

ESTABLISHMENT AND PRODUCTION COSTS FOR WALNUTS

Late Leafing Terminal-Bearing

WN-VN-90-3

Northern San Joaquin Valley
-1990-



ESTABLISHMENT AND PRODUCTION ASSUMPTIONS
FOR GROWING WALNUTS

Northern San Joaquin Valley - 1990

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

1. Labor rates shown include 27% for SDI, FICA, insurance, and other benefits. To account for maintenance and repair time, labor hours for operations involving machinery are 10% higher than the machine hours.
2. Land and trees for establishing a new orchard in 1990:
Bare land value (63 acres): \$4,500/acre

Since only 60 of the 63 total acres are in production, the land value per acre needs to be adjusted to \$4,725 per producing acre. To obtain the annual costs for depreciation, the establishment costs are divided by 20 years. Land is not depreciated. Interest on the investment in land and trees is calculated by multiplying the interest rate (12%) by the average value of land and trees. The average value of the trees is estimated to be one-half of the establishment costs.

3. Varieties:

Separate establishment and production cost studies have been developed for each of three walnut variety types: (1) early leafing lateral-bearing, (2) late leafing lateral-bearing and, (3) late leafing terminal-bearing. A partial listing of varieties included in these categories is shown below:

Lateral-bearing		Terminal-bearing
Early leafing	Late leafing	Late leafing
Payne	Chandler	Hartley
Ashley	Howard	Franquette
Vina		Eureka
Serr		
Chico		

There are several differences among variety types that affect costs, labor and equipment requirements, and yield. The most significant difference is the number of trees per acre; terminal-bearing trees are planted fewer to the acre than lateral-bearing. For the late-leafing

varieties, less pesticide applications are made than for the early-leaving varieties. Terminal-bearing trees require less pruning per tree than lateral-bearing trees. Of course, terminal-bearing varieties bear more slowly than lateral-bearing varieties. This is reflected in the establishment cost studies in the fifth through eighth years.

4. 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 the new cost per acre by the years to trade. (c) "Interest" on investment is figured at 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.

5. 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.

6. Pruning:

Pruning and training costs during orchard establishment include dormant pruning and summer training of trunk and scaffold branches. All work is done by skilled hand labor through year 7. Starting in year 8, a pruning tower is used. Pruning costs shown in the Cost of Production worksheets reflect alternate year pruning for lateral bearing varieties and pruning every third year for terminal bearing varieties.

Year	Lateral-Bearing (Early leafing and Late leafing)	Terminal-Bearing (Late leafing)
1	6	6
2	9	9
3	11	3
4	6	3
5	3	3
6	3	3
7	3	3
8+	3	3

7. Irrigation:

Applied water pumped. System is assumed to be 70% efficient. A pipeline irrigation system is used. The orchard is flood-irrigated the first three years. Borders are put up after that and the row middles are disced. Water applications rates are as follows:

Year	Acre Feet/Year
1	1.0
2	1.0
3	2.0
4	2.5
5	3.0
6+	3.5

8. Orchard floor management:

Middles are cross-disced 6X per season through year 3 of orchard establishment. Thereafter, pre-emergent herbicide strip spray is applied in the fall, contact strip spray in spring, and middles are disced.

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

10. Interest:

An operating interest rate of 12% per year is assumed. Interest is charged on accumulated cash costs in establishment years to reflect interest charged on a long-term establishment loan. Interest is also charged at 12% on investment capital to account for the income foregone by keeping money tied up in capital equipment.

1990 WALNUT ORCHARD
SAMPLE ESTABLISHMENT AND PRODUCTION COSTS

LATE LEAFING TERMINAL-BEARING VARIETIES

Northern San Joaquin Valley

by

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This cost study provides detailed information on the sample costs of producing walnuts in the northern San Joaquin Valley. Costs are projected for a hypothetical 60 acre orchard with 3 non-producing acres for buildings, roads, ditches, burn area, etc.

This study contains five tables and a List of General Assumptions. The tables include an Establishment Cost Worksheet, a Cost of Production Worksheet, a Monthly Summary of Sample Costs, an Equipment List, and a Ranging Analysis showing returns over costs at varying yields and prices. Costs given in this sample study are for those of a typical well-managed orchard and are not intended to reflect an average of all orchards in the northern San Joaquin 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 1990 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.

For an explanation of calculations used in this study, refer to the attached list of General Assumptions or call Agricultural Economics Extension, University of California, Davis, California, (916) 752-3563, or call the farm advisor in your county. SuperCalc4 or Lotus 1-2-3 templates of this cost study on IBM formatted floppy discs are also available through your farm advisor.

SAMPLE COSTS TO ESTABLISH ENGLISH WALNUT ORCHARD
LATE LEAFING TERMINAL-BEARING
Northern San Joaquin Valley - 1990

Costs are for an orchard planted 40' X 40', with 27 trees/acre. A pipeline irrigation system is used.

Skilled labor: \$8.04 per hour Interest rate: 12.0%
Field labor: \$6.37 per hour

YEAR	Costs per Acre							
	1st	2nd	3rd	4th	5th	6th	7th	8th
YIELD (Pounds/acre)						400	900	2,000
Planting costs								
Land preparation: subsoil - contract	180							
Level, disk and float: 2 hrs-labor & tractor	35							
Trees: 27 @ \$11.00 (+2 2nd Yr. & 1 3rd Yr.)	297	22	11					
Stakes	34							
Survey, mark, plant and paint	38	2	1					
TOTAL PLANTING COSTS	\$584	\$24	\$12					
Cultural costs:								
Prune and train (skilled hand labor)	\$48	\$72	\$24	\$24	\$20	\$20	\$20	\$20
Brush disposal	5	9	30	30	30	30	30	30
Tillage and Irrigation Preparation	62	62	62	31	31	31	31	31
Weed control sprays (material & application)	0	0	0	33	33	33	33	33
Irrig. labor: 4 hrs yrs 1-2, 6 hrs yrs 3+	25	25	38	38	38	38	38	38
Water @ \$8/ac. ft.	8	8	16	20	24	28	28	28
Fertilizer: N @ \$0.28/lb + labor & tractor	4	5	7	11	18	34	59	59
Miscellaneous labor and power - 1 hour	25	25	25	25	25	25	25	25
Pick-up truck costs	25	25	25	25	25	25	25	25
TOTAL CULTURAL COSTS	\$202	\$232	\$227	\$237	\$245	\$264	\$289	\$289
Harvesting Costs:								
Pick and haul - \$105/ton						21	47	105
Hull and dry - \$85/ton						17	38	85
TOTAL HARVEST COSTS						\$38	\$86	\$190
Overhead Costs:								
Office and business costs	100	100	100	100	100	100	100	100
County Taxes	56	56	56	56	56	86	92	99
Insurance	21	21	21	21	21	21	21	21
TOTAL OVERHEAD COSTS	\$177	\$177	\$177	\$177	\$177	\$207	\$213	\$220
TOTAL CASH COSTS	\$963	\$432	\$416	\$413	\$421	\$510	\$588	\$699
ACCUMULATED CASH COSTS	\$963	\$1,395	\$1,811	\$2,224	\$2,646	\$3,155	\$3,743	\$4,442

YEAR	Costs per Acre							
	1st	2nd	3rd	4th	5th	6th	7th	8th
Depreciation:								
Buildings, equipment and irrigation system	87	87	87	87	87	87	87	87
TOTAL DEPRECIATION	\$87	\$87	\$87	\$87	\$87	\$87	\$87	\$87
Interest on Investment								
Buildings, equipment and irrigation system	66	66	66	66	66	66	66	66
Land \$4500/acre	600	600	600	600	600	600	600	600
Interest on accumulated cash costs	116	167	217	267	317	379	449	533
TOTAL INTEREST ON INVESTMENT	\$782	\$833	\$883	\$933	\$983	\$1,045	\$1,115	\$1,199
TOTAL COST FOR THE YEAR	\$1,832	\$1,353	\$1,386	\$1,433	\$1,492	\$1,641	\$1,790	\$1,985
CREDIT FROM HARVEST @ \$0.50/POUND						\$200	\$450	\$1,000
NET COST FOR THE YEAR	\$1,832	\$1,353	\$1,386	\$1,433	\$1,492	\$1,441	\$1,340	\$985
TOTAL ACCUMULATED NET COST	\$1,832	\$3,184	\$4,570	\$6,003	\$7,495	\$8,937	\$10,276	\$11,261

SAMPLE COSTS TO PRODUCE ENGLISH WALNUTS
 Late-Leafing and Terminal-Bearing
 Northern San Joaquin Valley - 1990

Labor Rate: \$8.04/hr. skilled labor Interest Rate: 12%
 \$6.37/hr. field labor Yield - dry (lbs/acre): 3,500

Operation	Tractor/ Implement No.	Implement No.	Hours	Labor Cost/A	Fuel & Repairs	Material Cost	Cash and Labor Costs per Acre Custom /Rent	Total Cost	Your Cost
Cultural costs:									
Pruning (1 of 3 years)		7	1.0	\$8.04	\$9.00			\$17	
Brush Disposal	1	5	.5	4.42	\$3.99			8	
Extra Labor			3.5	22.28				22	
Fertilize (200# N @ \$.28)	1		.2	1.77	.99	\$56.00		59	
Tillage and irrig. prep.	1	2	1.8	15.92	15.39			31	
Irrigation (7 X 6" = 42")		8				28.00		28	
Labor			6.0	38.19				38	
Weed control spray 2X	1	6	.6	5.31	5.36	22.17		33	
Miscellaneous			4.0	25.46				25	
Costs for pick up truck					25.00			25	
Interest on operating capital @ 12%								23	
TOTAL CULTURAL COSTS			18	\$121	\$60	\$106		\$310	
Harvest Costs:									
Pick and haul				\$105 per ton			\$184	\$184	
Hull & Dry				\$85 per ton			149	149	
TOTAL HARVEST COSTS							\$333	\$333	
Cash overhead:									
Office and business costs								\$100	
County Taxes								107	
Insurance								21	
TOTAL CASH OVERHEAD COSTS								\$228	
TOTAL CASH COSTS								\$870	
TOTAL CASH COST/TON:			3500 lbs/acre yield					\$497	
Investment									
		Per production Acre		----- Annual Cost -----					
				Depreciation	Interest @ 12%				
Land (bare)		\$4,500				\$540		\$540	
Equipment & buildings		1,093		\$87		66		153	
Trees (40 yr. depreciation)		11,261		282		676		957	
TOTAL INVESTMENT COSTS		\$ 16,854		\$369		\$1,281		\$1,650	
TOTAL COSTS PER ACRE								\$2,520	
TOTAL COST/TON:			3500 lbs/acre yield					\$1,440	

LATE-LEAFING TERMINAL-BEARING WALNUTS
MONTHLY SUMMARY OF PER ACRE CASH COSTS

Production Year: November - October
Northern San Joaquin Valley - 1990

Operation	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	TOTAL
Cultural costs:													
Pruning			17.0										\$17
Brush Disposal					8.4								8
Extra Labor					22.3								22
Fertilize (200# N)					29.4				29.4				59
Tillage & irri. prep.						5.2	5.2	5.2	5.2	5.2	5.2		31
Irrigation (7 X 6")						4.0	4.0	4.0	4.0	4.0	4.0	4.0	28
Labor						5.5	5.5	5.5	5.5	5.5	5.5	5.5	38
Weed control 2X*						12.7						20.1	33
Miscellaneous						12.7					12.7		25
Pick-up truck costs	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	25
Interest on operating capital @ 12%			.2	.3	.9	1.3	1.5	1.7	2.2	2.3	6.0	6.4	23
TOTAL CULTURAL COSTS	\$2	\$2	\$19	\$2	\$63	\$44	\$18	\$18	\$48	\$19	\$35	\$38	\$310
Harvest Costs (1.75 tns/A):													
Pick and haul											183.8		184
Hull & Dry											148.8		149
TOTAL HARVEST COSTS											\$333		\$333
Cash overhead:													
Office and business	8.3	8.3	8.3	8.3	8.3	8.3	8.3	8.3	8.3	8.3	8.3	8.3	100
County Taxes		53.4				53.4							107
Insurance			21.0										21
TOTAL CASH OVERHEAD	\$8	\$62	\$29	\$8	\$8	\$62	\$8	\$8	\$8	\$8	\$8	\$8	\$228
TOTAL CASH COSTS	\$10	\$64	\$49	\$11	\$71	\$105	\$27	\$27	\$57	\$27	\$376	\$46	\$870

* Preemergence in October. Contact in April.

EQUIPMENT AND BUILDING LIST FOR LATE-LEAFING TERMINAL-BEARING ENGLISH WALNUTS
Northern San Joaquin Valley - 1990

Interest Rate: 12½

Fuel Cost per Gallon \$1.00 diesel
\$1.00 unleaded

ITEM #	DESCRIPTION	NEW COST	ANNUAL USE (ACRES)	COST PER ACRE	LIFE (HRS)	YEARS TO TRADE	OVERHEAD* DEPRECIATION	INTEREST*	TAR*	FUEL*	REPAIRS*	HOURLY COSTS TOTAL
Tractors:												
1	55 HP wheel diesel	\$20,000	60	\$333	12,000	10	\$33.33	\$20.00	120½	\$2.95	\$2.00	\$4.95
2	Disc, tandem 14'	7,500	60	125	2,500	10	12.50	7.50	120		3.60	3.60
3	Float	2,000	60	33	2,500	10	3.33	2.00	120		.96	.96
4	Brush rake	1,000	60	17	2,500	15	1.11	1.00	100		.40	.40
5	Brush shredder	7,600	60	127	2,500	10	12.67	7.60	100		3.04	3.04
6	Weed sprayer, SP	1,650	60	28	2,000	10	2.75	1.65	120	3.00	.99	3.99
7	Pruning tower	15,000	60	250	2,000	20	12.50	15.00	120		9.00	9.00
8	Pipeline irrigation system	24,000	60	400	27,000	20	20.00	24.00	10		.09	.09
9	Pick-up, 1/2 ton	14,000	60	233	2,000	7	33.33	14.00	60			
	Miscellaneous shop tools	4,500	60	75		10	7.50	4.50				
	Buildings	12,000	60	200		30	6.67	12.00				
TOTAL COST		\$109,250		\$1,821			\$146	\$109				
60% OF NEW COSTS*		\$65,550		\$1,093			\$87	\$66				

* 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 LATE-LEAFING TERMINAL-BEARING WALNUTS AT VARYING PRICES AND YIELDS

	YIELD (Pounds/acre)								
	1000	1500	2000	2500	3000	3500	4000	4500	5000
Cultural Costs	310	310	310	310	310	310	310	310	310
Harvest Costs	95	143	190	238	285	333	380	428	475
Cash Overhead	228	228	228	228	228	228	228	228	228
Cash cost/acre	633	680	728	775	823	870	918	965	1,013
Cash cost/ton	1,266	907	728	620	549	497	459	429	405
Investment cost	1,650	1,650	1,650	1,650	1,650	1,650	1,650	1,650	1,650
TOTAL COST/ACRE	2,283	2,330	2,378	2,425	2,473	2,520	2,568	2,615	2,663
TOTAL COST/TON	4,566	3,107	2,378	1,940	1,649	1,440	1,284	1,162	1,065

PER ACRE INCOME ABOVE CASH COSTS AT VARYING PRICES AND YIELDS

Dollars per Dry In-shell Pound	YIELD (Pounds/acre)								
	1000	1500	2000	2500	3000	3500	4000	4500	5000
.30	-333	-230	-128	-25	77	180	282	385	487
.35	-283	-155	-28	100	227	355	482	610	737
.40	-233	-80	72	225	377	530	682	835	987
.45	-183	-5	172	350	527	705	882	1,060	1,237
.50	-133	70	272	475	677	880	1,082	1,285	1,487
.55	-83	145	372	600	827	1,055	1,282	1,510	1,737
.60	-33	220	472	725	977	1,230	1,482	1,735	1,987

PER ACRE INCOME ABOVE TOTAL COSTS AT VARYING PRICES AND YIELDS

Dollars per Dry In-shell Pound	YIELD (Pounds/acre)								
	1000	1500	2000	2500	3000	3500	4000	4500	5000
.30	-1,983	-1,880	-1,778	-1,675	-1,573	-1,470	-1,368	-1,265	-1,163
.35	-1,933	-1,805	-1,678	-1,550	-1,423	-1,295	-1,168	-1,040	-913
.40	-1,883	-1,730	-1,578	-1,425	-1,273	-1,120	-968	-815	-663
.45	-1,833	-1,655	-1,478	-1,300	-1,123	-945	-768	-590	-413
.50	-1,783	-1,580	-1,378	-1,175	-973	-770	-568	-365	-163
.55	-1,733	-1,505	-1,278	-1,050	-823	-595	-368	-140	87
.60	-1,683	-1,430	-1,178	-925	-673	-420	-168	85	337