

**1988 SAMPLE COSTS TO PRODUCE
HARTLEY WALNUTS
IN THE
SACRAMENTO VALLEY**



by

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Janine Hasey, Sutter-Yuba Counties Farm Advisor
Bill Krueger, Glenn County Farm Advisor
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and
Jim Du Bruille, Staff Research Associate, U.C. Davis
UC Cooperative Extension**

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This cost study provides detailed information on the sample costs of producing Hartley walnuts in the Sacramento Valley. 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 includes a Cost of Production Worksheet, Monthly Summary of Sample Costs, Equipment List, and Ranging Analysis for Hartley walnuts. A companion study has been developed on sample costs to establish and produce lateral bearing walnuts. A single list of assumptions which applies to both studies is included. 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 walnuts 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 Worksheet 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 HARTLEY

AND LATERAL BEARING WALNUTS

Sacramento Valley - 1988

The following list contains a description of some general assumptions pertaining to the sample costs of establishing and producing walnuts 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 walnut orchard in full production.

A. ESTABLISHMENT ASSUMPTIONS ONLY

1. Land and trees for establishing a new lateral bearing orchard:
Bare land value (105 acres): \$2,500/acre
Trees:
Lateral bearing - 70 Trees/acre - 25' X 25' spacing.
(Hartley - 35 Trees/acre - 35' X 35' spacing.)

Many orchards are initially planted at these close spacings with temporary trees between the permanent trees that are removed after about 10 years.

2. Orchard floor management assumes cultivation the first three years to control weeds, changing to a strip weed spray with mowed centers in the fourth year.
3. Pre-plant fumigation is practiced where walnuts are established on former orchard land. The cost of fumigation is listed for reference, but is not included in the total planting costs.
4. Certain cultural costs for establishing Hartley orchards will differ from the costs listed for lateral bearing varieties. Typically less pruning and fewer sprays are needed for Hartley. Hartley orchards will also have fewer trees per acre. Hartley walnuts come into production later and harvest costs would not be expected until the 6th or 7th year.

B. ESTABLISHMENT AND PRODUCTION ASSUMPTIONS

1. Land and trees for 12 year old orchard:
Bare land value (105 acres): \$1,905/acre
Establishment costs - 70 Trees/acre -
25' X 25' Spacing. \$3,000/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. 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 40 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

To account for maintenance and repair time, labor hours for operations involving machinery are 10% higher than the machine hours.

3. Equipment costs:

In allocating the equipment costs per acre, the following calculations were made: (a) "Original Cost" of equipment is the new cost including sales tax. (b) "Depreciation" is straight line with no adjustment for Salvage Value. It is calculated by dividing new cost per acre by the years to trade. (c) "Interest" on investment is figured as one-half of the new cost per acre multiplied by the interest rate. One-half of the new cost is the average value of the equipment during its useful life. (d) The investment per acre used in the cost study is calculated at 60% of the depreciation and interest costs for all new equipment to reflect a mix of new and used equipment.

4. Fuel and repair costs:

The cost of production worksheets contain numbers in two columns with the headings Tractor/Implement No. and Implement No. which refer to the item number on the equipment table. The far right-hand column on the equipment table shows the fuel and repair costs per hour which is multiplied by the hours used per acre for each piece of equipment to obtain the cost per acre for fuel and repairs.

5. Office and business costs include phone, office supplies, accounting fees, etc.

6. County taxes are calculated at 1% of land at acquisition plus 1% of the average value of trees, equipment, buildings and improvements.

7. Equipment insurance is at 0.8% of the average value of equipment.

8. Pickup costs are based on 10,000 miles/year of farm operation at \$0.15/mile.

9. Supervisory fees are not included in the cost study, but are estimated to be between \$30 - \$100/acre.

10. Safe chemical storage is included with the shop building.

11. Irrigation assumptions:

12 inches of water is available from the soil. Surface water is assumed as the source for applied water. If water is pumped from a well then material costs for irrigation (pumping costs) and the ownership costs of a well and larger pump should be included.

Irrigation system - Solid set sprinklers - 30.00 acre inches/year.
Ten irrigations - three inches/irrigation - four 25-acre sets/irrig.
50 HP Pump - Capacity: 900 gal/min - 2 acre inches/24 hours.
Electricity costs @ 50% plant efficiency = \$25.00/acre-foot.

12. Harvest costs are based on custom rates.

13. Interest on operating capital is based on cultural costs and assumes a 9 month loan at 11%.

14. Pruning on mature lateral bearing walnuts is performed every year.

On mature Hartleys it is performed every third year - so pruning and brush removal costs are divided by three.

15. Orchard floor management:

Centers are mowed for weed control six 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:

Hartleys - One insect spray for codling moth, navel orangeworm or aphid, and one husk fly spray using insecticide plus bait.

Lateral bearing - Two codling moth sprays, one insect spray for aphid, mites, caterpillars or husk fly.

Fixed copper is used for blight sprays.

SAMPLE COSTS TO PRODUCE WALNUTS - HARTLEY
Sacramento Valley - 1988

Labor Rate: \$7.25/hr. skilled labor Interest Rate: 11%
\$5.40/hr. field labor Yield (tons/acre): 2.0

Operation	Tractor/Implement		Hours	Cash and Labor Costs per Acre					Your Cost
	No.	Implement No.		Labor Cost/A	Fuel & Repairs	Material Cost	Custom /Rent	Total Cost	
Cultural costs (35 trees/acre, 35' X 35'):									
Pruning - 1 of 3 years	13		3.0	\$21.75	\$18.00				\$40
Brush Removal-1 of 3 years	1	6	.4	4.64	2.59				7
Fertilize (200# N @ \$.19)						\$38.00	\$2.75		41
Irrigation (10 X 3")	11	12	21.0		8.08	62.50			71
Labor			1.0	5.40					5
Mow 6X	1	5	1.2	9.57	10.46				20
Weed sprays	2	3	.7	5.58	3.57	30.00			39
Blight Sprays 2X	1	4	.8	6.38	19.13	29.60			55
Husk fly spray	1	4	.4	3.19	9.57	15.00			28
Other insect spray	1	4	.4	2.38	9.57	24.00			36
Costs for pick up truck					15.00				15
Interest on operating capital @ 11%									20
TOTAL CULTURAL COSTS			29	\$59	\$96	\$199	\$3		\$377
Harvest Costs:									
Shake				\$40 per acre			\$40		\$40
Sweep & Pick Up				\$55 per acre			55		55
Hauling				\$6 per ton			12		12
Hull & Dry				\$90 per ton			180		180
TOTAL HARVEST COSTS							\$287		\$287
Cash overhead:									
Office and business costs									\$60
County Taxes									44
Equipment Insurance									7
TOTAL CASH OVERHEAD COSTS									\$110
TOTAL CASH COSTS									\$774
TOTAL CASH COST/TON:		2 tons/acre							\$387
Investment									
			Per production	Annual Cost					
			Acres	Depreciation	Interest @ 11%				
Land @ \$1,905/acre (bare)			2,000			\$220			\$220
Equipment & buildings			1,703	\$148		94			241
Trees (40 yr. depreciation)			3,000	75		165			240
TOTAL INVESTMENT COSTS			\$6,703	\$223		\$479			\$701
TOTAL COSTS PER ACRE									\$1,476
TOTAL COST/TON:		2 tons/acre							\$738

MONTHLY SUMMARY OF
SAMPLE COSTS TO PRODUCE WALNUTS - HARTLEY

Sacramento Valley - 1988

Operation	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	TOTAL
Cultural costs:													
Pruning	19.9	19.9											\$40
Brush Removal		7.2											7
Fertilize 200# N				20.4				20.4					41
Irrigation (10 X 3")				14.1	14.1	14.1	14.1	14.1					71
Labor				1.1	1.1	1.1	1.1	1.1					5
Mow 6X				3.3	3.3	3.3	3.3	3.3		3.3			20
Weed sprays						13.1					26.1		39
Blight Sprays 2X				27.6	27.6								55
Husk fly spray								27.8					28
Other insect spray						35.9							36
Pick-up truck costs	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	.2	.5	.5	1.1	1.5	2.2	2.4	3.0	3.1	5.8			20
TOTAL CULTURAL COSTS	\$21	\$29	\$2	\$69	\$49	\$71	\$22	\$71	\$4	\$10	\$27	\$1	\$377
Harvest Costs:													
Shake										40.0			40
Sweep & Pick Up										55.0			55
Hauling										12.0			12
Hull & Dry										180.0			180
TOTAL HARVEST COSTS										\$287			\$287
Cash overhead:													
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				21.8								21.8	44
Equipment Insurance	6.8												7
TOTAL CASH OVERHEAD	\$12	\$5	\$5	\$27	\$5	\$5	\$5	\$5	\$5	\$5	\$5	\$27	\$110
TOTAL CASH COSTS	\$33	\$34	\$7	\$96	\$54	\$76	\$27	\$76	\$9	\$302	\$32	\$28	\$774

EQUIPMENT AND BUILDING LIST FOR WALNUTS - LATERAL BEARING AND HARTLEY
Sacramento Valley - 1988

Interest Rate: 11%

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

ITEM #	DESCRIPTION	NEW COST	ANNUAL USE (ACRES)	COST PER ACRE	YEARS TO LIFE (HRS)	OVERHEAD*		TAR*	HOURLY COSTS --			
						DEPRECIATION	INTEREST*		FUEL*	REPAIRS*	TOTAL	
Tractors:												
1	60 HP wheel diesel	\$22,000	100	\$220	12,000	10	\$22.00	\$12.10	120%	\$2.61	\$2.20	\$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	Offset Disc, 12 ft.	6,833	100	68	2,500	10	6.83	3.76	120		3.28	3.28
8	Pruning equipment	1,200	100	12		10	1.20	.66	100			
9	Truck, 1 1/2 ton	17,500	100	175	2,000	8	21.88	9.63	80			
10	Pick-up, 1/2 ton	14,000	100	140	2,000	5	28.00	7.70	60			
11	Solid set sprinkler sys.	100,000	100	1,000	27,000	15	66.67	55.00	10		.37	.37
12	Irrigation pump (50 HP)	10,000	100	100	35,000	20	5.00	5.50	5		.01	.01
13	Pruning tower, 25 ft.	15,000	100	150	5,000	10	15.00	8.25	100	3.00	3.00	6.00
	Buildings	25,000	100	250		35	7.14	13.75				
	Miscellaneous shop tools	4,500	100	45		10	4.50	2.48				
TOTAL COST		\$283,883		\$2,839			\$246	\$156				
60% OF NEW COSTS*		\$170,330		\$1,703			\$148	\$94				

* 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.

PER ACRE COST TO PRODUCE HARTLEY WALNUTS AT VARYING PRICES AND YIELDS

	YIELD (Pounds/acre)						
	1000	2000	3000	4000	5000	6000	7000
Cultural Costs	377	377	377	377	377	377	377
Harvest Costs	143	191	239	287	335	383	431
Cash Overhead	110	110	110	110	110	110	110
Cash cost/acre	630	678	726	774	822	870	918
Cash cost/ton	1,260	678	484	387	329	290	262
Investment cost	701	701	701	701	701	701	701
TOTAL COST/ACRE	1,332	1,380	1,428	1,476	1,524	1,572	1,620
TOTAL COST/TON	2,663	1,380	952	738	609	524	463

PER ACRE INCOME ABOVE CASH COSTS AT VARYING PRICES AND YIELDS

Dollars per dry in-shell pound	YIELD (Pounds/acre)						
	1000	2000	3000	4000	5000	6000	7000
.30	-330	-78	174	426	678	930	1,182
.40	-230	122	474	826	1,178	1,530	1,882
.50	-130	322	774	1,226	1,678	2,130	2,582
.60	-30	522	1,074	1,626	2,178	2,730	3,282
.70	70	722	1,374	2,026	2,678	3,330	3,982
.80	170	922	1,674	2,426	3,178	3,930	4,682
.90	270	1,122	1,974	2,826	3,678	4,530	5,382

PER ACRE INCOME ABOVE TOTAL COSTS AT VARYING PRICES AND YIELDS

Dollars per dry in-shell pound	YIELD (Pounds/acre)						
	1000	2000	3000	4000	5000	6000	7000
.30	-1,032	-780	-528	-276	-24	228	480
.40	-932	-580	-228	124	476	828	1,180
.50	-832	-380	72	524	976	1,428	1,880
.60	-732	-180	372	924	1,476	2,028	2,580
.70	-632	20	672	1,324	1,976	2,628	3,280
.80	-532	220	972	1,724	2,476	3,228	3,980
.90	-432	420	1,272	2,124	2,976	3,828	4,680