

**1988 SAMPLE COSTS TO ESTABLISH & PRODUCE
LATERAL BEARING WALNUTS
IN THE
SACRAMENTO VALLEY**



by

**John Edstrom, Colusa County Farm Advisor
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This cost study provides detailed information on the sample costs of establishing and producing lateral bearing 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 Establishment Worksheet, a Cost of Production Worksheet, Monthly Summary of Sample Costs, Equipment List, and Ranging Analysis for lateral bearing walnuts. A companion study has been developed on sample costs to produce Hartley 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 ESTABLISH LATERAL BEARING WALNUT ORCHARD
Sacramento Valley - 1988

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

Interest rate: 11.0%
 70 trees/acre, 25' X 25'

YEAR	Costs per Acre							
	1st	2nd	3rd	4th	5th	6th	7th	8th
YIELD (Pounds/acre)				500	1,500	2,000	3,200	4,000
Planting costs								
(Pre-plant fumigation 10' strip)	(\$200)							
Land preparation, survey, mark	95							
Tree stakes @ \$1.25/stake	88							
Set stake, plant, paint and water	140							
Trees - 70 @ \$8.00 (Black rootstock)*	560							
TOTAL PLANTING COSTS	\$883							
Cultural costs:								
Training, tie, prune	\$30	\$30	\$35	\$35	\$40	\$50	\$60	\$66
Brush removal	0	0	0	.5	8	15	20	20
Cultivation	29	29	29	0	0	0	0	0
Mow	0	0	0	20	20	20	20	20
Irrigation labor	3	3	3	3	3	3	3	3
Irrigation water @ \$25/ac. ft. + R&M	15	35	35	35	55	71	71	71
Fertilizer applied	8	13	17	27	36	41	46	51
Weed sprays	0	0	0	47	47	47	47	47
Blight spray	0	0	0	75	75	157	157	157
Insect and mite spray	0	0	0	0	0	75	110	110
Replants	0	60	30	0	0	0	0	0
Miscellaneous labor	12	12	18	18	18	24	24	24
Pick-up truck costs	15	15	15	15	15	15	15	15
TOTAL CULTURAL COSTS	\$112	\$197	\$182	\$280	\$317	\$518	\$573	\$584
Harvesting Costs:								
Shake				25	35	50	50	50
Sweep and pick up				35	45	50	55	55
Hauling				2	5	6	10	12
Hull and dry				23	68	90	144	180
TOTAL HARVEST COSTS				\$84	\$152	\$196	\$259	\$297
Overhead Costs:								
Office and business costs	60	60	60	60	60	60	60	60
County Taxes	34	34	34	34	55	61	69	79
Insurance	7	7	7	7	7	7	7	7
TOTAL OVERHEAD COSTS	\$100	\$100	\$100	\$100	\$122	\$128	\$136	\$146
TOTAL CASH COSTS	\$1,095	\$297	\$283	\$464	\$591	\$842	\$967	\$1,026
ACCUMULATED CASH COSTS	\$1,095	\$1,392	\$1,674	\$2,139	\$2,730	\$3,571	\$4,539	\$5,565

* Add \$3.00 each for Paradox rootstock.

YEAR	Costs per Acre							
	1st	2nd	3rd	4th	5th	6th	7th	8th
Depreciation:								
Building & equipment	148	148	148	148	148	148	148	148
TOTAL DEPRECIATION	\$148	\$148	\$148	\$148	\$148	\$148	\$148	\$148
Interest on Investment at 11%								
Building & equipment	94	94	94	94	94	94	94	94
Land \$2500/acre	220	220	220	220	220	220	220	220
Interest on accumulated cash costs	120	153	184	235	300	393	499	612
TOTAL INTEREST ON INVESTMENT	\$434	\$467	\$498	\$549	\$614	\$707	\$813	\$926
TOTAL COST FOR THE YEAR	\$1,678	\$912	\$929	\$1,161	\$1,353	\$1,696	\$1,929	\$2,100
CREDIT FROM HARVEST @ \$0.45/POUND				\$225	\$675	\$900	\$1,440	\$1,800
NET COST FOR THE YEAR	\$1,678	\$912	\$929	\$936	\$678	\$796	\$489	\$300
TOTAL ACCUMULATED NET COST	\$1,678	\$2,589	\$3,518	\$4,455	\$5,133	\$5,929	\$6,418	\$6,718

SAMPLE COSTS TO PRODUCE WALNUTS - LATERAL BEARING
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				Total Cost	Your Cost
	No.	Implement No.		Labor Cost/A	Fuel & Repairs	Material Cost	Custom /Rent		
Cultural costs (70 trees/acre, 25' X 25'):									
Pruning- every 2 yrs	13		6.1	\$44.23				\$44	
Brush Removal- every 2 yrs	1	6	.7	8.86	4.94			14	
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 2X	2	3	1.0	7.98	5.10	34.00		47	
Blight Sprays 6X	1	4	2.4	19.14	57.39	80.00		157	
Codling moth spray 2X	1	4	.8	6.38	19.13	48.00		74	
Other insect spray	1	4	.4	2.38	9.57	23.63		36	
Costs for pick up truck					15.00			15	
Interest on operating capital @ 11%								27	
TOTAL CULTURAL COSTS			35	\$104	\$130	\$286	\$3	\$549	
Harvest Costs:									
Shake							\$50	\$50	
Sweep & Pick Up							55	55	
Hauling							12	12	
Hull & Dry							180	180	
TOTAL HARVEST COSTS								\$297	\$297
Cash overhead:									
Office and business costs								\$60	
County Taxes								44	
Equipment Insurance								7	
TOTAL CASH OVERHEAD COSTS								\$110	
TOTAL CASH COSTS								\$956	
TOTAL CASH COST/TON:			2 tons/acre					\$478	
Investment									
		Per production Acre		Annual Cost					
				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								\$1,658	
TOTAL COST/TON:			2 tons/acre					\$829	

MONTHLY SUMMARY OF
SAMPLE COSTS TO PRODUCE WALNUTS - LATERAL BEARING

Sacramento Valley - 1988

Operation	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	TOTAL
Cultural costs:													
Pruning-70 Trees/acre	22.1	22.1											\$44
Brush Removal		13.8											14
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 2X			23.5								23.5		47
Blight Sprays 6X			26.1	78.3	52.2								157
Codling moth spray 2X				36.8			36.8						74
Other insect spray								35.6					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	.6	1.0	2.5	3.1	3.4	3.9	4.6	7.4				27
TOTAL CULTURAL COSTS	\$24	\$38	\$52	\$158	\$75	\$23	\$60	\$80	\$9	\$5	\$25	\$1	\$549
Harvest Costs:													
Shake									50.0				50
Sweep & Pick Up									55.0				55
Hauling									12.0				12
Hull & Dry									180.0				180
TOTAL HARVEST COSTS									\$297				\$297
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	\$35	\$43	\$57	\$184	\$80	\$28	\$65	\$85	\$311	\$10	\$30	\$28	\$956

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

Interest Rate: 11%

Fuel Cost per Gallon \$0.65 diesel
\$.75 unleaded

DESCRIPTION	NEW COST	ANNUAL USE (ACRES)	COST PER ACRE	LIFE (HRS)	YEARS TO DEPRECIATION		OVERHEAD* INTEREST*		--- HOURLY COSTS ---		
					TRADE	ATION	TAR*	FUEL*	REPAIRS*	TOTAL	
Tractors:											
60 HP wheel diesel	\$22,000	100	\$220	12,000	10	\$22.00	\$12.10	120%	\$2.61	\$2.20	\$4.81
30 HP wheel diesel	15,000	100	150	12,000	10	15.00	8.25	120	1.31	1.50	2.81
Weed sprayer, P.T.O.	2,750	100	28	1,200	10	2.75	1.51	100		2.29	2.29
Orchard sprayer, 500 gal.	38,000	100	380	2,000	10	38.00	20.90	80	3.90	15.20	19.10
Flail mower, 10 foot	6,500	100	65	2,000	10	6.50	3.58	120		3.90	3.90
Buck Rake/Front end loader	5,600	100	56	2,500	10	5.60	3.08	100		2.24	2.24
Offset disc, 12'	6,833	100	68	2,500	10	6.83	3.76	120		3.28	3.28
Pruning equipment	1,200	100	12		10	1.20	.66	100			
Truck, 1 1/2 ton	17,500	100	175	2,000	8	21.88	9.63	80			
Pick-up, 1/2 ton	14,000	100	140	2,000	5	28.00	7.70	60			
Solid set sprinkler sys.	100,000	100	1,000	27,000	15	66.67	55.00	10		.37	.37
Irrigation pump (50 HP)	10,000	100	100	35,000	20	5.00	5.50	5		.01	.01
Pruning tower, 25'	15,000	100	150	2,500	10	15.00	8.25	100	3.00	6.00	9.00
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 LATERAL BEARING WALNUTS AT VARYING PRICES AND YIELDS

	YIELD (Pounds/acre)						
	1000	2000	3000	4000	5000	6000	7000
Cultural Costs	549	549	549	549	549	549	549
Harvest Costs	153	201	249	297	345	393	441
Cash Overhead	110	110	110	110	110	110	110
Cash cost/acre	812	860	908	956	1,004	1,052	1,100
Cash cost/ton	1,625	860	606	478	402	351	314
Investment cost	701	701	701	701	701	701	701
TOTAL COST/ACRE	1,514	1,562	1,610	1,658	1,706	1,754	1,802
TOTAL COST/TON	3,028	1,562	1,073	829	682	585	515

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	-512	-260	-8	244	496	748	1,000
.40	-412	-60	292	644	996	1,348	1,700
.50	-312	140	592	1,044	1,496	1,948	2,400
.60	-212	340	892	1,444	1,996	2,548	3,100
.70	-112	540	1,192	1,844	2,496	3,148	3,800
.80	-12	740	1,492	2,244	2,996	3,748	4,500
.90	88	940	1,792	2,644	3,496	4,348	5,200

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	-1,214	-962	-710	-458	-206	46	298
.40	-1,114	-762	-410	-58	294	646	998
.50	-1,014	-562	-110	342	794	1,246	1,698
.60	-914	-362	190	742	1,294	1,846	2,398
.70	-814	-162	490	1,142	1,794	2,446	3,098
.80	-714	38	790	1,542	2,294	3,046	3,798
.90	-614	238	1,090	1,942	2,794	3,646	4,498