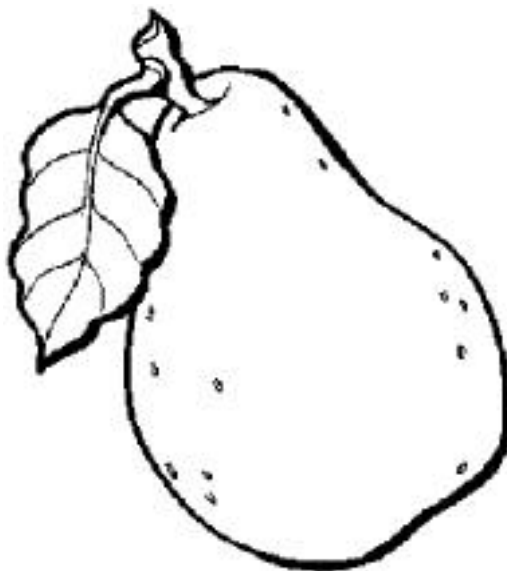

UNIVERSITY OF CALIFORNIA COOPERATIVE EXTENSION

2003

**SAMPLE COSTS to
ESTABLISH and PRODUCE**

PEARS

Green Bartlett



NORTH COAST REGION

Lake and Mendocino Counties

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UNIVERSITY OF CALIFORNIA COOPERATIVE EXTENSION

SAMPLE COSTS to ESTABLISH and PRODUCE PEARS

Green Bartlett - Sprinkler Irrigated

North Coast Region 2003

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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 7 and pertain to sample costs to establish a pear orchard and produce pears in the North Coast Region. 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 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.

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 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 several 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 orchard removal, ripping, and fumigation. The orchard site is sprayed with a contact herbicide 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. 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 guard is placed around the trunk to protect it from vertebrate damage and sunburn. New trees are cut back soon after planting to encourage trunk development. In the second year, 2% of the trees or 4 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 12' X 20' spacing, 182 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 100 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 each year as the trees mature. The average amount of water applied is shown in Table A.

| Year | Irrigation | Frost | Total |
|------|------------|------------|-------|
| | | Protection | 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 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 per night on approximately 18 nights during April and 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. Pear trees are pruned to a multiple leader system, which reduces the risk of losing a tree to fire blight (*Erwinia amylovora*). Pruning time increases each year until the orchard reaches full production. Prunings are shredded in the spring 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. In the remaining years granular urea is dissolved in the irrigation water and applied in two irrigations. Annual rates of applied N are shown in Table B.

| 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 are not 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.

Discing is used in this study, although orchard cultivators or other tillage equipment can be used. During the first year the tree rows and middles are disced. In the second year the resident vegetation in the row middles is left to grow and is mowed. Orchard floor vegetation provides several benefits: reduces compaction by equipment, allows equipment access during the winter, improves water infiltration, maintains a habitat for beneficial insects, and lowers dust emissions. Disadvantages are increased risk of frost damage, and competition for nutrients and water.

Chemical weed control in the tree row begins in the fall/winter (November to February) of the first year with a tank mixture of Gramoxone (contact herbicide) and Prowl (pre-emergent herbicide). This combination, also called a dormant strip spray, is applied in the second to fourth years. Beginning in the fifth year, Roundup and Goal are applied to the tree row. In the spring and during the growing season Gramoxone or Roundup is applied.

Insects and Arthropods. 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 and mites start in 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 in the delayed dormant and summer periods to control codling moth, pear psylla, mites and other pests. An antibiotic for disease control is mixed with the first cover (codling moth) spray. In the fifth year four cover sprays are applied. 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 with a foliar application of lime sulfur solution and supreme oil at bud break but prior to cluster bud for pear scab and pear psylla control. Three additional scab sprays of Ziram, Flint, or Syllit are made from March through May.

In the spring, fire blight symptoms 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 of Kocide, Mycoshield and/or Agri-Mycin. This increases to 12 treatments in the fourth year and continues through the production years. Treatments for fire blight are sometimes mixed with other pest control applications, usually with a scab and a cover spray. Treatments for blight occur during April and May.

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 receive lower prices than fresh market fruit so grower incentive is to produce for the fresh market although, fresh market prices tend to fluctuate more than processed prices from year to year.

Table C. Assumed Annual Yields of Bartlett Pears

| Year | Total Yield | Fresh | | |
|-----------|-------------|--------|-----------|-----------|
| | | Market | Processed | Off-grade |
| Tons/Acre | | | | |
| 5 | 4.0 | 1.7 | 1.6 | .7 |
| 6 | 7.0 | 2.9 | 2.8 | 1.3 |
| 7 | 10.0 | 4.2 | 4.0 | 1.8 |
| 8 | 13.0 | 5.5 | 5.2 | 2.3 |
| 9 | 16.0 | 6.7 | 6.4 | 2.9 |
| 10+ | 20.0 | 8.4 | 8.0 | 3.6 |

Production Operating Costs

Pruning. In this study, a contract hand crew does pruning in the winter months. Prunings are placed in the row middles and shredded in the spring during the first mowing.

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 split equally in two applications through the irrigation system in June and in September after harvest.

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. For information and pesticide use permits, contact the local county Agricultural Commissioner's office. Adjuvants may be used or be required with many pesticides, but are not included in this study.

Pest Control Advisor (PCA). Written recommendations are required for many pesticides and are made by licensed pest control advisors. 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.

Weeds. Weeds in mature orchards are controlled with the same chemical and cultural (mowing) practices as during establishment. Pre-emergent weeds are controlled in the tree row with a dormant strip spray (November to February) of residual and contact herbicides (Goal and Roundup). In this study the strip spray is

in December. During the growing season, weeds are controlled with in-season strip sprays of either Roundup or Gramoxone. The orchard floor vegetation in the tree middles is mowed seven times from March through July.

Insects and Arthropods. 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 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. Guthion is used to control these generations. Additional applications of Guthion or other organophosphates may be required depending on moth populations. In this study, Imidan is applied in July. Treatments for codling moth also help to control other lepidopteran pests such as leaf rollers, but reduce natural enemy populations of mites and pear psylla.

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 Plus Oil) in January or early February, a delayed dormant spray (415 or 440 Oil) in late February, combination psylla and mite sprays (Oil and Agrimek) in June and July, and a postharvest 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. Therefore follow up control is needed during the season, generally in conjunction with June and July pear psylla treatments.

Diseases. Fire blight, previously described in the Establishment section, can cause the loss of complete branches or trees. Twelve treatments are made from April through May using an Agri-mycin and Mycoshield tank mix. 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. The combined blight/scab or cover 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. In the first treatment Ziram is applied in March during bud break. Three additional scab sprays (two are combined with fire blight treatments) using Flint, Syllit, or Ziram are made in March, April, and May.

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 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. 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 1998 - 2002¹

| Year | Lake County | | | | Mendocino County | | | |
|-------------------|-------------|-------|---------|-----------|------------------|-------|---------|-----------|
| | Tons | Fresh | Process | Off-grade | Tons | Fresh | Process | Off-grade |
| | | % | | | | % | | |
| 1998 ² | 72,787 | 25 | 51 | 24 | 49,257 | 16 | 65 | 19 |
| 1999 | 82,453 | 42 | 40 | 18 | 56,427 | 26 | 56 | 18 |
| 2000 | 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 |
| Avg | 62,073 | 40 | 44 | 16 | 45,835 | 29 | 54 | 17 |

¹California Pear Advisory Board Annual Reports 1998 – 2002. Agricultural Commissioner Annual Report, Mendocino County 1996-2000 ²Severe scab year

An assumed yield of 20 tons per acre is used to calculate returns and 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, 42%; processed, 40%; and off-grade, 18%.

Returns. Gross return prices per ton for the Bartlett Pear categories described above are: fresh market, \$622; processed, \$213; and off grade, \$50. 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 2002 and current markets.

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.

Table E. California Pear Advisory Board Assessments Bartlett Pears

| Category | Unit Price | Unit |
|---------------------|------------|----------|
| <u>Fresh Market</u> | | |
| 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 |
| <u>Processed</u> | | |
| Unrestricted grades | \$4.00 | ton |
| Restricted grade | \$1.50 | ton |
| Other products | \$1.50 | ton |

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 \$2 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. Hourly wages for workers are \$9.00 and \$7.25 per hour for machine and non-machine workers, respectively. Adding 45% for the employers share of federal and state payroll taxes, insurance, and other benefits gives the labor rates shown of \$13.05 and \$10.51 per hour for machine labor and non- The overhead includes the employers' share of federal and California state payroll taxes, workers' compensation insurance for fruit orchards (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 1, 2003 (California Department of Insurance). Labor for operations involving machinery are 20% higher than the operation time given in Table 1 to account for the extra labor involved in equipment set up, moving, maintenance, work breaks, and field repair.

Equipment Operating Costs. Repair costs are based on purchase price, annual hours of use, total hours of life, and repair coefficients formulated by ASAE. Fuel and lubrication costs are also determined by ASAE equations based on maximum PTO horsepower, and fuel type. Prices for on-farm delivery of diesel and gasoline are \$1.11 and \$1.58 per gallon, respectively. The fuel prices are a January 2003 average based on four less than truckload California field delivery locations. The cost includes a 2.25% sales tax (effective September 2001) on diesel fuel and 7.25% sales tax on gasoline. Gasoline also includes federal and state excise tax, which can be refunded for on-farm use when filing your income tax. The fuel, lube, and repair cost per acre for each operation in Table 2 is determined by multiplying the total hourly operating cost in Table 6 for each piece of equipment used for the selected operation by the hours per acre. Tractor time is 10% higher than implement time for a given operation to account for setup, travel and down time.

Interest On Operating Capital. Interest on operating capital is based on cash operating costs and is calculated monthly until harvest at a nominal rate of 7.14% 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 grown 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.

Interest On Operating Capital. Interest on operating capital is based on cash operating costs and is calculated monthly until harvest at a nominal rate of 7.14% per year. A nominal interest rate is the typical market rate for borrowed funds.

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 0.676% of the average value of the assets over their useful life. Liability insurance covers accidents on the farm and costs \$516 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, and road maintenance.

Sanitation Services. Sanitation services provide single portable toilets and washbasin for the orchard and cost the farm \$117 per month. 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.

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 5.

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 USDA-ERS's ten-year average of California's agricultural sector long run rate of return to production assets from current income. It is used to reflect the long-term realized rate of return to these specialized resources that can only be used effectively in the agricultural sector. In other words, the next best alternative use for these resources is in another agricultural enterprise.

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.

Land. 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.

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 \$11,141 per acre or \$278,525 for the 25-acre orchard. Establishment cost is amortized beginning in the sixth year over the remaining 95 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 8. 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 PER ACRE TO ESTABLISH A PEAR ORCHARD
 NORTH COAST REGION – Lake/Mendocino Counties 2003

| Year: | Cost Per Acre | | | | | |
|--|---------------|------------|------------|--------------|--------------|--------------|
| | 1st | 2nd | 3rd | 4th | 5th | 6th |
| Tons Per Acre: | | | | | 4.0 | 7.0 |
| Planting Costs: | | | | | | |
| Remove Old Orchard | 375 | | | | | |
| Land Preparation - Rip 3X | 250 | | | | | |
| Land Preparation - Disc 2X | 17 | | | | | |
| Land Preparation - Fumigate | 1,800 | | | | | |
| Land Preparation - Apply Herbicide & Disc | 23 | | | | | |
| Layout Orchard | 210 | | | | | |
| Auger Tree Holes | 142 | | | | | |
| Plant Trees | 96 | 3 | | | | |
| Trees: 182 Per Acre @ \$5.80 ea., (2% in 2nd year) | 1,056 | 23 | | | | |
| Tree Guard & NPK Fertilizer | 227 | 4 | | | | |
| Head Back Trees | 32 | 2 | | | | |
| TOTAL PLANTING COSTS | 4,228 | 32 | 0 | 0 | 0 | 0 |
| Cultural Costs: | | | | | | |
| Train Trees | 32 | | | | | |
| Pruning & Training | | 95 | 284 | 568 | 757 | 757 |
| Fertilizer - Nitrogen | 11 | 14 | 22 | 29 | 29 | 29 |
| Weed Control - Disc 4X | 33 | | | | | |
| Weed Control - Mow Middles 7X | | 61 | 61 | 61 | 61 | 61 |
| Weed Control - Strip Sprays | 28 | 40 | 40 | 40 | 73 | 73 |
| Pest Control - Dormant Spray | | 23 | 74 | 74 | 74 | 74 |
| Pest Control - Delay Dormant Spray | | | | | 27 | 27 |
| Pest Control - Gophers | 8 | 8 | 8 | 8 | 8 | 8 |
| Pest Control - Bud break Spray | | | | | 30 | 30 |
| Pest Control - Pear Scab Sprays | | | | | 37 | 37 |
| Pest Control - Fire Blight | | | 96 | 215 | 215 | 215 |
| Pest Control - Fire Blight & Pear Scab Sprays | | | | | 123 | 139 |
| Pest Control - Cover Sprays, Codling Moth | | | | | 111 | 111 |
| Pest Control - Psylla & Mite Sprays | | | | | 235 | 235 |
| Pest Control - Codling Moth Traps | | | | | 2 | 2 |
| Fruit Sizing - Hormone Spray | | | | | 31 | 31 |
| Irrigate | 153 | 153 | 176 | 176 | 149 | 149 |
| Frost Protection 18X | | | | | 84 | 84 |
| PCA Fees | | | 35 | 35 | 35 | 35 |
| Leaf Analysis | | | | 16 | 15 | 15 |
| Pickup Truck Use | 84 | 84 | 84 | 84 | 84 | 84 |
| ATV Use | 71 | 71 | 71 | 71 | 71 | 71 |
| TOTAL CULTURAL COSTS | 420 | 548 | 951 | 1,377 | 2,251 | 2,267 |
| Harvest Costs: | | | | | | |
| Pick Fruit | | | | | 250 | 420 |
| Haul to Shed | | | | | 32 | 55 |
| Sort/Pack/Store/Sell Fruit | | | | | 605 | 1,067 |
| TOTAL HARVEST COSTS | 0 | 0 | 0 | 0 | 887 | 1,542 |
| Postharvest: | | | | | | |
| Irrigate | | | | | 27 | 27 |
| Pest Control - Postharvest Oil | | | | | 23 | 23 |
| TOTAL POSTHARVEST COSTS | 0 | 0 | 0 | 0 | 50 | 50 |
| Assessments: | | | | | | |
| California Pear Advisory Board | | | | | 38 | 68 |
| California Pear Growers | | | | | 5 | 6 |
| TOTAL ASSESSMENT COSTS | 0 | 0 | 0 | 0 | 43 | 74 |
| Interest On Operating Capital @ 7.14% | 303 | 14 | 24 | 29 | 53 | 61 |
| TOTAL OPERATING COSTS/ACRE | 4,951 | 593 | 975 | 1,406 | 3,284 | 3,994 |

UC COOPERATIVE EXTENSION
Table 1. continued

| Year: | Cost Per Acre | | | | | |
|--|---------------|--------------|--------------|---------------|---------------|---------------|
| | 1st | 2nd | 3rd | 4th | 5th | 6th |
| Tons Per Acre: | | | | | 4.0 | 7.0 |
| Cash Overhead Costs: | | | | | | |
| Office Expense | 44 | 44 | 44 | 44 | 44 | 44 |
| Sanitation Fees | 13 | 13 | 4 | 13 | 13 | 13 |
| Liability Insurance | 7 | 7 | 7 | 7 | 7 | 7 |
| Property Taxes | 108 | 105 | 107 | 107 | 109 | 111 |
| Property Insurance | 15 | 13 | 14 | 14 | 16 | 17 |
| Investment Repairs | 86 | 86 | 89 | 86 | 87 | 87 |
| TOTAL CASH OVERHEAD COSTS | 273 | 268 | 265 | 271 | 276 | 279 |
| TOTAL CASH COSTS/ACRE | 5,224 | 861 | 1,240 | 1,677 | 3,560 | 4,273 |
| INCOME/ACRE FROM PRODUCTION | 0 | 0 | 0 | 0 | 1,422 | 2,488 |
| NET CASH COSTS/ACRE FOR THE YEAR | 5,224 | 861 | 1,240 | 1,677 | 2,138 | 1,785 |
| ACCUMULATED NET CASH COSTS/ACRE | 5,224 | 6,085 | 7,325 | 9,002 | 11,141 | 12,925 |
| Capital Recovery Cost: (Non-Cash Overhead) | | | | | | |
| Shop Building | 57 | 57 | 57 | 57 | 57 | 57 |
| Worker Housing | 10 | 10 | 10 | 10 | 10 | 10 |
| Fuel Tank & Pump | 4 | 4 | 4 | 4 | 4 | 4 |
| Shop Tools | 17 | 17 | 17 | 17 | 17 | 17 |
| Sprinkler Irrigation System | 152 | 152 | 152 | 152 | 152 | 152 |
| Deer Fence - Electric | 32 | 32 | 32 | 32 | 32 | 32 |
| Ladders - 16 Each | | | | | 4 | 4 |
| Land | 536 | 536 | 536 | 536 | 536 | 536 |
| Equipment | 112 | 52 | 62 | 81 | 120 | 146 |
| TOTAL CAPITAL RECOVERY COSTS | 920 | 860 | 870 | 889 | 932 | 958 |
| TOTAL COST/ACRE FOR THE YEAR | 6,144 | 1,721 | 2,110 | 2,566 | 4,492 | 5,231 |
| INCOME/ACRE FROM PRODUCTION | 0 | 0 | 0 | 0 | 1,422 | 2,488 |
| TOTAL NET COST/ACRE FOR THE YEAR | 6,144 | 1,721 | 2,110 | 2,566 | 3,070 | 2,743 |
| TOTAL ACCUMULATED NET COST/ACRE | 6,144 | 7,865 | 9,975 | 12,541 | 15,612 | 18,354 |

UC COOPERATIVE EXTENSION
Table 2. COSTS PER ACRE to PRODUCE PEARS
 NORTH COAST REGION - Lake and Mendocino Counties 2003

| Operation | Cash and Labor Cost per acre | | | | | | Total Cost | Your Cost |
|---------------------------------------|------------------------------|------------|----------------------|---------------|--------------|--------------|------------|-----------|
| | Operation Time (Hrs/A) | Labor Cost | Fuel, Lube & Repairs | Material Cost | Custom/Rent | Total Cost | | |
| Cultural: | | | | | | | | |
| Pest Control - Dormant | 0.28 | 4 | 2 | 25 | 0 | 32 | | |
| Pest Control - Delayed Dormant | 0.28 | 4 | 2 | 13 | 0 | 19 | | |
| Weed Control - Strip Spray 3X | 0.53 | 8 | 3 | 63 | 0 | 75 | | |
| Pest Control - Gophers 3X | 0.20 | 3 | 1 | 4 | 0 | 8 | | |
| Weed Control - Mow Middles 7X | 2.52 | 39 | 21 | 0 | 0 | 61 | | |
| Pest Control - Scab | 0.55 | 9 | 5 | 60 | 0 | 73 | | |
| Frost Protection | 1.54 | 16 | 0 | 68 | 0 | 84 | | |
| Pest Control - Blight | 1.24 | 19 | 11 | 160 | 0 | 190 | | |
| Pest Control - Blight & Scab | 0.55 | 9 | 5 | 152 | 0 | 165 | | |
| Prune Trees | 0.00 | 0 | 0 | 0 | 819 | 819 | | |
| Pest Control - Blight & Cover | 0.28 | 4 | 2 | 73 | 0 | 80 | | |
| Pest Control - Cover Spray | 0.83 | 13 | 7 | 129 | 0 | 149 | | |
| Irrigate | 3.00 | 32 | 0 | 65 | 0 | 96 | | |
| Fertilize - Nitrogen | 0.00 | 0 | 0 | 27 | 0 | 27 | | |
| Pest Control - Psylla & Mites | 0.83 | 13 | 7 | 282 | 0 | 302 | | |
| Apply Hormone | 0.28 | 4 | 2 | 24 | 0 | 31 | | |
| PCA Fees | 0.00 | 0 | 0 | 0 | 35 | 35 | | |
| Leaf Analysis | 0.00 | 0 | 0 | 0 | 19 | 19 | | |
| Pickup Truck Use | 3.80 | 60 | 24 | 0 | 0 | 84 | | |
| ATV Use | 3.80 | 60 | 11 | 0 | 0 | 71 | | |
| TOTAL CULTURAL COSTS | 20.47 | 297 | 105 | 1,144 | 873 | 2,419 | | |
| Harvest: | | | | | | | | |
| Harvest Fruit - 1st Pick | 0.32 | 10 | 3 | 0 | 340 | 353 | | |
| Harvest Fruit - 2nd Pick | 0.64 | 20 | 7 | 0 | 689 | 716 | | |
| Haul To Packinghouse | 5.72 | 90 | 69 | 0 | 0 | 158 | | |
| TOTAL HARVEST COSTS | 6.68 | 120 | 79 | 0 | 1,029 | 1,228 | | |
| Packing: | | | | | | | | |
| Sort/Pack/Sell Fruit | 0.00 | 0 | 0 | 0 | 3,395 | 3,395 | | |
| TOTAL PACKING COSTS | 0.00 | 0 | 0 | 0 | 3,395 | 3,395 | | |
| Assessment: | | | | | | | | |
| California Pear Advisory Board | 0.00 | 0 | 0 | 196 | 0 | 196 | | |
| California Pear Growers | 0.00 | 0 | 0 | 23 | 0 | 23 | | |
| TOTAL ASSESSMENT COSTS | 0.00 | 0 | 0 | 219 | 0 | 219 | | |
| Postharvest: | | | | | | | | |
| Irrigate | 3.00 | 32 | 0 | 48 | 0 | 80 | | |
| Fertilize - Nitrogen | 0.00 | 0 | 0 | 27 | 0 | 27 | | |
| Pest Control - Psylla & Mites | 0.28 | 4 | 3 | 13 | 0 | 19 | | |
| TOTAL POSTHARVEST COSTS | 3.28 | 36 | 2 | 88 | 0 | 127 | | |
| Interest on operating capital @ 7.14% | | | | | | 104 | | |
| TOTAL OPERATING COSTS/ACRE | | 453 | 187 | 1,451 | 5,297 | 7,492 | | |
| TOTAL OPERATING COSTS/TON | | | | | | 375 | | |

UC COOPERATIVE EXTENSION
Table 2 continued

| | Total | Your | |
|--------------------------------------|---------------|------------------|--------------|
| | Cost | Cost | |
| CASH OVERHEAD: | | | |
| Office Expense | 44 | | |
| Liability Insurance | 7 | | |
| Sanitation Fee | 13 | | |
| Property Taxes | 167 | | |
| Property Insurance | 55 | | |
| Investment Repairs | 77 | | |
| TOTAL CASH OVERHEAD COSTS | 363 | | |
| TOTAL CASH COSTS/ACRE | 7,855 | | |
| TOTAL CASH COSTS/TON | 393 | | |
| NON-CASH OVERHEAD: | | | |
| | Per producing | Annual Cost | |
| Investment | Acre | Capital Recovery | |
| Buildings | 638 | 57 | 57 |
| Worker Housing | 117 | 10 | 10 |
| Fuel Tanks –Above Ground | 50 | 4 | 4 |
| Shop Tools | 171 | 17 | 17 |
| Sprinkler System | 1,894 | 152 | 152 |
| Ladders - 16 Each | 31 | 4 | 4 |
| Land | 8,571 | 536 | 536 |
| Pear Establishment | 11,141 | 699 | 699 |
| Equipment | 1,793 | 213 | 213 |
| TOTAL NON-CASH OVERHEAD COSTS | 24,408 | 1,692 | 1,692 |
| TOTAL COSTS/ACRE | | | 9,547 |
| TOTAL COSTS/TON | | | 477 |

UC COOPERATIVE EXTENSION
Table 3. COSTS AND RETURNS PER ACRE to PRODUCE PEARS
 NORTH COAST REGION - 2003

| | Quantity/ Acre | Unit | Price or Cost/Unit | Value or Cost/Acre | Your Cost |
|---|-------------------|------------|-----------------------|-----------------------|--------------|
| GROSS RETURNS | | | | | |
| Fresh | 8.40 | ton | 622.00 | 5,225 | |
| Processed/Unrestricted | 8.00 | ton | 213.00 | 1,704 | |
| Off-Grades/Restricted | 3.60 | ton | 50.00 | 180 | |
| TOTAL GROSS RETURNS | 20.00 | ton | | 7,109 | |
| OPERATING COSTS | | | | | |
| Insecticide: | | | | | |
| Dormant Oil Plus | 8.00 | gal | 3.15 | 25 | |
| 415 Oil | 11.00 | gal | 3.19 | 35 | |
| Guthion 50W | 9.00 | lb | 12.50 | 113 | |
| Imidan 70WSB | 6.00 | lb | 9.00 | 54 | |
| Agri-Mek | 36.00 | oz | 7.57 | 273 | |
| Herbicide: | | | | | |
| Gramoxone Extra | 2.00 | pint | 5.73 | 6 | |
| Goal 2XL | 2.00 | pint | 16.68 | 33 | |
| Roundup Ultra Max | 2.60 | pint | 9.20 | 24 | |
| Rodenticide: | | | | | |
| Rodent Bait | 1.00 | lb | 3.59 | 4 | |
| Fungicide: | | | | | |
| Ziram WDG 76 | 8.00 | lb | 3.39 | 27 | |
| Flint | 5.00 | oz | 12.99 | 65 | |
| Syllit 65W | 3.00 | lb | 16.19 | 49 | |
| Water: | | | | | |
| Water - Frost Protection | 18.00 | acin | 3.76 | 68 | |
| Water - Pumped | 30.00 | acin | 3.76 | 113 | |
| Antibiotic: | | | | | |
| Mycoshield | 7.50 | lb | 22.79 | 171 | |
| Agri-mycin 17 | 60.00 | oz | 1.59 | 95 | |
| Contract: | | | | | |
| Pruning Crew | 182.00 | tree | 4.50 | 819 | |
| Hand Pick | 20.00 | ton | 50.00 | 1,000 | |
| PCA Fees | 1.00 | acre | 35.00 | 35 | |
| Leaf Analysis | 1.00 | acre | 18.50 | 19 | |
| Fertilizer: | | | | | |
| 46-0-0 (Urea) | 200.00 | lb N | 0.27 | 54 | |
| Growth Regulator: | | | | | |
| Liqui-Stik | 24.00 | oz | 1.00 | 24 | |
| Rent: | | | | | |
| Forklift Rental | 2.00 | acwk | 14.50 | 29 | |
| Custom: | | | | | |
| 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 | 32.00 | 371 | |
| Assessment: | | | | | |
| CA Fresh Advisory Board Fresh Market | 467.00 | box | 0.34 | 159 | |
| CA Pear Advisory Board Processed - Unrestricted | 8.00 | ton | 4.00 | 32 | |
| CA Pear Advisory Board Processed - Restricted | 3.60 | ton | 1.50 | 5 | |
| CA Pear Growers | 11.60 | ton | 2.00 | 23 | |
| Labor (machine) | 28.62 | hrs | 13.05 | 373 | |
| Labor (non-machine) | 7.54 | hrs | 10.51 | 79 | |
| Fuel - Gas | 13.68 | gal | 1.58 | 22 | |
| Fuel - Diesel | 67.02 | gal | 1.11 | 74 | |
| Lube | | | | 14 | |
| Machinery repair | | | | 76 | |
| Interest on operating capital @ 7.14% | | | | 104 | |
| TOTAL OPERATING COSTS/ACRE | | | | 7,492 | |
| TOTAL OPERATING COSTS/TON | | | | 375 | |
| NET RETURNS ABOVE OPERATING COSTS | | | | -383 | |

UC COOPERATIVE EXTENSION
Table 3 continued

| | Quantity/ Acre | Unit | Price or Cost/Unit | Value or Cost/Acre | Your Cost |
|--|-------------------|------|-----------------------|-----------------------|--------------|
| CASH OVERHEAD COSTS: | | | | 44 | |
| Office Expense | | | | 7 | |
| Liability Insurance | | | | 13 | |
| Sanitation Fee | | | | 167 | |
| Property Taxes | | | | 55 | |
| Property Insurance | | | | 77 | |
| Investment Repairs | | | | 363 | |
| TOTAL CASH OVERHEAD COSTS/ACRE | | | | 7,855 | |
| TOTAL CASH COSTS/ACRE | | | | 393 | |
| TOTAL CASH COSTS/TON | | | | 44 | |
| NON-CASH OVERHEAD COSTS (capital recovery) | | | | | |
| Buildings | | | | 57 | |
| Worker Housing | | | | 10 | |
| Fuel Tanks & Pumps | | | | 4 | |
| Shop Tools | | | | 17 | |
| Sprinkler System | | | | 152 | |
| Ladders - 16 Each | | | | 4 | |
| Land | | | | 536 | |
| Pear Establishment | | | | 699 | |
| Equipment | | | | 214 | |
| TOTAL NON-CASH OVERHEAD COSTS/ACRE | | | | 1,692 | |
| TOTAL COSTS/ACRE | | | | 9,547 | |
| TOTAL COSTS/TON | | | | 477 | |
| NET RETURNS ABOVE TOTAL COSTS | | | | -2,438 | |

U.C. COOPERATIVE EXTENSION
Table 4. MONTHLY CASH COSTS PER ACRE to PRODUCE PEARS
 NORTH COAST REGION - Lake and Mendocino Counties 2003

| Beginning JAN 03 | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP | OCT | NOV | DEC | TOTAL |
|-----------------------------------|--------------|------------|------------|------------|------------|------------|------------|--------------|------------|-----------|-----------|-----------|--------------|
| Ending DEC 03 | 03 | 03 | 03 | 03 | 03 | 03 | 03 | 03 | 03 | 03 | 03 | 03 | |
| Cultural: | | | | | | | | | | | | | |
| Prune Trees | 819 | | | | | | | | | | | | 819 |
| Pest Control - Dormant | 32 | | | | | | | | | | | | 32 |
| Pest Control - Delayed Dormant | | 19 | | | | | | | | | | | 19 |
| Weed Control - Strip Spray 3X | | 54 | | 11 | | | 10 | | | | | | 75 |
| Pest Control - Gophers 3X | | | 8 | | | | | | | | | | 8 |
| Weed Control - Mow Middle 7X | | | 9 | 9 | 9 | 17 | 17 | | | | | | 61 |
| Pest Control - Scab | | | 73 | | | | | | | | | | 73 |
| Frost Protection | | | | 42 | 42 | | | | | | | | 84 |
| Pest Control - Blight | | | | 106 | 84 | | | | | | | | 190 |
| Pest Control - Blight & Scab | | | | 75 | 91 | | | | | | | | 165 |
| Pest Control - Blight & Cover | | | | | 80 | | | | | | | | 80 |
| Pest Control - Cover Spray | | | | | | 88 | 61 | | | | | | 149 |
| Irrigate | | | | | | 48 | 48 | | | | | | 96 |
| Fertilize - Nitrogen | | | | | | 27 | | | | | | | 27 |
| Pest Control - Psylla & Mites | | | | 101 | | 101 | 101 | | | | | | 302 |
| Apply Hormone | | | | | | | | 31 | | | | | 31 |
| PCA Fees | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | | | | 35 |
| Leaf Analysis | | | | | | | 19 | | | | | | 19 |
| Pickup Truck Use | 7 | 7 | 7 | 7 | 7 | 7 | 7 | 7 | 7 | 7 | 7 | 7 | 84 |
| ATV Use | 6 | 6 | 6 | 6 | 6 | 6 | 6 | 6 | 6 | 6 | 6 | 6 | 71 |
| TOTAL CULTURAL COSTS | 868 | 90 | 107 | 361 | 323 | 298 | 273 | 48 | 17 | 13 | 13 | 13 | 2,419 |
| Harvest: | | | | | | | | | | | | | |
| Harvest Fruit - 1st Pick | | | | | | | | 353 | | | | | 353 |
| Harvest Fruit - 2nd Pick | | | | | | | | 716 | | | | | 716 |
| Haul To Packinghouse | | | | | | | | 158 | | | | | 158 |
| TOTAL HARVEST COSTS | | | | | | | | 1,228 | | | | | 1,228 |
| Packing: | | | | | | | | | | | | | |
| Sort/Pack/Sell Fruit | | | | | | | | 3,395 | | | | | 3,395 |
| TOTAL PACKING COSTS | | | | | | | | 3,395 | | | | | 3,395 |
| Assessment: | | | | | | | | | | | | | |
| California Pear Advisory | | | | | | | | 196 | | | | | 196 |
| California Pear Growers | | | | | | | | 23 | | | | | 23 |
| TOTAL ASSESSMENT COSTS | | | | | | | | 219 | | | | | 219 |
| Postharvest: | | | | | | | | | | | | | |
| Irrigate | | | | | | | | 53 | 27 | | | | 80 |
| Fertilize - Nitrogen | | | | | | | | | 27 | | | | 27 |
| Pest Control - Psylla & Mites | | | | | | | | | 19 | | | | 19 |
| TOTAL POSTHARVEST COSTS | | | | | | | | 53 | 73 | | | | 127 |
| Interest on operating capital | 5 | 6 | 6 | 8 | 10 | 12 | 14 | 43 | -1 | 0 | 0 | 0 | 104 |
| TOTAL OPERATING COSTS/ACRE | 873 | 96 | 113 | 369 | 333 | 310 | 285 | 4,986 | 90 | 13 | 13 | 13 | 7,492 |
| TOTAL OPERATING COSTS/TON | 44 | 5 | 6 | 18 | 17 | 16 | 14 | 249 | 5 | 1 | 1 | 1 | 375 |
| OVERHEAD: | | | | | | | | | | | | | |
| Office Expense | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 4 | 44 |
| Liability Insurance | 7 | | | | | | | | | | | | 7 |
| Sanitation Fee | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | | | | 13 |
| Property Taxes | 84 | | | | | | 84 | | | | | | 167 |
| Property Insurance | 28 | | | | | | 28 | | | | | | 55 |
| Investment Repairs | 6 | 6 | 6 | 6 | 6 | 6 | 6 | 6 | 6 | 6 | 6 | 6 | 77 |
| TOTAL CASH OVERHEAD COSTS | 130 | 12 | 12 | 12 | 12 | 12 | 123 | 12 | 12 | 10 | 10 | 10 | 363 |
| TOTAL CASH COSTS/ACRE | 1,002 | 107 | 125 | 380 | 345 | 321 | 407 | 4,998 | 101 | 23 | 23 | 23 | 7,855 |
| TOTAL CASH COSTS/TON | 50 | 5 | 6 | 19 | 17 | 16 | 20 | 250 | 5 | 1 | 1 | 1 | 393 |

UC COOPERATIVE EXTENSION

**Table 5. WHOLE FARM ANNUAL EQUIPMENT, INVESTMENT,
and BUSINESS OVERHEAD COSTS**
NORTH COAST REGION – Lake/Mendocino Counties 2003

ANNUAL EQUIPMENT COSTS

| Yr | Description | Price | Yrs Life | Salvage Value | Capital Recovery | Cash Overhead | | Total |
|-------------------------|--------------------------|----------------|-------------|------------------|---------------------|----------------|--------------|---------------|
| | | | | | | Insur- ance | Taxes | |
| 03 | 3 Point Forks #1 | 670 | 15 | 64 | 67 | 2 | 4 | 74 |
| 03 | 3 Point Forks #2 | 670 | 15 | 64 | 67 | 2 | 4 | 74 |
| 03 | 55 HP 2WD Tractor #2 | 32,269 | 12 | 8,068 | 3,431 | 136 | 202 | 3,769 |
| 03 | 55 HP 2WD Tractor #1 | 32,269 | 12 | 8,068 | 3,431 | 136 | 202 | 3,769 |
| 03 | ATV 4WD | 7,430 | 7 | 2,818 | 810 | 35 | 51 | 896 |
| 03 | Bait Applicator | 1,046 | 10 | 185 | 130 | 4 | 6 | 140 |
| 03 | Mower - Flail 9' | 7,372 | 10 | 1,304 | 916 | 29 | 43 | 988 |
| 03 | Orchard Sprayer 500 G #1 | 19,741 | 10 | 3,491 | 2,452 | 79 | 116 | 2,647 |
| 03 | Orchard Sprayer 500 G #2 | 19,741 | 10 | 3,491 | 2,452 | 79 | 116 | 2,647 |
| 03 | Pickup Truck 1/2 T | 24,500 | 7 | 994 | 3,329 | 114 | 169 | 3,612 |
| 03 | Truck - 10 Ton | 41,827 | 10 | 12,355 | 4,824 | 183 | 271 | 5,278 |
| 03 | Weed Sprayer 100 G | 3,947 | 10 | 698 | 490 | 16 | 23 | 529 |
| TOTAL | | 191,482 | 0 | 49,900 | 22,400 | 816 | 1,207 | 24,423 |
| 60% of New Cost* | | 114,889 | 0 | 29,940 | 13,440 | 490 | 724 | 14,654 |

*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 | |
| INVESTMENT | | | | | | | | |
| Buildings | 44,693 | 20 | | 3,976 | 151 | 223 | 894 | 5,245 |
| Fuel Tanks & Pumps | 3,500 | 25 | 350 | 274 | 13 | 19 | 70 | 376 |
| Ladders - 16 Each | 2,196 | 10 | 220 | 285 | 8 | 12 | 44 | 350 |
| Land | 600,000 | 95 | 600,000 | 37,500 | 0 | 6,000 | 0 | 43,500 |
| Pear Establishment | 278,525 | 95 | | 17,463 | 941 | 1,393 | 0 | 19,797 |
| Shop Tools | 12,000 | 15 | 1,133 | 1,208 | 44 | 66 | 240 | 1,558 |
| Sprinkler System | 132,555 | 25 | | 10,617 | 448 | 663 | 3,973 | 15,701 |
| Worker Housing | 8,217 | 20 | | 731 | 28 | 41 | 164 | 964 |
| TOTAL INVESTMENT | 1,081,686 | | 601,703 | 72,054 | 1,633 | 8,417 | 5,385 | 87,491 |

ANNUAL BUSINESS OVERHEAD COSTS

| Description | Units/ Farm | Unit | Price/ Unit | Total Cost |
|---------------------|----------------|------|----------------|---------------|
| Liability Insurance | 70 | Acre | 7.37 | 516 |
| Office Expense | 70 | Acre | 44.00 | 3,080 |
| Sanitation Fee | 70 | Acre | 13.37 | 936 |

UC COOPERATIVE EXTENSION
Table 6. HOURLY EQUIPMENT COSTS
 NORTH COAST REGION – Lake/Mendocino Counties 2003

| Yr | Description | COSTS PER HOUR | | | | | | | | |
|----|--------------------------|-------------------------|---------------------|----------------|-------|-----------|----------------|-------|----------------|--------------------|
| | | Actual Hours Used | Cash Overhead | | | Operating | | | Total Oper. | Total Costs/Hr. |
| | | | Capital Recovery | Insur- ance | Taxes | Repairs | Fuel & Lube | | | |
| 03 | 3 Point Forks #1 | 72.00 | 0.56 | 0.02 | 0.03 | 0.10 | 0.00 | 0.10 | 0.71 | |
| 03 | 3 Point Forks #2 | 72.00 | 0.56 | 0.02 | 0.03 | 0.10 | 0.00 | 0.10 | 0.71 | |
| 03 | 55 HP 2WD Tractor #2 | 526.40 | 3.91 | 0.16 | 0.23 | 1.43 | 3.45 | 4.88 | 9.18 | |
| 03 | 55 HP 2WD Tractor #1 | 863.20 | 2.38 | 0.09 | 0.14 | 1.43 | 3.45 | 4.88 | 7.50 | |
| 03 | ATV 4WD | 294.50 | 1.65 | 0.07 | 0.10 | 0.89 | 1.82 | 2.71 | 4.54 | |
| 03 | Bait Applicator | 15.00 | 5.20 | 0.17 | 0.25 | 0.40 | 0.00 | 0.40 | 6.01 | |
| 03 | Mower - Flail 9' | 201.00 | 2.73 | 0.09 | 0.13 | 3.05 | 0.00 | 3.05 | 6.00 | |
| 03 | Orchard Sprayer 500 G #1 | 171.70 | 8.57 | 0.27 | 0.41 | 3.34 | 0.00 | 3.34 | 12.59 | |
| 03 | Orchard Sprayer 500 G #2 | 84.40 | 17.43 | 0.56 | 0.83 | 3.34 | 0.00 | 3.34 | 22.16 | |
| 03 | Pickup Truck 1/2 T | 285.00 | 7.01 | 0.24 | 0.36 | 1.79 | 4.54 | 6.33 | 13.94 | |
| 03 | Truck - 10 Ton | 203.00 | 14.26 | 0.54 | 0.80 | 4.00 | 7.98 | 11.98 | 27.58 | |
| 03 | Weed Sprayer 100 G | 39.20 | 7.50 | 0.24 | 0.36 | 1.06 | 0.00 | 1.06 | 9.16 | |

UC COOPERATIVE EXTENSION
Table 7. RANGING ANALYSIS
 NORTH COAST REGION – Lake/Mendocino Counties 2003

COSTS PER ACRE AT VARYING YIELD TO PRODUCE PEARS

| | TOTAL YIELD (tons/acre) | | | | | | |
|-------------------------------------|-------------------------|--------------|--------------|---------------|---------------|---------------|---------------|
| | 16.00 | 18.00 | 20.00 | 22.00 | 24.00 | 26.00 | 28.00 |
| OPERATING COSTS/ACRE: | | | | | | | |
| Cultural Cost | 2,419 | 2,419 | 2,419 | 2,419 | 2,419 | 2,419 | 2,419 |
| Harvest Cost | 993 | 1,110 | 1,228 | 1,345 | 1,462 | 1,579 | 1,696 |
| Postharvest Cost | 127 | 127 | 127 | 127 | 127 | 127 | 127 |
| Packing Cost | 2,716 | 3,056 | 3,395 | 3,735 | 4,074 | 4,414 | 4,753 |
| Assessment Cost | 176 | 197 | 219 | 241 | 263 | 285 | 307 |
| Interest on operating capital | 98 | 101 | 104 | 107 | 110 | 113 | 115 |
| TOTAL OPERATING COSTS/ACRE | 6,529 | 7,010 | 7,492 | 7,974 | 8,455 | 8,937 | 9,417 |
| TOTAL OPERATING COSTS/TON | 408 | 389 | 375 | 362 | 352 | 344 | 336 |
| CASH OVERHEAD COSTS/ACRE | 363 | 363 | 364 | 364 | 364 | 364 | 364 |
| TOTAL CASH COSTS/ACRE | 6,892 | 7,373 | 7,856 | 8,338 | 8,819 | 9,301 | 9,781 |
| TOTAL CASH COSTS/TON | 431 | 410 | 393 | 379 | 367 | 358 | 349 |
| NON-CASH OVERHEAD COSTS/ACRE | 1,685 | 1,689 | 1,691 | 1,694 | 1,696 | 1,698 | 1,700 |
| TOTAL COSTS/ACRE | 8,577 | 9,062 | 9,547 | 10,032 | 10,515 | 10,999 | 11,481 |
| TOTAL COSTS/TON | 536 | 503 | 477 | 456 | 438 | 423 | 410 |

UC COOPERATIVE EXTENSION
Table 7 continued

NET RETURNS PER ACRE ABOVE OPERATING COSTS

| PRICE (\$/ton) | | | YIELD (tons/acre) | | | | | | |
|----------------|---------------|--------------|-------------------|--------|-------------|--------|--------|--------|--------|
| Fresh | Processing | Off-Grades | 6.72 | 7.56 | 8.40 | 9.24 | 10.08 | 10.92 | 11.76 |
| | | | 6.40 | 7.20 | 8.00 | 8.80 | 9.60 | 10.40 | 11.20 |
| | | | 2.88 | 3.24 | 3.60 | 3.96 | 4.32 | 4.68 | 5.04 |
| 472.00 | 183.00 | 35.00 | -2,085 | -2,011 | -1,937 | -1,864 | -1,789 | -1,716 | -1,640 |
| 522.00 | 193.00 | 40.00 | -1,671 | -1,544 | -1,419 | -1,294 | -1,168 | -1,042 | -915 |
| 572.00 | 203.00 | 45.00 | -1,256 | -1,078 | -901 | -724 | -546 | -369 | -190 |
| 622.00 | 213.00 | 50.00 | -842 | -612 | -383 | -154 | 76 | 304 | 535 |
| 672.00 | 223.00 | 55.00 | -428 | -146 | 135 | 415 | 697 | 978 | 1,261 |
| 722.00 | 233.00 | 60.00 | -13 | 320 | 653 | 985 | 1,319 | 1,651 | 1,986 |
| 772.00 | 243.00 | 65.00 | 401 | 787 | 1,171 | 1,555 | 1,940 | 2,325 | 2,711 |

NET RETURNS PER ACRE ABOVE CASH COSTS

| PRICE (\$/ton) | | | YIELD (tons/acre) | | | | | | |
|----------------|---------------|--------------|-------------------|--------|-------------|--------|--------|--------|--------|
| Fresh | Processing | Off-Grades | 6.72 | 7.56 | 8.40 | 9.24 | 10.08 | 10.92 | 11.76 |
| | | | 6.40 | 7.20 | 8.00 | 8.80 | 9.60 | 10.40 | 11.20 |
| | | | 2.88 | 3.24 | 3.60 | 3.96 | 4.32 | 4.68 | 5.04 |
| 472.00 | 183.00 | 35.00 | -2,448 | -2,374 | -2,301 | -2,228 | -2,153 | -2,080 | -2,004 |
| 522.00 | 193.00 | 40.00 | -2,034 | -1,907 | -1,783 | -1,658 | -1,532 | -1,406 | -1,279 |
| 572.00 | 203.00 | 45.00 | -1,619 | -1,441 | -1,265 | -1,088 | -910 | -733 | -554 |
| 622.00 | 213.00 | 50.00 | -1,205 | -975 | -747 | -518 | -288 | -60 | 171 |
| 672.00 | 223.00 | 55.00 | -791 | -509 | -229 | 51 | 333 | 614 | 897 |
| 722.00 | 233.00 | 60.00 | -376 | -43 | 289 | 621 | 955 | 1,287 | 1,622 |
| 772.00 | 243.00 | 65.00 | 38 | 424 | 807 | 1,191 | 1,576 | 1,961 | 2,347 |

NET RETURNS PER ACRE ABOVE TOTAL COSTS

| PRICE (\$/ton) | | | YIELD (tons/acre) | | | | | | |
|----------------|---------------|--------------|-------------------|--------|-------------|--------|--------|--------|--------|
| Fresh | Processing | Off-Grades | 6.72 | 7.56 | 8.40 | 9.24 | 10.08 | 10.92 | 11.76 |
| | | | 6.40 | 7.20 | 8.00 | 8.80 | 9.60 | 10.40 | 11.20 |
| | | | 2.88 | 3.24 | 3.60 | 3.96 | 4.32 | 4.68 | 5.04 |
| 472.00 | 183.00 | 35.00 | -4,133 | -4,063 | -3,992 | -3,922 | -3,849 | -3,778 | -3,704 |
| 522.00 | 193.00 | 40.00 | -3,719 | -3,596 | -3,474 | -3,352 | -3,228 | -3,104 | -2,979 |
| 572.00 | 203.00 | 45.00 | -3,304 | -3,130 | -2,956 | -2,782 | -2,606 | -2,431 | -2,254 |
| 622.00 | 213.00 | 50.00 | -2,890 | -2,664 | -2,438 | -2,212 | -1,984 | -1,758 | -1,529 |
| 672.00 | 223.00 | 55.00 | -2,476 | -2,198 | -1,920 | -1,643 | -1,363 | -1,084 | -803 |
| 722.00 | 233.00 | 60.00 | -2,061 | -1,732 | -1,402 | -1,073 | -741 | -411 | -78 |
| 772.00 | 243.00 | 65.00 | -1,647 | -1,265 | -884 | -503 | -120 | 263 | 647 |

UC COOPERATIVE EXTENSION
Table 8. OPERATIONS WITH EQUIPMENT AND MATERIALS LISTED
 NORTH COAST REGION - Lake and Mendocino Counties 2003

| Operation | Operation Month | Equipment | | Material | Rate/acre | Unit |
|--------------------------------|------------------------------|-----------|------------------|-------------------|------------|------|
| | | Tractor | Implement | | | |
| Pest Control - Dormant | January | 55HP 2WD | Orchard Sprayer | Dormant Oil | 8.00 | gal |
| Pest Control - Delayed Dormant | February | 55HP 2WD | Orchard Sprayer | 415 Oil | 4.00 | gal |
| Weed Control - Strip Spray 3X | February | 55HP 2WD | Weed Sprayer | Roundup Ultra Max | 1.80 | pt |
| | April | 55HP 2WD | Weed Sprayer | Roundup Ultra Max | 0.80 | pt |
| | July | 55HP 2WD | Weed Sprayer | Gramoxone Extra | 1.00 | pt |
| Pest Control - Gophers 3X | March | 55HP 2WD | Bait Applicator | Rodent Bait | 1.00 | lb |
| Weed Control - Mow Middles 7X | March | 55HP 2WD | Mower - Flail 9' | | | |
| | April | 55HP 2WD | Mower - Flail 9' | | | |
| | May | 55HP 2WD | Mower - Flail 9' | | | |
| | June | 55HP 2WD | Mower - Flail 9' | | | |
| | July | 55HP 2WD | Mower - Flail 9' | | | |
| Pest Control - Scab | March | 55HP 2WD | Orchard Sprayer | Ziram | 8.00 | lb |
| | March | 55HP 2WD | Orchard Sprayer | Flint | 2.50 | oz |
| Frost Protection | April | | | Water | 9.00 | acin |
| | May | | | Water | 9.00 | acin |
| Pest Control - Blight | April | 55HP 2WD | Orchard Sprayer | Mycoshield | 0.50 | lb |
| | | | | Agri-mycin | 4.00 | oz |
| | April | 55HP 2WD | Orchard Sprayer | Mycoshield | 0.50 | lb |
| | | | | Agri-mycin | 4.00 | oz |
| | April | 55HP 2WD | Orchard Sprayer | Mycoshield | 0.50 | lb |
| | | | | Agri-mycin | 4.00 | oz |
| | April | 55HP 2WD | Orchard Sprayer | Mycoshield | 0.50 | lb |
| | | | | Agri-mycin | 4.00 | oz |
| | May | 55HP 2WD | Orchard Sprayer | Mycoshield | 0.50 | lb |
| | | | | Agri-mycin | 4.00 | oz |
| | May | 55HP 2WD | Orchard Sprayer | Mycoshield | 0.50 | lb |
| | | | | Agri-mycin | 4.00 | oz |
| | May | 55HP 2WD | Orchard Sprayer | Mycoshield | 0.50 | lb |
| | | | | Agri-mycin | 4.00 | oz |
| | Pest Control - Blight & Scab | April | 55HP 2WD | Orchard Sprayer | Mycoshield | 1.00 |
| | | | | Agri-mycin | 8.00 | oz |
| | | | | Flint | 2.50 | oz |
| May | | 55HP 2WD | Orchard Sprayer | Mycoshield | 1.00 | lb |
| | | | | Agri-mycin | 8.00 | oz |
| | | | | Syllit | 3.00 | lb |
| Prune Trees | January | | | Labor | | |
| Pest Control - Blight & Cover | May | 55HP 2WD | Orchard Sprayer | Mycoshield | 1.00 | lb |
| | | | | Agri-mycin | 8.00 | oz |
| | | | | Guthion | 3.00 | lb |
| Pest Control - Cover Spray | June | 55HP 2WD | Orchard Sprayer | Guthion | 3.00 | lb |
| | June | 55HP 2WD | Orchard Sprayer | Guthion | 3.00 | lb |
| | July | 55HP 2WD | Orchard Sprayer | Imidan | 6.00 | lb |
| Irrigate | June | | | Water | 8.58 | acin |
| | July | | | Water | 8.58 | acin |
| | August | | | Water | 8.58 | acin |
| | September | | | Water | 4.29 | acin |
| Fertilize - Nitrogen | June | | | 46-0-0 | 100.00 | lb N |
| | September | | | 46-0-0 | 100.00 | lb N |

UC COOPERATIVE EXTENSION
Table 8 continued

| Operation | Operation | | Equipment | | Material | Rate/acre | Uni |
|-------------------------------|-----------|----------------|------------------|--|-----------------|-----------|------|
| | Month | Tractor | Implement | | | | |
| Pest Control - 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 | | | | 415 Oil | 4.00 | gal |
| Apply Hormone | August | 55HP 2WD | Orchard Sprayer | | Liqui-Stik | 24.00 | floz |
| Pickup Truck Use | Annual | Pickup 1/2 ton | | | | | |
| ATV Use | Annual | ATV 4WD | | | | | |
| Harvest Fruit - 1st Pick | August | 55HP 2WD | 3 Point Forks | | Contract Labor | | |
| | | 55HP 2WD #2 | 3 Point Forks #2 | | Forklift Rental | 0.67 | acwk |
| Harvest Fruit - 2nd Pick | August | 55HP 2WD | 3 Point Forks | | Contract Labor | | |
| | | 55HP 2WD #2 | 3 Point Forks #2 | | Forklift Rental | 1.33 | acwk |
| Haul To Packinghouse | August | Truck 10 ton | | | | | |