

COSTS TO ESTABLISH AND PRODUCE WALNUTS

SACRAMENTO VALLEY - 1982

By

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This study involves several cost analyses on walnut costs for growing walnuts in the Sacramento Valley. Establishment costs and production costs are presented separately. The cost of establishment is included as an investment in the cost of production studies.

Three cost of production studies are included. The first two are for lateral bearing variety orchards. One is for orchards under cultivation and surface irrigation and the other is for orchards using mowing (instead of cultivation) and sprinkler irrigation. The third cost of production study is for terminal bearing (Hartley variety) orchards with mowing and sprinkler irrigation.

Establishment costs were calculated for two alternative spacing patterns. Typical establishment costs for lateral bearing walnuts are presented as well as the cost to establish a denser hedge row planting. Establishment costs are presented for both types of orchards to allow for comparison of potential cost differences which may result from earlier and higher yields associated with closer planting of trees. These studies are patterned after an experimental spacing trial in Tehama County.

The following assumptions may help clarify some items:

- (1) There are two labor rates in this study. The \$6.75/hr. rate applies only to pruning and shaking labor. The general labor rate is \$5.00/hr.

(2) Spraying for insects is assumed as follows:

<u>Terminal Bearing (Hartley)</u>	<u>Lateral Bearing (flood or sprinkler irrigated)</u>
2 full coverage walnut blight sprays	4 half coverage walnut blight sprays
1 full coverage worm spray	10X: 3 full coverage blight sprays
1 full coverage husk fly spray	2 full coverage worm sprays
1 full coverage misc. spray	1 full coverage misc. spray

(3) Strip weed spraying is performed 2X on sprinkled and mowed walnuts, usually using a preemergence and a contact herbicide in the fall and a contact herbicide in the summer.

(4) On some lateral bearing orchards, the addition of a growth regulator spray near harvest at \$18 per acre could be included to help hasten maturity.

In practice, almost all growers have a mix of new and used equipment.

However, for the purposes of these studies, new equipment prices were used because of the difficulty of assigning values to used equipment and the impossibility of defining a typical inventory of used and new equipment.

The depreciation and interest charges on investment represent the opportunity cost of having money tied up in investment and is not the cash cost of purchasing the land, machinery and equipment. That is, the depreciation is an estimate of the annual decrease in a grower's net worth due to the decrease in value of machinery and equipment from its use in the orchard. The interest is really the income the grower could have earned from an alternative investment (such as money market certificates) instead of investing in the orchard and equipment.

The sum of the depreciation and interest on investment act as an estimate of the yearly cost of owning the orchard, machinery and equipment.

Cash overhead is calculated as eight percent of the total operating and harvest costs. This means that overhead costs are higher for production practices with higher cultural costs.

The establishment budgets are calculated on the premiss of a short term loan for planting and cultural costs at 16 percent interest. The grower does not start paying interest on the loan until he actually uses the money. The money for the first year is borrowed for seven years, the money for the second year is borrowed for six years, etc.

COSTS TO ESTABLISH ENGLISH WALNUT ORCHARD
SACRAMENTO VALLEY - 1982

Based on 100 acres, 30'X30' spacing - 48 trees/acre. Labor at \$5.00 per hr., including fringe benefits.

	1st Year	2nd Year	3rd Year	4th Year	5th Year	6th Year	7th Year
Yield: pounds per acre					500.00	1,000	2,000
Planting Costs:							
Land Preparation, Shallow Subsoil	50.00						
Disc	25.00						
Survey and Mark	20.00						
Tree Stakes @ \$1/tree	48.00						
Plant, Paint, Set Stakes,							
Water @ \$1.75/tree	84.00						
Trees @ \$8/tree	384.00						
Total Planting Costs	611.00						
Cultural Costs:							
Training, Tie, Prune	25.00	25.00	28.00	30.00	35.00	40.00	50.00
Brush Disposal				18.00	25.00	25.00	25.00
Tillage & Furrow Irrigation							
Prep.: 7 hrs. Labor + Tractor/yr.	77.00	77.00	77.00	77.00	77.00	77.00	77.00
Irrigation Labor	20.00	20.00	20.00	25.00	30.00	30.00	30.00
Water @ \$15/ac. ft.	15.00	30.00	45.00	45.00	45.00	45.00	45.00
Fertilizer Applied	5.00	10.00	12.00	15.00	20.00	35.00	50.00
Spray Applied		10.00	15.00	40.00	50.00	90.00	185.00
Misc. Labor	10.00	10.00	10.00	10.00	10.00	10.00	10.00
Replant		15.00	15.00				
Cultivation: 2.2 hrs./yr.	26.75	26.75	26.75	26.75	26.75	26.75	26.75
Misc. Materials	15.00	15.00	15.00	15.00	15.00	15.00	15.00
Taxes, Real & Pers. Property	58.00	58.00	58.00	58.00	93.00	93.00	93.00
Repairs	40.00	40.00	40.00	40.00	40.00	40.00	40.00
Office & Business Costs	72.00	27.00	29.00	32.00	37.00	42.00	47.00
Interest on Oper. Capital @ 16%	78.00	171.00	209.00	240.00	249.00	262.00	223.00
Pre-Harvest Cash Costs	1,052.75	534.75	599.75	671.75	762.75	830.75	913.75
Harvesting Costs:							
Land Preparation					4.00	4.00	4.00
Shake						22.25	22.25
Sweep and Rake					10.00	10.00	25.00
Pick-up and Haul					22.00	22.00	22.00
Hull & Dry @ \$.045/lb.					22.50	45.00	90.00
Total Harvesting Costs					58.50	103.25	163.25
Total Cash Costs	1,047.75	534.75	599.75	671.75	821.25	934.00	1,077.00
Depreciation:							
Irrigation System	13.33	13.33	13.33	13.33	13.33	13.33	13.33
Buildings & Equipment	223.70	223.70	223.70	223.70	223.70	223.70	223.70
Total Depreciation	237.03	237.03	237.03	237.03	237.03	237.03	237.03
Interest on Investment @ 14%:							
Irrigation System	14.00	14.00	14.00	14.00	14.00	14.00	14.00
Buildings & Equipment	161.84	161.84	161.84	161.84	161.84	161.84	161.84
Land	630.00	630.00	630.00	630.00	630.00	630.00	630.00
Total Interest on Investment	805.84	805.84	805.84	805.84	805.84	805.84	805.84
Total Cost for the Year					1,864.12	1,976.87	2,119.87
Credit for Fruit @ 45¢/lb.					225.00	450.00	900.00
Net Cost for the Year	2,095.62	1,577.62	1,642.62	1,714.62	1,639.12	1,526.87	1,219.87
Accumulated Net Cost	2,095.62	3,673.24	5,315.86	7,030.48	8,669.60	10,196.47	11,416.34

*For trees on Paradox rootings, add \$3.00 each.

COSTS TO ESTABLISH ENGLISH WALNUT ORCHARDS
FOR
HEDGEROW PLANTING, LATERAL BEARING, MOWED, SURFACE IRRIGATED
SACRAMENTO VALLEY - 1982

Based on 100 acres, 11' X 22' spacing - 180 trees/acre. Labor at \$5.00 per hr., including fringe benefits.

	1st Year	2nd Year	3rd Year	4th Year	5th Year	6th Year	7th Year
Yield: pounds per acre				1,000	2,000	4,000	5,600
Planting Costs:							
Land Preparation, Shallow Subsoil	50.00						
Disc	25.00						
Survey and Mark	40.00						
Tree Stakes @ \$1/tree	180.00						
Plant, Paint, Set Stakes, Water @ \$1.25/tree	225.00						
Trees @ \$8/tree	1,440.00						
Total Planting Costs	\$1,960.00						
Cultural Costs:							
Training, Tie, Prune	94.00	94.00	105.00	113.00	20.00*	20.00*	20.00*
Brush Disposal			50.00	68.00	95.00	95.00	95.00
Tillage & Furrow Irrigation Prep.: 7 hrs. Labor + Tractor/yr.	77.00	77.00	77.00	77.00	77.00	77.00	77.00
Irrigation Labor	20.00	20.00	20.00	25.00	30.00	30.00	30.00
Water @ \$15/ac. ft.	15.00	30.00	45.00	45.00	45.00	45.00	45.00
Fertilizer Applied	19.00	38.00	45.00	56.00	75.00	130.00	190.00
Spray Applied		15.00	21.00	56.00	110.00	125.00	260.00
Misc. Labor	10.00	10.00	10.00	10.00	10.00	10.00	10.00
Replant		60.00	60.00				
Cultivation: 2.2 hrs./yr. Strip, Weed, Spray	26.75	26.75	45.00	45.00	45.00	45.00	45.00
Mow 8X (30 HP tractor)			40.00	40.00	40.00	40.00	40.00
Misc. Materials	15.00	15.00	15.00	15.00	15.00	15.00	15.00
Taxes, Real & Pers. Property	58.00	58.00	58.00	93.00	93.00	93.00	93.00
Repairs	40.00	40.00	40.00	40.00	40.00	40.00	40.00
Office & Business Costs	30.00	41.00	45.00	58.00	50.00	66.00	80.00
Interest on Oper. Capital @ 16%	189.00	387.00	435.00	477.00	494.00	487.00	369.00
Pre-Harvest Cash Costs	2,553.75	911.75	1,111.00	1,218.00	1,239.00	1,298.00	1,419.00
Harvesting Costs:							
Ethaphon (¼ acreage)						18.00	18.00
Shake				66.00	66.00	66.00	66.00
Sweep and Rake				20.25	20.25	20.25	20.25
Pickup and Haul				30.00	30.00	30.00	30.00
Hull & Dry @ \$.045/lb.				45.00	90.00	180.00	252.00
Total Harvesting Costs				161.25	206.25	314.25	386.25
Total Cash Costs	2,553.75	911.75	1,110.00	1,379.25	1,435.25	1,601.25	1,784.25
Depreciation:							
Irrigation System	13.33	13.33	13.33	13.33	13.33	13.33	13.33
Buildings & Equipment	223.70	223.70	223.70	223.70	223.70	223.70	223.70
Total Depreciation	237.03	237.03	237.03	237.03	237.03	237.03	237.03
Interest on Investment @ 14%:							
Irrigation System	14.00	14.00	14.00	14.00	14.00	14.00	14.00
Buildings & Equipment	161.84	161.84	161.84	161.84	161.84	161.84	161.84
Land	630.00	630.00	630.00	630.00	630.00	630.00	630.00
Interest on Accumulated Costs							
Total Interest on Investment	805.84	805.84	805.84	805.84	805.84	805.84	805.84
Total Cost for the Year	3,596.62	1,954.62	2,153.87	2,422.12	2,489.12	2,655.12	2,838.12
Credit for Fruit @ 45c/lb.				450.00	900.00	1,800.00	2,520.00
Net Cost for the Year	3,596.62	1,954.62	2,153.87	1,972.12	1,589.12	855.12	318.12
Accumulated Net Cost	3,596.62	5,551.24	7,705.11	9,677.23	11,266.35	12,121.47	12,439.59

*From the fifth year on trees are mechanically pruned. One side of the row is hedged each year. The top is pruned annually.

**SAMPLE COSTS TO PRODUCE: LATERAL BEARING ENGLISH WALNUTS (CULTIVATED & SURFACE IRRIGATED)
SACRAMENTO VALLEY - 1982**

Production data: Based on 100 acres, 30'X30' spacing, 48 trees/acre (10-15 yr. old trees).
Labor at \$5.00/hr. unskilled & \$6.75/hr. skilled, includ. fringe benefits. Yield: 2 tons/acre.

Operation	Hours Per Acre	Cash and labor cost per acre				Your Costs
		Labor	Fuel and repairs	Materials Kind and Quantity Cost	Total	
Cultural costs						
Pruning	10.0	67.50	20.00			87.50
Brush Disposal	4.0	20.00	16.80			36.80
Fertilizer	.3	1.50	1.80	Nitrogen 175# @ 30c	52.50	55.80
Spray, 10X				Materials + Application	260.00	260.00
Cultivate & Disc, 5X	2.2	11.00	15.75			26.75
Irrigation (surface) 6X	6.0	30.00		District Water	15.00	45.00
Misc. Labor	2.0	10.00				10.00
Replant	1.0	5.00		1/2 Tree - Tree, Stake, Fum.	5.00	10.00
Int. on Oper. Capital					43.00	43.00
TOTAL CULTURAL COSTS						
		145.00	54.35		375.50	574.85
Harvest Costs						
Landlevel	.3	1.50	2.40			3.90
Shake	1.5	10.13	12.00			22.13
Sweep	2.0	10.00	7.00			17.00
Pickup & Haul	1.5	7.50	15.00			22.50
Hull & Dry				Custom @ 4 1/2c/lb.	180.00	180.00
TOTAL HARVEST COSTS						
		29.13	36.40		180.00	245.53
Cash overhead						
Misc., office, etc.					65.63	65.63
Taxes					140.00	140.00
TOTAL CASH OVERHEAD						
					205.64	205.63
TOTAL CASH COST						
		174.13	90.75		761.13	1026.01
INVESTMENT						
	Per Acre			Annual Cost		
				Depreciation	Interest @ 14%	
Land	4,500			--	630.00	
Trees	11,416			456.64	799.12	
Irrigation system	200			13.33	14.00	
Buildings	150			7.50	10.50	
Equipment	2,162			216.20	151.34	
Total	18,428			693.67	1,604.96	2298.63
TOTAL COST PER ACRE						
Cost per ton	@ 2 ton	yield				\$324.64
						\$662.32

SAMPLE COSTS TO PRODUCE: TERMINAL BEARING ENGLISH WALNUTS - (HARLEI VARIETY)
MOWED & SPRINKLER IRRIGATED)
SACRAMENTO VALLEY - 1982

Production data: Based on 100 acres, 30'X30' spacing, 48 trees/acre (10-15 yr. old trees).
 Labor at \$5.00/hr. unskilled, & \$6.75/hr. skilled, includ. fringe benefits. Yield: 2 tons/acre.

Operation	Hours Per Acre	Cash and labor cost per acre				Your Costs
		Labor	Fuel and repairs	Materials Kind and Quantity Cost	Total	
Cultural costs						
Pruning	5.0	33.75	10.00			43.75
Brush Disposal	2.0	10.00	8.40			18.40
Fertilizer	.3	1.50	1.80	Nitrogen 175# @ 30c	52.50	55.80
Spray, 5X				Materials + Application		160.00
Mow, 8X	3.2	16.00	16.80			32.80
Irrigation	6.0	30.00		Power to pump 3ac.ft. @ \$25	75.00	105.00
Strip Weed Spray	.5	2.50	2.25	Material	25.00	29.75
Misc. Labor	2.0	10.00				10.00
Replant	1.0	5.00		1/2 tree-tree, stake, fumig.	5.00	10.00
Interest on Oper. Capital					37.00	37.00
TOTAL CULTURAL COSTS						
		108.75	39.25		354.50	502.50
Harvest Costs						
Shake	2.0	13.50	16.00			29.50
Sweep	2.0	10.00	7.00			17.00
Pickup & Haul	1.5	7.50	15.00			22.50
Hull & Dry				Custom @ 4 1/2c/lb.	180.00	180.00
TOTAL HARVEST COSTS						
		31.00	38.00		180.00	249.00
Cash overhead						
Misc., office, etc.					60.12	60.12
Taxes					140.00	140.00
TOTAL CASH OVERHEAD						
					200.12	200.12
TOTAL CASH COST						
		139.75	77.25		734.62	951.62
INVESTMENT						
	Per Acre			Annual Cost		
Land	4,500			Depreciation	Interest @ 14%	
Trees	11,216			--	630.00	
Irrigation system	550			448.64	785.12	
Buildings	150			36.67	38.50	
Equipment	2,162			7.50	10.50	
				216.20	151.34	
Total	\$18,578			709.01	1,615.46	
						2324.47
TOTAL COST PER ACRE						3276.09
Cost per ton @ 2 ton yield						1638.05

EQUIPMENT INVESTMENT FOR ENGLISH WALNUT PRODUCTION

SACRAMENTO VALLEY - 1982

	<u>Cost</u>	<u>Operating Cost Per Hour</u>
<u>CULTURAL EQUIPMENT:</u>		
Tractor, 60 hp Wheel Diesel	\$20,000	\$7.00
Tractor, 30 hp Wheel Diesel	14,000	4.00
Mower	6,000	1.25
Speed Sprayer, 500-gallon	35,000	3.50
Buck Rake	1,000	.20
Harrow, Offset Disc 10'	5,000	1.15
Landleveler	5,000	1.00
Ridger	1,500	.35
Weed Sprayer, 300 gallon	2,500	.50
Pruning Equipment (2 towers)	24,000	2.00
Pickup, ½ ton	9,000	---
Truck, 1½ ton	16,000	---
Nurse Tank and Pump	<u>2,800</u>	---
	\$141,800	
<u>HARVEST EQUIPMENT:</u>		
Rake, SP	15,000	3.50
Pickup Machinery, PTO	15,000	2.50
Shaker	42,000	8.00
Carts - 3	<u>2,400</u>	.20
	\$74,400	
TOTAL EQUIPMENT INVESTMENT	\$216,200.00	
Per Acre on 100 Acres	2,162.00	
Depreciation per Acre	216.20	
Interest per Acre	151.34	

VARYING YIELD TABLES^{1/}

	-----Yield - Pounds Per Acre-----				
	2,000	3,000	4,000	5,000	6,000
<u>Lateral Bearing, Cultivated and Surface Irrigated:</u>					
Cash Costs per Acre	\$1,020	\$1,140	\$1,260	\$1,380	\$1,500
Total Costs per Acre	\$3,192	\$3,312	\$3,432	\$3,552	\$3,672
<u>Lateral Bearing, Mowed and Sprinkler Irrigated:</u>					
Cash Costs per Acre	\$1,131	\$1,251	\$1,371	\$1,491	\$1,611
Total Costs per Acre	\$3,351	\$3,471	\$3,591	\$3,711	\$3,831
<u>Terminal Bearing (Hartley), Mowed and Sprinkler Irrigated:</u>					
Cash Costs per Acre	\$ 943	\$1,063	\$1,183	\$1,303	\$1,423
Total Costs per Acre	\$3,140	\$3,200	\$3,380	\$3,500	\$3,620

^{1/} This table is based on a custom harvest rate of 12¢ per lb. The cost studies assume operator owned harvest equipment. The appropriate changes were made in the cash costs and investment costs to reflect a custom harvest operation in developing this table. At a yield of 4,000 lbs. (2 tons) per acre the cash and total costs for custom harvest are higher while investment costs are lower than for an operation owning its harvest equipment.