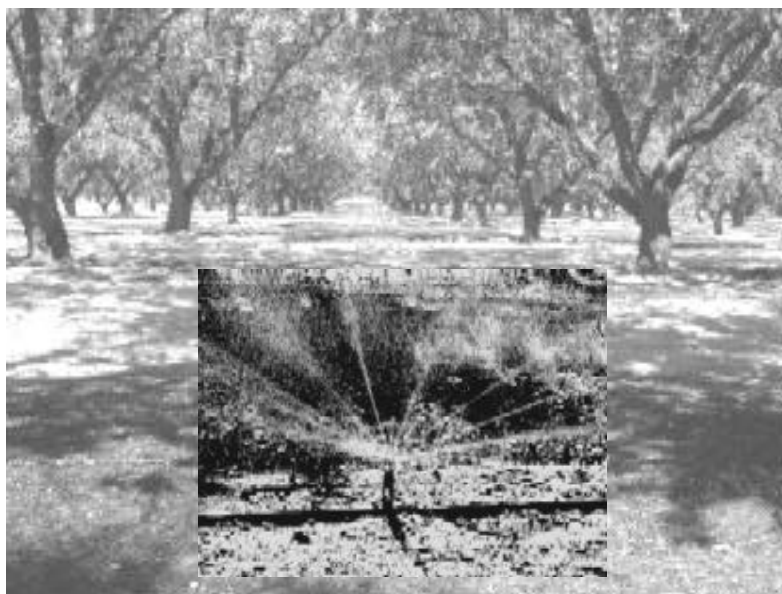

UNIVERSITY OF CALIFORNIA - COOPERATIVE EXTENSION

2002

SAMPLE COSTS TO ESTABLISH
AN ALMOND ORCHARD AND PRODUCE

ALMONDS



SAN JOAQUIN VALLEY NORTH
MICRO-SPRINKLER IRRIGATION

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UNIVERSITY OF CALIFORNIA COOPERATIVE EXTENSION

SAMPLE COST TO ESTABLISH an ALMOND ORCHARD and PRODUCE ALMONDS San Joaquin Valley North - 2002 Sprinkler Irrigation

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INTRODUCTION

Sample costs to establish an almond orchard and produce 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>.

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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 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 farmed by the owner. Almonds are being established on 40 acres. A Mature almond orchard is on 55 acres; road, irrigation systems and farmstead occupy 5 acres.

Establishment Operating Costs

Trees. No specific almond variety is planted in this study, but cultural practices are based on a mid-season variety. 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. The 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. Custom operators charge 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. 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. Holes are dug by a custom backhoe operator. A fumigation company fumigates the tree row. Contract labor companies who specialize in orchard planting do the planting operation. They plant, prune, paint the trees, and place a milk carton around the trunk. The milk cartons protect against above ground rodents, herbicide sprays, and sunburn. 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 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. Fertilizer rates in this study are typical nutrient requirements, but do not take into account soil and water nitrogen. In the first year, equally split applications of 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 hand applied near the base of the tree. Beginning in the second year, the N is applied monthly through the irrigation system. Potassium is applied along the tree row in the fall. Boron is applied with the shothole spray. In the third year Boron and Zinc are applied as a foliar with the pink bud sprays. Boron can also be applied as a strip spray alone or with an herbicide spray. Many orchards in the Northern San Joaquin Valley are boron deficient and additional boron may be required. Annual rates of actual 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 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. No assumption is made about effective rainfall. Frost protection begins in the fourth year and uses two acre-inches annually. The amount of water applied for irrigation 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.

Weeds. During the first year, the row middles are disked, floated and then mowed four times. A dormant strip spray (Goal and Prowl) is applied in the winter. Beginning in year two, the row middles are mowed seven times and a dormant strip spray (Goal and Roundup) is applied to the tree row (25% acres). A spot spray (Gramoxone) is done on the tree row in the spring or summer. A preharvest spray (Roundup) is applied starting in the third year to clean up the orchard floor for 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, Asana, Kocide) controls peach twig borer (PTB), San Jose scale (SJS), bacterial blast, and brown almond and European red mites. Also, in July of the second year, mites are controlled with an application of Omite. 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. Hand harvest starts in the third year using contract labor. The nuts are moved to the centers by hand raking. 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 and Returns. Almonds begin bearing an economic crop in the third year after planting. Typical annual yields for almonds are measured in meat (kernel) pounds per acre and are shown in Table C.

Production 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.

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-six 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. Nitrogen as UN-32 at 200 pounds per acre is applied monthly in equal amounts from April to August through the micro-sprinklers. Potassium is fall banded along the tree row at 400 pounds of material per acre. Boron (Solubor) and zinc (Neutral Zinc) is foliar applied with an insecticide or fungicide spray at pink bud. Boron can also be applied to the soil surface with an herbicide spray. 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 pesticides and rates mentioned in this cost study are listed in *UC Integrated Pest Management Guidelines, Almonds*. For more information on other pesticides available, pest identification, monitoring, and management visit the UC IPM website at www.ipm.ucdavis.edu. Cultural practices are discussed in the publications *Integrated Pest Management for Almonds* and *Almond Production Manual*. For information and pesticide use permits, contact the local county agricultural commissioner's office.

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 using pre-emergent and contact herbicides (Goal, Roundup) to control weeds in the tree rows is applied in December or January. In June, a post emergent spot spray (Gramoxone) is applied on the berms. Resident species are grown as a ground cover in the middles and 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 (Dormant Oil, Asana, Kocide) in January or early February before bud swell controls peach twig borer, San Jose scale, bacterial blast and brown almond and European red mites. Ant bait (Clinch) is applied on the berms in July for ant control. At the beginning of hull split in July, Lorsban and Omite are applied to control navel orangeworm (NOW) and various mites, respectively. NOW is also managed by early harvest and winter sanitation.

Disease. Brown rot is sprayed in February at pink bud with Rovral and 1% Supreme Oil. A second spray for brown rot is applied 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. Poison bait is applied in the spring by a mechanical applicator for gopher control. 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.

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 harvest costs.

Yields and Returns. Typical annual yields for almonds are measured in meat (kernel) pounds per acre and are shown in Table C. An estimated price of a \$1.25 per pound is used in this study to determine potential profits/losses. Returns will vary depending on the market. The yields and prices used in this cost study are estimates 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 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 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 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. 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 \$3,841 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.

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.

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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
Planting Costs:							
Orchard Removal	100						
Orchard Removal Field Cleanup	102						
Land Preparation - Subsoil 2X	200						
Land Preparation - Disc 2X	11						
Land Preparation - Backhoe Tree Holes	203						6
Land Preparation - Fumigate	650						
Land Preparation - Disc & Roll	6						
Land Preparation - Put Up Berms	3						
Survey and Plant Trees	116	3					2
Trees: 110 Per Acre (1% Replant In 2nd Year)	528	10					5
Paint And Put Trunk Guards Trees	37	1					
TOTAL PLANTING COSTS	1,956	13					13
Cultural Costs:							
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 – Disk/Mow	31	35	35	35	35	35	35
Weed Control - Spot Spray Tree Rows		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 - Ants			5	5	5	5	5
Insect Control - PTB/Mite Yr 1, Worms & Mites Yr 2+	25	28	57	75	75	75	75
Disease Control - Shot hole/Scab (Boron included Yr 2)		25	20	34	34	34	34
Disease Control - Pinkbud-Brn Rot/Zn/B			37	37	37	37	37
Disease Control - Brown Rot			50	64	64	64	64
Vertebrate Control – Rodents	21	21	21	21	21	21	21
Fertilizer – Nitrogen	28	13	25	38	56	63	63
Fertilizer – Potassium			25	37	49	60	60
Irrigate	26	50	74	98	98	98	98
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
TOTAL CULTURAL COSTS	288	387	673	1,016	1,069	1,087	1,088
Harvest Costs:							
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
TOTAL HARVEST COSTS			83	200	288	310	332

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%	61	3	11	22	24	24	24
TOTAL OPERATING COSTS/ACRE	2,305	403	767	1,238	1,381	1,421	1,457
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	115	115	115	115	115	115	115
Property Insurance	13	13	13	13	13	13	13
Investment Repairs	69	69	69	69	69	69	69
TOTAL CASH OVERHEAD COSTS	247	247	247	247	247	247	247
TOTAL CASH COSTS/ACRE	2,552	650	1,014	1,485	1,628	1,668	1,704
INCOME/ACRE FROM PRODUCTION			375	1,000	2,000	2,250	2,500
NET CASH COSTS/ACRE FOR THE YEAR	2,552	650	639	485			
PROFIT/ACRE ABOVE CASH COSTS					372	582	796
ACCUMULATED NET CASH COSTS/ACRE	2,552	3,202	3,841	4,326	3,954	3,372	2,576
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	12
Sprinkler Irrigation System	232	232	232	232	232	232	232
Pruning Equipment	2	2	2	2	2	2	2
Equipment	61	61	61	61	61	61	61
TOTAL NON-CASH OVERHEAD COST/ACRE	957	957	957	957	957	957	957
TOTAL COST/ACRE FOR THE YEAR	3,509	1,607	1,971	2,442	2,585	2,625	2,661
INCOME/ACRE FROM PRODUCTION			375	1,000	2,000	2,250	2,500
TOTAL NET COST/ACRE FOR THE YEAR	3,509	1,607	1,596	1,442	585	375	161
NET PROFIT/ACRE ABOVE TOTAL COST							0
TOTAL ACCUMULATED NET COST/ACRE	3,509	5,116	6,712	8,154	8,739	9,114	9,275

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		
Pollination	0.00	0	0	0	113	113		
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	0.00	0	0	63	0	63		
Fertilize: Potassium Sulfate	0.08	1	1	58	0	60		
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	24.46	292	56	533	224	1,105		
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		
TOTAL HARVEST COSTS	0.25	2	0	0	330	332		
Interest on operating capital @ 7.40%						24		
TOTAL OPERATING COSTS/ACRE		294	56	533	554	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						1,741		

UC COOPERATIVE EXTENSION
Table 2. Continued

Operation	Operation	Cash and Labor Costs per acre		Total Cost	Your Cost
	Time (Hrs/A)	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	
Sprinkler Irrigation System		2,850	232	232	
Pruning Equipment		14	2	2	
Orchard Establishment Costs Equipment		3,841 536	330 61	330 61	
TOTAL NON-CASH OVERHEAD COSTS		17,316	1,287	1,287	
TOTAL COSTS/ACRE				3,028	

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
GROSS RETURNS					
Almonds	2,000.00	lb	1.25	2,500	
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	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	
Contract:					
Pollination Fee	2.50	hive	45.00	113	
Herbicide:					
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	
Insecticide:					
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	
Fungicide:					
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	
Rodenticide:					
Gopher Bait	1.50	lb	3.59	5	
Squirrel Bait	1.50	lb	1.82	3	
Fertilizer:					
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	
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	
Labor (machine)	10.83	hrs	14.07	152	
Labor (non-machine)	15.69	hrs	9.05	142	
Fuel - Gas	10.64	gal	1.51	16	
Fuel - Diesel	12.63	gal	1.26	16	
Lube				5	
Machinery repair				19	
Interest on operating capital @ 7.40%				24	
TOTAL OPERATING COSTS/ACRE				1,461	
NET RETURNS ABOVE OPERATING COSTS				1,039	

UC COOPERATIVE EXTENSION

Table 3. 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	
Equipment				61	
TOTAL NON-CASH OVERHEAD COSTS/ACRE				1,287	
TOTAL COSTS/ACRE				3,028	
NET RETURNS ABOVE TOTAL COSTS				-528	

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	
Cultural:													
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				13	13	13	13	13					63
Weed: Mow 7X			5	5	5	5	5	5	5				35
Irrigate – Frost Protection		5											5
Irrigate 7X			4	8	13	22	25	20	8				99
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	19
TOTAL CULTURAL COSTS	115	176	126	33	39	54	132	69	20	68	8	264	1,105
Harvest:													
Shake									70				70
Sweep									40				40
Hand Rake Nuts									2				2
Pickup and Haul Nuts									100				100
Hull and Shell Nuts									120				120
TOTAL HARVEST COSTS									332				332
Interest on operating capital	1	2	3	3	3	3	4	5	7	-2	-2	-2	24
TOTAL OPERATING COSTS/ACRE	116	178	129	36	42	57	136	74	359	66	6	262	1,461
OVERHEAD:													
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	67							67					134
Property Insurance	13							13					26
Investment Repairs	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	279
TOTAL CASH COSTS/ACRE	210	192	138	45	51	66	226	83	369	75	15	271	1,741

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	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	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	20	552	940	37	56	1,033
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
TOTAL		100,005		11,504	11,108	368	558	12,034
60% of New Cost*		60,003		6,902	6,665	221	335	7,220

*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	769	0	14,493
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	1,226,062		901,917	85,607	1,082	10,640	3,446	100,776

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 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	408.30	3.79	0.16	0.25	1.19	4.63	5.82	10.02
02	ATV 4WD	263.00	2.13	0.07	0.10	0.89	1.74	2.17	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	62.13	2.43	3.68	3.88	0.00	3.88	72.12
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	101.20	2.64	0.08	0.12	0.95	0.00	0.95	3.79

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
OPERATING COSTS/ACRE:							
Cultural Cost	1,105	1,105	1,105	1,105	1,105	1,105	1,105
Harvest Cost	266	288	310	332	354	377	399
Interest on operating capital	24	24	24	24	25	25	25
TOTAL OPERATING COSTS/ACRE	1,394	1,417	1,439	1,461	1,484	1,506	1,528
TOTAL OPERATING COSTS/LB	1.00	0.89	0.89	0.73	0.67	0.63	0.59
CASH OVERHEAD COSTS/ACRE	283	283	283	283	283	283	283
TOTAL CASH COSTS/ACRE	279	279	279	279	279	279	279
TOTAL CASH COSTS/LB	1,673	1,696	1,718	1,741	1,763	1,785	1,808
NON-CASH OVERHEAD COSTS/ACRE	1.20	1.06	0.96	0.87	0.80	0.75	0.70
TOTAL COSTS/ACRE	1,287	1,287	1,287	1,287	1,287	1,287	1,287
TOTAL COSTS/LB	2,961	2,983	3,005	3,028	3,050	3,072	3,095

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	-274	-137	1	139	276	414	552
0.95	-64	103	271	439	606	774	942
1.10	146	343	541	739	936	1,134	1,332
1.25	356	583	811	1,039	1,266	1,494	1,722
1.40	566	823	1,081	1,339	1,596	1,854	2,112
1.55	776	1,063	1,351	1,639	1,926	2,214	2,502
1.70	986	1,303	1,621	1,939	2,256	2,574	2,892

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	-553	-416	-278	-141	-3	135	272
0.95	-343	-176	-8	159	327	495	662
1.10	-133	64	262	459	657	855	1,052
1.25	77	304	532	759	987	1,215	1,442
1.40	287	544	802	1,059	1,317	1,575	1,832
1.55	497	784	1,072	1,359	1,647	1,935	2,222
1.70	707	1,024	1,342	1,659	1,977	2,295	2,612

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	-1,841	-1,703	-1,565	-1,428	-1,290	-1,152	-1,015
0.95	-1,631	-1,463	-1,295	-1,128	-960	-792	-625
1.10	-1,421	-1,223	-1,025	-828	-630	-432	-235
1.25	-1,211	-983	-755	-528	-300	-72	155
1.40	-1,001	-743	-485	-228	30	288	545
1.55	-791	-503	-215	72	360	648	935
1.70	-637	-263	55	372	690	1,008	1,325