
UNIVERSITY OF CALIFORNIA COOPERATIVE EXTENSION

2007

**SAMPLE COSTS TO PRODUCE
ORGANIC**



ALMONDS

SAN JOAQUIN VALLEY - NORTH

Sprinkler Irrigation

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INTRODUCTION

Sample costs to produce organic almonds under sprinkler irrigation in the northern 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 1 and 2 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.

Sample Cost of Production Studies for many commodities are available and can be requested through the Department of Agricultural and Resource Economics, UC Davis, (530) 752-4424 Current studies can be obtained from selected county UC Cooperative Extension offices or downloaded from the department website at <http://coststudies.ucdavis.edu>.

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ASSUMPTIONS

The assumptions refer to Tables 1 to 8 and pertain to sample costs to convert an orchard to organic production and produce organic almonds in the Northern San Joaquin Valley under sprinkler irrigation. The cultural practices described represent production operations and materials considered typical of a well-managed farm 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 farm consists of 100 contiguous acres – 95 acres of almonds and 5 acres of roads, irrigation system and homestead -- farmed by the owner. The land is assumed to be well drained and either a class I or II soil. Almonds on 40 acres are being converted to organic production.

Trees. Almond orchards will include at least two or more varieties in which pollen shedding and bloom periods overlap to insure good pollination. In this study, 110 trees per acre are planted on a 18-foot X 22-foot spacing. The varieties planted are 50% Nonpareil, 25% Carmel, and 25% Monterey. Organic growers should keep in mind that some varieties are more prone to diseases, and others to insects. For example, Nonpareil is more susceptible to insect damage than Carmel, while Carmel is more susceptible to brown rot and scab than Nonpareil. The life of the orchard at the time of planting is estimated to be 25 years.

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 transition, 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 after the third year of establishment, completed the transition period and certified as organic. Refer to the USDA rules for organic production.

Cover Crop. A cover crop can be planted in the fourth or fifth year of orchard establishment (Table 8). Coated (nitrogen fixing inoculants) subterranean clover at 20 pounds per acre is planted. Seeding rates are estimates and will vary by grower and seeding mix. Establishment begins in the fall with discing the orchard twice-- one time with the disc only and one time with the disc and ring roller. A custom operator broadcasts the seed. The field is then finished with a ring roller. A 3 or 4-inch irrigation germinates the crop. Seed set generally occurs in mid-May, but can also occur early June depending upon the species. Because the legumes reseed themselves, they do not require yearly planting and have a 5-year life in this study.

Production Operating Costs

Winter Sanitation. Winter (December) sanitation destroys over wintering sites for navel orangeworm (NOW). 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. Hand poling may be needed in low rainfall years.

Pruning. Hand pruning is done in November or December in this study, but can be done anytime from harvest through the dormant period. Prunings are hand stacked in the row middles and shredded by a custom operator.

Irrigation and Frost Protection. Irrigation costs include pumping (water) and labor costs. The water is pumped from a well, through a filtration system and fed into the micro-sprinkler system. In this study, water costs \$4.67 per acre inch based on current PG&E agricultural rates. A total of 44 acre-inches of water is applied to the orchard – two-acre inches for frost protection in February and March, and 42 acre-inches during the season (March to October). Water rate is based on a 90% application efficiency and no assumption is made about effective rainfall, evaporation, and runoff.

Pollination. Two and one half hives (5+ frames/hive) per acre are contracted for pollination and set in the orchard by the beekeeper in February prior to bloom.

Fertilization. Zinc sulfate at 10 to 15 pounds per acre and boron at two pounds per acre of a 21% boron product, are applied as a foliar spray post-harvest before leaf fall (October) Boron can also be applied to the soil any time of the year at a rate of 10 to 20 pounds of boron. It can be sprayed directly on the soil surface or injected through the irrigation system. The zinc and boron should be applied only after leaf analysis and discussion with your organic certifier. Plant based compost at 10 tons per acre is applied post harvest 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. Many organic growers plant legume cover crops in the fall, early October, to supplement nitrogen. A cover crop with a five year life is established in this study. Fertilizer rates in this study are typical nutrient requirements, but do not take into account soil and water nitrogen.

Sampling. Tree nutrient status is determined by leaf and hull 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. In addition, soil samples are taken at one per 20 acres to determine nitrogen and zinc levels. The grower uses an ATV to collect the samples which is assumed to take one hour per 40 acres (0.025 hrs/acre) each time. In addition another hour is required to prepare and ship the samples to a commercial lab for analysis. Also, water analysis should be done periodically to determine nitrate availability.

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 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. Also consult your organic certification agency. Pesticide costs in this study are taken from a single dealer with volume discounts taken when applicable.

Pest Control Adviser (PCA). Written recommendations are required for many pesticides and are made by licensed pest control advisors. In addition the PCA will monitor the field for agronomic problems including pests and nutrition. Growers may hire private PCA's or receive the service as part of a service agreement with an agricultural chemical and fertilizer company. No pest control adviser is hired in this study.

Cover Crop and Weeds. Weeds are controlled by mechanical or physical means. A legume cover crop is grown in the middles and mowed seven times from February to August. Alternate middles are mowed each month during the first six months to provide an environment for beneficial predators. All middles are mowed in August to prepare the orchard floor for harvest. The tree rows can be flamed, hand and/or string trimmer weeded. In this study, the tree rows are flamed twice a month beginning in March and once in August with a grower owned flamer, pulled by a tractor. The propane tank on the flamer is furnished free-of-charge by the propane company. Some companies may also furnish the flamer. Other growers may have to purchase the tank and flamer.

Insect and Mite. A dormant or delayed dormant spray (dormant oil) in December or early January before bud swell controls San Jose scale, brown almond mite and European red mites. In late March, based on peach twig borer (PTB) emergence (around petal fall), Dipel (Bt) is applied to control peach twig borer. 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, Entrust (spinosad) pesticide is applied to control navel orangeworm (NOW). NOW is also managed primarily by winter sanitation and early harvest; additional NOW controls may be necessary in some orchards. Ants are controlled on the berms with boric acid applications in May and July.

Disease. Scab (*Cladosporium carpophilum*) is controlled with liquid lime sulfur as a delayed dormant spray in January. Liquid lime sulfur may also have efficacy against shot hole (*Stigmina carphphila*) as well as some other diseases. Brown rot (*Monilinia laxa*) is controlled with three wettable sulfur or mineral oil (Trylogy, Sporan, etc.) sprays at 10 to 14 day intervals during bloom – twice during February and once in March.

Vertebrate Pest. Trapping or flooding is used to control gophers and squirrels. Owl boxes may help reduce squirrels, moles, and gophers. Explosive gas devices (propane and oxygen mixtures) may be used. Costs are allocated in this study to March and August, but may occur year round.

Harvest. In this study, a custom operator mechanically harvests the almond crop. The grower furnishes labor for hand raking to move nuts, missed by the sweeper, into the windrows. Harvest begins in August with the early maturing varieties and continues into October for late maturing varieties. In this study, harvest is in September. 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. 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 and Returns. 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 from diseases and insects that are not controlled. In this study, the estimated yield is 80% of conventional orchards (2,000 pounds per acre). The average price for organic almonds from 2001 to 2005 is \$3.79 per meat pound. During the last two years, yields have been reduced by an estimated 40% because of weather and diseases and the returns are as high as \$5.42 per pound. Therefore for this study, using a normal yield, an estimated price of a \$3.00 per pound is used to determine potential profits/losses. Returns will vary depending on the variety and market. Currently organic producers receive a premium over conventional markets for their product.

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 9,500 miles per year for the pickup. The ATV is used for baiting ants and gophers and is included in those costs. Additional ATV use for checking the orchard, diseases and irrigation system is shown as an operation.

Labor, Equipment, and Interest

Labor. Hourly wages for workers are \$11.75 for machine operators and \$8.00 per hour non-machine labor. Adding 38% for the employer's share of federal and state payroll taxes, workers compensation insurance, for nut crops (0045) and other possible benefits gives the labor rates shown of \$16.22 and \$11.04 per

hour for machine labor and non-machine labor, respectively. 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, 2005 (California Department of Insurance). Labor for operations involving machinery are 20% higher than the operation time given in Table 1 to account for the extra labor involved in equipment set up, moving, maintenance, work breaks, and field repair.

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 Engineers (ASAE). Fuel and lubrication costs are also determined by ASAE equations based on maximum power takeoff (PTO) horsepower, and fuel type. Average prices for on-farm delivery of diesel and gasoline based on 2006 data from the American Automobile Association (AAA) and the Energy Information Administration are \$2.30 and \$2.80 per gallon, respectively. The cost includes a 2% local sales tax on diesel fuel and 8% sales tax on gasoline. Gasoline also includes federal and state excise tax, which are refundable for on-farm use when filing your income tax. The fuel, lube, and repair cost per acre for each operation in Table 1 is determined by multiplying the total hourly operating cost in Table 6 for each piece of equipment used for the selected operation by the hours per acre. Tractor time is 10% higher than implement time for a given operation to account for setup, travel and down time.

Interest on Operating Capital. Interest on operating capital is based on cash operating costs and is calculated monthly until harvest at a nominal rate of 10.00% 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 2007.

Risk. The risks associated with crop production 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 profitability and economic viability.

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% 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 0.70% of the average value of the assets over their useful life. Liability insurance covers accidents on the farm and costs \$529 for the entire farm.

Office Expense. Office and business expenses are estimated at \$50 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 one portable toilet and cost the farm \$560 annually. The cost includes one single toilet unit with washbasin, delivery and 4 months of weekly service.

Regulatory Costs (Environmental Fees). Various environmental fees are collected by the county and state. The fees will vary by county. For example the Air Resources Board (state agency) charges \$100 per plan

to deal with air pollution and the Ag Waiver Fee (county agency) cost \$2.00 per acre. The grower must also provide safety training, safety equipment, and maintain training records. For this study, a cost of \$5.26 per producing acre or \$500 for the farm is assumed.

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 first year fees, therefore only the annual fees are shown.

California Certified Organic Farmers (CCOF). CCOF is an accredited certifying agency. They charge a one time membership fee, an annual renewal fee of \$550 (this fee is based on gross organic income), and annual farm inspection fee based on time and parcels, estimated at \$500 for this study. Additional fees can be incurred, but are voluntary.

California Department of Food and Agriculture (CDFA). State registration is required and the county agricultural commissioner collects the fees. There is a first time registration fee. Thereafter, the annual registration fee is based on gross organic income and for this study is \$300.

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, except for tree replacement in the orchard. The average tree replacement cost over the life of the orchard is assumed to be 0.10% of the establishment cost or \$170 (\$4.25 per acre) per year.

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 7.25% 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 2007.

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 *Sample Costs to Establish and Produce Almonds, 2006, San Joaquin Valley North, Micro-Sprinkler Irrigation*, in the third year represents the establishment cost. For this study the cost is \$4,391 per acre or \$175,640 for the 40-acre orchard. The establishment cost is spread over the remaining 22 years of the 25 years the orchard is in production. Establishment costs in this study are based on typical basic operations, but can vary considerably, depending upon terrain, soil type, local regulations, and other factors.

Cover Crop Establishment Costs. Costs to establish the cover crop in the fifth is year are the total cash costs for planting and germinating the crop. Although the crop reseeds, the expected crop life is five years and is amortized over five years.

Sprinkler Irrigation System. The sprinkler system consists of micro-sprinklers installed on the 40 acres in the tree row and includes a filtration/injection system located near the pumping plant.

Irrigation Pumping System. A 200 foot deep well with a pumping level at 75-feet is drilled on the site and a new 25 horsepower pump installed to irrigate the 40 acres.

Land. Bare land values range from \$3,000 to \$15,000 per acre depending upon water source (well, district or surface water). Land with available surface water ranges from \$5,000 to \$15,000 per acre. Land in this study is valued at \$12,000 per acre or \$12,632 per producing acre. Land values with planted almonds ranges from \$5,000 to \$19,000.

Building. The metal building(s) are on a cement slab and total approximately 2,400 square feet. The buildings are used for shops and equipment storage. The buildings are located on the grower owned land.

Shop/FieldTools. This includes shop tools and equipment, hand tools, and miscellaneous field tools including pruning equipment. 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.

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 Table 5. Equipment costs are composed of three parts: non-cash overhead, cash overhead, and operating costs. Both of the overhead factors have been discussed in previous sections. The operating costs consist of repairs, fuel, and lubrication and are discussed under operating costs.

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

REFERENCES

- American Society of Agricultural Engineers. 1994. American Society of Agricultural Engineers Standards Yearbook. Russell H. Hahn and Evelyn E. Rosentreter (ed.) St. Joseph, Missouri. 41st edition.
- Barker, Doug. 2005. *California Workers' Compensation Rating Data for Selected Agricultural Classifications as of January 1, 2005*. California Department of Insurance, Rate Regulation Branch.
- Boehlje, Michael D., and Vernon R. Eidman. 1984. Farm Management. John Wiley and Sons. New York, New York
- California Certified Organic Farmers. *A Guide to CCOF Certification*. 2001. California Certified Organic Farmers. Santa Cruz, CA.
- California Chapter of the American Society of Farm Managers and Rural Appraisers. 2005. *Trends in Agricultural Land and Lease Values*. California Chapter of the American Society of Farm Managers and Rural Appraisers, Inc. Woodbridge, CA.
- California State Automobile Association. 2007. *Gas Price Survey 2006*. AAA Public Affairs, San Francisco,
- California State Board of Equalization. *Fuel Tax Division Tax Rates*. Internet accessed January 2007. <http://www.boe.ca.gov/sptaxprog/spftdrates.htm>
- Doanes Editors. *Facts and Figures for Farmers*. 1977. Doane Publishing, St. Louis, MO. P 292.
- Duncan, Roger A., Paul S. Verdegaal, Brent A. Holtz, Karen A. Klonsky and Richard L. De Moura. 2006. *Sample Costs to Establish an Almond Orchard and Produce Almonds, San Joaquin Valley North, Micro-Sprinkler Irrigation*. University of California Cooperative Extension, Department of Agricultural and Resource Economics. Davis, CA.
- Energy Information Administration. 2006. *Weekly Retail on Highway Diesel Prices*. Internet accessed January 2007. <http://tonto.eia.doe.gov/oog/info/wohdp>
- University of California Statewide Integrated Pest Management Program. *UC Pest Management Guidelines, Almonds*. 2005. University of California, Davis, CA. <http://www.ipm.ucdavis.edu>
- University of California, Division of Agriculture and Natural Resources. 1996. Almond Production Manual. University of California, Division of Agriculture and Natural Resources. Oakland, California. Publication 3364.

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. COSTS PER ACRE TO PRODUCE ORGANIC ALMONDS
 SAN JOAQUIN VALLEY - NORTH 2007

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:								
Insect: Mites, Scale (Oil) Dormant	0.31	6	5	92	0	102		
Disease: Scab (Lime Sulfur) Delayed Dormant	0.31	6	5	40	0	51		
Irrigate: Frost Protection	0.18	2	0	9	0	11		
Pollination: Hives	0.00	0	0	0	350	350		
Weed: Mow 7X	0.77	15	11	0	0	26		
Disease: Brown Rot 3X (Thiolux)	0.94	18	14	48	0	80		
Insect: PTB (Dipel)	0.31	6	5	14	0	25		
Vertebrate: Gopher/Squirrel (Trap)	0.66	13	2	0	0	15		
Weed: Flame Tree Row	1.41	27	17	89	0	134		
Irrigate: (water & labor)	5.04	56	0	196	0	252		
Insect: Ants (Boric Acid)	0.16	3	1	6	0	9		
Insect: NOW (Entrust)	0.31	6	5	78	0	89		
Fertilize: Leaf Sample/Analysis	0.05	1	0	0	2	3		
Insect: Mites (Oil)	0.62	12	9	61	0	82		
Fertilize: Hull Sample/Analysis (Boron)	0.03	1	0	0	1	1		
Fertilize: Soil Sample/Analysis	0.05	1	0	0	2	3		
Fertilize: Foliar (Zn & B)	0.31	6	5	10	0	20		
Fertilize: Compost	0.00	0	0	270	12	282		
Prune: Hand	13.00	144	0	0	0	144		
Prune: Stack Prunings (hand)	1.50	17	0	0	0	17		
Prune: Shred Prunings	0.00	0	0	0	27	27		
Winter Sanitation: Shake, Blow, Shred	0.09	2	1	0	140	143		
Pickup Truck Ranch Use	3.33	65	31	0	0	96		
ATV: General Use	1.00	19	4	0	0	23		
TOTAL CULTURAL COSTS	30.38	426	113	913	533	1,984		
Harvest:								
Shake	0.00	0	0	0	95	95		
Sweep	0.00	0	0	0	45	45		
Hand Rake Nuts	0.25	3	0	0	0	3		
Pickup and Haul Nuts	0.00	0	0	0	80	80		
Hull and Shell Nuts	0.00	0	0	0	64	64		
TOTAL HARVEST COSTS	0.25	3	0	0	284	287		
Interest on operating capital @ 10.00%						55		
TOTAL OPERATING COSTS/ACRE		429	113	912	816	2,326		
CASH OVERHEAD:								
Office Expense						50		
Liability Insurance						6		
Sanitation Expense						6		
Environmental Fee						5		
Organic Certification Fee						34		
Property Taxes						166		
Property Insurance						28		
Investment Repairs						60		
TOTAL CASH OVERHEAD COSTS						355		
TOTAL CASH COSTS/ACRE						2,681		

UC COOPERATIVE EXTENSION
Table 1. CONTINUED
 SAN JOAQUIN VALLEY - NORTH 2007

Operation	Operation	Cash and Labor Costs per acre					Total Cost	Your Cost
	Time (Hrs/A)	Labor Cost	Fuel, Lube & Repairs	Material Cost	Custom/Rent			
Non-cash Overhead (Capital Recovery) Investment	Per producing Acre					Annual Cost		
						Capital Recovery		
Buildings: 2400 sqft		842				81	81	
Land		12,632				916	916	
Fuel Tanks 2-500g		69				6	6	
Shop/Field tools		158				18	18	
Irrigation: Sprinkler System		1,300				114	114	
Irrigation: Pump, Filters Refurbished		425				37	37	
Orchard Establishment Costs		4,391				405	405	
Cover Crop Establishment		138				34	34	
Equipment		735				85	85	
TOTAL NON-CASH OVERHEAD COSTS		20,689				1,696	1,696	
TOTAL COSTS/ACRE							4,377	

UC COOPERATIVE EXTENSION
Table 2. COSTS AND RETURNS PER ACRE TO PRODUCE ORGANIC ALMONDS
 SAN JOAQUIN VALLEY - NORTH 2007

	Quantity/ Acre	Unit	Price or Cost/Unit	Value or Cost/Acre	Your Cost
GROSS RETURNS					
Organic Almonds	1,600.00	lb	2.80	4,480	
OPERATING COSTS					
Insecticide/Fungicide:					
Thiolux Jet	60.00	lb	0.80	48	
Lime Sulfur Solution	8.00	gal	5.00	40	
Dipel DF	1.00	lb	14.36	14	
Stollers Natur'l Oil	10.00	gal	15.29	153	
Safer Roach & Ant Killing Powder (Boric Acid)	2.00	lb	2.79	6	
Entrust 80 WP	2.50	oz	31.18	78	
Fertilizer:					
Solubor (boron)	2.00	lb	1.08	2	
MKM Zinc Sulfate Powder 36%	10.00	lb	0.74	7	
Compost (plant based)	10.00	ton	27.00	270	
Irrigation:					
Water - Frost Protection	2.00	acin	4.67	9	
Water - Pumped	42.00	acin	4.67	196	
Custom:					
Shake Trees	2.00	hrs	95.00	190	
Sweep Nuts	2.00	hrs	45.00	90	
Pickup Nuts	1.00	acre	75.00	75	
Haul Nuts	16.00	cwt	0.31	5	
Hull & Shell Nuts	1,600.00	lb	0.04	64	
Leaf Analysis (lab fee)	0.05	each	30.00	2	
Hull Analysis (lab fee)	0.03	each	17.00	1	
Soil Analysis (lab fee)	0.05	each	30.00	2	
Spread Compost	1.00	ton	12.00	12	
Shred Prunings	0.10	hrs	270.00	27	
Pollination (hives)	2.50	hive	140.00	350	
Fuel:					
Propane for Flamer	49.50	gal	1.80	89	
Labor (machine)	12.80	hrs	16.22	208	
Labor (non-machine)	20.06	hrs	11.04	221	
Fuel - Gas	10.28	gal	2.80	29	
Fuel - Diesel	18.91	gal	2.30	43	
Lube				11	
Machinery repair				29	
Interest on operating capital @ 10.00%				55	
TOTAL OPERATING COSTS/ACRE				2,326	
NET RETURNS ABOVE OPERATING COSTS				2,154	
CASH OVERHEAD COSTS:					
Office Expense				50	
Liability Insurance				6	
Sanitation Expense				6	
Environmental Fee				5	
Organic Certification Fee				34	
Property Taxes				166	
Property Insurance				28	
Investment Repairs				60	
TOTAL CASH OVERHEAD COSTS/ACRE				355	
TOTAL CASH COSTS/ACRE				2,681	

UC COOPERATIVE EXTENSION
Table 2. CONTINUED
 SAN JOAQUIN VALLEY - NORTH 2007

	Quantity/ Acre	Unit	Price or Cost/Unit	Value or Cost/Acre	Your Cost
NON-CASH OVERHEAD COSTS (Capital Recovery)					
Buildings: 2400 sqft				81	
Land				916	
Fuel Tanks 2-500g				6	
Shop/Field tools				18	
Irrigation: Sprinkler System				114	
Irrigation: Pump, Filters Refurbished				37	
Orchard Establishment Costs				405	
Cover Crop Establishment				34	
Equipment				85	
TOTAL NON-CASH OVERHEAD COSTS/ACRE				1,696	
TOTAL COSTS/ACRE				4,377	
NET RETURNS ABOVE TOTAL COSTS				103	

UC COOPERATIVE EXTENSION
Table 3. MONTHLY CASH COSTS – ORGANIC ALMONDS
 SAN JOAQUIN VALLEY - NORTH 2007

Beginning JAN 07	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	TOTAL
Ending DEC 07	07	07	07	07	07	07	07	07	07	07	07	07	
Cultural:													
Insect: Mites, Scale (Oil) Dormant	102												102
Disease: Scab (Lime Sulfur) Delayed Dormant	51												51
Irrigate: Frost Protection		6	6										11
Pollination: Hives		350											350
Weed: Mow 7X		3	3	3	3	3	3	6					26
Disease: Brown Rot 3X (Thiolux)		53	26										80
Insect: PTB (Dipel)			25										25
Vertebrate: Gopher/Squirrel (Trap)			8						8				15
Weed: Flame Tree Row			24	24	24	24	24	12					134
Irrigate: (water & labor)			9	23	32	42	50	44	34	18			252
Insect: Ants (Boric Acid)					5		5						9
Insect: NOW (Entrust)							89						89
Fertilize: Leaf Sample/Analysis							3						3
Insect: Mites (Oil)							41	41					82
Fertilize: Hull Sample/Analysis (Boron)									1				1
Fertilize: Soil Sample/Analysis									3				3
Fertilize: Foliar (Zn & B)										20			20
Fertilize: Compost										282			282
Prune: Hand												144	144
Prune: Stack Prunings (hand)												17	17
Prune: Shred Prunings												27	27
Winter Sanitation: Shake, Blow, Shred												143	143
Pickup Truck Ranch Use	8	8	8	8	8	8	8	8	8	8	8	8	96
ATV: General Use	2	2	2	2	2	2	2	2	2	2	2	2	23
TOTAL CULTURAL COSTS	163	422	111	61	75	79	225	121	48	330	10	340	1,984
Harvest:													
Shake									95				95
Sweep									45				45
Hand Rake Nuts									3				3
Pickup and Haul Nuts									80				80
Hull and Shell Nuts									64				64
TOTAL HARVEST COSTS									287				287
Interest on operating capital @ 10.00%	1	5	6	6	7	8	9	10	13	-6	-3	-3	55
TOTAL OPERATING COSTS/ACRE	164	427	117	67	82	87	234	132	348	325	7	337	2,326
OVERHEAD:													
Office Expense	4	4	4	4	4	4	4	4	4	4	4	4	50
Liability Insurance		6											6
Sanitation Expense	6												6
Environmental Fee			5										5
Organic Certification Fee					34								34
Property Taxes	83							83					166
Property Insurance	14							14					28
Investment Repairs	5	5	5	5	5	5	5	5	5	5	5	5	60
TOTAL CASH OVERHEAD COSTS	112	15	14	9	43	9	106	9	9	9	9	9	355
TOTAL CASH COSTS/ACRE	277	442	131	76	125	96	340	141	357	334	16	346	2,681

UC COOPERATIVE EXTENSION
Table 4. RANGING ANALYSIS
 SAN JOAQUIN VALLEY - NORTH 2007

COSTS PER ACRE AT VARYING YIELDS TO PRODUCE ORGANIC ALMONDS

	YIELD (lb/acre)						
	1,000	1,200	1,400	1,600	1,800	2,000	2,200
OPERATING COSTS/ACRE:							
Cultural Cost	1,984	1,984	1,984	1,984	1,984	1,984	1,984
Harvest Cost	260	269	278	287	296	305	314
Interest on operating capital @ 10.00%	54	54	54	55	55	55	55
TOTAL OPERATING COSTS/ACRE	2,298	2,307	2,316	2,326	2,335	2,344	2,353
TOTAL OPERATING COSTS/LB	2.30	1.92	1.65	1.45	1.30	1.17	1.07
CASH OVERHEAD COSTS/ACRE	355	355	355	355	355	355	355
TOTAL CASH COSTS/ACRE	2,653	2,662	2,671	2,681	2,690	2,699	2,708
TOTAL CASH COSTS/LB	2.65	2.22	1.91	1.68	1.49	1.35	1.23
NON-CASH OVERHEAD COSTS/ACRE	1,696	1,696	1,696	1,696	1,696	1,696	1,696
TOTAL COSTS/ACRE	4,349	4,358	4,367	4,377	4,386	4,395	4,404
TOTAL COSTS/LB	4.35	3.63	3.12	2.74	2.44	2.20	2.00

NET RETURNS PER ACRE ABOVE OPERATING COSTS

PRICE	YIELD (lb/acre)						
	1,000	1,200	1,400	1,600	1,800	2,000	2,200
\$/lb							
1.90	-398	-27	344	714	1,085	1,456	1,827
2.20	-98	333	764	1,194	1,625	2,056	2,487
2.50	202	693	1,184	1,674	2,165	2,656	3,147
2.80	502	1,053	1,604	2,154	2,705	3,256	3,807
3.10	802	1,413	2,024	2,634	3,245	3,856	4,467
3.40	1,102	1,773	2,444	3,114	3,785	4,456	5,127
3.70	1,402	2,133	2,864	3,594	4,325	5,056	5,787

NET RETURN PER ACRE ABOVE CASH COSTS

PRICE	YIELD (lb/acre)						
	1,000	1,200	1,400	1,600	1,800	2,000	2,200
\$/lb							
1.90	-753	-382	-11	359	730	1,101	1,472
2.20	-453	-22	409	839	1,270	1,701	2,132
2.50	-153	338	829	1,319	1,810	2,301	2,792
2.80	147	698	1,249	1,799	2,350	2,901	3,452
3.10	447	1,058	1,669	2,279	2,890	3,501	4,112
3.40	747	1,418	2,089	2,759	3,430	4,101	4,772
3.70	1,047	1,778	2,509	3,239	3,970	4,701	5,432

NET RETURNS PER ACRE ABOVE TOTAL COSTS

PRICE	YIELD (lb/acre)						
	1,000	1,200	1,400	1,600	1,800	2,000	2,200
\$/lb							
1.90	-2,449	-2,078	-1,707	-1,337	-966	-595	-224
2.20	-2,149	-1,718	-1,287	-857	-426	5	436
2.50	-1,849	-1,358	-867	-377	114	605	1,096
2.80	-1,549	-998	-447	103	654	1,205	1,756
3.10	-1,249	-638	-27	583	1,194	1,805	2,416
3.40	-949	-278	393	1,063	1,734	2,405	3,076
3.70	-649	82	813	1,543	2,274	3,005	3,736

UC COOPERATIVE EXTENSION
Table 5. WHOLE FARM ANNUAL EQUIPMENT, INVESTMENT, AND BUSINESS OVERHEAD COSTS
 SAN JOAQUIN VALLEY - NORTH 2007

ANNUAL EQUIPMENT COSTS

Yr Description	Price	Yrs Life	Salvage Value	Capital Recovery	Cash Overhead		Total
					Insur- ance	Taxes	
07 66 HP 2WD Tractor	46,230	20	5,932	4,308	183	261	4,752
07 ATV 4WD	5,790	7	2,196	832	28	40	900
07 Flamer 22 'Red Dragon GP1000	3,200	10	566	420	13	19	452
07 Mower/Chopper - 8'	6,713	10	1,187	882	28	40	949
07 Orchard Sprayer 500 Gal	21,000	15	2,016	2,264	81	115	2,459
07 Pickup 1/2 ton	16,500	7	1,650	2,899	64	91	3,053
TOTAL	99,433	0	13,547	11,605	395	565	12,565
60% of New Cost*	59,660	0	8,128	6,963	237	339	7,539

*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	
Orchard Establishment	175,640	22		16,209	615	878	175	17,877
Buildings 2400 sqft	80,000	20		7,699	280	400	1,600	9,979
Cover Crop Establishment	5,520	5		1,355	0	0	0	1,355
Fuel Tanks 2-500g	6,514	20	651	611	25	36	130	802
Land	1,200,000	22	1,200,000	87,000	0	12,000	0	99,000
Pump 25HP Refurbished	17,000	10		1,492	60	85	340	1,976
Shop/Field Tools	15,000	15		1,673	53	75	300	2,101
Sprinkler Irrigation System	52,000	25		4,563	182	260	1,040	6,045
TOTAL INVESTMENT	1,551,674		1,200,651	120,603	1,214	13,734	3,585	139,136

ANNUAL BUSINESS OVERHEAD COSTS

Description	Units/ Farm	Unit	Price/ Unit	Total Cost
Liability Insurance	100	acre	5.29	529
Environmental Fee	95	acre	5.26	500
Organic Certification Fees	40	acre	33.75	1,350
Office Expense	95	acre	50.00	4,750
Sanitation Fees	95	acre	5.89	560

UC COOPERATIVE EXTENSION
Table 6. HOURLY EQUIPMENT COSTS
 SAN JOAQUIN VALLEY - NORTH 2007

Yr Description	COSTS PER HOUR							
	Actual Hours Used	Cash Overhead			Operating			Total Costs/Hr.
		Capital Recovery	Insur- ance	Taxes	Repairs	Fuel & Lube	Total Oper.	
07 66 HP 2WD Tractor	600	4.31	0.18	0.26	1.81	8.44	10.25	15.00
07 ATV 4WD	287	1.74	0.06	0.08	0.42	3.22	3.64	5.52
07 Flamer 22 'Red Dragon GP1000	150	1.68	0.05	0.08	0.85	0.00	0.85	2.66
07 Mower/Chopper - 8'	200	2.64	0.08	0.12	2.74	0.00	2.74	5.58
07 Orchard Sprayer 500 Gal	130	10.46	0.37	0.53	3.31	0.00	3.31	14.67
07 Pickup 1/2 ton	285	6.10	0.13	0.19	1.20	8.05	9.25	15.67

UC COOPERATIVE EXTENSION
Table 7. OPERATIONS WITH EQUIPMENT
 SAN JOAQUIN VALLEY - NORTH 2007

Operation	Operation Month	Equipment Tractor	Implement	Non-Mach		Broadcast Rate/acre	Unit
				Labor hrs/acre	Material		
Cultural:							
Insect: Mites (Oil)	January	66HP 2WD	Air-blast Sprayer		Natur'l Oil	6.00	gal
Disease: Scab (delay dormant)	January	66HP 2WD	Air-blast Sprayer		Lime Sulfur	8.00	gal
Pollination	February	Custom			Hives	2.50	each
Disease: Brown Rot	February	66HP 2WD	Air-blast Sprayer		Thiolux	20.00	lb
	February	66HP 2WD	Air-blast Sprayer		Thiolux	20.00	lb
	March	66HP 2WD	Air-blast Sprayer		Thiolux	20.00	lb
Insect PTB: (Dipel)	March	66HP 2WD	Air-blast Sprayer		Dipel	1.00	lb
Vertebrate: Gopher & Squirrel (Trap)	March	ATV					
	August	ATV					
Weed: Mow (Alternate middles - Feb - July)	February	66HP 2WD	Mower/Chopper				
	March	66HP 2WD	Mower/Chopper				
	April	66HP 2WD	Mower/Chopper				
	May	66HP 2WD	Mower/Chopper				
	June	66HP 2WD	Mower/Chopper				
	July	66HP 2WD	Mower/Chopper				
	August	66HP 2WD	Mower/Chopper				
Irrigate: Frost Protection	February			0.09	Water	1.00	acin
	March			0.09	Water	1.00	acin
Irrigate: water & labor	March			0.36	Water	1.00	acin
	April			0.72	Water	3.25	acin
	May			0.72	Water	5.25	acin
	June			0.72	Water	7.25	acin
	July			0.72	Water	9.00	acin
	August			0.72	Water	7.75	acin
	September			0.36	Water	5.50	acin
	October			0.30	Water	3.00	acin
Weed: Flame Tree Row	March	66HP 2WD	Flamer		Propane	4.50	gal
	March	66HP 2WD	Flamer		Propane	4.50	gal
	April	66HP 2WD	Flamer		Propane	4.50	gal
	April	66HP 2WD	Flamer		Propane	4.50	gal
	May	66HP 2WD	Flamer		Propane	4.50	gal
	May	66HP 2WD	Flamer		Propane	4.50	gal
	June	66HP 2WD	Flamer		Propane	4.50	gal
	June	66HP 2WD	Flamer		Propane	4.50	gal
	July	66HP 2WD	Flamer		Propane	4.50	gal
	July	66HP 2WD	Flamer		Propane	4.50	gal
	August	66HP 2WD	Flamer		Propane	4.50	gal
Insect: Mites	July	66HP 2WD	Air-blast Sprayer		Natur'l Oil	2.00	gal
	August	66HP 2WD	Air-blast Sprayer		Natur'l Oil	2.00	gal
Fertilize: Leaf Samples	July	ATV		0.03	Analysis	0.05	each
Fertilize: Hull Samples	Sept	ATV		0.03	Analysis	0.03	each
Fertilize: Soil Analysis	Sept	ATV		0.03	Analysis	0.05	each
Fertilize: Foliar	October	66HP 2WD	Air-blast Sprayer		Solubor	2.00	lb
					Zinc Sulfate	10.00	lb
Insect: NOW	July	66HP 2WD	Air-blast Sprayer		Entrust	2.50	oz
Insect: Ants	May	ATV			Boric Acid	1.00	lb
	July	ATV			Boric Acid	1.00	lb

UC COOPERATIVE EXTENSION
Table 7. CONTINUED
 SAN JOAQUIN VALLEY - NORTH 2007

Operation	Operation Month	Equipment Tractor	Implement	Non-Mach	Material	Broadcast	Unit
				Labor hrs/acre		Rate/acre	
Harvest: Shake Trees	September	Custom			Shake	1.00	hour
Harvest: Sweep Nuts	September	Custom			Sweep	1.00	hour
Harvest: Hand Rake Nuts	September			0.30			
Harvest: Pickup & Haul Nuts	September	Custom			Pickup	1.00	acre
					Haul	16.00	cwt
Hull & Shell Nuts	September	Custom			Hull & Shell	1,600.00	lb
Fertilize: Compost	October	Custom			Compost	10.00	ton
					Spread	1.00	acre
Prune: Hand	December			13.00			
Prune: Stack Prunings	December			1.50			
Prune: Shred Prunings	December	Custom			Shred	0.10	hour
Winter Sanitation:	December	66HP 2WD	Mower/Chopper				
		Custom			Shake	1.00	hour
		Custom		0.30	Sweep	1.00	hour

UC COOPERATIVE EXTENSION
Table 8. COSTS PER ACRE TO ESTABLISH COVER CROP
 SAN JOAQUIN VALLEY - NORTH 2007

Operation	Cash and Labor Costs per acre						
	Operation Time (Hrs/A)	Labor Cost	Fuel, Lube & Repairs	Material Cost	Custom/Rent	Total Cost	Your Cost
Planting:							
Disc 1X	0.26	5	3	0	0	8	
Disc & Roll	0.26	5	3	0	0	8	
Plant- Custom	0.00	0	0	75	7	82	
Roll	0.19	4	2	0	0	6	
Irrigate 2X	0.18	2	0	19	0	21	
TOTAL PLANTING COSTS	0.89	16	9	94	7	125	
Interest on operating capital @ 10.00%						12	
TOTAL OPERATING COSTS/ACRE	0.89	16	9	94	7	137	
CASH OVERHEAD:							
Property Taxes						1	
Property Insurance						0	
TOTAL CASH OVERHEAD COSTS						1	
TOTAL CASH COSTS/ACRE						138	

COVER CROP ESTABLISHMENT MATERIAL COSTS

	Quantity/Acre	Unit	Price or Cost/Unit	Value or Cost/Acre	Your Cost
OPERATING COSTS					
Seed:					
Clover Subterranean Mix Coated	20.00	lb	3.76	75	
Custom:					
Plant Cover Crop	1.00	acre	6.50	7	
Water:					
Water - Pumped	4.00	acin	4.67	19	
Labor (machine)	0.85	hrs	16.22	14	
Labor (non-machine)	0.18	hrs	11.04	2	
Fuel - Diesel	2.49	gal	2.30	6	
Lube				1	
Machinery repair				2	
Interest on operating capital				12	
TOTAL OPERATING COSTS/ACRE				137	
CASH OVERHEAD COSTS:					
Property Taxes				1	
Property Insurance				0	
TOTAL CASH OVERHEAD COSTS/ACRE				1	
TOTAL CASH COSTS/ACRE				138	

ANNUAL EQUIPMENT COSTS for COVER CROP ESTABLISHMENT

Yr	Description	Price	Yrs Life	Salvage Value	Capital Recovery	Cash Overhead		Total
						Insur-ance	Taxes	
07	66 HP 2WD Tractor	46,230	20	5,932	4,308	183	261	4,752
07	Disc - Offset 8'	9,024	15	866	973	35	49	1,056
07	Ring Roller - 10'	1,893	20	99	180	7	10	197
	TOTAL	57,147	57,147	0	6,897	5,461	224	320
	60% of New Cost *	34,288	0	4,138	3,276	134	192	3,603

*Used to reflect a mix of new and used equipment