
UNIVERSITY OF CALIFORNIA COOPERATIVE EXTENSION

2008

SAMPLE COSTS TO ESTABLISH
AN ALMOND ORCHARD AND PRODUCE

ALMONDS



SAN JOAQUIN VALLEY SOUTH
MICRO-SPRINKLER IRRIGATION

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and PRODUCE ALMONDS**

San Joaquin Valley South - 2008

Micro-Sprinkler Irrigation

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INTRODUCTION

Sample costs to establish an almond orchard and produce almonds under micro-sprinkler irrigation in the Southern San Joaquin Valley are presented in this study. This study is intended as a guide only, and can be used to make production decisions, determine potential returns, prepare budgets and evaluate production loans. Practices described are based on production practices considered typical for the crop and area, but will not apply to every situation. Sample costs for labor, materials, equipment and custom services are based on current figures. A blank column, “Your Costs”, in Tables 2 and 3 is provided to enter your costs.

The hypothetical farm operation, production practices, overhead, and calculations are described under the assumptions. For additional information or an explanation of the calculations used in the study call the Department of Agricultural and Resource Economics, University of California, Davis, (530) 752-3589 or your local UC Cooperative Extension office.

Current and some archived Sample Cost of Production Studies are available for many commodities and can be downloaded at <http://coststudies.ucdavis.edu> or can be requested through the Department of Agricultural and Resource Economics, UC Davis, (530) 752-1715 Current studies can be obtained from selected county UC Cooperative Extension offices.

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ASSUMPTIONS

The assumptions refer to Tables 1 to 8 and pertain to sample costs to establish an orchard (Table 1) and produce almonds (Tables 2-8) in the Southern San Joaquin Valley under micro-sprinkler irrigation. Practices described represent production practices and materials considered typical of a well-managed orchard in the region. The costs, materials, and practices shown in this study will not apply to all situations. Establishment and production cultural practices vary by grower and the differences can be significant. **The use of trade names and cultural practices in this report does not constitute an endorsement or recommendation by the University of California nor is any criticism implied by omission of other similar products or cultural practices.**

Land. The hypothetical farm consists of 100 contiguous acres farmed by the owner. Almonds are being established on 95 acres; roads, irrigation systems and farmstead occupy five acres. Farms with lesser acres may be subject to minimum charges for custom farming services.

Establishment Cultural Practices and Material Inputs

Site Preparation. The new orchard is planted (established) on land previously planted to an orchard or vineyard. The land is assumed to be well drained and either a class I or II soil with a Storie index above 80%.

Orchard Removal. In October the trees are pushed over (uprooted) which removes the tree along with most of the roots beneath the soil. Trees are piled and then ground into wood chips. The chips are hauled to a cogeneration plant. Orchard removal fees vary considerably. The lowest fees appear to be those in conjunction with cogeneration plants, where the wood is ground in the field and hauled to the plant for fuel. The grower hires a custom removal service to remove the orchard.

Preplant Evaluation. The field is backhoed at one hole per 20 acres, depending on soil variability and is or should be done to determine the need to slip plow or rip. Composite soil samples from the various depths and soil layers are taken at the same time to determine major salinity (sodium, chloride, boron) concerns. Appropriate amendment and leaching requirements can then be determined.

Land Preparation. Slip plowing should be deep enough to mix soil layers and ripping should be deep enough to break the compacted layers. In this study, the field is slip plowed every 10 to 12 feet to a depth of 5 to 6 feet across the future tree row. A final pass is made down the tree row, for a total of three passes per row. The land is disked four times in different directions, berms made, and the tree rows fumigated. Custom operators do all operations, including fumigation, to prepare the orchard for planting in the year prior to planting, but costs are shown in the first year.

Planting. In January or February, contract labor companies who specialize in orchard planting do the planting operation. They survey, dig (auger) the planting holes, plant, prune, spray trees with bactericide, and place a tree guard around the trunk. The tree guards protect against above ground rodents, herbicide sprays, and sunburn. In the second year, one tree per acre is replanted.

Trees. Two or three mid-blooming varieties 5/8 inch in diameter are planted at 110 trees per acre on 22 X 18-foot spacing. Almond orchards will include at least two or more varieties in which pollen shedding and bloom periods overlap to insure good pollination. Almond varieties are grouped by early, mid and late blooming varieties. Please refer to the “Regional Almond Variety Trials, 2006 Progress Report”, for more information. Planting densities may range from 75 to 121 trees per acre. In the high-density or closer plantings (greater than 130 trees per acre), more intensive management is needed to prevent excessive insect and disease problems. There are bare root and potted trees. Bare root tree sizes range from 5/16 inch to one-inch trunk diameter. Smaller sizes those one-half inch and less may require stakes the first and second year. Potted trees must have a bamboo stake the year planted and a 2 X 2 inch X 4 foot stake the following year. The staking results in higher planting costs. The life of the orchard at the time of planting is estimated to be 25 years.

Fertilization. Beginning in the second year, leaf samples are taken in June/July for nutrient analysis and the fertilizers applied according to analysis recommendations. Fertilizer rates in this study are typical nutrient requirements, but do not take into account soil and water nitrogen. In the first year, equally split applications of nitrogen (N) as ammonium sulfate are made one-half in the spring (March) and one-half in the summer (July). The fertilizer is hand applied near the base of the trees (approximately 18-inches from the trunk). Beginning in the second year, equal applications of N are applied in the spring (March) and summer (July) through the irrigation system. One or two zinc chelate applications are made from May through September. In this study, zinc chelate is applied in May (combined with mite sprays) and September during the first and second year. Beginning in the fifth year, boron (Solubor) is sprayed on the trees in October. Annual rates of actual N used in this study are shown in Table A.

Year:	1	2	3	4	5	6+
	lbs/acre					
N:	20	40	100	120	240	280

Training/Pruning. Suckering is done by grower labor twice (April and May) in the first year and once (May) in the second year. Training which includes pruning begins in December of the first year or January of the second year. Although pruning may not be required every year, in this study pruning is done from the second through fourth year; after which the orchard is pruned in alternate years. Trees are tied every year from the second through sixth year, but some growers may tie through the twelfth year. The tie (small rope) is made around the tree about one-quarter of the way from the tree top. A labor contractor does the pruning and tying each year. A custom or contract operator shreds the prunings.

Fall Defoliation. Beginning in the third year, zinc sulfate is applied in mid-November to defoliate the tree and also to reduce the amount of inoculum for rust and shothole. This also allows for early pruning and provides secondary control for rust and some diseases.

Winter Sanitation. Winter (December) sanitation begins in the third year. The cost depends on the number of mummies left on the trees after harvest. The variety and number of trees per acre are factors affecting the cost. Winter shaking can substitute for poling in some years. In this study a minimal cost for hand poling is allocated in the third year and beginning in the fourth year, the costs include some poling and a custom operator who shakes the mummy nuts from the trees, and blows and rakes them into the row middles where the grower shreds them. If there are excessive mummies left on the tree at harvest, poling may be done at that time to include the nuts in the harvest and reduce winter sanitation costs.

Pollination. A commercial beekeeper sets out one-half hive per acre in the third year, one hive per acre in the fourth and two hives thereafter. The hives are placed in the orchard in early February, prior to bloom. Hive strength is assumed to equal or exceed six frames per hive.

Irrigation. Water is pumped from a reservoir (common in Kern county), through a filtration system into the micro-sprinkler system. In this study water costs \$10.50 per acre-inch. No assumption is made about effective rainfall. The irrigation line is laid out in December prior to planting at which time 2 acre-inches of water is applied to the berms. Bubblers are used at each tree for irrigation through the first year. The micro sprinklers are installed in the second year and moved to the center of the trees. The total costs are shown under investments. The amount of water applied each year is shown in Table B.

Table B. Applied Water

Year	AcIn/Yr
1	5
2	16
3	26
4	47
5+	52

Pest Management. The pesticides and rates mentioned in this cost study as well as other materials available are listed in *UC Integrated Pest Management Guidelines, Almonds* available online at www.imp.ucdavis.edu. Pesticides mentioned in the study are commonly used, but are not recommendations.

Weeds. During February of the first year, after planting, the six-foot berm strip is sprayed with Treflan and incorporated with light discing. The row middles are disked four times – April, May, August, October/November. In the second year, the row middles are disked five times – January, April, May, August, October/November. Beginning in the first year and in subsequent years a spot spray using Roundup is applied to the tree row in the spring (March) and summer (July). A dormant strip spray with Surflan and Goal is applied beginning in the winter of the first year (December) or second year (January in this study). In February of the third year the row middles are disked, floated and rolled. The resident vegetation is allowed to grow and is mowed four times – April, May, June and July. Beginning in the fourth year, the row middles are mowed six times – March for frost control; April, two times; one time each in June, July, and August. Beginning in the third year, Roundup is applied to the entire orchard floor in August prior to harvest.

Insects. In May of the first year, peach twig borer is controlled with Diazinon. Beginning in the second year, a dormant spray in January or early February with Supreme Oil and Asana controls peach twig borer (PTB), San Jose scale (SJS), and brown almond and European red mites. In May of the first, second and third years, web spinning mites are controlled with an Agrimek and Supreme Oil application. Beginning in late June/July of the third year, ant bait (Clinch or Distance) is broadcast on the field for ant control. Navel orange worms (NOW) and mites are treated in June (hull split spray) with Imidan and Omite. The sprays in the first and second years are applied with a handgun that is attached to the sprayer. It is assumed that one person drives the tractor that pulls the sprayer and one person sprays the trees with the handgun, both labor costs are included in the application costs. Label rates may be reduced during the first three years, because of the small tree size.

Diseases. Beginning in the fourth year, brown rot is treated at full bloom (February) with Rovral. Shot hole, botrytis (green fruit rot) and scab are treated two to three weeks later – mid-March - with Ziram and Vanguard. Alternaria and rust may be a problem in some areas, but not every year and is not included as a cost in the study.

Vertebrates. Gophers in this study are managed in the first three years with poison bait applied in the spring (March) and fall using a hand bait applicator. Beginning in the fourth year, gophers are controlled in the spring with gopher bait and ground squirrels in the late spring (May) with an anti-coagulant squirrel bait. Squirrels may also be controlled with a late winter fumigation when soil moisture is adequate.

Harvest. Mechanical harvesting and pickup by a custom operator begins in the third year. The nuts are removed from the trees by shaking, moved to the centers by sweeping and hand raking, picked up and transported to a hulling and shelling facility.

Year	Kernel Pounds
3	500
4	1,100
5	2,400
6	2,600
7+	2,800

Yields and Returns. Almonds begin bearing an economic crop in the third year after planting. Typical annual yields for almonds are measured in meat (kernel) pounds per acre and are shown in Table C.

Production Cultural Practices and Material Inputs

Winter Sanitation. Winter (January) sanitation destroys over-wintering sites for navel orange worm. Mummy nuts should be removed before bud swell or by February 1. A custom operator shakes the mummy nuts from the trees, and blows/rakes them into the row middles where the grower shreds them. Some hand poling is included in the cost, but often is needed in low rainfall years and costs can range from \$80 to \$400 per acre, depending on the number of mummy nuts. Some growers may pole the unharvested nuts at harvest after shaking to include the nuts in the yield and reduce poling costs for removing mummy nuts.

Pruning. Hand pruning is done in alternate years by contract labor in November, but can be done anytime after harvest through the dormant period. The prunings are stacked in the row middles and shredded by a custom operator. One half of the cost for pruning and shredding is charged to the orchard each year. There is a trend toward mechanical pruning (hedging) being done in alternate middles every other year. One set of middles is done in the first round and the unhedged middles the next round resulting in all middles being hedged every four years.

Irrigation. Water is pumped from a reservoir, through a filtration system into the micro-sprinkler system. In this study water costs \$10.50 per acre-inch (\$126 per acre-foot) and includes the pumping cost from the reservoir. The irrigation costs includes the water and irrigation labor. A total of fifty-two acre-inches of water is applied to the orchard. Water costs in the San Joaquin Valley vary by water district and costs the grower from \$30 to \$200 per acre-foot. No assumption is made about effective rainfall, evaporation, and runoff.

Frost Protection. The resident vegetation is mowed in March. Also, when temperatures drop below freezing during or after bloom, water will be applied to the field during these periods.

Pollination. Two hives (6+ frames/hive) per acre are contracted for pollination and set in the orchard in February by the beekeeper prior to bloom.

Fertilization. Nitrogen (N) as UN-32 at 280 pounds per acre is applied in equal amounts in March and July through the micro-sprinklers. The irrigator connects the fertilizer tank to the irrigation system; therefore the fertilizer labor charges are included in the irrigation costs. Boron (Solubor) is foliar applied in October. Fertilizer rates in this study are typical nutrient requirements, but do not take into account soil and water nitrogen. Leaf samples are taken in June/July for nutrient analysis and the fertilizers applied according to analysis recommendations. Leaf samples in this study are calculated at one per 20 acres and analyzed for N, P, K, B, Na, and Zn. The samples are collected by the PCA and the cost is for the lab analysis.

Fall Defoliation. Zinc sulfate is applied in mid-November to defoliate the trees and also to reduce the amount of inoculum for rust and shothole. This also allows for early pruning and provides secondary control for rust and some diseases.

Pest Management. The pesticides and rates mentioned in this cost study are listed in *UC Integrated Pest Management Guidelines, Almonds*. For more information on other pesticides available, pest identification, monitoring, and management visit the UC IPM website at www.ipm.ucdavis.edu. Cultural practices are discussed in the publications *Integrated Pest Management for Almonds* and *Almond Production Manual*. For information and pesticide use permits, contact the local county agricultural commissioner's office. Adjuvants or surfactants may be recommended for use with some pesticides, but are not included in this study. Pesticide costs vary by location and grower volume. Pesticide costs in this study are taken from a single dealer and shown as full retail.

Pest Control Adviser (PCA). Written recommendations are required for many pesticides and are made by licensed pest control advisers. In addition the PCA will monitor the field for agronomic problems including pests and nutrition. Growers may hire private PCAs or receive the service as part of a service agreement with an agricultural chemical and fertilizer company. In this study, the grower hires a PCA for pest and nutrition advice and a PCA or irrigation specialist for irrigation advice.

Weeds. A dormant strip spray using pre/post-emergent herbicides (Surflan, Goal) to control weeds in the tree rows is applied in January. In March and July, a post emergent spot spray (Roundup) is applied on the berms. Resident species are grown as a ground cover in the middles and are mowed six times (March through August). A preharvest spray (Roundup) is used to prepare the orchard floor for harvest.

Insects. In Kern County, scale can be a problem, therefore a dormant spray of Asana and Supreme Oil in January or early February before bud swell controls peach twig borer, San Jose scale, and brown almond and European red mites. In other regions or counties, the dormant spray may not be necessary. Ant bait (Clinch or Distance) is broadcast on the orchard floor in June for ant control. When baits have failed, a Lorsban application may be necessary two weeks prior to shaking (harvest). At the beginning of hull split in June, Imidan and Omite are applied to control navel orangeworm (NOW) and various mites, respectively. NOW can also be managed by early harvest and winter sanitation.

Disease. Rovral and 1% Supreme Oil are applied in February at bloom to control brown rot blossom blight. A second spray using Ziram and Vanguard to control, shot hole, greenfruit or jacket rot, and scab is applied in mid-March at petal fall. Fungicide sprays for control of brown rot, jacket rot and shothole diseases will depend on rainfall during bloom and post bloom period.

Vertebrate Pest. Poison bait is applied in the spring (March) by a mechanical applicator for gopher control. Ground squirrels are controlled by the use of anti-coagulant baits with above ground bait stations in the spring. Late winter fumigation can be done when soil moisture is adequate.

Harvest. In this study, a custom operator mechanically harvests the almond crop. The operator shakes the nuts from the trees, sweep the nuts into a windrow, picks up the nuts and hauls them to the huller/sheller. The custom operator also furnishes hand labor to rake the nuts missed by the sweeper into the windrow. Harvest begins in August for the early maturing varieties and continues into October for late maturing varieties. Some varieties may require hand poling immediately after harvest to remove unharvested nuts (future mummy nuts). The poled nut will be included in the current yield and can also reduce winter sanitation costs.

Yields and Returns. Typical annual yields for almonds are measured in meat (kernel) pounds per acre and are shown in Table C. An estimated price of a \$1.50 per pound based on published estimates for 2007 grower returns. Returns will vary depending on the market.

Assessment. The Almond Board of California (ABC) 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.

Pickup/ATV. The study assumes business use mileage of 4,500 miles per year for the pickup. The ATV is used for spot spraying, baiting ants and gophers and is included in those costs. Additional ATV use for monitoring the orchard and checking the irrigation system is shown under ATV and assumes the ATV travels 3,000 miles per year or 30 miles per acre.

Labor. Labor rates of \$14.74 per hour for machine operators and \$10.72 for general labor includes payroll overhead of 34%. The basic hourly wages are \$11.00 for machine operators and \$8.00 for general labor. The overhead includes the employers' share of federal and California state payroll taxes, workers' compensation insurance for orchard/nut crops (code 0045), and a percentage for other possible benefits. Workers' compensation costs will vary among growers, but for this study the cost is based upon the average industry final rate as of January 1, 2008 (California Department of Insurance, unreferenced). Labor for operations involving machinery are 20% higher than the operation time given in Table 2 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 the American Society of Agricultural Engineers (ASAE). Fuel and lubrication costs are also determined by ASAE equations based on maximum PTO horsepower and fuel type. Prices for on-farm delivery of diesel and gasoline are \$2.50 and \$3.10 per gallon, respectively. The fuel prices are the annual average costs derived from American Automobile Association (AAA) and Energy Information Administration 2007 monthly data. The cost includes a 2.25% sales tax on diesel fuel and 8% sales tax on gasoline. Gasoline also includes federal and state excise tax, which can be refunded for on-farm use when filing your income tax. The fuel, lube, and repair cost per acre for each operation in the "Cost Per Acre to Produce" table is determined by multiplying the total hourly operating cost in the "Hourly Equipment Costs" table for each piece of equipment used from the Operation Time (Hrs/A) column by the hours per acre. Tractor time is 10% higher than implement time for a given operation to account for setup, travel and down time.

Interest on Operating Capital. Interest on operating capital is based on cash operating costs and is calculated monthly until harvest at a nominal rate of 8.75% per year. A nominal interest rate is the typical market cost of borrowed funds. The interest cost of post harvest operations is discounted back to the last harvest month using a negative interest charge. The rate will vary depending upon various factors, but the rate in this study is considered a typical lending rate by a farm lending agency as of January 2008.

Risk. Production risks should not be minimized. 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 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.

Property Taxes. Counties charge a base property tax rate of 1% on the assessed value of the property. In some counties special assessment districts exist and charge additional taxes on property including equipment, buildings, and improvements. For this study, county taxes are calculated as 1% of the average value of the property. Average value equals new cost plus salvage value divided by 2 on a per acre basis.

Insurance. Insurance for farm investments varies depending on the assets included and the amount of coverage. Property insurance provides coverage for property loss and is charged at 0.740% of the average value of the assets over their useful life. Liability insurance covers accidents on the farm and costs \$559 for the entire farm.

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.

Sanitation Services. Sanitation services provide single portable toilets and washbasins for the orchard and cost the farm \$155 per month. The monthly service charge is an average of four to six California sanitation companies and locations. The cost includes delivery and 2 months of weekly service.

Safety Training/Equipment. An estimated cost to cover safety training workshops, record keeping and related materials for employees. Also, includes safety equipment such as respirators for spraying, coveralls, eyewash stations and related materials.

Management/Supervisor Salaries. The grower farms the orchard; therefore no salaries are included for management. Returns above costs are considered a return to management.

Investment Repairs. Annual maintenance is calculated as two percent of the purchase price. For orchard maintenance (tree replacement etc.), the cost is 0.005% of the establishment cost.

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 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 Engineers (ASAE) based on equipment type and years of life. The life in years is estimated by dividing the wear out life, as given by ASAE by the annual hours of use in this operation. For other investments including irrigation systems, buildings, and miscellaneous equipment, the value at the end of its useful life is zero. 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 6.25% is used to calculate capital recovery. The rate will vary depending upon size of loan and other lending agency conditions, but is a suggested rate by a farm lending agency in January 2008.

Establishment Cost. Costs to establish the orchard are used to determine capital recovery expenses, depreciation, and interest on investment for the production years. 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. The Total Accumulated Net Cash Cost on Table 1, in the third year represents the establishment cost. For this study the cost is \$4,839 per acre or \$459,705 for the 95-acre orchard. The establishment cost is spread over the remaining 22 years of the 25 years the orchard is in production.

Irrigation System. Micro-sprinkler lines are laid out prior to planting. The labor cost for laying out the line, changing from bubblers to micro-sprinkler and the filtration injection system is included in the irrigation system cost. A 25 horsepower pump and reservoir is already installed from the previous orchard and is not accounted for in this study. The water flows into the reservoir from the district and is pumped from the reservoir into the system. A reservoir is most common in Kern County and may not be used in other counties.

Land. Land values in the region for open or crop land range from \$2,500 to \$12,000 per acre. Land in this study is valued at \$8,000 per acre or \$8,474 per producing acre (95 acres). Land with producing almond orchards ranges from \$8,500 to \$15,000 per acre (2007 Trends in Agriculture).

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

Tools. This includes shop tools, hand tools, and miscellaneous field tools such as pruning tools.

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.

Equipment. Farm equipment is purchased new or used, but the study shows the current purchase price for new equipment. The new purchase price is adjusted to 60% to indicate a mix of new and used equipment. Annual ownership costs for equipment and other investments are shown in the Whole Farm Annual Equipment, Investment, and Business Overhead Costs table. Equipment costs are composed of three parts: non-cash overhead, cash overhead, and operating costs. Both of the overhead factors have been discussed in previous sections. The operating costs consist of repairs, fuel, and lubrication and are discussed under operating costs.

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

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For information concerning the above mentioned University of California publications contact UC DANR Communications Services (1-800-994-8849) or your local county Cooperative Extension office.

UC COOPERATIVE EXTENSION
Table 1. SAMPLE COSTS TO ESTABLISH AN ALMOND ORCHARD
 SAN JOAQUIN VALLEY - SOUTH 2008

	Cost Per Acre					
	Year:	1st	2nd	3rd	4th	5th
Meat Pounds Per Acre:				600	1,200	2,400
Planting Costs:						
Orchard Removal		275				
Preplant Evaluation: Backhoe, Soil Sampling		7				
Land Preparation: Slip Plow (3 passes)		450				
Land Preparation: Disc 4X		120				
Land Preparation: Fumigate Tree Row (Telone)		216				
Land Preparation: Put Up Berms		15				
Plant: Mark, Plant, Dip Trees, Prune, Trunk Guards		138	1			
Trees: 110 Per Acre (1% Replant In 2nd Year)		578	5			
Irrigate		21				
Weed: Spray Berms (Treflan)		7				
Weed: Incorporate Treflan		6				
TOTAL PLANTING COSTS		1,832	7			
Cultural Costs:						
Train Prune, Sucker + Tie in years 2-5.		39	106	140	160	200
Insect: PTB (Diazinon)		19				
Insect: Mite (Agrimek). Fertilize: (Zinc)		57	98			
Irrigate: water, labor		70	187	295	524	576
Vertebrate: Rodents (bait)		10	19	19	23	23
Fertilizer: Nitrogen (Yr 1, 21-0-0. Yr 2+, UN32)		22	30	75	90	150
Fertilizer: (Zinc)		15	15			
Weed: Dormant Strip (Surflan, Goal)		63	63	63	63	63
Weed: Disc (Yr 1, 4X. Yr 2, 5X. Yr 3, 1X)		22	28	6		
Weed: Spot Spray Tree Rows 2X (Roundup)		21	21	21	21	21
Fertilizer: Leaf Analysis			2	2	2	2
Shred Prunings (custom)			21	21	24	24
Insect: Dormant (Asana, Oil)			*43	40	40	40
Winter Sanitation: Yr 3, pol. Yr 4+, pol, shake, sweep, shred				220	210	213
Insect: Ants (Clinch)				16	16	16
Insect: Mite (Agrimek)				93		
Insect: Mite (Omite), NOW (Imidan)				125	125	125
Weed: Mow (Yr 3, 4X. Yr 4+, 6X)				27	40	40
Weed: Float/Roll Middles				13		
Defoliate: Zinc Sulfate				47	47	47
Pollination: Bee Hives				63	125	250
Weed: Preharvest- Spray Orchard Floor (Roundup)				17	17	17
Disease: Shothole/Scab (Ziram, Vanguard)					78	78
Disease: Brown Rot (Rovral, Oil)					39	39
Fertilize: Solubor (Boron)						13
Pest Control Advisers (Agronomic & Irrigation)		35	35	35	35	35
Pickup Use		43	43	43	43	43
ATV Use not included in above operations		22	22	22	22	22
TOTAL CULTURAL COSTS		437	732	1,400	1,741	2,035
Harvest Costs:						
Shake, Rake, Sweep, Haul				210	215	221
Hull Nuts				36	72	144
TOTAL HARVEST COSTS				246	287	365
Interest On Operating Capital @ 8.75%		194	41	25	37	49
TOTAL OPERATING COSTS/ACRE		2,463	779	1,671	2,065	2,448

UC COOPERATIVE EXTENSION

Table 1. CONTINUED

Year:	Cost Per Acre				
	1st	2nd	3rd	4th	5th
	Meat Pounds Per Acre:		600	1,200	2,400
Cash Overhead Costs:					
Office Expense	100	100	100	100	100
Liability Insurance	6	6	7	6	6
Sanitation Fees	3	3	3	3	3
Safety Training and Equipment	6	6	5	6	6
Property Taxes	100	100	101	100	100
Property Insurance	12	12	12	12	12
Investment Repairs	48	48	48	48	48
TOTAL CASH OVERHEAD COSTS	275	275	276	275	275
TOTAL CASH COSTS/ACRE	2,738	1,054	1,947	2,340	2,723
INCOME/ACRE FROM PRODUCTION			900	1,800	3,600
NET CASH COSTS/ACRE FOR THE YEAR	2,738	1,054	1,047	540	
PROFIT/ACRE ABOVE CASH COSTS					877
ACCUMULATED NET CASH COSTS/ACRE	2,738	3,792	4,839	5,379	4,502
Non-Cash Overhead Costs (Capital Recovery on Investments):					
Building	63	63	63	63	63
Land	526	526	526	526	526
Fuel Tanks	5	5	5	5	5
Shop Tools	16	16	16	16	16
Sprinkler Micro Irrigation System	108	108	108	108	108
Equipment	68	68	76	68	68
TOTAL NON-CASH OVERHEAD COST/ACRE	787	787	795	786	786
TOTAL COST/ACRE FOR THE YEAR	3,525	1,841	2,742	3,126	3,509
INCOME/ACRE FROM PRODUCTION			900	1,800	3,600
TOTAL NET COST/ACRE FOR THE YEAR	3,525	1,841	1,842	1,326	
NET PROFIT/ACRE ABOVE TOTAL COST					91
TOTAL ACCUMULATED NET COST/ACRE	3,525	5,366	7,208	8,535	8,444

*Includes handgun operator

UC COOPERATIVE EXTENSION
Table 2. COSTS PER ACRE TO PRODUCE ALMONDS
 SAN JOAQUIN VALLEY - SOUTH 2008

Operation	Operation		Cash and Labor Costs per acre				Total Cost	Your Cost
	Time (Hrs/A)	Labor Cost	Fuel, Lube & Repairs	Material Cost	Custom/Rent			
Cultural:								
Prune: Dormant prune	0.00	0	0	0	125	125		
Prune: Shred prunings (custom)	0.00	0	0	0	13	13		
Insect: Dormant PTB, SJS, Mites (Asana, Oil)	0.31	6	5	30	0	40		
Irrigate: Water & Labor	2.80	30	0	546	0	576		
Disease: Brown Rot (Rovral)	0.31	6	5	29	0	39		
Pollination: Bee Hives	0.00	0	0	0	250	250		
Fertilize: N (UN32) in irrigation	0.00	0	0	210	0	210		
Weed: Mow 6X	1.25	22	18	0	0	40		
Weed: Spot Spray (Roundup)	0.23	4	1	16	0	21		
Vertebrate: Gopher (Gopher Bait)	0.01	0	0	9	0	10		
Disease: ShotHole (Vanguard, Ziram)	0.31	6	5	68	0	78		
Vertebrate: Squirrel (Squirrel Bait)	0.01	0	0	13	0	13		
Fertilize: Leaf Samples (1 per 20ac)	0.00	0	0	0	2	2		
Insect: Ants (Clinch or Distance)	0.01	0	0	15	0	16		
Insect: Mite (Ornite), NOW (Imidan)	0.31	6	5	115	0	125		
Weed: Preharvest, Spray Orchard Floor (Roundup)	0.23	4	3	10	0	17		
Fertilize: Boron (Solubor)	0.31	6	5	3	0	13		
Defoliate: Remove Leaves (ZnSO4)	0.31	6	5	37	0	47		
Weed: Dormant (Surflan Goal) Tree Row	0.23	4	1	58	0	63		
Winter Sanitation: Shake, Sweep, Rake, Pol, Shred	0.17	3	2	0	228	233		
Pest Control Advisers (agronomic & irrigation)	0.00	0	0	0	35	35		
Pickup	1.50	27	16	0	0	43		
ATV	1.00	18	4	0	0	22		
TOTAL CULTURAL COSTS	9.30	145	73	1,158	653	2,029		
Harvest:								
Harvest-Shake, Rake, Sweep, Haul	0	0	0	0	223	223		
Harvest-Hull/Shell	0	0	0	0	168	168		
TOTAL HARVEST COSTS	0	0	0	0	391	391		
Interest on operating capital @ 8.75%						45		
TOTAL OPERATING COSTS/ACRE		145	73	1,158	1,044	2,465		
CASH OVERHEAD:								
Office Expense						100		
Liability Insurance						6		
Sanitation Fee (Toilet Rental)						3		
Safety Training/Equipment						6		
Property Taxes						124		
Property Insurance						30		
Investment Repairs						73		
TOTAL CASH OVERHEAD COSTS						341		
TOTAL CASH COSTS/ACRE						2,806		
NON-CASH OVERHEAD:								
		Per producing Acre		Annual Cost				
				Capital Recovery				
Buildings		842		63		63		
Fuel Tanks		69		5		5		
Shop Tools		158		16		16		
Land		8,421		526		526		
Sprinkler-Micro		1,350		108		108		
Orchard Establishment		4,839		411		411		
Equipment		612		68		68		
TOTAL NON-CASH OVERHEAD COSTS		16,291		1,197		1,197		
TOTAL COSTS/ACRE						4,004		

UC COOPERATIVE EXTENSION
Table 3. COSTS AND RETURNS PER ACRE TO PRODUCE ALMONDS
 SAN JOAQUIN VALLEY - SOUTH 2008

	Quantity/ Acre	Unit	Price or Cost/Unit	Value or Cost/Acre	Your Cost
GROSS RETURNS					
Almonds	2,800.00	lb	1.50	4,200	
OPERATING COSTS					
Custom/Contract:					
Prune Trees (alternate years)	0.50	acre	250.00	125	
Shred Prunings (alternate years)	0.05	hour	265.00	13	
Leaf Analysis (1 per 20 acre)	0.05	each	35.00	2	
Pollination (bee hives)	2.00	hive	125.00	250	
Shake Trees (harvest & winter sanitation)	1.50	hour	98.00	147	
Sweep/Blow Nuts (harvest & winter sanitation)	2.00	hour	62.00	124	
Pol Nuts/Mummies (harvest &/or winter sanitation)	2.00	hour	12.00	24	
Rake Nuts/Mummies (harvest & winter sanitation)	1.00	acre	80.00	80	
PCA Pest/Nutrition	1.00	acre	25.00	25	
PCA Irrigation Specialist	1.00	acre	10.00	10	
Pickup & Shuttle Nuts (harvest)	0.60	hour	98.00	59	
Haul Nuts (within 20 miles radius of field)	1.40	ton	8.44	12	
Haul Nuts (fuel surcharge 43%)	1.40	ton	3.61	5	
Hull/Shell	2,800.00	lb	0.06	168	
Irrigation:					0
Water - District + Pumping Costs	52.00	acin	10.50	546	
Rodenticide:					0
Gopher Bait Rozol	3.00	lb	3.09	9	
Squirrel Bait Rozol	3.00	lb	4.29	13	
Insecticide:					0
Clinch	1.00	lb	15.46	15	
Asana XL	4.00	floz	1.08	4	
Volck Supreme Oil	6.00	gal	4.20	25	
Imidan 70 WSB	4.30	lb	12.39	53	
Omite 30-WS	7.50	lb	8.23	62	
Fungicide:					0
Rovral 4F	1.00	Pint	29.09	29	
Vanguard WG	7.50	oz	4.66	35	
Ziram 76DF	8.00	lb	4.14	33	
Fertilizer:					0
UN-32	280.00	lb N	0.75	210	
Boron (Solubor)	2.00	lb	1.40	3	
ZnS04 Solution 12% (10 gallons)	108.00	lb	0.34	37	
Herbicide:					0
Roundup Ultra Max	3.25	pint	7.80	25	
Surflan AS	2.16	pint	14.52	31	
Goal 2 XL	1.62	pint	16.45	27	
Labor (machine)	7.82	hrs	14.74	115	
Labor (non-machine)	2.80	hrs	10.72	30	
Fuel - Gas	5.25	gal	3.10	16	
Fuel - Diesel	12.36	gal	2.50	31	
Lube				7	
Machinery repair				19	
Interest on operating capital @ 8.75%				45	
TOTAL OPERATING COSTS/ACRE				2,465	
NET RETURNS ABOVE OPERATING COSTS				1,735	

UC COOPERATIVE EXTENSION
Table 3. CONTINUED
SAN JOAQUIN VALLEY - SOUTH 2008

	Quantity/ Acre	Unit	Price or Cost/Unit	Value or Cost/Acre	Your Cost
CASH OVERHEAD:					
Office Expense				100	
Liability Insurance				6	
Sanitation Fee (Toilet Rental)				3	
Safety Training/Equipment				6	
Property Taxes				124	
Property Insurance				30	
Investment Repairs				73	
TOTAL CASH OVERHEAD COSTS				341	
TOTAL CASH COSTS/ACRE				2,806	
NON-CASH OVERHEAD COSTS:					
Buildings				63	
Fuel Tanks				5	
Shop Tools				16	
Land				526	
Sprinkler-Micro				108	
Orchard Establishment				411	
Equipment				68	
TOTAL NON-CASH OVERHEAD COSTS				1,197	
TOTAL COSTS/ACRE				4,004	
NET RETURNS ABOVE TOTAL				196	

UC COOPERATIVE EXTENSION
Table 4. MONTHLY CASH COSTS PER ACRE TO PRODUCE ALMONDS
 SAN JOAQUIN VALLEY - SOUTH 2008

Beginning JAN 08	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	TOTAL
Ending DEC 08	08	08	08	08	08	08	08	08	08	08	08	08	
Cultural:													
Prune: Dormant prune	125												125
Prune: Shred prunings (custom)	13												13
Insect: Dormant PTB, SJS, Mites (Asana, Oil)	40												40
Irrigate: Water & Labor	22	22	44	66	66	88	88	22	66	44	23	23	576
Disease: Brown Rot (Rovral)		39											39
Pollination: Bee Hives		250											250
Fertilize: N (UN32) in irrigation			105				105						210
Weed: Mow 6X			7	13	7	7	7						40
Weed: Spot Spray (Roundup)			10				10						21
Vertebrate: Gopher (Gopher Bait)			10										10
Disease: ShotHole (Vanguard, Ziram)			78										78
Vertebrate: Squirrel (Squirrel Bait)					13								13
Fertilize: Leaf Samples (1 per 20ac)							2						2
Insect: Ants (Clinch or Distance)							16						16
Insect: Mite (Omite), NOW (Imidan)						125							125
Weed: Preharvest, Spray Orchard Floor (Roundup)								17					17
Fertilize: Boron (Solubor)										13			13
Defoliate: Remove Leaves (ZnSO4)											47		47
Weed: Dormant (Surflan Goal) Tree Row												63	63
Winter Sanitation: Shake, Sweep, Rake, Pol, Shred												233	233
Pest Control Advisers (agronomic & irrigation)	3	3	3	3	3	3	3	3	3	3	3	3	35
Pickup	4	4	4	4	4	4	4	4	4	4	4	4	43
ATV	2	2	2	2	2	2	2	2	2	2	2	2	22
TOTAL CULTURAL COSTS	208	320	262	88	94	246	219	47	75	65	78	328	2,030
Harvest:													
Harvest-Shake, Rake, Sweep, Haul								223					223
Harvest-Hull/Shell								168					168
TOTAL HARVEST COSTS								391					391
Interest on operating capital @ 8.75%	2	4	6	6	7	9	10	14	-4	-3	-3	-3	45
TOTAL OPERATING COSTS/ACRE	210	323	268	94	101	255	229	452	71	62	75	325	2,466
OVERHEAD:													
Office Expense	8	8	8	8	8	8	8	8	8	8	8	8	100
Liability Insurance								6					6
Sanitation Fee	0	0	0	0	0	0	0	0	0	0	0	0	3
Safety Training/Equipment	0	0	0	0	0	0	0	0	0	0	0	0	6
Property Taxes	62						62						124
Property Insurance	15						15						30
Investment Repairs	6	6	6	6	6	6	6	6	6	6	6	6	73
TOTAL CASH OVERHEAD COSTS	92	15	15	15	15	15	92	21	15	15	15	15	341
TOTAL CASH COSTS/ACRE	302	339	283	109	117	270	321	473	86	77	90	340	2,807

UC COOPERATIVE EXTENSION
Table 5. RANGING ANALYSIS
 SAN JOAQUIN VALLEY - SOUTH 2008

COSTS PER ACRE AT VARYING YIELDS TO PRODUCE ALMONDS

	YIELD (lb/acre)						
	2,000	2,200	2,400	2,600	2,800	3,000	3,200
OPERATING COSTS/ACRE:							
Cultural Cost	2,029	2,029	2,029	2,029	2,029	2,029	2,029
Harvest Cost	338	352	365	378	391	404	418
Interest on operating capital	44	45	45	45	45	45	45
TOTAL OPERATING COSTS/ACRE	2,411	2,426	2,439	2,452	2,465	2,478	2,492
Total Operating Costs/lb	1.21	1.10	1.02	0.94	0.88	0.83	0.78
CASH OVERHEAD COSTS/ACRE							
CASH OVERHEAD COSTS/ACRE	341	341	341	341	341	341	341
TOTAL CASH COSTS/ACRE	2,752	2,767	2,780	2,793	2,806	2,819	2,833
Total Cash Costs/lb	1.38	1.26	1.16	1.07	1.00	0.94	0.89
NON-CASH OVERHEAD COSTS/ACRE							
NON-CASH OVERHEAD COSTS/ACRE	1,197	1,197	1,197	1,197	1,197	1,197	1,197
TOTAL COSTS/ACRE	3,949	3,964	3,977	3,990	4,003	4,016	4,030
Total Costs/lb	1.97	1.80	1.66	1.53	1.43	1.34	1.26

NET RETURNS PER ACRE ABOVE OPERATING COSTS

PRICE \$/lb	YIELD (lb/acre)						
	2,000	2,200	2,400	2,600	2,800	3,000	3,200
1.10	-211	-6	201	408	615	822	1,028
1.30	189	434	681	928	1,175	1,422	1,668
1.50	589	874	1,161	1,448	1,735	2,022	2,308
1.70	989	1,314	1,641	1,968	2,295	2,622	2,948
1.90	1,389	1,754	2,121	2,488	2,855	3,222	3,588
2.10	1,789	2,194	2,601	3,008	3,415	3,822	4,228
2.30	2,189	2,634	3,081	3,528	3,975	4,422	4,868

NET RETURNS PER ACRE ABOVE CASH COSTS

PRICE \$/lb	YIELD (lb/acre)						
	2,000	2,200	2,400	2,600	2,800	3,000	3,200
1.10	-552	-347	-140	67	274	481	687
1.30	-152	93	340	587	834	1,081	1,327
1.50	248	533	820	1,107	1,394	1,681	1,967
1.70	648	973	1,300	1,627	1,954	2,281	2,607
1.90	1,048	1,413	1,780	2,147	2,514	2,881	3,247
2.10	1,448	1,853	2,260	2,667	3,074	3,481	3,887
2.30	1,848	2,293	2,740	3,187	3,634	4,081	4,527

NET RETURNS PER ACRE ABOVE TOTAL COSTS

PRICE \$/lb	YIELD (lb/acre)						
	2,000	2,200	2,400	2,600	2,800	3,000	3,200
1.10	-1,749	-1,544	-1,337	-1,130	-923	-716	-510
1.30	-1,349	-1,104	-857	-610	-363	-116	130
1.50	-949	-664	-377	-90	197	484	770
1.70	-549	-224	103	430	757	1,084	1,410
1.90	-149	216	583	950	1,317	1,684	2,050
2.10	251	656	1,063	1,470	1,877	2,284	2,690
2.30	651	1,096	1,543	1,990	2,437	2,884	3,330

UC COOPERATIVE EXTENSION
Table 6. WHOLE FARM ANNUAL EQUIPMENT, INVESTMENT, AND BUSINESS OVERHEAD COSTS
 SAN JOAQUIN VALLEY - SOUTH 2008

ANNUAL EQUIPMENT COSTS

Yr Description	Price	Yrs Life	Salvage Value	Capital Recovery	Cash Overhead		Total
					Insur- ance	Taxes	
08 66 HP 2WD Tractor	31,000	20	3,978	2,653	129	175	2,957
08 ATV 4WD	5,790	7	2,196	787	30	40	856
08 Mower/Chopper - 8'	6,800	10	1,203	845	30	40	914
08 Orchard PTO Sprayer 500 gal	21,000	15	2,016	2,113	85	115	2,313
08 Pickup 1/2 ton	28,000	7	10,621	3,805	143	193	4,141
08 Spot Sprayer 15 gal	225	10	40	28	1	1	30
08 Weed Sprayer 100 gal	4,100	10	725	509	18	24	551
TOTAL	96,915		20,779	10,739	435	588	11,763
60% of New Cost*	58,149		12,467	6,443	261	353	7,058

*Used to reflect a mix of new and used equipment

ANNUAL INVESTMENT COSTS

Description	Price	Yrs Life	Salvage Value	Capital Recovery	Cash Overhead			Total
					Insur- ance	Taxes	Repairs	
Buildings 2,400 sqft	80,000	30		5,968	296	400	1,600	8,264
Orchard Establishment	459,705	22		39,010	1,701	2,299	2,298	45,308
Fuel Tanks 2-500g	6,514	25	651	510	27	36	130	703
Land	800,000	25	800,000	50,000	0	8,000	0	58,000
Shop Tools	15,000	15	1,133	1,519	60	81	300	1,960
Sprinkler-Micro System	128,250	25		10,272	475	641	2,565	13,953
TOTAL INVESTMENT	1,489,469		801,784	107,280	2,558	11,457	6,893	128,188

ANNUAL BUSINESS OVERHEAD COSTS

Description	Units/		Price/	Total
	Farm	Unit	Unit	Cost
Liability Insurance	95	acre	5.88	559
Office Expense	95	acre	100.00	9,500
Safety Training/Equipment	95	acre	5.50	523
Sanitation (2 months)	95	acre	3.26	310

UC COOPERATIVE EXTENSION
Table 7. HOURLY EQUIPMENT COSTS
 SAN JOAQUIN VALLEY - SOUTH 2008

Yr Description	COSTS PER HOUR							
	Actual Hours Used	Cash Overhead			Operating			Total Costs/Hr.
		Capital Recovery	Insur- ance	Taxes	Repairs	Fuel & Lube	Total Oper.	
08 66 HP 2WD Tractor	368	4.33	0.21	0.29	1.25	9.18	10.43	15.26
08 ATV 4WD	142	3.32	0.12	0.17	0.43	3.56	3.99	7.60
08 Mower/Chopper - 8'	135	3.77	0.13	0.18	2.81	0.00	2.81	6.89
08 Orchard PTO .Sprayer 500 gal	178	7.13	0.29	0.39	3.21	0.00	3.21	11.02
08 Pickup 1/2 ton	143	16.02	0.60	0.81	2.05	8.91	10.96	28.39
08 Spot Sprayer 15 gal	22	0.77	0.03	0.04	0.06	0.00	0.06	0.90
08 Weed Sprayer 100 gal	44	6.96	0.24	0.33	1.09	0.00	1.09	8.62

UC COOPERATIVE EXTENSION
Table 8. OPERATIONS WITH EQUIPMENT
 SAN JOAQUIN VALLEY - SOUTH 2008

Operation	Month	Equipment		Material	Rate/acre*	Unit
		Tractor	Implement			
Cultural:						
Prune/Tie- Dormant	January	Custom				
Shred Prunings	January	Custom				
Irrigate	January			Water 2X	2.00	acin
	February			Water 2X	2.00	acin
	March			Water 4X	4.00	acin
	April			Water 6X	6.00	acin
	May			Water 6X	6.00	acin
	June			Water 8X	8.00	acin
	July			Water 8X	8.00	acin
	August			Water 2X	2.00	acin
	September			Water 6X	6.00	acin
	October			Water 4X	4.00	acin
	November			Water 2X	2.00	acin
	December			Water 2X	2.00	acin
Pest-Gopher (Gopher Bait)	March	ATV		Gopher Bait	3.00	lbs
Pest-Gopher (Squirrel Bait)	May	ATV		Squirrel Bait	3.00	lbs
Pest-Ants (Clinch or Distance)	June	ATV		Clinch	1.00	lbs
Pest-Disease: Brown Rot (Rovral)	February	66HP 2WD	Orchard Sprayer	Rovral	1.00	pt
Pest-Disease: ShotHole (Vanguard/Ziram)	March	66HP 2WD	Orchard Sprayer	Vanguard	7.50	oz
				Ziram	8.00	lbs
Pest-Dormant (Asana, Oil)	January	66HP 2WD	Orchard Sprayer	Asana	4.00	floz
				Supreme Oil	6.00	gal
Pest-Mite (Omite) -NOW (Imidan)	June	66HP 2WD	Orchard Sprayer	Omite	7.50	lbs
				Imidan	4.30	lbs
Fertilize N (UN32) in irrigation	March			UN32	140.00	lb N
	July			UN32	140.00	lb N
Fertilize Boron (Solubor)	October	66HP 2WD	Orchard Sprayer	Solubor	2.00	lb
Remove Leaves (ZnSO4)	November	66HP 2WD	Orchard Sprayer	Zinc Sulfate	108.00	lb
Fertilize-Leaf Samples 1/20ac	June	Custom				
Weed-Mow 6X	March	66HP 2WD	Mower/Chopper 8'			
	April	66HP 2WD	Mower/Chopper 8'			
	April	66HP 2WD	Mower/Chopper 8'			
	May	66HP 2WD	Mower/Chopper 8'			
	June	66HP 2WD	Mower/Chopper 8'			
	July	66HP 2WD	Mower/Chopper 8'			
	July	66HP 2WD	Mower/Chopper 8'			
Weed-Spot Spray (Roundup)	March	ATV	Spot Sprayer	Roundup	1.00	pt
	July	ATV	Spot Sprayer	Roundup	1.00	pt
Weed-Preharvest Orchard Floor	August	66HP 2WD	Weed Sprayer	Roundup	1.25	pt
Weed-Dormant (Surflan, Goal) Tree Row	December	ATV	Weed Sprayer	Surflan	2.16	pt
				Goal	1.62	pt
Pollination	February	Custom		Bee Hives	2.00	hives
Winter Sanitation- Shake, Rake, Shred	December	66HP 2WD	Mower/Chopper 8'			
		Custom		Shake/Sweep		
Pest Control Advisers	Annual	Custom				
Pickup	Annual	Pickup 1/2 T				
ATV	Annual	ATV				
Harvest:						
Harvest-Shake, Rake, Sweep, Haul	August	Custom				
Harvest-Hull/Shell	August	Custom				

*Rates are per broadcast acre