UNIVERSITY OF CALIFORNIA AGRICULTURE AND NATURAL RESOURCES COOPERATIVE EXTENSION UC DAVIS DEPARTMENT OF AGRICULTURAL AND RESOURCE ECONOMICS 2024

SAMPLE COSTS TO PRODUCE ORGANIC ALMONDS



SAN JOAQUIN VALLEY - NORTH DOUBLE LINE DRIP IRRIGATION

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Funding Source: This study was funded by the Almond Board of California

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San Joaquin Valley North - 2024 Double Line Drip Irrigation

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INTRODUCTION

The sample costs to produce organic almonds under double line drip irrigation in the Northern San Joaquin Valley are presented in this study. 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 contract services are based on early 2024 figures. 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 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 or Paul Long, University of California, Davis Department of Agricultural and Resource Economics, at 530-752-4651 or <u>Pmlong@ucdavis.edu</u>

Sample Cost of Production studies for many commodities are available and can be down loaded from the Agricultural and Resource Economics Department website, <u>http://coststudies.ucdavis.edu</u>. Archived studies are also available on the website.

Costs and Returns Study Program/Acknowledgements. A cost and return study is a compilation of specific crop data collected from meetings with professionals working in production agriculture from the region where the study is based. The authors thank the farmer cooperators and other industry representatives who provided information, assistance, and expert advice. The use of trade names and cultural practices in this report does not constitute an endorsement or recommendation by the University of California nor is any criticism implied by the omission of other similar products or cultural practices. *The University of California, Division of Agriculture and Natural Resources (UC ANR) is an equal opportunity provider.*

ASSUMPTIONS

The following assumptions refer to tables 1 to 7 and pertain to sample costs to produce organic almonds under double line drip irrigation in the Northern San Joaquin Valley. Cultural practices and costs for organic almonds production vary considerably among growers within the region; therefore, many of the costs, practices, and materials in this study will not be applicable to every farm. The practices and inputs used in this cost study serve as a guide only.

Establishment Cultural Practices

Farm. The farm consists of 100 contiguous acres farmed by the owner, to include 95 acres of established almonds and 5 acres of roads, irrigation system and a homestead. Note that non-contiguous parcels may have additional costs for travel time and equipment calibration. Larger farms will have increased efficiencies and thus lower per acre costs. The land is assumed to be well drained and either a class I or II soil. Almonds on 40 acres have been converted to organic production.

Organic Orchard Preparation. The orchard is assumed to have been established as a conventional almond orchard. Changing a farming system from conventional to organic practices requires a three-year transition period. Crops grown in transition years can be sold or labeled transitional, providing the rules and regulations are adhered to. Rules and regulations specific to organic commodities are established under the Organic Food Act of 1990 in the California Department of Food and Agriculture (CDFA) and the United States Department of Agriculture's (USDA) National Organic Program (NOP). The orchard in this report is considered to have begun the transition period and certification as organic after the second year of establishment. Refer to the USDA rules for organic production: http://www.ams.usda.gov/AMSv1.0/nop

Government subsidy programs exist for a wide variety of orchard development, improving soil health, and water conservation. This study will not show any subsidy in particular, contact your local USDA, or NRCS office to see what your specific area has available.

Trees. Traditionally, almond orchards will include at least two or more varieties in which bloom periods overlap to insure good pollination. In organic farming, the variety is selected by considering insect and disease resistance. For example, while Nonpareil is more susceptible to insect damage than other varieties, it is also more tolerant to springtime diseases. In this study, the orchard is planted with Nonpareil (50%) and Aldrich varieties (50%). Contact the local UCCE advisor or a commercial nursery for varieties and roots stocks that are available. Planting densities may range from 75-180 trees per acre. In this study, 110 trees are planted on a 18' by 22' spacing (tree x row) to allow cross-mowing. The life of the orchard at the time of planting is estimated to be 25 years.

Production Operating Costs and Material Inputs

Cover Crop. In this study, the cover crop is planted after harvest the third year as part of the transition period, although a cover crop can be planted in the first year of orchard establishment. The cover crop serves multiple purposes, including dust mitigation, weed competition and nitrogen supplementation. Coated (nitrogen fixing inoculants) subterranean clover at 20 pounds per acre is planted by a custom operator. Seeding rates are estimates and will vary by grower and seeding mix. The custom operator will start by discing the orchard rows twice– one time with the disc only and one time with the disc and ring roller. The custom operator then broadcasts the seed and finishes the field with a ring roller. A 3 or 4-acre-inch irrigation germinates the crop and is accomplished with the regular irrigation of 3-acre inches in October. Seed set generally occurs in mid-May, but can also occur early June depending upon the species. For this study, the cost of the cover crop is applied to the cost of production; however, because the legumes reseed themselves, they do not require yearly planting.

Pruning. Hand pruning to remove limbs for equipment access and safety can be done anytime from harvest through the dormant period and is done every other year. In this study, it is done in November or December of every other year as such, 50 percent of the cost of pruning is applied to the cost of the production in this study. Prunings are hand stacked in the row middles and shredded by a custom operator.

Fertilization. Fertilizer such as zinc and boron should be applied only after leaf analysis and discussion with an organic certifier, but before any deficiencies takes place in the orchard. Zinc sulfate at 10 pounds per acre, and a 20 percent boron product at a rate of two pounds per acre, is applied as a foliar spray post-harvest before leaf fall (October). If the hull analysis indicates a boron deficiency, boron can be applied to the soil any time of the year at a rate of 10 to 20 pounds of a 20 percent boron product by spraying it directly on the soil surface or injecting it through the irrigation system. In this study, an additional 10 lbs. per acre of 20 percent boron is applied through the irrigation system in late October. Plant based compost at 10 tons per acre is applied one-half in the spring and one-half post-harvest in the fall to provide approximately 150 pounds of potassium (K) and 200 pounds of nitrogen (N). Compost nutrients vary and rates to obtain the required nutrients will vary, as such, this study includes four compost samples taken at the pile upon delivery in the spring and fall for a total cost of \$600 per year. Many organic growers plant legume cover crops to supplement nitrogen. In general, the fertilizer rates in this study mirror typical tree nutrient requirements, but do not take into account soil and water nitrogen.

Fish hydrolysate is applied through fertigation at 5 gallons an acre between March through June for a total of 20 gallons total per acre per year.

Sampling. Tree nutrient status is determined by leaf, hull and soil analysis. Leaf samples at one per 20 acres are taken in July. A hull sample at one per 40 acres is taken from the windrow at harvest to test for boron levels. A water analysis should be done annually to determine nitrate availability and to maintain regulatory records and is included in this study.

In addition, soil samples are taken every other year, as such, 50 percent of the cost is reflected in this study. Samples are taken a rate of six samples per 40 acres to determine salinity, pH and nutrient levels. The samples are taken at three depths (0-1ft, 1-3ft and 3-5ft), to allow for a complete soil profile, from multiple areas in the orchard with specified depths pooled for analysis. The grower uses an ATV to collect the samples.

Irrigation. Price per acre-foot of water will vary by grower depending on water source, well characteristics and irrigation system. In this study, the water is pumped from an on-site well and the total pumping cost is estimated at \$200/acre foot. A total of 42 acre-inches during the season (March to October). Application rates are greater than the actual tree water requirement due to application inefficiency; therefore, the water application rate is based on 90 percent efficiency. No assumption is made about effective rainfall, evaporation, and runoff. It is assumed that the season begins with a full soil profile.

Sustainable Groundwater Management Act (SGMA). SGMA requires governments and water agencies of high and medium priority basins to halt overdraft and bring groundwater basins into balanced levels of pumping and recharge, which may significantly restrict the amount of water available to irrigate an orchard during drought years. This study assumes that adequate water will be available for the life of the entire orchard, however careful consideration of the amount and quality of water available for irrigation should be done prior to planting. For detailed information visit the website; <u>www.water.ca.gov/Programs/Groundwater-Management/SGMA-Groundwater-Management</u>.

Pollination. A commercial beekeeper sets out two hives per acre for pollination. The bee colony strength should be a standard 8 frames per hive and are set in the orchard in February prior to bloom. The cost ranges from \$150-225 per hive; this study charges \$210 per hive.

Bees are sensitive to pesticides and timing of applications must coordinate with bee pollinating activity. See the individual pesticide labels, environmental hazards section. For more information visit the websites listed below. <u>https://ipm.ucanr.edu/bee-precaution-pesticide-ratings/</u>

The Almond Board of California recently refreshed the BMPs, (Honey Bee Best Management Practices) incorporating new tips and resources that growers and other stakeholders can use to protect honey bees and plan for a productive pollination. <u>almonds.com/pollination</u>

Pest Management. The approved pesticides and rates mentioned in this cost study are federally defined and are listed in California Certified Organic Farmers (CCOF) handbook, and the Organic Materials Review Institute (OMRI). For more information on other pesticides available, pest identification, monitoring, and management visit the UC IPM website at <u>www.ipm.ucdavis.edu</u>. Cultural practices are discussed in the publications UC *Integrated Pest Management Guidelines, Almond*. For information and pesticide use permits, contact the local county agricultural commissioner's office and consult with your organic certification agency.

Pest Control Adviser/Certified Crop Advisor (PCA/CCA). The PCA/CCA monitors the field for agronomic problems including pests and nutrition and writes pesticide recommendations. Growers may hire a private PCA/CCA or receive the service as part of a service agreement with an agricultural chemical and fertilizer company. No PCA/CCA is hired in this study.

Vegetation Management-Weeds. Weeds can be controlled by mechanical or physical means. In this study, a legume cover crop is grown in the middles for weed mitigation, to provide an environment for beneficial predators and as a supplementary nitrogen source. The tree rows can be flamed, hand and/or string trimmer weeded or mowed with a flail mower. In this study, all the row middles are mowed once in the spring using a flail mower and then all rows are flamed every three weeks to keep the middles and rows at less than ½-dollar size of growth for a total of 6 treatments per year. The grower will want to run the irrigation during the flame treatments to keep the lines wet so no melting or burning of the irrigation lines occurs. Sheep can also be used in mature orchards to control the weeds and keep the cover crop at a desired length, but no costs for this option are associated with this study.

Insect and Mites. An OMRI approved dormant or delayed dormant oil spray is applied at a rate of 6 gallons/acre in early January before bud swell to control San Jose scale (*Quadraspidiotus perniciosus*), brown mite (*Bryobia rubrioculus*) and European red mites (*Panonychus ulmi*). The spray also includes 7 lbs/acre of copper as an active ingredient to control shot hole (*Stigmina carphphila*). In late March, a biological insecticide is applied at a rate of 1 lb/acre based on peach twig borer (PTB) emergence (around petal fall). Mites can be managed during the season with two OMRI approved light oil sprays: July and August. In July, at the beginning of hull split, a spinosad pesticide is applied to control navel orange worm (NOW). NOW is also managed primarily by winter sanitation and early harvest; additional NOW and PTB controls may be necessary in some orchards.

Beginning in the third year and in subsequent years, navel orangeworm, *Amyelois transitella* (NOW) is monitored using pheromone traps with lures as well as egg traps (& female traps in many orchards). The traps are placed in the orchard in March or April to monitor insect flights through hull-split. Spray applications are dependent on pest pressure, more or fewer applications may be needed. Other insecticides and timing may be utilized depending upon insect type and pressure. This study includes \$120 per acre cost for NOW mating disruption, application, and monitoring.

Winter Sanitation. Winter sanitation in December destroys overwintering sites and spring food sources for NOW and Carpophilus beetle. The mummy nuts are shaken from the trees, dropped to the orchard floor, blown into the

row middles and shredded with a flail mower. Winter sanitation operations except for the shredding are custom hired. Some years, mummy nuts stick worse than others ensuing that more labor for hand polling may be required.

Disease. The delayed dormant oil and copper spray will also provide some scab (*Cladosporium carpophilum*) control. Scab is typically controlled with two applications of an OMRI approved micronized sulfur at the highest label rate (typically 20 lbs/acre) at two and five weeks after petal fall. Micronized sulfur may also have efficacy against shot hole (*Stigmina carphphila*), typically at petal fall. Brown rot (*Monilinia laxa*) is controlled with a bio fungicide or micronized sulfur application at early bloom and more importantly at full bloom (February). Hull rot can be controlled with deficit irrigation during initial hull split.

Vertebrate Pest. Trapping is used to control gophers and squirrels at a cost of \$8.50/trap. Gopher traps are set in March and August, while squirrel traps are set from March through October. The grower uses an ATV to set 2.5 traps/acre (100 traps for 40 acres), which is assumed to take one hour per 40 acres (0.025 hrs/acre) each time. Owl boxes may also be used to control vertebrate pests. The cost of the traps is included in shop tools.

Endangered Species. It is important to know if your farm is located in an area where endangered or threatened species reside. PRESCRIBE is an online database application to allow pesticide applicators to learn if endangered species are in the vicinity of an application site, and the use limitations applicable to the pesticide product(s) they intend to use. The database is implemented by the California Department of Pesticide Regulation. https://www.cdpr.ca.gov/docs/endspec/prescint.htm

Harvest. In this study, a custom operator mechanically harvests the almond crop starting in the third year. Harvest begins in August with the early maturing varieties and continues into October for late maturing varieties. In this study, harvest is in September. An inertia trunk shaker is the most common shaker used for almonds. The shaker head attaches to the tree trunk to shake the nuts from the tree. The nuts fall to the ground and in a separate operation are blown from around the trees and swept into windrows to dry. The grower then furnishes labor for hand raking to move nuts, missed by the sweeper, into the windrows. A pickup machine gathers the nuts from the windrow and loads them into a cart or bankout wagon. In this study, the nuts are elevated or dumped into bottom dump trailers with extended sides for delivery to the huller.

Yields. Typical annual yields for almonds are measured in kernel (meat) pounds per acre. Yields in organic orchards when compared to conventional orchards are subject to potential decreases in yield and quality due to differences in pesticide and fertilizer efficacy. In this study, the estimated yield is 1,800 pounds. Below is an estimated annual yield table based on the age of the tree comparing yields in organic almond production and conventional almond production.

Annual Yield Estimates											
Year	Organic Kernel lbs.	Conventional Kernel lbs.									
3	300	400									
4	600	800									
5	1,300	1,600									
6+	1,800	2,200									

Returns. Returns will vary depending on the variety and market. A ranging analysis of yields and returns is provided in Table 4. Typically, organic producers receive a premium over conventional markets for their product. For this study, an estimated price of \$2.25 per pound is used to determine potential profits/losses.

Almond Hulls and By-Products. Almond hulls are high in fiber and are sold as a feed additive to the dairy industry. For this study, no additional revenue from by-products is added as the price varies significantly based on variety, quality and market.

Assessment. The Almond Board of California assesses all almonds commercially grown in the state to pay for almond promotions and research. The mandatory assessment is paid by processors and is not reflected in grower costs.

Labor, Equipment, and Interest

Labor. Hourly wages for workers are \$22.00 for machine operators and \$20.00 per hour non-machine labor. Adding 43.00 percent for the employer's share of federal and state payroll taxes, workers' compensation insurance, for nut crops (Code 0045) and other possible benefits gives the labor rates shown of \$31.46 and \$28.60 per hour for machine labor and non-machine labor, respectively. Workers' compensation costs will vary among growers. The costs are based upon the average industry final rate as of August 2024. Labor time for operations involving machinery is 20 percent higher than the equipment time to account for the extra labor involved in equipment set up, moving, maintenance, work breaks, and field repair.

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 & Biological Engineers (ASABE). Fuel and lubrication costs are also determined by ASABE equations based on maximum power takeoff (PTO) horsepower, and fuel type. Prices for on-farm delivery of diesel and gasoline are \$4.80 and \$4.40 per gallon, respectively. The costs are based on August 2024, Energy Information Administration (EIA), monthly data. The cost includes a 13.0 percent sales tax on diesel fuel and 2.25 percent sales tax on gasoline. Included in the cost per gallon is federal and state excise tax, \$0.36 on diesel fuel and \$0.42 on gasoline, which are refundable for on-farm use when filing your income tax. Federal highway tax and local district sales taxes are not included.

Pickup Truck/Utility Vehicle, (ATV). The half-ton pickup is used around the farm to monitor the orchard and for hauling tools and supplies. The ATV is used for herbicide spraying, baiting ants, checking irrigation and monitoring vertebrate traps.

Interest on Operating Capital. Interest on operating capital is based on cash operating costs and is calculated monthly until harvest at a nominal rate of 9 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, the rate is considered a typical lending rate by a farm lending agency as of August 2024.

Risk. The risks associated with the establishment and production of organic almonds should not be minimized. Weather and other risks are a continual concern for conventional growers, but organic growers face additional risks such as pest outbreaks that cannot be adequately controlled with organic methods. 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 the profitability and economic viability of organic almond production.

Cash Overhead Costs

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 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. For this study, county taxes are calculated as 1 percent of the average value of the property. Average value equals new cost plus salvage value divided by 2 on a per acre basis.

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

Property Insurance. This provides coverage for property loss and is charged at 8.86 percent per \$1,000 of the average value of the assets over their useful life.

Liability Insurance. A baseline farm liability insurance policy will help cover the expenses for which you become legally obligated to pay for bodily injury claims on your property and damages to another person's property as a result of a covered accident. Common liability expenses covered under your policy include attorney fees and court costs, medical expenses for people injured on your property, injury or damage to another's property. For this analysis, \$833 is charged and covers the entire farm.

Crop Insurance. This is available to almond growers for any unavoidable loss of production, damage or poor quality resulting from adverse weather conditions such as cool wet weather, freeze, frost, hail, heat, rain, wind and damage from birds, drought, earthquakes and fire. Coverage levels are from 50-85 percent of the approved average yield as established by verifiable production records from the orchard. 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, no level is specified. The USDA Risk Management Agency, 2023 Crop Insurance Policies link: rma.usda.gov/policies/.

Office Expense. Office and business expenses are estimated at \$100 per acre. These expenses include office supplies, telephones, bookkeeping, accounting, legal fees, shop and office utilities, and miscellaneous administrative charges.

Environmental/Regulatory Costs. Various environmental fees are collected by the county and state. The fees will vary by county. For example, there are fees assessed by the Air Resources Board (state agency) regulating air pollution, a Water Coalition Fee (local coalition), formerly called an Ag Waiver Fee for water discharges and hazardous material storage fee (local coalition). The grower must also provide safety training, safety equipment, and maintain training records. For this study, a cost of \$40.00 per acre is included.

Organic Production Fees. Organic growers must meet certain criteria as defined by the National Organic Act requiring state registration and certification by a USDA accredited certifying agent. For this study, it is assumed the grower has paid the initial application fees; as such, only the only the one-time transition fee and the annual inspection/certification fees are shown.

California Certified Organic Farmers (CCOF). CCOF is an accredited certifying agency. They charge a one time application fee of 350.00. The annual inspection fee varies and is estimated at \$250.00 (\$85.00/hr inspection fee plus a \$47.50/hr travel fee). The annual certification fee is based on production revenues and is estimated at \$1432.04 for the 40-acre orchard.

California Department of Food and Agriculture (CDFA). State registration is required and the county agricultural commissioner collects the fees. The fee is based on production revenues and is estimated at \$300 annual fee for the 40-acre orchard.

Sanitation Services. Sanitation services provide one portable toilet and cost the farm \$800 annually. The cost includes one double toilet unit with washbasin, delivery and 4 months of weekly service.

Management/Supervisor Salaries. The grower farms the orchard; therefore, no salaries are included for 2024 Organic Almonds Cost & Returns Study San Joaquin Valley North UCCE, UCDAVIS-ARE 8

management. Returns above costs are considered a return to management.

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

Non-Cash Overhead Costs

Non-cash overhead is 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 prices 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 ((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 (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 ASABE based on equipment type and years of life. The life in years is estimated by dividing the wear out life, as given by ASABE by the annual hours of use in this operation. For other investments including irrigation systems, buildings, and miscellaneous equipment, the value at the end of its useful life is zero. The salvage value for land is the purchase price because land does not depreciate. The purchase price and salvage value for equipment and investments are shown in the tables.

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

Interest Rate. The interest rate of 8.25 percent 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 August 2024

Land. Cropland with irrigation availability plantable to almonds is valued at \$25,000 per acre. For this study, the producing acreage is estimated worth is \$25,000 per acre. It is the crop land value plus the Establishment Cost for the first three years of an almond orchard in the northern San Joaquin Valley, (\$25,000 + \$17,182 = \$42,182). Established almond orchards range in value from \$28,000 to \$48,000 per acre in this region, which varies by irrigation availability, age of trees, average yields, soil quality and various other factors. The cost is amortized over the remaining 23 years of orchard production to estimate the annual capital recovery cost.

Establishment Cost. Establishment cost is the sum of the costs for land preparation, planting, trees, cash overhead and production expenses for growing the trees through the first year that almonds are harvested minus any returns from production. Costs to establish the orchard are included in non-cash overhead expenses and capital recovery costs for the production years and is estimated at \$17,182 per planted acre for this study.

Irrigation System. In this study, the water is pumped from an existing 300 foot deep well with a pumping level at 75-feet. A new 125 horsepower pump is installed to irrigate the 40 acres. An annual pump test is performed in January to monitor pumping level and efficiency (gallons/minute) at a cost of \$200 for the test. This study

uses a double line drip system, The double-line drip irrigation system and micro-sprinkler systems are the prevalent systems in the region. A double-line drip irrigation system reduces evaporation losses compared to micro sprinklers, thereby providing some water savings. but alternative systems could include micro-sprinklers hanging in the tree line or flood irrigation, depending on the soil make-up and access to water sources. The system includes a filtration/injection system located near the pumping plant. The life of the irrigation system is estimated to be 25 years.

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 percent to indicate a mix of new and used equipment. Annual ownership costs for equipment and other investments are shown in the tables. 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.

Shop/Field Tools. This includes shop tools and equipment, hand tools, and miscellaneous field tools, including pruning equipment, bait stations and a frost alarm system. The cost is assumed and not based on any collected data.

Fuel Tanks. Two 500-gallon fuel tanks using gravity feed are on metal stands. The tanks are setup in a cement containment pad that meets federal, state, and county regulations.

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

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UC COOPERATIVE EXTENSION-AGRICULTURAL AND RESOURCE ECONOMICS, UC DAVIS Table 1. COST PER ACRE TO PRODUCE ORGANIC ALMONDS

NORTHERN SAN JOAQUIN VALLEY - 2024

	Equipment Cash and Labor Costs per Acre							
	Time	Labor	Fuel	Lube	Material	Custom/	Total	Your
Operation	(Hrs/A)	Cost		& Repairs	Cost	Rent	Cost	Cost
Cultural:								
Pump Test	0.00	0	0	0	0	5	5	
Pest: Dormant (Oil Spray)	0.25	9	5	2	82	0	98	
Disease: Brown Rot (Regalia)	0.25	9	5	2	80	0	96	
Pollination: Hive Rental	0.00	0	0	0	0	420	420	
Weeds: Mow Middles	0.75	28	7	6	0	0	42	
Disease: Brown Rot (Kumulus)	0.25	9	5	2	45	0	61	
Pest: Gopher Traps 2x	0.05	2	0	0	0	0	2	
Pest: Squirrel Traps 6x	0.15	6	0	0	0	0	6	
Weeds: Flame Tree Rows	0.00	0	0	0	0	160	160	
Water Analysis	0.01	0	0	0	0	1	2	
Irrigate	0.00	100	0	0	700	0	799	
Fertigate: Fish Hydrolysate	0.00	0	0	0	110	0	110	
NOW Mating Disruption	0.00	0	0	0	120	0	120	
Fertilize: Compost	0.00	0	0	0	300	24	324	
Compost Analysis	0.00	8	0	0	0	15	23	
Disease: Scab (Sulfur) 2x	0.50	19	9	4	43	0	75	
Fertilize: Boron & Zinc Foliar	0.25	9	5	2	14	0	30	
Insect:N. Orangeworm (Entrust)	0.25	9	5	2	186	0	202	
Leaf Analysis Fee	0.02	1	0	0	0	2	3	
Insect: Mite (Oil Spray)	0.50	19	9	4	44	0	76	
Fertigate Boron	0.00	0	0	0	20	0	20	
Hull Samples	0.03	1	0	0	0	1	2	
Soil Analysis (50% of cost)	0.03	1	0	0	0	2	3	
Plant Cover Crop	0.00	0	0	0	13	45	58	
Pruning (50% of cost)	0.00	114	0	0	0	0	114	
Stack Brush (50% of cost)	0.00	14	0	0	0	0	14	
Shred Prunings (50% of cost)	0.00	0	0	0	0	27	27	
Winter Sanitation	0.09	4	2	1	0	150	156	
Pickup Truck Use	1.67	63	20	7	0	0	90	
ATV Use	1.25	47	2	1	0	0	50	
TOTAL CULTURAL COSTS	6.29	474	72	33	1,757	853	3,189	
Harvest:								
Shake/Sweep/Pick up/Haul Nuts	0.00	0	0	0	0	465	465	
Hand Rake Nuts	0.00	14	0	0	0	0	14	
Hull and Shell Nuts	0.00	0	0	0	0	144	144	
TOTAL HARVEST COSTS	0.00	14	0	0	0	609	623	
Interest on Operating Capital at 9.00%							93	
TOTAL OPERATING COSTS/ACRE	6	488	72	33	1,757	1,462	3,905	

UC COOPERATIVE EXTENSION-AGRICULTURAL AND RESOURCE ECONOMICS, UC DAVIS Table 1. COST PER ACRE TO PRODUCE ORGANIC ALMONDS (CONTINUED) NORTHERN SAN JOAQUIN VALLEY - 2024

	Operation			Cash and I	Labor Costs p	ber Acre		
	Time	Labor	Fuel	Lube	Material	Custom/	Total	Your
Operation	(Hrs/A)	Cost		& Repairs	Cost	Rent	Cost	Cost
CASH OVERHEAD:								
Environmental/Regulatory Fees							40	
Liability Insurance							16	
Office Expense							100	
Organic Cert Fee 40ac							36	
Sanitation Fees							20	
CDFA Organic Registration Fee							8	
Property Taxes							369	
Property Insurance							26	
Investment Repairs							214	
TOTAL CASH OVERHEAD COSTS/ACRE							828	
TOTAL CASH COSTS/ACRE							4,733	
NON-CASH OVERHEAD:]	Per Producing		Annual	Cost			
		Acre		Capital Re	ecovery			
Fuel Tanks 2-500Gal		34		3			3	
Shop/Field Tools		158		18			18	
Land (40 acres)		25,000		2,063			2,063	
Almond Orchard Establishment		17,182		1,718			1,718	
Well/Pump/Filters		6,219		523			523	
Equipment		437		60			60	
TOTAL NON-CASH OVERHEAD COSTS		49,030		4,386			4,386	
TOTAL COSTS/ACRE							9,119	

UC COOPERATIVE EXTENSION-AGRICULTURAL AND RESOURCE ECONOMICS, UC DAVIS Table 2. COSTS AND RETURNS PER ACRE TO PRODUCE ORGANIC ALMONDS NORTHERN SAN JOAQUIN VALLEY - 2024

	Quantity/	Unit	Price or Cost/Unit	Value or	Your
GROSS RETURNS	Add	Onit	Cost Onit	COMPACI	COSI
Almond Production	1.800	Lb	2.25	4.050	
TOTAL GROSS RETURNS	1,800	Lb	2.20	4.050	
OPED ATING COSTS	1,000	LU		1,000	
				422	
Dormont Oil (110 Surroy Oil)	10.00	Cal	11.00	432	
Common	10.00	Ual L	2.27	110	
NOW Disguster/Tree Monitoring	7.00	LU	120.00	10	
NOW Disrupton Trap Monitoring	1.00	Acre Oz	120.00	120	
Europeider	10.00	OZ	18.02	160	
Pegalia Biofungicide	4.00	Ot	20.00	80	
Kumulus DE (Wettable Sulfur)	20.00	UL Lh	20.00	80 45	
Mioronized Sulfur	20.00	Lb	2.25	43	
Fortilizer	20.00	LU	2.10	43	
Fish Hydrolysate	20.00	Gal	5 50	110	
Manure/Compost	10.00	Ton	30.00	300	
Boron Solubor (20%)	12.00	Th	2 03	24	
Zinc Sulfate (36%)	10.00	Lb	0.98	10	
Custom:	10.00	Lo	0.90	1.462	
Pump Test	0.03	Fach	200.00	1,102	
Pollination Fee	2.00	Hive	210.00	420	
Flame Tree Rows	8.00	Acre	20.00	160	
Water Analysis	0.03	Fach	50.00	100	
Spread Compost	2.00	Acre	12.00	24	
Compost Analysis	0.20	Each	75.00	15	
Leaf Analysis	0.10	Each	20.00	2	
Hull Analysis	0.05	Each	20.00	1	
Harvest- Sweep/Pick up/Haul Nuts	1.00	Acre	465.00	465	
Hull & Shell Nuts	1800.00	Lb	0.08	144	
Soil Analysis	0.08	Each	30.00	2	
Plant Cover Crops	1.00	Acre	45.00	45	
Shred Prunings	0.10	Hour	270.00	27	
Shake/Sweep Tree- Winter NOW	1.00	Acre	150.00	150	
Irrigation:				700	
Water - Pumped	42.00	AcIn	16.66	700	
Seed:				13	
Clover (Subterranean, Coated)	5.00	Lb	2.55	13	
Labor				488	
Equipment Operator Labor	7.55	hrs	31.46	238	
Irrigation Labor	3.48	hrs	28.60	100	
Non-Machine Labor	5.28	hrs	28.60	151	
Machinery				106	
Fuel-Gas	0.57	gal	4.40	3	
Fuel-Diesel	14.53	gal	4.80	70	
Lube				11	
Machinery Repair				23	
Interest on Operating Capital @ 9.00%				93	
TOTAL OPERATING COSTS/ACRE				3,905	
TOTAL OPERATING COSTS/LB				2	
NET RETURNS ABOVE OPERATING COSTS				145	

UC COOPERATIVE EXTENSION-AGRICULTURAL AND RESOURCE ECONOMICS, UC DAVIS Table 2. COSTS AND RETURNS PER ACRE TO PRODUCE ORGANIC ALMONDS (CONTINUED)

NORTHERN SAN JOAQUIN VALLEY - 2024

	Quantity/		Price or	Value or	Your
	Acre	Unit	Cost/Unit	Cost/Acre	Cost
CASH OVERHEAD COSTS					
Environmental/Regulatory Fees				40	
Liability Insurance				16	
Office Expense				100	
Organic Cert Fee 40ac				36	
Sanitation Fees				20	
CDFA Organic Registration Fee				8	
Property Taxes				369	
Property Insurance				26	
Investment Repairs				214	
TOTAL CASH OVERHEAD COSTS/ACRE				828	
TOTAL CASH OVERHEAD COSTS/LB				0	
TOTAL CASH COSTS/ACRE				4,733	
TOTAL CASH COSTS/LB				3	
NET RETURNS ABOVE CASH COSTS				-683	
NON-CASH OVERHEAD COSTS (Capital Recovery)					
Fuel Tanks 2-500Gal				3	
Shop/Field Tools				18	
Land (40 acres)				2,063	
Almond Orchard Establishment				1,718	
Well/Pump/Filters				523	
Equipment				60	
TOTAL NON-CASH OVERHEAD COSTS/ACRE				4,386	
TOTAL NON-CASH OVERHEAD COSTS/LB				2	
TOTAL COST/ACRE				9,119	
TOTAL COST/LB				5	
NET RETURNS ABOVE TOTAL COST				-5,069	

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	Total
	24	24	24	24	24	24	24	24	24	24	24	24	
Cultural:													
Pump Test	5												5
Pest: Dormant (Oil Spray)	98												98
Disease: Brown Rot (Regalia)		96											96
Pollination: Hive Rental		420											420
Weeds: Mow Middles			10	10	10		10						42
Disease: Brown Rot (Kumulus)			61										61
Pest: Gopher Traps 2x			1					1					2
Pest: Squirrel Traps 6x			1	1	1	1			1	1			6
Weeds: Flame Tree Rows			20	20	20	20	20	20	20	20			160
Water Analysis			2										2
Irrigate			19	62	99	137	171	147	104	60			799
Fertigate: Fish Hydrolysate			28	28	28	28							110
NOW Mating Disruption				120									120
Fertilize: Compost				162						162			324
Compost Analysis				8						15			23
Disease: Scab (Sulfur) 2x				38	38								75
Fertilize: Boron & Zinc Foliar				30									30
Insect:N. Orangeworm (Entrust)				20			202						202
Leaf Analysis Fee							3						-0
Insect: Mite (Oil Spray)							38	38					76
Fertigate Boron							20	50					20
Hull Samples							20		2				20
Soil Analysis (50% of cost)									3				23
Plant Cover Crop									5	58			58
Pruning (50% of cost)										50		114	114
Stock Brush (50% of cost)												14	14
Shred Drunings (50% of cost)												14	27
Winter Sonitation												156	156
Dialman Travala Lian	0	0	0	0	0	o	0	o	0	o	o	150	150
ATTALLA	8	0	8	0	8	8	0	0	8	0	8	8	90
AlvUse	4	4	4	4	4	4	4	4	4	4	4	4	50
TOTAL CULTURAL COSTS	115	528	153	490	208	198	476	218	142	327	12	324	3,189
Harvest:									165				165
Shake/Sweep/Pick up/Haul Nuis									403				403
									14				14
Hull and Shell Nuts									144				144
TOTAL HARVEST COSTS	0	0	0	0	0	0	0	0	623	0	0	0	623
Interest on Operating Capital @ 9.00%	1	5	6	10	11	13	16	18	24	-5	-3	-2	93
TOTAL OPERATING COSTS/ACRE	115	532	159	499	219	210	492	235	789	322	9	321	3,905
CASH OVERHEAD													
Environmental/Regulatory Fees			40										40
Liability Insurance			16										16
Office Expense	8	8	8	8	8	8	8	8	8	8	8	8	100
Organic Cert Fee 40ac				36									36
Sanitation Fees						20							20

UC COOPERATIVE EXTENSION-AGRICULTURAL AND RESOURCE ECONOMICS, UC DAVIS **Table 3. MONTHLY PER ACRE CASH COSTS TO PRODUCE ORGANIC ALMONDS** NORTHERN SAN JOAQUIN VALLEY – 2024

2024 Organic Almonds Cost & Returns Study San Joaquin Valley North UCCE, UCDAVIS-ARE 16

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	Total
	24	24	24	24	24	24	24	24	24	24	24	24	
CDFA Organic Registration Fee			8										8
Property Taxes		185							185				369
Property Insurance		13							13				26
Investment Repairs	18	18	18	18	18	18	18	18	18	18	18	18	214
TOTAL CASH OVERHEAD COSTS	26	224	89	62	26	46	26	26	224	26	26	26	828
TOTAL CASH COSTS/ACRE	142	756	248	561	245	256	518	262	1,013	349	35	347	4,733

UC COOPERATIVE EXTENSION-AGRICULTURAL AND RESOURCE ECONOMICS, UC DAVIS **Table 3. MONTHLY PER ACRE CASH COSTS TO PRODUCE ORGANIC ALMONDS** NORTHERN SAN JOAQUIN VALLEY – 2024

UC COOPERATIVE EXTENSION-AGRICULTURAL AND RESOURCE ECONOMICS, UC DAVIS **Table 4. RANGING ANALYSIS FOR ORGANIC ALMONDS** NORTHERN SAN JOAQUIN VALLEY - 2024

COST PER ACRE AND PER LB AT VARYING YIELDS TO PRODUCE ORGANIC ALMONDS

			YIELD (I	(bs/acre)				
	-	1,200.00	1,400.00	1,600.00	1,800.00	2,000.00	2,200.00	2,400.00
OPERATING COSTS/ACF	RE:							
Cultural		3,189	3,189	3,189	3,189	3,189	3,189	3,189
Interest on Operating Capita	al@ 9.00%	93	93	93	93	93	93	93
TOTAL OPERATING COS	STS/ACRE	3,857	3.873	3.889	3,905	3.921	3,937	3,953
TOTAL OPERATING COS	STS/LB	3.21	2.77	2.43	2.17	1.96	1.79	1.65
CASH OVERHEAD COST	S/ACRE	828	828	828	828	828	828	828
TOTAL CASH COSTS/AC	RE	4.685	4,701	4.717	4,733	4,750	4,766	4,782
TOTAL CASH COSTS/LB		3.90	3.36	2.95	2.63	2.37	2.17	1.99
NON-CASH OVERHEAD	COSTS/ACRE	4,386	4,386	4,386	4,386	4,386	4,386	4,386
TOTAL COSTS/ACRE		9,071	9,087	9,103	9,119	9,135	9,151	9,167
TOTAL COSTS/LB		8.00	6.00	6.00	5.00	5.00	4.00	4.00
		NET RETURNS P	ER ACRE ABO	VE OPERATING	COSTS			
PRICE			YIELD (lb	o/acre)				
Organic Almonds	1200.00	1400.00	1600.00	1800.00	2	2000.00	2200.00	2400.00
0.75	2 957	2 823	2 680	2 555		2 421	2 287	2 153
1.25	-2,937	-2,823	-2,089	-2,555		-2,421	-2,287	-2,153
1.25	-2,337	-1 423	-1,089	-1,055		-1,421	-1,107	-255
2 25	-1,757	-723	-1,089	-755		579	1 013	1 447
2.23	-557	-23	511	1 045		1 579	2 113	2 647
3.25	43	677	1.311	1,945		2.579	3.213	3.847
3.75	643	1,377	2,111	2,845		3,579	4,313	5,047
		NET RETUR	N PER ACRE AF	BOVE CASH CO	STS			,
PRICE			YIELD (lb	/acre)				
Organic Almonds	1200.00	1400.00	1600.00	1800.00		2000.00	2200.00	2400.00
0.75	-3.785	-3.651	-3.517	-3.383		-3.250	-3.116	-2.982
1.25	-3.185	-2.951	-2.717	-2.483		-2.250	-2.016	-1.782
1.75	-2,585	-2,251	-1,917	-1,583		-1,250	-916	-582
2.25	-1,985	-1,551	-1,117	-683		-250	184	618
2.75	-1,385	-851	-317	217		750	1,284	1,818
3.25	-785	-151	483	1,117		1,750	2,384	3,018
3.75	-185	549	1,283	2,017		2,750	3,484	4,218
		NET RETURN	NS PER ACRE A	BOVE TOTAL C	COSTS			
PRICE			YIELD (lb	o/acre)				
Organic Almonds	1200.00	1400.00	1600.00	1800.00		2000.00	2200.00	2400.00
0.75	-8,171	-8,037	-7,903	-7,769		-7,635	-7,501	-7,367
1.25	-7,571	-7,337	-7,103	-6,869		-6,635	-6,401	-6,167
1.75	-6,971	-6,637	-6,303	-5,969		-5,635	-5,301	-4,967
2.25	-6,371	-5,937	-5,503	-5,069		-4,635	-4,201	-3,767
2.75	-5,771	-5,237	-4,703	-4,169		-3,635	-3,101	-2,567
3.25	-5,171	-4,537	-3,903	-3,269		-2,635	-2,001	-1,367
3.75	-4,571	-3,837	-3,103	-2,369		-1,635	-901	-167

UC COOPERATIVE EXTENSION Table 5. ANNUAL EQUIPMENT, INVESTMENT, AND BUSINESS OVERHEAD COSTS NORTHERN SAN JOAQUIN VALLEY - 2024

ANNUAL EQUIPMENT COSTS

						Cash Over	head		
Yr	Description	Price	Yrs Life	Salvage Value	Capital Recovery	Insurance	Taxes	Total	
24	85HP 4WD Tractor	48,321	20	6,200	4,882	19	273	5,174	
24	Air-Blast PTO 500Gal	26,000	8	5,870	4,020	11	159	4,191	
24	50HP 2WD Tractor	19,697	20	2,527	1,990	8	111	2,109	
24	ATV-4WD	8,350	10	2,466	1,090	4	54	1,148	
24	Pickup Truck 1/2 Ton	34,000	5	15,238	5,987	17	246	6,251	
24	Flail Mower 11'	12,803	10	2,264	1,775	5	75	1,856	
	TOTAL	149,171	-	34,566	19,745	65	919	20,729	
	60% of New Cost*	89,503	-	20,740	11,847	39	551	12,437	

*Used to reflect a mix of new and used equipment

ANNUAL INVESTMENT COSTS

					Cash Ov	erhead			
Description	Price	Yrs Life	Salvage Value	Capital Recovery	Insurance	Taxes	Repairs	Total	
INVESTMENT									
Fuel Tanks 2-500Gal	3,224	20	226	330	1	17	64	412	
Shop/Field Tools	15,000	15	1,050	1,741	6	80	300	2,127	
Land (40 acres)	1,000,000	30	1,000,000	82,500	710	10,000	0	93,210	
Almond Orchard Establishment	687,280	22	0	68,713	244	3,436	3,436	75,829	
Well/Pump/Filters	248,775	50	0	20,921	88	1,244	4,976	27,230	
TOTAL INVESTMENT	1,954,279	-	1,001,276	174,205	1,049	14,778	8,776	198,808	

ANNUAL BUSINESS OVERHEAD COSTS

	Units/	T T 1	Price/	Total
Description	Farm	Unit	Unit	Cost
Environmental/Regulatory Fees	40.00	Acre	40.00	1,600
Liability Insurance	40.00	Acre	15.53	621
Office Expense	40.00	Acre	100.00	4,000
Organic Certification Fee	40.00	Acre	35.81	1,432
Sanitation Fees	40.00	Acre	20.00	800
CDFA Organic Registration Fee	40.00	Acre	8.00	300

UC COOPERATIVE EXTENSION **Table 6. HOURLY EQUIPMENT COSTS - ORGANIC ALMONDS** NORTHERN SAN JOAQUIN VALLEY - 2024

		Organic Almonds	Total	_	Cash O	verhead		Operating		_
		Hours	Hours	Capital			Lube&		Total	Total
Yr	Description	Used	Used	Recovery	Insurance	Taxes	Repairs	Fuel	Oper.	Costs/Hr.
24	85HP 4WD Tractor	103	600	4.88	0.02	0.27	3.25	16.50	19.75	24.93
24	Air-Blast PTO 500Gal	90	250	9.65	0.03	0.38	4.39	0.00	4.39	14.45
24	50HP 2WD Tractor	33	600	1.99	0.01	0.11	2.05	8.72	10.77	12.88
24	ATV-4WD	61	200	3.27	0.01	0.16	0.84	1.65	2.49	5.93
24	Pickup Truck 1/2 Ton	67	400	8.98	0.03	0.37	4.30	12.00	16.30	25.68
24	Flail Mower 11'	34	200	5.33	0.02	0.23	5.88	0.00	5.88	11.45

UC COOPERATIVE EXTENSION-AGRICULTURAL AND RESOURCE ECONOMICS, UC DAVI
Table 7. ANNUAL EQUIPMENT, INVESTMENT, AND BUSINESS OVERHEAD COSTS
NORTHERN SAN JOAQUIN VALLEY – 2024

	Operation			Labor Type/	Rate/	
Operation	Month	Tractor	Implement	Material	acre	Unit
Pump Test	Jan			Pump Test	0.03	Each
Pest: Dormant (Oil)	Jan	85HP 4WD Tractor	Air-Blast PTO 500Gal	Equipment Operator Labor	0.30	hour
				Dormant Oil (440 Spray Oil)	6.00	Gal
				Copper	7.00	Lb
Disease: Brown Rot	Feb	85HP 4WD Tractor	Air-Blast PTO 500Gal	Equipment Operator Labor	0.30	hour
				Regalia Biofungicide	4.00	Qt
Pollination: Hive	Feb			Pollination Fee	2.00	Hive
Weeds: Mow Middles	Mar	50HP 2WD Tractor	Flail Mower 11'	Equipment Operator Labor	0.23	hour
	Apr	50HP 2WD Tractor	Flail Mower 11	Equipment Operator Labor	0.23	hour
	May	50HP 2WD Tractor	Flail Mower 11	Equipment Operator Labor	0.23	hour
	July	50HP 2WD Tractor	Flail Mower II'	Equipment Operator Labor	0.23	hour
Disease: Brown Rot	Mar	85HP 4WD Tractor	Air-Blast PTO 500Gal	Equipment Operator Labor	0.30	hour
	м			Kumulus DF (Wettable Sulfur)	20.00	Lb
Pest: Gopher Traps 2	Mar		ATV-4WD	Equipment Operator Labor	0.03	hour
De et. Servine 1 Trees	Aug		ATV-4WD	Equipment Operator Labor	0.03	hour
Pest: Squiffer Traps	Mar		ATV 4WD	Equipment Operator Labor	0.03	hour
	Apr May		ATV 4WD	Equipment Operator Labor	0.03	hour
	lung		ATV AWD	Equipment Operator Labor	0.03	hour
	Sent		ATV 4WD	Equipment Operator Labor	0.03	hour
	Oct		ATV-4WD	Equipment Operator Labor	0.03	hour
Weeds: Flame Tree Rows	Mar		AIVHWD	Equipment Operator Labor	1.00	Acre
weeds. I fame free Rows	Apr			Flame Tree Rows	1.00	Acre
	May			Flame Tree Rows	1.00	Acre
	June			Flame Tree Rows	1.00	Acre
	July			Flame Tree Rows	1.00	Acre
	Aug			Flame Tree Rows	1.00	Acre
	Sept			Flame Tree Rows	1.00	Acre
	Oct			Flame Tree Rows	1.00	Acre
Water Analysis	Mar		ATV-4WD	Equipment Operator Labor	0.02	hour
5				Water Analysis	0.03	Each
Irrigate	Mar			Irrigation Labor	0.08	hour
5				Water - Pumped	1.00	AcIn
	Apr			Irrigation Labor	0.26	hour
	-			Water - Pumped	3.25	AcIn
	May			Irrigation Labor	0.42	hour
				Water - Pumped	5.25	AcIn
	June			Irrigation Labor	0.58	hour
				Water - Pumped	7.25	AcIn
	July			Irrigation Labor	0.72	hour
				Water - Pumped	9.00	AcIn
	Aug			Irrigation Labor	0.62	hour
	a			Water - Pumped	7.75	Acln
	Sept			Irrigation Labor	0.44	hour
	0.1			Irrigation Labor		Acln
	Oct			Irrigation Labor	0.36	hour
Fortigato, Fish	Mor			water - Fumped Fish Hydrolysete	5.00	Aciii Gal
relugate. FISH	Apr			Fish Hydrolysate	5.00	Gal
	May			Fish Hydrolysate	5.00	Gal
	June			Fish Hydrolysate	5.00	Gal
NOW Mating Disruption	Anr			NOW Disruptor/Tran Monitoring	1.00	Acre
Fertilize: Compost	Apr			Manure/Compost	5.00	Ton
retuiize. Compost	7 tpi			Spread Compost	1.00	Acre
	Oct			Manure/Compost	5.00	Ton
				Spread Compost	1.00	Acre
Compost Analysis	Apr			Non-Machine Labor	0.03	hour
				Compost Analysis	0.10	Each
	Oct			Non-Machine Labor	0.25	hour
				Compost Analysis	0.10	Each
Disease: Scab (Sulfu	Apr	85HP 4WD Tractor	Air-Blast PTO 500Gal	Equipment Operator Labor	0.30	hour
`	1			Micronized Sulfur	10.00	Lb
	May	85HP 4WD Tractor	Air-Blast PTO 500Gal	Equipment Operator Labor	0.30	hour
				Micronized Sulfur	10.00	Lb
Fertilize: Boron & Z	Apr	85HP 4WD Tractor	Air-Blast PTO 500Gal	Equipment Operator Labor	0.30	hour
				Boron Solubor (20%)	2.00	Lb
				Zinc Sulfate (36%)	10.00	Lb
Insect:N. Orangeworm	July	85HP 4WD Tractor	Air-Blast PTO 500Gal	Equipment Operator Labor	0.30	hour
· · · · · -				Entrust SC	10.00	Oz
Leaf Analysis Fee	July		ATV-4WD	Equipment Operator Labor	0.03	hour

	Operation			Labor Type/	Rate/	
Operation	Month	Tractor	Implement	Material	acre	Unit
				Leaf Analysis	0.10	Each
Insect: Mite (Oil)	July	85HP 4WD Tractor	Air-Blast PTO 500Gal	Equipment Operator Labor	0.30	hour
				Dormant Oil (440 Spray Oil)	2.00	Gal
	Aug	85HP 4WD Tractor	Air-Blast PTO 500Gal	Equipment Operator Labor	0.30	hour
				Dormant Oil (440 Spray Oil)	2.00	Gal
Fertigate Boron	July			Boron Solubor (20%)	10.00	Lb
Hull Samples	Sept		ATV-4WD	Equipment Operator Labor	0.03	hour
				Hull Analysis	0.05	Each
Soil Analysis (50%)	Sept		ATV-4WD	Equipment Operator Labor	0.03	hour
	-			Soil Analysis	0.08	Each
Plant Cover Crop	Oct			Clover (Subterranean, Coated)	5.00	Lb
				Plant Cover Crops	1.00	Acre
Pruning (50% of cost)	Dec			Non-Machine Labor	4.00	hours
Stack Brush (50%)	Dec			Non-Machine Labor	0.50	hour
Shred Prunings (50%)	Dec			Shred Prunings	0.10	Hour
Winter Sanitation	Dec	85HP 4WD Tractor	Flail Mower 11'	Equipment Operator Labor	0.11	hour
				Shake/Sweep Tree- Winter NOW	1.00	Acre
Pickup Truck Use	Dec		Pickup Truck 1/2 Ton	Non-Machine Labor		
ATV Use	Dec		ATV-4WD	Equipment Operator Labor	1.50	hours
Shake/Sweep/Pick up/	Sept			Harvest- Sweep/Pick up/Haul Nuts	1.00	Acre
Hand Rake Nuts	Sept			Non-Machine Labor	0.50	hour
Hull and Shell Nuts	Sept			Hull & Shell Nuts	1,800.00	Lb