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UNIVERSITY OF CALIFORNIA COOPERATIVE EXTENSION

2002

SAMPLE COSTS TO ESTABLISH  
AN ALMOND ORCHARD AND PRODUCE

# ALMONDS



SAN JOAQUIN VALLEY NORTH  
FLOOD IRRIGATION

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**SAMPLE COST TO ESTABLISH an ALMOND ORCHARD  
and PRODUCE ALMONDS**

San Joaquin Valley North - 2002  
Flood Irrigation

**CONTENTS**

INTRODUCTION ..... 2  
ASSUMPTIONS..... 3  
    Establishment Operating Costs..... 3  
    Production Operating Costs ..... 5  
    Cash Overhead..... 8  
    Non-Cash Overhead..... 8  
REFERENCES..... 10  
Table 1. SAMPLE COSTS PER ACRE TO ESTABLISH AN ALMOND ORCHARD..... 11  
Table 2. COSTS PER ACRE TO PRODUCE ALMONDS ..... 13  
Table 3. COSTS AND RETURNS PER ACRE TO PRODUCE ALMONDS ..... 15  
Table 4. MONTHLY CASH COSTS – ALMONDS..... 17  
Table 5. WHOLE FARM EQUIPMENT, INVESTMENT, AND BUSINESS OVERHEAD COSTS ..... 18  
Table 6. HOURLY EQUIPMENT COSTS ..... 19  
Table 7. RANGING ANALYSIS ..... 20

**INTRODUCTION**

Sample costs to establish an almond orchard and produce almonds under flood irrigation in the Northern San Joaquin Valley are presented in this study. This study is intended as a guide only, and can be used in making production decisions, determining potential returns, preparing budgets and evaluating 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>.

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## ASSUMPTIONS

The assumptions refer to Tables 1 to 7 and pertain to sample costs to establish an orchard and produce almonds under flood irrigation in the Northern San Joaquin Valley. 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 be applicable 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 nor is any criticism implied by omission of other similar products.

**Land.** The farm consists of 100 contiguous acres farmed by the owner. Almonds are being established on 40 acres. A mature almond orchard covers 55 acres and roads, irrigation systems and farmstead occupy five acres.

### Establishment Operating Costs

**Trees.** No specific almond variety is planted in this study, but cultural practices are based on mid-season varieties. Almond orchards will include at least two or more varieties in which pollen shedding and bloom periods overlap to insure good pollination. Cultivars that might be planted in this region include: A) Early blooming Sonora; B) Mid-blooming Aldrich, Nonpareil, Carmel, Monterey, Price, and Fritz; C) Late blooming Mission, Padre, Livingston, and Butte. Planting densities may range from 75 to 180 trees per acre. In this study, 110 trees per acre are planted on a 22-foot X 18-foot spacing. The life of the orchard at the time of planting is estimated to be 25 years.

**Land Preparation.** This 40-acre orchard is established on land previously planted to an orchard. The land is assumed to be well drained and either a class I or II soil.

*Orchard Removal.* In this study the trees are pushed over and then chipped. The custom operator charges a fee ranging from \$40 per acre to \$100, plus he keeps and sells the wood. The grower then cleans up the orchard afterward for land preparation. Orchards that are pushed over and burned, cost about \$200 per acre, but less in clean up costs.

*Land Preparation.* The ground is disked twice, and then leveled. Normal laser leveling cost for orchards range around \$200 to \$250 per acre. Light leveling, moving a minimum of amount of dirt, cost about \$150 per acre. Depending on amount of dirt moved, leveling costs can exceed \$250 per acre. The ground is cross-rippled 24 to 36 inches deep to break up hardpan and pull up remaining tree roots. A custom operator fumigates the tree rows. The ground is disked and floated once after fumigation. Berms for the tree rows are made prior to planting. All operations that prepare the orchard for planting are done the year prior to planting, but costs are shown in the first year.

**Planting, Training, and Pruning.** Planting the orchard starts by surveying and marking tree sites. A custom backhoe operator digs the holes. A fumigation company fumigates the tree row. Then the trees are planted, pruned, painted, and a milk carton placed around the trunk. The milk cartons protect against above ground rodents, herbicide sprays, and sunburn. Contract labor companies who specialize in orchard planting do the planting operation. In the second year, two trees per acre are replanted. Pruning, training, and suckering begins the first year and labor time required for pruning increases in the subsequent years.

**Fertilization.** Leaf samples should be taken in July for nutrient analysis and fertilizers applied according to recommendations. Also, water analysis should be done periodically to determine nitrate availability. Fertilizer rates in this study are typical nutrient requirements, but do not take into account soil and water nitrogen. In the first and second year, equally split applications of N are made one-third in the spring (April), one third in early summer (June) and one-third in late summer (August). The fertilizer is spread near the base (ringed) of the tree. Beginning in the third year, the N as UN-32 is sprayed along the tree row and irrigated in. Potassium is applied along the tree row in the fall. Boron is applied with the shothole spray in the second year and during the following years, boron and zinc are applied as a foliar with the pink bud sprays. The boron can also be applied as a strip spray. Many orchards in northern San Joaquin Valley are boron deficient and additional boron may be required. Annual rates of N, K, and B used in this study are shown in Table A.

Table A. Establishment Years Applied Actual Nitrogen (N), Potassium (K), Boron (B)

Year	N	K	B/
	lb/acre		
1	20	0	0
2	40	0	2
3	80	80	2
4	120	120	2
5	160	160	2
6+	200	200	2

**Irrigation.** Water for irrigation is supplied by the water district and delivered to the orchard through an underground pipe and alfalfa valve system. In this study, water costs \$26.00 per acre. Because of the per acre water charge, the cost per acre-foot or inch will change each year according to the amount of water applied. Acre-inch cost in year one is \$2.60 (\$26/10 acin). Costs also vary among water districts and are considerably higher in some districts. No assumption is made about effective rainfall, evaporation, or runoff. The amount of irrigation water applied to the orchard is shown in Table B.

Table B. Applied Water

Year	AcIn/Yr
1	10
2	20
3	30
4+	40

**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*. Pesticides mentioned in the study are commonly used, but are not recommendations. Adjuvants or surfactants are recommended with many pesticides but are not included as a cost in this study.

**Weeds.** During the first year, the row middles are disked three times. A dormant strip spray (Gramoxone and Prowl) is applied in the winter. Beginning in year two, the row middles are mowed seven times. A dormant strip spray (Goal and Roundup) is applied to the tree row (25% acres) in the fall, or winter, and a spot spray (Gramoxone) in the spring or summer. A preharvest spray (Roundup) is applied starting in the third year to clean up the row middles prior to harvest.

**Insects.** In May of the first year, peach twig borer and mites are controlled with Lorsban and Omite. Beginning in the second year, a dormant spray (January or early February) with oil, an insecticide and fungicide (Dormant Oil, Lorsban, Kocide) controls peach twig borer (PTB), San Jose scale (SJS), bacterial blast, and brown almond and European red mites. Omite is applied in July for mite control. Beginning in July of the third

year, ant bait (Clinch) is sprinkled on the berms for ant control. Navel orange worms (NOW) and mites are treated in July (hull split spray) with Lorsban and Omite.

**Diseases.** In the second and following years, shot hole and scab are treated in March (petal fall) with Ziram. Beginning in the third year, brown rot is treated at pink bud with Rovral and Supreme Oil, and again at petal fall with Ziram and Abound. Sprays are usually applied with a handgun sprayer during the first two years and with an air blast sprayer, thereafter. Label rates are reduced during the first three years, because of the small tree size.

**Vertebrates.** Gophers can cause major losses to trees. Gophers are managed with the use of poison bait applied in the spring by a mechanical bait applicator. Ground squirrels are managed by late winter use of anti-coagulant bait in aboveground bait stations.

**Harvest.** Harvest starts in the third year using contract labor for hand harvest (poling). The nuts are moved to the centers by hand raking labor furnished by the grower. Mechanical harvesting and pickup by a custom operator begins in the fourth year.

Year	Kernel Pounds
3	300
4	800
5	1,600
6	1,800
7+	2,000

**Yields.** 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 Operating Costs

**Winter Sanitation.** Winter (January) sanitation destroys over wintering sites for navel orangeworm. 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 are custom hired. Hand polling 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.

**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.** Forty acre-inches of water are applied to the orchard -- thirty-seven acre-inches during the growing season and three acre-inches post harvest. No assumption is made about effective rainfall, evaporation, and runoff. Irrigation operations include water and labor costs. District water costs \$26 per acre for up to 3.5 acre-feet (42 acre-inches) and calculates to \$0.65 per acre-inch for 40 acre-inches. Water costs can vary greatly among districts. The water is gravity fed into an underground pipeline and alfalfa valve system for delivery to the orchard.

**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.** Tree nutrient status is determined by leaf analysis; sampling for analysis is done in June-July. Nitrogen at 200 pounds per acre per season as UN32 is sprayed along the tree row and irrigated in. Early season rates are higher than late season rates – 50% of the N is applied in April, 25% in June, 25% in August Potassium sulfate is fall banded along the tree row at 400 pounds of material or 200 pounds of K per acre. Boron at two pounds per acre or 9.80 pounds of material and zinc sulfate at five pounds per acre is foliar applied with an insecticide or fungicide spray at pink bud. Boron can also be applied to the soil surface alone or with an herbicide spray.

**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](http://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.

**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.

**Weeds.** A dormant strip spray of pre-emergent and contact herbicides (Goal, Roundup) to control weeds in the tree rows are applied after the first significant winter rain (January in this study). Weed control continues with a June post emergent spot spray (Gramoxone) on the berms and where needed to control perennial weeds on approximately 5% of the acres. Row middles are mowed seven times (February through August). A preharvest weed control spray (Roundup) is used to prepare the orchard floor for harvest.

**Insect and Mite.** A dormant spray (Asana, Dormant Oil, Kocide) in January or early February before bud swell controls peach twig borer, San Jose scale, and certain mite eggs. Ant bait (Clinch) is applied on the berms in July for ant control. At the beginning of hull split, a July spray mix (Lorsban/Omite) to control navel orange worm (NOW) and various mites is applied. NOW is also managed by early harvest and winter sanitation.

**Disease.** Brown rot is controlled with a pink bud spray in February with Rovral and 1% Supreme Oil and again in March at petal fall with Ziram and Abound. Shot hole and scab treatments with Ziram, are made at petal fall in mid-March

**Vertebrate Pest.** Gophers are managed with the use of poison bait applied in the spring using a mechanical applicator. Ground squirrels are managed by late winter fumigation and/or the use of anti-coagulant baits on above ground bait stations during the growing season when rodents accept grain.

**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.

For growers who own harvesting equipment, the equipment used for harvesting operations should be added to the equipment and investment inventories on Table 5 and custom harvest charges should be replaced in Harvest costs in Tables 1 and 2, with grower performed harvest costs.

**Yields and Returns.** Typical annual yields for almonds are measured in meat pounds per acre and are shown in Table C. An estimated price of a \$1.25 per pound of almonds is used in this study to determine potential profits/losses. Returns will vary depending upon the market. The yields and prices used in this cost study are estimated based on current markets.

**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 spot spraying, baiting ants and gophers and is included in those costs. Additional ATV use for checking the orchard, diseases and irrigation system is shown as a line item.

**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 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 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 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

(Tables 1-7)

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 units with washbasin, delivery and 4 months of weekly service.

**Managers Salary.** No salary is accounted for, the farm is owned and operated by the grower, therefore returns above cost are assumed to go to management (grower).

**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 Table 5.

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

*Interest Rate.* 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. It is used to reflect the long-term realized rate of return to these specialized resources that can only be used effectively in the agricultural sector. In other words, the next best alternative use for these resources is in 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 the third year represents the establishment cost. For this study the cost is \$3,857 per acre or \$154,280 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.

**Irrigation System.** The system consists of underground pipeline and alfalfa valves. Water flows from the district canals by gravity feed.

**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 including pruning equipment.

**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.

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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 - NORTH 2002

Year	Cost Per Acre						
	1st	2nd	3rd	4th	5th	6th	7th
Meat Pounds Per Acre			300	800	1,600	1,800	2,000
<b>Planting Costs:</b>							
Orchard Removal	100						
Orchard Removal Field Cleanup	102						
Land Preparation - Laser Level	200						
Land Preparation - Subsoil 2X	200						
Land Preparation - Disc 2X	11						
Land Preparation - Backhoe Tree Holes	203						
Land Preparation - Fumigate	650						
Land Preparation - Disc & Roll	6						
Land Preparation - Put Up Berms	3						
Survey and Plant Trees	116	3					
Trees: 110 Per Acre (1% Replant In 2nd Year)	528	10					
Paint And Put Trunk Guards Trees	37	1					
<b>TOTAL PLANTING COSTS</b>	<b>2,156</b>	<b>13</b>					
<b>Cultural Costs:</b>							
Training, Pruning, & Suckering	46	33	50	118	118	118	118
Prunings – Stack, Burn			18	24	24	24	24
Winter Sanitation:				114	114	114	114
Weed Control - Dormant Strip	16	45	45	45	45	45	45
Weed Control - Disc 3X Yr 1, Mow 7X Yr 2+	19	35	35	35	35	35	35
Weed Control - Spot Spray Tree Rows 1X		6	6	6	6	6	6
Weed Control - Preharvest Spray				15	15	15	15
Insect Control - Dormant		36	63	63	63	63	63
Insect Control - PTB/Mite Yr 1, Worms & Mites Yr 2+	25	25	57	75	75	75	75
Insect Control - Ants			5	5	5	5	5
Disease Control - Shot hole/Scab		20	20	34	34	34	34
Disease Control - Pinkbud-Brn Rot/Zn/B			34	32	32	32	32
Disease Control - Brown Rot			50	64	64	64	64
Vertebrate Control - Rodents	21	21	21	21	21	21	21
Fertilizer - Potassium			25	37	49	60	60
Fertilizer - Nitrogen	28	32	31	54	73	79	79
Irrigate 6X Yr 1, 7X Yr 2+	43	46	46	46	46	46	46
Pollination			45	90	113	113	113
Pickup Truck Use	75	75	75	75	75	75	75
ATV Truck Use	20	20	20	20	20	20	20
Leaf Analysis			2	2	2	2	2
<b>TOTAL CULTURAL COSTS</b>	<b>293</b>	<b>402</b>	<b>651</b>	<b>980</b>	<b>1,034</b>	<b>1,051</b>	<b>1,051</b>
<b>Harvest Costs:</b>							
Pole Trees (Hand Harvest)			25				
Shake Trees				70	70	70	70
Sweep Nuts				40	40	40	40
Hand Rake			25	2	2	2	2
Pick Up and Haul			15	40	80	90	100
Hull Nuts			18	48	96	108	120
<b>TOTAL HARVEST COSTS</b>			<b>83</b>	<b>200</b>	<b>288</b>	<b>310</b>	<b>332</b>

U.C. COOPERATIVE EXTENSION  
Table 1. continued

Year	Cost Per Acre						
	1st	2nd	3rd	4th	5th	6th	7th
Meat Pounds Per Acre			300	800	1,600	1,800	2,000
Interest On Operating Capital @ 7.40%	70	3	10	21	23	23	23
<b>TOTAL OPERATING COSTS/ACRE</b>	<b>2,519</b>	<b>419</b>	<b>745</b>	<b>1,201</b>	<b>1,345</b>	<b>1,384</b>	<b>1,420</b>
Cash Overhead Costs:							
Office Expense	40	40	40	40	40	40	40
Liability Insurance	5	5	5	5	5	5	5
Sanitation Fees	5	5	5	5	5	5	5
Property Taxes	104	104	104	104	104	104	104
Property Insurance	6	6	6	6	6	6	6
Investment Repairs	23	23	23	23	23	23	23
<b>TOTAL CASH OVERHEAD COSTS</b>	<b>183</b>	<b>183</b>	<b>183</b>	<b>183</b>	<b>183</b>	<b>183</b>	<b>183</b>
<b>TOTAL CASH COSTS/ACRE</b>	<b>2,702</b>	<b>602</b>	<b>928</b>	<b>1,384</b>	<b>1,528</b>	<b>1,567</b>	<b>1,603</b>
<b>INCOME/ACRE FROM PRODUCTION</b>			<b>375</b>	<b>1,000</b>	<b>2,000</b>	<b>2,250</b>	<b>2,500</b>
<b>NET CASH COSTS/ACRE FOR THE YEAR</b>	<b>2,702</b>	<b>602</b>	<b>553</b>	<b>384</b>			
<b>PROFIT/ACRE ABOVE CASH COSTS</b>					472	683	897
<b>ACCUMULATED NET CASH COSTS/ACRE</b>	<b>2,702</b>	<b>3,304</b>	<b>3,857</b>	<b>4,241</b>	<b>3,769</b>	<b>3,086</b>	<b>2,189</b>
Non-Cash Overhead Costs:							
Capital Recovery Cost:							
Shop Building	37	37	37	37	37	37	37
Land	607	607	607	607	607	607	607
Fuel Tanks	6	6	6	6	6	6	6
Shop Tools	12	12	12	12	12	12	15
Flood Irrigation System	36	36	36	36	36	36	36
Pruning Equipment	2	2	2	2	2	2	2
Equipment	56	50	64	65	65	65	65
<b>TOTAL NON-CASH OVERHEAD COST/ACRE</b>	<b>756</b>	<b>750</b>	<b>764</b>	<b>765</b>	<b>765</b>	<b>765</b>	<b>765</b>
<b>TOTAL COST/ACRE FOR THE YEAR</b>	<b>3,457</b>	<b>1,341</b>	<b>1,653</b>	<b>2,164</b>	<b>2,301</b>	<b>2,335</b>	<b>2,365</b>
<b>INCOME/ACRE FROM PRODUCTION</b>			<b>375</b>	<b>1,000</b>	<b>2,000</b>	<b>2,250</b>	<b>2,500</b>
<b>TOTAL NET COST/ACRE FOR THE YEAR</b>	<b>3,458</b>	<b>1,352</b>	<b>1,317</b>	<b>1,149</b>	<b>293</b>	<b>82</b>	
<b>NET PROFIT/ACRE ABOVE TOTAL COST</b>							<b>132</b>
<b>TOTAL ACCUMULATED NET COST/ACRE</b>	<b>3,458</b>	<b>4,810</b>	<b>6,127</b>	<b>7,276</b>	<b>7,569</b>	<b>7,651</b>	<b>7,519</b>

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

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: 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: Winter Strip	0.30	5	2	37	0	45		
Weed: Mow 7X	1.35	23	12	0	0	35		
Weed: Spot Spray	0.30	5	1	0	0	6		
Weed: Spray Orchard Floor	0.23	4	2	9	0	15		
Pest: Dormant	0.25	4	2	56	0	63		
Pest: Shot hole/Scab @ Petal Fall	0.25	4	2	27	0	34		
Pest/Fertilize: Brown Rot/Zn, B @ Pink bud	0.25	4	2	31	0	37		
Pest: Brown Rot @ Petal Fall	0.25	4	2	58	0	64		
Pest: NOW/Mite	0.25	4	2	68	0	75		
Pest: Ants	0.08	1	0	3	0	5		
Pest: Gopher & Squirrel	0.66	11	1	8	0	21		
Fertilize N - 200lb N/acre	0.69	12	5	63	0	79		
Fertilize: Potassium Sulfate	0.08	1	1	58	0	60		
Fertilize: Leaf Analysis	0.05	1	0	0	1	2		
Irrigate 7X	2.25	20	0	26	0	46		
Pollination	0.00	0	0	0	113	113		
Pickup Truck Ranch Use	3.33	56	18	0	0	75		
ATV: General Use	1.00	17	2	0	0	19		
Tree Replacement 1/acre/year	0.00	0	0	13	0	13		
<b>TOTAL CULTURAL COSTS</b>	<b>27.01</b>	<b>321</b>	<b>61</b>	<b>457</b>	<b>224</b>	<b>1,063</b>		
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	100	100		
Hull and Shell Nuts	0.00	0	0	0	120	120		
<b>TOTAL HARVEST COSTS</b>	<b>0.25</b>	<b>2</b>	<b>0</b>	<b>0</b>	<b>330</b>	<b>332</b>		
Interest on operating capital @ 7.40%							24	
<b>TOTAL OPERATING COSTS/ACRE</b>		<b>323</b>	<b>61</b>	<b>457</b>	<b>554</b>		<b>1,415</b>	
CASH OVERHEAD:								
Office Expense							40	
Liability Insurance							5	
Sanitation Fees							5	
Property Taxes							123	
Property Insurance							19	
Investment Repairs							23	
<b>TOTAL CASH OVERHEAD COSTS</b>							<b>214</b>	
<b>TOTAL CASH COSTS/ACRE</b>							<b>1,633</b>	

UC COOPERATIVE EXTENSION  
Table 2. Continued

Operation	Operatio Time (Hrs/A)	Cash and Labor Costs per acre		Total Cost	Your Cost
		Per producing Acre	Annual Cost Capital Recovery		
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	
Flood Irrigation System		516	36	36	
Pruning Equipment		14	2	2	
Orchard Establishment Costs		3,857	332	332	
Equipment		564	65	65	
<b>TOTAL NON-CASH OVERHEAD COSTS</b>		<b>15,025</b>	<b>1,098</b>	<b>1,098</b>	
<b>TOTAL COSTS/ACRE</b>				<b>2,731</b>	

UC COOPERATIVE EXTENSION  
**Table 3. 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
<b>GROSS RETURNS</b>					
Almonds	2,000.00	lb	1.25	2,500	
<b>OPERATING COSTS</b>					
<b>Custom:</b>					
Shake Trees (Harvest & Sanitation)	220.00	tree	0.64	140	
Sweep Nuts (Harvest & Sanitation)	2.00	acre	40.00	80	
Pickup Nuts	2,000.00	lb	0.04	80	
Haul Nuts	2,000.00	lb	0.01	20	
Hull & Shell Nuts	2,000.00	lb	0.06	120	
Leaf Analysis	1.00	acre	1.25	1	
<b>Contract:</b>					
Pollination Fee	2.50	hive	45.00	113	
<b>Herbicide:</b>					
Roundup Ultra	2.25	pint	7.25	16	
Goal 2 XL	2.00	pint	15.00	30	
Gramoxone Extra	0.10	pint	3.74	0	
<b>Insecticide:</b>					
Asana XL	14.00	floz	0.96	13	
Dormant Oil	6.00	gal	2.55	15	
Supreme Oil	1.00	gal	4.22	4	
Lorsban 4 E	4.00	pint	6.83	27	
Clinch	0.25	lb	12.79	3	
Omite 30 WP	8.00	lb	5.10	41	
<b>Fungicide:</b>					
Kocide 101	10.00	lb	2.75	28	
Ziram WDG 76	16.00	lb	3.39	54	
Rovral 4 Flowable	1.00	pint	17.23	17	
Abound	14.00	floz	2.17	30	
<b>Rodenticide:</b>					
Gopher Bait	1.50	lb	3.59	5	
Squirrel Bait	1.50	lb	1.82	3	
<b>Fertilizer:</b>					
Boron	9.80	Lb	0.64	6	
Neutral Zinc	5.00	lb	0.60	3	
UN-32	200.00	lb N	0.31	63	
Potassium Sulfate	400.00	Lb	0.15	58	
<b>Irrigation:</b>					
Water - District	40.00	acin	0.65	26	
<b>Tree Replant:</b>					
Backhoe Tree Hole	1.00	each	6.00	6	
Tree - Almond	1.00	each	4.80	5	
Mark, Stake & Dig	1.00	tree	2.25	2	
Tree Guards	1.00	each	0.07	0	
Paint Trees	1.00	tree	0.03	0	
Galltrol A	1.00	tree	0.05	0	
Labor (machine)	11.66	hrs	14.07	164	
Labor (non-machine)	17.55	hrs	9.05	159	
Fuel - Gas	10.43	gal	1.51	16	
Fuel - Diesel	15.06	gal	1.26	19	
Lube				5	
Machinery repair				20	
Interest on operating capital @ 7.40%				24	
<b>TOTAL OPERATING COSTS/ACRE</b>				<b>1,419</b>	
<b>NET RETURNS ABOVE OPERATING COSTS</b>				<b>1,081</b>	

## UC COOPERATIVE EXTENSION

Table 3. continued

	Quantity/ Acre	Unit	Price or Cost/Unit	Value or Cost/Acre	Your Cost
<b>CASH OVERHEAD COSTS:</b>					
Office Expense				40	
Liability Insurance				5	
Sanitation Fees				5	
Property Taxes				123	
Property Insurance				19	
Investment Repairs				23	
<b>TOTAL CASH OVERHEAD COSTS/ACRE</b>				<b>214</b>	
<b>TOTAL CASH COSTS/ACRE</b>				<b>1,633</b>	
<b>NON-CASH OVERHEAD COSTS (Capital Recovery)</b>					
Buildings				37	
Land				607	
Fuel Tanks 2-500g				6	
Shop Tools				12	
Flood Irrigation System				36	
Pruning Equipment				2	
Orchard Establishment				332	
Equipment				65	
<b>TOTAL NON-CASH OVERHEAD COSTS/ACRE</b>				<b>1,098</b>	
<b>TOTAL COSTS/ACRE</b>				<b>2,731</b>	
<b>NET RETURNS ABOVE TOTAL COSTS</b>				<b>-231</b>	



UC COOPERATIVE EXTENSION  
**Table 4. 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	
<b>Cultural:</b>													
Weed: Winter Strip Spray	45												45
Pest: Dormant	63												63
Tree Replacement 1/acre/ye		13											13
Pest/Fertilize: Brown Rot/Zn B @ Pink bud		37											37
Pollination		113											113
Pest: Shot hole/Scab @ Petal Fall			34										34
Pest: Brown Rot @ Petal Fall			64										64
Pest: Gopher & Squirrel			12					9					21
Fertilize N - 200lb N/acre				37		21		21					79
Weed: Mow 7X			5	5	5	5	5	5	5				35
Irrigate 7X			7	7	7	7	13	7					46
Weed: Spot Spray						6							6
Pest: Worm (NOW)/Mite							75						75
Pest: Ants							5						5
Fertilize: Leaf Analysis							2						2
Weed: Spray Orchard Middles								15					15
Fertilize: Potassium Sulfate										60			60
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
Pickup Truck Use	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	20
<b>TOTAL CULTURAL COSTS</b>	<b>115</b>	<b>171</b>	<b>129</b>	<b>56</b>	<b>20</b>	<b>47</b>	<b>108</b>	<b>65</b>	<b>13</b>	<b>68</b>	<b>8</b>	<b>264</b>	<b>1,063</b>
<b>Harvest:</b>													
Shake									70				70
Sweep									40				40
Hand Rake Nuts									2				2
Pickup and Haul Nuts									100				100
Hull and Shell Nuts									120				120
<b>TOTAL HARVEST COSTS</b>									<b>332</b>				<b>332</b>
Interest on operating capital	1	2	3	3	3	3	4	4	7	-2	-2	-2	24
<b>TOTAL OPERATING COSTS/ACRE</b>	<b>116</b>	<b>173</b>	<b>132</b>	<b>59</b>	<b>23</b>	<b>50</b>	<b>112</b>	<b>69</b>	<b>352</b>	<b>66</b>	<b>6</b>	<b>262</b>	<b>1,419</b>
<b>OVERHEAD:</b>													
Office Expense	3	3	3	3	3	3	3	3	3	3	3	3	40
Liability Insurance		5											5
Sanitation Fees	0	0	0	0	0	0	0	0	0	0	0	0	5
Property Taxes	61						61						123
Property Insurance	9						9						19
Investment Repairs	2	2	2	2	2	2	2	2	2	2	2	2	23
<b>TOTAL CASH OVERHEAD COSTS</b>	<b>76</b>	<b>11</b>	<b>6</b>	<b>6</b>	<b>6</b>	<b>6</b>	<b>76</b>	<b>6</b>	<b>6</b>	<b>6</b>	<b>6</b>	<b>6</b>	<b>214</b>
<b>TOTAL CASH COSTS/ACRE</b>	<b>192</b>	<b>183</b>	<b>137</b>	<b>65</b>	<b>28</b>	<b>56</b>	<b>188</b>	<b>75</b>	<b>357</b>	<b>72</b>	<b>12</b>	<b>267</b>	<b>1,633</b>

UC COOPERATIVE EXTENSION  
**Table 5. WHOLE FARM ANNUAL EQUIPMENT, INVESTMENT, AND BUSINESS OVERHEAD COSTS**  
 SAN JOAQUIN VALLEY - NORTH 2002

ANNUAL EQUIPMENT COSTS

Yr	Description	Price	Yrs Life	Salvage Value	Cash Overhead			Total
					Capital Recovery	Insur- ance	Taxes	
02	66 HP 2WD Tractor	29,708	20	3,812	2,578	111	168	2,856
02	ATV 4WD	7,430	10	1,314	931	29	44	1,004
02	Brush Rake - 10'	1,584	25	45	128	5	8	142
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	Orch.Sprayer 500 G	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
02	Spin/Spreader-Pull	10,593	10	1,873	1,328	41	62	1,431
02	Spot Sprayer 15 G	225	10	40	28	1	1	30
02	Weed Sprayer 100 G	3,550	10	628	445	14	21	480
<b>TOTAL</b>		<b>100,005</b>		<b>12,825</b>	<b>11,497</b>	<b>373</b>	<b>565</b>	<b>12,432</b>
60% of New Cost*		60,003		7,695	6,898	223	338	7,460

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

ANNUAL INVESTMENT COSTS

Description	Price	Yrs Life	Salvage Value	Cash Overhead				Total
				Capital Recovery	Insur- ance	Taxes	Repairs	
Orchard Establishment	154,280	22		13,273	509	771	0	14,553
Buildings	39,253	20		3,537	130	196	785	4,648
Flood Irrigation System	49,042	40		3,429	162	245	980	4,816
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
<b>TOTAL INVESTMENT</b>	<b>1,161,744</b>		<b>901,917</b>	<b>79,823</b>	<b>870</b>	<b>10,318</b>	<b>2,146</b>	<b>93,158</b>

ANNUAL BUSINESS OVERHEAD COSTS

Description	Units/ Farm	Unit	Price/ Unit	Total Cost
Liability Insurance	95	acre	5.31	504
Office Expense	95	acre	40.00	3,800
Sanitation Fees	95	acre	4.92	468

UC COOPERATIVE EXTENSION  
**Table 6. HOURLY EQUIPMENT COSTS**  
 SAN JOAQUIN VALLEY - NORTH 2002

Yr	Description	COSTS PER HOUR							Total Costs/Hr.
		Actual Hours Used	Cash Overhead			Operating			
			Capital Recovery	Insur- ance	Taxes	Repairs	Fuel & Lube	Total Oper.	
02	66 HP 2WD Tractor	438.80	3.52	0.15	0.23	1.19	4.63	5.82	9.73
02	ATV 4WD	263.00	2.13	0.07	0.10	0.89	1.74	2.63	4.92
02	Brush Rake - 10'	36.00	2.13	0.09	0.14	0.22	0.00	0.22	2.58
02	Front End Loader	36.00	8.23	0.29	0.44	0.68	0.00	0.68	9.65
02	Mower/Chopper - 8'	163.60	3.09	0.10	0.14	2.77	0.00	2.77	6.10
02	Orch.Sprayer 500 G	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
02	Spin/Spreader-Pull	9.10	87.75	2.72	4.12	4.06	0.00	4.06	98.64
02	Spot Sprayer 15 G	36.00	0.47	0.01	0.02	0.06	0.00	0.06	0.57
02	Weed Sprayer 100 G	129.00	2.07	0.06	0.10	0.95	0.00	0.95	3.18

UC COOPERATIVE EXTENSION  
**Table 7. RANGING ANALYSIS**  
 SAN JOAQUIN VALLEY - NORTH 2002

COSTS PER ACRE AT VARYING YIELDS TO PRODUCE ALMONDS

	YIELD (kernel lb/acre)						
	1,400	1,600	1,800	2,000	2,200	2,400	2,600
<b>OPERATING COSTS/ACRE:</b>							
Cultural Cost	1,063	1,063	1,063	1,063	1,063	1,063	1,063
Harvest Cost	266	288	310	332	354	377	399
Interest on operating capital	23	24	24	24	24	24	24
<b>TOTAL OPERATING COSTS/ACRE</b>	<b>1,352</b>	<b>1,374</b>	<b>1,397</b>	<b>1,419</b>	<b>1,441</b>	<b>1,464</b>	<b>1,486</b>
<b>TOTAL OPERATING COSTS/LB</b>	<b>0.97</b>	<b>0.86</b>	<b>0.78</b>	<b>0.71</b>	<b>0.66</b>	<b>0.61</b>	<b>0.57</b>
<b>CASH OVERHEAD COSTS/ACRE</b>	<b>214</b>	<b>214</b>	<b>214</b>	<b>214</b>	<b>214</b>	<b>214</b>	<b>214</b>
<b>TOTAL CASH COSTS/ACRE</b>	<b>1,566</b>	<b>1,589</b>	<b>1,611</b>	<b>1,633</b>	<b>1,656</b>	<b>1,678</b>	<b>1,700</b>
<b>TOTAL CASH COSTS/LB</b>	<b>1.12</b>	<b>0.99</b>	<b>0.89</b>	<b>0.82</b>	<b>0.75</b>	<b>0.70</b>	<b>0.65</b>
<b>NON-CASH OVERHEAD COSTS/ACRE</b>	<b>1,098</b>	<b>1,098</b>	<b>1,098</b>	<b>1,098</b>	<b>1,098</b>	<b>1,098</b>	<b>1,098</b>
<b>TOTAL COSTS/ACRE</b>	<b>2,664</b>	<b>2,686</b>	<b>2,709</b>	<b>2,731</b>	<b>2,753</b>	<b>2,776</b>	<b>2,798</b>
<b>TOTAL COSTS/LB</b>	<b>1.90</b>	<b>1.68</b>	<b>1.50</b>	<b>1.37</b>	<b>1.25</b>	<b>1.16</b>	<b>1.08</b>

NET RETURNS PER ACRE ABOVE OPERATING COSTS FOR ALMONDS

PRICE \$/lb	YIELD (kernel lb/acre)						
	1,400	1,600	1,800	2,000	2,200	2,400	2,600
0.80	-232	-94	43	181	319	456	594
0.95	-22	146	313	481	649	816	984
1.10	188	386	583	781	979	1,176	1,374
1.25	398	626	853	1,081	1,309	1,536	1,764
1.40	608	866	1,123	1,381	1,639	1,896	2,154
1.55	818	1,106	1,393	1,681	1,969	2,256	2,544
1.70	1,028	1,346	1,663	1,981	2,299	2,616	2,934

NET RETURN PER ACRE ABOVE CASH COST FOR ALMONDS

PRICE \$/lb	YIELD (kernel lb/acre)						
	1,400	1,600	1,800	2,000	2,200	2,400	2,600
0.80	-446	-309	-171	-33	104	242	380
0.95	-236	-69	99	267	434	602	770
1.10	-26	171	369	567	764	962	1,160
1.25	184	411	639	867	1,094	1,322	1,550
1.40	394	651	909	1,167	1,424	1,682	1,940
1.55	604	891	1,179	1,467	1,754	2,042	2,330
1.70	814	1,131	1,449	1,767	2,084	2,402	2,720

NET RETURNS PER ACRE ABOVE TOTAL COST FOR ALMONDS

PRICE \$/lb	YIELD (kernel lb/acre)						
	1,400	1,600	1,800	2,000	2,200	2,400	2,600
0.80	-1,544	-1,406	-1,269	-1,131	-993	-856	-718
0.95	-1,334	-1,166	-999	-831	-663	-496	-328
1.10	-1,124	-926	-729	-531	-333	-136	62
1.25	-914	-686	-459	-231	-3	224	452
1.40	-704	-446	-189	69	327	584	842
1.55	-494	-206	81	369	657	944	1,232
1.70	-637	34	351	669	987	1,304	1,622