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1997

**U.C. COOPERATIVE EXTENSION**

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



***Green Bartlett & Sprinkler Irrigated*  
IN LAKE COUNTY**

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# UNIVERSITY OF CALIFORNIA - COOPERATIVE EXTENSION

## GENERAL INFORMATION FOR ESTABLISHING A PEAR ORCHARD AND PRODUCING PEARS *Green Bartlett and Sprinkler Irrigated* Lake County - 1997

Detailed costs of establishing a pear orchard and production of pears under irrigated conditions in Lake County are presented in this study. The hypothetical farm used in this report is 75 acres, 45 of existing pear orchards and 25 that are currently being planted to pears.

This study consists of assumptions for establishing a pear orchard and producing pears and seven tables. It is intended as a guide only. It can be used to make production decisions, determine potential returns, prepare budgets and evaluate production loans. Practices described in this study are based on those production procedures considered typical for Lake County. Sample costs given for labor, materials, equipment and contract services are based on current figures. Some costs and practices detailed in this study may not be applicable to every situation. A blank, *Your Cost*, column is provided to enter your actual costs on Table 2, Sample Costs To Produce Pears and Table 3, Costs And Returns Per Acre to Produce Pears.

This study consists of general assumptions for establishing a pear orchard and producing pears, green bartlett & sprinkler irrigated, and seven tables. Tables included:

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 Lake County U.C. Cooperative Extension office at (707) 263-2281.

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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# UNIVERSITY OF CALIFORNIA - COOPERATIVE EXTENSION

## GENERAL ASSUMPTIONS FOR ESTABLISHING A PEAR ORCHARD AND PRODUCING PEARS *Green Bartlett and Sprinkler Irrigated* Lake County - 1997

The following is a description of some general assumptions pertaining to sample costs to establish a pear orchard and produce pears in Lake County. Practices described should not be considered recommendations by the University of California, but rather represent production procedures considered typical for this crop and area. Some of these costs and practices may not be applicable to your situation nor used during every production year. Additional ones not indicated may be needed. Establishment and cultural practices for the production of pears vary by grower and region. Variations can be significant. The practices and inputs used in this cost study serve only as a sample or guide. These costs are represented 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 75 acres of land. Of that, 45 acres are mature pear trees in production, 25 acres of pears are being established, and five acres are occupied by roads, irrigation systems, fencing, and farmstead. The orchard is situated on alluvial bottomland typical of the Scotts Valley region. Property costs \$5,467 per acre. Because only 70 of the 75 acres are planted to pears, land is valued at \$5,858 per producing acre.

**Labor.** Hourly wages for workers are \$7.66 and \$6.01 per hour for machine and non-machine workers, respectively. Adding 34% for Workers Compensation, Social Security, Medicare, insurance, and other possible benefits gives the labor rates shown of \$10.26 and \$8.06 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 lower than 34%.

On September 1, 1997, the minimum wage increased from \$5.00 per hour to \$5.15 per hour and will increase to \$5.75 per hour by March 1, 1998. The wage rates for non-machine labor used in this study reflects the September 1, 1997 rate. Growers using wage rates different from those shown in this report may adjust their labor costs by subtracting or adding the appropriate amounts.

Labor time 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 a manager are not included as cost. Returns above total costs is considered a return to management and risk.

**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 better vigor than most other rootstocks. Bartlett on Winter Nellis is one of the most common combinations of cultivar and rootstock in Lake County and is used in this study. The trees are planted at 12' X 20' spacing, 182 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.

When selecting varieties to plant, growers should consider not only whether they can be successfully grown in Lake County, but also if there is a market that will bring an adequate return for particular cultivars. Other cultivars that are also grown in Lake County include Bosc, Red Bartlett, and Starkrimson (or Red Clapp). These varieties should also be scrutinized for potential planting.

**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	Frost Protection	Total Applied Water
	----- AcIn/Year -----		
1	24	0	24
2	24	0	24
3	30	0	30
4	30	0	30
5+	30	18	48

**Frost Protection.** Protecting the orchard from frost is not required until the fifth year when fruit is set. There are several approaches to guarding trees from low temperatures; wind machines, orchard heaters, and/or sprinkler applied water. Use of water sprinkled onto the orchard floor is the most common system in Lake County and since it uses the existing irrigation system it eliminates added investment in wind machines or other alternatives. The amount of water applied for frost protection is shown in Table A above. Once fruit production begins in the fifth year, the sprinkler system is run to protect against frost damage 18 days during April and May. When protection is required, one acre-inch of water is applied in six hours per night. Frost damage can increase due to the cooling effect caused by ground covers on orchard temperature. Injury to the pear buds can be mitigated by keeping the orchard vegetation suppressed by spraying herbicides or mowing during this period. The orchard floor is cut twice in April and May to maintain resident vegetation as low as possible.

## **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 with removal of the old orchard. Old trees are pushed out with a large bulldozer and moved into a pile to be burned. Deep ripping of the soil profile to 2 to 3 feet breaks up any underlying hardpan to improve root and water penetration and also pulls up additional roots from the previous orchard which can harbor disease. Afterwards the ground is disced several times which helps break up large clods of soil and smooth the ground in advance of fumigation and planting. Ideally following discing, a company is contracted to fumigate the orchard site to control soil-borne pathogens and pests; 100% of the ground is treated. Ripping and discing prior to fumigation opens the soil for better diffusion of the fumigant through a larger area of the soil which provides better control for soil-borne diseases. A contact herbicide (Roundup ) is applied for weed control through most of the early growing season. The orchard site is disced two weeks later for added control. Orchard removal, ripping, and fumigation 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 with a small stake. Holes are dug at each stake using a tractor mounted post hole digger and auger. 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 trunk development is encouraged. In the second year, 2% of the trees or 4 trees per acre will have to be replaced.

**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. Pear trees are pruned to a multiple leader system in order to mitigate any loss of limb or scaffolds due to fire blight (*Erwinia amylovora*). Time required for pruning increase annually. 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 three years it is applied by hand at the base of the young tree to ensure efficient placement. In the

remaining years it is mixed into irrigation water and applied with two irrigations. It is applied in the form of granular urea (46-0-0) that is soluble in water. Annual rates of applied N are shown in Table B.

Table B. Annual Applied Nitrogen

Year	Lbs Of N/Acre	Lbs Of Urea/Acre
1	35	76
2	45	98
3	75	163
4 - 6	100	217
7+	200	435

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

Tillage of rows and middles helps manage vegetation on the orchard floor during the first year. Discing is the cultivation practice used in this study, though orchard cultivators or other tillage equipment might also be used. By the second year the resident vegetation in the row middles is left to grow and is maintained by mowing instead of discing. Retaining orchard floor vegetation provides several important benefits: reduces compaction by equipment, allows access with equipment during the winter, improves water infiltration, maintains a habitat for beneficial arthropods, and helps lower dust emissions. Disadvantages include increased chance of frost damage and competition for nutrients and water.

Chemical weed control for the orchard begins in the fall/winter of the first year with a mixture of the residual, pre-emergent herbicides Gramoxone and Surflan sprayed along the tree rows. This mixture controls a wide range of annual and perennial weeds through much of the next growing season. The same combination of herbicides is used in the second year for the dormant strip spray and is followed in spring with an application of Gramoxone or Roundup as the in-season strip spray.

**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 of various pesticides. Many of the pesticides are mixed and applied together controlling 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 aphids, 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.

Codling moth treatment begins in year four with one cover spray in May. Guthion, for codling moth, is mixed with an antibiotic used for disease control. The following year three additional cover sprays are added to the regime.

**Disease Management.** While many pear diseases afflict Lake County production regions, two major ones, pear scab (*Venturia pirina*) and fire blight (*Erwinia amylovora*), are responsible for most disease management practices. During the developmental years several diseases are present and are treated, beginning with fumigation of the field before planting. Methyl bromide is used to fumigate for control of many soil-borne pathogens as well as insect and nematode pests.

Scab can infect blossoms and leaves in early spring, but generally does not cause significant damage. Infected fruit develop an exterior scab which misshapens fruits and renders them unsuitable for fresh market sale. After planting, 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 May.

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 compounds (mainly dust), antibiotics, maintaining moderate tree vigor, and/or elimination of infected branches below any visible infection. During years of heavy disease pressure, fire blight may require 20 or more applications of pesticides to manage; in this study, 12 treatments are made. The high number of sprays results from 3 - 4 day application cycles needed to maintain effective control using preventative materials.

The orchard in this report begins treating for blight by the third year with five applications of both Mycoshield and Agro-Mycin. This increases to 12 treatments in the fourth year and remains the same for production year. As with other pesticides, treatments for fire blight are mixed with other materials used to control other pests and sprayed at the same time; either Mycoshield, or Agro-Mycin is mixed and applied with one scab and one cover spray. Treatments for blight usually occur during April and 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 \$9,502 per acre or \$427,590 for the 45 acre orchard. Establishment cost is depreciated beginning in the fifth year over the remaining 95 years of production.

## Production Cultural Practices and Material Inputs

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

**Fertilization.** Tree nitrogen status is determined by visual observation of growth (shoot vigor and leaf color) and validated by leaf analysis. Over fertilization of trees can cause excessive shoot growth, resulting in increased susceptibility to fire blight and reduced fruit set due to shading. Multiple applications of nitrogen are made to provide trees with N when needed. These occur once in June and after harvest in September. In this study, nitrogen is supplied in the form of urea (46-0-0) at a rate of 200 pounds of actual N per acre. Urea is dissolved in water and injected into the irrigation system and applied with the irrigation water.

**Weed Management.** Weeds in mature orchards are controlled with the same combination of chemical and cultural (mowing) practices as when being established. Pre-emergent weeds are controlled in the tree row with a dormant strip spray of residual and contact herbicides (Goal and Roundup ) in February. Persistent weeds that are not controlled by the dormant strip spray receive an in-season strip spray of Roundup along the tree rows during June. A tractor and mower are used to cut orchard floor vegetation in the tree middles seven times from March through July.

**Insect and Arthropod Management.** Several insect and arthropod pests are treated each year. Pests dealt with in this study include codling moth, pear psylla, and mites. All pest management operations are performed by the growers with their own equipment.

Codling moth is considered the primary pear pest and its control largely determines subsequent control of other pests. Its damage makes fruit unmarketable and since multiple generations occur annually, control with insecticide treatments based on careful monitoring of the population and degree days is essential. The first generation usually begins hatching late April or early May and, in this study, is controlled with Guthion in the cover spray. The second and third hatch normally occur in July and August. Guthion is used again approximately every 20 days after the first cover spray to control both of these generations. Additional applications of Guthion or other organophosphates may be required depending on moth populations. Treatments for codling moth also help to control other lepidopteran pests such as leafrollers, but reduce populations of the natural enemies of mites and pear psylla.

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 is controlled with horticultural oil and Agrimek applied at various times during the year. Treatments made in this study include a dormant spray in January or early February, delayed dormant spray in late February, combination psylla and mites in June and July, and a postharvest spray in September.

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 June and July pear psylla treatments.

**Disease Management.** Fire blight, as described before, can cause the loss of complete branches or trees. Twelve treatments are made using a combination of Agri-mycin and Mycoshield during April through May, though approved copper compounds may also be used. Two of the blight sprays are combined with other pest applications: one with a scab treatment and one in the first cover spray. Blight sprays that include only antibiotics are made to every other row, which effectively cuts the actual pounds applied in half. The combined blight/scab or cover treatments are applied every row so a full rate of antibiotics are used.

Pear scab is caused by a fungus which 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 causing reductions in quality. Pear scab is a serious disease in the cool, moist growing region of Lake County.

Pesticides are the primary approach to combating this disease. 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 during March. Three additional scab sprays (two are combined with fire blight treatments) using Benlate, Dithane, or Ziram mixed with wettable sulfur are made in March, April, and May.

**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.

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.

**Harvest.** commercial crop 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 in August.

While 4-5th year orchards are only harvested once, older pear orchards are harvested twice. The first pick is selective and usually collects 33% of the fruit, most of which will go for 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 C.

Table C. California Pear Advisory Board Assessments for Pears

Category	Price per Unit	Unit
Fresh market:		
Tight-fill carton	\$0.30	36 lb. tight-fill carton
Standard box	\$0.375	45 lb. box
LA lug	\$0.193	lug
Processed:		
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. Half of this fee is returned to producers within one year and the remainder within five years.

**Yields.** Typical annual yields for Green Bartlett pears are measured in tons per acre; Table D 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, and off-grade. 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 D. Annual yields per acre

Year	Total Yield	Fresh Market	Processed	Off-grade
	----- Tons/Acre -----			
5	4.0	2.0	1.6	0.4
6	7.0	3.5	2.8	0.7
7	10.0	5.0	4.0	1.0
8	13.0	6.5	5.2	1.3
9	16.0	8.0	6.4	1.6
10+	20.0	10.0	8.0	2.0

An assumed yield of 20 tons per acre is used to calculate cost per ton. A typical yield range is 15 to 35 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 - 50%, processed - 40%, and off-grade - 10%. Actual

tonnage and percent of packout by various market categories for the previous eight years in Lake County is shown in Table E; preliminary 1997 data is also included.

Table E. Lake County Annual Tonnage And Percent Packout For Previous Eight Harvests

Year	Tonnage	Fresh Market	Processed	Off-grade
-----Percent of Tonnage-----				
1989	81,540	36	49	15
1990	73,139	46	40	16
1991	81,194	42	40	18
1992	75,911	40	39	21
1993	51,316	44	39	17
1994	79,051	44	36	20
1995	66,530	40	40	20
1996	78,856	41	39	20
1997 <sup>1/</sup>	78,030	37	46	17
Average	73,952	41	41	18

<sup>1/</sup> Preliminary

**Returns.** Estimated return prices per ton for the categories described above are: fresh market - \$686.00, processed - \$255.50, and restricted grade - \$80.00. 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 Lake 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.

*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 10.00% 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 \$469 for the entire farm.

*Office Expense* Office and business expenses are estimated at \$44 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 \$228 annually. This cost includes delivery and servicing of toilets. Cash overhead costs are included in Tables 1-5.

**Non-Cash Overhead.** Non-cash overhead is calculated as the capital recovery cost for equipment and other farm investments. Although farm equipment on pear orchards in Lake 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 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). 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 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 market value of an investment at the end of its useful life. It is calculated differently for different investments. For farm machinery (e.g., tractors and implements) the remaining value is a percentage of the new cost of the investment. Salvage value is calculated 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 8.25% 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.

**Equipment Cash 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 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 \$0.97 and \$1.30 per gallon, respectively.

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UC DANR publications may be purchased through your local UC Cooperative Extension office or by calling 1-800-994-8849.

Table 1.

## SAMPLE COSTS PER ACRE TO ESTABLISH A PEAR ORCHARD

Year	Cost Per Acre					
	1st	2nd	3rd	4th	5th	6th
Tons Per Acre					4.0	7.0
<b>Planting Costs:</b>						
Remove Old Orchard	\$350					
Land Preparation - Rip 3X	135					
Land Preparation - Disc 2X	15					
Land Preparation - Fumigate	1,485					
Land Preparation - Apply Herbicide & Disc	21					
Layout Orchard	161					
Auger Tree Holes	115	\$3				
Plant Trees	73	2				
Trees: 182 Per Acre @ \$4.56 ea., (2% in 2nd year)	829	18				
Tree Guard & Tank Mix	212	5				
Head Back Trees	24	1				
<b>TOTAL PLANTING COSTS</b>	<b>3,420</b>	<b>28</b>				
<b>Cultural Costs:</b>						
Train Trees	24					
Pruning & Training		73	\$218	\$435	\$580	\$580
Fertilizer - Nitrogen	13	17	27	36	36	36
Weed Control - Disc 4X	28					
Weed Control - Mow Middles 7X		50	50	50	50	50
Weed Control - Strip Sprays	40	51	51	51	51	51
Pest Control - Dormant Spray		17	55	55	55	55
Pest Control - Delay Dormant Spray		20	20	20	20	20
Pest Control - Gophers	3	3	3	7	7	3
Pest Control - Budbreak Spray		12	16	16	16	16
Pest Control - Scab Sprays				35	35	35
Pest Control - Blight			79	182	182	182
Pest Control - Blight & Scab Sprays					48	48
Pest Control - Cover Sprays				96	96	96
Pest Control - Psylla & Mite Sprays	8	35	282	172	172	172
Fruit Sizing - Hormone Spray					28	28
Irrigate	96	96	108	108	91	91
Frost Protection 18X					48	48
PCA Fees			33	33	33	33
Leaf Analysis				19	15	15
Pickup Truck Use	63	63	63	63	63	63
ATV Use	52	52	52	52	52	52

Table 1. Continued

Year	Cost Per Acre					
	1st	2nd	3rd	4th	5th	6th
Tons Per Acre					4.0	7.0
<b>TOTAL CULTURAL COSTS</b>	327	489	1,057	1,430	1,678	1,674
<b>Harvest Costs:</b>						
Pick Fruit					198	318
Haul to Shed					30	46
Pack Fruit					756	1,323
<b>TOTAL HARVEST COSTS</b>					984	1,687
<b>Postharvest:</b>						
Irrigate					17	17
Pest Control - Postharvest Oil					18	18
<b>TOTAL POSTHARVEST COSTS</b>					35	35
<b>Assessments:</b>						
California Pear Advisory Board					40	69
California Pear Growers					4	14
<b>TOTAL ASSESSMENT COSTS</b>					44	83
<b>Interest On Operating Capital @ 7.89%</b>	352	20	39	44	64	71
<b>TOTAL OPERATING COSTS/ACRE</b>	4,099	537	1,096	1,474	2,805	3,550
<b>Cash Overhead Costs:</b>						
Office Expense	44	44	44	44	44	44
Sanitation Fees	3	3	3	3	3	3
Liability Insurance	6	6	6	6	6	6
Property Taxes	78	78	78	78	86	82
Property Insurance	56	56	56	56	61	58
Investment Repairs	71	71	71	71	71	71
<b>TOTAL CASH OVERHEAD COSTS</b>	258	258	258	258	271	264
<b>TOTAL CASH COSTS/ACRE</b>	4,357	795	1,354	1,732	2,996	3,696
<b>INCOME/ACRE FROM PRODUCTION</b>					1,813	3,172
<b>NET CASH COSTS/ACRE FOR THE YEAR</b>	4,357	795	1,354	1,732	1,184	523
<b>ACCUMULATED NET CASH COSTS/ACRE</b>	4,357	5,152	6,506	8,238	<b>9,422</b>	9,945



Table 1. continued

Year	Cost Per Acre					
	1st	2nd	3rd	4th	5th	6th
Tons Per Acre					4.0	7.0
<b>Non-Cash Overhead Costs:</b>						
<b>Capital Recovery Cost:</b>						
Shop Building	62	62	62	62	62	62
Worker Housing	12	12	12	12	12	12
Fuel Tank & Pump	10	10	10	10	10	10
Shop Tools	20	20	20	20	20	20
Sprinkler Irrigation System	192	192	192	192	192	192
Hand Tools	7	7	7	7	7	7
Deer Fence - Electric	15	15	15	15	15	15
Ladders - 16 Each	5	5	5	5	5	5
Land @ \$5,858/Acre	483	483	483	483	483	483
Equipment	78	65	76	81	164	164
<b>TOTAL INTEREST ON INVESTMENT</b>	<b>884</b>	<b>871</b>	<b>882</b>	<b>887</b>	<b>970</b>	<b>970</b>
<b>TOTAL COST/ACRE FOR THE YEAR</b>	<b>5,241</b>	<b>1,666</b>	<b>2,236</b>	<b>2,619</b>	<b>3,966</b>	<b>4,666</b>
<b>INCOME/ACRE FROM PRODUCTION</b>					<b>1,813</b>	<b>3,172</b>
<b>TOTAL NET COST/ACRE FOR THE YEAR</b>	<b>5,241</b>	<b>1,666</b>	<b>2,236</b>	<b>2,619</b>	<b>2,154</b>	<b>1,493</b>
<b>TOTAL ACCUMULATED NET COST/ACRE</b>	<b>5,241</b>	<b>6,907</b>	<b>9,143</b>	<b>11,762</b>	<b>13,916</b>	<b>15,409</b>

Table 2.

UC COOPERATIVE EXTENSION  
 COSTS PER ACRE TO PRODUCE PEARS  
 LAKE COUNTY - 1997

Labor Rate: \$10.26/hr. machine labor                      Interest Rate: 10.00%  
 \$8.06/hr. non-machine labor                                      Yield per Acre: 20 Ton

Operation	Cash and Labor Costs per Acre						Total	Your
Operation	Time (Hrs/A)	Labor Cost	Fuel,Lube & Repairs	Material Cost	Custom/ Rent	Total Cost	Cost	
Cultural:								
Pest Control - Dormant	0.25	3	2	50	0	55		
Weed Control - Strip Spray 3X	0.53	7	3	40	0	50		
Pest Control - Gophers 3X	0.20	2	1	3	0	7		
Pest Control - Budbreak	0.20	2	1	13	0	16		
Weed Control - Mow Middles 7X	2.52	31	19	0	0	50		
Pest Control - Scab	0.50	6	3	30	0	40		
Frost Protection	1.54	12	0	36	0	48		
Pest Control - Fungicide Spray	0.75	9	5	56	0	71		
Pest Control - Blight	2.50	31	17	83	0	131		
Pest Control - Blight & Scab	0.25	3	2	17	0	22		
Prune & Train Trees	0.00	0	0	0	792	792		
Pest Control - Blight & Cover	0.25	3	2	34	0	38		
Pest Control - Cover Spray	0.75	9	5	51	0	66		
Irrigate	3.00	24	0	34	0	58		
Fertilize - Nitrogen	0.00	0	0	34	0	34		
Pest Control - Psylla & Mites	0.50	6	3	163	0	172		
Apply Hormone	0.20	2	1	24	0	28		
PCA Fees	0.00	0	0	0	33	33		
Leaf Analysis	0.00	0	0	0	19	19		
Pickup Truck Use	3.80	47	15	0	0	62		
ATV Use	3.80	47	10	0	0	57		
<b>TOTAL CULTURAL COSTS</b>	<b>21.53</b>	<b>246</b>	<b>90</b>	<b>667</b>	<b>843</b>	<b>1847</b>		
Harvest:								
Harvest Fruit - 1st Pick	0.32	8	3	0	272	283		
Harvest Fruit - 2nd Pick	0.64	16	6	0	544	566		
Haul To Packinghouse	5.72	70	62	0	0	133		
Sort & Pack Fruit	0.00	0	0	0	3780	3780		
<b>TOTAL HARVEST COSTS</b>	<b>6.68</b>	<b>94</b>	<b>71</b>	<b>0</b>	<b>4597</b>	<b>4762</b>		

UC COOPERATIVE EXTENSION

Table 2. Continued

Operation	Operation Time (Hrs/A)	Cash and Labor Costs per Acre					Total Cost	Your Cost
		Labor Cost	Fuel,Lube & Repairs	Material Cost	Custom/ Rent			
Assessment:								
California Pear Advisory Board	0.00	0	0	198	0	198		
California Pear Growers	0.00	0	0	40	0	40		
TOTAL ASSESSMENT COSTS	0.00	0	0	238	0	238		
Postharvest:								
Irrigate	3.00	24	0	25	0	50		
Fertilize - Nitrogen	0.00	0	0	34	0	34		
TOTAL POSTHARVEST COSTS	3.00	24	0	60	0	84		
Interest on operating capital @ 10.00%						100		
TOTAL OPERATING COSTS/ACRE		364	162	965	5440	7030		
TOTAL OPERATING COSTS/TON						351.50		
CASH OVERHEAD:								
Office Expense						44		
Liability Insurance						6		
Sanitation Fees						3		
Property Taxes						131		
Property Insurance						93		
Investment Repairs						67		
TOTAL CASH OVERHEAD COSTS						345		
TOTAL CASH COSTS/ACRE						7375		
TOTAL CASH COSTS/TON						368.75		
NON-CASH OVERHEAD:								
	Per producing	-- Annual Cost --						
<u>Investment</u>	<u>Acres</u>	<u>Capital Recovery</u> - 8.25% Interest Rate						
Buildings	595			62		62		
Worker Housing	117			12		12		
Fuel Tanks & Pumps	99			10		10		
Shop Tools	177			20		20		
Sprinkler Irrigation System	1855			192		192		
Hand Tools	64			7		7		
Ladders - 16'	31			5		5		
Land	5858			483		483		
Pear Orchard Establishment	9422			778		778		
Equipment	1639			216		216		
TOTAL NON-CASH OVERHEAD COSTS	19859			1786		1786		
TOTAL COSTS/ACRE						9161		
TOTAL COSTS/TON						458.05		

Table 3.

UC COOPERATIVE EXTENSION  
 COSTS AND RETURNS PER ACRE TO PRODUCE PEARS  
 LAKE COUNTY - 1997

	Quantity/Acre	Unit	Price or Cost/Unit	Value or Cost/Acre	Your Cost
GROSS RETURNS					
Fresh	10.00	Ton	686.00	6860	
Processing	8.00	Ton	255.00	2040	
Off-Grades	2.00	Ton	80.00	<u>160</u>	
TOTAL GROSS RETURNS FOR PEARS				<u>9060</u>	
OPERATING COSTS					
Herbicide:					
Gramoxone Extra	2.00	Pint	5.57	11	
Surflan 4 AS	1.20	Qt	18.67	22	
Roundup	1.00	Pint	6.88	7	
Rodenticide:					
Rodent Bait	1.00	Lb	3.27	3	
Fungicide:					
Ziram WDG 76	18.00	Lb	3.31	60	
Dithane	4.50	Lb	4.44	20	
Water:					
Irrigation	48.03	AcIn	1.98	95	
Antibiotic:					
Mycoshield	3.50	Lb	18.29	64	
Agri-mycin 17	3.50	Lb	14.72	52	
Contract:					
Pruning Crew	182.00	Tree	4.35	792	
Hand Pick	20.00	Ton	40.00	800	
PCA Fees	1.00	Acre	33.00	33	
Leaf Analysis	1.00	Acre	18.50	19	
Insecticide:					
Dormant Oil	20.00	Gal	3.13	63	
Guthion 50W	6.00	Lb	11.36	68	
Supreme Oil	8.00	Gal	3.13	25	
Agromek	25.00	Oz	5.50	138	
Fertilizer:					
Urea (46-0-0)	200.00	Lb	0.343	69	
Thinning Agent:					
Fruit Fix 200	24.00	Oz	1.00	24	
Rent:					
Forklift Rental	2.00	Week	8.36	17	
Custom:					
Pack - Fresh	10.00	Ton	330.00	3300	
Shed Cost - Processed	10.00	Ton	48.00	480	

Table 3. Continued

	Quantity/Acre	Unit	Price or Cost/Unit	Value or Cost/Acre	Your Cost
Assessment:					
Fresh Market	556.00	Box	0.26	145	
Processed - Unrestricted	8.00	Ton	6.30	50	
Processed - Restricted	2.00	Ton	1.50	3	
California Pear Growers	20.00	Ton	2.00	40	
Labor (machine)	29.55	Hrs	10.26	303	
Labor (non-machine)	7.54	Hrs	8.06	61	
Fuel - Gas	11.31	Gal	1.30	15	
Fuel - Diesel	69.33	Gal	0.97	67	
Lube				12	
Machinery repair				68	
Interest on operating capital @ 10.00%				<u>100</u>	
TOTAL OPERATING COSTS/ACRE				7030	
TOTAL OPERATING COSTS/TON				<u>352</u>	
NET RETURNS ABOVE OPERATING COSTS				2030	
CASH OVERHEAD COSTS:					
Office Expense				44	
Liability Insurance				6	
Sanitation Fees				3	
Property Taxes				131	
Property Insurance				93	
Investment Repairs				<u>67</u>	
TOTAL CASH OVERHEAD COSTS/ACRE				<u>345</u>	
TOTAL CASH COSTS/ACRE				7375	
TOTAL CASH COSTS/TON				<u>269</u>	
NON-CASH OVERHEAD COSTS (CAPITAL RECOVERY - 8.25% Interest Rate):					
Buildings				62	
Worker Housing				12	
Fuel Tanks & Pumps				10	
Shop Tools				20	
Sprinkler Irrigation System				192	
Hand Tools				7	
Ladders - 16'				5	
Land				483	
Pear Orchard Establishment				778	
Equipment				<u>216</u>	
TOTAL NON-CASH OVERHEAD COSTS/ACRE				<u>1786</u>	
TOTAL COSTS/ACRE				9161	
TOTAL COSTS/TON				<u>458</u>	
NET RETURNS ABOVE TOTAL COSTS				<u>-101</u>	

Table 4.

MONTHLY CASH COSTS PER ACRE TO PRODUCE PEARS  
LAKE COUNTY - 1997

Beginning JAN 97	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	TOTAL
Ending DEC 97	97	97	97	97	97	97	97	97	97	97	97	97	
Cultural:													
Pest Control - Dormant		55											55
Weed Control - Strip Spray 3X		31		10			9						50
Pest Control - Gophers 3X			7										7
Pest Control - Budbreak			16										16
Weed Control - Mow Middles 7X			8	8	8	14	14						50
Pest Control - Scab			35	5									40
Frost Protection				24	24								48
Pest Control - Fungicide Spray				11	59								71
Pest Control - Blight				65	65								131
Pest Control - Blight & Scab				22									22
Prune & Train Trees					792								792
Pest Control - Blight & Cover					38								38
Pest Control - Cover Spray						44	22						66
Irrigate						29	29						58
Fertilize - Nitrogen						34							34
Pest Control - Psylla & Mites						17	155						172
Apply Hormone								28					28
PCA Fees		4	4	4	4	4	4	4	4				33
Leaf Analysis					19								19
Pickup Truck Use	5	5	5	5	5	5	5	5	5	5	5	5	62
ATV Use	5	5	5	5	5	5	5	5	5	5	5	5	57
<b>TOTAL CULTURAL COSTS</b>	<b>10</b>	<b>100</b>	<b>79</b>	<b>159</b>	<b>1019</b>	<b>152</b>	<b>242</b>	<b>42</b>	<b>14</b>	<b>10</b>	<b>10</b>	<b>10</b>	<b>1847</b>
Harvest:													
Harvest Fruit - 1st Pick								283					283
Harvest Fruit - 2nd Pick								566					566
Haul To Packinghouse								133					133
Sort & Pack Fruit								3780					3780
<b>TOTAL HARVEST COSTS</b>								<b>4762</b>					<b>4762</b>
Assessment:													
California Pear Advisory Board								198					198
California Pear Growers								40					40
<b>TOTAL HARVEST COSTS</b>								<b>238</b>					<b>238</b>

Table 4. Continued

Beginning JAN 97 Ending DEC 97	JAN 97	FEB 97	MAR 97	APR 97	MAY 97	JUN 97	JUL 97	AUG 97	SEP 97	OCT 97	NOV 97	DEC 97	TOTAL
Postharvest:													
Irrigate								33	17				50
Fertilize - Nitrogen									34				34
-----													
TOTAL POSTHARVEST COSTS								33	51				84
Interest on oper. capital	0	1	2	3	11	13	15	57	-1	-0	-0	-0	100
TOTAL OPERATING COSTS/ACRE	10	101	81	162	1030	165	257	5132	64	10	10	10	7030
OVERHEAD:													
Office Expense	4	4	4	4	4	4	4	4	4	4	4	4	44
Liability Insurance	6												6
Sanitation Fees		3											3
Property Taxes	65						65						131
Property Insurance	47						47						93
Investment Repairs	6	6	6	6	6	6	6	6	6	6	6	6	67
-----													
TOTAL CASH OVERHEAD COSTS	128	12	9	9	9	9	121	9	9	9	9	9	345
TOTAL CASH COSTS/ACRE	138	113	90	171	1040	174	378	5141	74	19	19	19	7375

Table 5. WHOLE FARM ANNUAL EQUIPMENT, INVESTMENT, AND BUSINESS OVERHEAD COSTS  
LAKE COUNTY - 1997  
ANNUAL EQUIPMENT COSTS

Yr	Description	Price	Yrs Life	Salvage Value	- Cash Overhead -			Total
					Capital Recovery	Insur- ance	Taxes	
97	3 Point Forks	670	15	64	77	3	4	83
97	3 Point Forks	670	15	64	77	3	4	83
97	55 HP 2WD Tractor	26782	12	6696	3252	119	167	3539
97	55 HP 2WD Tractor	26782	12	6696	3252	119	167	3539
97	ATV 4WD	7430	10	1314	1030	31	44	1105
97	Bait Applicator	1046	10	185	145	4	6	156
97	Mower - Flail 9'	7372	10	1304	1022	31	43	1096
97	Orchard Sprayer - 500 Gal	17055	10	3016	2365	72	100	2537
97	Orchard Sprayer - 500 Gal	17055	10	3016	2365	72	100	2537
97	Pickup Truck - 1/2 Ton	16226	7	6155	2459	80	112	2650
97	Truck - 10 Ton	41827	10	12355	5461	193	271	5925
97	Weed Sprayer - 100 Gal	3228	10	571	448	14	19	480
TOTAL		166143		41436	21953	740	1038	23731
60% of New Cost *		99686		24862	13172	444	623	14239

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

Table 5. Continued

ANNUAL INVESTMENT COSTS									
=====									
Yr	Description	Price	Yrs Life	Salvage Value	Capital Recovery	----- Cash Overhead -----			Total
						Insur- ance	Taxes	Repairs	
-----									
INVESTMENT									
	Buildings	41672	20		4324	149	208	833	5514
	Fuel Tanks & Pumps	6949	20	695	706	27	38	139	911
	Hand Tools	4505	15	451	518	18	25	50	611
	Ladders - 16'	2196	10	220	316	9	12	44	381
	Land	410025	95	410025	33829	2924	4100	0	40853
	Pear Orchard Establishment	423990	95		34998	1512	2120	0	38629
	Shop Tools	12389	15	1239	1425	49	68	247	1789
	Sprinkler Irrigation System	129848	20		13472	463	649	3246	17830
	Worker Housing	8217	20		853	29	41	164	1087
-----									
	TOTAL INVESTMENT	1039813		412652	90440	5178	7262	4723	107604
=====									

ANNUAL BUSINESS OVERHEAD COSTS

=====				
Description	Units/ Farm	Unit	Price/ Unit	Total Cost
-----				
Liability Insurance	75.00	Acre	6.25	469
Office Expense	70.00	Acre	44.00	3080
Sanitation Fees	70.00	Acre	3.04	213
=====				



Table 6.

UC COOPERATIVE EXTENSION  
HOURLY EQUIPMENT COSTS  
LAKE COUNTY - 1997

Yr Description	Actual Hours Used	----- COSTS PER HOUR -----						Total Oper.	Total Costs/Hr.
		Capital Recovery	- Cash Overhead -			Operating			
			Insur- ance	Taxes	Repairs	Fuel & Lube			
97 3 Point Forks	64.2	0.72	0.02	0.03	0.09	0.00	0.09	0.87	
97 3 Point Forks	64.2	0.72	0.02	0.03	0.09	0.00	0.09	0.87	
97 55 HP 2WD Tractor	71.5	27.28	1.00	1.40	1.14	3.01	4.15	33.84	
97 55 HP 2WD Tractor	768.2	2.54	0.09	0.13	1.14	3.01	4.15	6.91	
97 ATV 4WD	282.1	2.19	0.07	0.09	0.89	1.49	2.38	4.73	
97 Bait Applicator	14.0	6.22	0.19	0.26	0.40	0.00	0.40	7.06	
97 Mower - Flail 9'	170.3	3.60	0.11	0.15	2.97	0.00	2.97	6.83	
97 Orchard Sprayer - 500 Gal	231.4	6.13	0.19	0.26	2.36	0.00	2.36	8.94	
97 Orchard Sprayer - 500 Gal	120.0	11.82	0.36	0.50	2.36	0.00	2.36	15.05	
97 Pickup Truck - 1/2 Ton	285.0	5.18	0.17	0.24	1.18	2.80	3.98	9.56	
97 Truck - 10 Ton	257.4	12.73	0.45	0.63	3.93	6.97	10.90	24.71	
97 Weed Sprayer - 100 Gal	35.8	7.51	0.23	0.32	0.85	0.00	0.85	8.91	

Table 7.

RANGING ANALYSIS  
LAKE COUNTY - 1997

	COSTS PER ACRE AT VARYING YIELDS TO PRODUCE PEARS						
	YIELD (FRESH MARKET TON/ACRE)						
	7.00	8.00	9.00	10.00	11.00	12.00	13.00
OPERATING COSTS/ACRE:							
Cultural Cost	1847	1847	1847	1847	1847	1847	1847
Harvest & Assessment Costs	3507	4004	4502	5000	5498	5996	6494
Postharvest Cost	84	84	84	84	84	84	84
Interest on operating capital	87	92	96	100	104	108	112
TOTAL OPERATING COSTS/ACRE	5524	6026	6528	7030	7532	8034	8536
TOTAL OPERATING COSTS/TON	789	753	725	703	685	670	657
CASH OVERHEAD COSTS/ACRE							
	345	345	345	345	345	345	345
TOTAL CASH COSTS/ACRE	5869	6371	6873	7375	7877	8379	8881
TOTAL CASH COSTS/TON	838	796	764	738	716	698	683
NON-CASH OVERHEAD COSTS/ACRE							
	1785	1785	1786	1786	1786	1787	1787
TOTAL COSTS/ACRE	7654	8156	8659	9161	9664	10166	10668
TOTAL COSTS/TON	1093	1020	962	916	879	847	821

Table 7. Continued

NET RETURNS PER ACRE ABOVE OPERATING COSTS FOR PEARS									
PRICE (DOLLARS/TON)			YIELD (TON/ACRE)						
Fresh			7.00	8.00	9.00	10.00	11.00	12.00	13.00
	Processing		5.60	6.40	7.20	8.00	8.80	9.60	10.40
		Off-Grades	1.40	1.60	1.80	2.00	2.20	2.40	2.60
500.00	175.00	50.00	-974	-826	-678	-530	-382	-234	-86
550.00	200.00	60.00	-470	-250	-30	190	410	630	850
600.00	225.00	70.00	34	326	618	910	1202	1494	1786
650.00	255.00	80.00	566	934	1302	1670	2038	2406	2774
700.00	275.00	90.00	1042	1478	1914	2350	2786	3222	3658
750.00	300.00	100.00	1546	2054	2562	3070	3578	4086	4594
800.00	325.00	110.00	2050	2630	3210	3790	4370	4950	5530

NET RETURNS PER ACRE ABOVE CASH COSTS FOR PEARS									
PRICE (DOLLARS/TON)			YIELD (TON/ACRE)						
Fresh			7.00	8.00	9.00	10.00	11.00	12.00	13.00
	Processing		5.60	6.40	7.20	8.00	8.80	9.60	10.40
		Off-Grades	1.40	1.60	1.80	2.00	2.20	2.40	2.60
500.00	175.00	50.00	-1319	-1171	-1023	-875	-727	-579	-431
550.00	200.00	60.00	-815	-595	-375	-155	65	285	505
600.00	225.00	70.00	-311	-19	273	565	857	1149	1441
650.00	255.00	80.00	221	589	957	1325	1693	2061	2429
700.00	275.00	90.00	697	1133	1569	2005	2441	2877	3313
750.00	300.00	100.00	1201	1709	2217	2725	3233	3741	4249
800.00	325.00	110.00	1705	2285	2865	3445	4025	4605	5185

NET RETURNS PER ACRE ABOVE TOTAL COSTS FOR PEARS									
PRICE (DOLLARS/TON)			YIELD (TON/ACRE)						
Fresh			7.00	8.00	9.00	10.00	11.00	12.00	13.00
	Processing		5.60	6.40	7.20	8.00	8.80	9.60	10.40
		Off-Grades	1.40	1.60	1.80	2.00	2.20	2.40	2.60
500.00	175.00	50.00	-3104	-2956	-2809	-2661	-2514	-2366	-2218
550.00	200.00	60.00	-2600	-2380	-2161	-1941	-1722	-1502	-1282
600.00	225.00	70.00	-2096	-1804	-1513	-1221	-930	-638	-346
650.00	255.00	80.00	-1564	-1196	-829	-461	-94	274	642
700.00	275.00	90.00	-1088	-652	-217	219	654	1090	1526
750.00	300.00	100.00	-584	-76	431	939	1446	1954	2462
800.00	325.00	110.00	-80	500	1079	1659	2238	2818	3398