UNIVERSITY OF CALIFORNIA COOPERATIVE EXTENSION

2002

SAMPLE COSTS TO ESTABLISH A WALNUT ORCHARD AND PRODUCE

WALNUTS

English

CENTRAL COAST- San Benito County

HOMESITE – Five-Acre Farm

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INTRODUCTION

Sample costs to establish a walnut orchard and produce walnuts on five-acres purchased as a home site in the Central Coast - San Benito County are presented in this study. This study is intended as a guide only, and can be used to make production decisions, determine potential returns, prepare budgets and evaluate production loans. Practices described are based on production practices considered typical for the crop and area, but will not apply to every farm. Sample costs for labor, materials, equipment and custom services are based on current figures. A blank column, "*Your Costs*", in Tables 2 and 3 is provided to enter your farming costs.

The hypothetical farm operation, production practices, overhead, and calculations are described under the assumptions. For additional information or an explanation of the calculations used in the study call the Department of Agricultural and Resource Economics, University of California, Davis, (530) 752-3589 or your local UC Cooperative Extension office.

Sample Cost of Production Studies for many commodities are available and can be requested through the Department of Agricultural and Resource Economics, UC Davis, (530) 752-1515. Current studies can be obtained from selected county UC Cooperative Extension offices or downloaded from the department website at http://coststudies.ucdavis.edu.

ASSUMPTIONS

The following assumptions refer to tables 1 to 7 and pertain to sample costs to establish a walnut orchard (table 1) and produce walnuts (tables 2 to 7) on five-acre home sites in the Central Coast - San Benito County. Practices described are not University of California recommendations, but represent production practices considered typical for this crop and area. Practices listed may not be done during every production year, while practices not listed may be needed. Cultural practices vary by grower, region, and year. Differences can be significant. For further cultural practice information, see UC publication *Walnut Production Manual* (publication 3373). The practices and inputs used in the cost study serve as a guide only. **The use of trade names in this report does not constitute an endorsement or recommendation by the University of California nor is any criticism implied by omission of other similar products**.

Farm. The hypothetical farm consists of five contiguous acres purchased for a home site. Walnuts are established on four acres. The owner farms the orchard, but the main income is from off-farm sources.

Establishment Operating Costs

Site Preparation. A custom operator rips the ground in two directions, two to three-feet deep, to break up underlying hardpan and open the soil for good root development. The grower discs twice to break up clods, then floats twice to level and smooth the surface. All operations that prepare the orchard for planting are done in the year prior to planting, but costs are shown in the first year.

Trees. No specific variety of English walnuts is planted in this study, but a late-leafing cultivar is assumed to reduce blight and codling moth management costs. Some typical late-leafing cultivars planted in the county are Chandler, Tulare, and Howard. Some orchards will include a small percentage of a second variety to insure pollen shedding and bloom period overlaps, especially when Chandler is planted. Paradox is the common rootstock in new plantings although Northern California black walnut may be used in some situations. The variety planted determines spacing. In this study, the 5/8 inch 2 year old trees are planted on 22 X 22 foot spacing, 90 trees per acre. The life of the orchard at planting is estimated to be 35 years.

Planting. Planting by the grower starts in the spring with surveying and marking tree sites with a small stake, digging holes, planting, topping, and staking trees. Trees are painted white for sunburn protection. In the second year, 4% of the orchard or two trees per acre are replanted. The grower rents a PTO driven auger to make the tree holes.

Fertilization. Nitrogen is the major nutrient required for tree growth and optimum yields, but some locations may require additional nutrients. Beginning in the second year, nitrogen fertilizer is applied in liquid form as UN 32 through the irrigation system. Projected annual rates of actual N are shown in Table A. In the sixth year and every third year thereafter, leaf samples are taken to determine actual nutrient requirements. One third of the cost is charged to the orchard each year.

Table A. Applied Nitrogen

Year	Actual N lbs/acre
1	0
2	50
3	50
4	50
5	50
6	60
7	75
8	100
9	125
10+	150

Pruning. Pruning and training begins in the first year, when the central leader that forms the trunk is selected and tied to the stake. Dormant pruning during

the second and third year develops the scaffolds originating from the main trunk. In the fourth through eighth year, heading cuts are made removing a portion of the current year's growth. During the first four years, the brush is placed in the row middles and chopped during the first discing. In the following years, the brush is pushed to the edge of the orchard and burned.

Irrigation. Price per acre-foot of water will vary by grower depending on power source, well characteristics, and irrigation district. In this study, water is calculated to cost $90 per acre-foot or $7.50 per acre-inch. No assumption is made about effective rainfall. The water applied to the orchard is shown in Table B**.**

Table B. Applied Irrigation Water

Year	acin/year	$/acre
1-4	12	90
5-9	15	113
10+	18	135

Pest Management. The pesticides and rates mentioned in this cost study are listed in *UC Integrated Pest Management Guidelines, Walnuts.* See the Integrated Pest Management (IPM) website for other materials available.

Weeds. Weed pressure, materials and application timing can vary each season. In this study, the tree row is sprayed prior to planting with preemergence (Goal) and contact (Roundup) herbicides. In-season sprays using Roundup are applied to the tree row in July. Winter strip sprays (Roundup and Goal) are applied during the dormant period (January) beginning in year two. The row middles are mowed or disced (disced in this study) five times.

Diseases. During the establishment years disease control for walnut blight is minimal. Beginning in the sixth year, a copper fungicide (Kocide) plus Manex is applied once in April. Materials are not applied at full rate on the young trees, resulting in lower costs.

Insects. Codling moth is assumed to reach treatment levels by the sixth year. One Lorsban application is made in July in the sixth and seventh year. Two applications – June and July - are made beginning in the eighth year. The 1A flight in May is skipped because of the use of a late-leafing cultivar.

Table C. Annual yields

Year	Dry Inshell lb/acre
6	180
7	270
8	410
9	610
10	910
11	1,400
12	2,000

Harvest. Depending upon variety, harvest starts in the fifth or sixth establishment year (sixth year in this study). The first crop is mechanically shaken by a custom operator. The grower pickups the walnuts by hand and puts them in a bin. This operation may be continued for an additional year to cut costs. Subsequently, a custom operator mechanically shakes, sweeps and picks ups the nuts. Yield maturity is reached in the twelfth year. Estimated yields are shown in Table C.

Production Operating Costs

Pruning. The grower does pruning to open the canopy, maintain healthy buds, lower tree height, remove dead and undesired limbs during the winter months. Prunings are placed in the row middles, pushed to the orchard edge and burned.

Fertilization. Tree nutrient status is determined from leaf samples taken in July. Samples are taken every third year, therefore one-third of the cost is charged to the orchard each year. Nitrogen at 150 pounds per acre is applied through the irrigation system in May.

Irrigation. The crop uses 18-acre inches of water, which the grower applies. No assumption is made about effective rainfall. In this study, water supplied from the San Luis Reservoir by way of the San Felipe Project cost $90 per acre-foot or $7.50 per acre-inch.

Pest Management. The pesticides and rates mentioned in this cost study are listed in *UC Integrated Pest Management Guidelines, Walnuts.* For more information on other pesticides available, pest identification, monitoring, and management visit the UC IPM website at www.ipm.ucdavis.edu. Written recommendations are required for many pesticides and are made by licensed pest control advisors (PCA). In addition, the PCA monitors the field for pests and nutrition. Growers may hire private PCA's or receive the service as part of a service agreement with an agricultural chemical and fertilizer company. For information and pesticide use permits, contact the local county agricultural commissioner's office.

*Weeds***.** Weeds in mature orchards are controlled with the same chemicals and cultural practices as during the establishment years. Weeds are controlled in the tree row with winter and in-season strip sprays using preemergent/postemergent and contact herbicides. Goal and Roundup are applied in January (winter strip spray). Roundup is applied during the growing season (in-season strip spray). Row middles are disced five times from April through August.

Insects. Codling moth (*Cydia pomonella*), a major pest, can cause damage resulting in offgrade nuts. Multiple generations occur and are controlled based on population monitoring. Two treatments are assumed; Lorsban is applied in June and July. The 1A flight in May is generally not a significant problem with late-leafing cultivars. Some locations may also require walnut husk fly (*Rhagoletis completa*) bait sprays, but this cost is not included in this study.

Disease. Walnut Blight (*Xanthomonas campestris* p.v. *juglandis)* is a spring disease that infects the nutlets and is the only disease treated in this study. One treatment with Kocide, a copper compound, and Manex is applied in April.

Harvest. Custom harvesters shake, sweep, pick up, and haul the walnuts to the huller/dryer. Hand raking is needed to windrow walnuts missed by the sweeper. In this study, the grower does the hand raking. After drying, the walnuts are sold to processors. Hulling and drying costs are charged on a per pound, dry-weight basis. Custom harvest operators usually charge by the hour and have a minimum job charge. The costs in this study have been converted to per acre charges and no minimum or small job charges are accounted for.

Yields. Yields are measured in clean, dry, in-shell tons or pounds per acre.

Returns. Actual price depends on a number of factors such as demand, size of the state crop, variety, nut size, and quality. An estimated price of $0.60 per pound is used in this study so that a ranging analysis for different yields and prices can be calculated.

Assessments. Under a state marketing order, the California Walnut Commission (CWC) collects mandatory assessment fees. These assessments are charged to the grower to pay for walnut marketing, advertising, and research programs. The CWC has a current fee of $0.01 per pound of dry in-shell nuts.

Labor. The study assumes the grower is doing all work; therefore no labor cost is allocated to skilled and unskilled labor. Labor for operations involving machinery are 20% higher than the operation time given in Table 2 to account for the extra labor involved in equipment set up, moving, maintenance and repair.

Equipment Operating Costs. Repair costs are based on purchase price, annual hours of use, total hours of life, and repair coefficients formulated by ASAE. Fuel and lubrication costs are also determined by ASAE equations based on maximum PTO horsepower, and fuel type. Prices for on-farm delivery of diesel and gasoline are $1.26 and $1.51 per gallon, respectively. The fuel, lube, and repair cost per acre for each operation in Table 2 is determined by multiplying the total hourly operating cost in Table 6 for each piece of equipment used for the selected operation by the hours per acre. Tractor time is 10% higher than implement time for a given operation to account for setup, travel and down time.

Interest On Operating Capital. Interest on operating capital is based on cash operating costs and is calculated monthly until harvest at a nominal rate of 7.40% per year. A nominal interest rate is the typical market cost of borrowed funds. The interest cost of post harvest operations is discounted back to the last harvest month using a negative interest charge.

Risk. The risks associated with producing and marketing walnuts are high. While this study makes every effort to model a production system based on typical, real world practices, it cannot fully represent financial, agronomic and market risks, which affect the profitability and economic viability of walnut production.

Cash Overhead

Cash overhead consists of various cash expenses paid out during the year that are assigned to the whole farm and not to a particular operation. These costs include property taxes, interest on operating capital, office expense, liability and property insurance, and equipment repairs.

Property Taxes. Counties charge a base property tax rate of 1% on the assessed value of the property. In some counties special assessment districts exist and charge additional taxes on property including equipment, buildings, and improvements. For this study, county taxes are calculated as 1% of the average value of the property. Average value equals new cost plus salvage value divided by 2 on a per acre basis.

Insurance. Insurance for farm investments varies depending on the assets included and the amount of coverage. Property insurance provides coverage for property loss and is charged at 0.66% of the average value of the assets over their useful life. Liability insurance covers accidents on the five-acre farm and costs $409 for the entire farm. Small hobby farms may have additional insurance costs.

Office Expense. Office and business expenses are estimated at $125 per producing acre or $500 per farm. These expenses include office supplies, telephones, bookkeeping, accounting, legal fees, shop utilities and miscellaneous administrative costs.

Establishment Cost. Costs to establish the orchard are used to determine the non-cash overhead expenses, capital recovery, and interest on investment for the production years. The establishment cost is the sum of cash costs for land preparation, planting, trees, production expenses, and cash overhead for growing walnut trees through the first year nuts are harvested less returns from production. The *Accumulated Net Cash Cost* in the sixth year shown in Table 1 represents the establishment cost per acre. For this study, the cost is $5,114 per acre or $20,456 for the four-acre orchard. Establishment cost is amortized beginning in the seventh year over the remaining 29 years of production.

Supervisor/Management Salaries. Wages for management are not included as a cash cost. Any return above total costs is considered a return to management and risk.

Investment Repairs. Costs are calculated as 2% of the purchase price on investments listed in Table 5.

Non-cash Overhead (Investments).

Non-cash overhead is calculated as the capital recovery cost for equipment and other farm investments.

Capital Recovery Costs. Capital recovery cost is the annual depreciation and interest costs for a capital investment. It is the amount of money required each year to recover the difference between the purchase price and salvage value (unrecovered capital). It is equivalent to the annual payment on a loan for the investment with the down payment equal to the discounted salvage value. This is a more complex method of calculating ownership costs than straight-line depreciation and opportunity costs, but more accurately represents the annual costs of ownership because it takes the time value of money into account (Boehlje and Eidman). The formula for the calculation of the annual capital recovery costs is ((Purchase Price – Salvage Value) x Capital Recovery Factor) + (Salvage Value x Interest Rate).

Salvage Value. Salvage value is an estimate of the remaining value of an investment at the end of its useful life. For farm machinery (tractors and implements) the remaining value is a percentage of the new cost of the investment (Boehlje and Eidman). The percent remaining value is calculated from equations developed by the American Society of Agricultural Engineers (ASAE) based on equipment type and years of life. The life in years is estimated by dividing the wear out life, as given by ASAE by the annual hours of use in this operation. For other investments including irrigation systems, buildings, and miscellaneous equipment, the value at the end of its useful life is zero. The salvage value for land is the purchase price because land does not depreciate. The purchase price and salvage value for equipment and investments are shown in Table 5.

Capital Recovery Factor. Capital recovery factor is the amortization factor or annual payment whose present value at compound interest is 1. The amortization factor is a table value that corresponds to the interest rate used and the life of the machine.

Interest Rate. The interest rate of 6.41% used to calculate capital recovery cost is the United States Department of Agriculture-Economic Reporting Service's (USDA-ERS) ten-year average of California's agricultural sector long run rate of return to production assets from current income. It is used to reflect the long-term realized rate of return to these specialized resources that can only be used effectively in the agricultural sector. In other words, the next best alternative use for these resources is in another agricultural enterprise.

Irrigation System. The cost includes the filtration system, installation and materials for the micro-sprinklers. Water from the San Luis Reservoir by way of the San Felipe Project is delivered by pressurized pipe to each farm. The system is connected directly to the pressurized pipe.

Fuel Tanks. Two 250-gallon fuel tanks are placed on stands in cement containment meeting Federal, State, and local regulations. Fuel is delivered to the equipment by gravity feed.

Land. Current market prices for five-acre home sites are $450,000. Being the land is purchased mainly for a home site, the value of the land is not included as overhead costs.

Equipment Costs. Equipment costs are composed of three parts: non-cash overhead, cash overhead, and operating costs. Both of the overhead factors have been discussed in previous sections. The operating costs consist of repairs, fuel, and lubrication and are discussed under operating costs. Although farm equipment used for walnuts may be purchased new or used, this study shows the current purchase price for new equipment. The new purchase price is adjusted to 40% to indicate a mix of new and used equipment. Annual ownership costs (equipment and investments) are shown in the tables and represent the capital recovery cost for investments on an annual per acre basis.

Table Values. Due to rounding, the totals may be slightly different from the sum of the components.

REFERENCES

American Society of Agricultural Engineers. (ASAE). 1992. *American Society of Agricultural Engineers Standards Yearbook*. St. Joseph, MO.

Boelje, Michael D., and Vernon R. Eidman. 1984. *Farm Management*. John Wiley and Sons. New York, NY.

Buchner, Richard P., John P. Edstrom, Janine K. Hasey, William H. Krueger, William H. Olson, Wilbur O. Reil, Karen M. Klonsky, and Richard L. De Moura. 2002. *Sample Costs to Establish and Produce Walnuts, Sacramento Valley.* University of California, Cooperative Extension. Department of Agricultural and Resource Economics. Davis, CA.

Integrated Pest Management Education and Publications. "UC IPM Pest Management Guidelines: Walnut". In M. L. Flint (ed.) *UC IPM Pest Management Guidelines.* University of California. Division of Agriculture and Natural Resources. Oakland, CA. Publication 3339.

Ramos, David E. (ed.). *Walnut Production Manual*. University of California, Division of Agricultural and Natural Resources. Oakland, CA. Publication 3373.

Reil, Wilbur. 2001. *Walnut Production in Yolo and Solano Counties of California.* University of California Cooperative Extension. Woodland, CA.

Schwankl, Larry, Terry Prichard, Blaine Hanson, Ilene Wellman. 2000. *Costs of Pressurized Irrigation Systems for Tree Crops.* University of California, Division of Agriculture and Natural Resources. Oakland, CA. Publication 21585.

USDA-ERS. 2000. *Farm Sector: Farm Financial Ratios*. Agriculture and Rural Economics Division, ERS. USDA. Washington, DC http://www.ers.usda.gov/data/farmbalancesheet/fbsdmu.htm; Internet; accessed January 4, 2002.

For information concerning the above or other University of California publications, contact UC DANR Communications Services at 1-800-994-8849, online at www.ucop.edu, or your local county UC Cooperative Extension office.

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Table 1. SAMPLE COSTS PER ACRE TO ESTABLISH AN ENGLISH WALNUT ORCHARD

CENTRAL COAST - San Benito County 2002

	Cost Per Acre								
Year:	1st	2nd	3rd	4th	5th	6th	7th	8th	9th
Yield: Dry, In-Shell Pounds Per Acre						180	270	410	610
Planting Costs:									
Land Preparation - Subsoil 2X	250								
Land Preparation - Disc 2X	3								
Land Preparation - Float 2X	3								
Land Prep-Weed: Preplant Strip Spray	29								
Trees: 90 Per Acre @ $15.00 ea, (2 in 2nd year)	1,350	30							
Survey, Mark, Dig Holes & Plant	7								
Stake & Paint Trees	225								
TOTAL PLANTING COSTS	1,867	30							
Cultural Costs:									
Pruning, Training & Tying 3X (Grower Labor)	0	0	0	0	0	0	0	0	0
Brush Disposal					1	1	1	1	1
Fertilizer - Nitrogen		16	16	16	16	19	23	31	39
Weed Control - Winter Strip Spray		29	32	32	32	32	32	32	32
Weed Control - Disc Middles 5X	7	7	7	7	7	7	7	7	7
Weed Control - In-Season Strip Spray	2	5	5	5	5	5	5	5	5
Disease Control - Walnut Blight						17	20	24	24
Irrigate	95	95	95	95	119	119	119	119	119
Insect Control - Codling Moth (1X Yr 6,7, 2X Yr 8+)						13	18	44	44
Leaf Analysis (1/3 yr)						5	5	5	5
TOTAL CULTURAL COSTS	104	152	155	155	180	218	230	268	276
Harvest Costs:									
Hand Pick (Grower Labor)						0			
Shake, Pick & Haul						50	109	110	112
Hand Rake (Grower Labor)						0	0	0	0
Hull Dry						11	16	25	37
California Walnut Commission Assessment Fee						2	3	4	6
TOTAL HARVEST COSTS						63	128	139	155
Interest On Operating Capital @ 7.40%	110	5	3	2	5	7	8	8	9
TOTAL OPERATING COSTS/ACRE	2,081	187	158	157	185	288	366	415	440
Cash Overhead Costs:									
Office Expense	125	125	125	125	125	125	125	125	125
Liability Insurance	102	102	102	102	102	102	102	102	102
Property Taxes	39	38	38	38	42	54	54	54	54
Property Insurance	26	25	25	25	28	36	36	36	36
Investment Repairs	65	65	65	65	65	65	65	65	65
TOTAL CASH OVERHEAD COSTS	357	355	355	355	362	382	382	382	382
TOTAL CASH COSTS/ACRE	2,438	542	513	512	547	670	748	797	822
INCOME/ACRE FROM PRODUCTION						108	162	246	366
NET CASH COSTS/ACRE FOR THE YEAR	2,438	542	513	512	547	562	586	551	456
PROFIT/ACRE ABOVE CASH COSTS									
ACCUMULATED NET CASH COSTS/ACRE	2,438	2,980	3,493	4,005	4,552	**5,114**	5,700	6,251	6,707
Capital Recovery									
Land (See assumptions)									
Shop Building	136	136	136	136	136	136	136	136	136
Fuel Tanks	36	36	36	36	36	36	36	36	36
Sprinkler Irrigation System	65	65	65	65	65	65	65	65	65
Equipment	273	262	262	262	312	457	457	457	457
TOTAL INTEREST ON INVESTMENT	510	499	499	499	549	694	694	694	694
TOTAL COST/ACRE FOR THE YEAR	2,948	1,041	1,012	1,011	1,096	1,364	1,442	1,491	1,516
INCOME/ACRE FROM PRODUCTION						108	162	246	366
TOTAL NET COST/ACRE FOR THE YEAR	2,948	1,041	1,012	1,011	1,096	1,256	1,280	1,245	1,150
NET PROFIT/ACRE ABOVE TOTAL COST									
TOTAL ACCUMULATED NET COST/ACRE	2,948	3,989	5,001	6,012	7,108	8,364	9,644	10,889	12,039

*Growers labor not included in any of the above costs. See Labor under Assumptions.

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Table 2. COSTS PER ACRE TO PRODUCE WALNUTS

CENTRAL COAST - San Benito County 2002

Operation	Operation Time (Hrs/A)	Cash and Labor Costs per acre *Labor Cost	Fuel, Lube & Repairs	Material Cost	Custom/ Rent	Total Cost	Your Cost
Cultural:							
Prune	6.00	0	0	0	0	0	
Prune-Brush Disposal	0.37	0	2	0	0	2	
Weed-Mow Middles 5X	1.25	0	7	0	0	7	
Disease-Walnut Blight	0.25	0	1	32	0	34	
Insect-Codling Moth 2X	0.50	0	3	55	0	58	
Fertilize-N	0.00	0	0	47	0	47	
Irrigate	1.20	0	0	142	0	142	
Weed-In-Season Spray	0.25	0	1	3	0	4	
Weed-Dormant Strip	0.25	0	1	30	0	32	
Leaf Analysis 1/3 Yr	0.04	0	0	0	5	5	
TOTAL CULTURAL COSTS	10.11	0	16	309	5	330	
Harvest:							
Harvest-Shake Pickup Haul	0.00	0	0	0	120	120	
Harvest-Rake Walnuts	1.50	0	0	0	0	0	
Harvest-Hull, Dry	0.00	0	0	0	120	120	
CWC Assessment Fee	0.00	0	0	20	0	20	
TOTAL HARVEST COSTS	1.50	0	0	20	240	260	
Interest on operating capital @ 7.40%						13	
TOTAL OPERATING COSTS/ACRE		0	16	329	245	603	
CASH OVERHEAD:							
Office Expense						125	
Liability Insurance						102	
Property Taxes						77	
Property Insurance						51	
Investment Repairs						65	
TOTAL CASH OVERHEAD COSTS						421	
TOTAL CASH COSTS/ACRE						1,023	
Non-cash Overhead:	Per Producing Acre			Annual Cost Capital Recovery			
Building	1,875			136		136	
Fuel Tanks	500			36		36	
Establishment	5,114			393		393	
Irrigation System	900			65		65	
Equipment	5,639			426		426	
TOTAL NON-CASH OVERHEAD COSTS	14,028			1,055		1,055	
TOTAL COSTS/ACRE						2,078	

*Grower's time shown, but labor costs not included. See Labor under Assumptions

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Table 3. COSTS AND RETURNS PER ACRE TO PRODUCE WALNUTS

CENTRAL COAST - San Benito County 2002

	Quantity /Acre	Unit	Price or Cost/Unit	Value or Cost/Acre	Your Cost
GROSS RETURNS					
Walnuts	2,000.00	lb	0.60	1,200	
OPERATING COSTS					
Fungicide:					
Kocide 101	8.00	lb	2.75	22	
Manex	4.00	pt	2.57	10	
Insecticide:					
Lorsban 4E	8.00	pt	6.83	55	
Herbicide:					
Goal 2XL	1.75	pt	15.00	26	
Roundup Ultramax	1.08	pt	7.25	8	
Fertilizer:					
UN-32	150.00	lb N	0.31	47	
Irrigation:					
Water	18.00	acin	7.90	142	
Custom:					
Shake Walnuts	1.00	acre	35.00	35	
Sweep Walnuts	1.00	acre	15.00	15	
Pickup Walnuts	1.00	acre	55.00	55	
Haul Walnuts	1.00	ton	15.00	15	
Hull/Shell Meats	2,000.00	lb	0.06	120	
Leaf Analysis	0.33	acre	15.00	5	
Assessment:					
CA Walnut Commission	2,000.00	lb	0.01	20	
Labor (machine-grower)	3.44	hrs	*0.00	0	
Labor (non-machine-grower)	8.74	hrs	*0.00	0	
Fuel - Diesel	8.51	gal	1.26	11	
Lube				2	
Machinery repair				4	
Interest on operating capital @ 7.40%				13	
TOTAL OPERATING COSTS/ACRE				603	
NET RETURNS ABOVE OPERATING COSTS				597	
CASH OVERHEAD COSTS:					
Office Expense				125	
Liability Insurance				102	
Property Taxes				77	
Property Insurance				51	
Investment Repairs				65	
TOTAL CASH OVERHEAD COSTS/ACRE				421	
TOTAL CASH COSTS/ACRE				1,023	
NON-CASH OVERHEAD COSTS (Capital Recovery)					
Building				136	
Fuel Tanks				36	
Establishment				393	
Irrigation System				65	
Equipment				426	
Land (not included-See Assumptions)				0	
TOTAL NON-CASH OVERHEAD COSTS\ACRE				1,055	
TOTAL COSTS/ACRE				2,078	
NET RETURNS ABOVE TOTAL COSTS				-878	

*Grower's time shown, but labor value not included. See Labor under Assumptions

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Table 4. MONTHLY CASH COSTS PER ACRE TO PRODUCE WALNUTS

CENTRAL COAST - San Benito County 2002

Beginning JAN 02 Ending DEC 02	JAN 02	FEB 02	MAR 02	APR 02	MAY 02	JUN 02	JUL 02	AUG 02	SEP 02	OCT 02	NOV 02	DEC 02	TOTAL
Prune	0												0
Prune-Brush Disposal		2											2
Weed-Disc Middles 5X				1	1	1	1	1					7
Disease-Walnut Blight				34									34
Insect-Codling Moth 2X						29	29						58
Fertilize-N					47								47
Irrigate					24	47	24	24	24				142
Weed-In-Season Spray							4						4
Weed-Dormant Strip	32												32
Leaf Analysis 1X/3 YR							5						5
TOTAL CULTURAL COSTS	32	2	0	35	72	78	63	25	24	0	0	0	330
Harvest:													
Harvest-Shake Pickup Haul										120			120
Harvest-Rake Walnuts										0			0
Harvest-Hull, Dry										120			120
CWC Assessment Fee										20			20
TOTAL HARVEST COSTS										260			260
Interest on operating capital	0	0	0	0	1	1	2	2	2	4			13
TOTAL OPERATING COSTS/ACRE	32	2	0	36	73	79	65	27	26	264	0	0	603
OVERHEAD:													
Office Expense	13	13	13	13	13	13	13	13	13	13			125
Liability Insurance										102			102
Property Taxes				38								38	77
Property Insurance	51												51
Investment Repairs	5	5	5	5	5	5	5	5	5	5	5	5	65
TOTAL CASH OVERHEAD COSTS	69	18	18	56	18	18	18	18	18	120	5	44	421
TOTAL CASH COSTS/ACRE	101	20	18	92	91	97	83	45	44	384	5	44	1,023

*Growers labor not included in above costs. See Labor under Assumptions

UC COOPERATIVE EXTENSION

Table 5. WHOLE FARM ANNUAL EQUIPMENT, INVESTMENT AND BUSINESS OVERHEAD

CENTRAL COAST - San Benito County 2002

ANNUAL EQUIPMENT COSTS

						Cash Overhead		
Yr	Description	Price	Yrs Life	Salvage Value	Capital Recovery	Insur-ance	Taxes	Total
02	55HP 5320 2WD Tractor	24,605	30	6,151	1,794	101	154	2,050
02	Brush Rake	1,584	25	317	123	6	10	139
02	Disc-Harrow 8'	7,000	30	1,400	515	28	42	584
02	Loader Forks	810	30	162	60	3	5	68
02	Orchard Sprayer 500 G	18,850	25	4,712	1,451	78	118	1,647
02	Weed Sprayer 100 G	3,550	20	185	315	12	19	346
TOTAL		56,399		12,927	4,258	228	348	4,834
	*40% of new cost	22,560		5,171	1,703	92	139	1,933

*Used to reflect a mix of new and used equipment

ANNUAL INVESTMENT COSTS

					Cash Overhead			
Description	Price	Yrs Life	Salvage Value	Capital Recovery	Insur-ance	Taxes	Repairs	Total
INVESTMENT								
Building	7,500	35		542	25	38	150	755
Establishment Costs	20,456	29		1,570	68	102	-	1,740
Fuel Tanks 2-250 gal	2,000	35	300	142	8	11	40	201
Irrigation System	3,600	35		260	12	18	72	362
Land (See assumptions)								
TOTAL INVESTMENT	33,556		300	2,515	112	169	262	3,058

ANNUAL BUSINESS OVERHEAD COSTS

Description	Units/ Farm	Unit	Price/ Unit	Total Cost
Liability Insurance	5	acre	81.80	409
Office Expense	4	acre	125.00	500

UC COOPERATIVE EXTENSION

Table 6. HOURLY EQUIPMENT COSTS

CENTRAL COAST - San Benito County 2002

			COSTS PER HOUR						
		Actual		Cash Overhead		Operating			
Yr	Description	Hours Used	Capital Recovery	Insur-ance	Taxes	Repairs	Fuel & Lube	Total Oper.	Total Costs/Hr.
02	55HP 5320 2WD Tractor	12.60	56.88	3.22	4.88	0.58	3.91	4.49	69.47
02	Brush Rake	1.50	33.56	1.71	2.59	0.18	0	0.18	38.03
02	Disc-Harrow 8'	5.00	41.17	2.22	3.36	0.62	0	0.62	47.37
02	Loader Forks	1.50	16.20	0.87	1.32	0.08	0	0.08	18.48
02	Orchard Sprayer 500 G	3.00	193.53	10.37	15.71	0.84	0	0.84	220.45
02	Weed Sprayer 100 G	2.00	63.01	2.47	3.74	0.39	0	0.39	69.60

UC COOPERATIVE EXTENSION

Table 7. RANGING ANALYSIS

CENTRAL COAST - San Benito County 2002

COSTS PER ACRE AT **VARYING YIELDS** TO PRODUCE WALNUTS

	YIELD (lb/acre – dry inshell)						
	1,400	1,600	1,800	2,000	2,200	2,400	2,600
OPERATING COSTS							
Cultural Cost	330	330	330	330	330	330	330
Harvest Cost*	200	213	227	240	254	267	281
Assessment	14	16	18	20	22	24	26
Interest on operating capital	12	12	12	13	13	13	13
TOTAL OPERATING COSTS/acre	556	571	587	603	619	634	650
Total Operating Costs/lb	0.40	0.36	0.33	0.30	0.28	0.26	0.25
CASH OVERHEAD COSTS	421	421	421	421	421	421	421
TOTAL CASH COSTS/acre	977	992	1,008	1,024	1,040	1,055	1,071
Total Cash Costs/lb	0.70	0.62	0.56	0.51	0.47	0.44	0.41
NON-CASH OVERHEAD COSTS	1,055	1,055	1,055	1,055	1,055	1,055	1,055
TOTAL COSTS /acre	2,032	2,047	2,063	2,079	2,095	2,110	2,126
Total Costs/lb	1.45	1.28	1.15	1.04	0.95	0.88	0.82

*Custom harvest cost charged by acre. Hauling charged by ton

NET RETURNS PER ACRE **ABOVE OPERATING** COSTS FOR WALNUTS

	YIELD (lb/acre – dry inshell)						
$/lb	1,400	1,600	1,800	2,000	2,200	2,400	2,600
0.42	32	101	169	237	305	374	442
0.48	116	197	277	357	437	518	598
0.54	200	293	385	477	569	662	754
0.60	284	389	493	597	701	806	910
0.66	368	485	601	717	833	950	1,066
0.72	452	581	709	837	965	1,094	1,222
0.78	536	677	817	957	1,097	1,238	1,378

NET RETURNS PER ACRE **ABOVE CASH** COSTS FOR WALNUTS

	YIELD (lb/acre – dry inshell)						
$/lb	1,400	1,600	1,800	2,000	2,200	2,400	2,600
0.42	-389	-320	-252	-184	-116	-47	21
0.48	-305	-224	-144	-64	16	97	177
0.54	-221	-128	-36	56	148	241	333
0.60	-137	-32	72	176	280	385	489
0.66	-53	64	180	296	412	529	645
0.72	31	160	288	416	544	673	801
0.78	115	256	396	536	676	817	957

NET RETURNS PER ACRE **ABOVE TOTAL** COSTS FOR WALNUTS

	YIELD (lb/acre – dry inshell)						
$/lb	1,400	1,600	1,800	2,000	2,200	2,400	2,600
0.42	-1,444	-1,375	-1,307	-1,239	-1,171	-1,102	-1,034
0.48	-1,360	-1,279	-1,199	-1,119	-1,039	-958	-878
0.54	-1,276	-1,183	-1,091	-999	-907	-814	-722
0.60	-1,192	-1,087	-983	-879	-775	-670	-566
0.66	-1,108	-991	-875	-759	-643	-526	-410
0.72	-1,024	-895	-767	-639	-511	-382	-254
0.78	-940	-799	-659	-519	-379	-238	-98