
UNIVERSITY OF CALIFORNIA COOPERATIVE EXTENSION

2002

**SAMPLE COSTS TO PRODUCE
ORGANIC
ALMONDS**



SAN JOAQUIN VALLEY - NORTH

Sprinkler Irrigation

Brent A. Holtz
Roger A. Duncan
Paul S. Verdegaal
Karen A. Klonsky

UCCE Farm Advisor, Madera County
UCCE Farm Advisor, Stanislaus County
UCCE Farm Advisor, San Joaquin County
UCCE Extension Specialist, Department of Agricultural and Resource
Economics, UC Davis
Research Associate, Department of Agricultural and Resource Economics, UC
Davis

Richard L. De Moura

UNIVERSITY OF CALIFORNIA COOPERATIVE EXTENSION

SAMPLE COST TO PRODUCE ORGANIC ALMONDS

San Joaquin Valley North - 2002

Sprinkler Irrigation

CONTENTS

INTRODUCTION.....	2
ASSUMPTIONS.....	3
Production Operating Costs.....	4
Cash Overhead.....	6
Non-Cash Overhead.....	7
REFERENCES.....	9
Table 1. COSTS PER ACRE TO PRODUCE ALMONDS.....	10
Table 2. COSTS AND RETURNS PER ACRE TO PRODUCE ALMONDS.....	12
Table 3. MONTHLY CASH COSTS – ALMONDS.....	14
Table 4. WHOLE FARM EQUIPMENT, INVESTMENT, AND BUSINESS OVERHEAD COSTS.....	15
Table 5. HOURLY EQUIPMENT COSTS.....	16
Table 6. RANGING ANALYSIS.....	17
Table 7. COSTS PER ACRE TO ESTABLISH COVER CROP.....	18

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 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.

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) 752-3589. Current studies can be obtained from selected county UC Cooperative Extension offices or downloaded from the department website at <http://coststudies.ucdavis.edu>.

The University of California, Cooperative Extension in compliance with Titles VI and VII of the Civil Rights Act of 1964, Title IX of the Education Amendments of 1972, Sections 503 and 504 of the Rehabilitation Act of 1973 does not discriminate on the basis of race, religion, color, national origins, sex, mental or physical handicaps or age in any of its programs or activities, or with respect to any of its employment policies, practices or procedures. Nor does the University of California does not discriminate on the basis of ancestry, sexual orientation, marital status, citizenship, medical condition (as defined in section 12926 of the California Government Code) or because the individuals are disabled or Vietnam era veterans (as defined the Vietnam Era Veterans Readjustment Act of 1974 and Section of the California Government Code). Inquiries regarding this policy may be directed to the Affirmative Action Director, University of California, Agriculture and Natural Resources, 300 Lakeside Drive, Oakland, California 94612-3560, (510) 987-0097.

ASSUMPTIONS

The assumptions refer to Tables 1 to 7 and pertain to sample costs to convert an orchard and produce organic almonds in the Northern San Joaquin Valley under sprinkler irrigation. Practices described are not University of California recommendations, but 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 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.**

Land. The farm consists of 100 contiguous acres – 95 acres of almonds and 5 acres of road, 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 22 X 18-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.

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 in year 5 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 7). 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 (January) sanitation destroys over-wintering sites for navel orange worm. The mummy nuts are shaken from the trees, dropped to the orchard floor, blown into the row middles and shredded. Winter sanitation operations are custom hired. Hand poling may be needed in low rainfall years.

Pruning. Hand pruning is done in December in this study, but can be done anytime from harvest through the dormant period. Prunings are stacked in the row middles and pushed out of the orchard by a tractor with a brush rake and burned. Many growers for an additional cost will have the brush shredded or wood chipped, either with their own equipment or by a custom operator.

Tree Replacement. One tree per acre is assumed to die and is replaced in late winter or spring. Costs in this study are basic costs that will vary with each orchard and type of tree loss.

Irrigation and Frost Protection. Water is pumped from a well, through an infiltration system into the micro-sprinkler system. In this study water costs \$28.92 per acre-foot. A total of forty-two acre-inches of water is applied to the orchard – thirty-seven acre-inches during the growing season, three acre-inches post harvest and two-acre inches for frost protection. Frost protection is usually done in February and March. 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 prior to bloom.

Fertilization. Manure compost at 7.5 tons per acre is applied post harvest to provide approximately 400 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 is established in this study. Boron (Solubor) and zinc sulfate is foliar applied at pink bud in this study. Boron can also be applied to the soil surface or run through the irrigation system at 3 to 5 ounces per tree. Zinc sulfate 36% at 10 to 15 pounds per acre can also be applied as a foliar spray post-harvest before leaf fall. Fertilizer rates in this study are typical nutrient requirements, but do not take into account soil and water nitrogen. Leaf samples are taken in July for nutrient analysis and the fertilizers applied according to analysis recommendations. Also, water analysis should be done periodically to determine nitrate availability. Leaf samples in this study are calculated at one per 20 acres and analyzed for N, P, K, B, and Zn.

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.

Pest Control Advisor (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.

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 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, copper) in December or early January before bud swell controls San Jose scale, brown almond and European red mites. In July at beginning of hull split, a *Bacillus thuringiensis* (BT) pesticide is applied to control navel orangeworm (NOW). NOW is also managed by early harvest and winter sanitation. Two bloom sprays in May with Dipel (BT) controls peach twig borer. Mites are controlled during the season with two oil sprays. Attempts to control ants on the berms with boric acid are made beginning in May.

Disease. Bacterial blast (*Pseudomonas syringae*), same organism as bacterial canker, can be controlled with the dormant oil sprays. Brown rot (*Monilinia laxa*) and scab (*Cladosporium carpophilum*) are not controlled in this study. Liquid-lime sulfur has reduced scab and may also have efficacy against shot hole (*Stigmia carpophila*) as well as some other diseases.

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.

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.

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). An estimated price of a \$2.80 per pound is used in this study 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. The returns in this cost study are averaged based on current markets and are weighted by the variety percentage in the orchard, assuming all varieties yield equally.

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.

CCOF. Assessments are not shown as a cost due to the varying rates. CCOF charges a one time \$250 membership fee, an application packet fee of \$25, an annual renewal fee of \$165 for growers over \$20,000 in gross income, and annual certification fees based on time and parcels, estimated at \$350 for this study. An assessment of 0.05% of gross revenue is charged growers whose gross income exceeds \$20,000. Additional fees can be incurred, but are voluntary.

C DFA. State registration is required and the county agricultural commissioner collects the fees. The fee for the first time registration is 1.5 times the annual fee based on gross revenue. In this study the first time fee is \$150 plus the annual fee of \$300.

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. Hourly wages for workers are \$10.50 for machine operators and \$6.75 per hour non-machine labor. Adding 34% for the employers share of federal and state payroll taxes, insurance, and other possible benefits gives the labor rates shown of \$14.07 and \$9.05 per hour for machine labor and non-machine labor, respectively. 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 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 \$1.26 and \$1.51 per gallon, respectively. The fuel, lube, and repair cost per acre for each operation in Table 2 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 7.40% 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.

Risk. The risks associated with organic 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 0.660% of the average value of the assets over their useful life. Liability insurance covers accidents on the farm and costs \$504 for the entire farm.

Office Expense. Office and business expenses are estimated at \$40 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 \$468 annually. The cost includes one single toilet unit with washbasin, delivery and 4 months of weekly service.

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

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

Non-Cash Overhead Costs

Non-cash overhead is calculated as the capital recovery cost for equipment and other farm investments.

Capital Recovery Costs. Capital recovery cost is the annual depreciation and interest costs for a capital investment. It is the amount of money required each year to recover the difference between the purchase 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 6.41% used to calculate capital recovery cost is the USDA-ERS's ten-year average of California's agricultural sector long-run rate of return to production assets from current income. This represents the long-term interest rate typical of another agricultural enterprise.

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, San Joaquin Valley North, Micro-Sprinkler Irrigation*, in the third year represents the establishment cost. For this study the cost is \$3,841 per acre or \$153,640 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. For example, development on marginal soils will require additional land preparation and soil amendments. Management/Development companies will have additional labor costs.

Cover Crop Establishment Cost. Costs to establish the cover crop in the fifth 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.

Irrigation System. A 200 foot deep well with a pumping level at 75-feet is already on the site. A new 25 horsepower pump, and filtration/injector station is being installed along with the drip irrigation system during planting. The pumps, filtration station, fertilizer injector system, drip lines and the labor to install the components are included in the irrigation system cost. Micro-sprinkler lines are laid out after planting with the labor cost included in the installation cost. The pump is lifting the water 75-feet. The irrigation system is considered an improvement to the property and has a 25-year life.

Land. Land values range from \$7,500 to \$10,000 per acre. Land in this study is valued at \$9,000 per acre or \$9,474 per producing acre.

Building. The shop building is a 40'X 60' metal building 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 Tables 3 and 8. 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.
- Asai, Wes, Lonnie Hendricks, Paul Verdegaal, Karen Klonsky, Chuck Ingels, Pete Livingston, and Laura Tourte. 1992. *Sample Costs To Produce Organic Almonds in the Northern San Joaquin Valley*. University of California Cooperative Extension. Department of Agricultural and Resource Economics. Davis, CA.
- Boelje, Michael D., and Vernon R. Eidman. 1984. Farm Management. John Wiley and Sons. New York, New York
- Buchner, Richard P., Joseph H. Connell, John P. Edstrom, William H. Krueger, Wilbur O. Reil, Karen M. Klonsky, and Richard L. De Moura. 2001. *Sample Costs to Establish an Almond Orchard and Produce Almonds, Sacramento Valley*. University of California Cooperative Extension. Department of Agricultural and Resource Economics. Davis, CA.
- California Certified Organic Farmers. *A Guide To CCOF Certification*. 2001. California Certified Organic Farmers. Santa Cruz, CA.
- Duncan, Roger A., Paul S. Verdegaal, Brent A. Holtz, Karen A. Klonsky and Richard L. De Moura. 2002. *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.
- Hendricks, Lonnie, Roger Duncan, Paul Verdegaal, and Pete Livingston. 1998. *Sample Cost to Establish an Almond Orchard and Produce Almonds, Northern San Joaquin Valley*. University of California Cooperative Extension. Department of Agricultural and Resource Economics. Davis, CA.
- Integrated Pest Management Education and Publications. "UC IPM Pest Management Guidelines: Almond". In M. L. Flint (ed.) *UC IPM Pest Management Guidelines*. University of California. Division of Agriculture and Natural Resources. Oakland, CA. Publication 3339.
- 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.
- USDA-ERS. 2000. *Farm Sector: Farm Financial Ratios*. Agriculture and Rural Economics Division, ERS. USDA. Washington, DC <http://www.ers.usda.gov/data/farbalancesheet/fbsdmu.htm>; Internet; accessed January 4, 2002.

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 ALMONDS
SAN JOAQUIN VALLEY - NORTH 2002

Operation	Operation Time (Hrs/A)	Cash and Labor Costs per acre					Total Cost	Your Cost
		Labor Cost	Fuel, Lube & Repairs	Material Cost	Custom/ Rent			
Cultural:								
Prune: Sucker, & Train	13.00	118	0	0	0	118		
Prune: Stack Brush	1.50	14	0	0	0	14		
Prune: Buck Brush	0.30	5	2	0	0	7		
Prune: Burn Brush	0.30	3	0	0	0	3		
Winter Sanitation: Shake Mummies	0.00	0	0	0	70	70		
Winter Sanitation: Blow & Rake Mummies	0.25	2	0	0	40	42		
Winter Sanitation: Shred Mummies	0.09	1	1	0	0	2		
Weed: Mow 7X	0.87	15	8	0	0	23		
Weed: Tree Row - Flame	1.41	24	10	74		108		
Pest: Dormant	0.25	4	2	73	0	79		
Pest: Peach Twig Borer	0.50	8	5	24	0	37		
Pest/Fertilize: Mites/Zn B	0.25	4	2	26	0	33		
Pollination	0.00	0	0	0	113	113		
Pest: NOW/Mite	0.25	4	2	32	0	39		
Pest: Ants	0.16	3	0	5	0	8		
Pest: Gopher, Squirrel	0.66	11	1	0	0	13		
Fertilize: Manure Compost	0.00	0	0	195	38	233		
Fertilize: Leaf Analysis	0.05	1	0	0	1	2		
Irrigate-Frost Protection	0.06	1	0	5	0	5		
Irrigate	0.33	3	0	96	0	99		
Pickup Truck Ranch Use	3.33	56	18	0	0	75		
ATV: General Field Use	1.00	17	2	0	0	19		
Tree Replacement 1/acre/year	0.00	0	0	13	0	13		
TOTAL CULTURAL COSTS	24.56	294	55	543	262	1,155		
Harvest:								
Shake	0.00	0	0	0	70	70		
Sweep	0.00	0	0	0	40	40		
Hand Rake Nuts	0.25	2	0	0	0	2		
Pickup and Haul Nuts	0.00	0	0	0	80	80		
Hull and Shell Nuts	0.00	0	0	0	96	96		
TOTAL HARVEST COSTS	0.00	2	0	0	286	288		
Interest on operating capital @ 7.40%						18		
TOTAL OPERATING COSTS/ACRE		296	53	543	548	1,461		
CASH OVERHEAD:								
Office Expense						40		
Liability Insurance						5		
Sanitation Fees						5		
Property Taxes						134		
Property Insurance						26		
Investment Repairs						69		
TOTAL CASH OVERHEAD COSTS						279		
TOTAL CASH COSTS/ACRE						1,740		

UC COOPERATIVE EXTENSION
Table 1. Continued

Operation	Operation Time (Hrs/A)	Cash and Labor Costs per acre			
		Per producing Acre	Annual Cost Capital Recovery	Total Cost	Your Cost
Non-cash Overhead (Capital Recovery) Investment					
Buildings		413	37	37	
Land		9,474	607	607	
Fuel Tanks 2-500g		69	6	6	
Shop Tools		119	12	12	
Sprinkler Irrigation System		2,850	232	232	
Pruning Equipment		14	2	2	
Orchard Establishment Costs		3,841	330	330	
Cover Crop Establishment		90	22	22	
Equipment		496	58	58	
TOTAL NON-CASH OVERHEAD COSTS		17,366	1,306	1,306	
TOTAL COSTS/ACRE					3,046

UC COOPERATIVE EXTENSION
Table 2. COSTS AND RETURNS PER ACRE TO PRODUCE ALMONDS
SAN JOAQUIN VALLEY - NORTH 2002

	Quantity/ Acre	Unit	Price or Cost/Unit	Value or Cost/Acre	Your Cost
GROSS RETURNS					
Almonds	1,600	lb	2.80	4,480	
OPERATING COSTS					
Custom:					
Shake Trees (Harvest & Sanitation)	220.00	tree	0.64	140	
Sweep Nuts (Harvest & Sanitation)	2.00	acre	40.00	80	
Pickup Nuts	1,600.00	lb	0.04	64	
Haul Nuts	1,600.00	lb	0.01	16	
Hull & Shell Nuts	1,600.00	lb	0.06	96	
Leaf Analysis	1.00	acre	1.25	1	
Contract:					
Pollination Fee	2.50	hive	45.00	113	
Insecticide:					
Copper Sulfate 50%	7.00	lb	1.80	13	
Dipel DF	3.00	lb	12.00	36	
Stolls Natur'l Oil	10.00	gal	10.00	100	
Boric Acid	2.00	lb	2.70	5	
Fertilizer:					
Boron (Solubor)	3.00	lb	1.20	4	
Zinc Sulfate 36%	5.00	lb	0.52	3	
Compost Manure	7.50	ton	26.00	195	
Irrigation:					
Water – Pumped	40.00	acin	2.41	96	
Water –Frost Protection	2.00	acin	2.41	5	
Tree Replant:					
Backhoe Tree Hole	1.00	each	6.00	6	
Tree - Almond	1.00	each	4.80	5	
Mark, Stake & Dig	1.00	each	2.25	2	
Tree Guards	1.00	each	0.07	0	
Paint Trees	1.00	each	0.03	0	
Galltrol A	1.00	each	0.05	0	
Fuel:					
Propane for Flamer	49.50	gal	1.50	74	
Labor (machine)	10.94	hrs	14.07	154	
Labor (non-machine)	15.69	hrs	9.05	142	
Fuel - Gas	10.21	gal	1.51	15	
Fuel - Diesel	13.74	gal	1.26	17	
Lube				5	
Machinery repair				18	
Interest on operating capital @ 7.40%				18	
TOTAL OPERATING COSTS/ACRE				1,461	
NET RETURNS ABOVE OPERATING COSTS				3,020	

UC COOPERATIVE EXTENSION
Table 2. continued

	Quantity/ Acre	Unit	Price or Cost/Unit	Value or Cost/Acre	Your Cost
CASH OVERHEAD COSTS:					
Office Expense				40	
Liability Insurance				5	
Sanitation Fees				5	
Property Taxes				134	
Property Insurance				26	
Investment Repairs				69	
TOTAL CASH OVERHEAD COSTS/ACRE				279	
TOTAL CASH COSTS/ACRE				1,741	
NON-CASH OVERHEAD COSTS (Capital Recovery)					
Buildings				37	
Land				607	
Fuel Tanks 2-500g				6	
Shop Tools				12	
Flood Irrigation System				232	
Pruning Equipment				2	
Orchard Establishment				330	
Cover Crop Establishment				22	
Equipment				58	
TOTAL NON-CASH OVERHEAD COSTS/ACRE				1,306	
TOTAL COSTS/ACRE				3,045	
NET RETURNS ABOVE TOTAL COSTS				1,435	

UC COOPERATIVE EXTENSION
Table 3. MONTHLY CASH COSTS - ALMONDS
SAN JOAQUIN VALLEY - NORTH 2002

Beginning JAN 02	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	TOTAL	
Ending DEC 02	02	02	02	02	02	02	02	02	02	02	02	02	02	
Cultural:														
Prune, Sucker, & Train													118	118
Stack Brush													14	14
Buck Brush													7	7
Burn Brush													3	3
Knock Mummies													70	70
Blow & Rake Mummies													42	42
Shred Mummies													2	2
Pest Control - Dormant	79													79
Pest/Fertilize - Mite/Zn B			33											33
Frost Protection-Irrigate		5												5
Tree Replacement 1/acre/year		13												13
Pollination		113												113
Pest: Gopher/Squirrel -Trap			6					6						13
Weed: Tree Row - Flame			20	20	20	20	20	10						108
Weed: Cover Crop - Mow 7X		3	3	3	3	3	3	5						23
Irrigate			4	8	13	22	25	20	8					99
Pest: Peach Twig Borer					37									37
Pest Control - Ants					4		4							8
Pest Control - NOWorm/Mite							39							39
Fertilize - Manure Compost										233				233
Pickup Truck Use	6	6	6	6	6	6	6	6	6	6	6	6	6	75
ATV Use	2	2	2	2	2	2	2	2	2	2	2	2	2	19
Leaf Analysis								2						2
TOTAL CULTURAL COSTS	87	142	73	38	84	52	100	49	17	240	8	263	1,154	
Harvest:														
Shake									70					70
Sweep									40					40
Hand Rake Nuts									2					2
Pickup and Haul Nuts									80					80
Hull and Shell Nuts									96					96
TOTAL HARVEST COSTS									288					288
Interest on operating capital	1	1	2	2	3	3	4	4	6	-3	-2	-2	18	
TOTAL OPERATING COSTS/ACRE	87	143	75	40	87	55	104	53	314	237	6	262	1,460	
OVERHEAD:														
Office Expense	3	3	3	3	3	3	3	3	3	3	3	3	3	40
Liability Insurance		5												5
Sanitation Fees	5													5
Property Taxes	67						67							134
Property Insurance	13						13							26
Investment Repairs	6	6	6	6	6	6	6	6	6	6	6	6	6	69
TOTAL CASH OVERHEAD COSTS	94	14	9	9	9	9	89	9	9	9	9	9	9	279
TOTAL CASH COSTS/ACRE	182	157	84	49	96	64	193	62	323	246	15	271	1740	

UC COOPERATIVE EXTENSION
Table 4. WHOLE FARM ANNUAL EQUIPMENT, INVESTMENT, AND BUSINESS OVERHEAD COSTS
SAN JOAQUIN VALLEY - NORTH 2002

ANNUAL EQUIPMENT COSTS

Yr	Description	Price	Yrs Life	Salvage Value	Capital Recovery	Cash Overhead		Total
						Insur- ance	Taxes	
02	66 HP 2WD Tractor	29,708	20	3,812	2,578	111	168	2,856
02	ATV 4WD	5,790	7	2,196	794	26	40	860
02	Brush Rake - 10'	1,584	25	45	128	5	8	142
02	Flamer 22 'Red Dragon CP1000	2,825	10	500	354	11	17	382
02	Front End Loader	4,852	15	466	494	18	27	538
02	Mower/Chopper - 8'	6,713	10	1,187	842	26	40	907
02	Orchard Sprayer 500 Gal	18,850	15	1,810	1,918	68	103	2,089
02	Pickup 1/2 ton	16,500	7	1,650	2,805	60	91	2,955
TOTAL		86,822		11,666	9,912	325	492	10,729
60% of New Cost*		52,093		7,000	5,947	195	295	6,438

*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	153,640	22		13,218	507	768	0	14,493
Cover Crop Establishment	3,600	5		864	0	0	0	864
Buildings	39,253	20		3,537	130	196	785	4,648
Sprinkler Irrigation System	114,000	25		9,268	376	570	2,280	12,494
Fuel Tanks 2-500g	6,514	20	651	570	24	36	130	760
Land	900,000	22	900,000	57,690	0	9,000	0	66,690
Pruning Equipment	1,325	10	133	174	5	7	25	211
Shop Tools	11,330	15	1,133	1,151	41	62	226	1,480
TOTAL INVESTMENT	1,229,662		901,917	86,472	1,083	10,639	3,446	101,640

ANNUAL BUSINESS OVERHEAD COSTS

Description	Units/ Farm	Unit	Price/ Unit	Total Cost
Liability Insurance	100	Acre	5.04	504
Office Expense	95	Acre	40.00	3,800
Sanitation Fees	95	Acre	4.92	468

UC COOPERATIVE EXTENSION
Table 5. HOURLY EQUIPMENT COSTS
SAN JOAQUIN VALLEY - NORTH 2002

Yr	Description	Actual Hours Used	COSTS PER HOUR						Total Costs/Hr.
			Capital Recovery	Cash Overhead		Operating			
				Insur- ance	Taxes	Repairs	Fuel & Lube	Total Oper.	
02	66 HP 2WD Tractor	422.20	3.66	0.16	0.24	1.19	4.63	5.82	9.88
02	ATV 4WD	245.80	1.94	0.06	0.10	0.43	1.74	2.17	4.27
02	Brush Rake - 10'	36.00	2.13	0.09	0.14	0.22	0.00	0.22	2.58
02	Flamer 22' Red Dragon 1000	66.30	3.20	0.10	0.15	0.76	0.00	0.76	4.21
02	Front End Loader	36.00	8.23	0.29	0.44	0.68	0.00	0.68	9.65
02	Mower/Chopper - 8'	144.20	3.50	0.11	0.16	2.77	0.00	2.77	6.55
02	Orchard Sprayer 500 Gal	150.00	7.67	0.27	0.41	2.87	0.00	2.87	11.23
02	Pickup 1/2 ton	304.30	5.53	0.12	0.18	1.21	4.34	5.55	11.37

UC COOPERATIVE EXTENSION
Table 6. RANGING ANALYSIS
SAN JOAQUIN VALLEY - NORTH 2002

COSTS PER ACRE AT VARYING YIELDS TO PRODUCE ALMONDS

	YIELD (kernel lb/acre)						
	1,000	1,200	1,400	1,600	1,800	2,000	2,200
OPERATING COSTS/ACRE:							
Cultural Cost	1,154	1,154	1,154	1,154	1,154	1,154	1,154
Harvest Cost	221	244	266	288	311	333	355
Interest on operating capital	18	18	18	18	18	18	18
TOTAL OPERATING COSTS/ACRE	1,393	1,415	1,438	1,460	1,483	1,505	1,527
TOTAL OPERATING COSTS/LB	1.39	1.18	1.03	0.91	0.82	0.75	0.69
CASH OVERHEAD COSTS/ACRE	279	279	279	279	279	279	279
TOTAL CASH COSTS/ACRE	1,675	1,695	1,717	1,740	1,762	1,784	1,807
TOTAL CASH COSTS/LB	1.68	1.41	1.23	1.09	0.98	0.89	0.82
NON-CASH OVERHEAD COSTS/ACRE	1,306	1,306	1,306	1,306	1,306	1,306	1,306
TOTAL COSTS/ACRE	2,978	3,001	3,023	3,045	3,068	3,090	3,113
TOTAL COSTS/LB	2.98	2.50	2.16	1.90	1.70	1.55	1.42

NET RETURNS PER ACRE ABOVE OPERATING COSTS FOR ALMONDS

PRICE \$/lb	YIELD (kernel lb/acre)						
	1,000	1,200	1,400	1,600	1,800	2,000	2,200
1.90	507	865	1,222	1,580	1,937	2,295	2,653
2.20	807	1,225	1,642	2,060	2,477	2,895	3,313
2.50	1,107	1,585	2,062	2,540	3,017	3,495	3,973
2.80	1,407	1,945	2,482	3,020	3,557	4,095	4,633
3.10	1,707	2,305	2,902	3,500	4,097	4,695	5,293
3.40	2,007	2,665	3,322	3,980	4,637	5,295	5,953
3.70	2,307	3,025	3,742	4,460	5,177	5,895	6,613

NET RETURN PER ACRE ABOVE CASH COST FOR ALMONDS

PRICE \$/lb	YIELD (kernel lb/acre)						
	1,000	1,200	1,400	1,600	1,800	2,000	2,200
1.90	225	585	943	1,300	1,658	2,016	2,373
2.20	525	945	1,363	1,780	2,198	2,616	3,033
2.50	825	1,305	1,783	2,260	2,738	3,216	3,693
2.80	1,125	1,665	2,203	2,740	3,278	3,816	4,353
3.10	1,425	2,025	2,623	3,220	3,818	4,416	5,013
3.40	1,725	2,385	3,043	3,700	4,358	5,016	5,673
3.70	2,025	2,745	3,463	4,180	4,898	5,616	6,333

NET RETURNS PER ACRE ABOVE TOTAL COST FOR ALMONDS

PRICE \$/lb	YIELD (kernel lb/acre)						
	1,000	1,200	1,400	1,600	1,800	2,000	2,200
1.90	-1,078	-721	-363	-5	352	710	1,067
2.20	-778	-361	57	475	892	1,310	1,727
2.50	-478	-1	477	955	1,432	1,910	2,387
2.80	-178	359	897	1,435	1,972	2,510	3,047
3.10	122	719	1,317	1,915	2,512	3,110	3,707
3.40	422	1,079	1,737	2,395	3,052	3,710	4,367
3.70	-637	1,439	2,157	2,875	3,592	4,310	5,027

UC COOPERATIVE EXTENSION
Table 7. COSTS PER ACRE TO ESTABLISH COVER CROP
SAN JOAQUIN VALLEY - NORTH 2002

Operation	Operation Time (Hrs/A)	Cash and Labor Costs per acre					Total Cost	Your Cost
		Labor Cost	Fuel, Lube & Repairs	Material Cost	Custom/ Rent			
Planting:								
Disc 1X	0.43	7	3	0	0	11		
Disc & Roll	0.26	4	2	0	0	6		
Plant- Custom	0.00	0	0	46	6	52		
Roll	0.19	3	1	0	0	5		
Irrigate 2X	0.00	0	0	10	0	10		
TOTAL PLANTING COSTS	0.88	15	7	56	6	83		
Interest on operating capital @ 7.40%						6		
TOTAL OPERATING COSTS/ACRE		15	7	56	6	89		
CASH OVERHEAD:								
Property Taxes						1		
Property Insurance						0		
TOTAL CASH OVERHEAD COSTS						1		
TOTAL CASH COSTS/ACRE						90		

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	2.30	46	
Custom:					
Plant Cover Crop	1.00	acre	5.50	6	
Water:					
Water - Pumped	4.00	acin	2.41	10	
Labor (machine)	1.06	hrs	14.07	15	
Labor (non-machine)	0.00	hrs	0.00	0	
Fuel - Diesel	3.10	gal	1.26	4	
Lube				1	
Machinery repair				2	
Interest on operating capital				6	
TOTAL OPERATING COSTS/ACRE				89	
CASH OVERHEAD COSTS:					
Property Taxes				1	
Property Insurance				0	
TOTAL CASH OVERHEAD COSTS/ACRE				1	
TOTAL CASH COSTS/ACRE				90	

WHOLE FARM ANNUAL EQUIPMENT COSTS

ANNUAL EQUIPMENT COSTS for COVER CROP ESTABLISHMENT

Yr	Description	Price	Yrs Life	Salvage Value	Capital Recovery	Cash Overhead		Total
						Insur- ance	Taxes	
02	66 HP 2WD Tractor	29,708	20	3,812	2,578	111	168	2,856
02	Disc - Offset 8'	8,369	15	803	851	30	46	928
02	Ring Roller - 10'	1,893	10	335	237	7	11	256
	TOTAL	39,970		4,950	3,667	148	225	4,039
	60% of New Cost *	23,982		2,970	2,200	89	135	2,424

*Used to reflect a mix of new and used equipment