
UNIVERSITY OF CALIFORNIA COOPERATIVE EXTENSION

2005

SAMPLE COSTS TO ESTABLISH
A WALNUT ORCHARD AND PRODUCE

WALNUTS

Chandler



NORTH COAST- Lake County

HOMESITE – Twenty-Acre Farm

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INTRODUCTION

Sample costs to establish a walnut orchard and produce walnuts on 20-acres purchased as a home site in the North Coast – Lake 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 8 and pertain to sample costs to establish a walnut orchard and produce walnuts on a twenty-acre home site in the North Coast – Lake County. Practices described represent production practices and materials considered typical of a well-managed orchard in the region. The costs, materials, and practices shown in this study will not be applicable to all situations. Establishment and cultural practices vary by grower and the 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 and cultural practices 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 or cultural practices.**

Farm. The hypothetical farm consists of 20 contiguous acres purchased for a home site. Walnuts are established on 19 acres. The homesite and other buildings are established on one acre. The owner farms the orchard, but the main income is from off-farm sources.

Establishment Operating Costs Table 1

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, and 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. Chandler, a late leafing English walnut variety is planted in this study. A late-leafing cultivar is assumed to be more likely to avoid exposure to frost and to reduce walnut blight and management costs. Paradox is the recommended rootstock in new plantings. The variety planted determines spacing. In this study, the 5/8 inch 2 year old nursery-grafted trees are planted on 16 X 28 foot spacing, 97 trees per acre. Although not shown in this study, tree costs may be reduced nearly one-half by planting Paradox seedling rootstock on the farm and grafting in place in the same or next season. The life of the orchard at planting is estimated to be 35 years.

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

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.

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 to remove a portion of the current year’s growth. The prunings are placed in the row

Table A. Applied N	
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

middles and chopped during the first discing during the first four years. Subsequently, the prunings are pushed to edge of the field, then stacked 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 \$45.12 per acre-foot or \$3.76 per acre-inch. No assumption is made about effective rainfall. The water applied to the orchard is shown in Table B.

Year	acin/year
1-4	12
5-9	15
10+	24

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 in January 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 five times. In the first two years, the grower makes three passes per middle and in subsequent years two passes. An alternative non-tillage approach utilizes herbicides sprayed in the tree row.

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

Insects. Walnut husk fly (WHF) is assumed to reach treatment levels by the sixth year. Four applications of Success and Nu Lure Insect bait are applied by the grower; once in July and September and twice in August. The materials are applied using the ATV with sprayer and wand. Several other materials are available for WHF, contact your PCA or farm advisor.

Rodents. Squirrels can be a menace in the orchard, especially in producing orchards, by eating and storing the nuts. In this study, treatment begins in the fifth year or the year prior to crop production. The squirrels are baited from March to December.

Harvest. Depending upon variety, harvest starts in the fifth or sixth establishment year (sixth year in this study). A custom operator mechanically shakes, sweeps and picks up the nuts. Depending upon the yield and to save costs, the first and possibly the second crop may be mechanically shaken by a custom operator, and then the walnuts picked up by hand and put into a bin. Yield maturity is reached in the eleventh year. Estimated yields are shown in Table C.

Year	Dry Inshell lb/acre
6	200
7	400
8	800
9	2,000
10	4,000
11+	5,000

Production Operating Costs

Tables 2 – 8

Pruning. The trees are pruned during the winter months (January) to open the canopy, maintain healthy buds, lower tree height, and to remove dead and undesired limbs. Prunings are placed in the row middles, pushed to the edge of the field using a tractor with forks to push the prunings into a stack, after which they are burned. A burn permit is required for which there is a cost. The current cost (not included in the study) for Lake County is \$20 for the permit.

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 June.

Irrigation. The crop uses 24-acre inches of water, which the grower applies. No assumption is made about effective rainfall. Irrigation through the sprinkler system begins in late June with an average of six-inches applied each time. Two irrigations are applied in July and one in August.

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. Adjuvants are recommended for use with many pesticides for effective control, but the adjuvants and their costs are not included in this study. Pesticide costs may vary by location, brand, and grower volume. Pesticide costs in this study are taken from a single dealer and shown as full retail.

Pest Control Adviser. 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 PCAs 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 in July during the growing season (in-season strip spray). Row middles are disced five times from April through August. The grower makes two passes per middle with the eight foot disc.

Insects. Walnut Husk Fly (*Rhagoletis completa*) infestation can lead to shriveled and darkened kernels. The fly is controlled with an application of Success and Nu Lure Bait, once in July, twice in August, and once in September. The grower uses the ATV with sprayer and a hand wand to apply the material.

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 is applied in April.

Rodents. Ground squirrels feed on young nuts in the trees, as well as mature nuts on the ground or in the tree. They can also damage plastic irrigations lines by gnawing on them and their burrows can disrupt irrigation and cause erosion. In this study, the squirrels are baited once per month from March through December. Four bait traps holding three pounds of bait are placed around the orchard. It is assumed that the laborer or grower on an ATV checks and baits the traps, which takes one-hour each month.

Harvest. The crop is harvested in October by custom harvesters who 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 and assumes two man-hours per acre. After drying, the walnuts are sold to processors. Harvesting costs are normally charged by the hour; but for this study, they are converted to per pound costs. Hulling and drying costs are charged on a per pound, dry-weight basis.

Yields. Yields are measured in clean, dry, in-shell tons or pounds per acre. The average yield based on grower data over the remaining years of the orchard is 5,000 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 based on the Lake County Agricultural Commissioner's Annual Crop Report of \$0.62 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 \$0.0088 per pound of dry in-shell nuts.

Pickup/ATV. Business mileage for the pickup is estimated at 2,500 total miles per year. The ATV is used to apply the walnut husk fly spray and is included in that cost. In addition, it is assumed that the grower uses the ATV three hours per acre per year to check the orchard and monitor the irrigation system.

Labor. Labor rates of \$14.30 per hour for machine operators and \$10.72 for general labor includes payroll overhead of 43%. The basic hourly wages are \$10.00 for machine operators and \$7.50 for general labor. The overhead includes the employers' share of federal and California state payroll taxes, workers' compensation insurance for orchard/fruit crops (code 0016), and a percentage for other possible benefits. Workers' compensation costs will vary among growers, but for this study the cost is based upon the average industry final rate as of January 5, 2005 (California Department of Insurance). 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, work breaks, and field repair.

Wages for management are not included as a cash cost. Any return above total costs is considered a return to management and risk. However, growers wanting to account for management may wish to add a fee. The manager makes all production decisions including cultural practices, action to be taken on pest management recommendations, and labor.

Equipment Operating Costs. Repair costs are based on purchase price, annual hours of use, total hours of life, and repair coefficients formulated by American Society of Agricultural Engineers (ASAE). Fuel and lubrication costs are also determined by ASAE equations based on maximum Power Take Off (PTO) horsepower, and fuel type. Prices for on-farm delivery of diesel and gasoline are \$2.00 and \$2.25 per gallon, respectively. The cost includes a 2% local sales tax on diesel fuel and 8% sales tax on gasoline. Gasoline also includes federal and state excise tax, which are refundable for on-farm use when filing your income tax. 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 7.65% 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.

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 0.69% of the average value of the assets over their useful life. Liability insurance covers accidents on the 20-acre farm and costs \$429 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 \$2,375 per farm. These expenses include office supplies, telephones, bookkeeping, accounting, legal fees, shop utilities and miscellaneous administrative costs.

Sanitation Services. Sanitation services provide single portable toilets, washbasins, soap, and towels for the orchard and cost the farm \$150 per month. The monthly service charge is an average of four to six California sanitation companies and locations. The cost includes delivery and three months of weekly service. The sanitation costs are estimated and not based on any specific data. Growers using contract labor may not have a cost because many labor contractors provide their own sanitation facilities.

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 \$7,056 per acre or \$134,064 for the 19-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 6, except for orchard establishment which is 0.5% to account for orchard maintenance such a tree replacement.

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 $((\text{Purchase Price} - \text{Salvage Value}) \times \text{Capital Recovery Factor}) + (\text{Salvage Value} \times \text{Interest Rate})$.

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 6.

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 Long Term. The interest rate of 6.01% used to calculate capital recovery cost is the USDA-ERSs 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.

Irrigation/Sprinkler System. The cost includes the sprinklers, filtration system, installation and materials for the sprinklers.

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. Bare land in Lake County ranges from \$6,000 to \$10,000 per acre. Land in this study is valued at \$8,000 per acre or \$8,571 per producing acre. Smaller parcels, 30 acres and under, may have a homesite value of \$150,000 to \$200,000 per acre and the remaining acreage an agricultural value. For this study 20 acres purchased for \$302,000 less the homesite value of \$150,000 for an acre yields an agricultural value of \$8,000 per acre on the remaining 19 acres.

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.
- American Society of Farm Managers and Rural Appraisers. 2005. *Trends in Agricultural Land & Lease Values*. California Chapter of the American Society of Farms Managers and Rural Appraisers. Woodbridge, CA.
- Barker, Doug. 2005. *California Workers' Compensation Rating Data for Selected Agricultural Classifications as of January 1, 2005*. California Department of Insurance, Rate Regulation Branch.
- Boehlje, Michael D., and Vernon R. Eidman. 1984. *Farm Management*. John Wiley and Sons. New York, NY
- Coates, William W., Karen M. Klonsky, and Richard L. De Moura. 2002. *Sample Costs to Establish and Produce Walnuts, Central Coast*. University of California, Cooperative Extension. Department of Agricultural and Resource Economics. Davis, CA.
- California State Automobile Association. 2005. *Gas Price Survey 2004*. AAA Public Affairs, San Francisco,
- California State Board of Equalization. *Fuel Tax Division Tax Rates*. Internet accessed January 2005. <http://www.boe.ca.gov/sptaxprog/spftdrates.htm>.
- University of California Statewide Integrated Pest Management Program. *UC Pest Management Guidelines, Walnuts*. 2005. University of California, Davis, CA. <http://www.ipm.ucdavis.edu>
- 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.
- United States Department of Agriculture-Economic Reporting Service. *Farm Financial Ratios Indicating Solvency and Profitability 1960 – 02, California*. 2002. Internet; accessed January 4, 2005. www.ers.usda.gov/data/farbalancesheet/fbsdmu.htm

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Table 1. SAMPLE COSTS PER ACRE TO ESTABLISH AN ENGLISH WALNUT ORCHARD
 NORTH COAST - Lake County 2005

	Cost Per Acre								
	Year:	1st	2nd	3rd	4th	5th	6th	7th	8th
Yield: Dry, In-Shell Pounds Per Acre							200	400	800
Planting Costs:									
Land Preparation: Subsoil 2X		250							
Land Preparation : Disc 2X		17							
Land Preparation : Float 2X		15							
Trees: 97 Per Acre @ \$15.00 ea., (4% in 2nd year)		1,455	60						
Survey, Mark, Dig Holes & Plant		168	5						
Stake & Paint Trees		452							
TOTAL PLANTING COSTS		2,356	65						
Cultural Costs:									
Pruning, Training & Tying 3X (Grower)		11	32	32	38	38	38	43	54
Prune: Brush Disposal (push & burn)						12	15	15	15
Rodent: Squirrel (bait)						36	36	36	36
Fertilizer: Nitrogen (UN32)			20	20	20	20	23	29	39
Weed: Winter Strip Spray (Roundup, Goal)		35	35	38	38	38	38	38	38
Weed: Disc Middles 5X (Yrs 1-2, 3 passes/middle)		36	36	24	24	24	24	24	24
Weed: In-Season Strip Spray (Roundup)		6	9	9	9	9	9	9	9
Disease: Walnut Blight (Kocide)							16	18	21
Irrigate: (water & labor)		64	64	64	64	81	81	81	81
Insect: Husk Fly (Success, Nu Lure Bait)							42	42	42
Pickup Truck Use		107	107	107	107	107	107	107	107
ATV Use		57	57	57	57	57	57	57	57
Leaf Analysis							1	1	1
TOTAL CULTURAL COSTS		316	359	351	356	422	487	501	524
Harvest Costs:									
Shake, Pick, Sweep, Rake							10	41	61
Haul							1	2	5
Hull & Dry							18	36	72
California Walnut Commission Assessment Fee							2	4	7
TOTAL HARVEST COSTS							31	83	145
Interest On Operating Capital @ 7.65%		159	13	9	7	12	13	14	15
TOTAL OPERATING COSTS/ACRE		2,831	437	360	363	434	531	599	684
Cash Overhead Costs:									
Office Expense		125	125	125	125	125	125	125	125
Sanitation Fees		24	24	24	24	24	24	24	24
Liability Insurance		23	23	23	23	23	23	23	23
Property Taxes		107	107	107	107	107	111	111	111
Property Insurance		19	19	19	19	20	21	21	21
Investment Repairs		71	71	71	71	71	71	71	71
TOTAL CASH OVERHEAD COSTS		370	369	369	369	369	375	375	375
TOTAL CASH COSTS/ACRE		3,201	806	729	732	804	906	974	1,059
INCOME/ACRE FROM PRODUCTION							124	248	496
NET CASH COSTS/ACRE FOR THE YEAR		3,201	806	729	732	804	782	726	563
PROFIT/ACRE ABOVE CASH COSTS									
ACCUMULATED NET CASH COSTS/ACRE		3,201	4,008	4,737	5,469	6,273	7,056	7,782	8,345

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Table 1. continued

	Cost Per Acre								
	Year:	1st	2nd	3rd	4th	5th	6th	7th	8th
Yield: Field Run - Pounds Per Acre							200	400	800
TOTAL DEPRECIATION									
Capital Recovery									
Land		481	481	481	481	481	481	481	481
Shop Building		153	153	153	153	153	153	153	153
Fuel Tanks		14	14	14	14	14	14	14	14
Sprinkler Irrigation System		69	69	69	69	69	69	69	69
Shop/Hand Tools		36	36	36	36	36	36	36	36
Equipment		159	156	169	169	160	199	199	199
TOTAL INTEREST ON INVESTMENT		911	909	922	922	913	951	952	952
TOTAL COST/ACRE FOR THE YEAR		4,112	1,716	1,651	1,654	1,717	1,858	1,926	2,011
INCOME/ACRE FROM PRODUCTION							124	248	496
TOTAL NET COST/ACRE FOR THE YEAR		4,112	1,716	1,651	1,654	1,717	1,734	1,678	1,515
NET PROFIT/ACRE ABOVE TOTAL COST							0	0	0
TOTAL ACCUMULATED NET COST/ACRE		4,112	5,828	7,479	9,133	10,850	12,584	14,262	15,777

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Table 2. COSTS PER ACRE TO PRODUCE WALNUTS
 NORTH COAST - Lake County 2005

Operation	Operation	Cash and Labor Costs per acre					Total Cost	Your Cost
	Time (Hrs/A)	Labor Cost	Fuel, Lube & Repairs	Material Cost	Custom/Rent			
Cultural:								
Weed: Dormant Strip (Roundup, Goal)	0.18	3	2	33	0	38		
Prune: Dormant	6.00	64	0	0	0	64		
Prune: Push & Burn Prunings	0.42	12	3	0	0	15		
Rodent: Squirrel (bait)	0.53	9	1	26	0	36		
Weed: Mow Middles 5X (2 passes/middle)	0.92	16	8	0	0	24		
Disease: Walnut Blight (Kocide)	0.20	3	2	26	0	32		
Fertilize: Nitrogen (UN32)	0.00	0	0	59	0	59		
Irrigate: (Water & Labor)	3.60	39	0	90	0	129		
Insect: Husk Fly (Success, NuLure)	1.05	18	2	22	0	42		
Weed: In-Season Spray (Roundup)	0.18	3	2	5	0	9		
Fertilize: Leaf Analysis 1X/3Yr	0.04	0	0	0	1	1		
ATV Use	3.00	51	6	0	0	57		
Pickup Use	4.39	75	32	0	0	107		
TOTAL CULTURAL COSTS	20.51	294	57	262	1	613		
Harvest:								
Harvest-Shake, Pickup (Custom). Rake (hand)	2.00	21	0	0	250	271		
Harvest: Haul (Custom)	0.00	0	0	0	30	30		
Harvest: Hull, Dry (Custom)	0.00	0	0	0	450	450		
CWC Assessment Fee	0.00	0	0	45	0	45		
TOTAL HARVEST COSTS	2.00	21	0	45	730	796		
Interest on operating capital @ 7.65%						26		
TOTAL OPERATING COSTS/ACRE		315	57	307	731	1,436		
Cash Overhead:								
Office Expense						125		
Liability Insurance						23		
Sanitation Fee						24		
Property Taxes						146		
Property Insurance						46		
Investment Repairs						106		
TOTAL CASH OVERHEAD COSTS						469		
TOTAL CASH COSTS/ACRE						1,906		
Non-cash Overhead:								
		Per producing	Annual Cost					
		Acres	Capital Recovery					
Buildings		2,105	153			153		
Fuel Tanks		184	14			14		
Shop/Field Tools		263	36			36		
Sprinkler System		1,000	69			69		
Land		8,000	481			481		
Orchard Establishment		7,056	520			520		
Equipment		2,182	199			199		
TOTAL NON-CASH OVERHEAD COSTS		20,790	1,471			1,471		
TOTAL COSTS/ACRE						3,377		

UC COOPERATIVE EXTENSION
Table 3. COSTS AND RETURNS PER ACRE TO PRODUCE WALNUTS
 NORTH COAST - Lake County 2005

	Quantity /Acre	Unit	Price or Cost/Unit	Value or Cost/Acre	Your Cost
GROSS RETURNS: Walnuts	5,000.00	Lb	0.62	3,100	
OPERATING COSTS					
Fungicide:					
Kocide 101	8.00	lb	3.31	26	
Insecticide:					
Success	2.56	floz	6.75	17	
Nu Lure Insect Bait	1.60	pt	3.14	5	
Fertilizer:					
UN-32	150.00	lb N	0.39	59	
Irrigation:					
Water	24.00	acin	3.76	90	
Herbicide:					
Goal 2XL	1.75	pt	16.41	29	
Roundup Ultra Max	1.08	pt	8.60	9	
Rodenticide:					
Bait Station - Squirrel	0.20	each	25.00	5	
Squirrel Bait - Wilco	6.30	lb	3.35	21	
Custom:					
Harvest - Shake, Sweep, Pickup	5,000.00	acre	0.05	250	
Harvest - Haul Walnuts	2.50	ton	12.00	30	
Harvest - Hull/Dry	5,000.00	lb	0.09	450	
Fertilize - Leaf Analysis (1X/3 Yrs)	0.33	acre	1.60	1	
Assessment:					
CA Walnut Commission	5,000.00	lb	0.01	45	
Labor (machine)	13.02	hrs	14.30	186	
Labor (non-machine)	12.05	hrs	10.72	129	
Fuel - Gas	13.84	hrs	2.25	31	
Fuel - Diesel	5.62	gal	2.00	11	
Lube				6	
Machinery repair				8	
Interest on operating capital @ 7.65%				26	
TOTAL OPERATING COSTS/ACRE				1,436	
NET RETURNS ABOVE OPERATING COSTS				1,664	
CASH OVERHEAD COSTS:					
Office Expense				125	
Liability Insurance				23	
Sanitation Fee				24	
Property Taxes				146	
Property Insurance				46	
Investment Repairs				106	
TOTAL CASH OVERHEAD COSTS/ACRE				470	
TOTAL CASH COSTS/ACRE				1,906	
NON-CASH OVERHEAD COSTS (Capital Recovery)					
Buildings				153	
Fuel Tanks				14	
Shop/Field Tools				36	
Sprinkler System				69	
Land				481	
Orchard Establishment				520	
Equipment				199	
TOTAL NON-CASH OVERHEAD COSTS\ACRE				1,471	
TOTAL COSTS/ACRE				3,377	
NET RETURNS ABOVE TOTAL COSTS				-277	

UC COOPERATIVE EXTENSION
Table 4. MONTHLY CASH COSTS PER ACRE TO PRODUCE WALNUTS
 NORTH COAST - Lake County 2005

Beginning JAN 05	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	TOTAL
Ending DEC 05	05	05	05	05	05	05	05	05	05	05	05	05	
Weed: Dormant Strip (Roundup, Goal)	38												38
Prune: Dormant	64												64
Prune: Push Brush & Burn		15											15
Rodent: Squirrel (bait)			4	4	4	4	4	4	4	4	4	4	36
Weed: Mow Middles 5X (1 pass/middle)				5	5	5	5	5					24
Disease: Walnut Blight (Kocide)				32									32
Fertilize: Nitrogen (UN32)						59							59
Irrigate: (Water & Labor)						32	64	32					129
Insect: Husk Fly (Success, NuLure)							11	21	11				42
Weed: In-Season Spray (Roundup)							9						9
Fertilize: Leaf Analysis 1X/3Yr							1						1
ATV Use	6	6	6	6	6	6	6	6	6	6			57
Pickup Use	9	9	9	9	9	9	9	9	9	9	9	9	107
TOTAL CULTURAL COSTS	117	30	18	55	23	114	108	76	29	18	13	13	613
Harvest:													0
Harvest-Shake, Pickup (Custom). Rake (hand)										271			271
Harvest: Haul (Custom)										30			30
Harvest: Hull, Dry (Custom)										450			450
CWC Assessment Fee										45			45
TOTAL HARVEST COSTS	0	0	0	0	0	0	0	0	0	796	0	0	796
Interest on operating capital @ 7.65%	1	1	1	1	2	2	3	3	4	9	0	0	26
TOTAL OPERATING COSTS/ACRE	118	30	19	56	25	116	111	80	32	823	12	12	1,436
CASH OVERHEAD:													
Office Expense	10	10	10	10	10	10	10	10	10	10	10	10	125
Liability Insurance										23			23
Sanitation Fee	2	2	2	2	2	2	2	2	2	2	2	2	24
Property Taxes				73								73	146
Property Insurance	46												46
Investment Repairs	9	9	9	9	9	9	9	9	9	9	9	9	106
TOTAL CASH OVERHEAD COSTS	67	21	21	94	21	21	21	21	21	44	21	94	470
TOTAL CASH COSTS/ACRE	185	52	41	150	46	137	132	101	54	867	34	107	1,905

UC COOPERATIVE EXTENSION
Table 5. RANGING ANALYSIS
 NORTH COAST – Lake County 2005

COSTS PER ACRE AT VARYING YIELDS TO PRODUCE WALNUTS

	YIELD (lb/acre – dry inshell)						
	1,000	2,000	3,000	4,000	5,000	6,000	7,000
OPERATING COSTS							
Cultural Cost	613	613	613	613	613	613	613
Harvest Cost	150	301	451	601	751	902	1,052
Assessments	9	18	27	36	45	54	63
Interest on operating capital	22	23	24	25	26	27	28
TOTAL OPERATING COSTS/acre	794	955	1,115	1,275	1,435	1,596	1,756
Total Operating Costs/lb	0.79	0.48	0.37	0.32	0.29	0.27	0.25
CASH OVERHEAD COSTS							
CASH OVERHEAD COSTS	470	470	470	470	470	470	470
TOTAL CASH COSTS/acre	1,264	1,425	1,585	1,745	1,905	2,066	2,226
Total Cash Costs/lb	1.26	0.71	0.53	0.44	0.38	0.34	0.32
NON-CASH OVERHEAD COSTS							
NON-CASH OVERHEAD COSTS	1,471	1,471	1,471	1,471	1,471	1,471	1,471
TOTAL COSTS /acre	2,735	2,896	3,056	3,216	3,376	3,537	3,697
Total Costs/lb	2.74	1.45	1.02	0.80	0.68	0.59	0.53

*Harvest includes custom operations: shake, sweep, pickup, haul plus raking labor

NET RETURNS PER ACRE ABOVE OPERATING COSTS

\$/lb	YIELD (lb/acre – dry inshell)						
	1,000	2,000	3,000	4,000	5,000	6,000	7,000
0.44	-354	-75	205	485	765	1,044	1,324
0.50	-294	45	385	725	1,065	1,404	1,744
0.56	-234	165	565	965	1,365	1,764	2,164
0.62	-174	285	745	1,205	1,665	2,124	2,584
0.68	-114	405	925	1,445	1,965	2,484	3,004
0.74	-54	525	1,105	1,685	2,265	2,844	3,424
0.80	6	645	1,285	1,925	2,565	3,204	3,844

NET RETURNS PER ACRE ABOVE CASH COSTS

\$/lb	YIELD (lb/acre – dry inshell)						
	1,000	2,000	3,000	4,000	5,000	6,000	7,000
0.44	-824	-545	-265	15	295	574	854
0.50	-764	-425	-85	255	595	934	1,274
0.56	-704	-305	95	495	895	1,294	1,694
0.62	-644	-185	275	735	1,195	1,654	2,114
0.68	-584	-65	455	975	1,495	2,014	2,534
0.74	-524	55	635	1,215	1,795	2,374	2,954
0.80	-464	175	815	1,455	2,095	2,734	3,374

NET RETURNS PER ACRE ABOVE TOTAL COSTS

\$/lb	YIELD (lb/acre – dry inshell)						
	1,000	2,000	3,000	4,000	5,000	6,000	7,000
0.44	-2,295	-2,016	-1,736	-1,456	-1,176	-897	-617
0.50	-2,235	-1,896	-1,556	-1,216	-876	-537	-197
0.56	-2,175	-1,776	-1,376	-976	-576	-177	223
0.62	-2,115	-1,656	-1,196	-736	-276	183	643
0.68	-2,055	-1,536	-1,016	-496	24	543	1,063
0.74	-1,995	-1,416	-836	-256	324	903	1,483
0.80	-1,935	-1,296	-656	-16	624	1,263	1,903

UC COOPERATIVE EXTENSION
Table 6. WHOLE FARM ANNUAL EQUIPMENT, INVESTMENT AND BUSINESS OVERHEAD
 NORTH COAST - Lake County 2005

ANNUAL EQUIPMENT COSTS

Yr	Description	Price	Yrs Life	Salvage Value	Capital Recovery	Cash Overhead		Total
						Insur- ance	Taxes	
05	55HP 5320 2WD Tractor	32,269	20	6,151	2,649	133	192	2,973
05	ATV 550 Kawasaki	7,430	15	1,446	703	31	44	778
05	ATV Sprayer 50 gallon	1,149	10	203	141	5	7	152
05	Brush Rake	1,584	25	317	118	7	10	134
05	Disc-Harrow 8'	8,850	20	1,400	734	35	51	821
05	Loader Forks	810	30	162	57	3	5	65
05	Orchard Sprayer 500 Gal	21,000	20	4,712	1,704	89	129	1,922
05	Pickup 1/2 ton	26,000	10	7,680	2,952	116	168	3,236
05	Weed Sprayer 100 G	4,550	20	237	391	17	24	431
	TOTAL	103,642		22,308	9,449	435	630	10,513
	40% of New Cost *	41,457		8,923	3,780	174	252	4,205

ANNUAL INVESTMENT COSTS

Description	Price	Yrs Life	Salvage Value	Capital Recovery	Cash Overhead			Total
					Insur- ance	Taxes	Repairs	
Buildings 1200 sqft	40,000	30		2,909	138	200	800	4,047
Orchard Establishment	132,620	29		9,768	458	663	663	11,552
Fuel Tanks 2-250ga	3,500	25	710	261	15	21	70	367
Land (19 acres)	152,000	35	152,000	9,135	-	1,520	-	10,655
Irrigation/Sprinkler System	19,000	35		1,312	66	95	380	1,853
Shop/Field Tools	5,000	10		680	17	25	100	822
TOTAL INVESTMENT	352,120		152,710	24,065	693	2,524	2,013	29,295

ANNUAL BUSINESS OVERHEAD COSTS

Description	Units/ Farm	Unit	Price/ Unit	Total Cost
Liability Insurance	19	acre	22.58	429
Office Expense	19	acre	125.00	2,375
Sanitation Fee	19	acre	23.68	450

UC COOPERATIVE EXTENSION
Table 7. HOURLY EQUIPMENT COSTS
 NORTH COAST - Lake County 2005

Yr	Description	COSTS PER HOUR							Total Costs/Hr.	
		Actual Hours Used	Capital Recovery	Cash Overhead			Operating			Total Oper.
				Insur- ance	Taxes	Repairs	Fuel & Lube			
05	55HP 5320 2WD Tractor	40	26.78	1.34	1.94	0.88	6.21	7.09	37.15	
05	ATV 550 Kawasaki	87	3.24	0.14	0.20	0.35	1.62	1.97	5.55	
05	ATV Sprayer 50 gallon	20	2.83	0.09	0.14	0.09	0.00	0.09	3.15	
05	Brush Rake	8	5.97	0.33	0.48	0.18	0.00	0.18	6.96	
05	Disc-Harrow 8'	18	16.83	0.81	1.17	0.88	0.00	0.88	19.69	
05	Loader Forks	8	2.87	0.17	0.25	0.09	0.00	0.09	3.38	
05	Orchard Sprayer 500 Gal	4	183.27	9.54	13.82	2.20	0.00	2.20	208.83	
05	Pickup 1/2 ton	83	14.17	0.56	0.81	0.72	6.47	7.19	22.73	
05	Weed Sprayer 100 G	7	22.71	0.96	1.39	0.50	0.00	0.50	25.56	

UC COOPERATIVE EXTENSION
Table 8. PRODUCTION OPERATIONS WITH EQUIPMENT & MATERIALS
 NORTH COAST - Lake County 2005

Operation	Operation Month	Tractor	Implement	Field Labor Hr/Acre	Material	Broadcast Rate/acre	Unit
Weed: Dormant Strip	January	55HP 2WD	Weed Sprayer		Roundup	0.54	pt
					Goal	1.75	pt
Weed: Disc Middles 5X	April	55HP 2WD	Disc				
	May	55HP 2WD	Disc				
	June	55HP 2WD	Disc				
	July	55HP 2WD	Disc				
	August	55HP 2WD	Disc				
Weed: In season Strip Spray	July	55HP 2WD	Weed Sprayer		Roundup	0.54	pt
Rodent: Squirrel (bait)	March	ATV			Bait Station	0.02	each
					Bait	0.63	lb
	April	ATV			Bait Station	0.02	each
					Bait	0.63	lb
	May	ATV			Bait Station	0.02	each
					Bait	0.63	lb
	June	ATV			Bait Station	0.02	each
					Bait	0.63	lb
	July	ATV			Bait Station	0.02	each
					Bait	0.63	lb
	Aug	ATV			Bait Station	0.02	each
					Bait	0.63	lb
	September	ATV			Bait Station	0.02	each
					Bait	0.63	lb
	October	ATV			Bait Station	0.02	each
					Bait	0.63	lb
	November	ATV			Bait Station	0.02	each
					Bait	0.63	lb
	December	ATV			Bait Station	0.02	each
					Bait	0.63	lb
Rodent: Squirrel (bait)	March	ATV			Bait Station	0.02	each
					Bait	0.63	lb
Prune: Hand	January			6.00			
Prune: Push Brush & Burn	February	55HP 2WD	Loader Forks Brush Rake				
Disease: Walnut Blight	April	55HP 2WD	Orchard Sprayer		Kocide	8.00	lbs
Insect: Husk Fly	July	ATV	ATV Sprayer		Success	0.64	floz
					NuLure	0.40	pt
	August	ATV	ATV Sprayer		Success	0.64	floz
					NuLure	0.40	pt
	August	ATV	ATV Sprayer		Success	0.64	floz
					NuLure	0.40	pt
	September	ATV	ATV Sprayer		Success	0.64	floz
					NuLure	0.40	pt
Irrigate	June			0.90	Water	6.00	acin
	July			1.80	Water	12.00	acin
	August			0.90	Water	6.00	acin
	September			1.00	Water	5.00	acin
Fertilize: Nitrogen	June				UN32	150.00	lbs N
Fertilize: Leaf Analysis 1X/3 Yrs	July	Custom					
Harvest: Shake, Sweep, Pickup, Rake	Oct	Custom		2.00			
Harvest: Haul	Oct	Custom					