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UNIVERSITY OF CALIFORNIA COOPERATIVE EXTENSION

2006

**SAMPLE COSTS to  
ESTABLISH and PRODUCE  
PEARS**

*Green Bartlett*



**NORTH COAST REGION**

Lake and Mendocino Counties

Prepared by:

Rachel B. Elkins

Karen M. Klonsky

Richard L. De Moura

UCCE Pomology Farm Advisor, Lake and Mendocino Counties

UCCE Extension Specialist, Department of Agricultural and Resource Economics,  
UC Davis

Staff Research Associate, Department of Agricultural and Resource Economics, UC  
Davis

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*Green Bartlett - Sprinkler Irrigated*

North Coast Region - Lake & Mendocino Counties 2006

**CONTENTS**

INTRODUCTION .....	2
ASSUMPTIONS .....	3
Orchard Establishment Operating Costs .....	3
Production Operating Costs .....	6
Cash Overhead Costs .....	10
Non-Cash Overhead Costs .....	10
ACKNOWLEDGEMENTS .....	11
REFERENCES .....	12
Table 1 Cost Per Acre to Establish a Pear Orchard .....	13
Table 2 Costs Per Acre to Produce Pears .....	15
Table 3 Costs and Returns Per Acre to Produce Pears .....	17
Table 4 Monthly Cash Costs Per Acre to Produce Pears .....	19
Table 5 Ranging Analysis .....	21
Table 6 Whole Farm Annual Equipment, Investment and Business Overhead .....	23
Table 7 Hourly Equipment Costs .....	24
Table 8 Operations With Equipment and Materials Listed .....	25

**INTRODUCTION**

Sample costs to establish a pear orchard and produce Bartlett pears under sprinkler irrigation in the North Coast Region are presented in this study. This study is intended as a guide only, and can be used to make production decisions, determine potential returns, prepare budgets and evaluate production loans. Practices described are based on production practices considered typical for the crop and area, but these same practices will not apply to every situation. The sample costs for labor, materials, equipment and custom services are based on current figures. A blank column, “*Your Costs*”, in Tables 2 and 3 is provided for entering your costs.

The hypothetical farm operation, production practices, overhead, and calculations are described under the assumptions. For additional information or explanation of calculations used in the study call the Department of Agricultural and Resource Economics, University of California, Davis, (530) 752-3589 or the Lake County UC Cooperative Extension office at (707) 263-6838.

Sample Cost of Production Studies for many commodities are available and can be requested through the Department of Agricultural and Resource Economics, UC Davis, (530) 752-4424. Current studies can be downloaded from the department website at <http://coststudies.ucdavis.edu> or obtained from selected county UC Cooperative Extension offices.

University of California and the United States Department of Agriculture, Risk Management Agency, Cooperating.

## ASSUMPTIONS

The assumptions refer to Tables 1 to 8 and pertain to sample costs to establish a pear orchard and produce pears in the North Coast Region – Lake and Mendocino counties. Practices described represent production practices and materials considered typical of a well-managed orchard in the region. The costs, materials, and practices shown in this study will not be applicable to all situations. Establishment and cultural practices vary by grower and the differences can be significant. The practices and inputs used in the study are intended to serve as a guide only. **The use of trade names and cultural practices in this report does not constitute an endorsement or recommendation by the University of California nor is any criticism implied by omission of other similar products or cultural practices.**

**Farm.** The farm consists of 75 acres of land, 25 acres are pears being established, 45 acres are producing pear trees, and five acres are occupied by roads, irrigation systems, fencing, and farmstead. The farm is on alluvial bottomland, typical of the North Coast region of Lake and Mendocino Counties. The establishment and production costs in this study are based on the 25 acres.

### Orchard Establishment Operating Costs

**Site/Land Preparation.** Land preparation begins with removing the old orchard. The trees are pushed out with a large bulldozer, piled and burned. The soil is ripped twice, 2 to 3 feet deep. The ripping breaks up underlying hardpan to improve root and water penetration, pulls up roots from the previous orchard that could harbor disease, and opens up the soil profile. Afterwards the ground is disced two times to break up large clods, and smooth the surface. Following discing, the orchard site is fumigated with methyl bromide to control soil-borne pathogens and pests. Contract or custom operators do the orchard removal, ripping, and fumigation. The orchard site is sprayed with a contact herbicide (Roundup) and disced prior to planting. All operations that prepare the orchard for planting are done in the summer or fall of 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. In late March or early April after the winter rains and the soil is dry, holes are dug at each stake using a tractor mounted posthole digger. Trees are planted, an NPK fertilizer mixture is hand applied around the base of the tree, and a tree wrap is placed around the trunk to protect it from vertebrate, chemical, and sunburn damage. The planting crew consists of a tractor driver and two men planting. New trees are cut back soon after planting to encourage trunk development. In the second year, 2% of the trees or 5 trees per acre are replaced.

**Trees.** The pear cultivar planted in this study is Green Bartlett on Winter Nellis rootstock, a common combination in Lake and Mendocino Counties. Bartlett is a dual-purpose pear, utilized for both fresh market and processing. Six rootstocks are generally used in commercial California orchards. Of these, Winter Nellis is the most favorable for Bartlett planted on sandy loam to loam soils. This rootstock gives uniformity in size and growth as well as better vigor than most rootstocks. The trees are planted on 10 X 18-foot spacing, 242 trees per acre. Other cultivars grown include Bosc, Red Bartlett, Starkrimson (or Red Clapp) and Comice. Pear trees have a long production life if they are well maintained. Some pear orchards with trees over 100 years old are still producing a commercial crop. The life of the orchard at the time of planting in this study is estimated to be 30 years.

**Irrigation.** The irrigation cost includes pumped water plus labor. The cost is based on two 25 - 30 hp motors pumping 48 acre-inches from depths of 60 to 90 feet. The water is pumped through a filtration station, then into the underground, permanent, sprinkler system in the tree rows. The prices per acre-foot for 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 \$45.12 per acre-foot (\$3.76/acin). No assumption is made about effective rainfall. The amount of water applied to the orchard increases as the trees mature. The average amount of water applied is shown in Table A.

Year	Irrigation	Frost	Total
		Protection	
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 begins in the fifth year when fruit is set. Trees may be protected from low temperatures by wind machines, orchard heaters, and/or sprinkler applied water. Water is sprinkled onto the orchard floor using the existing irrigation system. To protect against frost damage, one acre-inch of water is applied in six hours each night on approximately 18 nights from April through May, however it may begin as early as March and extend into June. The amount of water applied for frost protection is shown in Table A.

Ground covers or resident vegetation cause a cooling affect in the orchard and can increase the chances of frost damage by lowering the orchard temperature. To avoid or reduce injury to the pear buds, spraying with herbicides or mowing during this period should suppress the orchard vegetation. Ground cover, especially grasses can also increase russetting during the early stages of fruit growth.

**Training/Pruning.** Training and pruning begin in the first year during the dormant season (December through February). During the first four years, young trees are trained and pruned to develop a structurally strong framework. Bartlett pear trees are pruned to a multiple leader system, which reduces the risk of losing a tree to fire blight (*Erwinia amylovora*). Pruning is done by grower labor and pruning time increases each year until the orchard reaches full production. Prunings are shredded in the spring during a regular mowing or left on the ground to break down naturally.

**Fertilization.** A nitrogen, phosphorous, potassium (NPK) fertilizer (15-15-15) is applied around the base of the tree at planting. 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. In the remaining years granular urea is dissolved in the irrigation water and applied in June. Annual rates of applied N are shown in Table B. Leaf samples are taken in July to determine nutrient requirements.

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

**Pest Management.** The pesticides and rates mentioned in this cost study as well as other materials available are listed in *UC Integrated Pest Management Guidelines, Pear*. Pesticides mentioned in the study are commonly used, but may not be recommendations.

**Weeds.** Weed control is important in young orchards so the trees will not be stressed due to competition for water and nutrients. A combination of practices -- discing, cultivation, mowing, and chemical control -- are used to manage the weeds. Prior to planting, the orchard is sprayed with Roundup and then disced. During the first year the middles are disced four times – March, April, May, June. In the second through the fourth year the resident vegetation in the row middles is left to grow and is mowed seven times from March through July. In the fifth and subsequent years, the row middles are sprayed three times with Roundup – March, May, July.

Chemical weed control in the tree row begins in the fall/winter (November to February) or dormant season of the first year with a tank mixture of Roundup (contact herbicide) and Prowl (pre-emergent herbicide). This combination is also applied in the second, third and fourth years. In the fifth and subsequent years, Roundup, Karmex and Princep are applied to the tree row in the fall/winter (December). Inseason weed control in the tree row begins in the second year. Roundup is applied to the tree row in April and July. All sprays are applied by the grower.

*Insects.* Pears have many insect and mite pests: codling moth (*Cydia [Laspeyresia] pomonella*), pear psylla (*Cacopsylla pyricola*), and several species of mites (*Tetranychus spp.*, *Epitrimerus pyri*, *Phytoptus pyri*, and *Panonychus ulmi*). Dormant oil sprays for insects start in January of the second year and continues throughout the life of the orchard. The spray is targeted at psylla, but also provides some control of aphids, mites and scale. Beginning in the first year of crop set (5th year in this study) additional applications of horticultural oil and other pesticides are added as needed to control codling moth (CM), pear psylla, mites and other pests. Psylla and mites are controlled with an oil spray in February (Delayed Dormant), Thiolux (sulfur) at budbreak in March, Agrimek and Oil in April, and Oil in September (postharvest). Codling Moth are treated with Intrepid insecticide three times: once in April, once in May mixed with the antibiotics (Agrimycin, Mycoshield) for disease control and once in June. Obliquebanded Leafroller is treated with Success in May. The pest control sprays are made with the grower's tractor and orchard sprayer.

*Diseases.* Many pear diseases can affect pears in the North Coast Region production area, but the two major diseases are pear scab (*Venturia pirina*) and fire blight (*Erwinia amylovora*). Scab can infect blossoms, leaves, and fruit, but generally does not cause significant damage to the blossoms and leaves. The infected fruit develop an exterior scab causing the fruit to be misshapen and unsuitable for fresh market. Disease management begins in the first year of significant crop set (5th year in this study) at bud break, but prior to cluster bud for pear scab and pear psylla control. Scab is controlled with two applications in March: one with Ziram and one with Flint. In addition, Flint is applied with the second blight spray in April and Syllit is applied with first blight spray in May.

Fire blight symptoms in the spring can appear in blossom clusters and shoot tips. If allowed to begin, the infection can move into twigs, stems, and branches. Severe infections may not only cause loss of fruit for the year, but may kill entire branches or trees. Conditions ideal for rapid fire blight infection and spread are rainy or humid weather following periods of temperatures ranging from 75°F to 85°F. Fire blight management includes applications of copper compounds or antibiotics, avoiding excessive tree vigor, and elimination of infected branches below any visible infection. During years of heavy disease pressure, fire blight may require 10 or more applications of pesticides, which results in 3 to 4 day spray cycles. In this report fire blight treatment begins in the third year with five applications: one each of Kocide, Mycoshield and Agri-Mycin in April, and one each of Kocide and Agrimycin in May. This increases to 12 treatments in the fourth year and continues through the production years. In the fourth year Kocide is applied three times in April and in May, Agrimycin is applied twice in April and in May, Mycoshield is applied once in April and in May. In the fifth and continuing years, Agrimycin and Mycoshield are combined and applied six times in April and in May. One treatment in April and in May is combined with a scab treatment, another application is combined with a codling moth treatment. Treatments for blight occur during April and May and the applications for the nine blight only treatments are applied to alternate rows.

*Vertebrate.* Rodent bait is applied to the orchard in March beginning in the first year. The grower uses a tractor and bait applicator to move around the field.

**Harvest.** Pears produce a commercial crop in the fourth or fifth year after planting. Some trees will produce fruit in the second or third year, but is usually removed so that early tree growth is not stunted. In this study, a commercial crop is produced and harvested in 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. Cleaning, sorting, and packing costs are paid by the grower. The harvest season for Green Bartlett in this study is in August. Four and five year old orchards are harvested once, and older pear orchards twice.

**Yields.** Typical annual yields for Green Bartlett pears are measured in tons per acre; Table C 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. Processed is also referred to as canning or unrestricted grade, and off-grade as restricted grade. Off-grade pears are used in juice, and in concentrated, fermented, dried, and frozen products. Pears that go to processing or off-grade normally receive lower prices than fresh market fruit so the grower incentive is to produce for the fresh market; although from year to year, fresh market prices tend to fluctuate more than processed prices.

Table C. Assumed Annual Yields of Bartlett Pears

Year	Total Yield	Fresh		
		Market	Processed	Off-grade
Tons/Acre				
5	4.0	1.68	1.60	0.72
6	7.0	2.94	2.80	1.26
7	10.0	4.20	4.00	1.80
8	13.0	5.46	5.20	2.34
9	16.0	6.72	6.40	2.88
10+	20.0	8.40	8.00	3.60

### Production Operating Costs

**Pruning.** In this study, a contract hand crew does pruning in the winter months (January). Small prunings are left in the orchard and will break down over the season with irrigations. Large prunings such as scaffolds and fire blight cuttings are removed from the orchard and burned. It is assumed that the prunings are small, therefore a cost is not shown to remove the prunings.

**Fertilization.** Tree nitrogen status is determined by visual observation (shoot vigor and leaf color) and validated by leaf analysis. Over fertilization of trees can cause excessive shoot growth, which results in increased susceptibility to fire blight, and a reduced fruit set due to shading. Urea at 200 pounds per acre of N is dissolved in water and split equally in two applications which are applied through the irrigation system in June and in September after harvest. Leaf samples for nutrient analysis at two per 25 acres are taken in July. It is assumed that it takes one-hour using an ATV to collect the samples and one-hour to package the samples for a total of 0.08 hours per acre.

**Pest Management.** Pesticides, rates, and cultural practices mentioned in this cost study are a few of those listed in the *UC IPM Pest Management Guidelines, Pear*, and *Integrated Pest Management for Apples and Pears*. For more information on pest identification, monitoring, and management visit the UC IPM website at [www.ipm.ucdavis.edu](http://www.ipm.ucdavis.edu). For information and pesticide use permits, contact the local county Agricultural Commissioner's office. Adjuvants are recommended for use with many pesticides for effective control, but the adjuvants and their costs are not included in this study. Pesticide costs may vary by location, brand, and grower volume. Pesticide costs in this study are taken from a single dealer and shown as full retail.

**Pest Control Adviser (PCA).** Written recommendations are required for many pesticides and are made by licensed pest control advisers. In addition the PCA will monitor the field for agronomic problems including pests and nutrition. Growers may hire private PCA's or receive the service as part of a service agreement with an agricultural chemical and fertilizer company. The private PCA in this study monitors the field for agronomic problems, pest, and diseases, hangs the pheromone ties and traps, and check the traps during the season.

*Weeds.* Weeds in the orchard middles are controlled with three Roundup applications one each in March, May and July. Weeds in the tree row (strip) are controlled with a dormant strip spray (November to February) of residual and contact herbicides (Karmex, Princep, and Roundup). In this study the dormant strip spray is in December. During the growing season, weeds are controlled with in-season strip sprays in April and July using Roundup.

*Insects.* Several insect and arthropod pests are treated each year. Pests in this study are codling moth, pear psylla, and mites. The grower does all pest management operations with his own equipment.

Codling moth (CM) is considered the primary pear pest because it makes fruit unmarketable. Its control largely determines subsequent control of other pests. 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 in late April or early May; the second and third generations normally occur in July and August. In this study, Intrepid is applied three times once in April, once in May with a blight spray, and once in June. Additional applications may be required depending on moth populations. Pheromones (Isomate) are placed in the trees in March by the PCA. The PCA also hangs the codling moth traps in late March or early April and checks them on a regular basis through September. The traps and lures are included in the PCA costs.

Pear psylla is also a significant insect pest. It injects a toxin into the tree, produces honeydew, and vectors the disease pear decline (caused by a mycoplasma). Pear decline is not considered a major problem if trees are grafted to a resistant rootstock. 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 can cause 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. Psylla is primarily controlled with horticultural oil (415 Oil) and Agrimek. Treatments in this study include a dormant spray (Dormant Oil) in January or early February, a delayed dormant spray (415 or 440 Oil) in late February, Thiolux (sulfur) in March, Oil and Agrimek in April, and a postharvest with Oil 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. Mites are controlled with the same materials and applications as the pear psylla

Obliquebanded leafroller (OBLR) (*Choristoneura rosaceana*) larvae may feed on flower parts or young fruit causing rough or russeted fruit. Success insecticide is applied in May for control.

*Diseases.* Fire blight, previously described in the Establishment section, can cause the loss of complete branches or trees. Twelve treatments are made from April (6 treatments) through May (6 treatments) using an Agri-mycin and Mycoshield tank mix. Three of the blight sprays are combined with other pest applications: two with scab treatments - one in April, one in May - and one with the codling moth spray in May. Blight sprays that include only antibiotics are made to every other or alternate rows. The combined blight/scab or blight/codling moth treatments are applied to every row. The biological control *Pseudomonas fluorescens* A506 (Blight Ban A506) is also used for fire blight as well as a frost and russet management tool by many growers, but is not included in this study.

Pear scab is a serious disease in the cool, moist growing North Coast region. It is 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 causing reductions in quality. In this study, three fungicide treatments are

made in the spring prior to infection. Temperature and moisture monitoring are used to pinpoint timing for the fungicide applications. Two applications are made in March, one with Ziram and one with Flint. Two additional scab sprays are combined with the fire blight treatments, one in April using Flint and one in May using Syllit.

**Vertebrate Pests.** The major vertebrate pest in pear orchards in the region is pocket gopher (*Thomomys sp.*). Trapping and/or baiting control them. In this study, gophers are managed by applying poison bait in the spring when populations are still low. The bait is placed underground in an artificial burrow made by a mechanical bait applicator and tractor. Gophers intersecting the tunnels will explore them and eat the bait.

**Harvest.** Mature pear orchards are harvested twice. The first pick in August 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 that is placed into one-half ton field bins. Two tractors with bin trailers and bins move the filled bins from the orchard, and place them on a flatbed truck or drop-trailers for transport to a packing shed for cleaning, sorting, and packing. The grower also rents a forklift for loading and unloading the bins. The crop is harvested and hauled by the grower, although a contracted harvesting company may be hired.

**Yields.** Typical annual yields for Green Bartlett pears are measured in tons per acre. Yields fall into three categories as shown in Table D: fresh market, processed, and off-grade. Processed is also referred to as canning or unrestricted grade, and off-grade as restricted grade. Off-grade pears are used in juice, baby food, and in concentrated, fermented, dried, and frozen products.

Table D. Tonnage & Percent Packout – Lake / Mendocino Counties Bartlett Pears 2000 - 2004<sup>1</sup>

Year	Lake County				Mendocino County			
	Tons	Fresh	Process	Off-grade	Tons	Fresh	Process	Off-grade
		%				%		
2000 <sup>2</sup>	62,749	46	42	12	47,353	30	50	20
2001	52,201	42	44	14	41,644	35	48	17
2002	55,674	43	44	13	34,493	36	54	10
2003	44,496	44	44	12	35,430	31	52	17
2004	47,432	48	37	15	33,438	33	55	12
Avg	52,510	45	42	13	38,472	33	52	15

<sup>1</sup>California Pear Advisory Board Annual Reports 2000 – 2004. Agricultural Commissioner Annual Report, Mendocino County 200-2004 <sup>2</sup>Severe scab year

An assumed average yield over the remaining life of the orchard is 20 tons per acre, which is used to calculate returns and costs 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, 42%; processed, 40%; and off-grade, 18%.

**Returns.** Gross return prices per ton for the Bartlett Pear categories described above are: fresh market, \$566; processed, \$200; and off grade, \$50. The return prices are approximated from the 2004 Agricultural Commissioner’s Annual Crop Reports. Fresh market prices by growers are often reported by the grower less packing house costs and will appear much lower than reported in this study. The return prices for pears are used to calculate a ranging analysis for a range of yields and prices. The prices used in this cost study are estimated based on 2004 and current markets.

Table E. California Pear Advisory Board Assessments Bartlett Pears

Category	Unit Price	Unit
<b>Fresh Market</b>		
Tight-fill carton	\$0.340	36 lb
Standard box	\$0.415	44-46 lb
Metric box	\$0.378	40 lb
LA lug	\$0.264	28 lb
<b>Processed</b>		
Unrestricted grades	\$4.00	ton
Restricted grade	\$1.50	ton
Other products	\$1.50	ton

**Assessments.** Under a state marketing order, mandatory assessment fees are collected and administered by the California Pear Advisory Board (CPAB). The assessment is charged to growers to pay for pear promotion and research.



Rates are set for pears bound for both fresh and processed markets. This report uses CPAB assessments for the categories: Fresh Market--tight-fill carton, and Processed--unrestricted, and Processed--restricted grades as shown in Table E.

Additionally, growers may pay a voluntary assessment 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 foster markets for processed pears. CPG charges members \$0.25 per ton of processed fruit.

**Packinghouse.** The packinghouse receives the pears delivered by the grower. The fees charged vary by packinghouse and include the sorting, grading, storage, packaging materials and selling costs. Selling costs are F.O.B. packinghouse. In this study 40% of the fresh market pears are hand wrap packed in 40 or 44 pound boxes at a cost of \$8.00 per box and 60% are packed in tight fill 36 pound boxes at \$6.00 per box. The packinghouse sells the processing pears to the cannery and receives the revenue. Cleaning, sorting, and packing costs are paid by the grower. The grower receives payment from the packinghouse less packinghouse charges.

**Labor.** Labor rates of \$14.30 per hour for machine operators and \$10.72 for general labor includes payroll overhead of 43%. The basic hourly wages are \$10.00 for machine operators and \$7.50 for general labor. The overhead includes the employers' share of federal and California state payroll taxes, workers' compensation insurance for orchard/fruit crops (code 0016), and a percentage for other possible benefits. Workers' compensation costs will vary among growers, but for this study the cost is based upon the average industry final rate as of January 5, 2005 (California Department of Insurance). Labor for operations involving machinery are 20% higher than the operation time given in Table 2 to account for the extra labor involved in equipment set up, moving, maintenance, work breaks, and field repair.

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

**Equipment Operating Costs.** Repair costs are based on purchase price, annual hours of use, total hours of life, and repair coefficients formulated by American Society of Agricultural Engineers (ASAE). Fuel and lubrication costs are also determined by ASAE equations based on maximum Power Take Off (PTO) horsepower, and fuel type. Prices for on-farm delivery of diesel and gasoline are \$2.00 and \$2.55 per gallon, respectively. The cost includes a 2% local sales tax on diesel fuel and 8% sales tax on gasoline. Gasoline also includes federal and state excise tax, which are refundable for on-farm use when filing your income tax. The fuel, lube, and repair cost per acre for each operation in Table 3 is determined by multiplying the total hourly operating cost in Table 6 for each piece of equipment used for the selected operation by the hours per acre. Tractor time is 10% higher than implement time for a given operation to account for setup, travel and down time.

**Interest on Operating Capital.** Interest on operating capital is based on cash operating costs and is calculated monthly until harvest at a nominal rate of 9.25% per year. A nominal interest rate is the typical market cost of borrowed funds. The interest cost of post harvest operations is discounted back to the last harvest month using a negative interest charge.

**Risk.** The risks associated with producing and marketing 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. When selecting varieties to plant, growers should consider not only whether they can be successfully grow in the North Coast Region, but if there is a market that will bring an adequate return.

## Cash Overhead Costs

Cash overhead consists of various cash expenses paid out during the year that are assigned to the whole farm and not to a particular operation. 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.

**Insurance.** Insurance for farm investments varies depending on the assets included and the amount of coverage. Property insurance provides coverage for property loss and is charged at 0.70% of the average value of the assets over their useful life. Liability insurance covers accidents on the farm and costs \$529 for the entire farm.

**Office Expense.** Office and business expenses are estimated at \$50 per acre. These expenses include office supplies, telephones, bookkeeping, accounting, legal fees, and road maintenance.

**Sanitation Services.** Sanitation services provide single portable toilets and washbasin for the orchard and cost the farm \$150 per month or \$4,800 per acre for the entire farm. This cost includes delivery and 8 months of weekly service.

**Investment Repairs.** Annual repairs on investments or capital recovery items that require maintenance are calculated as two percent of the purchase price, except for the orchard establishment costs which are calculated at 0.50% to cover tree replacement each year.

## Non-Cash Overhead Costs

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

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

**Salvage Value.** Salvage value is an estimate of the remaining value of an investment at the end of its useful life. For farm machinery (tractors and implements) the remaining value is a percentage of the new cost of the investment (Boehlje and Eidman). The percent remaining value is calculated from equations developed by the American Society of Agricultural Engineers (ASAE) based on equipment type and years of life. The life in years is estimated by dividing the wear out life, as given by ASAE by the annual hours of use in this operation. For other investments including irrigation systems, buildings, and miscellaneous equipment, the value at the end of its useful life is zero. The salvage value for land is the purchase price because land does not depreciate. The purchase price and salvage value for equipment and investments are shown in Table 6.

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

*Interest Rate Long Term.* The interest rate of 6.25% used to calculate capital recovery cost is the rate available in January 2006 from a farm lending agency.

**Fuel Tanks.** Two 500-gallon fuel tanks are placed on stands in cement containment meeting Federal, State, and local regulations. Fuel is delivered to the equipment by gravity feed.

**Tools.** Includes shop tools/equipment, hand tools and field tools such as pruning equipment.

**Irrigation System.** Because an older orchard was removed at this location, pumps and wells already existed. The cost of the irrigation system is for recasing of the wells, refurbishing the pumps and motors, installing underground, permanent sprinklers and a new filtration system. The new irrigation system was installed after the orchard had been laid out, but prior to planting. The life of the irrigation system is estimated to be 25 years. The irrigation system is considered an improvement to the property. The irrigation system cost shown in the Investment Tables is the cost for the 70 acres.

**Land.** Bare land and pear land values in the North Coast Region range from \$6,000 to \$10,000 per acre. Land in this study is valued at \$8,000 per acre or \$8,571 per producing acre. Smaller parcels, 30 acres and under, may have a homesite value of \$150,000 to \$200,000 per acre and the remaining acreage an agricultural value. For example, 15 acres purchased for \$280,000 less the homesite value of \$150,000 per acre yields an agricultural value of \$9,285 on the remaining 14 acres.

**Establishment Cost.** Costs to establish the orchard are used to determine the non-cash overhead expenses, capital recovery, and interest on investment for the production years. The establishment cost is the sum of cash costs for land preparation, planting, trees, production expenses, and cash overhead for growing pear trees through the first year fruit is harvested less 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 \$13,183 per acre or \$329,575 for the 25-acre orchard. Establishment cost is amortized beginning in the sixth year over the remaining 25 years of production.

**Equipment.** Farm equipment is purchased new or used, but the study shows the current purchase price for new equipment. The new purchase price is adjusted to 60% to indicate a mix of new and used equipment. Annual ownership costs for equipment and other investments are shown in Tables 3 and 6. Equipment costs are composed of three parts: non-cash overhead, cash overhead, and operating costs. Both of the overhead factors have been discussed in previous sections. The operating costs consist of repairs, fuel, and lubrication and are discussed under operating costs.

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

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UC COOPERATIVE EXTENSION  
**Table 1. SAMPLE COSTS TO ESTABLISH A PEAR ORCHARD**  
 NORTH COAST - Lake & Mendocino Counties 2006

	Cost Per Acre						
	Year:	1st	2nd	3rd	4th	5th	6th
Tons Per Acre:						4.0	7.0
<b>Planting Costs:</b>							
Remove Old Orchard		425					
Land Prep: Rip 2X		250					
Land Prep: Disc 2X		21					
Land Prep: Fumigate		2,100					
Land Prep: Apply Herbicide (Roundup)		20					
Land Prep: Disc 1X		10					
Plant: Layout Orchard		214					
Plant: Auger Tree Holes		169					
Plant: Trees		247	5				
Trees: 242 Per Acre @ \$6.40 ea., (2% in 2nd year)		1,549	32				
Plant: Tree Guard. Fertilize: NPK Fertilizer (15-15-15)		280	7				
Plant: Head Back Trees		43	2				
<b>TOTAL PLANTING COSTS</b>		<b>5,328</b>	<b>46</b>				
<b>Cultural Costs:</b>							
Train/Prune: Trees		43	96	289	579	772	772
Fertilizer: Nitrogen (Urea)		20	18	30	39	39	39
Weed: Disc Middles 4X, Yr 1. Mow 7X, Yrs 2-4. Spray 3X (Roundup) Yr 5+.		39	75	75	75	70	70
Weed: Strip Spray 3X (Inseason 2X, Dormant 1X)		23	51	51	51	48	48
Insects: Psylla/Mites, Dormant Spray, (Oil)			24	40	40	40	40
Insects: Psylla/Mites, Delayed Dormant Spray (Oil)						30	30
Insect: Psylla/Mites (Thiolux, AgriMek, Oil)						151	151
Vertebrate: Gophers (Bait)		11	11	11	11	11	11
Disease: Scab (Ziram, Flint)						84	84
Disease: Blight (Kocide, Agrimycin, Mycoshield) Alt. Row				41	94	151	151
Disease: Blight /Scab (Kocide, Agrimycin, Mycoshield/ Flint, Syllit)						157	157
Disease/Insect: Blight/Codling Moth (Agrimycin, Mycoshield/ Intrepid)						75	75
Insect: Codling Moth (Intrepid)						100	100
Insect: OBLR (Success)						49	49
Insect: Codling Moth (Pheromones, Traps/Lures) Monitored by PCA						125	125
Growth Regulator: Fruit Sizing (LiquiStik)						48	48
Irrigate: Water (includes post harvest)		129	129	161	161	161	161
Frost Protection: Sprinkle 18X						84	84
Pest: PCA Fees				35	35	45	45
Fertilize: Leaf Analysis					4	4	4
Pickup Truck Use		100	100	100	100	100	100
ATV Use		75	75	75	75	75	75
<b>TOTAL CULTURAL COSTS</b>		<b>440</b>	<b>580</b>	<b>908</b>	<b>1,264</b>	<b>2,420</b>	<b>2,420</b>
<b>Harvest Costs:</b>							
Pick Fruit						279	429
Haul to Shed						41	71
Pack Fruit						645	1,077
<b>TOTAL HARVEST COSTS</b>						<b>964</b>	<b>1,577</b>
<b>Assessments:</b>							
California Pear Advisory Board						38	68
California Pear Growers						1	1
<b>TOTAL ASSESSMENT COSTS</b>						<b>39</b>	<b>69</b>
Interest On Operating Capital @ 9.25%		611	35	50	73	105	110
<b>TOTAL OPERATING COSTS/ACRE</b>		<b>6,380</b>	<b>661</b>	<b>959</b>	<b>1,337</b>	<b>3,528</b>	<b>4,175</b>

**Note:** Disease – See Assumptions. Similar disease operations are combined for this table. Materials mentioned are applied alone and/or in combination.

## UC COOPERATIVE EXTENSION

Table 1. continued

	Cost Per Acre						
	Year:	1st	2nd	3rd	4th	5th	6th
Tons Per Acre:						4.0	7.0
Cash Overhead Costs:							
Office Expense	50	50	50	50	50	50	50
Sanitation Fees	69	69	69	69	69	69	69
Liability Insurance	8	8	8	8	8	8	8
Property Taxes	109	107	108	108	111	112	112
Property Insurance	16	15	15	16	18	18	18
Investment Repairs	74	74	74	74	76	76	76
<b>TOTAL CASH OVERHEAD COSTS</b>	<b>326</b>	<b>322</b>	<b>323</b>	<b>324</b>	<b>331</b>	<b>332</b>	<b>332</b>
<b>TOTAL CASH COSTS/ACRE</b>	<b>6,705</b>	<b>984</b>	<b>1,281</b>	<b>1,661</b>	<b>3,859</b>	<b>4,508</b>	<b>4,508</b>
<b>INCOME/ACRE FROM PRODUCTION</b>					<b>1,307</b>	<b>2,287</b>	<b>2,287</b>
<b>NET CASH COSTS/ACRE FOR THE YEAR</b>	<b>6,705</b>	<b>984</b>	<b>1,281</b>	<b>1,661</b>	<b>2,552</b>	<b>2,221</b>	<b>2,221</b>
<b>ACCUMULATED NET CASH COSTS/ACRE</b>	<b>6,705</b>	<b>7,689</b>	<b>8,970</b>	<b>10,631</b>	<b>13,183</b>	<b>15,404</b>	<b>15,404</b>
Non-Cash Overhead Costs (Capital Recovery):							
Shop Building	64	64	64	64	64	64	64
Worker Housing	10	10	10	10	10	10	10
Fuel Tanks	4	4	4	4	4	4	4
Shop Tools	22	22	22	22	22	22	22
Sprinkler Irrigation System	156	156	156	156	156	156	156
Deer Fence: Electric	32	32	32	32	32	32	32
Ladders: 16 Each					17	17	17
Land	536	536	536	536	536	536	536
Equipment	93	59	66	77	120	132	132
<b>TOTAL INTEREST ON INVESTMENT</b>	<b>917</b>	<b>883</b>	<b>890</b>	<b>901</b>	<b>960</b>	<b>972</b>	<b>972</b>
<b>TOTAL COST/ACRE FOR THE YEAR</b>	<b>7,622</b>	<b>1,866</b>	<b>2,171</b>	<b>2,561</b>	<b>4,819</b>	<b>5,480</b>	<b>5,480</b>
<b>INCOME/ACRE FROM PRODUCTION</b>					<b>1,307</b>	<b>2,287</b>	<b>2,287</b>
<b>TOTAL NET COST/ACRE FOR THE YEAR</b>	<b>7,622</b>	<b>1,866</b>	<b>2,171</b>	<b>2,561</b>	<b>3,512</b>	<b>3,193</b>	<b>3,193</b>
<b>TOTAL ACCUMULATED NET COST/ACRE</b>	<b>7,622</b>	<b>9,488</b>	<b>11,659</b>	<b>14,221</b>	<b>17,733</b>	<b>20,926</b>	<b>20,926</b>

UC COOPERATIVE EXTENSION  
**Table 2. COSTS PER ACRE to PRODUCE PEARS**  
 NORTH COAST REGION - Lake and Mendocino Counties 2006

Operation	Operation Time (Hrs/A)	Cash and Labor Cost per acre				Total Cost	Your Cost
		Labor Cost	Fuel, Lube & Repairs	Material Cost	Custom/ Rent		
<b>Cultural:</b>							
Prune: Trees	0.00	0	0	0	847	847	
Insects: Dormant Spray (Oil)	0.31	5	4	31	0	40	
Insects: Delayed Dormant (Oil)	0.31	5	4	22	0	30	
Vertebrate: Gophers (Bait)	0.20	3	2	6	0	11	
Insect: Codling Moth (Isomate) Hang Pheromones (PCA)	0.00	0	0	125	0	125	
Weed: Spray Middles 3X (Roundup)	0.71	12	7	52	0	70	
Insect: Budbreak, Psylla/Mites (Thiolux)	0.31	5	4	20	0	29	
Disease: Scab (Ziram)	0.31	5	4	25	0	34	
Disease: Scab (Flint)	0.31	5	4	41	0	50	
Weed Strip Spray 2X (Roundup)	0.47	8	4	15	0	28	
Insect: Psylla/Mite (AgriMek, Oil)	0.31	5	4	99	0	108	
Insect: Codling Moth 2X (Intrepid)	0.61	11	7	83	0	100	
Frost Protection: Sprinkle	1.54	17	0	68	0	84	
Disease: Blight (Agrimycin, Mycoshield) 10X Alt. Row	1.38	24	16	111	0	151	
Disease: Blight/Scab (Agrimycin, Mycoshield/Flint)	0.31	5	4	66	0	75	
Insect: Codling Moth (PCA Hang Traps)	0.00	0	0	0	0	0	
Disease: Blight/Scab (Agrimycin, Mycoshield/Syllit)	0.31	5	4	73	0	82	
Disease/Insect: Blight/Codling Moth (Agrimycin, Mycoshield/Intrepid)	0.31	5	4	66	0	75	
Insect: OBLR (Success)	0.31	5	4	41	0	49	
Irrigate (water & labor) (includes post harvest)	4.50	48	0	113	0	161	
Fertilize: Nitrogen (Urea)	0.30	3	0	75	0	78	
Fertilize: Leaf Analysis (ATV, labor, analysis)	0.04	2	0	0	2	4	
Growth Regulator: Fruit Retention (Liqui Stik)	0.31	5	4	39	0	48	
Insect: Psylla/Mite (Oil) (post harvest)	0.31	5	4	5	0	14	
Weed: Strip Spray Dormant (Princep, Karmex, Roundup)	0.23	4	2	14	0	20	
Pest: PCA	0.00	0	0	0	45	45	
Pickup Truck Use	3.80	65	35	0	0	100	
ATV Use	3.80	65	9	0	0	75	
<b>TOTAL CULTURAL COSTS</b>	<b>21.30</b>	<b>325</b>	<b>127</b>	<b>1,188</b>	<b>894</b>	<b>2,534</b>	
<b>Harvest:</b>							
Harvest Fruit: 1st Pick	0.32	11	5	0	340	357	
Harvest Fruit: 2nd Pick	0.64	22	11	0	690	723	
Haul To Packinghouse	5.72	98	105	0	0	203	
<b>TOTAL HARVEST COSTS</b>	<b>6.68</b>	<b>131</b>	<b>122</b>	<b>0</b>	<b>1,030</b>	<b>1,283</b>	
<b>Packing:</b>							
Sort/Pack/Sell Fruit	0.00	0	0	0	3,430	3,430	
<b>TOTAL PACKING COSTS</b>	<b>0.00</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>3,430</b>	<b>3,430</b>	
<b>Assessment:</b>							
California Pear Advisory Board	0.00	0	0	185	0	185	
California Pear Growers	0.00	0	0	3	0	3	
<b>TOTAL ASSESSMENT COSTS</b>	<b>0.00</b>	<b>0</b>	<b>0</b>	<b>188</b>	<b>0</b>	<b>188</b>	
Interest on operating capital @ 9.25%						139	
<b>TOTAL OPERATING COSTS/ACRE</b>		<b>456</b>	<b>249</b>	<b>1,376</b>	<b>5,354</b>	<b>7,574</b>	
<b>TOTAL OPERATING COSTS/TON</b>						<b>379</b>	

## UC COOPERATIVE EXTENSION

Table 2. continued

Operation	Operation	Cash and Labor Cost per acre				Total Cost	Your Cost
	Time (Hrs/A)	Labor Cost	Fuel, Lube & Repairs	Material Cost	Custom/Rent		
CASH OVERHEAD:							
Office Expense						50	
Liability Insurance						8	
Sanitation Fee						69	
Property Taxes						178	
Property Insurance						65	
Investment Repairs						132	
TOTAL CASH OVERHEAD COSTS						501	
TOTAL CASH COSTS/ACRE						8,075	
TOTAL CASH COSTS/TON						404	
NON-CASH OVERHEAD:							
Investment		Per producing Acre		Annual Cost			
				Capital Recovery			
Buildings		857		64		64	
Worker Housing		117		10		10	
Fuel Tanks		50		4		4	
Shop Tools		214		22		22	
Sprinkler System		1,950		156		156	
Ladders - 16 Each		122		17		17	
Land		8,571		536		536	
Pear Establishment		13,183		1,056		1,056	
Equipment		1,553		186		186	
TOTAL NON-CASH OVERHEAD COSTS						2,051	2,051
TOTAL COSTS/ACRE						10,126	
TOTAL COSTS/TON						506	



UC COOPERATIVE EXTENSION  
**Table 3. COSTS AND RETURNS PER ACRE to PRODUCE PEARS**  
 NORTH COAST REGION - Lake and Mendocino Counties 2006

	Quantity/ Acre	Unit	Price or Cost/Unit	Value or Cost/Acre	Your Cost
<b>GROSS RETURNS</b>					
Fresh	8.40	ton	566.00	4,754	
Processing	8.00	ton	200.00	1,600	
Off-Grades	3.60	ton	50.00	180	
<b>TOTAL GROSS RETURNS FOR PEAR</b>	<b>20.00</b>	<b>ton</b>		<b>6,534</b>	
<b>OPERATING COSTS</b>					
<b>Insecticide:</b>					
Dormant Oil Plus	8.00	gal	3.83	31	
415 Oil	6.00	gal	5.38	32	
Agri-Mek 0.15EC	12.00	floz	7.82	94	
Intrepid 2F	48.00	floz	2.58	124	
Success	6.00	floz	6.75	41	
<b>Herbicide:</b>					
Karmex DF	0.60	lb	5.66	3	
Princep Caliber 90	0.60	lb	4.69	3	
Roundup Ultra Max	8.70	pint	8.60	75	
<b>Rodenticide:</b>					
Gopher Getter Ag	1.00	lb	5.56	6	
<b>Fungicide:</b>					
Thiolux Jet (sulfur)	25.00	lb	0.80	20	
Ziram Granuflo	8.00	lb	3.15	25	
Flint	5.00	oz	16.50	83	
Syllit 65W	3.00	lb	16.19	49	
<b>Lures/Confusion:</b>					
Isomate C Plus (200 ties/acre)	1.00	acre	125.00	125	
<b>Antibiotic:</b>					
Mycoshield	3.75	lb	36.15	136	
Agri-mycin 17	30.00	oz	1.62	49	
<b>Fertilizer:</b>					
46-0-0 (Urea)	200.00	lb N	0.38	75	
<b>Growth Regulator:</b>					
Liqui-Stik	24.00	oz	1.62	39	
<b>Water:</b>					
Water - Frost Protection	18.00	acin	3.76	68	
Water - Pumped	30.00	acin	3.76	113	
<b>Rent:</b>					
Forklift Rental	2.00	acwk	15.00	30	
<b>Assessment:</b>					
Fresh Market - Pear	467.00	box	0.34	159	
Processed - Unrestricted	3.60	ton	4.00	14	
Processed - Restricted	8.00	ton	1.50	12	
CA Pear Growers Association	11.60	ton	0.25	3	
<b>Custom/Contract:</b>					
Prune Trees	242.00	tree	3.50	847	
PCA Fees	1.00	acre	45.00	45	
Leaf Analysis	0.08	acre	30.00	2	
Harvest - Hand Pick	20.00	ton	50.00	1,000	
Pack - Fresh 36 lb box	280.00	box	6.00	1,680	
Pack - Fresh 40/44 lb box	168.00	box	8.00	1,344	
Shed Cost - Processed	11.60	ton	35.00	406	
Labor (machine)	27.06	hrs	14.30	387	
Labor (non-machine)	6.43	hrs	10.72	69	
Fuel - Gas	12.07	gal	2.55	31	
Fuel - Diesel	63.05	gal	2.00	126	
Lube				24	
Machinery repair				69	
Interest on operating capital @ 9.25%				139	
<b>TOTAL OPERATING COSTS/ACRE</b>				<b>7,574</b>	
<b>TOTAL OPERATING COSTS/TON</b>				<b>379</b>	
<b>NET RETURNS ABOVE OPERATING COSTS</b>				<b>-1,040</b>	

## UC COOPERATIVE EXTENSION

Table 3. continued

	Quantity/ Acre	Unit	Price or Cost/Unit	Value or Cost/Acre	Your Cost
Cash Overhead:					
Office Expense				50	
Liability Insurance				8	
Sanitation Fee				69	
Property Taxes				178	
Property Insurance				65	
Investment Repairs				132	
<b>TOTAL CASH OVERHEAD COSTS/ACRE</b>				<b>501</b>	
<b>TOTAL CASH COSTS/ACRE</b>				<b>8,076</b>	
<b>TOTAL CASH COSTS/TON</b>				<b>404</b>	
Non-Cash Overhead (Capital Recovery):					
Buildings				64	
Worker Housing				10	
Fuel Tanks				4	
Shop Tools				22	
Sprinkler System				156	
Ladders - 16 Each				17	
Land				536	
Pear Establishment				1,056	
Equipment				186	
<b>TOTAL NON-CASH OVERHEAD COSTS/ACRE</b>				<b>2,051</b>	
<b>TOTAL COSTS/ACRE</b>				<b>10,126</b>	
<b>TOTAL COSTS/TON</b>				<b>506</b>	
<b>NET RETURNS ABOVE TOTAL COST/Acre</b>				<b>-3,592</b>	

UC COOPERATIVE EXTENSION  
**Table 4. MONTHLY CASH COSTS PER ACRE to PRODUCE PEARS**  
 NORTH COAST REGION - Lake and Mendocino Counties 2006

Beginning JAN 06	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	TOTAL
Ending DEC 06	06	06	06	06	06	06	06	06	06	06	06	06	06
Cultural:													
Prune: Trees	847												847
Insect: Dormant Spray (Oil)	40												40
Insect: Delayed Dormant (Oil)		30											30
Vertebrate: Gophers (Bait)			11										11
Insect: Codling Moth (Checkmate) Hang Pheromones (PCA)			125										125
Weed: Spray Middles 3X (Roundup)			23		23		23						70
Insect: Budbreak, Psylla/Mites (Thiolux)			29										29
Disease: Scab (Ziram)			34										34
Disease: Scab (Flint)			50										50
Weed Strip Spray 2X (Roundup)				14		14							28
Insect: Psylla/Mite (AgriMek, Oil)				108									108
Insect: Codling Moth 2X (Intrepid)				50		50							100
Frost Protection: Sprinkle				42	42								84
Disease: Blight (Agrimycin, Mycoshield) 10X Alt. Row				84	67								151
Disease: Blight/Scab (Agrimycin, Mycoshield/Flint)				75									75
Insect: Codling Moth (PCA Hang Traps)				0									0
Disease: Blight/Scab (Agrimycin, Mycoshield/Syllit)					82								82
Disease/Insect: Blight/Codling Moth (Agrimycin, Mycoshield/Intrepid)					75								75
Insect: OBLR (Success)					49								49
Irrigate (water & labor) (includes post harvest)						54	54	27	27				161
Fertilize: Nitrogen (Urea)						39			39				78
Fertilize: Leaf Analysis (ATV, labor, analysis)							4						4
Growth Regulator: Fruit Retention (Liqui Stik)								48					48
Insect: Psylla/Mite (Oil) (post harvest)									14				14
Weed: Strip Spray Dormant (Princep, Karmex, Roundup)												20	20
Pest: PCA	4	4	4	4	4	4	4	4	4	4	4	4	45
Pickup Truck Use	8	8	8	8	8	8	8	8	8	8	8	8	100
ATV Use	6	6	6	6	6	6	6	6	6	6	6	6	75
<b>TOTAL CULTURAL COSTS</b>	<b>905</b>	<b>49</b>	<b>291</b>	<b>391</b>	<b>357</b>	<b>175</b>	<b>100</b>	<b>93</b>	<b>99</b>	<b>18</b>	<b>18</b>	<b>39</b>	<b>2,534</b>
Harvest:													
Harvest Fruit: 1st Pick								357					357
Harvest Fruit: 2nd Pick								723					723
Haul To Packinghouse								203					203
<b>TOTAL HARVEST COSTS</b>								<b>1,284</b>					<b>1,284</b>

UC COOPERATIVE EXTENSION

Table 4. continued

Beginning JAN 06	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	TOTAL
Ending DEC 06	06	06	06	06	06	06	06	06	06	06	06	06	
Packing:													
Sort/Pack/Sell Fruit								3,430					3,430
<b>TOTAL PACKING COSTS</b>								<b>3,430</b>					<b>3,430</b>
Assessment:													
California Pear Advisory Board								185					185
California Pear Growers								3					3
<b>TOTAL ASSESSMENT COSTS</b>								<b>188</b>					<b>188</b>
Interest on operating Capital @ 9.25%	7	7	10	13	15	17	17	56	-1	0	-1	-1	139
<b>TOTAL OPERATING COSTS/ACRE</b>	<b>912</b>	<b>56</b>	<b>300</b>	<b>404</b>	<b>372</b>	<b>192</b>	<b>117</b>	<b>5,051</b>	<b>98</b>	<b>18</b>	<b>18</b>	<b>38</b>	<b>7,575</b>
<b>TOTAL OPERATING COSTS/TON</b>	<b>46</b>	<b>3</b>	<b>15</b>	<b>20</b>	<b>19</b>	<b>10</b>	<b>6</b>	<b>253</b>	<b>5</b>	<b>1</b>	<b>1</b>	<b>2</b>	<b>379</b>
OVERHEAD:													
Office Expense	4	4	4	4	4	4	4	4	4	4	4	4	50
Liability Insurance								8					8
Sanitation Fee	6	6	6	6	6	6	6	6	6	6	6	6	69
Property Taxes				89								89	178
Property Insurance				32								32	65
Investment Repairs	11	11	11	11	11	11	11	11	11	11	11	11	132
<b>TOTAL CASH OVERHEAD COSTS</b>	<b>21</b>	<b>21</b>	<b>21</b>	<b>142</b>	<b>21</b>	<b>21</b>	<b>21</b>	<b>28</b>	<b>21</b>	<b>21</b>	<b>21</b>	<b>142</b>	<b>501</b>
<b>TOTAL CASH COSTS/ACRE</b>	<b>933</b>	<b>77</b>	<b>321</b>	<b>546</b>	<b>393</b>	<b>213</b>	<b>138</b>	<b>5,079</b>	<b>119</b>	<b>39</b>	<b>39</b>	<b>180</b>	<b>8,076</b>
<b>TOTAL CASH COSTS/TON</b>	<b>47</b>	<b>4</b>	<b>16</b>	<b>27</b>	<b>20</b>	<b>11</b>	<b>7</b>	<b>254</b>	<b>6</b>	<b>2</b>	<b>2</b>	<b>9</b>	<b>404</b>

UC COOPERATIVE EXTENSION  
**Table 5. RANGING ANALYSIS**  
 NORTH COAST REGION – Lake/Mendocino Counties 2006

COSTS PER ACRE AT VARYING YIELD TO PRODUCE PEARS

	TOTAL YIELD (tons/acre)						
	14.00	16.00	18.00	20.00	22.00	24.00	26.00
<b>OPERATING COSTS/ACRE:</b>							
Cultural Cost	2,534	2,534	2,534	2,534	2,534	2,534	2,534
Harvest & Haul Cost	1,022	1,109	1,196	1,283	1,370	1,456	1,543
Packing Cost	2,394	2,740	3,085	3,430	3,775	4,120	4,466
Assessment Cost	73	111	150	188	227	265	303
Interest on operating capital	129	132	136	139	143	147	150
<b>TOTAL OPERATING COSTS/ACRE</b>	<b>6,152</b>	<b>6,626</b>	<b>7,101</b>	<b>7,574</b>	<b>8,049</b>	<b>8,522</b>	<b>8,996</b>
<b>TOTAL OPERATING COSTS/TON</b>	<b>439</b>	<b>414</b>	<b>395</b>	<b>379</b>	<b>366</b>	<b>355</b>	<b>346</b>
<b>CASH OVERHEAD COSTS/ACRE</b>							
<b>TOTAL CASH COSTS/ACRE</b>	<b>6,653</b>	<b>7,127</b>	<b>7,602</b>	<b>8,075</b>	<b>8,550</b>	<b>9,023</b>	<b>9,497</b>
<b>TOTAL CASH COSTS/TON</b>	<b>475</b>	<b>445</b>	<b>422</b>	<b>404</b>	<b>389</b>	<b>376</b>	<b>365</b>
<b>NON-CASH OVERHEAD COSTS/ACRE</b>							
<b>TOTAL COSTS/ACRE</b>	<b>8,708</b>	<b>9,181</b>	<b>9,654</b>	<b>10,126</b>	<b>10,599</b>	<b>11,070</b>	<b>11,541</b>
<b>TOTAL COSTS/TON</b>	<b>622</b>	<b>574</b>	<b>536</b>	<b>506</b>	<b>482</b>	<b>461</b>	<b>444</b>

NET RETURNS PER ACRE ABOVE OPERATING COSTS

F.O.B. PRICE (\$/ton)			YIELD (tons/acre)						
Fresh	Processed	Off-Grade	5.88	6.72	7.56	8.40	9.24	10.08	10.92
			5.60	6.40	7.20	8.00	8.80	9.60	10.40
			2.52	2.88	3.24	3.60	3.96	4.32	4.68
396.20	140.00	35.00	-2,950	-2,967	-2,984	-3,000	-3,018	-3,033	-3,050
452.80	160.00	40.00	-2,493	-2,444	-2,396	-2,347	-2,299	-2,249	-2,200
509.40	180.00	45.00	-2,035	-1,921	-1,808	-1,693	-1,580	-1,465	-1,351
566.00	200.00	50.00	-1,578	-1,399	-1,220	-1,040	-861	-681	-501
622.60	220.00	55.00	-1,121	-876	-632	-386	-142	103	348
679.20	240.00	60.00	-663	-353	-44	267	576	887	1,198
735.80	260.00	65.00	-206	170	544	921	1,295	1,672	2,047

NET RETURNS PER ACRE ABOVE CASH COSTS

F.O.B. PRICE (\$/ton)			YIELD (tons/acre)						
Fresh	Processed	Off-Grade	5.88	6.72	7.56	8.40	9.24	10.08	10.92
			5.60	6.40	7.20	8.00	8.80	9.60	10.40
			2.52	2.88	3.24	3.60	3.96	4.32	4.68
396.20	140.00	35.00	-3,451	-3,468	-3,485	-3,501	-3,519	-3,534	-3,551
452.80	160.00	40.00	-2,994	-2,945	-2,897	-2,848	-2,800	-2,750	-2,701
509.40	180.00	45.00	-2,536	-2,422	-2,309	-2,194	-2,081	-1,966	-1,852
566.00	200.00	50.00	-2,079	-1,900	-1,721	-1,541	-1,362	-1,182	-1,002
622.60	220.00	55.00	-1,622	-1,377	-1,133	-887	-643	-398	-153
679.20	240.00	60.00	-1,164	-854	-545	-234	75	386	697
735.80	260.00	65.00	-707	-331	43	420	794	1,171	1,546

UC COOPERATIVE EXTENSION

Table 5. continued

NET RETURNS PER ACRE ABOVE TOTAL COSTS

F.O.B. PRICE (\$/ton)			YIELD (tons/acre)						
Fresh	Processed	Off-Grade	5.88	6.72	7.56	8.40	9.24	10.08	10.92
			5.60	6.40	7.20	8.00	8.80	9.60	10.40
			2.52	2.88	3.24	3.60	3.96	4.32	4.68
396.20	140.00	35.00	-5,506	-5,522	-5,537	-5,552	-5,568	-5,581	-5,595
452.80	160.00	40.00	-5,049	-4,999	-4,949	-4,899	-4,849	-4,797	-4,745
509.40	180.00	45.00	-4,591	-4,476	-4,361	-4,245	-4,130	-4,013	-3,896
566.00	200.00	50.00	-4,134	-3,954	-3,773	-3,592	-3,411	-3,229	-3,046
622.60	220.00	55.00	-3,677	-3,431	-3,185	-2,938	-2,692	-2,445	-2,197
679.20	240.00	60.00	-3,219	-2,908	-2,597	-2,285	-1,974	-1,661	-1,347
735.80	260.00	65.00	-2,762	-2,385	-2,009	-1,631	-1,255	-876	-498

UC COOPERATIVE EXTENSION  
**Table 6. WHOLE FARM ANNUAL EQUIPMENT, INVESTMENT,  
and BUSINESS OVERHEAD COSTS**  
NORTH COAST REGION - Lake County and Mendocino Counties 2006

ANNUAL EQUIPMENT COSTS

Yr	Description	Price	Yrs Life	Salvage Value	Capital Recovery	Cash Overhead		Total
						Insur- ance	Taxes	
06	55 HP 2WD Tractor #2	32,269	12	8,068	3,431	141	202	3,773
06	55 HP 2WD Tractor #1	32,269	12	8,068	3,431	141	202	3,773
06	ATV 4WD	7,430	7	2,818	1,010	36	51	1,097
06	Bait Applicator	1,046	10	185	130	4	6	140
06	Bin Trailer #1	979	15	94	98	4	5	108
06	Bin Trailer #2	979	15	94	98	4	5	108
06	Orch.Sprayer 500 gal #1	21,000	10	3,714	2,609	87	124	2,819
06	Orch.Sprayer 500 gal #2	21,000	10	3,714	2,609	87	124	2,819
06	Pickup Truck 1/2 T	26,000	7	9,863	3,533	126	179	3,838
06	Truck - 10 Ton	41,827	10	12,355	4,824	190	271	5,285
06	Weed Sprayer 100 G	3,947	10	698	490	16	23	530
<b>TOTAL</b>		<b>188,746</b>		<b>49,671</b>	<b>22,262</b>	<b>834</b>	<b>1,192</b>	<b>24,289</b>
<b>60% of New Cost *</b>		<b>113,248</b>		<b>29,803</b>	<b>13,357</b>	<b>501</b>	<b>715</b>	<b>14,573</b>

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

ANNUAL INVESTMENT COSTS

Description	Price	Yrs Life	Salvage Value	Capital Recovery	Cash Overhead			Total
					Insur- ance	Taxes	Repairs	
<b>INVESTMENT</b>								
Buildings 1800sqft	60,000	30		4,476	210	300	1,200	6,186
Fuel Tanks 2-500 gal	3,500	25	350	274	13	19	70	377
Ladders - 16 Each	3,057	10		420	11	15	61	507
Land 75 acres	600,000	95	600,000	37,500	0	6,000	0	43,500
Orchard Establishment (25 acre)	329,575	25		26,397	1,154	1,648	1,648	30,846
Shop Tools	15,000	15	1,500	1,507	58	83	300	1,947
Sprinkler System (70 acres)	136,500	25		10,933	478	683	2,730	14,823
Worker Housing	8,217	20		731	28	41	164	964
<b>TOTAL INVESTMENT</b>	<b>1,155,849</b>		<b>601,850</b>	<b>82,238</b>	<b>1,952</b>	<b>8,789</b>	<b>6,173</b>	<b>99,151</b>

ANNUAL BUSINESS OVERHEAD COSTS

Description	Units/ Farm	Unit	Price/ Unit	Total Cost
Liability Insurance	70	acre	7.56	529
Office Expense	70	acre	50.00	3,500
Sanitation Fee	70	acre	68.57	4,800

UC COOPERATIVE EXTENSION  
**Table 7. HOURLY EQUIPMENT COSTS**  
 NORTH COAST REGION – Lake and Mendocino Counties 2006

Yr	Description	Actual Hours Used	COSTS PER HOUR						Total Oper.	Total Costs/Hr.
			Capital Recovery	Cash Overhead			Operating			
				Insur- ance	Taxes	Repairs	Fuel & Lube			
06	55 HP 2WD Tractor #2	1,000.20	2.06	0.08	0.12	1.43	6.21	7.64	9.90	
06	55 HP 2WD Tractor #1	999.50	2.06	0.08	0.12	1.43	6.21	7.64	9.90	
06	ATV 4WD	285.00	2.13	0.08	0.11	0.55	1.95	2.50	4.82	
06	Bait Applicator	120.00	0.65	0.02	0.03	0.40	0.00	0.40	1.10	
06	Bin Trailer #1	166.00	0.36	0.01	0.02	0.14	0.00	0.14	0.53	
06	Bin Trailer #2	166.00	0.36	0.01	0.02	0.14	0.00	0.14	0.53	
06	Orch.Sprayer 500 gal #1	200.10	7.82	0.26	0.37	3.55	0.00	3.55	12.00	
06	Orch.Sprayer 500 gal #2	200.40	7.81	0.26	0.37	3.55	0.00	3.55	11.99	
06	Pickup Truck 1/2 T	285.00	7.44	0.26	0.38	1.91	7.33	9.24	17.32	
06	Truck - 10 Ton	200.00	14.47	0.56	0.84	4.00	14.38	18.38	34.25	
06	Weed Sprayer 100 G	150.30	1.96	0.06	0.09	1.06	0.00	1.06	3.17	



UC COOPERATIVE EXTENSION  
**Table 8. PRODUCTION OPERATIONS WITH EQUIPMENT AND MATERIALS**  
 NORTH COAST REGION - Lake and Mendocino Counties 2006

Operation	Operation		Equipment		Labor Hrs/Acre	Material	Rate/acre	Unit
	Month	Tractor	Implement					
Insect: Dormant	January	55HP 2WD	Orchard Sprayer			Dormant Oil	8.00	gal
Insect: Delayed Dormant	February	55HP 2WD	Orchard Sprayer			415 Oil	4.00	gal
Weed: Strip Spray	April	55HP 2WD	Weed Sprayer			Roundup	0.90	pt
	June	55HP 2WD	Weed Sprayer			Roundup	0.90	pt
Weed: Strip Spray Dormant	December	55HP 2WD	Weed Sprayer			Roundup	0.90	pt
						Karmex	0.60	lb
						Princep	0.60	lb
Vertebrate: Gophers	March	55HP 2WD	Bait Applicator			Rodent Bait	1.00	lb
Weed: Spray Middles 3X	March	55HP 2WD	Weed Sprayer			Roundup	2.00	pt
	May	55HP 2WD	Weed Sprayer			Roundup	2.00	pt
	July	55HP 2WD	Weed Sprayer			Roundup	2.00	pt
Disease: Scab	March	55HP 2WD	Orchard Sprayer			Ziram	8.00	lb
	March	55HP 2WD	Orchard Sprayer			Flint	2.50	oz
Frost Protection	April				0.80	Water	9.00	acin
	May				0.80	Water	9.00	acin
Insect: Budbreak, Psylla/Mites	March	55HP 2WD	Orchard Sprayer			Thiolux	25.00	lb
Insect: Psylla & Mites	April	55HP 2WD	Orchard Sprayer			415 Oil	1.00	gal
						Agri-Mek	12.00	oz
	June	55HP 2WD	Orchard Sprayer			415 Oil	1.00	gal
						Agri-Mek	12.00	oz
	July	55HP 2WD	Orchard Sprayer			415 Oil	1.00	gal
						Agri-Mek	12.00	oz
	September	55HP 2WD	Orchard Sprayer			415 Oil	1.00	gal
Disease: Blight (Alternate Rows)	April	55HP 2WD	Orchard Sprayer			Mycoshield	0.25	lb
						Agri-mycin	2.00	oz
	April	55HP 2WD	Orchard Sprayer			Mycoshield	0.25	lb
						Agri-mycin	2.00	oz
	April	55HP 2WD	Orchard Sprayer			Mycoshield	0.25	lb
						Agri-mycin	2.00	oz
	April	55HP 2WD	Orchard Sprayer			Mycoshield	0.25	lb
						Agri-mycin	2.00	oz
	May	55HP 2WD	Orchard Sprayer			Mycoshield	0.25	lb
						Agri-mycin	2.00	oz
	May	55HP 2WD	Orchard Sprayer			Mycoshield	0.25	lb
						Agri-mycin	2.00	oz
	May	55HP 2WD	Orchard Sprayer			Mycoshield	0.25	lb
						Agri-mycin	2.00	oz
Disease: Blight & Scab	April	55HP 2WD	Orchard Sprayer			Mycoshield	0.50	lb
						Agri-mycin	4.00	oz
						Flint	2.50	oz
	May	55HP 2WD	Orchard Sprayer			Mycoshield	0.50	lb
						Agri-mycin	4.00	oz
						Syllit	3.00	lb
Prune Trees	January	Contract						
Disease/Insect: Blight/Codling Moth	May	55HP 2WD	Orchard Sprayer			Mycoshield	0.50	lb
						Agri-mycin	4.00	oz
						Intrepid	16.00	floz
Insect: Codling Moth	April	55HP 2WD	Orchard Sprayer			Intrepid	16.00	floz
	June	55HP 2WD	Orchard Sprayer			Intrepid	16.00	floz

## UC COOPERATIVE EXTENSION

Table 8 continued

Operation	Operation Month	Equipment		Labor Hrs/acre	Material	Rate/acre	Unit
		Tractor	Implement				
Insect: Codling Moth, Hang Pheromones	March	PCA			Isomate	200.00	acre
Insect: Codling Moth, Hang Traps	April	PCA			No Charge		
Insect: OBLR (petal fall)	May	55HP 2WD	Orchard Sprayer		Success	6.00	floz
Irrigate	June			1.50	Water	8.58	acin
	July			1.50	Water	8.58	acin
	August			0.75	Water	8.58	acin
	September			0.75	Water	4.29	acin
Fertilize - Nitrogen	June			0.15	46-0-0	100.00	lb N
	September			0.15	46-0-0	100.00	lb N
Fertilize: Leaf Analysis	July			0.08	Samples	0.10	each
Apply Hormone	August	55HP 2WD	Orchard Sprayer		Liqui-Stik	24.00	floz
Pickup Use	Annual	Pickup 1/2 ton					
ATV Use	Annual	ATV 4WD					
Harvest Fruit - 1st Pick	August	55HP 2WD	Bin Trailer	Contract	Forklift Rental	0.67	acwk
		55HP 2WD #2	Bin Trailer #2				
Harvest Fruit - 2nd Pick	August	55HP 2WD	Bin Trailer	Contract	Forklift Rental	1.33	acwk
		55HP 2WD #2	Bin Trailer #2				
Haul To Packinghouse	August	Truck 10 ton					
Sort, Pack, Sell	August	Custom			Pack 36 lb	280.00	box
					Pack 40/44 lb	168.00	box
					Shed Cost	11.60	ton