

**1988 SAMPLE COSTS TO ESTABLISH & PRODUCE
ALMONDS ON CLASS I SOIL
IN THE
SACRAMENTO VALLEY**



by

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Bill Krueger, Glenn County Farm Advisor
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and
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UC Cooperative Extension

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This cost study provides detailed information on the sample costs of establishing and producing almonds in the Sacramento Valley on Class I soil. Costs are projected for a hypothetical 100 acre orchard on 105 acres of land. The 5 non-producing acres are for buildings, roads, ditches, burn area, etc.

This study is one of two which describe the typical costs of growing almonds on Class I and Class II soil. Each includes a Cost of Establishment Worksheet, a Cost of Production Worksheet, Monthly Summary of Sample Costs, Equipment List, and Ranging Analysis. A single list of assumptions is also included with each study. The variability in costs between Class I and Class II soils tends to represent the differences in pests, water, diseases, and soil conditions between Butte County (Class I) and western Colusa, Glenn and Tehama Counties (Class II). Costs given in this sample study are for those of a typical well-managed full bearing orchard and are not intended to reflect an average of all orchards in the Sacramento Valley.

Practices listed are based on those production procedures considered typical for this crop and area. Sample costs given for labor, materials, equipment and contract services are based on 1988 figures. Some costs or practices listed in this study may not be applicable to your situation. Production costs for almonds can vary based on a number of factors including age of orchard, spacing of trees, type of irrigation system, annual variations in pest pressure and differing management practices. This study is intended only as a guide and can be used as an aid in making production decisions, determining potential returns, preparing budgets and evaluating production loans. A blank "Your Costs" column is provided on the Cost of Production Worksheets to enter your actual costs.

For explanation of calculations used for the study refer to the attached List of Assumptions, call Agricultural Economics Extension, University of California, Davis, California (916) 752-2745, or contact the Farm Advisor in your county.

ASSUMPTIONS FOR ESTABLISHING AND PRODUCING ALMONDS

ON CLASS I AND CLASS II SOILS

Sacramento Valley - 1988

The following list contains a description of some general assumptions pertaining to the sample costs of establishing and producing almonds in the Sacramento Valley. The establishment assumptions apply to current sample costs for establishing a new orchard. The production assumptions apply to typical sample costs for a well managed, 12 year old almond orchard in full production.

A. ESTABLISHMENT ASSUMPTIONS ONLY

1. Land and trees for establishing a new almond orchard:

Bare land value - Class I soil	\$2,500/acre
(105 acres) - Class II soil	\$1,500/acre
Trees:	
Class I soil - 75 Trees/acre - 24' square or 26' diamond.	
Class II soil - 90 Trees/acre 22' X 22' spacing.	

2. Establishment costs could be adjusted for a bean intercrop during the first two years and mowed centers starting in the third year on Class soil.

B. ESTABLISHMENT AND PRODUCTION ASSUMPTIONS

1. Land and trees for 12 year old orchard:

Bare land value (105 acres):	
Class I Soil -	\$1,905/acre
Class II Soil -	\$ 950/acre
Establishment costs:	
Class I Soil -	\$3,500/acre
Class II Soil -	\$3,500/acre

Since only 100 of the 105 total acres are in production, the land value per acre needs to be adjusted to \$2000 per producing acre for Class I and \$1000 per producing acre for Class II soil. Investment costs for land and trees reflect actual cost incurred at time of planting. The annual costs for depreciation are obtained by dividing the initial establishment costs by 30 years. Land is not depreciated. Interest on the investment in land and trees is calculated by multiplying the interest rate (11%) by the average value of land and trees. The average value of the trees is estimated to be one-half of the establishment costs.

2. Labor rates: (include 27% for SDI, FICA, insurance, and other benefits)

Skilled labor (machinery operators):	\$7.25/hr
Field labor (irrigators & misc. labor):	\$5.40/hr

Class II soil -

Irrigation system - Drip.

25 hp pump - continuous irrigation - 36.00 acre inches/year.

Electricity costs @ 50% plant efficiency = \$17.00/acre-foot.

12. Harvest costs include ownership costs for shaking and harvesting and custom rates for hauling and hulling.
13. Interest on operating capital is based on cultural costs and assumes a 9 month loan at 11%.
14. Fertilizer program:
Broadcast Nitrogen on Class I soil.
Nitrogen applied under the drip system on Class II soil.
Fertilize with potassium sulfate (K₂SO₄) in the fall as needed.
With zinc deficiency apply zinc sulfate spray in fall.
15. Orchard floor management:
Class I soil -
Centers are mowed for weed control seven times, pre-emergent and post-emergent strip spray is applied in fall after harvest, spot treatment with post-emergence herbicide in the growing season.
Middles are sprayed in July for harvest preparation.

Class II soil -
Centers are mowed for weed control five times, pre-emergent and post-emergent strip spray is applied in fall after harvest, spot treatment with post-emergence herbicide in the growing season.
16. Insect and disease control:
Insect spray could cover navel orange worm, peach twig borer or mites. Disease sprays are for Brown rot and shothole.
17. Winter sanitation is performed with shaker or hand pole.

SAMPLE COSTS TO ESTABLISH SPRINKLER IRRIGATED ALMOND ORCHARD
Class I Soil - Sacramento Valley - 1988

Skilled labor: \$7.25 per hour
Field labor: \$5.40 per hour

Interest rate: 11.0%
75 Trees per acre, 24' square or 26' diamond.

YEAR	Costs per Acre					
	1st	2nd	3rd	4th	5th	6th
YIELD (Heat lbs/acre)				400	800	1,600
Planting costs						
Ripping	90					
Root removal and land preparation	95					
Layout, plant, and protect trees	94					
Trees - 75 @ \$3.25	244					
TOTAL PLANTING COSTS	\$523					
Cultural costs:						
Training and pruning	\$7	\$12	\$25	\$25	\$25	\$20
Brush removal	0	5	10	10	15	20
Mow	0	0	15	23	23	23
Irrigation	72	72	72	81	81	81
Fertilizer applied	8	10	13	21	35	49
Weed spray - middles	0	0	0	0	8	8
Weed spray - pre-emerg/contact	16	37	37	37	37	37
Dormant spray	0	15	20	28	28	28
Fungicide 3X	0	0	0	31	62	93
Insect spray	12	12	0	0	0	50
Replants	0	10	5	0	0	0
Bees, 2.5 hives/acre @ \$24	0	0	0	12	24	48
Miscellaneous	24	24	24	24	24	24
Pick-up truck costs	15	15	15	15	15	15
TOTAL CULTURAL COSTS	\$154	\$212	\$236	\$307	\$377	\$496
Harvesting Costs:						
Shake				30	30	30
Sweep				15	17	17
Hand rake				5	5	10
Pick up and haul				20	25	34
Hull				16	32	64
TOTAL HARVEST COSTS				\$86	\$109	\$155
Overhead Costs:						
Office and business costs	60	60	60	60	60	60
County Taxes	37	37	37	37	45	48
Insurance	9	9	9	9	9	9
TOTAL OVERHEAD COSTS	\$106	\$106	\$106	\$106	\$114	\$117
TOTAL CASH COSTS	\$783	\$318	\$343	\$499	\$600	\$768
ACCUMULATED CASH COSTS	\$783	\$1,101	\$1,443	\$1,942	\$2,542	\$3,310

YEAR	Costs per Acre					
	1st	2nd	3rd	4th	5th	6th
Depreciation:						
Building & equipment	206	206	206	206	206	206
TOTAL DEPRECIATION	\$206	\$206	\$206	\$206	\$206	\$206
Interest on Investment at 11%						
Building & equipment	131	131	131	131	131	131
Land \$2500/acre	275	275	275	275	275	275
Interest on accumulated cash costs	86	121	159	214	280	364
TOTAL INTEREST ON INVESTMENT	\$492	\$527	\$565	\$620	\$686	\$770
TOTAL COST FOR THE YEAR	\$1,481	\$1,051	\$1,113	\$1,325	\$1,491	\$1,744
CREDIT FROM HARVEST @ \$1.00/POUND				\$400	\$800	\$1,600
NET COST FOR THE YEAR	\$1,481	\$1,051	\$1,113	\$925	\$691	\$144
TOTAL ACCUMULATED NET COST	\$1,481	\$2,532	\$3,645	\$4,570	\$5,261	\$5,405

SAMPLE COSTS TO PRODUCE ALMONDS - CLASS I SOILS
Sacramento Valley - 1988

Labor Rate: \$7.25/hr. skilled labor Interest Rate: 11%
\$5.40/hr. field labor Yield (meat lbs/acre): 2,000

Operation	Tractor/ Implement		Hours	Cash and Labor Costs per Acre					Total Cost	Your Cost
	No.	No.		Labor Cost/A	Fuel & Repairs	Material Cost	Custom /Rent			
Pruning - 75 Trees/acre	8		11.0	\$59.40				\$59		
Stack brush			4.0	21.60				22		
Buck brush	1	6	.3	1.99	1.76			4		
Tree replacement			.3	1.35		\$3.40		5		
Fertilize (2 X 150# N)	2		.4	3.19	1.12	57.00	\$4.00	65		
Irrigation (7 X 4")	10	11	1.0	5.40	2.00	58.33		66		
Irrig. - frost protection	10	11	.5	2.70	8.00	4.17		15		
Now 7X	1	5	1.4	11.17	12.20			23		
Weed spray - middles	7		.2	1.60	.24	6.00		8		
Weed spray-pre-emer/contact	2	3	.8	5.98	3.82	27.00		37		
Dormant spray	2	4	.4	3.19	8.76	16.38		28		
Fungicide 3X	2	4	1.2	9.57	26.29	57.00		93		
Insect spray	2	4	.4	3.19	8.76	38.00		50		
Winter sanitation	12		1.0	7.98	22.11			30		
Bees (2.5 hives/acre)							60.00	60		
Miscellaneous			2.0	10.80		13.36		24		
Costs for pick up truck					15.00			15		
Interest on operating capital @ 11%								28		
TOTAL CULTURAL COSTS			25	\$149	\$110	\$281	\$64	\$632		
Shake	12		1.0	7.98	22.11			\$30		
Sweep	13		1.0	7.98	9.45			17		
Hand rake and pole			3.0	16.20				16		
Pick up and haul	14		1.0	7.98	8.47		22	39		
Hull							80	80		
TOTAL HARVEST COSTS			6.0		\$40		\$102	\$182		
Office and business costs								\$60		
County Taxes								49		
Equipment Insurance								9		
TOTAL CASH OVERHEAD COSTS								\$119		
TOTAL CASH COSTS								\$933		
TOTAL CASH COST/MEAT LB: 2000 meat lbs/acre								\$4.7		
Investment	Per production		Annual Cost							
	Acres		Depreciation	Interest @ 11%						
Land @ \$1,905/acre (bare)	\$2,000			\$220	\$220					
Equipment & buildings	2,345		\$205	129	334					
Trees (30 yr. depreciation)	3,500		117	193	309					
TOTAL INVESTMENT COSTS			\$7,845	\$322	\$541	\$863				
TOTAL COSTS PER ACRE								\$1,796		
TOTAL COST/MEAT LB: 2000 meat lbs/acre								\$4.90		

MONTHLY SUMMARY OF
SAMPLE COSTS TO PRODUCE ALMONDS ON CLASS I SOIL

Sacramento Valley - 1988

Operation	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	TOTAL
Pruning - 75 Trees/ac											29.7	29.7	\$59
Stack brush							4.3					17.3	22
Buck brush							.8					3.0	4
Tree replacement		2.4									2.4		5
Fertilize (2 X 150# N)		32.7					32.7						65
Irrigation (7 X 4")					9.4	18.8	18.8	18.8					66
Irrig. - frost prot.		7.4	3.7	3.7									15
Mow 7X		3.3	3.3	3.3	6.7	3.3		3.3					23
Weed spray - middles							7.8						8
Weed spray 2X						11.0					25.8		37
Dormant spray	28.3												28
Fungicide 3X		31.0	31.0	31.0									93
Insect spray							50.0						50
Winter sanitation	30.1												30
Bees (2.5 hives/acre)		30.0	30.0										60
Miscellaneous	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	24
Costs - pick up truck	1.3	1.3	1.3	1.3	1.3	1.3	1.3	1.3	1.3	1.3	1.3	1.3	15
Int.operating capital	.6	1.6	2.2	2.6	2.8	3.2	4.3	5.1	6.0				28
TOTAL CULTURAL COSTS	\$62	\$112	\$74	\$44	\$22	\$40	\$122	\$30	\$9	\$3	\$61	\$53	\$632
Shake								15.0	15.0				30
Sweep								8.7	8.7				17
Hand rake and pole								8.1	8.1				16
Pick up and haul								19.3	19.3				39
Kull									40.0	40.0			80
TOTAL HARVEST COSTS								\$51	\$91	\$40			\$182
Office and business	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	60
County Taxes				24.6								24.6	49
Equipment Insurance	9.4												9
TOTAL CASH OVERHEAD	\$14	\$5	\$5	\$30	\$5	\$5	\$5	\$5	\$5	\$5	\$5	\$30	\$119
TOTAL CASH COSTS	\$77	\$117	\$79	\$74	\$27	\$45	\$127	\$87	\$105	\$48	\$66	\$83	\$933

**EQUIPMENT AND BUILDING LIST FOR ALMONDS ON CLASS I SOIL
Sacramento Valley - 1988**

Interest Rate: 11%

Fuel Cost per Gallon \$.65 diesel
\$.75 unleaded

ITEM #	DESCRIPTION	NEW COST	ANNUAL USE (ACRES)	COST PER ACRE	LIFE (HRS)	YEARS TO TRADE	----OVERHEAD*----		TAR*	--- HOURLY COSTS ---		
							DEPREC-	INTEREST*		FUEL*	REPAIRS*	TOTAL
Tractors:												
1	60 HP wheel diesel	\$22,000	100	\$220	12,000	10	22	\$12.10	120%	3	2	\$4.81
2	30 HP wheel diesel	15,000	100	150	12,000	10	15.00	8.25	120	1.31	1.50	2.81
3	Weed sprayer, P.T.O.	2,750	100	28	1,200	10	2.75	1.51	100		2.29	2.29
4	Orchard sprayer, 500 gal.	38,000	100	380	2,000	10	38.00	20.90	80	3.90	15.20	19.10
5	Flail mower, 10 foot	6,500	100	65	2,000	10	6.50	3.58	120		3.90	3.90
6	Buck Rake/Front end loader	5,600	100	56	2,500	10	5.60	3.08	100		2.24	2.24
7	4 wheel ATV & sprayer	6,000	100	60	3,000	5	12.00	3.30	60		1.20	1.20
8	Pruning equipment	1,200	100	12		10	1.20	.66	100			
9	Pick-up truck, 1/2 ton	14,000	100	140	2,000	5	28.00	7.70	60		4.20	4.20
10	Solid set sprinkler sys.	103,000	100	1,030	27,000	15	68.67	56.65	10		.38	.38
11	2 Irrigation pumps (100hp)	35,000	100	350	35,000	20	17.50	19.25	5		.05	.05
12	Shaker	63,000	100	630	2,500	10	63.00	34.65	80	1.95	20.16	22.11
13	Sweeper	18,000	100	180	2,500	10	18.00	9.90	100	2.25	7.20	9.45
14	Pick-up machine/4 carts	22,400	100	224	2,500	10	22.40	12.32	80	1.30	7.17	8.47
15	Offset disc, 12'	6,833	100	68	2,500	10	6.83	3.76	120		3.28	3.28
	Buildings	25,000	100	250		35	7.14	13.75				
	Miscellaneous shop tools	6,000	100	60		10	6.00	3.30				
	Thermometers & frost alarms	500	100	5		5	1.00	.28				
TOTAL COST		\$390,783		\$3,908				\$342	\$215			
60% OF NEW COSTS*		\$234,470		\$2,345				\$205	\$129			

*** DEFINITIONS:**

YEARS TO TRADE----- The projected life of the machine in years adjusted for excessive annual use.
OVERHEAD ----- Per acre per year.
DEPRECIATION ----- "COST PER ACRE" divided by "YEARS TO TRADE"
INTEREST----- ("COST PER ACRE" X "INTEREST RATE") divided by 2 = average interest cost per acre per year.
TAR----- Total accumulated repairs. The total cost of repairs during the machine's life expressed as a percent of "NEW COST". Calculated from equations based on equipment type and annual use.
HOURLY COST OF FUEL----- Diesel fuel, oil and lube costs per hour = HP x cost of diesel fuel/gal X 0.0667.
Gasoline fuel, oil and lube costs per hour = HP x cost of gasoline/gal X 0.0889.
HOURLY COST OF REPAIRS-- ("NEW COST" X "TAR") divided by ("LIFE IN HOURS").
60% OF NEW COSTS ----- Used to reflect a mix of new and used equipment.

COST TO PRODUCE ALMONDS ON CLASS I SOIL AT VARYING PRICES AND YIELDS

	YIELD (Pounds/acre)					
	500	1000	1500	2000	2500	3000
Cultural Costs	632	632	632	632	632	632
Harvest Costs	106	131	157	182	208	233
Cash Overhead	119	119	119	119	119	119
Cash cost/acre	857	882	908	933	959	984
Cash cost/lb	1.71	.88	.61	.47	.38	.33
Investment cost	863	863	863	863	863	863
TOTAL COST/ACRE	1,720	1,745	1,771	1,796	1,822	1,847
TOTAL COST/LB	3.44	1.75	1.18	.90	.73	.62

PER ACRE INCOME ABOVE CASH COSTS AT VARYING PRICES AND YIELDS

\$ per Meat Pound	YIELD (Meat Pounds/acre)					
	500	1000	1500	2000	2500	3000
.60	-557	-282	-8	267	541	816
.80	-457	-82	292	667	1,041	1,416
1.00	-357	118	592	1,067	1,541	2,016
1.20	-257	318	892	1,467	2,041	2,616
1.40	-157	518	1,192	1,867	2,541	3,216
1.60	-57	718	1,492	2,267	3,041	3,816
1.80	43	918	1,792	2,667	3,541	4,416

PER ACRE INCOME ABOVE TOTAL COSTS AT VARYING PRICES AND YIELDS

\$ per Meat Pound	YIELD (Meat Pounds/acre)					
	500	1000	1500	2000	2500	3000
.60	-1,420	-1,145	-871	-596	-322	-47
.80	-1,320	-945	-571	-196	178	553
1.00	-1,220	-745	-271	204	678	1,153
1.20	-1,120	-545	29	604	1,178	1,753
1.40	-1,020	-345	329	1,004	1,678	2,353
1.60	-920	-145	629	1,404	2,178	2,953
1.80	-820	55	929	1,804	2,678	3,553

SEASON-AVERAGE GROWER PRICES FOR ALMONDS (Shelled basis), 1978 - 1987

YEAR	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987
AVERAGE PRICE (\$/POUND)	1.45	1.53	1.47	.78	.94	1.04	.77	.80	1.92	.95

Source: Non-Citrus Fruits and Nuts Summary, NASS, USDA