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UNIVERSITY OF CALIFORNIA AGRICULTURAL AND NATURAL RESOURCES  
COOPERATIVE EXTENSION  
AGRICULTURAL ISSUES CENTER  
UC DAVIS DEPARTMENT OF AGRICULTURAL AND RESOURCE ECONOMICS  
**2018**

**SAMPLE COSTS TO PRODUCE SUNFLOWERS  
FOR HYBRID SEED**



**IN THE SACRAMENTO VALLEY**

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In the Sacramento Valley - 2018

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**INTRODUCTION**

Sample costs to produce sunflowers for hybrid seed in the Sacramento Valley are presented in this document. This study is intended as a guide only. It can be used to help guide production decisions, estimate potential returns, prepare budgets, and evaluate production loans. Sample costs given for labor, materials, equipment, and custom services are based on January 2018 figures. Practices described are based on production practices considered typical for the crop and region, but will not apply to every situation. A blank column titled Your Costs 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 Jeremy Murdock, University of California Agriculture and Natural Resources, Agricultural Issues Center, Department of Agricultural and Resource Economics, at 530-752-4651, [jmmurdock@ucdavis.edu](mailto:jmmurdock@ucdavis.edu). The local extension office can be contacted through; Sarah Light, [selight@ucanr.edu](mailto:selight@ucanr.edu), Rachael Long, [rflong@ucanr.edu](mailto:rflong@ucanr.edu), and Mariano Galla, [mfgalla@ucanr.edu](mailto:mfgalla@ucanr.edu).

**Costs and Returns Study Program/Acknowledgements.** A costs and returns study is a compilation of specific crop data collected from meetings with professionals working in production agriculture from the study area. The authors thank the farmer cooperators, UC Cooperative Extension, and other industry representatives who provided information, assistance, and expert advice. **The use of trade names and farming 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.** *The University is an affirmative action/equal opportunity employer.*

## ASSUMPTIONS

The following assumptions pertain to sample costs to produce sunflower hybrid seed in the Sacramento Valley. Practices described are not recommendations by the University of California, but rather represent production procedures considered typical of a well-managed farm for the Sacramento Valley. Costs and practices detailed in this study may not be applicable to all situations. Cultural practices and varieties for the production of sunflowers vary by grower and region, so differences in costs may occur. The practices and inputs used in this cost study serve only as a sample or guide. These costs are represented on an annual, per acre basis.

### **Production Cultural Practices and Material Inputs**

**Farm.** This report is based on a 3,500-acre field, row, and tree crop farm of which 200 acres are producing sunflower seed. Crops that might be planted on the remaining acres include alfalfa hay, corn, safflower, dry beans, other seed crops, processing tomatoes, wheat, and almonds.

**Land Preparation and Planting.** In this cost study, sunflowers are grown on sub-surface drip irrigation with a single tape down the center at a 10- inch depth, on 5-foot beds. In the fall (August to November) on 85 percent of acreage (170 acres), with no disturbance to the drip tape, furrows are chiseled to a 12-inch depth. Next, the field is disced and rolled twice to incorporate crop residue and open the soil, then disced again with a finishing disc to ensure a fine seedbed. Afterwards, a GPS drag scraper is used to level the field. The last operation in the fall is the listing of 5-foot beds with a 5-bed lister. In the spring before planting, the beds are shaped while incorporating a pre-plant herbicide. A good seedbed is needed to ensure plants germinate well, so that there is a good nick, or overlap in bloom of male and female plants for cross pollination. Beds can be conditioned, but due to issues with soil compaction in the Sacramento Valley, fields are more often disced and beds re-listed.

In this study, every 7-years the drip tape is scheduled for complete removal. Annually, 15 percent of the drip system acreage (30 acres) has the tape removed. On these acres, in the year preceding the sunflower crop, (August to December), fields are ripped to a depth of 18-inches, followed by field practices described above in preparation for planting the following spring.

Drip tape is installed at 10-in depth (1 line/bed, 5 beds/pass), with beds re-shaped in the same operation. Drip tape is reconnected by hand to underground PVC water supply lines. Drip lines at the terminal ends are trimmed and plugged with in-line valves. Depending on the tape, pest pressure and irrigation system, drip tape can last longer than 7-years. Extra irrigation labor is included to perform the expected increase in maintenance on the buried tape.

There are 2-3 planting dates for sunflower from March to May in the Sacramento Valley, depending on rainfall and how early fields can be worked. In this study, planting occurs early April using an air-planter. Sunflower seed is planted at a rate of 1 to 6 pounds per acre (depending on the variety) with a starter fertilizer (8-24-6 with 1% Zn). Hybrid seed production requires crosses between male and female parent lines, with planting configurations depending on the variety being produced. In this study, the ratio is 25% male parent lines to 75% female parent lines. Males are planted in 3 rows on a single 5-foot bed, while females are planted in two rows on 3, 5-foot beds. The male plants are destroyed after pollination to prevent seed contamination with the female lines and weedy volunteer sunflowers in following crops. There are different planting times for the male and female parent lines, as directed by the seed companies, to ensure a good nick, or overlap in bloom.

Seeds begin to emerge in five to seven days depending on soil temperature. Companies contracting sunflower seed plantings in the Sacramento Valley provide the sunflower seed to growers at no charge (part of the contract for seed production) and specify planting rates and dates. Yields and prices will vary by sunflower seed variety, which often depends on the yield potential of the female lines. Hybrid sunflower seed production needs cross pollination, with growers renting and placing 2 hives per acre in their fields prior to bloom, at a cost of \$45 per hive.

**Stand Isolation.** Hybrid sunflower seed production requires at least a 1.25-mile isolation to avoid cross-pollination with other sunflower varieties. Companies will also specify different planting dates to isolate fields in time, in order to avoid simultaneous bloom and cross-pollination with other varieties.

**Fertilization.** A starter fertilizer of 8-24-6 with 1-2% Zinc is applied during planting at the rate of 10 gallons per acre, two-inches below and two-inches to the side of the seed row. At layby (when the plants are about 12-inches tall) a soil test is conducted to determine the amount of residual nitrogen available to plants. Irrigation water is also tested to determine nitrogen availability in the water source. Assuming negligible nitrogen availability in the water and soil, UAN-32 is injected at 100 pounds of nitrogen per acre at layby and continued until the sunflowers begin to head out.

**Irrigation.** Water costs \$90 per acre-foot (or \$7.50 per acre-inch). The grower uses a combination of district canal water and ground water pumped from a depth of 250 feet. The irrigation costs itemized and shown in Tables 1 and 3 are for irrigation and fertigation labor, pumping, and water.

Sprinkler irrigation is used on 50% of the acres at 4-inches, as a double application to germinate and establish the stand after planting (other 50% of acreage is planted earlier into moisture from rainfall). Once the stand is established, about 20-inches of water is applied through the drip system to match crop needs from April through August, for a total 24-inches applied.

Sub-surface drip and sprinkler system efficiencies are typically between 85% and 95%; therefore, additional water may need to be applied to account for distribution uniformity (DU) of the system. For example, if the net crop water requirement under drip systems is 20-inches and the DU is 90%, then the gross application amount would be 22.2 inches (20/90%). These additional water cost inefficiencies are not included in this study.

The drip system requires chemical flushing to retard calcium buildup and emitter clogging. This operation is performed after harvest with N-pHuric acid applied through the drip system with 0.16-inches of water.

**Pest Management.** More information on sunflower production practices as well as pests, weeds, and diseases can be found in the UC ANR Sunflower Hybrid Seed Production manual (Long et al. 2018).

Check with your PCA (Pest Control Advisor) for current pesticide recommendations. Written recommendations are required for use of most pesticides and are made by licensed pest control advisors. For information and pesticide use permits, contact the local county Agricultural Commissioner's office.

While adjuvants may be recommended for use with many pesticides for effective pest and weed control (such as surfactants), adjuvants and their costs are not included in this study.

The PCA or CCA (Certified Crop Advisor) or an independent consultant will monitor the field for agronomic pest problems and nutrients, which includes a nitrogen management plan. Growers may receive the service as part of a service agreement with an agricultural chemical and fertilizer company or hire a private PCA/CCA, but these costs are not included in the study.

**Weed Management.** Both chemical and cultural practices are used for weed control. During the winter, a fallow herbicide (usually Roundup) is used for weed control, using a ATV-pulled sprayer with a 25-foot boom. Before planting, the beds are cultivated to control weeds and to prepare a seedbed and to put down pre-emergent herbicides. Sonalan (ethafluralin, 3.5 pt/ac) is tank-mixed with Dual Magnum (metolachlor, 1.5 pt/ac) and broadcast over the beds and incorporated with a power mulcher on all acreage. Sonalan controls nightshades and Dual Magnum controls nutsedge. The herbicide rates are highly dependent on soil texture, so check the pesticide label, as it is the law. For this study, we used medium textured soils for the herbicide rates given.

There is no in-season herbicide application. A single mechanical cultivation is used at layby, when the plants are about 6-inches tall, to manage weeds. The male beds are usually cultivated first as they tend to be further along because they are planted earlier, followed by the female beds (1 pass per bed per season).

**Insect Pest Management.** The main pest of sunflower, the sunflower head moth, is generally controlled with Coragen in July, by air twice, on 75% of the acreage, as this pest does not necessarily require treatment in every field every year. Coragen is relatively safe for bees, as compared to other insecticides like pyrethroids, but sometimes has to be sprayed twice for good head moth control, once at the late flower bud stage and again at the very beginning of bloom. Earlier plantings often escape sunflower head moth damage. The seed comes pre-treated with fungicides and insecticides for pest and disease control, which is provided by the seed company. Crops may be rogued for additional pests, weeds, and diseases and “off-types” of a different variety, as needed for meeting seed certification standards, but are not included in this study.

**Harvest.** Male sunflower rows are destroyed with a tractor and chopper after flowering and pollination. At maturity the female plants are sprayed with sodium chlorate to dry them down in preparation for harvest. Only the female seed lines are harvested. Harvesting is done by the grower using their own grain combine with a header. The seeds are hauled to the warehouse at a cost of \$0.37 per hundredweight (cwt) where further cleaning, also referred to as scalping, is performed by the contracting seed company at no charge. Any additional seed cleaning, if needed, is paid by the grower.

**Yields.** The gross yield before cleaning is about 1,400 pounds per acre in the Sacramento Valley, based on county crop reports (CCIA). The net crop yield used in this study is about 10% less or 1,260 pounds per acre, because approximately 10% of the gross yield is lost when the seeds are cleaned in the scalping process. Yields will vary considerably, depending on the variety planted.

**Returns.** Due to the different hybrid sunflower seeds grown in the Sacramento Valley, prices will vary. A selling price of \$1,512 per acre or \$1.20 per pound for dry, scalped seed with a 1,260 yield is used to estimate income from the sale of the seeds. Lower yielding varieties tend to have higher prices, while higher yielding ones have lower prices.

**Risk.** The risks associated with crop 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 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 reported in this study.** Any returns above total costs are considered returns on risk and investment to management (or owners).

## Labor, Equipment, and Interest

**Labor.** Hourly wages for workers are \$16.00 per hour for machine operators and \$12.00 per hour non-machine labor. Adding 46 percent for the employer's share of federal and state payroll taxes, insurance, and other possible benefits gives the labor rates shown of \$23.36 and \$17.52 per hour for machine labor and non-machine labor, respectively. 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 possible benefits. Workers' compensation insurance costs will vary among growers. The cost is based on the average industry rate as of January 2018. Labor for operations involving machinery are 20 percent higher than the operation time given in to account for the extra labor involved in equipment set up, moving, maintenance, work breaks, and field repair.

*Irrigation labor.* Labor is involved in drip system operation and maintenance. Charges include the manual labor required for repairs (i.e. rodent damage), re-hookup to main lines, sub-main lines, in-season irrigation, maintenance of the drip tape, and time for flushing the system and adding chemicals to reduce drip emitter clogging. Additional labor has been included in this study for sprinkler setup, operation, and removal. Drip tape system maintenance costs are lowest in the first year and continually increase over the life expectancy of the drip tape.

**California Minimum Wage and Overtime Rules.** In 2016, The California State Government passed new legislation concerning overtime and minimum wage rates that may affect farm labor costs. The California minimum wage rate for 2018 is \$11.00 per hour for companies with more than 25 employees and will rise each year by \$1.00 per hour until it reaches \$15.00 per hour in 2022. Businesses with 25 or fewer employees are given an additional year to comply with the changes. For businesses with 25 or fewer employees, the minimum wage rate is \$10.50 per hour for 2018 and increases to \$11.00 per hour in 2019; thereafter, their minimum wage rate increases by \$1.00 per hour each year from \$11.00 per hour in 2019 to \$15.00 per hour in 2023.

Recent California regulations also decrease the overtime threshold—the number of hours required to be worked before overtime benefits are received—for agricultural workers. The regulations decrease the overtime threshold for agricultural workers from 60 hours per week and 10 hours per day by 5.0 hours per week and 0.5 hours per day each year until it reaches 40 hours per week and 8.0 hours per day in 2022. Businesses with 25 or fewer employees are given an additional three years to comply with the regulation's changes. By January 1<sup>st</sup>, 2019 (2022 for employers with 25 or fewer employees) employees will also be entitled to overtime for 8 hours on the seventh consecutive day of work.

These regulations may cause increased cost of labor used on farms, whether as direct hires, as farm labor contractor employees or as a component of custom services.

For more information and to view the California minimum wage and overtime phase-in schedules visit <http://aic.ucdavis.edu/>

**Farm Management Costs.** Farm management wages and/or costs vary based on how the owner chooses to operate the farm. A management salary is not provided even though the operation is performed by the owner or an assistant manager. Returns above costs are considered payment for the management of the operation.

**Equipment Operating Costs.** Equipment repair costs are based on purchase price, annual hours of use, total hours of life, and repair coefficients formulated by the 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 2018 data from the Energy Information Administration are \$2.92 and \$3.20 per

gallon, respectively. The cost includes a 13.0 percent sales tax and \$0.36/gal excise tax on diesel fuel, and a 10.17 percent sales tax and \$0.42/gal excise tax on gasoline. It is noted that federal and state excise taxes are refundable for on-farm use when filing the farm income tax return. The fuel, lube, and repair cost per acre for each operation is determined by multiplying the total hourly operating cost 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.

**Interest on Operating Capital.** Interest on operating capital is based on cash operating costs and is calculated monthly until harvest at a nominal rate of 5 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 is considered a typical lending rate by a farm lending agency as of January 2018.

### **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 can include property taxes, interest on operating capital, office expense, liability and property insurance, sanitation services, equipment repairs, and management.

**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. County taxes are calculated as 1 percent of the average value of the property. Average value equals new cost plus salvage value divided by 2 on a per acre basis.

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

*Property Insurance.* This provides coverage for property loss and is charged at 0.846 percent 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 an employer becomes legally obligated to pay for bodily injury claims on the property and damages to another person's property as a result of a covered accident. Common liability expenses covered under the policy include attorney fees and court costs, medical expenses for people injured on the property, and injury or damage to another's property. Liability insurance costs \$1,756 per year for the entire farm or \$.50 cents per acre.

**Office Expense.** Office and business expenses are estimated at \$50 per acre. The total cost is \$10,000 for the 200 acres of sunflower production. These expenses include office supplies, telephones, bookkeeping, accounting, office utilities, and miscellaneous administrative charges.

**Sanitation Services.** Sanitation services provide portable toilets for the farm and costs \$.56 per acre or \$1,960 for the entire farm. The cost includes two double toilet units with wash basins, shade structure, delivery and pickup, and five months of weekly servicing. Costs also include soap or other suitable cleansing agent, and single use towels. Separate potable water and single-use drinking cups are also supplied.

**Land Rent.** Leasing practices and rental rates for agricultural property are continually being adjusted due to production changes, market economics, land values, and relative bargaining positions of the landlord and tenant. The recent plantings of orchard crops have affected land lease and rental rates. The 200 acres are leased on a share-rent basis with the land owner receiving 18 percent of the gross returns from the sunflower

crop. Therefore, land rent is based on the yield and the price. The yield is 1,260 lbs./acre valued at \$1.20/lb. equaling a gross return of \$1,512/acre. The land rent in this scenario would be \$226.80/acre. The rented land includes the drip irrigation system infrastructure, including developed wells, source pipes, and filter systems that are maintained by the landlord. The drip tape is not included in the land rent and is purchased, inserted and maintained by the grower.

**Investment Repairs.** Annual maintenance is calculated as two percent of the purchase price.

### **Non-Cash Overhead**

Non-cash overhead costs, shown on an annual per-acre basis, are calculated as the capital recovery cost for equipment and other farm investments.

**Capital Recovery Costs.** Capital recovery cost is the annual depreciation and interest costs for a capital investment. It is the amount of money required each year to recover the difference between the purchase price and salvage value (unrecovered capital). It is equivalent to the annual payment on a loan for the investment with the down payment equal to the discounted salvage value. This is a more complex method of calculating ownership costs than straight-line depreciation and opportunity costs, but more accurately represents the annual costs of ownership because it takes the time value of money into account (Boehlje and Eidman). The formula for the calculation of the annual capital recovery costs is:  $((\text{Purchase Price} - \text{Salvage Value}) \times (\text{Capital Recovery Factor})) + (\text{Salvage Value} \times \text{Interest Rate})$ .

*Salvage Value.* Salvage value is an estimate of the remaining value of an investment at the end of its useful life. For farm machinery (tractors and implements), the remaining value is a percentage of the new cost of the investment (Boehlje and Eidman). The percent remaining value is calculated from equations developed by the American Society of Agricultural and Biological Engineers (ASABE) based on equipment type and years of life. The life in years is estimated by dividing the wear out life, as given by ASABE, by the annual hours of use in the operation. For other investments including irrigation systems, buildings, and miscellaneous equipment, the value at the end of its useful life is zero. The salvage value for land is the purchase price because land does not depreciate. The purchase price and salvage value for equipment and investments are shown in Table 5.

*Capital Recovery Factor.* Capital recovery factor is the amortization factor or annual payment whose present value at compound interest is 1. The amortization factor is a table value that corresponds to the interest rate used and the life of the machine.

*Interest Rate.* An interest rate of 5.5 percent is used to calculate capital recovery. The rate will vary depending upon loan amount and other lending agency conditions, but is the basic suggested rate by a farm lending agency as of January 2018.

**Buildings.** The metal building is constructed on a cement slab totaling 2,400 square feet and is used for shop and/or storage.

**Tools.** This includes shop tools, hand tools, and miscellaneous field tools. The tools are an estimated value and not taken from any specific data.

**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 moved 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 minimum seven-year life expectancy of the tape. There are no recycling revenue or disposal fees for the drip tape.

**Fuel Tanks.** The farm has two fuel storage tanks. One 5,000-gallon diesel tank and one 1,000-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.

**Land Values.** Sunflowers are planted on rented land; therefore, the purchase of land is not included. Cropland in the Central Valley of California ranges in value from \$10,000 to \$22,000 per acre (2017 Trends & Leases).

**Equipment.** Farm equipment is purchased new or used, the study shows the current purchase price for new equipment. The new purchase price is adjusted to 60 percent 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. 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.

**Acknowledgment.** Appreciation is expressed to cooperators who provided support and information for this study.

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**TABLE 1. COSTS PER ACRE TO PRODUCE SUNFLOWERS**

Sacramento Valley - 2018

Operation	Operation Time (Hrs/A)	Cash and Labor Costs per Acre					Total Cost	Your Cost
		Labor Cost	Fuel	Lube & Repairs	Material Cost	Custom/ Rent		
Pre-Plant:								
Chisel Furrows to 12-inches (85% of acreage)	0.11	3	5	2	0	0	10	
Rip to 18-inches (15% of acreage)	0.03	1	1	1	0	0	3	
Stubble Disc and Ring-Roll 2X	0.30	9	14	7	0	0	30	
Finish Disc and Ring-Roll 1X	0.13	4	6	3	0	0	13	
Drag Scraper (GPS, level & smooth)	0.15	4	7	3	0	0	14	
List Beds, 5-bed lister	0.17	5	13	4	0	0	22	
Attach Mainlines to Drip Tape	0.00	53	0	0	25	0	78	
Water Test/Water Analysis	0.00	0	0	0	1	0	1	
Weeds- Fallow Herbicide	0.00	0	0	0	7	0	7	
Weeds- Preplant Herbicide/Cultivate	0.22	6	4	3	50	0	63	
<b>TOTAL PRE-PLANT COSTS</b>	<b>1.11</b>	<b>84</b>	<b>52</b>	<b>22</b>	<b>83</b>	<b>0</b>	<b>241</b>	
Planting:								
Plant & Starter Fertilizer	0.14	4	6	4	55	0	69	
<b>TOTAL PLANTING COSTS</b>	<b>0.14</b>	<b>4</b>	<b>6</b>	<b>4</b>	<b>55</b>	<b>0</b>	<b>69</b>	
Cultural:								
Sprinkler Irrigate & Setup	0.25	42	5	2	15	0	64	
Subsurface Drip Irrigate	0.00	61	0	0	150	0	211	
Fertigate- UAN-32 (100 lbs N/acre)	0.00	0	0	0	58	0	58	
Soil Test (NPK)	0.00	0	0	0	1	0	1	
Weeds- Cultivate	0.17	5	7	2	0	0	14	
Pollination- 2 Hives/Acre	0.00	0	0	0	90	0	90	
Insects- Moths (75% of acreage) 2X	0.00	0	0	0	94	24	118	
Knock Down Males (25% of acreage)	0.10	3	2	1	0	0	6	
Defoliate (75% of acreage)	0.11	3	2	1	8	0	14	
Pickup Truck	1.25	35	11	4	0	0	51	
ATV	0.75	21	1	1	0	0	22	
<b>TOTAL CULTURAL COSTS</b>	<b>2.63</b>	<b>170</b>	<b>28</b>	<b>10</b>	<b>416</b>	<b>24</b>	<b>649</b>	
Post-Harvest:								
Irrigate: Drip Acid Flush	0.00	9	0	0	6	0	15	
<b>TOTAL POST-HARVEST COSTS</b>	<b>0.00</b>	<b>9</b>	<b>0</b>	<b>0</b>	<b>6</b>	<b>0</b>	<b>15</b>	
Harvest:								
Harvest	0.07	2	3	3	0	0	8	
Haul	0.00	0	0	0	0	5	5	
<b>TOTAL HARVEST COSTS</b>	<b>0.07</b>	<b>2</b>	<b>3</b>	<b>3</b>	<b>0</b>	<b>5</b>	<b>13</b>	
Interest on Operating Capital at 5.00%							19	
<b>TOTAL OPERATING COSTS/ACRE</b>	<b>4</b>	<b>268</b>	<b>88</b>	<b>40</b>	<b>560</b>	<b>29</b>	<b>1,005</b>	

UC COOPERATIVE EXTENSION-AGRICULTURAL ISSUES CENTER

**TABLE 1. CONTINUED**

Sacramento Valley - 2018

Operation	Operation	Cash and Labor Costs per Acre						Total Cost	Your Cost
	Time (Hrs/A)	Labor Cost	Fuel	Lube & Repairs	Material Cost	Custom/ Rent			
<b>CASH OVERHEAD:</b>									
Liability Insurance								1	
Office Expense								50	
Sanitation Services								1	
Land Rent- Sunflowers, 18%								272	
GPS Annual Activation Fee								2	
Property Taxes								5	
Property Insurance								0	
Investment Repairs								20	
<b>TOTAL CASH OVERHEAD COSTS/ACRE</b>								<b>350</b>	
<b>TOTAL CASH COSTS/ACRE</b>								<b>1,355</b>	
<b>NON-CASH OVERHEAD:</b>									
		Per Producing Acre	Annual Cost Capital Recovery						
Building 2400 sq. ft.		24	2					2	
Fuel Storage Tanks & Pumps		11	1					1	
Shop Tools		6	0					0	
Drip Tape		900	158					158	
Sprinkler Pipe		26	2					2	
GPS Receivers (2)		3	0					0	
GPS Sending Unit		5	1					1	
Equipment		694	70					70	
<b>TOTAL NON-CASH OVERHEAD COSTS</b>		<b>1,670</b>	<b>234</b>					<b>234</b>	
<b>TOTAL COSTS/ACRE</b>								<b>1,590</b>	

UC COOPERATIVE EXTENSION-AGRICULTURAL ISSUES CENTER  
**TABLE 2. COSTS AND RETURNS PER ACRE TO PRODUCE SUNFLOWERS**  
 Sacramento Valley - 2018

	Quantity/ Acre	Unit	Price or Cost/Unit	Value or Cost/Acre	Your Cost
<b>GROSS RETURNS</b>					
Sunflower Seed	1,260	Lb	1.20	1,512	
<b>TOTAL GROSS RETURNS</b>	1,260	Lb		1,512	
<b>OPERATING COSTS</b>					
<b>Irrigation:</b>					<b>197</b>
Fittings & Valves	1.00	Acre	25.00	25	
Well Test/Water Analysis	1.00	Acre	1.00	1	
Water- Well and District	22.16	AcIn	7.50	166	
Acid Flush	0.10	Gal	47.54	5	
<b>Herbicide:</b>					<b>57</b>
Roundup Weather Max	2.00	Pint	3.50	7	
Sonalan HFP	3.50	Pint	7.90	28	
Dual II Magnum	1.50	Pint	15.00	23	
<b>Fertilizer:</b>					<b>114</b>
8-24-6-1% Zn	10.00	Gal	5.50	55	
UAN-32	100.00	Lb N	0.58	58	
Soil Test (NPK)	1.00	Acre	1.00	1	
<b>Pollination:</b>					<b>90</b>
Bee Hives	2.00	Hive	45.00	90	
<b>Custom:</b>					<b>29</b>
Application-By Air, 20 Gal/Acre	1.50	Acre	16.00	24	
Haul	14.00	Cwt	0.37	5	
<b>Insecticide:</b>					<b>94</b>
Coragen	10.69	FlOz	8.37	94	
<b>Desiccant:</b>					<b>8</b>
Sodium Chlorate 5 SE	1.00	Gal	7.70	8	
<b>Labor</b>					<b>270</b>
Equipment Operator Labor	4.83	hrs	23.36	113	
Irrigation Labor	6.00	hrs	17.52	105	
Non-Machine Labor	3.00	hrs	17.52	53	
<b>Machinery</b>					<b>128</b>
Fuel-Gas	3.74	gal	3.20	12	
Fuel-Diesel	26.16	gal	2.92	76	
Lube				13	
Machinery Repair				27	
Interest on Operating Capital @ 5.00%				19	
<b>TOTAL OPERATING COSTS/ACRE</b>				1,007	
<b>TOTAL OPERATING COSTS/LB</b>				1	
<b>NET RETURNS ABOVE OPERATING COSTS</b>				505	

UC COOPERATIVE EXTENSION-AGRICULTURAL ISSUES CENTER

**TABLE 2. CONTINUED**

Sacramento Valley - 2018

	Quantity/ Acre	Unit	Price or Cost/Unit	Value or Cost/Acre	Your Cost
<b>CASH OVERHEAD COSTS</b>					
Liability Insurance				1	
Office Expense				50	
Sanitation Services				1	
Land Rent- Sunflowers, 18%				272	
GPS Annual Activation Fee				2	
Property Taxes				5	
Property Insurance				0	
Investment Repairs				20	
<b>TOTAL CASH OVERHEAD COSTS/ACRE</b>				<b>350</b>	
<b>TOTAL CASH OVERHEAD COSTS/LB</b>				<b>0</b>	
<b>TOTAL CASH COSTS/ACRE</b>				<b>1,357</b>	
<b>TOTAL CASH COSTS/LB</b>				<b>1</b>	
<b>NET RETURNS ABOVE CASH COSTS</b>				<b>155</b>	
<b>NON-CASH OVERHEAD COSTS (Capital Recovery)</b>					
Building 2400 sq. ft.				2	
Fuel Storage Tanks & Pumps				1	
Shop Tools				0	
Drip Tape				158	
Sprinkler Pipe				2	
GPS Receivers (2)				0	
GPS Sending Unit				1	
Equipment				70	
<b>TOTAL NON-CASH OVERHEAD COSTS/ACRE</b>				<b>234</b>	
<b>TOTAL NON-CASH OVERHEAD COSTS/LB</b>				<b>0</b>	
<b>TOTAL COST/ACRE</b>				<b>1,592</b>	
<b>TOTAL COST/LB</b>				<b>1</b>	
<b>NET RETURNS ABOVE TOTAL COST</b>				<b>-80</b>	

UC COOPERATIVE EXTENSION-AGRICULTURAL ISSUES CENTER

TABLE 3. MONTHLY COSTS PER ACRE TO PRODUCE SUNFLOWERS

Sacramento Valley - 2018

	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	Total
	17	17	17	18	18	18	18	18	18	18	18	18	18	
Pre-Plant:														
Chisel Furrows to 12-inches (85% of acreage)	10													10
Rip to 18-inches (15% of acreage)	3													3
Stubble Disc and Ring-Roll 2X	30													30
Finish Disc and Ring-Roll 1X	13													13
Drag Scraper (GPS, level & smooth)	14													14
List Beds, 5-bed Lister		22												22
Attach Mainlines to Drip Tape			78											78
Water Test/Water Analysis				1										1
Weeds- Fallow Herbicide				7										7
Weeds- Preplant Herbicide/Cultivate						63								63
<b>TOTAL PRE-PLANT COSTS</b>	<b>69</b>	<b>22</b>	<b>78</b>	<b>8</b>		<b>63</b>								<b>241</b>
Planting:														
Plant & Starter Fertilizer							69							69
<b>TOTAL PLANTING COSTS</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>		<b>0</b>	<b>69</b>							<b>69</b>
Cultural:														
Sprinkler Irrigate & Setup							64							64
Subsurface Drip Irrigate							41	31	54	61	24			211
Fertigate- UAN-32							12	38	9					58
Soil Test (NPK)								1						1
Weeds- Cultivate								14						14
Pollination- 2 Hives/Acre									90					90
Insects- Moths (75% of acreage) 2X									59	59				118
Knock Down Males (25% of acreage)										6				6
Defoliate (75% of acreage)											14			14
Pickup Truck	4	4	4	4	4	4	4	4	4	4	4	4	4	51
ATV	2	2	2	2	2	2	2	2	2	2	2	2	2	22
<b>TOTAL CULTURAL COSTS</b>	<b>6</b>	<b>6</b>	<b>6</b>	<b>6</b>	<b>6</b>	<b>6</b>	<b>122</b>	<b>89</b>	<b>217</b>	<b>132</b>	<b>43</b>	<b>6</b>	<b>6</b>	<b>649</b>
Post-Harvest:														
Irrigate: Drip Acid Flush													15	15
<b>TOTAL POST-HARVEST COSTS</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>15</b>	<b>15</b>
Harvest:														
Harvest												8		8
Haul												5		5
<b>TOTAL HARVEST COSTS</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>13</b>	<b>0</b>	<b>13</b>
Interest on Operating Capital @5.00%	0	0	1	1	1	1	2	2	3	4	4	0	0	19
<b>TOTAL OPERATING COSTS/ACRE</b>	<b>75</b>	<b>28</b>	<b>84</b>	<b>15</b>	<b>6</b>	<b>70</b>	<b>193</b>	<b>92</b>	<b>220</b>	<b>136</b>	<b>47</b>	<b>18</b>	<b>20</b>	<b>1,005</b>
CASH OVERHEAD														
Liability Insurance										1				1
Office Expense	4	4	4	4	4	4	4	4	4	4	4	4	4	50
Sanitation Services										1				1
Land Rent- Sunflowers, 18%										272				272
GPS Annual Activation Fee					2									2
Property Taxes				3						3				5
Property Insurance				0						0				0
Investment Repairs	2	2	2	2	2	2	2	2	2	2	2	2	2	20
<b>TOTAL CASH OVERHEAD COSTS</b>	<b>5</b>	<b>5</b>	<b>5</b>	<b>8</b>	<b>7</b>	<b>5</b>	<b>5</b>	<b>5</b>	<b>5</b>	<b>281</b>	<b>5</b>	<b>5</b>	<b>5</b>	<b>350</b>
<b>TOTAL CASH COSTS/ACRE</b>	<b>97</b>	<b>34</b>	<b>89</b>	<b>23</b>	<b>14</b>	<b>76</b>	<b>199</b>	<b>97</b>	<b>226</b>	<b>417</b>	<b>52</b>	<b>24</b>	<b>26</b>	<b>1,355</b>

UC COOPERATIVE EXTENSION-AGRICULTURAL ISSUES CENTER  
**TABLE 4. RANGING ANALYSIS - SUNFLOWERS**  
 Sacramento Valley - 2018

COSTS PER ACRE AND PER LB AT VARYING YIELDS TO PRODUCE SUNFLOWERS

	NET YIELD (LB/ACRE )						
	960.00	1,060.00	1,160.00	1,260.00	1,360.00	1,460.00	1,560.00
OPERATING COSTS/ACRE:							
Pre-Plant	241	241	241	241	241	241	241
Planting	69	69	69	69	69	69	69
Cultural	649	649	649	649	649	649	649
Post-Harvest	15	15	15	15	15	15	15
Harvest	12	12	13	13	13	14	14
Interest on Operating Capital @ 5.00%	19	19	19	19	19	19	19
TOTAL OPERATING COSTS/ACRE	1,004	1,004	1,005	1,005	1,006	1,006	1,006
TOTAL OPERATING COSTS/LB	1.05	0.95	0.87	0.80	0.74	0.69	0.65
CASH OVERHEAD COSTS/ACRE							
	350	350	350	350	350	350	350
TOTAL CASH COSTS/ACRE	1,354	1,355	1,355	1,355	1,356	1,356	1,357
TOTAL CASH COSTS/LB	1.41	1.28	1.17	1.08	1.00	0.93	0.87
NON-CASH OVERHEAD COSTS/ACRE							
	234	234	234	234	234	234	234
TOTAL COSTS/ACRE	1,588	1,589	1,589	1,590	1,590	1,590	1,591
TOTAL COSTS/LB	2.00	1.00	1.00	1.00	1.00	1.00	1.00

Net Return per Acre above Operating Costs for Sunflowers

PRICE (\$/lb)	NET YIELD (lb/acre)						
	960.00	1060.00	1160.00	1260.00	1360.00	1460.00	1560.00
Sunflower Seed							
0.90	-140	-50	39	129	218	308	398
1.00	-44	56	155	255	354	454	554
1.10	52	162	271	381	490	600	710
1.20	148	268	387	507	626	746	866
1.30	244	374	503	633	762	892	1,022
1.40	340	480	619	759	898	1,038	1,178
1.50	436	586	735	885	1,034	1,184	1,334

Net Return per Acre above Cash Costs for Sunflowers

PRICE (\$/lb)	NET YIELD (lb/acre)						
	960.00	1060.00	1160.00	1260.00	1360.00	1460.00	1560.00
Sunflower Seed							
0.90	-490	-401	-311	-221	-132	-42	47
1.00	-394	-295	-195	-95	4	104	203
1.10	-298	-189	-79	31	140	250	359
1.20	-202	-83	37	157	276	396	515
1.30	-106	23	153	283	412	542	671
1.40	-10	129	269	409	548	688	827
1.50	86	235	385	535	684	834	983

Net Return per Acre above Total Costs for Sunflowers

PRICE (\$/lb)	NET YIELD (lb/acre)						
	960.00	1060.00	1160.00	1260.00	1360.00	1460.00	1560.00
Sunflower Seed							
0.90	-724	-635	-545	-456	-366	-276	-187
1.00	-628	-529	-429	-330	-230	-130	-31
1.10	-532	-423	-313	-204	-94	16	125
1.20	-436	-317	-197	-78	42	162	281
1.30	-340	-211	-81	48	178	308	437
1.40	-244	-105	35	174	314	454	593
1.50	-148	1	151	300	450	600	749



UC COOPERATIVE EXTENSION-AGRICULTURAL ISSUES CENTER  
**TABLE 5. WHOLE FARM ANNUAL EQUIPMENT, INVESTMENT, AND BUSINESS OVERHEAD COSTS**  
 Sacramento Valley - 2018

ANNUAL EQUIPMENT COSTS

Yr.	Description	Price	Yrs. Life	Salvage Value	Capital Recovery	Cash Overhead		Total
						Insurance	Taxes	
18	ATV 4WD	8,350	8	2,914	1,018	5	56	1,079
18	Tractor 155HP4WD	155,596	15	30,292	14,150	79	929	15,158
18	Planter-Air 6-Row 15'	54,000	15	5,184	5,148	25	296	5,469
18	300 Gallon Saddle Tanks	1,660	5	541	292	1	11	304
18	Tractor 425HP4WD	425,000	16	76,121	37,533	212	2,506	40,251
18	Tractor 110HP4WD HC	127,363	15	24,795	11,582	64	761	12,407
18	Combine	476,827	15	48,830	45,325	222	2,628	48,176
18	Combine Header 30'	57,662	15	5,905	5,481	27	318	5,826
18	Bed Shaper/Power Incorporator 15'	34,000	15	3,264	3,242	16	186	3,444
18	Fertilizer Bar- 3-Row 15'	13,000	6	3,748	2,058	7	84	2,149
18	Cultivator Sled 3-Row 15'	11,200	10	1,981	1,332	6	66	1,404
18	Pickup 1/2 Ton	28,000	8	9,772	3,415	16	189	3,620
18	ATV Sprayer 30' Boom	5,646	8	1,275	760	3	35	798
18	Tractor 250HP4WD	250,000	16	44,777	22,078	125	1,474	23,677
18	Disc - Stubble 16'	45,000	12	6,233	4,841	22	256	5,119
18	Trailer	2,300	20	120	189	1	12	202
18	Spray Boom - 25'	3,640	10	644	433	2	21	456
18	Mower- Flail 5'	8,800	10	1,556	1,047	4	52	1,103
18	Subsoiler - 16'	42,000	10	7,427	4,995	21	247	5,263
18	Ring Roller-Heavy 15'	18,666	10	3,301	2,220	9	110	2,339
18	Laser Plane Bucket & GPS System	24,000	10	4,244	2,854	12	141	3,008
18	Chisel 15'	12,000	10	2,122	1,427	6	71	1,504
18	Finish Disc 25'	48,000	12	6,648	5,164	23	273	5,460
18	Bed Lister 5-Row 60"	18,450	15	1,889	1,754	9	102	1,864
TOTAL		1,871,160	-	293,583	178,339	916	10,824	190,079
60% of New Cost*		1,122,696	-	176,150	107,004	549	6,494	114,047

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

ANNUAL INVESTMENT COSTS

Description	Price	Yrs. Life	Salvage Value	Capital Recovery	Cash Overhead			Total
					Insurance	Taxes	Repairs	
INVESTMENT								
Building 2400 sq. ft.	84,000	30	0	5,780	36	420	1,680	7,915
Fuel Storage Tanks & Pumps	39,565	20	2,770	3,231	18	212	791	4,252
Shop Tools	20,000	20	1,400	1,633	9	107	400	2,149
Drip Tape	180,000	7	0	31,674	76	900	3,600	36,250
Sprinkler Pipe	90,784	25	45,392	5,881	58	681	1,816	8,435
GPS Receivers (2)	3,990	10	279	508	2	21	80	611
GPS Sending Unit	5,895	10	413	750	3	32	118	902
TOTAL INVESTMENT	424,234	-	50,254	49,456	201	2,372	8,485	60,515

ANNUAL BUSINESS OVERHEAD COSTS

Description	Units/ Farm	Unit	Price/ Unit	Total Cost
Liability Insurance	200	Acre	.50	100
Office Expense	200	Acre	50.00	10,000
Sanitation Services	200	Acre	.56	112
Land Rent- Sunflowers, 18%	200	Acre	272.16	54,432
GPS Annual Activation Fee	200	Acre	2.00	400

UC COOPERATIVE EXTENSION-AGRICULTURAL ISSUES CENTER

**TABLE 6. HOURLY EQUIPMENT COSTS**

Sacramento Valley - 2018

Yr.	Description	Sunflowers	Total	Cash Overhead			Operating		Total Oper.	Total Costs/Hr.
		Hours Used	Hours Used	Capital Recovery	Insurance	Taxes	Lube & Repairs	Fuel		
18	ATV 4WD	150	250	2.44	0.01	0.14	0.76	0.96	1.72	4.31
18	Tractor 155HP4WD	69	1066	7.96	0.04	0.52	9.35	36.43	45.79	54.32
18	Planter-Air 6-Row 15'	28	100	30.89	0.15	1.78	13.93	0.00	13.93	46.75
18	300 Gallon Saddle Tanks	92	300	0.58	0.00	0.02	0.45	0.00	0.45	1.06
18	Tractor 425HP4WD	37	1000	22.52	0.13	1.50	21.32	72.02	93.35	117.50
18	Tractor 110HP4WD HC	148	1066	6.52	0.04	0.43	5.98	18.64	24.62	31.60
18	Combine	16	200	135.97	0.67	7.88	38.42	36.43	74.86	219.38
18	Combine Header 30'	14	200	16.44	0.08	0.95	1.00	0.00	1.00	18.48
18	Bed Shaper/Power Incorporator 15'	43	133	14.62	0.07	0.84	3.80	0.00	3.80	19.34
18	Fertilizer Bar- 3-Row 15'	28	200	6.17	0.02	0.25	5.08	0.00	5.08	11.53
18	Cultivator Sled 3-Row 15'	77	200	4.00	0.02	0.20	2.37	0.00	2.37	6.58
18	Pickup 1/2 Ton	250	250	8.20	0.04	0.45	3.40	9.00	12.40	21.09
18	ATV Sprayer 30' Boom	14	185	2.47	0.01	0.11	1.52	0.00	1.52	4.11
18	Tractor 250HP4WD	159	1000	13.25	0.07	0.88	12.54	42.37	54.91	69.12
18	Disc - Stubble 16'	61	166	17.50	0.08	0.93	7.22	0.00	7.22	25.72
18	Trailer	50	150	0.76	0.00	0.05	0.34	0.00	0.34	1.15
18	Spray Boom - 25'	21	150	1.73	0.01	0.09	0.98	0.00	0.98	2.80
18	Mower- Flail 5'	21	250	2.51	0.01	0.12	1.55	0.00	1.55	4.19
18	Subsoiler - 16'	6	200	14.99	0.06	0.74	9.53	0.00	9.53	25.32
18	Ring Roller-Heavy 15'	87	200	6.66	0.03	0.33	2.13	0.00	2.13	9.15
18	Laser Plane Bucket & GPS System	30	300	5.71	0.02	0.28	3.67	0.00	3.67	9.69
18	Chisel 15'	22	200	4.28	0.02	0.21	2.54	0.00	2.54	7.05
18	Finish Disc 25'	26	166	18.66	0.08	0.99	7.70	0.00	7.70	27.44
18	Bed Lister 5-Row 60"	34	400	2.63	0.01	0.15	0.00	0.00	0.00	2.80

UC COOPERATIVE EXTENSION-AGRICULTURAL ISSUES CENTER  
**TABLE 7. OPERATIONS WITH EQUIPMENT & MATERIALS**  
 Sacramento Valley – 2018

Operation	Operation Month	Tractor	Implement	Labor Type/ Material	Rate/ acre	Unit
Chisel Furrows to 12 Inch Rip to 18 Inches (15%)	Oct	Tractor 250HP4WD	Chisel 15'	Equipment Operator Labor	0.13	hour
	Oct	Tractor 250HP4WD	Subsoiler - 16'	Equipment Operator Labor	0.04	hour
Stubble Disc and Ring Roll	Oct	Tractor 250HP4WD	Disc - Stubble 16' Ring Roller-Heavy 15'			
Finish Disc and Ring Roll	Oct	Tractor 250HP4WD	Finish Disc 25' Ring Roller-Heavy 15'	Equipment Operator Labor	0.16	hour
Drag Scraper (GPS)	Oct	Tractor 250HP4WD	Laser Plane Bucket & GPS	Equipment Operator Labor	0.18	hour
List Beds, 5-bed Lister Attach Mainlines	Nov	Tractor 425HP4WD	Bed Lister 5-Row 60"	Equipment Operator Labor	0.20	hour
	Dec			Irrigation Labor	3.00	hours
Water Test/Water Analysis	Jan			Fittings & Valves	1.00	Acre
	Jan			Well Test/Water Analysis	1.00	Acre
Weeds- Fallow Herbicide	Jan		ATV Sprayer 30' Boom	Equipment Operator Labor	0.08	hour
	Jan			Roundup Weather Max	2.00	Pint
Weeds- Preplant Herbicide	Mar	Tractor 110HP4WD HC	Cultivator Sled 3-Row 15'	Equipment Operator Labor	0.26	hour
			300 Gallon Saddle Tanks	Sonalan	3.50	Pint
Plant & Starter Fertilizer	Apr	Tractor 155HP4WD	Bed Shaper/Power Incorporator 15'	Dual Magnum	1.50	Pint
			Planter-Air 6-Row 15'	Equipment Operator Labor	0.17	hour
Sprinkler Irrigate	Apr	Tractor 110HP4WD HC	Trailer	8-24-6-1% Zn	10.00	Gal
					Non-Machine Labor	2.00
Subsurface Drip Irrigate	Apr			Water- Well and District	2.00	AcIn
					Irrigation Labor	1.50
	May			Water- Well and District	2.00	AcIn
					Irrigation Labor	0.50
	June			Water- Well and District	3.00	AcIn
					Irrigation Labor	0.50
	July			Water- Well and District	6.00	AcIn
					Non-Machine Labor	0.50
	Aug			Water- Well and District	7.00	AcIn
					Non-Machine Labor	0.50
Fertigate- UAN-32	Apr			Water- Well and District	2.00	AcIn
					UAN32	20.00
Soil Test (NPK)	May			UAN32	65.00	Lb N
					UAN32	15.00
Weeds- Cultivate	May	Tractor 155HP4WD	Cultivator Sled 3-Row 15'	Soil Test (NPK)	1.00	Acre
Pollination- 2 Hives	June			Equipment Operator Labor	0.21	hour
Insects- Moths (75%) 2X	June			Bee Hives	2.00	Hive
					Application Air20G	0.75
Knock Down Males (25%) Defoliate (75%)	July	Tractor 110HP4WD HC	Mower- Flail 5'	Coragen	5.63	FLOz
				Tractor 110HP4WD HC	300 Gallon Saddle Tanks	Coragen
	Aug			Application Air20G	0.75	Acre
					Equipment Operator Labor	0.12
Pickup Truck	Aug			Equipment Operator Labor	0.13	hour
					Sodium Chlorate 5 SE	1.00
ATV	Aug		Spray Boom - 25'			
Irrigate: Drip Acid	Oct			Equipment Operator Labor	1.50	hours
					Pickup 1/2 Ton	0.90
				ATV 4WD	0.50	hour
					Irrigation Labor	0.50
				Acid Flush	0.10	Gal
					Water- Well and District	0.16
Harvest	Sept		Combine	Equipment Operator Labor	0.08	hour
Haul	Sept		Combine Header 30'			
				Haul (cwt)	14.00	Cwt