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1999

**U.C. COOPERATIVE EXTENSION**

**SAMPLE COSTS  
TO ESTABLISH A PEAR ORCHARD AND PRODUCE  
~PEARS~**



*Green Bartlett & Sprinkler Irrigated*

**IN SACRAMENTO COUNTY**

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## INTRODUCTION

This study includes detailed costs and underlying assumptions for establishing a pear orchard and producing pears under irrigated conditions in Sacramento County are presented in this study. The hypothetical farm used in this report is 500 acres which includes 100 acres of pear orchards. Annual production costs are presented in Tables 2-7. Table 1 pertains to orchard establishment costs.

This study is intended as a guide only. It can be used to make production decisions, determine potential returns, prepare budgets and evaluate production loans. Sample costs given for labor, materials, equipment and contract services are based on current figures. Costs and practices detailed in this study will not be applicable to every situation. A blank, *Your Cost*, column is provided to enter your actual costs on.

Tables include:

Table 1.	Costs Per Acre to Establish A Pear Orchard
Table 2.	Costs Per Acre to Produce Pears
Table 3.	Costs and Returns Per Acre to Produce Pears
Table 4.	Monthly Cash Costs Per Acre to Produce Pears
Table 5.	Whole Farm Annual Equipment, Investment and Business Overhead
Table 6.	Hourly Equipment Costs
Table 7.	Ranging Analysis

For an explanation of calculations used for the study refer to the attached General Assumptions or call the Department of Agricultural Economics, Cooperative Extension, University of California, Davis, California, (530) 752-3589 or the Sacramento County U.C. Cooperative Extension office at (916) 875-6913.

This study and others can be requested through the Department of Agricultural Economics, U.C. Davis, or from selected county Cooperative Extension offices.

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## ASSUMPTIONS

The following is a description of some general assumptions pertaining to sample costs of establishing a pear orchard and producing Green Bartlett pears in Sacramento County. Practices described are not recommendations by the University of California, but represent production procedures and materials considered typical of a well managed orchard for Sacramento County. Costs and practices detailed in this study may not be applicable to all situations. Establishment and cultural practices vary by grower and region; variations can be significant. These costs are on an annual, per acre basis. *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.*

**Land.** The whole farm consists of 400 acres of land. Of that, 100 acres are or are being planted to pear trees. The orchard is situated on peat soils typical of the Sacramento Delta region. Property costs \$6,000 per acre.

**Labor.** Hourly wages for workers are \$6.50 and \$5.75 per hour for machine and non-machine workers, respectively. Adding 40% for Workers Compensation, Social Security, Medicare, insurance, and other possible benefits gives the labor rates shown of \$9.10 and \$8.05 per hour for machine labor and non-machine labor, respectively. The percentage charged for benefits varies depending upon whether or not growers utilize labor contractors or hire their own laborers. For those growers hiring their own labor, benefit percentages may be different than 40%.

Labor time for operations involving machinery is 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 a manager are not included as cost. Returns above total costs is considered a return to management.

**Trees.** The pear cultivar planted in this study is Green Bartlett. It is a dual purpose pear, utilized for either fresh market or processing. In the Northwest, pear orchards will be planted to two varieties in which pollen shedding and bloom periods coincide so that adequate pollination is insured. Bartlett in California are the exception to this and do not require pollination by another variety since fruit is set parthenocarpically; thus orchards are solid planted to Bartlett.

Choice of the proper rootstock is a critical decision for successful tree establishment. Six rootstocks are generally used in commercial California orchards. Of these, Winter Nellis is the most favorable for Bartlett on sandy loam to loam soils, giving uniformity in size and growth as well as optimum vigor. Bartlett on Winter Nellis is one of the most common combinations of cultivar and rootstock in Sacramento County and is used in this study. The trees are planted at 9' X 18' spacing, 269 trees per acre. Pear trees have a very long production life if they are well maintained. Some pear orchards that are still producing a commercial crop are over 100 years old. The life of the orchard at the time of planting in this study is estimated to be 100 years.

**Irrigation System.** Pumped water plus labor is the irrigation cost. The cost is based on using two 25 - 30 hp motors to pump 48 acre-inches 60 to 90 feet over 70 acres. Water is pumped to the orchard after running through a filtration station into an underground, permanent sprinkler system in the tree rows. Since an older orchard was removed at this location, pumps and wells already exist and the cost of the irrigation system is for the recasing of the wells, refurbishment of the pumps and motors, and the installation of a new filtration system and underground, permanent sprinklers. The new irrigation system is installed after the orchard has been laid out and prior to planting.

The life of the irrigation system is estimated at 25 years. The irrigation system is considered an improvement to the property and is shown in the Non-Cash Overhead sections of Tables 1-3 as capital recovery costs and the Annual Investments portion of Table 5.

Price per acre foot of water will vary by grower in this region depending on power source, power cost, various well characteristics, and other irrigation factors. In this study, water is calculated to cost \$30.12 per acre foot. No assumption is made about effective rainfall. The amount of water applied to the orchard period varies annually and is shown in Table A.

Table A. Applied irrigation water

Year	Irrigation
	----- Ac In/Year -----
1	24
2	24
3	30
4	30
5+	30

## ORCHARD ESTABLISHMENT CULTURAL PRACTICES AND MATERIAL INPUTS

This orchard is established on ground that has been previously planted to an older pear orchard. The land is assumed to be on bottomland with soils that are moderately drained and fertile.

**Site Preparation.** Land preparation begins by spreading lime on the field over fifty percent of the acreage. The site is ripped three times which breaks up any underlying hardpan in the soil profile to improve root and water penetration and also pulls up additional roots from the previous orchard which can harbor disease. The roots are piled and burned. Afterwards the ground is disced twice to reduce the size of large soil clods and smooth the ground in advance of leveling and planting. The land is laser leveled and disced two more times with the last discing incorporating a preplant herbicide (Prowl ) for weed control through most of the early growing season. The application of lime and laser leveling are performed by contract or custom operators. All operations that prepare the orchard for planting are done in the year prior to planting, but costs are shown in the first year.

**Planting:** Planting the orchard starts by laying out and marking tree sites. Holes are dug at each site, trees are planted and a tree guard is placed around the trunk to protect it from vertebrate damage and sunburn, and a mixture of water and fertilizer is applied. New trees are cut back soon after planting so that scaffold development is encouraged. In the second year, 5% of the trees or 11 trees per acre will have to be replaced. Tree loss and replacement rate for subsequent years is 2%.

**Pruning.** Training and pruning begins in the first year during the dormant season (December through February). For the first four years, young trees are trained to promote a structurally strong framework to provide support for fruit and ease of cultural and harvest operations. Time required for pruning increases until the trees are ten years old. Prunings are shredded in the spring with a tractor and mower during a regular mowing.

**Fertilization.** Nitrogen is the major nutrient required for proper tree growth and optimum yields. In the first four years a combination fertilizer (20-6-27) is applied by hand at the base of the young tree to ensure efficient placement. In the remaining years nitrogen is applied in the fall as urea (46-0-0) along with potash (0-0-60) for potassium. The fifth year also sees the start of a spring application of nitrogen as calcium ammonium nitrate (17-0-0-9 Ca). Annual rates of applied nutrients are shown in Table B.

Table B. Annual applied nutrients and amendments

Year	Nitrogen	Phosphorus	Potassium	Calcium
	-----Lbs/Acre-----			
1	11	3	15	
2	11	3	15	
3	22	6	30	
4	33	8	45	
5	80		200	21
6	80		200	21
7+	80		200	21

**Orchard Floor Management.** Control of weeds is important in young orchards so that trees are not stressed due to competition for water and nutrients by weeds. Management of the orchard floor uses several techniques to control weeds: cultivation, mowing, and application of herbicides.

Vegetation in the middles between the tree rows is managed by mowing. In the first year the middles are mowed four times and they are mowed nine times annually from the second year on. Retaining orchard floor vegetation provides several important benefits: reducing compaction by equipment, allowing access with equipment during the winter, improving water infiltration, maintaining a habitat for beneficial arthropods, and helping lower dust emissions.

Chemical weed control for the orchard begins in the first year with three in-season post-emergence herbicide (Roundup-) applications sprayed along the tree rows. In the third year two in-season strip sprays are used and a fall strip spray is added. The fall strip spray is a mixture of the residual, pre-emergence herbicides Karmex- and Goal- plus Roundup-. This mixture controls a wide range of annual and perennial weeds through much of subsequent growing seasons. A spring contact treatment of 2,4-D and Roundup- begins during the fourth year.

**Insect and Arthropod Management.** Pears have many insect and mite pests; codling moth (*Cydia (Laspeyresia) pomonella*), pear psylla (*Cacopsylla pyricola*), and several species of mites (*Tetranychus spp.*, *Epirimerus pyri*, *Phytoptus pyri*, and *Panonychus ulmi*) are managed with cultural practices and treatment with various pesticides. Many of the pesticides are mixed and applied together to control a combination of insects, mites, and diseases. All of the pest control sprays are applied by a tractor and orchard sprayer.

Pesticide sprays used to manage insects and mites start in the first year and are continued, to some degree, each year throughout the life of the orchard. Beginning in the summer of the first year an insecticide spray of a horticultural oil is targeted for pear psylla and mites. A dormant and delayed dormant spray of oil are added in the second year, occurring in January and February, respectively. These are targeted at psylla, but also provide some control of mites and scale. The summer oil spray for psylla and mites continues with the addition of Agrimek- plus oil in one supplementary application during the third year, which increases the cost of this treatment. In year 4, a delayed dormant application of Asana- plus lime sulfur is made for control of mites.

Codling moth treatment begins in year five with one application of pheromone dispensers (400/acre) and a cover spray of Guthion- at the second peak of the overwintering generation. No other sprays are required for codling moth control.

**Disease Management.** Methyl bromide is often used to fumigate before planting for control of many soil-borne pathogens as well as insect and nematode pests. The primary above-ground disease of concern in Sacramento County is fire blight (*Erwinia amylovora*), although pear scab (*Venturia pirina*) can be serious in some years also.

Scab can infect blossoms and leaves in early spring, but generally does not cause significant damage because of dry spring weather in many years and because protective sprays are applied. Infected fruit develop an exterior scab which misshapens fruits and renders them unsuitable for fresh market sale. Foliar disease management begins in the second year with a budbreak spray of lime sulfur, wettable sulfur, and Asana- for pear scab and pear psylla control (Asana- is an insecticide only). In the fifth year two additional scab sprays are made March through early May. Scab problems have increased in recent years, requiring greater attention to rigorous protection of fruit.

In spring, symptoms for fire blight usually appear first in blossom clusters and shoot tips. If left untreated, the infection can move into twigs, stems, and branches. Severe infection may not only cause loss of fruit for that year, but may kill entire branches or trees, thereby reducing orchard yields for a longer period of time. Infection may occur when there are blooms and mean temperatures reach 62° F in March, 60 F° in April, and 58° F in May. Conditions ideal for rapid blight infection and spread are rainy or humid weather with temperatures ranging from 75° to 85°. The disease requires the most intensive efforts of growers in this region to manage. Management of fire blight can include applications of copper dust, antibiotics, and other fungicides; maintaining moderate tree vigor; and/or cutting infected branches at least a foot below any visible infection. During years of heavy disease pressure, fire blight may require 15 or more applications of pesticides to manage; in this study, 12 treatments are made.

The orchard in this report begins treating for blight by the fourth year with six applications of Mycoshield-. From the fifth year on, treatments consist of six weekly applications of BlightBan- plus Agrimycin, and six weekly applications of Mycoshield- midway between the BlightBan-/Agrimycin applications. This increases to 12 treatments in the fourth year and remains the same for production year. Pesticides used to control fire blight and other pests are often tank-mixed with other materials. For example, Mycoshield- can be mixed and applied scab sprays, however, BlightBan- is not fully compatible with Mycoshield- and the fungicide Dithane-. Treatments for blight usually occur from mid-March through early May.

**Establishment Cost.** The cost to establish the orchard is used to determine the non-cash overhead expenses: depreciation and interest on investment for production years. The establishment cost is the sum of cash costs for land preparation, planting, trees, production expenses, and cash overhead for growing pear trees through the first year fruit is harvested minus any returns from production. The *Total Accumulated Net Cash Cost* in the fifth year shown in Table 1 represents the establishment cost per acre. For this study, this cost is \$8,618 per acre or \$861,800 for the 100 acre orchard. Establishment cost is depreciated beginning in the fifth year over the remaining 95 years of production.

## MATURE ORCHARD CULTURAL PRACTICES AND MATERIAL INPUTS

**Pruning.** In this study, pruning is done in the winter months by a contract hand crew. Prunings are usually chopped in the spring.

**Fertilization.** Tree nitrogen status is determined by visual observation of growth (shoot vigor and leaf color) and validated by leaf analysis. Overfertilization of trees can cause excessive shoot growth, resulting in increased susceptibility to fire blight and reduced fruit set due to shading. Split applications of nitrogen are used in June and after harvest in September. In this study, fall nitrogen is applied as urea at a rate of 40 pounds of actual N per acre and in June as calcium ammonium nitrate also at 40 pounds of N per acre. Both fertilizers are broadcast on the orchard. Table C shows the timing and rates of fertilizer applications for a mature orchard.

**Weed Management.** Weeds in mature orchards are controlled with most of the same practices as those used in the fifth year. Weed management begins with an application of residual and contact herbicides (Goal-, Karmex-, and Roundup-) along a six foot strip in the tree row in November. A February burn-down spray of Roundup delays the first mowing until April. Weeds are then mowed about nine times through the year. Brush disposal in January is the first mowing that also chops prunings. Table C shows the timing and rates of herbicide applications for a mature orchard.

**Insect and Arthropod Management.** Several insect and arthropod pests are treated each year. Pests discussed in this study include codling moth, pear psylla, and mites. All pest management operations are performed by the growers with their own equipment. Table C shows the insect and arthropod treatments and timing for a mature orchard.

Codling moth is considered the primary pear pest and its control affects subsequent control of other pests. A program of mating disruption plus one organophosphate insecticide treatment, applied at the second peak of the overwintering generation (“1B” peak; usually mid-May) has proven effective for most orchards in this district. However, orchards with high moth populations or those in the first year of mating disruption may require two insecticide applications. In years with very low codling moth populations, some growers have eliminated organophosphate sprays altogether. Careful monitoring of moth populations and degree-days is essential to determine the need for spraying. The 1B peak insecticide application also helps to control obliquebanded leafrollers (OBLR), however, a spray at the 1A peak (usually mid-April) is more effective for OBLR but less effective for codling moth.

Pear psylla is the next most economically significant insect pest of pears. It injects a toxin into the tree, produces honeydew, and vectors the disease pear decline (caused by a mycoplasma). Toxin from psylla also results in a condition referred to as psylla shock. Once in the tissue the toxin causes burning of the foliage, which, if severe enough, can lead to yield reductions, smaller fruit size, and loss of tree vigor. Honeydew excreted by psylla can cause russetting on fruit and sooty mold on leaves, reducing photosynthesis. Pear decline is not considered a major problem if trees are grafted to a resistant rootstock, but can result in a loss of vigor.

Psylla are controlled with horticultural oil and/or Agrimek applied at various times during the year. Treatments made in this study include a dormant spray in December, delayed dormant spray in late February, combination psylla and mites in April, and a postharvest spray in August.

Mites can cause damage in pears even at low levels (two per leaf). Dormant oil sprays during the winter control some mites before damage occurs. However, use of certain insecticides can suppress mite predators and create outbreaks of harmful mites during the growing season. For this reason follow up control is needed during the season, generally in conjunction with the April pear psylla treatment, and another application in June. Some growers using codling moth mating disruption have eliminated in-season psylla and mite sprays because the number of applications of disruptive organophosphate insecticides is reduced.

**Disease Management.** Fire blight, as described before, can cause the loss of complete branches or trees. Twelve treatments are made using six weekly applications of a combination of BlightBan- plus Agrimycin-, alternated with six weekly applications of Mycoshield- midway between the BlightBan-/Agrimycin- applications; copper dust may be used in place of this program. These sprays are applied from late March through early May. Several of the blight sprays are combined with scab sprays and with the cover spray if needed. Blight and scab treatments made in March and early April are sprayed every other row, which effectively cuts the actual pounds applied in half. Once foliage gets thicker in mid April sprays are applied every row so a full rate of materials is used. Table C shows the timing and rate of disease treatments for this study.

Pear scab is caused by a fungus that first attacks young fruit, appearing as dark velvety spots and often causing the young pears to drop. If fruit does not drop, scabbing and deformities occur and cause reductions in quality. Pear scab can be a serious disease during cool, wet springs.

Fungicides are the primary approach to combating pear scab. In this study, three fungicide treatments are made *prior to* infections occurring in spring. Temperature and moisture monitoring are used to pinpoint timing for application of fungicides. The materials used in the first treatment are lime sulfur and wettable sulfur (mixed with Asana- for pear psylla control) applied at budbreak in late February. Three additional scab sprays (two are combined with fire blight treatments) using Benlate-, Dithane-, or Ziram- mixed with wettable sulfur are made mainly in March and April as needed.

**Vertebrate Pest Management.** The major vertebrate pest in pear orchards for this region is pocket gopher (*Thomomys sp.*) which presents a constant management problem. Since there is no way to exclude gophers from the orchard other control measures such as trapping or baiting must be used instead. Gophers in this study are managed with the use of poison bait applied in the spring while populations are still low. The bait is placed underground in an artificial burrow built by a mechanical bait applicator attached to a tractor. Gophers intersecting these tunnels will explore them and eat the bait.



Table C. Fertilizer and pesticide applications

MONTH	OPERATION & MATERIALS USED <sup>1/</sup>	RATE PER APPLIED ACRE		
August	Strip herbicide spray (if needed):	Roundup Ultra Orchard Master	2 qts. 3 pts.	
September	Fall fertilization:	Urea 46-0-0 Muriate of Potash	40 units N 500 lbs.	
October	Fall cleanup spray:	Summer oil Sulforix	5 gal. 2.5 gal.	
November	Fall herbicide strip spray:	Roundup Ultra Goal Karmex	2 qts. 1 qt. 4 lbs.	
December	Dormant oil spray (before Dec. 15):	Volck oil	10 gal.	
January	None			
February	Delayed dormant spray (psylla and scab control):	Asana (plus sticker) Thiolux	8 oz. 10 lbs.	
March	Burn-down spray (Full Rate):	Roundup Ultra	2 qts.	
	Fire blight sprays (4X - made every other row):	BlightBan 2X	2.5 oz.	
		Agrimycin 2X	9.6 oz.	
		Mycoshield 2X	1 lb.	
	Scab sprays (2X - mixed with fire blight spray as appropriate and applied every other row):	Dithane 1X	2 qts.	
		Microthiol 1X	10 lbs.	
		Ziram 1X Vanguard 1X	4 lbs. 4 oz.	
	Codling moth mating disruption:	Isomate C+ dispensers	400	
	Strip herbicide spray:	Roundup Ultra Orchard Master	2 qts. 3 pts.	
	April	Fire blight sprays (8X – 4 sprays are made every other row):	BlightBan 4X	2.5 oz.
Agrimycin 4X			9.6 oz.	
Mycoshield 4X			1 lb.	
Scab sprays (2X - mixed with fire blight spray as appropriate and applied every other row):		Benlate 1X Dithane 1X	8 oz. 2 qts.	
		Benlate 1X Ziram 1X	8 oz. 4 lbs.	
		Psylla & mite spray:	Agri-Mek Summer oil	12 oz. 1 gal.
In-season strip herbicide spray:		Roundup Ultra Orchard Master	2 qts. 3 pts.	
May		Cover spray (codling moth, OBLR & mite control):	Guthion Apollo	2.5 lbs. 3 oz.
		In-season strip herbicide spray:	Roundup Ultra Orchard Master	2 qts. 3 pts.
June		Early summer fertilization:	Calcium nitrate	40 units N
	Hormone (stop-drop) spray:	NAA	24 oz.	

<sup>1/</sup> Pesticides connect with a vertical bar are mixed and sprayed together.

Pesticides, rates, and cultural practices mentioned in this cost study are a few of those listed in the [UC IPM Pear Pest Management Guidelines](#) and [Integrated Pest Management For Pears And Pears](#). Written recommendations are required for many pesticides and are made by licensed pest control advisors. For information and pesticide use permits, contact the local county Agricultural Commissioner's office.

**Equipment Cash Costs.** Equipment costs are fall into three categories; capital recovery, cash overhead, and operating costs. The cash overhead and capital recovery costs will be discussed in later sections. The operating costs consist of fuel, lubrication, and repairs.

Repair costs are based on purchase price, annual hours of use, total hours of life, and repair coefficients formulated by the American Society of Agricultural Engineers (ASAE). Fuel and lubrication costs are also determined by ASAE equations based on maximum PTO hp, and type of fuel used. The fuel 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 cultural practice by the number of hours per acre for that operation. Tractor time is 10% higher than implement time (Operation Time) for a given operation to account for fueling, moving equipment, and setup time. Prices for on-farm delivery of diesel and gasoline are \$0.62 and \$1.02 per gallon, respectively.

**Harvest.** Commercial harvest begins in the fourth or fifth year after planting. Though some trees will yield fruit in the second or third year, it is usually removed so that early tree growth is not stunted. In this study, a commercial crop is produced and harvested by the fifth year. Growers are paid for fruit based on gross field tons for different grades. The crop is harvested and hauled by the grower, although a contracted harvesting company may be hired to harvest pears. Cleaning, sorting, and packing costs are paid by the grower. The harvest season for Green Bartlett is usually July to early August.

While 4-5th year orchards are only harvested once, older pear orchards are harvested twice. The first pick is selective and usually collects a third of the fruit, most of which will be sold on the fresh market. The second pick gathers the remaining pears about 10 days or two weeks later. Harvest crews use ladders and picking bags to hand pick fruit which is placed into half-ton field bins. Tractors with forklift attachments on both the front loader and 3-point hitch pick up the filled bins, move them from the orchard, and place them on a flatbed truck or drop trailers for transport to a packing shed for cleaning, sorting, and packing. For growers who contract their harvest, the equipment and labor used for harvest operations should be removed from Harvest costs in Tables 2-4, and custom harvest charges should be added to Harvest costs in the same tables.

**Assessments.** Under a state marketing order, mandatory assessment fees are collected and administered by the California Pear Advisory Board (CPAB). This assessment is charged to growers to pay for pear marketing and advertising. Rates are set for pears bound for both fresh and processed markets. This report uses CPAB assessments for the categories fresh market carton and processed unrestricted and restricted grades as shown in Table D.

Table D. California Pear Advisory Board assessments for pears

Category	Price per Unit	Unit
<u>Fresh market</u>		
Tight-fill carton	\$0.30	36 lb. tight-fill carton
Standard box	\$0.375	45 lb. box
LA lug	\$0.193	lug
<u>Processed</u>		
Unrestricted grades	\$4.00	ton
Restricted grade	\$1.50	ton
All other special products	\$1.50	ton

Additionally, a voluntary assessment may also be paid by growers to the California Pear Growers (CPG). The CPG uses these funds to negotiate a price for growers who sell their pears to proprietary processors and to help growers maintain and obtain chemical registration of pesticides that are important for pear production. CPG charges members \$2 per ton of processed fruit.

**Yields.** Typical annual yields for Green Bartlett pears are measured in tons per acre; Table E indicates the assumed yields for the variety used in this study from the first yield to maturity. Yields fall into three categories: fresh market, processed (canned), and off-grade (juice). The latter two categories are pears that will not make fresh market grades due to cosmetic, size, or other damage factors, but can be used for canning or processing into juice, sauce or other processed pear products. Processed may also be referred to as canning or unrestricted grade while off-grade can be called restricted grade. Off-grade pears are used in juice, concentrate, fermented products, drying, and frozen goods. Pears that go to processing or off-grade receive lower prices than fresh market fruit so grower incentive is to produce for the fresh fruit trade.

Table E. Annual yields per acre

Year	Total Yield	Fresh Market	Tons/Acre	
			Canned	Juice
5	2.5	0.6	1.6	0.2
6	5.6	1.4	4.0	0.2
7	8.7	2.2	6.3	0.3
8	11.8	3.0	8.5	0.4
9	14.9	3.7	10.7	0.4
10+	18.0	4.5	11.7	0.5

An assumed yield of 18 tons per acre is used to calculate cost per ton for a mature orchard. A typical yield range is 15 to 30 tons per acre. Yield maturity is reached in the tenth year. This report separates yields for the three different categories from gross tonnage as follows: fresh market - 25%, processed - 72%, and off-grade - 3%. Of the pears going to processing 10% are culls and are not sold. Actual tonnage and percent of packout by various market categories for the previous five years in Sacramento County is shown in Table F.

Table F. Sacramento County annual tonnage and percent packout for previous five harvests

Year	Tonnage	Fresh Market	percent of tonnage	
			Processed	Off-grade
1994	144,608	17.4	78.1	4.5
1995	107,899	16.3	68.7	15.0
1996	101,798	19.8	75.3	4.9
1997	129,106	15.6	77.0	7.4
1998	134,829	18.1	76.7	5.2
Average	123,648	17.4	75.2	7.4

**Returns.** Estimated return prices per ton for the categories described above are: fresh market - \$250, canned - \$242, and juice grade - \$50. In the previous ten years prices have ranged for fresh market - \$400 to \$700 per ton, processed - \$190 to \$230, and off-grade - \$25 to \$125. Use of return prices for pears is to calculate ranging analysis for different yields and prices. Returns, shown in Table 7, will vary and the yields and prices used in this cost study are an estimate taking into consideration varieties produced, fruit quality, and current market conditions. Other varieties might reach prices as high as \$600 to \$800 per ton for fresh fruit, but will have very little processing value since they can not be canned.

**Risk.** The risks associated with producing and marketing pears 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 the profitability and economic viability of pear production. A market channel should be determined before pears are planted and brought into production in Sacramento County.

## OVERHEAD COSTS

**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, sanitation services, and equipment repairs. Cash overhead costs are included in Tables 1-5.

*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. Salvage value for investments will vary.

*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 9.69% per year. A nominal interest rate is the going market cost of borrowed funds.

*Insurance* Insurance for farm investments vary depending on the assets included and the amount of coverage. Property insurance provides coverage for property loss and is charged at 0.713% of the average value of the assets over their useful life. Liability insurance covers accidents on the farm and costs \$650 for the entire farm.

*Office Expense* Office and business expenses are estimated at \$25 per acre. These expenses include office supplies, telephones, bookkeeping, accounting, legal fees, road maintenance, etc.

*Sanitation Services* Sanitation services provide portable toilets for the orchard and cost the farm \$655 annually. This cost includes delivery and servicing of toilets.

**Capital Recovery Costs.** Non-cash overhead is calculated as the capital recovery cost for equipment and other farm investments. Although farm equipment on pear orchards in Sacramento County might be purchased new or used, this study shows the current purchase price for new equipment. The new purchase price is adjusted to 60% to indicate a mix of new and used equipment. Annual ownership costs (Equipment and Investments) are shown in Tables 1-3, and 5. They represent the capital recovery cost for investments on an annual per acre basis.

Capital recovery cost is the money required each year to recover the difference between the purchase price and salvage value (unrecovered capital). Put another way, it is equivalent to the annual payment on a loan for the investment with the downpayment 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 calculation for the annual capital recovery costs is as follows.

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

*Salvage Value.* Salvage value is an estimate of the remaining value of an investment at the end of its life. For farm machinery (e.g., tractors and implements) the remaining value is a percentage of the new cost of the investment. The life in years is estimated by dividing the wear-out life, as given by American Society of Agricultural Engineers (ASAE) by the annual use in hours. Salvage value is calculated by Boelje and Eidman as

$$\text{New Price} \times \% \text{Remaining Value}$$

Salvage value for other investments including irrigation systems, buildings, and miscellaneous equipment is zero. The salvage value for land is equal to the purchase price because land does not depreciate. Salvage value for investments can vary. The purchase price and salvage value for certain equipment and investments are shown in Table 7.

*Capital Recovery Factor.* Capital recovery factor is the amortization factor or annual payment whose present value at compound interest is 1. It is the function of the interest rate and years of life of the equipment.

*Interest Rate.* The interest rate of 7.40% used to calculate capital recovery cost is the USDA-ERS's ten year average of California's agricultural sector longrun 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.

**Acknowledgment.** The authors also wish to thank all of the persons who provided information for this study.

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U.C. COOPERATIVE EXTENSION  
 SAMPLE COSTS PER ACRE TO ESTABLISH A PEAR ORCHARD  
 SACRAMENTO COUNTY - 1999

Table 1.

Labor Rate: \$9.10/hr. machine labor  
 \$8.05/hr. non-machine labor

Interest Rate: 9.69%

Year	Costs Per Acre				
	1st	2nd	3rd	4th	5th
Tons Per Acre					2.5
<b>Planting Costs:</b>					
Land Preparation - Apply Lime	\$35				
Land Preparation - Rip 3X	120				
Land Preparation - Disc 2X	50				
Land Preparation - Leveling	75				
Land Preparation - Disc 1X	18				
Land Preparation - Apply Herbicide	40				
Layout Orchard	15				
Trees: 270 Per Acre (5% in year 2, 2% year 3+)	1,431	\$74	\$21	\$21	\$21
Plant Trees & Place Tree Guards	338	17	5	5	5
Head Back Trees	54				
<b>TOTAL PLANTING COSTS</b>	<b>2,176</b>	<b>91</b>	<b>26</b>	<b>26</b>	<b>26</b>
<b>Cultural Costs:</b>					
Train & Prune		108	135	472	472
Fertilize (Spring & Fall)	67	67	92	116	66
Pest Control - Fall Cleanup Spray				45	45
Weed Control - Burn-down Spray		16	16	16	16
Weed Control - Mow Middles 4X (2X in year 2+)	22	50	50	50	50
Weed Control - In-season Strip Sprays 2X	27	27	27	27	27
Weed Control - Fall Strip Spray			25	25	25
Pest Control - Dormant Spray		14	14	20	39
Pest Control - Delay Dormant Spray				26	33
Pest Control - Gophers	13	13	13	13	13
Pest Control - Scab Sprays 4X				106	106
Pest Control - Cut Blight		100	100	150	150
Pest Control - Blight 12X				290	290
Pest Control - Pheromone Confusion					130
Pest Control - Cover Spray					64
Pest Control - Psylla & Mite Spray				92	92
Fruit Sizing - Hormone Spray					36
Irrigate 6X	107	107	107	133	158
Pickup Truck Use	9	9	9	9	9
ATV Use	8	8	8	8	8
<b>TOTAL CULTURAL COSTS</b>	<b>253</b>	<b>519</b>	<b>596</b>	<b>1,598</b>	<b>1,829</b>
<b>Harvest Costs:</b>					
Pick Fruit					125
Haul to Shed					15
<b>TOTAL HARVEST COSTS</b>					<b>140</b>
<b>Assessments:</b>					
California Pear Advisory Board					40
California Pear Growers					5
<b>TOTAL ASSESSMENT COSTS</b>					<b>45</b>
Interest On Operating Capital @ 9.69%	309	26	29	67	86
<b>TOTAL OPERATING COSTS/ACRE</b>	<b>2,738</b>	<b>636</b>	<b>651</b>	<b>1,691</b>	<b>2,126</b>
<b>Cash Overhead Costs:</b>					
Office Expense	25	25	25	25	25
Sanitation Fees	1	1	1	1	1
Liability Insurance	1	1	1	1	1
Property Taxes	73	71	71	72	72
Property Insurance	52	50	50	51	51
Investment Repairs	60	46	46	46	46
<b>TOTAL CASH OVERHEAD COSTS</b>	<b>212</b>	<b>194</b>	<b>194</b>	<b>196</b>	<b>196</b>
<b>TOTAL CASH COSTS/ACRE</b>	<b>2,950</b>	<b>830</b>	<b>845</b>	<b>1,887</b>	<b>2,277</b>
<b>INCOME/ACRE FROM PRODUCTION</b>					<b>555</b>
<b>NET CASH COSTS/ACRE FOR THE YEAR</b>	<b>2,950</b>	<b>830</b>	<b>845</b>	<b>1,887</b>	<b>1,722</b>
<b>ACCUMULATED NET CASH COSTS/ACRE</b>	<b>2,950</b>	<b>3,780</b>	<b>4,625</b>	<b>6,512</b>	<b>8,234</b>

U.C. COOPERATIVE EXTENSION  
 COSTS PER ACRE TO *ESTABLISH* A PEAR ORCHARD  
 Table 1. continued  
 SACRAMENTO COUNTY - 1999

Year	Costs Per Acre				
	1st	2nd	3rd	4th	5th
Tons Per Acre					2.5
Capital Recovery Cost - 7.40% Interest Rate:					
Shop Building	9	9	9	9	9
Fuel Tank & Pump	1	1	1	1	1
Shop Tools	3	3	3	3	3
Sprinkler Irrigation System	129	129	129	129	129
Hand Tools	1	1	1	1	1
Ladders - 10 Each	1	1	1	1	1
Land @ \$6,000/Acre	444	444	444	444	444
Picking Trailers					18
Spray Mixing Station	7	7	7	7	7
Tile Drainage System	18	18	18	18	18
Equipment	16	21	25	53	53
<b>TOTAL CAPITAL RECOVERY COSTS</b>	<b>629</b>	<b>634</b>	<b>638</b>	<b>666</b>	<b>684</b>
<b>TOTAL COST/ACRE FOR THE YEAR</b>	<b>3,579</b>	<b>1,464</b>	<b>1,483</b>	<b>2,553</b>	<b>2,961</b>
<b>INCOME/ACRE FROM PRODUCTION</b>					<b>555</b>
<b>TOTAL NET COST/ACRE FOR THE YEAR</b>	<b>3,579</b>	<b>1,464</b>	<b>1,483</b>	<b>2,553</b>	<b>2,406</b>
<b>TOTAL ACCUMULATED NET COST/ACRE</b>	<b>3,579</b>	<b>5,043</b>	<b>6,526</b>	<b>9,079</b>	<b>11,485</b>



Table 2.

UC COOPERATIVE EXTENSION  
COSTS PER ACRE TO PRODUCE PEARS  
SACRAMENTO COUNTY - 1999

Labor Rate: \$9.10/hr. machine labor  
\$8.05/hr. non-machine labor

Interest Rate: 9.69%  
Yield per Acre: Fresh – 4.5 Ton  
Canned – 11.7 Ton  
Juice – 0.5 Ton

Operation	Operation Time (Hrs/A)	Cash and Labor Costs per Acre					Total Cost	Your Cost
		Labor Cost	Fuel,Lube & Repairs	Material Cost	Custom/ Rent			
<b>Cultural:</b>								
Weed Control - Fall Strip Spray	0.25	3	1	21	0	25		
Pest Control - Dormant Spray	0.13	1	1	30	0	32		
Train & Prune	0.00	0	0	0	651	651		
Brush Disposal	0.40	4	2	0	0	7		
Weed Control - Burn-down Spray	0.25	3	1	12	0	16		
Pest Control - Delay Dormant Spray	0.13	1	1	25	0	28		
Replant Trees - 2%	0.00	0	0	27	0	27		
Plant Trees & Place Guards	1.30	10	0	7	0	17		
Weed Control - Mow Middles 9X	2.94	32	18	0	0	50		
Weed Control - In-season Strip Sprays 2X	0.75	8	4	29	0	41		
Pest Control - Blight & Scab Spray 4X	0.50	5	4	179	0	188		
Pest Control - Blight Spray 8X	1.83	20	13	165	0	198		
Irrigate 9X	2.10	17	0	153	0	170		
Rodent Control	0.20	2	1	10	0	13		
Pest Control - Cut Blight	0.00	0	0	0	250	250		
Pest Control - Codling Moth Confusion	1.25	10	0	120	0	130		
Pest Control - Psylla & Mite Spray	0.33	4	2	86	0	92		
Pest Control - Cover Spray	0.33	4	2	54	0	60		
Fertilize - Early Summer	1.00	8	0	29	0	37		
Hormone Spray	0.33	4	2	30	0	36		
Fertilize - Postharvest	0.00	0	0	74	5	79		
Pickup Truck Use	0.57	6	2	0	0	9		
ATV Use	0.57	6	1	0	0	8		
<b>TOTAL CULTURAL COSTS</b>	<b>15.17</b>	<b>149</b>	<b>57</b>	<b>1,051</b>	<b>905</b>	<b>2,162</b>		
<b>Harvest:</b>								
Pick Fruit	0.00	0	0	0	980	980		
Haul Fruit To Shed	0.00	0	0	0	15	15		
<b>TOTAL HARVEST COSTS</b>	<b>0.00</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>995</b>	<b>995</b>		
<b>Assessments:</b>								
California Pear Advisory Board	0.00	0	0	139	0	139		
California Pear Growers Association	0.00	0	0	33	0	33		
<b>TOTAL ASSESSMENT COSTS</b>	<b>0.00</b>	<b>0</b>	<b>0</b>	<b>172</b>	<b>0</b>	<b>172</b>		
Interest on operating capital @ 10%						92		
<b>TOTAL OPERATING COSTS/ACRE</b>		<b>149</b>	<b>57</b>	<b>1,224</b>	<b>1,900</b>	<b>3,422</b>		
<b>CASH OVERHEAD:</b>								
Office Expense						25		
Liability Insurance						1		
Sanitation Fees						1		
Property Taxes						112		
Property Insurance						80		
Investment Repairs						43		
<b>TOTAL CASH OVERHEAD COSTS</b>						<b>263</b>		
<b>TOTAL CASH COSTS/ACRE</b>						<b>3,685</b>		

UC COOPERATIVE EXTENSION  
Table 2. continued

CAPITAL RECOVERY COSTS (7.40% Interest Rate):			
Investment	Per producing Acre	-- Annual Cost -- Capital Recovery	
Buildings	89	9	9
Fuel Tanks & Pumps	14	1	1
Shop Tools	25	3	3
Sprinkler Pears	1,326	129	129
Land	6,000	444	444
Hand Tools	9	1	1
Ladders - 10 each	3	0	0
Pear Orchard Establishment	8,234	610	610
Picking Trailers	38	4	4
Spray Mixing Station	13	1	1
Tile Drainage System	200	18	18
Equipment	367	53	53
<b>TOTAL CAPITAL RECOVERY COSTS</b>	<b>16,318</b>	<b>1,273</b>	<b>1,273</b>
<b>TOTAL COSTS/ACRE</b>			<b>4,958</b>

Table 3.

UC COOPERATIVE EXTENSION  
COSTS AND RETURNS PER ACRE TO PRODUCE PEARS  
SACRAMENTO COUNTY - 1999

Quantity/Acre	Unit	Price or Cost/Unit	Value or Cost/Acre	Your Cost
<b>GROSS RETURNS</b>				
Fresh	4.50	Ton	250.00	1,125
Canned	11.70	Ton	242.00	2,831
Juice	0.50	Ton	50.00	25
<b>TOTAL GROSS RETURNS FOR PEARS</b>				3,981
<b>OPERATING COSTS</b>				
<b>Herbicide:</b>				
Goal 2 XL	0.50	Pint	16.97	8
Karmex DF	1.00	Lb	6.27	6
Roundup Ultra	6.00	Pint	6.23	37
Orchardmaster	2.25	Pint	4.65	10
<b>Insecticide:</b>				
Volck Oil	10.00	Gal	2.95	30
Asana XL	8.00	Oz	1.58	13
Agri-Mek	12.00	Oz	6.78	81
Summer Oil	1.00	Gal	4.34	4
Guthion 50W	2.50	Lb	8.58	21
<b>Contract:</b>				
Prune & Train	270.00	Tree	2.41	651
Blight Cutting	1.00	Acre	250.00	250
<b>Fungicide:</b>				
Thiolux	10.00	Lb	1.07	11
Microthiol	10.00	Lb	0.826	8
Dithane F-45	8.00	Pint	2.430	19
BlightBan	15.00	Oz	4.56	68
Ziram	8.00	Lb	3.52	28
Vanguard	4.00	Oz	3.79	15
Benlate SP	1.00	Lb	25.74	26
<b>Adjuvant:</b>				
Sticker	10.00	Oz	0.205	2
<b>Tree:</b>				
Tree - Pear	5.00	Each	5.30	27
<b>Tree Aids:</b>				
Tree Guards	14.00	Each	0.50	7
<b>Antibiotic:</b>				
Agrimycin 17	57.60	Oz	0.92	53
Mycoshield	6.00	Lb	21.09	127
<b>Irrigation:</b>				
Water	36.00	AcIn	4.26	153
<b>Rodenticide:</b>				
Rodent Bait	2.00	Lb	5.06	10
<b>Lures/Confusion:</b>				
Codling Moth Ties	1.00	Acre	110.00	110
Monitoring Fee	1.00	Acre	10.00	10
<b>Miticide:</b>				
Apollo	3.00	Oz	10.75	32
<b>Fertilizer:</b>				
CAN	40.00	Lb N	0.719	29
46-0-0	40.00	Lb N	0.279	11
Muriate Of Potash	500.00	Lb	0.126	63
<b>Growth Regulator:</b>				
NAA	24.00	Oz	1.23	30
<b>Custom:</b>				
Harvest - Hand	18.00	Ton	50.00	900
Haul - Custom	4.50	Ton	3.33	15
Spread Amendment	1.00	Acre	4.50	5
<b>Rent:</b>				
Tractor Rentals - 10	10.00	Acre	8.00	80

UC COOPERATIVE EXTENSION  
Table 3. continued

Assessment:				
Fresh Market	250.00	Box	0.26	65
Processed - Unrestricted	11.70	Ton	6.30	74
Processed - Restricted	0.50	Ton	1.50	1
California Pear Growers Association	16.70	Ton	2.00	33
Labor (machine)	11.42	Hrs	9.10	104
Labor (non-machine)	5.65	Hrs	8.05	45
Fuel - Gas	2.05	Gal	1.02	2
Fuel - Diesel	24.82	Gal	0.62	15
Lube				3
Machinery repair				36
Interest on operating capital @ 9.69%				92
<b>TOTAL OPERATING COSTS/ACRE</b>				<b>3,422</b>
<b>NET RETURNS ABOVE OPERATING COSTS</b>				<b>559</b>
<b>CASH OVERHEAD COSTS:</b>				
Office Expense				25
Liability Insurance				1
Sanitation Fees				1
Property Taxes				112
Property Insurance				80
Investment Repairs				43
<b>TOTAL CASH OVERHEAD COSTS/ACRE</b>				<b>263</b>
<b>TOTAL CASH COSTS/ACRE</b>				<b>3,685</b>
<b>CAPITAL RECOVERY COSTS (7.4% Interest rate):</b>				
Buildings				9
Fuel Tanks & Pumps				1
Shop Tools				3
Sprinkler Pears				129
Land				444
Hand Tools				1
Ladders - 10 each				0
Pear Orchard Establishment				610
Picking Trailers				4
Spray Mixing Station				1
Tile Drainage System				18
Equipment				53
<b>TOTAL CAPITAL RECOVERY COST/ACRE</b>				<b>1,273</b>
<b>TOTAL COSTS/ACRE</b>				<b>4,958</b>
<b>NET RETURNS ABOVE TOTAL COSTS</b>				<b>-977</b>

Table 4.

UC COOPERATIVE EXTENSION  
MONTHLY CASH COSTS PER ACRE TO PRODUCE PEARS  
SACRAMENTO COUNTY - 1999

Beginning NOV 98 Ending OCT 99	NOV 98	DEC 98	JAN 99	FEB 99	MAR 99	APR 99	MAY 99	JUN 99	JUL 99	AUG 99	SEP 99	OCT 99	TOTAL
<b>Cultural:</b>													
Weed Control - Fall Strip Spray	25												25
Pest Control - Dormant Spray		32											32
Train & Prune		651											651
Brush Disposal			7										7
Weed Control - Burn-down Spray				16									16
Pest Control - Delay Dormant Spray				28									28
Replant Trees - 2%					27								27
Plant Trees & Place Guard					17								17
Weed Control - Mow Middle 9X					6	11	11	11	6	6			50
Weed Control - In-season Strip Sprays 2X					14	14	14						41
Pest Control - Blight & Scab Spray 4X					93	95							188
Pest Control - Blight Spray 8X					45	153							198
Irrigate 9X						19	19	38	38	19	19	18	170
Rodent Control							13						13
Pest Control - Cut Blight							83	83	85				250
Pest Control - Codling Moth Confusion							130						130
Pest Control - Psylla & Mite Spray							92						92
Pest Control - Cover Spray								60					60
Fertilize - Early Summer									37				37
Hormone Spray									36				36
Fertilize - Postharvest											79		79
Pickup Truck Use	1	1	1	1	1	1	1	1	1	1	1	1	9
ATV Use	1	1	1	1	1	1	1	1	1	1	1	1	8
<b>TOTAL CULTURAL COSTS</b>	<b>26</b>	<b>684</b>	<b>8</b>	<b>45</b>	<b>203</b>	<b>611</b>	<b>187</b>	<b>208</b>	<b>45</b>	<b>26</b>	<b>99</b>	<b>19</b>	<b>2162</b>
<b>Harvest:</b>													
Pick Fruit									980				980
Haul Fruit To Shed									15				15
<b>TOTAL HARVEST COSTS</b>									<b>995</b>				<b>995</b>
<b>Assessments:</b>													
California Pear Advisory Board									139				139
California Pear Growers Association									33				33
<b>TOTAL ASSESSMENT COSTS</b>									<b>172</b>				<b>172</b>
Interest on oper. Capital <sup>1/</sup>	0	6	6	6	8	13	14	16	26	-1	-1	0	92
<b>TOTAL OPERATING COSTS/ACRE</b>	<b>26</b>	<b>690</b>	<b>14</b>	<b>52</b>	<b>210</b>	<b>624</b>	<b>202</b>	<b>224</b>	<b>1239</b>	<b>25</b>	<b>98</b>	<b>19</b>	<b>3422</b>
<b>OVERHEAD:</b>													
Office Expense	2	2	2	2	2	2	2	2	2	2	2	2	25
Liability Insurance				1									1
Sanitation Fees	0	0	0	0	0	0	0	0	0	0	0	0	1
Property Taxes				56					56				112
Property Insurance				40					40				80
Investment Repairs	4	4	4	4	4	4	4	4	4	4	4	4	43
<b>TOTAL CASH OVERHEAD COSTS</b>	<b>6</b>	<b>6</b>	<b>6</b>	<b>103</b>	<b>6</b>	<b>6</b>	<b>6</b>	<b>6</b>	<b>102</b>	<b>6</b>	<b>6</b>	<b>6</b>	<b>263</b>
<b>TOTAL CASH COSTS/ACRE</b>	<b>32</b>	<b>695</b>	<b>20</b>	<b>155</b>	<b>216</b>	<b>630</b>	<b>207</b>	<b>230</b>	<b>1340</b>	<b>31</b>	<b>104</b>	<b>25</b>	<b>3685</b>

<sup>1/</sup> Postharvest operation costs are discounted back to the time of the first harvest.

Table 5.

UC COOPERATIVE EXTENSION  
WHOLE FARM ANNUAL EQUIPMENT, INVESTMENT, AND BUSINESS OVERHEAD COSTS  
SACRAMENTO COUNTY - 1999

ANNUAL EQUIPMENT COSTS								
Yr	Description	Price	Yrs Life	Salvage Value	Capital Recovery	- Cash Overhead - Insur- ance		Total
99	55 HP 2WD Tractor	32,269	12	8,068	3,709	144	202	4,055
99	ATV 4WD	7,430	10	1,314	984	31	44	1,059
99	Bait Applicator	1,046	10	185	139	4	6	149
99	Mower - Rotary 9'	5,400	10	955	715	23	32	770
99	Orchard Sprayer - 500 Gal	19,741	4	7,266	4,254	96	135	4,485
99	Pickup Truck - 1/2 Ton	18,200	7	6,904	2,636	90	126	2,851
99	Weed Sprayer - 100 Gal	3,947	10	698	523	17	23	563
TOTAL		88,033		25,390	25,390	404	567	13,932
60% of New Cost *		52,820		15,234	15,234	243	340	8,359

\* Used to reflect a mix of new and used equipment.

ANNUAL INVESTMENT COSTS

ANNUAL INVESTMENT COSTS								
Description	Price	Yrs Life	Salvage Value	Capital Recovery	----- Cash Overhead ----- Insur- ance			Total
INVESTMENT								
Buildings	44,693	20		4,351	159	223	894	5,628
Fuel Tanks & Pumps	7,088	20	709	673	28	39	142	882
Hand Tools	4,595	15	460	500	18	25	92	635
Ladders - 10 each	1,400	10	140	193	5	8	28	234
Land	3,000,000	95	3,000,000	222,000	21,390	30,000	0	273,390
Pear Orchard Establishment	823,400	95		61,001	2,935	4,117	0	68,053
Picking Trailers	18,769	20	1,877	1,783	74	103	206	2,166
Shop Tools	12,637	15	1,264	1,374	50	70	253	1,746
Spray Mixing Station	6,566	15	657	714	26	36	180	956
Sprinkler Irrigation System	132,555	20		12,904	473	663	3,973	18,012
Tile Drainage System	20,000	25		1,779	71	100	0	1,950
TOTAL INVESTMENT	4,071,703		3,005,107	307,271	25,229	35,384	5,768	373,652

ANNUAL BUSINESS OVERHEAD COSTS

Description	Units/ Farm	Unit	Price/ Unit	Total Cost
Liability Insurance	500	Acre	1.30	650
Office Expense	500	Acre	25.00	12,500
Sanitation Fees	500	Acre	1.31	655

Table 6.

UC COOPERATIVE EXTENSION  
HOURLY EQUIPMENT COSTS  
SACRAMENTO COUNTY – 1999

Yr	Description	-----COSTS PER HOUR -----							
		Actual	Capital	Insur-	- Cash Overhead -			----- Operating -----	
		Hours Used			Recovery	ance	Taxes	Repairs	Fuel & Lube
99	55 HP 2WD Tractor	921.4	2.42	0.09	0.13	1.40	1.93	3.33	5.97
99	ATV 4WD	299.7	1.97	0.06	0.09	0.89	1.17	2.06	4.18
99	Bait Applicator	120.0	0.69	0.02	0.03	0.40	0.00	0.40	1.14
99	Mower - Rotary 9'	334.3	1.28	0.04	0.06	2.52	0.00	2.52	3.90
99	Orchard Sprayer - 500 Gal	458.3	5.57	0.13	0.18	3.48	0.00	3.48	9.35
99	Pickup Truck - 1/2 Ton	285.0	5.55	0.19	0.26	1.33	2.93	4.26	10.26
99	Weed Sprayer - 100 Gal	175.0	1.79	0.06	0.08	1.04	0.00	1.04	2.97

Table 7.

RANGING ANALYSIS  
SACRAMENTO COUNTY – 1999

	COSTS PER ACRE AT VARYING YIELDS TO PRODUCE PEARS							
	----- YIELD (TONS/ACRE) -----							
	3.0	3.5	4.0	4.5	5.0	5.5	6.0	
Fresh	3.0	3.5	4.0	4.5	5.0	5.5	6.0	
Canned	9.0	10.0	11.0	12.0	13.0	14.0	15.0	
Juice	0.25	0.25	0.50	0.75	1.00	1.50	2.00	
OPERATING COSTS/ACRE:								
Cultural Cost	2,162	2,162	2,162	2,162	2,162	2,162	2,162	
Harvest & Assessment Costs	805	926	1,047	1,168	1,289	1,409	1,530	
Interest on operating capital	89	90	91	92	93	94	95	
TOTAL OPERATING COSTS/ACRE	3,057	3,179	3,300	3,422	3,544	3,666	3,787	
CASH OVERHEAD COSTS/ACRE	263	263	263	263	263	263	263	
TOTAL CASH COSTS/ACRE	3,320	3,442	3,563	3,685	3,807	3,929	4,051	
NON-CASH OVERHEAD COSTS/ACRE	1,273	1,273	1,273	1,273	1,273	1,273	1,273	
TOTAL COSTS/ACRE	4,593	4,715	4,837	4,958	5,080	5,202	5,324	

Table 7. Continued

UC COOPERATIVE EXTENSION  
RANGING ANALYSIS  
SACRAMENTO COUNTY – 1999

NET RETURNS PER ACRE ABOVE OPERATING COSTS FOR PEARS									
PRICE (DOLLARS/TON)			YIELD (TON/ACRE)						
Fresh	Canned	Juice	3.0	3.5	4.0	4.5	5.0	5.5	6.0
			9.0	10.0	11.0	12.0	13.0	14.0	15.0
			0.25	0.25	0.50	0.75	1.00	1.50	2.00
205	195	35	-678	-502	-318	-133	51	244	438
220	210	40	-497	-299	-90	118	326	544	763
235	225	45	-316	-95	137	369	601	844	1,088
250	240	50	-134	109	365	620	876	1,144	1,413
265	255	55	47	313	592	872	1,151	1,444	1,738
280	270	60	228	516	820	1,123	1,426	1,744	2,063
295	285	65	409	720	1,047	1,374	1,701	2,044	2,388

NET RETURNS PER ACRE ABOVE CASH COSTS FOR PEARS									
PRICE (DOLLARS/TON)			YIELD (TON/ACRE)						
Fresh	Canned	Juice	3.0	3.5	4.0	4.5	5.0	5.5	6.0
			9.0	10.0	11.0	12.0	13.0	14.0	15.0
			0.25	0.25	0.50	0.75	1.00	1.50	2.00
205	195	35	-941	-765	-581	-396	-212	-19	174
220	210	40	-760	-562	-353	-145	63	281	499
235	225	45	-579	-358	-126	106	338	581	824
250	240	50	-397	-154	102	357	613	881	1,149
265	255	55	-216	50	329	609	888	1,181	1,474
280	270	60	-35	253	557	860	1,163	1,481	1,799
295	285	65	146	457	784	1,111	1,438	1,781	2,124

NET RETURNS PER ACRE ABOVE TOTAL COSTS FOR PEARS									
PRICE (DOLLARS/TON)			YIELD (TON/ACRE)						
Fresh	Canned	Juice	3.0	3.5	4.0	4.5	5.0	5.5	6.0
			9.0	10.0	11.0	12.0	13.0	14.0	15.0
			0.25	0.25	0.50	0.75	1.00	1.50	2.00
205	195	35	-2,214	-2,039	-1,854	-1,670	-1,485	-1,292	-1,099
220	210	40	-2,033	-1,835	-1,627	-1,418	-1,210	-992	-774
235	225	45	-1,852	-1,631	-1,399	-1,167	-935	-692	-449
250	240	50	-1,671	-1,427	-1,172	-916	-660	-392	-124
265	255	55	-1,489	-1,224	-944	-665	-385	-92	201
280	270	60	-1,308	-1,020	-717	-413	-110	208	526
295	285	65	-1,127	-816	-489	-162	165	508	851