplanting, liquid starter fertilizer at 8 lbs. of N per acre of 8-24-5 plus 6.5%

zinc is banded with a tractor and implement. Nitrogen fertilizer, UAN-32 at 200 lbs. of N per acre, is injected at multiple intervals through the drip system over the growing season. The assistant manager calibrates and injects the pesticides and fertilizers. Growers may be applying additional micronutrients, biologicals and manures or planting cover crops on part of their acreage, but as these are not widespread practices, these operations are not included in this study.

Irrigation. In this study, water costs $65 per acre-foot (or $5.42 per acre-inch). The grower uses a combination of district canal water and ground water pumped from a depth of less than 120 feet. The irrigation costs itemized and shown in Tables 1 and 3 are for pumping and water. Two half-ton pickup trucks used for irrigation are itemized separately. Two ATVs are also used in the irrigation operation. An annual laboratory analysis to determine nitrate availability and to maintain regulatory records is included in this study.

Total applied water was calculated at 27.5 acre-inches (2.29 acre-feet). Sprinkler irrigation was used on 50% of the acres at 2 acre-inches (1" for the farm) as a single application to establish the stand after planting while 26 acre-inches are applied through the drip system to match crop evapotranspiration and to account for 85% irrigation system efficiency. The drip system requires chemical flushing to retard calcium buildup and emitter clogging. For this study the operation is performed after harvest with N-pHuric acid applied through the drip system with 0.5 acre-inch of water.

Pest Management. The pesticides and rates mentioned in this cost study are listed in *UC Integrated Pest Management Guidelines, Tomatoes.* For information on other pesticides available, pest identification, monitoring, and management visit the UC IPM website at www.ipm.ucanr.edu. **Although growers commonly use the pesticides mentioned, many other pesticides are available. Check with your PCA and/or the UC IPM website for current recommendations.** To purchase pesticides for commercial use, a grower must be a Certified Private Applicator to obtain a Pesticide Identification number. **For information and pesticide use permits, contact your local county agricultural commissioner's office.** While adjuvants may be recommended for use with many pesticides for effective control, adjuvants and their costs are not included in this study.

Pest Control Adviser/Certified Crop Advisor (PCA/CCA). Written recommendations are required for many pesticides and are available from a licensed pest control adviser. In addition, the PCA/CCA or an independent consultant will monitor the field for agronomic pest problems including irrigation and nutrition which would include a nitrogen management plan. Growers may hire a private PCA/CCA or receive the service as part of a service agreement with an agricultural chemical and fertilizer company.

Weeds. Beginning in January, glyphosate (Roundup UltraMax) in combination with oxyfluorfen (Goal 2XL) is sprayed on the fallow beds to control emerged weeds and repeated later with glyphosate only. The applications are made with an ATV-pulled sprayer with a 25-foot boom.

Before planting, the beds are cultivated to control weeds and to prepare a seedbed. As a preplant in the spring, trifluralin (Triflurex HFP) is tank-mixed with metolachlor (Dual II Magnum) as a broadcast and incorporated with a power mulcher on all acreage. Post-transplant, a band of rimsulfuron (Matrix SG) is sprayed to control weeds. Post-transplant at layby, a power incorporator is used to re-shape beds but without additional herbicides.

A combination of hand weeding and mechanical cultivation is also used for weed control. The crop is mechanically cultivated with a sled-mounted cultivator once during the season. A contract labor crew hand-removes weeds during the season.

Insects, Diseases & Vertebrate pests. The primary insect pests of seedlings included in this study are flea beetle, darkling ground beetle, and cutworm. Foliage and fruit feeders included are tomato fruitworm, various armyworm species, russet mite, stinkbug, and potato aphid. Diseases that are treated are primarily bacterial speck, occasionally late blight, and blackmold fruit rot. Vertebrate pests include squirrels, rabbits and gophers.

In this study, Kocide for bacterial speck is applied to 30% of the acres. Warrior is applied to 20% acreage for aphid control. Sulfur dust for russet mite and powdery mildew control is custom applied to 40% of the acres. Bravo-Weatherstik is applied in June to 5% of the acres for late blight control and in September on 15% of the acres as a fruit protectant fungicide. Confirm for worm control is applied to 100% of the acres. The application rates shown in Table 2 are adjusted to reflect the percentage of acreage treated. For gopher control, zinc phosphide is injected into gopher tunnels with a hand-held probe. Traps are also setup inside the gopher tunnels.

Fruit Ripener. Ethrel, a fruit ripening agent, is applied with a ground sprayer three weeks before harvest to 5% of the acreage. The rate in Table 2 is for 5% of an acre.

Harvest. The fruit is mechanically harvested by grower-owned-and-operated harvesters on 50% of the acreage while the remaining 50% is custom harvested by processor-owned-and-operated harvesters. The custom harvesting includes opening harvest lanes, harvesting, in-field hauling, and generator-light machines for night harvesting. The grower uses a single machine for 50% of the 1,000 acres. Typically, growers of this scale also own an older, back-up harvester when harvesting all 1,000 acres. Harvest support equipment includes tractors, trailer dollies, generator-light machine, and fuel trailers. A crew of four manual sorters, a harvester driver, and two bulk-trailer tractor drivers are used per harvester. A seasonal average of two loads per hour at 25 tons per load are harvested with two (one day and one night) shifts of 10 hours each. Harvest efficiency includes maintenance and cleaning, scheduled daily breaks, and transportation between fields. The processor pays the transportation cost of the tomatoes from the field to the processing plant.

Costs for harvest operations are shown in Tables 1, 3 and 4. Equipment is listed in Tables 5 and 6. Growers may choose to own harvesting equipment, purchase either new or used or hire a custom harvester. Many factors are important in deciding which harvesting option a grower uses.

Yields. An average of annual county tomato yields combined across the Sacramento Valley including neighboring San Joaquin County over the past five years ranged from 39.25 to 46.30 tons per acre. The reporting counties were Colusa, Sacramento, Solano, Sutter, Yolo and San Joaquin. Butte and Tehama are the only Sacramento Valley counties that do not report their processing tomato production average. In this study, a yield of 44 tons per acre is used.

Returns. Customarily, growers produce tomatoes under annual contracts with various tomato processors. A price of $72.50 per ton is used in this study which reflects the statewide crop price in 2016.

Ranging Analysis. Table 4 has a range of return prices used for calculating net returns per acre with different yields. Processing tomatoes are contracted as a statewide core price with late-season premiums and some fruit

quality incentives. For this analysis, selected yields ranged from 29 to 59 tons per acre and crop prices ranged from $57.50 to $87.50 per ton.

Assessments. Under a state marketing order, a mandatory assessment fee is collected and administered by the Processing Tomato Advisory Board (PTAB) to inspect and grade fruit. Fees vary between inspection stations. In the region, inspection fees in 2016 ranged from $9.68 to $11.52 per load with an average of $10.50. Growers and processors share equally in the fee; growers pay $5.25 per load in this study. A truckload is assumed to be 25 tons so the cost per ton is $0.21. Tomato growers are also assessed a fee for the Curly Top Virus Control Program (CTVCP) administered by the California Department of Food and Agriculture (CDFA). Growers in Yolo County are charged $0.019 per ton. Additionally, several voluntary organizations assess member growers. California Tomato Growers Association (CTGA) represents growers' interest in negotiating contract prices with processors and for grower advocacy. CTGA membership charges are $0.17 per ton. The California Tomato Research Institute (CTRI) funds projects for crop improvement. CTRI membership charges are $0.07 per ton.

Environmental Assessments. Certain areas have local assessments to fund state regulatory programs: Irrigated Lands Regulatory Program (ILRP) and the Erosion and Sediment Control Plan (ESCP) of the State Water Resources Control Board. The landowner is responsible for maintaining these records and paying the annual fees.

Pickups/ATVs. The study assumes approximately 8,500 business-use miles per year for each of four pickups and is shown as a separate line item. The two ATVs are used for irrigation, transportation, weed control and monitoring the crop.

Back Hoe/Road Grader/Service Truck/Water Truck. Each piece of equipment is listed separately under operations. This equipment is used for various tasks.

Irrigation Booster Pumps/Pipe Trailers. This equipment is owned by the grower and used for sprinkler irrigating the plants soon after transplanting or as a pre-plant irrigation.

Labor, Equipment and Interest

Labor. Basic wages are $13.25 and $11.25 per hour for machine operators and non-machine workers, respectively. Irrigation labor is paid $12.00 per hour. Adding 45% for the employer's share of federal and state payroll taxes, insurance and other benefits raises the total labor costs to $19.21 per hour for machine operators, $16.31 per hour for non-machine laborers and $17.40 per hour for irrigators. The overhead includes the employer's share of federal and California state payroll taxes, workers' compensation insurance for field crops and a percentage for other additional benefits. Workers' compensation insurance costs vary among growers. The cost is based on the average industry rate as of January 2017. The labor for operations involving machinery is 20% higher than the field operation time to account for equipment set up, road travel, maintenance, and repair and downtime.

Irrigation labor. Labor is involved in drip system operation and maintenance. Charges include the manual labor required during the underground installation and the removal of the drip tape. Labor is also needed for sprinkler setup, operation and removal.

Drip tape system maintenance costs are lowest in the first year and continually increase over the five-year life expectancy of the drip tape. The costs are for repairs, additional labor and time for flushing the system and adding chemicals to reduce drip emitter clogging.

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. Average prices for on-farm delivery of diesel and gasoline based on January 2017 data from the Energy Information Administration are $2.87 and $2.76 per gallon, respectively. The cost includes a 9.25% sales tax on diesel and 2.25% sales tax on gasoline. Federal and state excise taxes on diesel ($0.16/gal) and gasoline ($0.28/gal) are refunded for on-farm use when filing the farm income tax return.

Fuel, Lube & Repair. 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% higher than implement time for a given operation to account for setup, travel and down time.

Interest on Operating Capital. Interest on operating capital is based on cash operating costs and is calculated monthly until harvest at a nominal rate of 4.5% per year. A nominal interest rate is the typical market cost of borrowed funds. 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 2017.

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. These costs include personal property taxes, liability, property insurance, office expense, supervisors' salaries, field sanitation, and investment repairs. Employee benefits, insurance, and payroll taxes are included in labor costs and not in overhead. Cash overhead costs are shown in Tables 1, 2, 3, 4 and 5.

Property Taxes. Counties charge a base property tax rate of 1% on the assessed value of the property. In some counties special assessment districts exist and charge additional taxes on property including equipment, buildings, and improvements. For this study, county taxes are calculated as 1% of the average value of the property.

Insurance. Insurance for farm investments varies depending on the assets included and the amount of coverage.

Property Insurance. This provides coverage for property loss and is charged at 0.846% of the average value of the assets over their useful life.

Liability Insurance. A standard farm liability insurance policy will help cover the expenses for which the grower becomes legally obligated to pay for bodily injury claims on owned property and damages to another person's property as a result of a covered accident. Common liability expenses covered under a policy include attorney fees and court costs, medical expenses for people injured on this farm, or injury or damage to

another's property. In this study, $3,512 for the entire farm, ($1.00 per acre) is charged for a two-million dollar blanket policy.

Crop Insurance. This is available to processing tomato growers for unavoidable loss of production, damage or poor quality resulting from adverse weather conditions such as cool wet weather, freeze, frost, hail, excessive heat, rain, wind and damage from birds, drought, earthquakes and fire. Coverage levels are from 50-85% of the approved average yield as established by verifiable production records from the farm. Actual insurance coverage is by unit, not by acre. A significant number of growers purchase crop insurance in this region. Due to variability in coverages, none is purchased in this study.
http://www.rma.usda.gov/policies/2017policy.html

Office Expense. Office and business expenses are estimated to be $175,000 for the entire farm or $50 per acre. These expenses include office supplies, telephone/Internet, bookkeeping, accounting, road maintenance, office and shop utilities, and miscellaneous administrative expenses.

Land/Share Rent. Rent arrangements will vary. For this study, 100% of the land is rented at 12% of gross revenue for the tomatoes. Land rent includes use of developed wells and access to surface-delivered water.

Field Supervisors Salary. Supervisors' salaries include insurance, payroll taxes and benefits. Two-thirds of the supervisor's time is allocated to tomatoes at $85 per acre.

Assistant Managers Salary. The assistant manager's salary includes insurance, payroll taxes and benefits and is allocated to tomatoes at $21 per acre.

Field Sanitation. Sanitation services provide portable toilet and washing facilities for the ranch during the crop season. The cost includes delivery and weekly service for six months. Costs will vary depending upon the crops and number of portable units required.

Miscellaneous Costs. Included expenses are employee safety training as well as pesticide use and regulatory continuing education training, additional materials and applications for unique fields or special conditions.

Investment Repairs. Annual repairs on investment or capital recovery items that require maintenance are calculated as 2% of the purchase price.

Non-Cash Overhead

Non-cash overhead is calculated as the capital recovery cost for equipment and other farm investments. Although farm equipment used for processing tomatoes may be purchased new or used, this study shows the current purchase price for new equipment. The new purchase price is adjusted to 60% to reflect a mix of new and used equipment. Annual ownership costs (equipment and investments) are shown in Tables 1, 2, and 5. They represent the capital recovery cost for investments on an annual per acre basis.

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 prices and salvage values (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:

[{Purchase Price - Salvage Value} x Capital Recovery Factor] + [Salvage Value x 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 Engineers (ASAE) based on equipment type and years of life. The life in years is estimated by dividing the wear out life, as given by ASAE by the annual hours of use in this operation. For other investments including irrigation systems, buildings, and miscellaneous equipment, the value at the end of its useful life is zero for this study. The salvage value for land is equal to the purchase price because land does not depreciate. Salvage value of sprinklers and aluminum irrigation pipe are an exception and calculated at 50% due to current market value. The purchase price and salvage value for certain 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 and the life of the equipment.

Interest Rate. The interest rate of 5% is used to calculate capital recovery. The rate will vary depending upon size of loan and other lending agency conditions, but is a suggested rate by a farm lending agency in January 2017.

Irrigation Systems. The land owner is responsible for the maintenance costs of the well. This study does not show these costs. Irrigation equipment owned by the grower consists of booster pumps, pipe main lines, hand-move sprinklers and various hand tools. Drip system equipment owned by the grower consists of filters, booster & injector pumps and drip tape installation & extraction implements. Grower costs include connections to the pump, drip tape installation, sub-main water supply lines and installation, pressure regulators and air vents. Multi-year rental agreements are needed to spread expenses over years. An annual pump test is performed in January to monitor pumping level and efficiency (gallons/minute) at a cost of $200 for each pump. The cost of the tests are spread across the entire acreage of the pumps' capacity. The annual water analysis is performed at the same time and the charges are combined.

Drip Tape. The drip tape is considered an investment and is amortized over the five-year life expectancy of the tape. There are no recycling revenue or disposal fees for the drip tape in this study.

Equipment. Farm equipment is purchased new or used, but the study shows the current purchase price for new equipment. The new purchase price is adjusted to 60% to indicate a mix of new and used equipment. Annual ownership costs for equipment and other investments are shown in the Whole Farm Annual Equipment, Investment, and Business Overhead Costs, 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.

Flatbed Truck/Implement Carrier. This miscellaneous equipment is listed under investments and is used throughout the year to move equipment and supplies.

Buildings-Shop/Storage. The shop and storage buildings are used to perform maintenance on equipment and storage for equipment and supplies for the entire farm.

Global Positioning Systems, (GPS). The stationary GPS sending unit is mounted so that it can receive and send data to the tractors operating in the fields. The receiving units are mounted so that they are removable and interchangeable with several tractors.

Generators/Lights/Shop Tools. This includes shop tools and equipment, hand tools, and miscellaneous field tools. Generators and lights are for the staging/loading areas when harvesting at night.

Fuel Tanks. The farm has two fuel storage tanks. One 5,000-gallon diesel tank and one 500-gallon gasoline tank using gravity-feed. The tanks are setup horizontally on metal stands in a cement containment pad that meets federal, state, and county regulations. Additionally, three portable, 500-gallon diesel fuel trailers are used.

Risk. The risks associated with processing tomato production should not be underestimated. While this study makes every effort to model a production system based on typical, real world practices, it cannot fully represent financial, agronomic and market risks, which affect profitability and economic viability of agricultural production. Because of many potential risk factors, effective risk management must combine specific tactics in a detailed manner, in various combinations for a sustainable operation. Moreover, Table 4 of this study reflects a ranging analysis of returns based on various assumptions which is therefore hypothetical in nature. **It is important to realize that actual results may differ from the returns contained in this study**. Any returns above total costs are considered returns on risk and investment to management (or owners).

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

REFERENCES

American Society of Agricultural and Biological Engineers (ASABE). *2013 ASABE Standards Book with 2015 Standards Supplement*. St. Joseph, MI: Curran Associates, Inc., 2015.

Boehlje, Michael D., and Vernon R. Eidman. *Farm Management*. New York: John Wiley and Sons, 1984.

California Chapter of the American Society of Farm Managers and Rural Appraisers. *Trends in Agricultural Land & Lease Values*. Woodbridge, CA: American Society of Farm Managers and Rural Appraisers, 2016. http://www.calasfmra.com/

"Economic Research Service - Publications." United States Department of Agriculture. www.ers.usda.gov/data-products.aspx.

"Identify and Manage Pests in Crops and Agriculture." University of California Statewide Integrated Pest Management Program-*Tomatoes*. http://www.ipm.ucdavis.edu/PMG/crops-agriculture.html.

Miyao, Gene, Brenna Aegerter, Karen Klonsky, and Donald Stewart. 2014. "Sample Costs to Produce Processing Tomatoes, Sub-surface Drip Irrigated (SDI). In the Sacramento Valley & northern Delta- 2014". University of California, Cooperative Extension. Department of Agricultural and Resource Economics. Davis, CA. https://coststudies.ucdavis.edu/current/

Miyao, Gene, Brenna Aegerter, Karen Klonsky, and Donald Stewart. 2014. "Sample Costs to Produce Processing Tomatoes, Furrow Irrigated, In the Sacramento Valley & northern Delta- 2014". University of California, Cooperative Extension. Department of Agricultural and Resource Economics. Davis, CA. https://coststudies.ucdavis.edu/current/

Statewide Integrated Pest Management Project. 1998. Integrated Pest Management for Tomatoes. Fourth Edition. University of California. Division of Agriculture and Natural Resources. Oakland, CA. Publication 3274. http://www.ipm.ucdavis.edu/PMG/selectnewpest.tomatoes.html

"Tax Rates for Motor Vehicle and Diesel Fuels." California State Board of Equalization. Last modified January, 2017. http://www.boe.ca.gov/pdf/l413.pdf.

"U.S. Gasoline and Diesel Retail Prices." U.S. Energy Information Administration (EIA). Last modified January, 2017. https://www.eia.gov/dnav/pet/pet_pri_gnd_dcus_nus_m.htm.

"Workers' Compensation Rate Comparison." California Department of Insurance. http://www.insurance.ca.gov/01-consumers/105-type/9-compare-prem/wc-rate/index.cfm

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TABLE 1. CULTURAL COSTS PER ACRE TO PRODUCE PROCESSING TOMATOES (SDI)

Sacramento Valley & northern Delta-2017

Operation	Equipment Time (Hrs/A)	Cash and Labor Costs per Acre						
		Labor Cost	Fuel	Lube & Repairs	Material Cost	Custom/ Rent	Total Cost	Your Cost
Pre-Plant:								
Laser level 4% Ac	0.00	0	0	0	0	7	7	
Chisel Furrows 80% Ac	0.18	4	9	3	0	0	17	
Condition Beds 80% Ac	0.10	2	5	2	0	0	10	
Stubble Disc & Roll 20% Ac	0.04	1	2	1	0	0	4	
Sub-Soil & Roll 20% Ac 2x	0.12	3	8	4	0	0	14	
Medium-Duty Disc & Roll 20% Ac	0.02	0	1	1	0	0	2	
Land Plane 20% Ac 2x	0.06	1	3	1	0	0	6	
Gypsum 20% Ac	0.00	0	0	0	0	42	42	
List Beds 6-Row 20% Ac	0.02	0	1	1	0	0	2	
Fertilize-(MOP) 40% Ac	0.13	3	3	2	28	0	36	
Insert Drip Tape/Shape Beds 5-Row 20% Ac	0.07	17	4	2	0	0	23	
Weeds-Pre-Plant Herbicides 2x	0.20	5	1	1	19	0	25	
TOTAL PREPLANT COSTS	0.95	37	38	17	47	49	187	
Cultural:								
Well Test/Water Analysis	0.00	0	0	0	0	1	1	
Open Beds 5-Row Alloway	0.10	2	2	1	0	0	6	
Mulch Beds-Incorporate Herbicides	0.33	8	9	6	33	0	56	
Fertilize-Starter 8-24-5, 6.5% Zn	0.22	5	5	4	30	0	44	
Transplant Tomatoes	0.00	0	0	0	503	259	763	
Weeds-Post Transplant Herbicide Spray-Band	0.18	4	4	2	2	0	12	
Irrigate-Sprinklers 50% Ac	1.17	27	7	1	5	0	41	
Irrigate-Drip Water & Labor Costs	0.00	178	0	0	141	0	319	
Weeds-Close Cultivate Sled	0.23	5	5	2	0	0	12	
Fertigation-UAN-32	0.00	0	0	0	116	0	116	
Weeds-Hand Hoe	0.00	0	0	0	0	120	120	
Bed Shape at Layby	0.23	5	6	3	0	0	15	
Bacterial Speck 30% Ac	0.06	1	2	1	6	0	9	
Insects-Aphids 20% Ac	0.02	0	0	0	1	0	2	
Disease-Late Blight 5% Ac	0.01	0	0	0	1	0	1	
Trim Vines	0.22	5	4	2	0	0	11	
Mites-Custom 40% Ac	0.00	0	0	0	9	15	24	
Disease-Fruit Rot 15% Ac	0.01	0	0	0	2	0	3	
Worms	0.06	1	1	1	15	0	18	
Fruit Ripener-Ethrel 5% Ac	0.01	0	0	0	2	0	2	
1/2 Ton Pickup Truck (2)	1.00	23	3	3	0	0	29	
3/4 Ton Pickup Truck (2)	1.00	23	4	4	0	0	31	
ATV (2)	0.67	15	2	1	0	0	19	
Service Truck	0.50	12	10	3	0	0	25	
Water Truck	0.33	8	2	3	0	0	14	
Back Hoe	0.20	5	3	1	0	0	8	
Road Grader	0.17	4	3	1	0	0	8	
Vertebrate Pest Control	0.20	5	1	0	3	0	9	
TOTAL CULTURAL COSTS	6.92	338	77	39	870	395	1,719	
Harvest:								
Harvest-Custom 50% Ac	0.00	0	0	0	0	275	275	
Open Harvest Lanes 4% Ac	0.07	2	2	1	0	0	4	
Harvest-Self 50% Ac	0.44	37	35	80	0	0	152	
In Field Hauling (2)	0.88	20	25	8	0	0	53	
Share Rent 12.0%	0.00	0	0	0	383	0	383	
TOTAL HARVEST COSTS	1.40	59	62	88	383	275	867	

UC COOPERATIVE EXTENSION-AGRICULTURAL ISSUES CENTER

TABLE 1. CONTINUED

Sacramento Valley & northern Delta-2017

	Equipment Time (Hrs/Ac)	Cash & Labor Costs Per Acre						
		Labor Costs	Fuel	Lube & Repairs	Material costs	Custom/ Rent	Total Costs	Your Cost
Post-Harvest:								
Irrigation-Drip Acid Flush	0.00	0	0	0	8	0	8	
Drip Tape Extraction 20% Ac	0.08	19	5	2	0	0	27	
TOTAL POST-HARVEST COSTS	0.08	19	5	2	8	0	35	
Assessment:								
PTAB CTGA CTRI CDFA-CTVP	0.00	0	0	0	21	0	21	
Interest on Operating Capital at 4.50%							44	
TOTAL OPERATING COSTS/ACRE	9.34	453	182	146	1,328	719	2,872	
CASH OVERHEAD:								
Liability Insurance							1	
Office Expense							50	
Misc Costs (Training etc.)							20	
Field Sanitation							1	
Field Supervisor							85	
Assistant Manager							21	
GPS Annual Activation Fee							2	
Property Taxes							8	
Property Insurance							1	
Investment Repairs							25	
TOTAL CASH OVERHEAD PER ACRE							214	
TOTAL CASH COSTS/ACRE							3,086	
		Per Producing		Annual				
NON-CASH OVERHEAD:		Acre		Capital Recovery				
GPS Stationary Receiver		1		0			0	
GPS Receiver/Tractor (2)		1		0			0	
Shop Building		36		3			3	
Storage Building		14		1			1	
Fuel Storage Tanks & Pumps		11		1			1	
Fuel/Service Trailers 500-Gallon (3)		13		1			1	
Shop Tools		6		0			0	
Generator & Lights		3		1			1	
Closed Mix System		1		0			0	
Sprinkler Pipe		91		5			5	
Pipe Main Line 10" 1/2 Mile		33		3			3	
Drip Irrigation System		762		53			53	
Drip Tape		288		67			67	
Implement Carrier		5		0			0	
Truck-Bobtail 5th -Wheel		20		2			2	
Equipment		825		89			89	
TOTAL NON-CASH OVERHEAD COSTS		2,109		226			227	
TOTAL COSTS/ACRE							3,313	

UC COOPERATIVE EXTENSION-AGRICULTURAL ISSUES CENTER

TABLE 2. COSTS & RETURNS PER ACRE TO PRODUCE PROCESSING TOMATOES (SDI)

Sacramento Valley & northern Delta-2017

	Quantity/ Acre	Unit	Price or Cost/Unit	Value or Cost/Acre	Your Cost
GROSS RETURNS					
Tomatoes (SDI)	44	Ton	72.50	3,190	
TOTAL GROSS RETURNS				3,190	
OPERATING COSTS					
Fertilizer:				**174**	
0-0-62 (MOP) Fines	100.00	Lb	0.28	28	
8-24-5, 6.5% Zn	8.00	Lb N	3.71	30	
UAN-32	200.00	Lb N	0.58	116	
Custom:				**599**	
Laser Level	0.04	Acre	165.00	7	
Gypsum-Hauled Spread	0.60	Ton	70.00	42	
Annual Well Test/Water Analysis	1.00	Acre	1.00	1	
Transplanting in Field	8.72	Thou	29.75	259	
Air App-Dusting	20.00	Lb	0.70	14	
Sulfur Dusting (Aerial Hazard Charge)	0.40	acre	1.57	1	
Harvest	22.00	ton	12.50	275	
Insecticide:				**25**	
Warrior II	0.38	FlOz	3.58	1	
Dusting Sulfur	20.00	Lb	0.45	9	
Confirm	6.40	FlOz	2.33	15	
Fungicide:				**9**	
Kocide 3000	0.53	Lb	10.89	6	
Bravo Weatherstik	0.40	Pint	8.23	3	
Herbicide:				**53**	
Roundup UltraMax	3.00	Pint	4.31	13	
Goal 2XL	8.00	FlOz	0.70	6	
Triflurex HFP	2.00	Pint	4.66	9	
Dual II Magnum	1.60	Pint	15.00	24	
Matrix SG	0.25	Oz	6.37	2	
Vertebrate Pest Control:				**3**	
Zinc Phosphide	0.50	Lb	2.50	1	
Gopher Trap	0.25	Each	8.50	2	
Growth Regulator:				**2**	
Ethrel	0.20	Pint	8.92	2	
Contract:				**120**	
Thin & Hoe	1.00	Acre	120.00	120	
Seed:				**251**	
Tomato Seed	10.02	Thou	25.00	251	
Transplant:				**253**	
Greenhouse Transplants	8.72	Thou	29.00	253	
Irrigation:				**155**	
Water-Sac Valley	27.50	AcIn	5.42	149	
Acid Flush	0.12	Gal	47.54	6	
Assessment:				**21**	
PTAB	44.00	Ton	0.21	9	
CTGA	44.00	Ton	0.17	7	
CTRI	44.00	Ton	0.07	3	
CDFA-CTVP	44.00	Ton	0.02	1	
Land Rent:				**383**	
Share Rent 12.0%	44.00	Ton	8.70	383	
Labor				**453**	
Equipment Operator Labor	11.21	hrs	19.21	215	
Irrigation Labor	12.12	hrs	17.40	211	
Non-Machine Labor	1.65	hrs	16.31	27	
Machinery				**328**	
Fuel-Gas	3.82	Gal	2.76	11	
Fuel-Diesel	59.72	Gal	2.87	171	
Lube				27	
Machinery Repair				119	
Interest on Operating Capital @ 4.50%				44	
TOTAL OPERATING COSTS/ACRE				2,872	
TOTAL OPERATING COSTS/TON				65.28	
NET RETURNS ABOVE OPERATING COSTS				318	

UC COOPERATIVE EXTENSION-AGRICULTURAL ISSUES CENTER

TABLE 2. CONTINUED

Sacramento Valley & northern Delta-2017

	Quantity/ Acre	Unit	Price or Cost/Unit	Value or Cost/Acre	Your Cost
CASH OVERHEAD COSTS					
Liability Insurance				1	
Office Expense				50	
Misc Costs (Training etc.)				20	
Field Sanitation				1	
Field Supervisor				85	
Assistant Manager				21	
GPS Annual Activation Fee				2	
Property Taxes				8	
Property Insurance				1	
Investment Repairs				25	
TOTAL CASH OVERHEAD COSTS/ACRE				214	
TOTAL CASH OVERHEAD COSTS/TON				4.87	
TOTAL CASH COSTS/ACRE				3,086	
TOTAL CASH COSTS/TON				70.15	
NET RETURNS ABOVE CASH COSTS				104	
NON-CASH OVERHEAD COSTS (Capital Recovery)					
GPS Stationary Receiver				0	
GPS Receiver/Tractor (2)				0	
Shop Building				3	
Storage Building				1	
Fuel Storage Tanks & Pumps				1	
Fuel/Service Trailers 500-Gallon (3)				1	
Shop Tools				0	
Generator & Lights				1	
Closed Mix System				0	
Sprinkler Pipe				5	
Pipe Main Line 10" 1/2 Mile				3	
Drip Irrigation System				53	
Drip Tape				67	
Implement Carrier				0	
Truck-Bobtail 5th -Wheel				2	
Equipment				89	
TOTAL NON-CASH OVERHEAD COSTS/ACRE				227	
TOTAL NON-CASH OVERHEAD COSTS/TON				5.16	
TOTAL COST/ACRE				3,313	
TOTAL COST/TON				75.31	
NET RETURNS ABOVE TOTAL COST				-123	

UC COOPERATIVE EXTENSION-AGRICULTURAL ISSUES CENTER

TABLE 3. MONTHLY CASH COSTS PER ACRE TO PRODUCE PROCESSING TOMATOES (SDI)

Sacramento Valley & northern Delta-2017

	OCT 16	NOV 16	DEC 16	JAN 17	FEB 17	MAR 17	APR 17	MAY 17	JUN 17	JUL 17	AUG 17	SEP 17	Total
Preplant:													
Laser level 4% Ac	7												7
Chisel Furrows 80% Ac	17												17
Condition Beds 80% Ac	10												10
Stubble Disc & Roll 20% Ac	4												4
Sub-Soil & Roll 20% Ac 2x	14												14
Medium-Duty Disc & Roll 20% Ac	2												2
Land Plane 20% Ac 2x	6												6
Gypsum 20% Ac	42												42
List Beds 6-Row 20% Ac		2											2
Fertilize-(MOP) 40% Ac		36											36
Insert Drip Tape/Shape Beds 5-Row 20% Ac		23											23
Weeds-Pre-Plant Herbicides 2x				15		9							25
TOTAL PREPLANT COSTS	102	61		15		9							187
Cultural:													
Well Test/Water Analysis				1									1
Open Beds 5-Row Alloway						6							6
Mulch Beds-Incorporate Herbicides						28		28					56
Fertilize-Starter 8-24-5, 6.5% Zn						22		22					44
Transplant Tomatoes							381	381					763
Weeds-Post Plant Herbicide Spray-Band							6	6					12
Irrigate-Sprinklers 50% Ac							21	21					41
Irrigate-Drip Water & Labor Costs							51	68	60	83	58		319
Weeds-Close Cultivate							6	7					13
Fertigation-UAN-32							29	29	29	29			116
Weeds-Hand Hoe								60	60				120
Bed Shape at Layby								7	7				15
Bacterial Speck 30% Ac									9				9
Insects-Aphids 20% Ac									2				2
Disease-Late Blight 5% Ac									1				1
Trim Vines										6	6		11
Mites-Custom 40% Ac										12	12		24
Disease-Fruit Rot 15% Ac												3	3
Worms												18	18
Fruit Ripener-Ethrel 5% Ac												2	2
1/2 Ton Pickup Truck (2)	2	2	2	2	2	2	2	2	2	2	2	2	29
3/4 Ton Pickup Truck (2)	3	3	3	3	3	3	3	3	3	3	3	3	31
ATV (2)	2	2	2	2	2	2	2	2	2	2	2	2	19
Service Truck	2	2	2	2	2	2	2	2	2	2	2	2	25
Water Truck	1	1	1	1	1	1	1	1	1	1	1	1	14
Back Hoe	1	1	1	1	1	1	1	1	1	1	1	1	8
Road Grader	1	1	1	1	1	1	1	1	1	1	1	1	8
Pest Control-Vertebrate	1	1	1	1	1	1	1	1	1	1	1	1	9
TOTAL CULTURAL COSTS	12	12	12	13	12	68	506	640	182	141	87	35	1,719

UC COOPERATIVE EXTENSION-AGRICULTURAL ISSUES CENTER

TABLE 3. CONTINUED

Sacramento Valley & northern Delta-2017

	OCT 16	NOV 16	DEC 16	JAN 17	FEB 17	MAR 17	APR 17	MAY 17	JUN 17	JUL 17	AUG 17	SEP 17	Total
Harvest:													
Harvest-Custom 50% Ac												275	275
Open Harvest Lanes 4% Ac												4	4
Harvest-Self 50% Ac												152	152
In Field Hauling (2)												53	53
Share Rent 12.0%												383	383
TOTAL HARVEST COSTS	0	0	0	0	0	0	0	0	0	0	0	867	867
Post-Harvest:													
Irrigation-Drip Acid Flush												8	8
Drip Tape Extraction 20% Ac												27	27
TOTAL POST-HARVEST COSTS	0	0	0	0	0	0	0	0	0	0	0	35	35
Assessment:													
PTAB CTGA CTRI CDFA-CTVP	2	2	2	2	2	2	2	2	2	2	2	2	21
Interest on Operating Capital at 4.50%	0.43	0.71	0.76	0.87	0.92	1.22	3.12	5.53	6.22	6.75	7.09	10.61	44.25
TOTAL OPERATING COSTS/ACRE	116	75	14	31	15	80	511	647	190	149	96	949	2,872
CASH OVERHEAD													
Liability Insurance					1								1
Office Expense	4	4	4	4	4	4	4	4	4	4	4	4	50
Misc Costs (Training etc.)												20	20
Field Sanitation												1	1
Field Supervisor	7	7	7	7	7	7	7	7	7	7	7	7	85
Assistant Manager	2	2	2	2	2	2	2	2	2	2	2	2	21
GPS Annual Activation Fee												2	2
Property Taxes				4						4			8
Property Insurance				0						0			1
Investment Repairs	2	2	2	2	2	2	2	2	2	2	2	2	25
TOTAL CASH OVERHEAD COSTS	15	15	15	20	16	15	15	15	15	20	15	38	214
TOTAL CASH COSTS/ACRE	131	90	29	50	31	95	526	662	205	169	111	988	3,086

UC COOPERATIVE EXTENSION-AGRICULTURAL ISSUES CENTER

TABLE 4. RANGING ANALYSIS

Sacramento Valley & northern Delta-2017

COSTS PER ACRE AND PER TON AT VARYING YIELDS TO PRODUCE PROCESSING TOMATOES (SDI)

	YIELD (TONS/ACRE)						
	29.00	34.00	39.00	44.00	49.00	54.00	59.00
OPERATING COSTS/ACRE:							
Pre-Plant	187	187	187	187	187	187	187
Cultural	1,719	1,719	1,719	1,719	1,719	1,719	1,719
Harvest	633	711	789	867	944	1,022	1,100
Post-Harvest	35	35	35	35	35	35	35
Assessment	14	16	18	21	23	25	28
Interest on Operating Capital at 4.50%	43.20	43.55	43.90	44.25	44.60	44.94	45.29
TOTAL OPERATING COSTS/ACRE	2,631	2,711	2,792	2,872	2,953	3,033	3,114
TOTAL OPERATING COSTS/TON	90.72	79.74	71.59	65.28	60.26	56.17	52.78
CASH OVERHEAD COSTS/ACRE	214	214	214	214	214	214	214
TOTAL CASH COSTS/ACRE	2,845	2,925	3,006	3,086	3,167	3,247	3,328
TOTAL CASH COSTS/TON	98.10	86.04	77.08	70.15	64.63	60.14	56.41
NON-CASH OVERHEAD COSTS/ACRE	227	227	227	227	227	227	227
TOTAL COSTS/ACRE	3,072	3,152	3,233	3,313	3,394	3,474	3,555
TOTAL COSTS/TON	106.00	93.00	83.00	75.00	69.00	64.00	60.00

Net Return per Acre above Operating Costs for Processing Tomatoes (SDI)

PRICE ($/ton)	YIELD (tons /acre)						
Tomatoes (SDI)	29.00	34.00	39.00	44.00	49.00	54.00	59.00
57.50	-963	-756	-549	-342	-135	72	279
62.50	-818	-586	-354	-122	110	342	574
67.50	-673	-416	-159	98	355	612	869
72.50	-528	-246	36	318	600	882	1,164
77.50	-383	-76	231	538	845	1,152	1,459
82.50	-238	94	426	758	1,090	1,422	1,754
87.50	-93	264	621	978	1,335	1,692	2,049

Net Return per Acre above Cash Costs for Processing Tomatoes (SDI)

PRICE ($/ton)	YIELD (tons /acre)						
Tomatoes (SDI)	29.00	34.00	39.00	44.00	49.00	54.00	59.00
57.50	-1,177	-970	-763	-556	-349	-142	65
62.50	-1,032	-800	-568	-336	-104	128	360
67.50	-887	-630	-373	-116	141	398	655
72.50	-742	-460	-178	104	386	668	950
77.50	-597	-290	17	324	631	938	1,245
82.50	-452	-120	212	544	876	1,208	1,540
87.50	-307	50	407	764	1,121	1,478	1,835

Net Return per Acre above Total Costs for Processing Tomatoes (SDI)

PRICE ($/ton)	YIELD (tons /acre)						
Tomatoes (SDI)	29.00	34.00	39.00	44.00	49.00	54.00	59.00
57.50	-1,404	-1,197	-990	-783	-576	-369	-163
62.50	-1,259	-1,027	-795	-563	-331	-99	132
67.50	-1,114	-857	-600	-343	-86	171	427
72.50	-969	-687	-405	-123	159	441	722
77.50	-824	-517	-210	97	404	711	1,017
82.50	-679	-347	-15	317	649	981	1,312
87.50	-534	-177	180	537	894	1,251	1,607

UC COOPERATIVE EXTENSION-AGRICULTURAL ISSUES CENTER

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

Sacramento Valley & northern Delta-2017

		ANNUAL EQUIPMENT COSTS						
						Cash Overhead		
Yr.	Description	Price	Yrs. Life	Salvage Value	Capital Recovery	Insurance	Taxes	Total
17	Road Grader	75,000	25	2,122	5,277	33	386	5,695
17	#1 Harvester Tomato	450,000	15	31,500	41,894	204	2,408	44,505
17	#1 275HP Crawler	275,000	15	53,538	24,013	139	1,643	25,795
17	#1 155HP 4WD Tractor	155,596	15	30,292	13,587	79	929	14,595
17	#2 155HP 4WD Tractor	155,596	15	30,292	13,587	79	929	14,595
17	#1 130HP 4WD HC Tractor[x]	127,363	15	24,795	11,121	64	761	11,947
17	#1 130HP 2WD Tractor	121,030	15	23,562	10,568	61	723	11,352
17	#1 110HP 4WD HC Tractor[x]	107,591	15	20,946	9,395	54	643	10,092
17	Service Truck	85,000	15	16,548	7,422	43	508	7,973
17	Water Truck	48,000	15	9,345	4,191	24	287	4,502
17	Rollup Sled Drip Tape 15'	7,800	15	799	714	4	43	761
17	#1 Irrigation Pipe Trailer	3,500	15	358	321	2	19	342
17	#2 Irrigation Pipe Trailer	3,500	15	358	321	2	19	342
17	#3 Irrigation Pipe Trailer	3,500	15	358	321	2	19	342
17	#4 Irrigation Pipe Trailer	3,500	15	358	321	2	19	342
17	#1 425HP Crawler	425,000	14	89,935	38,346	218	2,575	41,139
17	#1 Irrigation Booster Pump	41,000	10	7,250	4,733	20	241	4,995
17	#2 Irrigation Booster Pump	41,000	10	7,250	4,733	20	241	4,995
17	Drip Tape Extractor	40,000	10	7,545	4,580	20	238	4,838
17	Cultivator Performer 3-Row	33,309	10	5,890	3,845	17	196	4,058
17	#1 Ring Roller 26'	30,333	10	5,364	3,502	15	178	3,695
17	#1 Rice Roller 18'	22,000	10	3,891	2,540	11	129	2,680
17	Cultivator Alloway 5-Row	22,000	10	3,891	2,540	11	129	2,680
17	Ring Roller-Heavy 16'	18,666	10	3,301	2,155	9	110	2,274
17	Back Hoe	16,599	10	2,935	1,916	8	98	2,022
17	Shaper Drip Tape Inserter 5-Row	16,117	10	3,040	1,846	8	96	1,949
17	#2 Cultivator Sled 3-Row	11,200	10	1,981	1,293	6	66	1,364
17	#1 Cultivator Sled 3-Row	11,200	10	1,981	1,293	6	66	1,364
17	#1 Trailer Dolly	1,596	10	301	183	1	9	193
17	#2 Trailer Dolly	1,596	10	301	183	1	9	193
17	Dry Fertilizer Spreader 15'	8,500	6	2,450	1,314	5	55	1,374
17	#1 Stubble Disc 18'	55,000	5	17,916	9,461	31	365	9,857
17	#1 Medium-Duty Disc 26'	48,769	5	15,886	8,389	27	323	8,740
17	#1 Subsoiler 16' 9-Shank	42,454	5	13,829	7,303	24	281	7,608
17	#1 Triplane 16'	38,000	5	12,378	6,537	21	252	6,810
17	Lister 6-Row	33,626	5	10,953	5,784	19	223	6,026
17	#1 Incorporator 15'	33,300	5	10,847	5,728	19	221	5,968
17	#2 Incorporator 15'	33,300	5	10,847	5,728	19	221	5,968
17	#1 Vine Diverter	17,650	5	5,749	3,036	10	117	3,163
17	Furrow Chisel 3-Row	17,405	5	5,669	2,994	10	115	3,119
17	Cultivator 3-Row	13,054	5	4,252	2,246	7	87	2,339
17	#1 Fertilizer Bar 15"	13,000	5	4,235	2,236	7	86	2,330
17	#1 ATV	8,500	5	3,809	1,274	5	62	1,341
17	#2 ATV	8,500	5	3,809	1,274	5	62	1,341
17	#1 ATV Spray System 25'	6,062	5	1,975	1,043	3	40	1,086
17	#1 Spray Boom 25'	6,050	5	1,971	1,041	3	40	1,084
17	#1 Vine Trimmer	5,280	5	1,835	888	3	36	926
17	#2 Spray Boom 15'	3,630	5	1,182	624	2	24	651
17	#1 Spray Boom 15'	3,630	5	1,182	624	2	24	651
17	#1 200-Gallon Saddle Tank	1,660	5	541	286	1	11	297
17	#2 200-Gallon Saddle Tank	1,660	5	541	286	1	11	297
17	#1 300-Gallon Saddle Tank	1,660	5	541	286	1	11	297
17	#3 200-Gallon Saddle Tank	1,660	5	541	286	1	11	297
17	#1 3/4 Ton Pickup	45,000	4	21,922	7,604	28	335	7,967
17	#2 3/4 Ton Pickup	45,000	4	21,922	7,604	28	335	7,967
17	#1 Incorporator-Tunnels 15'	45,000	4	16,563	8,848	26	308	9,182
17	#1 1/2 Ton Pickup	28,000	4	13,640	4,732	18	208	4,957
17	#2 1/2 Ton Pickup	28,000	4	13,640	4,732	18	208	4,957
	TOTAL	2,946,942	-	610,653	318,929	1,505	17,788	338,222
	60% of New Cost*	1,768,165	-	366,392	191,358	903	10,673	202,933

HC Tractor[x]; High Crop Tractor. *Used to reflect a mix of new and used equipment

UC COOPERATIVE EXTENSION-AGRICULTURAL ISSUES CENTER

TABLE 5. CONTINUED

Sacramento Valley & northern Delta-2017

ANNUAL INVESTMENT COSTS

Description	Price	Yrs. Life	Salvage Value	Capital Recovery	Cash Overhead			Total
					Insurance	Taxes	Repairs	
INVESTMENT:								
Drip Irrigation System	762,000	25	0	54,066	322	3,810	15,240	73,438
Sprinkler Pipe	90,784	25	45,392	5,490	58	681	1,816	8,045
Shop Building	125,000	25	0	8,869	53	625	722	10,269
Storage Building	47,500	25	0	3,370	20	238	586	4,214
Main Line 10" 1/2 Mile	33,384	20	2,336	2,608	15	179	668	3,470
Fuel Storage Tanks & Pumps	39,565	20	2,769	3,091	18	212	791	4,112
Shop Tools	20,000	20	1,447	1,561	9	107	145	1,822
Truck-Bobtail 5th-Wheel	70,000	15	4,900	6,517	32	375	1,400	8,323
Fuel/Service Trailers 500-Gallon (3)	45,000	15	3,150	4,189	20	241	900	5,351
Implement Carrier	16,700	15	974	1,564	7	88	487	2,147
Closed Mix System	5,074	10	507	617	2	28	25	672
GPS Receiver/Tractor (2)	3,590	10	251	445	2	19	72	538
GPS Stationary Receiver	3,500	10	0	453	1	18	70	542
Generator & Lights	8,763	5	613	1,913	4	47	175	2,139
Drip Tape	288,000	5	0	66,521	122	1,440	5,760	73,843
TOTAL INVESTMENT	1,558,860	-	62,339	161,275	686	8,106	28,857	198,923

ANNUAL BUSINESS OVERHEAD COSTS

Description	Units/ Farm	Unit	Price/ Unit	Total Cost
Liability Insurance	1000	Acre	1.00	1,000
Office Expense	1000	Acre	50.00	50,000
Misc Costs (Training etc.)	1000	Acre	20.00	20,000
Field Sanitation	1000	Acre	1.29	1,290
Field Supervisor	1000	Acre	85.00	85,000
Assistant Manager	1000	Acre	21.00	21,000
GPS Annual Activation Fee	1000	Acre	2.00	2,000

UC COOPERATIVE EXTENSION-AGRICULTURAL ISSUES CENTER

TABLE 6. HOURLY EQUIPMENT COSTS

Sacramento Valley & northern Delta-2017

Yr.	Description	Processing Tomatoes (SDI) Hours Used	Total Hours	Capital Recovery	Cash Overhead Insurance	Cash Overhead Taxes	Operating Lube & Repairs	Operating Fuel	Operating Total Oper.	Total Costs/Hr.
17	#1 ATV	536	2000	0.38	0.00	0.02	2.01	2.76	4.77	5.17
17	#2 ATV	533	2000	0.38	0.00	0.02	2.01	2.76	4.77	5.17
17	#1 Harvester Tomato	486	1250	20.11	0.10	1.16	164.16	71.75	235.91	257.27
17	#1 425HP Crawler	367	1142	20.15	0.11	1.35	19.47	57.40	76.87	98.48
17	#1 155HP 4WD Tractor	735	1066	7.65	0.04	0.52	7.81	25.82	33.63	41.84
17	#2 155HP 4WD Tractor	853	1066	7.65	0.04	0.52	7.81	25.82	33.63	41.84
17	#1 110HP 4WD HC Tractor	375	1066	5.29	0.03	0.36	5.47	18.32	23.79	29.47
17	#1 130HP 4WD HC Tractor	303	1066	6.26	0.04	0.43	6.47	21.65	28.13	34.85
17	#1 275HP Crawler	404	1060	13.59	0.08	0.93	13.79	45.80	59.60	74.20
17	#1 Irrigation Booster Pump	642	1000	2.84	0.01	0.14	0.97	5.74	6.71	9.71
17	#2 Irrigation Booster Pump	642	1000	2.84	0.01	0.14	0.97	5.74	6.71	9.71
17	#1 130HP 2WD Tractor	773	800	8.34	0.05	0.57	8.89	21.65	30.54	39.50
17	Service Truck	500	800	5.57	0.03	0.38	6.65	20.09	26.74	32.72
17	Water Truck	333	800	3.14	0.02	0.22	10.35	7.18	17.53	20.90
17	#1 Trailer Dolly	442	750	0.15	0.00	0.01	0.04	0.00	0.04	0.20
17	#2 Trailer Dolly	442	750	0.15	0.00	0.01	0.04	0.00	0.04	0.20
17	#1 Irrigation Pipe Trailer	583	666	0.29	0.00	0.02	0.10	0.00	0.10	0.41
17	#2 Irrigation Pipe Trailer	583	666	0.29	0.00	0.02	0.10	0.00	0.10	0.41
17	#3 Irrigation Pipe Trailer	583	666	0.29	0.00	0.02	0.10	0.00	0.10	0.41
17	#4 Irrigation Pipe Trailer	583	666	0.29	0.00	0.02	0.10	0.00	0.10	0.41
17	#1 Vine Trimmer	220	600	0.89	0.00	0.04	1.19	0.00	1.19	2.12
17	#1 Triplane 16'	61	600	6.54	0.02	0.25	5.93	0.00	5.93	12.74
17	#1 1/2 Ton Pickup	500	500	5.68	0.02	0.25	2.61	3.45	6.06	12.01
17	#1 3/4 Ton Pickup	500	500	9.13	0.03	0.40	3.99	4.14	8.13	17.69
17	#2 1/2 Ton Pickup	500	500	5.68	0.02	0.25	2.61	3.45	6.06	12.01
17	#2 3/4 Ton Pickup	500	500	9.13	0.03	0.40	3.99	4.14	8.13	17.69
17	#1 Incorporator-Tunnels 15'	227	500	10.62	0.03	0.37	5.26	0.00	5.26	16.27
17	Drip Tape Extractor	85	500	5.50	0.02	0.29	0.88	0.00	0.88	6.68
17	Rollup Sled Drip Tape 15'	85	500	0.86	0.00	0.05	0.20	0.00	0.20	1.11
17	Shaper Drip Tape Inserter 5-Row	70	500	2.21	0.01	0.11	0.35	0.00	0.35	2.69
17	Cultivator 3-Row	223	400	3.37	0.01	0.13	2.92	0.00	2.92	6.43
17	Furrow Chisel 3-Row	183	400	4.49	0.01	0.17	3.90	0.00	3.90	8.58
17	Road Grader	183	400	7.92	0.05	0.58	3.80	17.22	21.02	29.56
17	#1 Incorporator 15'	167	400	8.59	0.03	0.33	3.88	0.00	3.88	12.83
17	#2 Incorporator 15'	167	400	8.59	0.03	0.33	3.88	0.00	3.88	12.83
17	#1 Subsoiler 16', 9-Shank	121	400	10.95	0.04	0.42	9.89	0.00	9.89	21.30
17	#1 Vine Diverter	70	400	4.55	0.01	0.18	3.12	0.00	3.12	7.87
17	#1 Stubble Disc 18'	36	400	14.19	0.05	0.55	9.36	0.00	9.36	24.14
17	#1 Lister 6-Row 30'	22	400	8.68	0.03	0.33	7.05	0.00	7.05	16.09
17	#1 Medium-Duty Disc 26'	20	400	12.58	0.04	0.48	8.30	0.00	8.30	21.41
17	#1 200-Gallon Saddle Tank	278	300	0.57	0.00	0.02	0.45	0.00	0.45	1.05
17	#2 200-Gallon Saddle Tank	258	300	0.57	0.00	0.02	0.45	0.00	0.45	1.05
17	#2 Spray Boom 15'	258	300	1.25	0.00	0.05	0.99	0.00	0.99	2.29
17	#1 Spray Boom 15'	258	300	1.25	0.00	0.05	0.99	0.00	0.99	2.29
17	#1 300-Gallon Saddle Tank	223	300	0.57	0.00	0.02	0.45	0.00	0.45	1.05
17	#1 ATV Spray System 25'	203	300	2.09	0.01	0.08	1.66	0.00	1.66	3.83
17	Back Hoe	200	300	3.83	0.02	0.20	4.70	14.35	19.05	23.09
17	#1 Spray Boom 25'	166	300	2.08	0.01	0.08	1.66	0.00	1.66	3.82
17	#3 200-Gallon Saddle Tank	147	300	0.57	0.00	0.02	0.45	0.00	0.45	1.05
17	#1 Fertilizer Bar 15"	223	240	5.59	0.02	0.22	5.11	0.00	5.11	10.94
17	Dry Fertilizer Spreader 15'	126	200	3.94	0.01	0.16	3.33	0.00	3.33	7.45
17	Ring Roller-Heavy 16'	121	200	6.46	0.03	0.33	2.14	0.00	2.14	8.96
17	#2 Cultivator Sled 3-Row	115	200	3.88	0.02	0.20	2.39	0.00	2.39	6.48
17	#1 Cultivator Sled 3-Row	115	200	3.88	0.02	0.20	2.39	0.00	2.39	6.48
17	#1 Cultivator Performer 3-Row	104	200	11.54	0.05	0.59	6.83	0.00	6.83	19.01
17	Cultivator Alloway 5-Row	100	200	7.62	0.03	0.39	4.51	0.00	4.51	12.55
17	#1 Rice Roller 18'	36	200	7.62	0.03	0.39	2.52	0.00	2.52	10.56
17	#1 Ring Roller 26'	20	200	10.51	0.05	0.54	3.47	0.00	3.47	14.56

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TABLE 7. OPERATIONS WITH EQUIPMENT & MATERIALS

Sacramento Valley & northern Delta-2017

Operation	Operation Month	Tractor	Implement	Labor Type/ Material	Rate/ acre	Unit
Laser level 4 % Ac	Oct			Laser Level	0.04	Acre
Chisel Furrows 80% Ac	Oct	#1 275 HP Crawler	Furrow Chisel 3-Row	Equipment Operator Labor	0.22	hour
Condition Beds 80% Ac	Oct	#1 275 HP Crawler	Cultivator Performer 3-Row	Equipment Operator Labor	0.12	hour
Stubble Disc & Roll 20% Ac	Oct	#1 425 HP Crawler	#1 Stubble Disc 18'	Equipment Operator Labor	0.04	hour
			#1 Rice Roller 18'			
Sub-Soil & Roll 20% Ac	Oct	#1 425 HP Crawler	#1 Subsoiler 16' 9-Shank	Equipment Operator Labor	0.15	hour
			Ring Roller-Heavy 16'			
Medium-Duty Disc & Roll	Oct	#1 275 HP Crawler	#1 Medium-Duty Disc 26'	Equipment Operator Labor	0.02	hour
			#1 Ring Roller 26'			
Land Plane 20% Ac 2x	Oct	#1 275 HP Crawler	#1 Triplane 16'	Equipment Operator Labor	0.07	hour
Gypsum 20% Ac	Oct			Gypsum-Hauled Spread	0.60	Ton
List Beds 6-Row 20% Ac	Nov	#1 425 HP Crawler	Lister 6-Row 30'	Equipment Operator Labor	0.03	hour
Fertilize-(MOP) 40% Ac	Nov	#1 130 HP 2WD Tractor	Fertilizer Spreader 25'	Equipment Operator Labor	0.06	hour
				0-0-62 (MOP) Fines	100.00	Lb
Insert Drip Tape/Shape Beds	Nov	#1 425 HP Crawler	Shaper-Drip Tape Inserter 5-Row	Equipment Operator Labor	0.08	hour
Insert Drip Tape-Labor	Nov			Irrigation Labor	0.87	hour
Weeds-Pre-Plant Herbicides	Jan		#1 ATV	Equipment Operator Labor	0.12	hour
				Roundup UltraMax	1.50	Pint
			#1 ATV Spray System 25'	Goal 2XL	8.00	FlOz
	Mar		#1 ATV	Equipment Operator Labor	0.12	hour
				Roundup UltraMax	1.50	Pint
			#1 ATV Spray System 25'			
Well Test/Water Analysis	Jan			Annual Well Test/Water Analysis	1.00	Acre
Open Beds Alloway 5-Row	Mar	#1 130 HP 2WD Tractor	Cultivator Alloway 5-Row	Equipment Operator Labor	0.12	hour
Mulch Beds-Apply Herbicides	Mar	#2 155 HP 4WD Tractor	#2 200-Gallon Saddle Tank	Equipment Operator Labor	0.25	hour
				Triflurex HFP	1.00	Pint
			#1 Incorporator 15'	Dual II Magnum	0.80	Pint
			#1 Spray Boom 15'			
	May	#2 155 HP 4WD Tractor	#1 200-Gallon Saddle Tank	Equipment Operator Labor	0.25	hour
				Dual II Magnum	0.80	Pint
			#2 Incorporator 15'	Triflurex HFP	1.00	Pint
			#2 Spray Boom 15'			
Fertilize-Starter	Mar	#1 130 HP 2WD Tractor	#1 300-Gallon Saddle Tank	Equipment Operator Labor	0.14	hour
				8-24-5, 6.5% Zn	4.00	Lb N
			Cultivator 3-Row			
			#1 Fertilizer bar 15"			
	May	#1 130 HP 4WD HC Trac	#1 300-Gallon Saddle Tank	Equipment Operator Labor	0.13	hour
				8-24-5, 6.5% Zn	4.00	Lb N
			Cultivator 3-Row			
			#1 Fertilizer bar 15"			
Transplant Tomatoes	Apr			Transplanting in Field	4.36	Thou
				Tomato Seed	5.01	Thou
				Greenhouse Transplants	4.36	Thou
	May			Transplanting in Field	4.36	Thou
				Tomato Seed	5.01	Thou
				Greenhouse Transplants	4.36	Thou
Weeds-Apply Herbicide	Apr	#1 130 HP 2WD Tractor	#1 200-Gallon Saddle Tank	Equipment Operator Labor	0.06	hour
				Matrix SG	0.13	Oz
			#1 Spray Boom 15'			
			#1 Incorporator-Tunnels 15'			
	May	#1 130 HP 2WD Tractor	#2 200-Gallon Saddle Tank	Equipment Operator Labor	0.06	hour
				Matrix SG	0.13	Oz
			#2 Spray Boom-15'			
			#2 Incorporator-Tunnels 15'			
Irrigate-Sprinklers	Apr		#1 Irrigation Booster Pump	Equipment Operator Labor	0.70	hour
				Water Sac Valley	0.50	AcIn
			#1 Irrigation Pipe Trailer			
			#3 Irrigation Pipe Trailer			
	May		#2 Irrigation Booster Pump	Equipment Operator Labor	0.70	hour
				Water Sac Valley	0.50	AcIn
			#2 Irrigation Pipe Trailer			
			#4 Irrigation Pipe Trailer			
Irrigate-Drip	Apr			Irrigation Labor	1.00	hour
				Water Sac Valley	1.50	AcIn
	Apr			Irrigation Labor	1.00	hour
				Water Sac Valley	1.50	AcIn
	May			Irrigation Labor	1.00	hour
				Water Sac Valley	1.50	AcIn
	May			Irrigation Labor	1.50	hours
				Water Sac Valley	3.00	AcIn

UC COOPERATIVE EXTENSION-AGRICULTURAL ISSUES CENTER

TABLE 7. CONTINUED

Sacramento Valley & northern Delta-2017

Operation	Operation Month	Tractor	Implement	Labor Type/ Material	Rate/ acre	Unit
	June			Irrigation Labor	1.75	hour
				Water Sac Valley	5.50	AcIn
	July			Irrigation Labor	2.25	hours
				Water Sac Valley	8.00	AcIn
	Aug			Irrigation Labor	1.75	hour
				Water Sac Valley	5.00	AcIn
Weeds-Close Cultivate	Apr	#1 110 HP 4WD HC Trac	#1 Cultivator Sled 3-Row	Equipment Operator Labor	0.14	hour
	May	#1 110 HP 4WD HC Trac	#2 Cultivator Sled 3-Row	Equipment Operator Labor	0.14	hour
Fertigation-UAN-32	Apr			UAN-32	50.00	Lb N
	May			UAN-32	50.00	Lb N
	June			UAN-32	50.00	Lb N
	July			UAN-32	50.00	Lb N
Weeds-Hand Crew	May			Thin & Hoe	0.50	Acre
	June			Thin & Hoe	0.50	Acre
Bed Shape at Layby	May	#1 155 HP 4WD Tractor	#1 Incorporator-Tunnels 15'	Equipment Operator Labor	0.14	hour
	June	#1 155 HP 4WD Tractor	#1 Incorporator-Tunnels 15'	Equipment Operator Labor	0.14	hour
Bacterial Speck	June	#1 130 HP 2WD Tractor	#3 200-Gallon Saddle Tank	Equipment Operator Labor	0.08	hour
				Kocide DF	0.53	Lb
			#1 Spray Boom 25'			
Insects-Aphids	June	#1 130 HP 4WD HC Trac	#1 200-Gallon Saddle Tank	Equipment Operator Labor	0.02	hour
				Warrior II	0.38	FlOz
			#1 Spray Boom 25'			
Disease-Late Blight	June	#1 130 HP 4WD HC Trac	#3 200-Gallon Saddle Tank	Equipment Operator Labor	0.01	hour
				Bravo Weatherstik	0.10	Pint
			#1 Spray Boom 25'			
Trim Vines	July	#1 110 HP 4WD HC Trac	#1 Vine Trimmer	Equipment Operator Labor	0.13	hour
	Aug	#1 110 HP 4WD HC Trac	#1 Vine Trimmer	Equipment Operator Labor	0.13	hour
Mites	July			Dusting Sulfur 98%	10.00	Lb
				Air App Dusting	10.00	Lb
				Sulfur Dusting	0.20	Acre
	Aug			Dusting Sulfur 98%	10.00	Lb
				Air App Dusting	10.00	Lb
				Sulfur Dusting	0.20	Acre
Disease-Fruit Rot	Sept	#1 130 HP 4WD HC Trac	#3 200-Gallon Saddle Tank	Equipment Operator Labor	0.01	hour
				Bravo Weatherstik	0.30	Pint
			#1 Spray Boom 25'			
Worms	Sept	#1 130 HP 4WD HC Trac	#3 200-Gallon Saddle Tank	Equipment Operator Labor	0.07	hour
				Confirm	10.00	FlOz
			#1 Spray Boom 25'			
Fruit Ripener-Ethrel	Sept	#1 110 HP 4WD HC Trac	#3 200-Gallon Saddle Tank	Equipment Operator Labor	0.01	hour
				Ethrel	0.20	Pint
			#1 Spray Boom 25'			
1/2 Ton Pickup Truck	Sept	#2 1/2 Ton Pickup		Equipment Operator Labor	0.60	hour
	Sept	#1 1/2 Ton Pickup		Equipment Operator Labor	0.60	hour
3/4 Ton Pickup Truck	Sept	#1 3/4 Ton Pickup		Equipment Operator Labor	0.60	hour
	Sept	#2 3/4 Ton Pickup		Equipment Operator Labor	0.60	hour
ATV (2)	Sept	#1 ATV		Equipment Operator Labor	0.40	hour
	Sept	#2 ATV		Equipment Operator Labor	0.40	hour
Service Truck	Sept	Service Truck		Equipment Operator Labor	0.60	hour
Water Truck	Sept	Water Truck		Equipment Operator Labor	0.40	hour
Back Hoe	Sept	Back Hoe		Equipment Operator Labor	0.24	hour
Road Grader	Sept	Road Grader		Equipment Operator Labor	0.20	hour
Pest Control-Vertebrate	Sept	#2 ATV		Equipment Operator Labor	0.24	hour
				Zinc Phosphide	0.50	Lb
				Gopher Trap	0.25	Each
Harvest Custom 50% Ac	Sept			Harvest	22.00	ton
Open Harvest Lanes	Sept	#1 130 HP 4WD HC Trac	#1 Vine Diverter	Equipment Operator Labor	0.08	hour
Harvest Self 50% Ac	Sept	#1 Harvester Tomato		Equipment Operator Labor	0.53	hour
	Sept			Non-Machine Labor	2.00	hours
In Field Hauling (2)	Sept	#1 155 HP 4WD Tractor	#1 Trailer Dolly	Equipment Operator Labor	0.53	hour
	Sept	#2 155 HP 4WD Tractor	#2 Trailer Dolly	Equipment Operator Labor	0.53	hour
Share Rent 12.0%	Sept			Share Rent 12.0%	44.00	Ton
Irrigation-Drip Flush	Sept			N-pHuric Acid	0.12	Gal
				Water Sac Valley	0.50	AcIn
Drip Tape Extraction	Sept	#1 425 HP Crawler	Drip Tape Extractor	Equipment Operator Labor	0.10	hour
			Rollup Sled Drip Tape 15'			
Drip Tape Extraction	Sept			Irrigation Labor	1.00	hour