UNIVERSITY OF CALIFORNIA COOPERATIVE EXTENSION

2013

SAMPLE COSTS TO PRODUCE
ORGANIC
WALNUTS

TERMINAL BEARING VARIETY

NORTH COAST – Lake County

Sprinkler Irrigation

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INTRODUCTION

Sample costs to produce organic walnuts under pull hose sprinkler irrigation 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 situation. Sample costs for labor, materials, equipment and custom services are based on current figures. A blank column, "Your Costs", in Tables 1 and 2 is provided to enter your 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 are available for many commodities. Current and archived studies can be downloaded from the Agricultural and Resource Economics website at UC Davis http://coststudies.ucdavis.edu, or requested through the department by calling (530) 752-6887.

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ASSUMPTIONS

The assumptions refer to Tables 1 to 7 and pertain to sample costs to produce organic walnuts in the North Coast – Lake County. The cultural practices described represent production operations and materials considered typical of a well-managed farm in the region. The costs, materials, and practices shown in this study will not apply to all situations. **For small farms such as 10 acres, custom operators may have a minimum charge and it may be considerably higher than the costs used in this study.** Establishment and production cultural practices vary by grower and the differences can be significant. **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.**

Land. The farm consists of 10 contiguous acres – 9 acres of walnuts and 1 acre of roads, irrigation system and homestead – purchased as a mature orchard and farmed by the owner. The land is assumed to be well drained and either a class I or II soil on level land. In this area many orchards are planted on hillsides of various slopes. The walnuts have been converted to organic production.

Trees. In this study, terminal bearing trees are planted on a 45-foot x 45-foot spacing, 20 to 21 trees per acre. The varieties used in this study are Franquette with a late October to mid-November harvest date and Hartley with a mid to late October harvest date. Another common variety unique to Lake County is Poe, which harvest slightly before Hartley. The life of the orchard at the time of planting was estimated to be 70 years.

Orchard Preparation for Organic Production. The orchard is assumed to have been established as a conventional walnut orchard. Changing a farming system from conventional to organic practices requires a 36 month transition period from the date of the final conventional material application. Crops grown in transition years can be sold or labeled transition, providing the organic rules and regulations are adhered to. Rules and regulations specific to organic commodities are established under the Organic Food Act of 1990 in the California Department of Food and Agriculture (CDFA) and the United States Department of Agriculture's (USDA) National Organic Program (NOP). The orchard in this report began the transition as an older mature orchard. It has completed the transition period and has been certified as organic. Refer to the USDA rules for organic production for further information (www.ams.usda.gov/AMSv1.0/nop).

Production Cultural Practices and Material Inputs

Prune/Sucker. Pruning is done in early February by a custom operator. The pruning is done using a tower with one person on the tower and one on the ground stacking the brush in the row middles. It takes about four man-hours per acre to prune and stack. The orchard is pruned once every five years and one-fifth of the cost is allocated to the orchard each year. The prunings are pushed to the edge of the field using a tractor with forks to push the prunings into a stack, after which they are burned. It takes a tractor driver and one man to push and burn the prunings and to clean up the miscellaneous trash from the pruning operation. Lake County requires a Burn Permit for which there is a $25 fee. The base of the trees are hand pruned (suckered) in July.

Irrigation. Irrigation costs include pumping (water) and labor costs. The water is pumped from a well, and fed into the pull-hose type sprinkler system. In this study water costs $5.27 per acre inch based on current PG&E agricultural rates and reported grower costs. Local orchards may receive from 16 to 24 acre inches of water per season. In this study, a total of 24 acre-inches of water is applied to the orchard – six inches per application, one application per month in late June, July, August and September. Water rate is based on 80% application efficiency and no assumption is made about effective rainfall, evaporation, and runoff.

Fertilization. Pelletized chicken manure at 1,000 pounds (one-half ton) per acre is applied in January to provide nitrogen (N). A 50-50 mixture of compost (grape pumice) and gypsum is applied at 6,000 pounds (three tons) per acre. Both applications are done by the grower with his tractor and a fertilizer spreader loaned by the fertilizer company. Both materials are delivered to the grower in 2,000 pound bags; a forklift is rented for a day to lift and dump the bags into the spreader. Zinc deficiency may need correcting in some locations but is not included in this study. Some organic walnut growers also plant legume cover crops in the fall, early to mid-October, to supplement nitrogen, add organic matter to the soil, and reduce erosion potential. Erosion may be especially problematic on hillside orchards; however fall cover crop applications can be difficult due to interference with harvest operations and the difficulty in establishing in dryland orchards. Fertilizer rates in this study are typical nutrient requirements, but do not take into account soil and water nitrogen. Refer to *Guide to Efficient Nitrogen Fertilizer Use in Walnut Orchards* (UCANR Publ. # 21623) and *Cover Crops for Walnut Orchards* (UCANR Publ. #21627) for detailed information on N and cover crops.

Leaf Sampling. Leaf samples at two per nine acres are collected in July once every three years. One third of the cost is included each year. The collector takes an estimated one hour to collect the two samples using the tractor to move around the field and another hour to package, mail the samples to the lab for analysis and to interpret the results once the analysis is returned.

Pest Management. The approved pesticides and rates mentioned in this cost study are federally defined and are listed in California Certified Organic Farmers (CCOF) handbook, and the Organic Materials Review Institute (OMRI). For more information on other pesticides available, pest identification, monitoring, and management visit the UC IPM website at www.ipm.ucdavis.edu. Cultural practices are discussed in the publications *Integrated Pest Management for Walnuts* and *Walnut Production Manual*. For information and pesticide use permits, contact the local county agricultural commissioner's office. Also consult your third party organic certification agency. Pesticide costs in this study are taken from a single dealer with volume discounts taken when applicable.

Pest Control Adviser (PCA). Written recommendations are required for many pesticides and are made by licensed pest control advisers. In addition the PCA will monitor the field for agronomic problems including 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. No pest control adviser is hired in this study.

Weeds. Weeds are controlled by mechanical or physical means. The middles are mowed five times (less for non-irrigated orchards) during the season – May, June, July, August, September. The tree rows are weeded by hand two times - once in June and once in August - using a gas powered weed-eater.

Insects. Walnut husk fly (WHF) in a problem in most orchards and an infestation can lead to shriveled and darkened kernels. The WHF is monitored by the grower using yellow sticky traps with ammoniuim carbonate superchargers. Two traps are hung July 1 on the nine acres by the grower and checked in July, August and September. No grower cost is shown for the traps and monitoring. The fly is controlled with applications of GF-120, diluted 1:4 with water, once in July, twice in August, and once in September. The grower uses a tractor with an attached pressurized 50 gallon sprayer and a hand gun to apply the material. The material is applied to a portion of every tree in every row. Full coverage sprays using Entrust combined with an organically acceptable bait may be required for very high WHF populations.

Disease. There are no disease treatments in this study, however walnut blight is a spring disease that infects the nutlets and may affect late-leafing varieties during springs with prolonged rains.

Vertebrate Pest. Trapping is used to control gophers and ground squirrels (not effective for gray squirrels). Owl boxes may also help reduce squirrels, moles, and gophers.

Harvest. In October, a custom operator mechanically harvests the walnut crop. The custom harvest may be slowed by excessive dead wood in the trees. In this study, the charge is $160 per acre (minimum charge) and may be more with higher yields. The grower furnishes labor for hand raking to move nuts missed by the sweeper into the windrows. For the harvest operation, the shaker head attaches to the tree trunk to shake the nuts from the tree. The nuts fall to the ground and in a separate operation are blown from around the trees and swept into windrows to dry. A pickup machine gathers the nuts from the windrow and loads them into a cart or bankout wagon. In this study the nuts are elevated or dumped into bottom dump trailers for delivery to the dryer.

Yields. Typical annual yields for walnuts are measured in clean, dry, inshell pounds per acre. Yields in organic orchards when compared to conventional orchards are subject to potential decreases in yield and quality from diseases and insects that are not controlled. In this study, the average yield based on grower information is 1,000 pounds (one-half ton) per acre.

Returns. Actual price depends on a number of factors such as demand, size of the state crop, variety, nut size, and quality. This study uses an estimated market price of $1.10 per pound plus an average annual premium for organic at 10% per pound, resulting in an average price of $1.20 per pound ($1.10 + $0.10). Prices will vary each year.

Assessment. Under a state marketing order, the California Walnut Commission (CWC) collects mandatory assessment fees. These assessments are charged to the grower to pay for health research and export market development activities. The CWC has a current fee of $0.01 per pound of dry in-shell nuts. The Walnut Marketing Board, governed by a Federal Marketing Order, represents the walnut growers and handlers of California. The Board is funded by mandatory assessments of the handlers. The Board promotes usage of walnuts in the United States through publicity and educational programs and provides funding for walnut production and post-harvest research.

Pickup. The study assumes business use mileage of 2,500 miles per year for the pickup. The pickup and/or tractor is used for baiting squirrels and gophers, as well as husk fly control. For this study the tractor is included in the mentioned operations. Additional pickup use for checking the orchard, diseases and the irrigation system is shown as an operation.

Labor, Equipment, and Interest

Labor. Hourly wages for workers are $15.00 for machine operators and $10.00 per hour non-machine labor. Adding 36% for the employer's share of federal and state payroll taxes, workers compensation insurance, for nut crops (code 0045) and other possible benefits gives the labor rates shown of $20.40 and $13.60 per hour for machine labor and non-machine labor, respectively. Workers' compensation costs will vary among growers, but for this study the cost is based upon the average industry final rate as of January 1, 2013 (California Department of Insurance). Labor for operations involving machinery are 20% higher than the operation time given in Table 1 to account for the extra labor involved in equipment set up, moving, maintenance, work breaks, and field repair.

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 and Biological Engineers (ASABE). Fuel and lubrication costs are also determined by ASABE equations based on maximum power

takeoff (PTO) horsepower, and fuel type. Prices for on-farm delivery of diesel and gasoline are $3.84 and $4.07 per gallon, respectively. The cost includes a 7.5% local sales tax on diesel fuel and 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 1 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 5.75% 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. The rate will vary depending upon various factors, but the rate in this study is considered a typical lending rate by a farm lending agency as of January 2013.

Risk. The risks associated with crop production should not be minimized. 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 profitability and economic viability.

Cash Overhead Costs

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.

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 0.817% of the average value of the assets over their useful life. Liability insurance covers accidents on the farm and costs $502 for the entire farm.

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

Sanitation Services. Sanitation services provide one portable toilet and cost the farm $334 annually. The cost includes one single toilet unit with washbasin, delivery and two months of weekly service. Sanitation services are needed mostly during harvest.

Organic Production Fees. Organic growers must meet certain criteria as defined by the National Organic Act requiring state registration and certification by a USDA accredited certifying agent. For this study, it is assumed the grower pays approximately $700 per farm for application, inspection and certification fees in the first year and approximately $300 to $1,000 thereafter for annual inspections and certifications. An assumed annual cost of $700 is used in this study. Costs vary among agencies. See the list of certifying agents at www.ams.USDAA.gov/AMSv1.0/nop in the USDA's National Organic Program.

Management/Supervisor Salaries. The grower farms the orchard; therefore no salaries are included for management. Returns above costs are considered a return to management.

Investment Repairs. Annual maintenance is calculated as two percent of the purchase price. It is assumed orchard maintenance will be minimal; therefore no costs are shown for tree replacement.

Non-Cash Overhead Costs

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 and Biological Engineers (ASABE) based on equipment type and years of life. The life in years is estimated by dividing the wear out life, as given by ASABE 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 the tables.

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 4.75% is used to calculate capital recovery. The rate will vary depending upon size of loan and other lending agency conditions, but is a suggested rate by a farm lending agency in January 2013.

Establishment Cost. This study does not take into account establishment cost. It is assumed the orchard is at least 50 years old when purchased.

Building. The metal building(s) are on a cement slab and total approximately 1,200 square feet. The buildings are used for shops and equipment storage.

Sprinkler Irrigation System (pull hose). The sprinkler system consists of 1.14 pull hose sprinklers per acre or 10 hoses for the field. A three inch buried mainline runs through the center of the field to which the pull hoses are attached. Each hose is 150 feet long and includes sprinklers that spray 45 feet and sprinkle four gallons per minute. The sprinkler system is not the typical system installed in new orchards, therefore; lacking data, the system costs are estimated based on previous data.

Irrigation Pumping System. Electric pumps range from 7.5 horsepower (HP) to 50 HP depending on well depth and water requirements. For this study, it is assumed that the grower has a 10 horsepower pump.

Land with trees. Agricultural land in this study is valued at $10,000 per acre. The value is in the land. The trees are at least 50 years old and have declined in production. The orchard was purchased (based on the land value) for organic production.

Shop/FieldTools. This includes shop tools and equipment, hand tools, and miscellaneous field tools including the pruning equipment. The cost is assumed and not based on any collected data.

Fuel Tanks. Fuel tanks are furnished by the petroleum dealer; therefore, a cost is not shown.

Equipment. Farm equipment is purchased new or used, but the 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 for equipment and other investments are shown in Tables 5 and 6. 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.

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

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For information concerning the above mentioned University of California publications contact UC DANR Communications Services (1-800-994-8849) or your local county Cooperative Extension office.

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Table 1. COSTS PER ACRE TO PRODUCE ORGANIC WALNUTS

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:								
Fertilize: Chicken Manure	0.10	2	1	0	160	10	174	
Fertilize: Compost/Gypsum	0.10	2	1	0	120	10	134	
Prune: Custom 1X/5yr	0.00	0	0	0	0	44	44	
Prune-Brush Disposal 1X/5yr	0.25	10	3	1	1	0	15	
Rodent: Squirrel (Tractor,Traps)	0.53	13	7	2	0	0	21	
Weed-Mow Middles 5X	0.86	21	11	5	0	0	37	
Weed: Hand (Weed Eater) Tree Row	1.05	26	2	0	0	0	27	
Irrigate 1X/month 4X	0.12	2	0	0	126	0	128	
Prune: Hand (Sucker)	1.00	11	0	0	0	0	11	
Insect: Husk Fly (GF120)	0.75	18	9	3	111	0	142	
Leaf Analysis 1X/3yr	0.11	4	1	0	0	2	8	
Pickup	3.25	80	55	11	0	0	145	
TOTAL Cultural COSTS	8.12	189	90	23	518	66	886	
Harvest:								
Harvest-Shake, Pickup, Rake	2.00	27	0	0	0	160	187	
Haul	0.00	0	0	0	0	8	8	
Harvest-Hull, Dry	0.00	0	0	0	0	100	100	
CWC Assessment Fee	0.00	0	0	0	9	0	9	
TOTAL Harvest COSTS	2.00	27	0	0	9	268	304	
Interest on Operating Capital @ 5.75%							26	
TOTAL OPERATING COSTS/ACRE	9.77	207	86	22	444	333	1,118	
CASH OVERHEAD:								
Organic Certification (annual)							78	
Liability Insurance							56	
Office Expense							125	
Sanitation Fee							37	
Property Taxes							158	
Property Insurance							38	
Investment Repairs							143	
TOTAL CASH OVERHEAD COSTS/ACRE							635	
TOTAL CASH COSTS/ACRE							1,853	
NON-CASH OVERHEAD:		Per producing Acre		Annual Cost Capital Recovery				
Buildings 1,200 sqft		4,444		281			281	
Land with trees		11,111		528			528	
Pull hose irrigation		1,000		59			59	
Pump 10HP & Well		1,333		79			79	
Shop/Field Tools		667		85			85	
Equipment		1,547		158			158	
TOTAL NON-CASH OVERHEAD COSTS		20,103		1,190			1,190	
TOTAL COSTS/ACRE							3,043	

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Table 2. COSTS and RETURNS PER ACRE TO PRODUCE ORGANIC WALNUTS

	Quantity/ Acre	Unit	Price or Cost/Unit	Value or Cost/Acre	Your Costs
GROSS RETURNS					
Organic Walnuts (price includes premium)	1,000.00	lb	1.20	1,200	
OPERATING COSTS					
Insecticide:				**111**	
GF-120 Fruit Fly Bait	80.00	floz	1.39	111	
Custom:				**314**	
Prune & Stack	0.80	hour	55.00	44	
Leaf Analysis	0.07	each	35.00	2	
Shake, Sweep, Pickup	1.00	acre	160.00	160	
Haul Nuts	0.50	ton	15.00	8	
Hull/Dry Walnuts	1,000.00	lb	0.10	100	
Irrigation:				**126**	
Water - Pump	24.00	AcIn	5.27	126	
Fertilizer:				**280**	
Chicken Manure (Pelleted)	1,000.00	lb	0.16	160	
Spreader (loaned)	2.00	acre	0.00	0	
Compost/Gypsum 50/50	3.00	ton	40.00	120	
Rent:				**19**	
Forklift Rental	0.12	day	160.00	19	
Assessment:				**10**	
Burn Permit	0.02	each	25.00	1	
CA Walnut Commission	1,000.00	lb	0.01	9	
Labor:				**216**	
Equipment Operator Labor	8.40	hrs	20.40	171	
Non-Machine Labor	3.48	hrs	13.60	44	
Machinery:				**113**	
Fuel-Gas	13.92	gal	4.07	57	
Fuel-Diesel	8.75	gal	3.84	34	
Lube				14	
Machinery Repair				10	
Interest on Operating Capital (5.75%)				28	
TOTAL OPERATING COSTS/ACRE				1,217	
NET RETURNS ABOVE OPERATING COSTS				-17	
CASH OVERHEAD COSTS					
Organic Certification (annual)				78	
Liability Insurance				56	
Office Expense				125	
Sanitation Fee				37	
Property Taxes				158	
Property Insurance				38	
Investment Repairs				143	
TOTAL CASH OVERHEAD COSTS/ACRE				635	
TOTAL CASH COSTS/ACRE				1,853	
NON-CASH OVERHEAD COSTS (Capital Recovery)					
Buildings 1,200sqft				281	
Land with trees				528	
Pull Hose Irrigation				59	
Pump 10HP & Well				79	
Shop/Field Tools				85	
Equipment				158	
TOTAL NON-CASH OVERHEAD COSTS				1,190	
TOTAL COST/ACRE				3,043	
NET RETURNS ABOVE TOTAL COST				-1,843	

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Table 3. MONTHLY CASH COSTS PER ACRE TO PRODUCE ORGANIC WALNUTS

Beginning 01-13	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	TOTAL
Ending 12-13	13	13	13	13	13	13	13	13	13	13	13	13	
Cultural:													
Fertilize: Chicken Manure	174												174
Fertilize: Compost/Gypsum	134												134
Prune: Custom 1X/5yr		44											44
Prune-Brush Disposal 1X/5yr		15											15
Rodent: Squirrel(Tractor, Traps)			2	2	2	2	2	2	2	2	2	2	21
Weed-Mow Middles 5X					7	7	7	7	7				37
Weed: Hand (Weed Eater) Tree Row						14		14					27
Irrigate 1X/month 4X						32	32	32	32				128
Prune: Hand (Sucker)							11						11
Insect: Husk Fly (GF120)							35	71	35				142
Leaf Analysis 1X/3yr							8						8
Pickup	12	12	12	12	12	12	12	12	12	12	12	12	145
TOTAL Cultural COSTS	319	71	14	14	22	67	108	138	89	14	14	14	886
Harvest:													
Harvest-Shake, Pickup, Rake										187			187
Haul										8			8
Harvest-Hull, Dry										100			100
CWC Assessment Fee										9			9
TOTAL Harvest COSTS	0	0	0	0	0	0	0	0	0	304	0	0	304
Interest on Operating Capital (5.75%)	2	2	2	2	2	2	3	4	4	6	0	0	28
TOTAL OPERATING COSTS/ACRE	321	73	16	16	24	70	111	142	93	323	14	14	1,217
CASH OVERHEAD													
Organic Certification (annual)	78												78
Liability Insurance			56										56
Office Expense	10	10	10	10	10	10	10	10	10	10	10	10	125
Sanitation Fee										37			37
Property Taxes				79								79	158
Property Insurance	19					19							38
Investment Repairs	12	12	12	12	12	12	12	12	12	12	12	12	143
TOTAL CASH OVERHEAD COSTS	119	22	78	101	22	42	22	22	22	59	22	101	635
TOTAL CASH COSTS/ACRE	440	95	94	118	46	111	133	164	115	383	36	116	1,853

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Table 4. RANGING ANALYSIS

COST PER ACRE AT VARYING YIELDS TO PRODUCE ORGANIC WALNUTS

	YIELD (Lbs/acre)						
	500	750	**1,000**	1,250	1,500	1,750	2,000
OPERATING COSTS:							
Cultural	886	886	886	886	886	886	886
Harvest	152	228	304	380	456	532	607
Interest on operating capital @ 5.75%	27	27	28	28	29	29	29
TOTAL OPERATING COSTS/ACRE	1,065	1,141	1,217	1,294	1,370	1,446	1,522
Total Operating Costs/lb	2.13	1.52	1.22	1.03	0.91	0.83	0.76
CASH OVERHEAD COSTS/ACRE	635	635	635	635	635	635	635
TOTAL CASH COSTS/ACRE	1,700	1,776	1,853	1,929	2,005	2,082	2,158
Total Cash Costs/lb	3.40	2.37	1.85	1.54	1.34	1.19	1.08
NON-CASH OVERHEAD COSTS/ACRE	1,190	1,190	1,190	1,190	1,190	1,190	1,190
TOTAL COSTS/ACRE	2,890	2,966	3,043	3,119	3,195	3,272	3,348
Total Costs/lb	5.78	3.96	3.04	2.50	2.13	1.87	1.67

NET RETURNS PER ACRE ABOVE OPERATING COSTS

PRICE($/lb)	YIELD(lb/acre)						
Walnuts	500	750	**1,000**	1,250	1,500	1,750	2,000
0.80	-665	-541	-417	-294	-170	-46	78
1.00	-565	-391	-217	-44	130	304	478
1.20	-465	-241	-17	206	430	654	878
1.40	-365	-91	183	456	730	1,004	1,278
1.60	-265	59	383	706	1,030	1,354	1,678
1.80	-165	209	583	956	1,330	1,704	2,078
2.00	-65	359	783	1,206	1,630	2,054	2,478

NET RETURNS PER ACRE ABOVE CASH COSTS

PRICE($/lb)	YIELD(lb/acre)						
Walnuts	500	750	**1,000**	1,250	1,500	1,750	2,000
0.80	-1,300	-1,176	-1,053	-929	-805	-682	-558
1.00	-1,200	-1,026	-853	-679	-505	-332	-158
1.20	-1,100	-876	-653	-429	-205	18	242
1.40	-1,000	-726	-453	-179	95	368	642
1.60	-900	-576	-253	71	395	718	1,042
1.80	-800	-426	-53	321	695	1,068	1,442
2.00	-700	-276	147	571	995	1,418	1,842

NET RETURNS PER ACRE ABOVE TOTAL COSTS

PRICE($/lb)	YIELD(lb/acre)						
Walnuts	500	750	**1,000**	1,250	1,500	1,750	2,000
0.80	-2,490	-2,366	-2,243	-2,119	-1,995	-1,872	-1,748
1.00	-2,390	-2,216	-2,043	-1,869	-1,695	-1,522	-1,348
1.20	-2,290	-2,066	-1,843	-1,619	-1,395	-1,172	-948
1.40	-2,190	-1,916	-1,643	-1,369	-1,095	-822	-548
1.60	-2,090	-1,766	-1,443	-1,119	-795	-472	-148
1.80	-1,990	-1,616	-1,243	-869	-495	-122	252
2.00	-1,890	-1,466	-1,043	-619	-195	228	652

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

ANNUAL EQUIPMENT COSTS

Yr	Description	Price	Yrs Life	Salvage Value	Capital Recovery	Cash Overhead Insur-ance	Taxes	Total
13	60HP MFWD Tractor	45,000	20	6,151	3,344	209	256	3,808
13	Brush Rake	20,000	25	317	1,377	83	102	1,561
13	Loader Forks	810	30	162	49	4	5	57
13	Mower/Flail 10 ft	10,000	20	521	769	43	53	865
13	Pickup Truck 1/2 T	31,730	10	9,373	3,306	168	206	3,679
13	Sprayer 3pt 50 gal	1,600	10	283	182	8	9	199
13	Weed Eater	450	5	147	77	2	3	82
TOTAL		109,590		16,953	9,103	517	633	10,252
40% of new cost*		43,836		6,781	3,641	207	253	4,101

*Used to reflect a mix of new and used equipment

ANNUAL INVESTMENT COSTS

Description	Price	Yrs Life	Salvage Value	Capital Recovery	Cash Overhead Insur-ance	Taxes	Repairs	Total
INVESTMENT								
Buildings 1,200 sqft	40,000	30	0	2,528	163	200	800	3,692
Land with trees (10 acres)	100,000	30	100,000	4,750	0	1,000	0	5,750
Pull Hose Irrigation	9,000	35	0	532	37	45	126	740
Pump 10HP & Well	12,000	35	0	710	49	60	240	1,059
Shop/Field Tools	6,000	10	0	768	25	30	120	942
TOTAL INVESTMENT	167,000		100,000	9,288	274	1,335	1,286	12,183

ANNUAL BUSINESS OVERHEAD COSTS

Description	Units/ Farm	Unit	Price/ Unit	Total Cost
Organic Certification (annual)	9.00	acre	77.78	700
Liability Insurance	9.00	acre	55.78	502
Office Expense	9.00	acre	125.00	1,125
Sanitation Fee	9.00	acre	37.11	334

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Table 6. HOURLY EQUIPMENT COSTS

Yr	Description	Walnuts Hours Used	Total Hours Used	COSTS PER HOUR Capital Recovery	Cash Overhead Insur-ance	Taxes	Operating Lube & Repairs	Fuel	Total Oper.	Total Costs/Hr.
13	60HP MFWD Tractor	27	605	2.21	0.14	0.17	2.97	11.31	14.28	16.80
13	Brush Rake	2	79	7.02	0.42	0.52	2.51	0.00	2.51	10.47
13	Loader Forks	2	65	0.30	0.02	0.03	0.10	0.00	0.10	0.45
13	Mower/Flail 10 ft	8	102	3.03	0.17	0.21	2.94	0.00	2.94	6.35
13	Pickup Truck 1/2 T	29	30	44.07	2.24	2.74	3.27	16.96	20.23	69.28
13	Sprayer 3pt 50 gal	7	154	0.47	0.02	0.02	0.28	0.00	0.28	0.80
13	Weed Eater	10	10	2.95	0.09	0.11	0.20	1.33	1.53	4.69

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Table 7. OPERATIONS WITH EQUIPMENT

Operation	Operation Month	Tractor	Implement	Labor Type/ Material	Rate/ acre	Unit
Fertilize: Chicken Manure	Jan	60HP MFWD Tractor		Equipment Operator	0.12	hour
				ChickManurePellet	1,000.00	lb
				Spreader (loaned)	1.00	acre
				Forklift Rental	0.06	day
Fertilize: Compost/Gyp	Jan	60HP MFWD Tractor		Equipment Operator	0.12	hour
				Compost/Gyp 50/50	3.00	ton
				Spreader (loaned)	1.00	acre
				Forklift Rental	0.06	day
Prune: Custom 1X/5yr	Feb			Non-Machine Labor		
				Prune&Stack	1.33	hour
				2hr/ac 1x/5yr x 2men		
Prune-Brush Disposal 1X/5yr	Feb	60HP MFWD Tractor	Loader Forks	Non-Machine Labor	0.41	hour
			Brush Rake	Burn Permit	0.11	each
Rodent: Squirrel (Tractor, Trap)	Mar	60HP MFWD Tractor		Equipment Operator	0.06	hour
	Apr	60HP MFWD Tractor		Equipment Operator	0.06	hour
	May	60HP MFWD Tractor		Equipment Operator	0.06	hour
	June	60HP MFWD Tractor		Equipment Operator	0.06	hour
	July	60HP MFWD Tractor		Equipment Operator	0.06	hour
	Aug	60HP MFWD Tractor		Equipment Operator	0.06	hour
	Sept	60HP MFWD Tractor		Equipment Operator	0.06	hour
	Oct	60HP MFWD Tractor		Equipment Operator	0.06	hour
	Nov	60HP MFWD Tractor		Equipment Operator	0.06	hour
	Dec	60HP MFWD Tractor		Equipment Operator	0.06	hour
Weed-Mow Middles 5X	May	60HP MFWD Tractor	Mower/Flail 10 ft	Equipment Operator	0.21	hour
	June	60HP MFWD Tractor	Mower/Flail 10 ft	Equipment Operator	0.21	hour
	July	60HP MFWD Tractor	Mower/Flail 10 ft	Equipment Operator	0.21	hour
	Aug	60HP MFWD Tractor	Mower/Flail 10 ft	Equipment Operator	0.21	hour
	Sept	60HP MFWD Tractor	Mower/Flail 10 ft	Equipment Operator	0.21	hour
Weed: Hand (Weed Eater) Tree Row	June		Weed Eater	Equipment Operator	0.63	hour
	Aug		Weed Eater	Equipment Operator	0.63	hour
Irrigate 1X/month 4X	June			Non-Machine Labor	0.03	hour
				Water - Pump Lake	6.00	AcIn
	July			Non-Machine Labor	0.03	hour
				Water - Pump Lake	6.00	AcIn
	Aug			Non-Machine Labor	0.03	hour
				Water - Pump Lake	6.00	AcIn
	Sept			Non-Machine Labor	0.03	hour
				Water - Pump Lake	6.00	AcIn
Prune: Hand Sucker	July			Non-Machine Labor	1.00	hour
Insect: Husk Fly (GF120)	July	60HP MFWD Tractor	Sprayer 3pt 50 gal	Equipment Operator	0.23	hour
				GF-120 FruitFlyBai	20.00	floz
	Aug	60HP MFWD Tractor	Sprayer 3pt 50 gal	Equipment Operator	0.23	hour
				GF-120 FruitFlyBai	20.00	floz
	Aug	60HP MFWD Tractor	Sprayer 3pt 50 gal	Equipment Operator	0.23	hour
				GF-120 FruitFlyBai	20.00	floz
	Sept	60HP MFWD Tractor	Sprayer 3pt 50 gal	Equipment Operator	0.23	hour
				GF-120 FruitFlyBai	20.00	floz
Leaf Analysis 1X/3yr	July	60HP MFWD Tractor		Non-Machine Labor	0.11	hour
				Leaf Analy $/Sample	0.07	each
Pickup	Oct	Pickup Truck		Equipment Operator	3.90	hours
Harvest-Shake Pickup Rate	Oct			Non-Machine Labor	2.00	hours
				Shake Sweep Pickup	1.00	acre
Haul	Oct			Haul Nuts	0.50	ton
Harvest-Hull, Dry	Oct			Hull/Dry	1,000.00	lb
CWC Assessment Fee	Oct			CA Walnut Commission	1,000.00	lb