1991
SAMPLE COSTS TO ESTABLISH AND PRODUCE PISTACHIOS IN THE SOUTHERN SAN JOAQUIN VALLEY

by

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The detailed costs for establishing and producing pistachio in the Southern San Joaquin Valley are presented in this study. The hypothetical farm used in this report consists of 50 acres of pistachios. The 50 acres includes 47.5 acres of producing acres and another 2.5 acres of roads, ditches and farmstead.

Practices described are based on those establishment and production procedures considered typical for this crop and area. Sample costs given for labor, materials, equipment and contract services are based on current figures. Some costs and practices detailed in this study may not be applicable to your situation. This study is only intended as a guide and can be used in making production decisions, determining potential returns, preparing budgets and evaluating production loans. A blank ***Your Costs*** column is provided to enter your actual costs on **Table 2, Sample Costs To Produce Pistachios.**

This study consists of **General Assumptions for Establishing and Producing Pistachios** and seven tables.

Table 1. **Sample Costs to Establish Pistachio Orchard**
Table 2. **Sample Costs to Produce Pistachios.**
Table 3. **Monthly Summary of Per Acre Cash Costs to Produce Pistachios.**
Table 4. **Equipment and Buildings List for Pistachios.**
Table 5. **Cost to Produce Pistachios at Varying Prices and Yield.**
Table 6. **Per Acre Income Above Cash Costs at Varying Prices and Yields.**
Table 7. **Per Acre Income Above Total Cost at Varying Prices and Yields.**

For an explanation of calculations used for the study refer to the attached **General Assumptions** or call the Department of Agricultural Economics, Cooperative Extension, University of California, Davis, California, (916) 752-3589 or call the farm advisor in the county of interest.

GENERAL ASSUMPTIONS TO ESTABLISH AND PRODUCE PISTACHIOS

Southern San Joaquin Valley - 1991
U.C. Cooperative Extension

The following is a description of the general assumptions used to generate sample costs of establishment and production for pistachios in the Southern San Joaquin Valley.

1. LAND:

Land is valued at $4,000 per acre. There are 50 acres allocated to the pistachio orchard operation, 47.5 acres of planted orchard and 2.5 acres of roads and farmstead. This increases the cost of land to $4,211 per producing acre. Land is not depreciated.

2. TREES:

Trees are planted at 18' X 21' spacings, with 115 trees per acre. To maximize production, pistachio trees need to be planted in the correct ratio of male trees to female trees. This study uses a ratio of 1 male tree to 8 female trees. Fruit wood can be budded to several rootstock varieties. *Pisticia integerrima* or its hybrids are used in this study and are budded during the first year between early July and early September. Failures are estimated to be 10% and are rebudded as soon as bud wood is available in the second year. In the 3rd season an estimated 2% of the trees are rebudded. If other less vigorous rootstock such as *P.atlantica* or *P.terebinthus* are used, budding is done during the second year and failures are rebudded in the third year.

3. YIELD:

Pistachios begin bearing an economic crop in the fifth year after planting. They are an alternate bearing crop, having a high yield one year and a low yield the next year. An alternate bearing cycle does not occur until the trees are between 12 to 15 years old. An average of a high-low yield cycle is used to reflect this factor and are utilized in **Tables 2** and **3**. The annual yields are measured in dry, in-shell pounds as shown in **Table A.** These yields are from the fifth year of orchard establishment to maturity and do not reflect alternate bearing. Yields for the first 7 years of establishment are shown on **Table 1.**

Table A.

Year	Yield (lbs/ac)
5	200
6	400
7	800
8	1000
9	1200
10	1400
11	1600
12	1800
13	2200

4. IRRIGATION:

The orchard is irrigated by district water through a drip irrigation system. The amount of water applied is adjusted for various factors in order to meet the orchard's water requirements. The efficiency of the drip irrigation system is assumed to be 85%. Average annual rainfall in this region accounts for 5 inches of the total water needs for the crop. The adjusted water is applied to the orchard at increasing rates during the first six years and is shown in **Table B.** Beginning with the seventh year a total of 3.7 acre-feet of water is applied per season. Water costs are estimated at $50 per acre foot.

If your orchard utilizes a sprinkler or furrow irrigation system then the efficiency for those systems, 80% and 70%, respectively should be used.

Table B.

Year	Acre-Feet/Year
1	.2
2	.9
3	1.6
4	1.6
5	2.3
6	2.3
7+	3.7

5. CULTURAL PRACTICES:

Detailed pruning is done by hand for mature trees during the winter. Young pistachios are trained, suckered, budded and rebudded during the first six years. Two annual insecticide spray applications occur during the year for navel orange worm and mites. Weeds are controlled with a combination of herbicide treatments and discing. For mature trees, nitrogen fertilizer is applied twice in the growing season. Once in May and again in August. The annual rates for nitrogen are shown in the **Table C.**

Table C.

Year	Lbs/Acre
1	25
2	35
3	35
4	50
5	65
6	65
7+	135

6. LABOR:

Hourly wages for workers are $5.97 and $4.48 per hour for equipment operators and field workers respectively. Adding 34% for SDI, FICA, insurance and other benefits gives the labor rates shown of $8.00 per hour for skilled labor and $6.00 per hour for field labor. The labor for operations involving machinery are 10% higher than the machine hours to account for the extra labor involved in equipment set-up, moving, maintenance and repair.

7. OVERHEAD:

County taxes are calculated as 1% of the land value plus 1% of the average of the trees, equipment, buildings and improvements. Insurance is charged at 0.8% of the average value of the equipment over its useful life. Office and business costs are estimated at $6,000 per year for the whole ranch and include office supplies, phone, bookkeeping, accounting, legal fees, etc.

8. INTEREST:

Interest on operating capital is based on cash costs and is calculated monthly until harvest at the rate of 11.75% per year. Interest is also charged on investment at 12% per year to account for income foregone that could be received from an alternative investment (opportunity cost) and is based on the value of the of the land plus the average value of the trees over the life of the orchard, buildings and equipment.

9. EQUIPMENT COSTS:

In allocating the equipment costs per acre, the following calculations were made and shown in **Table 4**: (a) **Original Cost** of equipment is the cost of the new equipment plus sales tax. (b) **Depreciation** is straight line with a ten percent salvage value. (c) **Interest** on investment is calculated as one-half of the new cost per acre (the average value of the equipment during its useful life) multiplied by an interest rate of 11%. (d) The total investment costs are also calculated as 60% of the depreciation and the interest costs for all new equipment to reflect a mix of the new and used equipment. These values are also used in **Table 2**.

10. FUEL & REPAIR:

Fuel and repair cost for each operation is determined by multiplying the total hourly operating cost for each piece of equipment by the number of hours per acre for that operation. The equipment used for an operation is identified by the number listed in the ***Item No.*** column on **Table 2** which corresponds to the ***Item No.*** column on **Table 4**. Prices for on-farm delivery of gasoline and diesel are $0.79 and $1.00 per gallon, respectively.

11. Pickup truck costs operating costs are based on 8,000 miles per year of use at $0.15 per mile.

Table 1. SAMPLE COSTS TO ESTABLISH PISTACHIO ORCHARD
Southern San Joaquin Valley - 1991
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Costs are for an orchard planted 18' X 21', with 115 trees/acre. A drip irrigation system is used.

Skilled labor: 8.00 per hour Interest rate: 11.75%
Field labor: 6.00 per hour

	Costs per Acre						
YEAR	1st	2nd	3rd	4th	5th	6th	7th
YIELD (Pounds/acre - dry in-shell)					200	400	800
Planting costs							
Land preparation: subsoil & level - contract	160						
Disk and Float: 4 hours - labor and tractor	76						
Trees: 115 @ $7 (+2 2nd Yr. and 1 3rd Yr.)	805	14	7	7			
Survey, plant and stake	177	2	1	1			
TOTAL PLANTING COSTS	$1,218	$16	$8	$8			
Cultural costs:							
Suckering and training	$4	$8	$15	$23	$55	$83	$46
Budding - re-budding	115	12	2	0	0	0	0
Irrigation labor: 2 hours	12	12	12	12	12	12	12
Water @ $50/ac. ft.	10	45	80	80	115	115	185
Fertilizer: Nitrogen @ $0.33/lb	8	12	12	17	21	21	45
Misc tree care	0	25	25	25	25	25	25
Tillage - 1.5 hours	28	28	28	28	28	28	28
Weed control sprays (material & application)	70	70	70	70	70	70	70
Miscellaneous labor and power - 1 hour	16	16	16	16	16	16	16
Pick-up truck costs	30	30	30	30	30	30	30
TOTAL CULTURAL COSTS	$293	$257	$290	$301	$373	$401	$457
Harvesting Costs:							
Hand harvest					100	110	120
Haul					1	2	4
TOTAL HARVEST COSTS					$101	$112	$124
Overhead Costs:							
Office and business costs	120	120	120	120	120	120	120
County Taxes	47	47	47	47	47	146	158
Insurance	26	26	26	26	26	26	26
TOTAL OVERHEAD COSTS	$193	$193	$193	$193	$193	$292	$304
TOTAL CASH COSTS	$1,705	$466	$491	$502	$667	$804	$885
ACCUMULATED CASH COSTS	$1,705	$2,171	$2,662	$3,164	$3,831	$4,635	$5,520

Table 1. continued

	Costs per Acre						
YEAR	1st	2nd	3rd	4th	5th	6th	7th
Depreciation:							
Buildings, equipment and irrigation system	123	123	123	123	123	123	123
TOTAL DEPRECIATION	$123	$123	$123	$123	$123	$123	$123
Interest on Investment							
Buildings, equipment and irrigation system	86	86	86	86	86	86	86
Land $4000/acre	470	470	470	470	470	470	470
Interest on accumulated cash costs	200	255	313	372	450	545	649
TOTAL INTEREST ON INVESTMENT	$756	$811	$869	$928	$1,006	$1,100	$1,204
TOTAL COST FOR THE YEAR	$2,584	$1,401	$1,483	$1,553	$1,796	$2,028	$2,212
CREDIT FROM HARVEST @ $1.20/POUND					$240	$480	$960
NET COST FOR THE YEAR	$2,584	$1,401	$1,483	$1,553	$1,556	$1,548	$1,252
TOTAL ACCUMULATED NET COST	$2,584	$3,985	$5,468	$7,021	$8,576	$10,125	$11,377

Table 2. SAMPLE COSTS TO PRODUCE PISTACHIOS
Southern San Joaquin Valley - 1991
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Labor Rate: $8.00/hr. skilled labor
$6.00/hr. field labor
Interest Rate: 11.75%
Yield - dry (Tons/acre): 1.1

Operation	Item No.	Hours	Labor Cost/A	Fuel & Repairs	Material Cost	Custom /Rent	Total Cost	Your Cost
			--- Cash and Labor Costs per Acre ---					
Cultural costs:								
Pruning @ $0.40/tree						$46.00	$46	
Shake trees (for sanitation)						28.75	29	
Brush shredding	1 3	.5	$4.40	$4.74			9	
Fertilize (135# N @ $.33)					$44.55		45	
Spray: Pest Control 2X					28.00	28.00	56	
Disc 3X	1 2	1.5	13.20	15.06			28	
Irrigation (3.7' @ $50/acft	7				185.00		185	
Labor		2.0	12.00				12	
Weed Control: Pre-Emerge	1 4	1.5	13.20	22.26	35.00		70	
Spot Spray	1 4	.5	4.40	7.42	11.67		23	
Miscellaneous		1.0	8.00	7.50			16	
Costs for pick up truck				30.00			30	
Interest on operating capital @ 11.75%							31	
TOTAL CULTURAL COSTS		7	$55	$87	$304	$103	$580	
Harvest Costs:								
Shake and catch	$ 1.25 per tree					$144	$144	
Haul	$ 9.00 per ton					10	10	
TOTAL HARVEST COSTS						$154	$154	
Cash overhead:								
Office and business costs							$120	
County Taxes							75	
Insurance							26	
TOTAL CASH OVERHEAD COSTS							$221	
TOTAL CASH COSTS							$955	
TOTAL CASH COST/TON:	1.1 tons/acre yield						$868	

Investment	Per production Acre	--- Annual Cost --- Depreciation	Interest @ 11.75%	
Land (bare)	$4,000		$470	$470
Equipment & buildings	1,459	$123	86	209
Trees (40 yr. depreciation)	5,520	138	324	462
TOTAL INVESTMENT COSTS	$ 10,979	$261	$880	$1,141
TOTAL COSTS PER ACRE				$2,096
TOTAL COST/TON:	1.1 tons/acre yield			$1,906

U.C. COOPERATIVE EXTENSION

Table 3. MONTHLY SUMMARY OF PER ACRE CASH COSTS TO PRODUCE PISTACHIOS
Southern San Joaquin Valley - 1991

Production Year: October - September

Operation	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	TOTAL
Cultural costs:													
Pruning @ $0.40/tree				46.0									$46
Shake trees												28.8	29
Brush shredding				9.1									9
Fertilize (135# N)								22.3			22.3		45
Spray: Pest Control 2X						33.6					22.4		56
Disc 3X											28.3		28
Irrigation (3.6')					10.3	10.3	20.6	20.6	41.1	41.1	41.1		185
Labor					1.5	1.5	1.5	1.5	1.5	2.3	2.3		12
Weed Control: Pre-Emerge		70.5											70
Spot Spray								23.5					23
Miscellaneous							7.8					7.8	16
Pick-up truck costs	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	30
Interest on operating capital @ 11.75%	.0	.7	.8	1.3	1.5	2.0	2.3	3.0	3.5	4.0	5.1	7.1	31
TOTAL CULTURAL COSTS	$3	$74	$3	$59	$16	$50	$35	$73	$49	$50	$124	$46	$580
Harvest cost:													
Shake and catch, $1.25 per tree												143.8	144
Haul, $9.00 per ton												9.9	10
TOTAL HARVEST COSTS												$154	$154
Cash overhead:													
Office and business	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	120
County Taxes			37.4				37.4						75
Insurance				25.8									26
TOTAL CASH OVERHEAD	$10	$10	$47	$36	$10	$10	$47	$10	$10	$10	$10	$10	$221
TOTAL CASH COSTS	$13	$84	$51	$95	$26	$60	$82	$83	$59	$60	$134	$210	$955

Table 4. EQUIPMENT AND BUILDING LIST FOR PISTACHIOS
Southern San Joaquin Valley - 1991
U.C. Cooperative Extension

Interest Rate: 11.75% Fuel Cost per Gallon - Gasoline $.79
Diesel $1.00

Item #	DESCRIPTION	New Cost	Annual Use (acres)	Cost Per acre	Life (hrs)	Years to Trade	----OVERHEAD*--- Deprec- iation	Interest*	TAR*	--- HOURLY COSTS -- Fuel*	Repairs*	Total
	Tractors:											
1	65 HP wheel diesel	$30,000	50	$600	12,000	10	$60.00	$35.25	120%	$3.44	$3.00	$6.44
2	Disc, tandem 12'	7,500	50	150	2,500	10	15.00	8.81	120%		3.60	3.60
3	Brush shredder	7,600	50	152	2,500	10	15.20	8.93	100%		3.04	3.04
4	Weed sprayer, SP	9,000	50	180	2,000	10	18.00	10.58	120%	3.00	5.40	8.40
5	Brush rake	1,000	50	20	2,500	15	1.33	1.18	100%		.40	.40
6	Pick-up, 1/2 ton	14,000	50	280	2,000	7	40.00	16.45	60%			
7	Irrigation system	35,000	50	700	27,000	20	35.00	41.13	10%		.13	.13
8	4 Wheel ATV	1,000	50	20	2,000	5	4.00	1.18	60%			
	Miscellaneous shop tools	4,500	50	90		10	9.00	5.29				
	Buildings	12,000	50	240		30	8.00	14.10				
	TOTAL COST	$121,600		$2,432			$206	$143				
	60% OF NEW COSTS*	$72,960		$1,459			$123	$86				

* 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 a
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.

Table 5.

COST TO PRODUCE PISTACHIOS AT VARYING YIELDS

	YIELD (Dry In-shell Tons/acre)						
	.25	.50	.75	1.00	1.25	1.50	1.75
Cultural Costs	580	580	580	580	580	580	580
Harvest Costs	146	148	151	153	155	157	160
Cash Overhead	221	221	221	221	221	221	221
Cash cost/acre	947	949	952	954	956	958	961
Cash cost/ton	3,789	1,899	1,269	954	765	639	549
Investment cost	1,141	1,141	1,141	1,141	1,141	1,141	1,141
TOTAL COST/ACRE	2,089	2,091	2,093	2,095	2,098	2,100	2,102
TOTAL COST/TON	8,354	4,182	2,791	2,095	1,678	1,400	1,201

Table 6.

PER ACRE INCOME ABOVE CASH COSTS AT VARYING PRICES AND YIELDS

DOLLARS	YIELD (Dry In-shell Tons/acre)						
PER LB.	.25	.50	.75	1.00	1.25	1.50	1.75
.80	-547	-149	248	646	1,044	1,442	1,839
.90	-497	-49	398	846	1,294	1,742	2,189
1.00	-447	51	548	1,046	1,544	2,042	2,539
1.10	-397	151	698	1,246	1,794	2,342	2,889
1.20	-347	251	848	1,446	2,044	2,642	3,239
1.30	-297	351	998	1,646	2,294	2,942	3,589
1.40	-247	451	1,148	1,846	2,544	3,242	3,939
1.50	-197	551	1,298	2,046	2,794	3,542	4,289
1.60	-147	651	1,448	2,246	3,044	3,842	4,639

Table 7.

PER ACRE INCOME ABOVE TOTAL COSTS AT VARYING PRICES AND YIELDS

DOLLARS	YIELD (Dry In-shell Tons/acre)						
PER LB.	.25	.50	.75	1.00	1.25	1.50	1.75
.80	-1,689	-1,291	-893	-495	-98	300	698
.90	-1,639	-1,191	-743	-295	152	600	1,048
1.00	-1,589	-1,091	-593	-95	402	900	1,398
1.10	-1,539	-991	-443	105	652	1,200	1,748
1.20	-1,489	-891	-293	305	902	1,500	2,098
1.30	-1,439	-791	-143	505	1,152	1,800	2,448
1.40	-1,389	-691	7	705	1,402	2,100	2,798
1.50	-1,339	-591	157	905	1,652	2,400	3,148
1.60	-1,289	-491	307	1,105	1,902	2,700	3,498