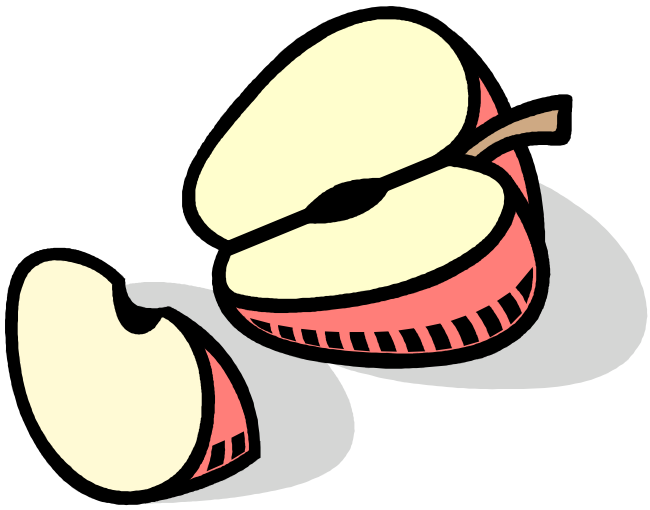
UNIVERSITY OF CALIFORNIA COOPERATIVE EXTENSION

2007

SAMPLE COSTS TO ESTABLISH AND PRODUCE

APPLES

Fuji Variety



INTERMOUNTAIN REGION – EL DORADO COUNTY

Sierra Nevada Foothills

20 acre Homesite with 5 acre orchard

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UNIVERSITY OF CALIFORNIA COOPERATIVE EXTENSION

SAMPLE COSTS TO ESTABLISH AND PRODUCE APPLES
Fuji Apple
Intermountain – El Dorado County 2007

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INTRODUCTION

Sample costs to establish an apple orchard and produce apples in the Intermountain Region – El Dorado County are presented in this study. The study is intended as a guide only, and can be used to make production decisions, determine potential returns, prepare budgets and evaluate production loans. The practices described are based on production procedures considered typical for this crop and area, and will not apply to every farm. Sample costs for labor, materials, equipment and custom services are based on current figures. A blank column, "Your Cost", is provided to enter your costs on Tables 1 and 2.

The hypothetical farm operation, production practices, overhead, and calculations are described under 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 El Dorado County UC Cooperative Extension office.

Sample Cost of Production Studies for many commodities can be downloaded at http://coststudies.ucdavis.edu, requested through the Department of Agricultural and Resource Economics, UC Davis, (530) 752-4424 or obtained from the local county UC Cooperative Extension office. Many archived studies are also available on the website.

ASSUMPTIONS

The following assumptions refer to Tables 1 to 8 and pertain to sample costs to establish an orchard and produce apples in the Intermountain Region, El Dorado County. The cultural practices described and materials used are considered typical for apple production in the region. The costs, practices, and materials will not be applicable to all situations every production year. Cultural practices, materials, and production costs vary by grower and region, and differences can be significant. The practices and inputs used in the cost study 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.*

Land. The orchard, located in the Intermountain (Sierra Nevada Foothills) – El Dorado County, is situated on previously unfarmed land. The farm is comprised of 20 acres, five planted to apples. The other 15 acres with one acre allocated to the orchard are occupied by roads, irrigation systems, farmstead, forest and/or other tree crops. Land is valued at $60,000 per acre. This study assumes that the land was purchased primarily for a homesite and the orchard was planted on the unused acres. The property is located in an easily accessible neighborhood for agritoursim and direct market sales. Agricultural and homesite property located in outlying areas may be less expensive. The orchard is owned and operated by the grower.

Establishment Cultural Practices and Material Inputs

Land Preparation. For many new farms in the area, the land may need to be cleared. The cost will vary depending upon the amount of clearing required. It is assumed that the land is cleared and free of stumps. Operations on the cleared land begin in the fall with the ground being ripped to a depth of three feet by a custom operator. The land is then disked twice by the grower to break up clods and smooth the surface. To prevent soil erosion during the winter, a cover crop of ryegrass is planted by hand. In the early spring of the following year, the cover crop is disked, the field layed out and planted.

Trees. Fuji apple on M106 rootstock with an October harvest is the variety chosen for this study. Varieties in the area are harvested from late August to early November. Varieties grown in the area according to harvest sequence are Galas, Golden Delicious, Red Delicious, Red Rome, Granny Smith, and Fuji. The life of the orchard in this study is assumed to be 25 years.

Planting. The field is layed out ahead of time and then planted in the spring, approximately April. The trees are planted on a 10 x 16 foot spacing (tree x row) with 272 trees per acre. In the second year 5% or 14 trees per acre are replanted for those lost in the first year. Three people spend two 8 hour days on the five acres (9.6 man-hours per acre) to lay out the baselines using a long tape or wire with the tree spacing positions for each tree soldered on the wire. A stake is placed where each tree will be planted. Then two laborers using a notched planting board put stakes in the side pegs of the board, which is on either side of the middle stake (future tree hole), for accurate positioning of the tree. On the day of planting, the middle stake is pulled out and one person on the tractor augers the holes using the side stakes to line up the hole. It takes the tractor operator 4.5 hours per acre to auger the holes. Besides the tractor driver, it takes 20 man hours/acre to plant with two men to plant, one holding the planting board to get the tree in the center of the hole and the other person dropping the fertilizer in the hole and shoveling in the soil.

Training and Pruning. Training is the manipulation (tie down) of branches to develop the tree structure. In this study a central leader system is used, and branches are trained in whorls through the fourth year. Pruning promotes open canopy for light and ensures good fruit wood. In the first year shortly after planting, the trees are headed back with one cut 24 to 32 inches above ground (cut at knee). Pinching or additional pruning may be done throughout the year, but no cost is shown in this study. In January of the second year the trees are trained and pruned to a central leader. First, the trees are pruned and then the lower branches anchored to the ground to form the first whorl. This training and pruning continues through the fourth year after which the trees are pruned to maintain shape and fruit production. When the trees have reached full production, summer pruning is done in addition to the dormant pruning. There are several pruning strategies for apple trees; central, perpendicular V and open vase systems. Choice of pruning is dependent on several factors such as the use of size controlling or normal rootstock, varieties susceptible to sunburn, or high density plantings.

Table A. PRUNE & TRAIN TIMES

Year	Hrs/Acre	Month	Operation (hours)
1	4.25	Apr	Cut at knee
2	39.00	Dec-Feb	Prune (11) + Tie (28)
3	50.00	Dec-Feb	Prune (23) + Tie (27)
4	90.00	Dec-Feb	Prune (45) + Tie (45)
5	55.00	Dec-Feb	Prune (55)
6+	113.00	Dec-Feb	Winter prune (45)
		July	Summer prune (68)

Fertilization. At planting two pounds of triple superphosphate (0-45-0) is placed in the bottom of each hole. A lesser amount is applied to the replants in the second year. Beginning in the fall after harvest (October/November) of the first year, calcium nitrate (15.5-0-0-19Ca) is applied to the orchard every other year. Therefore, one-half the cost of the fertilizer is charged to the orchard each year. In the first year, the fertilizer at 21 pounds of N per acre (10.5 pounds per year) is applied around each tree by hand and beginning in the third year, it is mechanically applied along the tree drip line at 42 pounds of N per acre (21 pounds per year). Also, beginning in the third year Solubor (boron) fertilizer is applied with the March tree row weed spray.

Irrigation. The micro sprinkler irrigation system is custom installed prior to planting the orchard. The trees are irrigated in April shortly after planting and then weekly from late June through September. In the following years the trees are irrigated from mid-June through October (depending on the season) with the amount of water increasing each year. It is assumed that it take one person 0.33 hours per acre per irrigation to irrigate and monitor the system. Water use is highly dependent on location and whether there is a cover crop planted.

Table B. WATER APPLIED

Year	acin
1	10
2	18
3	24
4	30
5+	36

Pest Management. For pest identification, monitoring, management and pesticide information, visit the UC IPM website at www.ipm.ucdavis.edu. Written recommendations are required for many commercially applied pesticides, and are available from licensed pest control advisers (PCAs). For information on pesticide use permits, contact the local county Agricultural Commissioner's office.

Weeds. During the first year, milk cartons are placed around the young trees in May or June to prevent spray damage. The grower using a hand wand sprays one half of one row per pass with Roundup in June and the middles are disked four times from May to August. Also in the first and subsequent years, Roundup and Princep are applied to the tree row during the dormant season (November). Beginning in the second year, the tree row is sprayed mechanically with Roundup in March and June. The middles are mowed four times from May to August. In the third and subsequent years, Solubor (boron fertilizer) is mixed with the March weed spray.

Diseases. The main disease affecting apples grown in the foothills is apple scab, and the number of treatments for scab required each year will depend on the annual rainfall conditions, which are conducive to scab development. A very rainy season may require seven scab sprays, but at least three scab sprays per season are anticipated. Four scab sprays are shown in this cost study. Control begins in the fourth year (or when you expect to have marketable fruit) at green tip with a Dithane spray followed by a second Dithane spray at pinkbud and then different materials are used in rotation to prevent fungicide resistance development. Rally applied at pinkbud (April) and Flint applied at bloom (May), both for scab, will also control mildew. Fuji apples are especially susceptible to blight, so one treatment of Mycoshield (Terramycin) is included with the Flint scab spray at bloom.

Insects. Codling moth is the key insect pest requiring management. Trapping and monitoring is critical for accurate timing of codling moth sprays, which vary depending on the season temperatures. A Pest Control Advisor (PCA) is hired to provide trapping and monitoring information. In this study, we assume a relatively high codling moth population requiring two supplemental sprays for each of three flights. Beginning in the third year, Intrepid is applied in May for the first (1a) flight, followed by an Assail application in June for the 1b flight. From approximately late June to early July, Rimon insecticide is applied for codling moth followed by an Assail spray in July. Supreme Oil is added to the May to July codling moth sprays to prevent possible mite flare-up. Since Fuji apples harvest later than other varieties; it is expected that a third flight of codling moth that needs to be managed. Two applications of Cyd-X insecticidal virus is applied in August for this flight. In the fourth and subsequent years, pheromones are hung by the grower in the orchard in April. The exact number of codling moth treatments will depend on the local codling moth population, the length of time the orchard has been under mating disruption, and the isolation of the orchard from other orchards or backyard trees. Typically the longer an orchard has been using mating disruption the lower the codling moth population and need for additional supplemental treatments. Guthion is to be phased out by the year 2012, therefore no Guthion for codling moth control is included in this cost study; alternative insecticides are used instead.

Table C. INSECT/DISEASE APPLICATIONS

Operation	Month	Year	Material
Insect: Delayed Dormant (aphid, mite, scale)	Mar	4 5 6	Dormant Oil
Disease: Scab (greentip)	Mar	4 5 6	Dithane DF
Insect: Codling Moth	Apr	4 5 6	Pheromone Twin Tube
Disease: Scab (pinkbud)	Apr	4 5 6	Dithane DF
Disease: Mildew and Scab (pink)	Apr	4 5 6	Rally
Insect: Rosey apple aphid (pink to petal fall)	May	4 5 6	Assail
Disease: Scab, Mildew & Blight (bloom)	May	4 5 6	Flint & Mycoshield
Insect: Codling moth	May	3 4 5 6	Intrepid + Supreme oil
Insect: Codling moth	June	3 4 5 6	Assail + Supreme oil
Insect: Codling moth	June	3 4 5 6	Rimon + Supreme oil
Insect: Codling moth	July	3 4 5 6	Assail + Supreme oil
Insect: Codling moth	Aug	3 4 5 6	Cyd X
Insect: Codling moth	Aug	3 4 5 6	Cyd X

Vertebrates. Gophers are controlled during a two week period in April during the first two years. The traps are checked every other day during the two week period. Eight to 10 traps are put in the field and their cost is included under the investment item Tools. The gophers are assumed to be under control by the third year and only a minimum amount of monitoring is required. Monitoring is done by the irrigator, therefore no cost is shown.

Cover Crop. In November of the first year a permanent cover crop (orchard mix) is planted. The field is disked and the seed spread by hand with a backpack type spreader. The crop reseeds itself and is maintained over the years by mowing.

Thinning. The fruit is hand thinned in June beginning in the fourth year.

Harvest. Harvest starts in the third or fourth year after the orchard is planted depending on variety and other factors. In the first few years the orchard is harvested with a single picking. After that, color picking for apples commences and trees are picked twice. Two pickers are used in the third year, but will vary according to crop and farm. See Harvest under Production Cultural Practices.

Table D. YIELDS

Year	Tons/acre
3	0.75
4	3.00
5	6.00
6+	9.00

Returns and Yields. See information in Production Cultural Practices.

Production Cultural Practices and Material Inputs

Pruning. Hand pruning is done in the winter months (December to February) to allow light into the tree canopy for fruit wood production and to remove shoots affected with disease and overwintering fire blight cankers. When trees have reached full production in the sixth year and thereafter, summer pruning (July) is done to keep the inner tree canopy open and producing fruit wood. Prunings are placed in the row middles and pushed out of the orchard by a tractor equipped with a brush rake, and then burned. See Table A for pruning times.

Fertilization. Tree nitrogen status is determined by leaf analysis. One sample for analysis is collected by the PCA in July. Over fertilization of trees can cause excessive shoot growth and undesirable characteristics for fresh market apples. Solubor (21% Boron) is applied with the March strip spray at a rate of ten pounds per acre of material. Calcium nitrate (15.5-0-0-19Ca) is spread mechanically along the drip line at 42 pounds of N per acre in November in alternate years. Therefore one-half the cost and rate (21 lbs) is shown each year.

Irrigation. The field is irrigated using a micro sprinkler system and is irrigated every 10-14 days (depending on weather) from mid-June until mid-Oct. It is assumed that it takes 0.33 labor hours per acre per irrigation for the irrigator, which includes walking the field to check the irrigation lines and sprinklers and to check for other orchard problems such as gophers. A total of 36 acre inches of water is applied during the season. The water is delivered from the local water district at a cost of $5.50 per acre inch. Additional administrative charges apply and are included in the water cost. No assumption is made about effective rainfall.

Pest Management. The pesticides and rates mentioned in this cost study are listed in *UC Integrated Pest Management Guidelines, Apples.* For information on other pesticides available, 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. **Pesticides mentioned in this study are used to calculate rates and costs. Although the pesticides mentioned are commonly used by growers, many other pesticides are available. Check with your PCA and/or the UC IPM website for current recommendations.** 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.

Crop Consultant/PCA. Pest Control Advisers (PCAs) write pesticide recommendations and monitor the fields for agronomic, nutrition, and pest problems. To assist with pest management decisions in this study, the grower uses an independent PCA. The PCA charges $725 per season for up

to 15 acres which includes the trapping and monitoring and in-season weekly pest reports and recommendations. The cost is allocated to the five producing acres at $145 per acre.

Weeds. The orchard middles are mowed four times (once per month) from May through August. Weeds are controlled in the tree row during the fall (November) with Princep and Roundup, a residual and contact herbicide, respectively and with Roundup in March (fertilizer added to this application) and June. Weeds in the tree row not controlled by the fall spray may be controlled with spot sprays as necessary.

Insects and Arthropods. A delayed dormant spray with Dormant Oil is applied in early March for control of aphids, mites, scale, and other pests. In addition, an Assail application in May (pink to petal fall) is included to specifically target Rosey Apple aphid. Diazinon has been commonly used in the past but is not included here due to recent water quality concerns. Codling moth is the most economically significant insect pest of apples causing damage that makes the fruit unmarketable. Multiple generations of codling moth occur annually and are controlled with mating disruption pheromones and supplemental insecticide treatments with application timing based on monitoring of the population. Guthion, an organophosphate insecticide traditionally used to control codling moth, is scheduled to be phased out by 2012 and so alternative insecticides (Intrepid, Assail, Rimon and Cyd-X) are used in this program. Many of these alternative or "reduced-risk" insecticides not only have short worker reentry intervals but also short residuals, so two sprays are often needed to cover one codling moth flight. Codling moth traps are hung in the orchard by the PCA in April and monitored throughout the season; the cost of maintaining the traps is included in the PCA service, therefore no line item cost is shown. In April one laborer hangs 200 mating disruption pheromones (Isomate Twin Tube) per acre in the trees taking one hour per acre. The first codling moth generation larvae arise from the overwintering moths which have an extended flight with two "peaks" (termed 1a and 1b). The larvae typically begin hatching in May and, in this study, are controlled with Intrepid to cover the 1a flight followed by Assail in early June to cover the 1b flight. The second flight occurring in June is during thinning and Rimon is applied in late June. Assail insecticide is applied 2 weeks later in early July to cover that flight. The third flight normally occurs in August and is controlled with two applications of the insecticidal virus Cyd-X (an approved organic product), approximately 10 days apart. Supreme Oil is added to the May to July codling moth sprays to prevent possible mite flare-up. See Table C for listing of insect and disease applications.

Diseases. Apple scab (*Venturia inaequalis)* is the primary disease of apples and is significant during years with rainfall. Management begins with winter sanitation by destruction/decomposition of leaves and other residue that provide an overwintering site for fungal spores. In this study, four fungicide treatments for apple scab are made before infections occur in the spring. Dithane is applied at green tip in March and at pinkbud in April. Rally is applied later in April still at pinkbud and Flint (with Mycoshield for blight control) at bloom in May. Temperature and moisture monitoring are used to pinpoint timing for applying these fungicides. Apple scab is caused by a fungus which first attacks young leaves as they are growing. Lesions will appear on lower leaf surfaces and inhibit normal leaf growth. If the fungus infects flowers during bloom, the blossoms usually drop causing yield reductions and scabbing of young fruit.

Powdery mildew (*Podosphaera leucotricha)* stunts and distorts affected leaves and shoots, russets fruit, and can reduce production. Rally fungicide is applied at pink bud (early April). Treatment is usually combined with the apple scab sprays. Also, one fire blight spray with Mycoshield (Terramycin) is incorporated with the late May apple scab application. See Table C for disease and insect application listing.

Thinning. Thinning fruit is the same as in the establishment years; hand fruit removal is done in June

Harvest. Fuji apples require picking based on "ground color", or the background color behind the blush on the fruit. Fruit is picked when the ground color turns from green to yellow, indicating ripeness. The first pick usually collects 50% of the fruit. The second pick gathers the remaining apples about a week or two later. Labor required for harvesting the second pick is less than the first pick since fruit is not selectively chosen. Harvest crews use ladders and picking bags to hand pick fruit that is placed into 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 the bins on a flatbed truck or bin trailer (bin trailer in this study) which transports them to a packing shed for cleaning, sorting, and packing. In this cost study, the crop is harvested and hauled by the grower. The picking crew consists of five persons that on the average can each pick 200 pounds of apples per hour.

Yields. Yields are sorted into three categories; 30% fresh market premium, 50% fresh market standard, and 20% fresh market utility. The latter category is apples that have poor appearance, size, or other damage factors, and are best used for processing into juice, sauce or other processed apple products such as Apple Hill Products (pies and jams). An assumed yield of 9 net tons per acre is used to calculate cost and returns per acre.

*Returns***.** Based on grower input for on-farm sales or fruit stand sales, estimated prices of $3,000 per ton ($1.50 per pound) for Premium, $2,000 per ton ($1.00 per pound) for Standard, and $600 per ton ($0.30 per pound) are used in this study. Return prices for apples are used to calculate ranging analysis for different yields and prices. A single price is used in Table 5 (Ranging Analysis) based on the weighted average of the above categories and prices, giving an average return over all products.

*Sorting, Packing, Selling***.** Cleaning, sorting, and packing costs are paid by the grower. The majority of the production in the Sierra Nevada Foothills is for fresh market sales. The apples are delivered to the growers own packing shed or a local packer, depending on the operation size. Growers will either process their own apples or sell them to a processor. Although growers will sell their apples in various size containers, an estimated cost of $8 per 40 pound box (not based on any specific collected data) is used in this study for sorting, packing and selling.

Marketing Costs. See Marketing Costs under Cash Overhead. A large portion of growers belong to the Apple Hill Growers Association which promotes the agricultural sales of the growers' products in the area. A grower may have his own label and products - fresh apples, processed (baked pies and apple juice) and other agricultural products.

Labor, Equipment and Interest

Labor. Hourly wages for workers are $10.00 and $8.00 per hour for machine and non-machine workers, respectively. Adding 38% for the employers' share of federal and state payroll taxes, insurance, and other possible benefits gives the labor rates shown of $13.80 and $11.04 per hour for machine labor and non-machine labor, respectively. Workers' compensation costs will vary among growers, but for this study the cost is based upon the average industry final rate as of January 1, 2007 (personal email from California Department of Insurance, May 18, 2007, unreferenced). Labor time for operations involving machinery are 20% higher than the operation time given in Table 2 to account for the extra labor involved in equipment set up, moving, maintenance, work breaks, and field repair.

Wages for a manager are not included as a cost. Returns above total costs are considered a return to management and risk.

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 takeoff (PTO) horsepower, and fuel type. Prices for on-farm delivery of diesel and gasoline are $2.30 and $2.80 per gallon, respectively. The costs are based on 2006 American Automobile Association (AAA) and Department of Energy (DOE) monthly data. 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 2 is determined by multiplying the total hourly operating cost in Table 7 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 10.00% per year. A nominal interest rate is the typical market cost of borrowed funds. The interest cost of post harvest operations is discounted back to the last harvest month using a negative interest charge. The rate will vary depending upon various factors, but the rate in this study is considered a typical lending rate by a farm lending agency as of January 2007.

Risk. 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 that affect the profitability and economic viability. The risks associated with producing and marketing the crop should not be minimized.

Cash Overhead

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

Property Taxes. Counties charge a base property tax rate of 1% on the assessed value of the property. In some counties special assessment districts exist and charge additional taxes on property including equipment, buildings, and improvements. For this study, county taxes are calculated as 1% of the average value of the property. Average value equals new cost plus salvage value divided by 2 on a per acre basis.

Insurance. Insurance for farm investments varies depending on the assets included and the amount of coverage. Property insurance provides coverage for property loss and is charged at 0.714% of the average value of the assets over their useful life. Liability insurance covers accidents on the farm and costs $437 for the entire farm.

Office Expense. Office and business expenses for the five acres are estimated at $2,500 annually or $500 per acre. These expenses include office supplies, telephones, bookkeeping, accounting, legal fees, road maintenance, etc.

Marketing Costs. The grower belongs to the Apple Hill Growers Association (http://applehill.com) and pays the annual membership of $175 and a $90 fee for a five acre farm. Additional charges apply for a

larger farm, for a bake shop, for wine and for crafts. The organization provides farm and product advertising. Not shown as a cost in this study is membership in El Dorado County Farm Trails (www.edc-farmtrails.org) which promotes and advertises the small family farm.

Sanitation Services. Sanitation services provide one double portable toilet and cost the farm $450 annually. The cost includes delivery and 2 months of weekly service. Sanitation facilities required will vary by state regulations and crew size. Cal/OSHA Safety Order 3457 requires employers to provide one hand-washing facility for each 20 employees or fraction thereof and if more than five laborers are employed, separate toilets for each sex are required. The employer must also keep records of toilet servicing for two years.

Non-Cash Overhead

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

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

Salvage Value. Salvage value is an estimate of the remaining value of an investment at the end of its useful life. For farm machinery (tractors and implements) the remaining value is a percentage of the new cost of the investment (Boehlje and Eidman). The percent remaining value is calculated from equations developed by the American Society of Agricultural 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. The interest rate of 7.25% is used to calculate capital recovery. The rate will vary depending upon size of loan and other lending agency conditions, but is a suggested rate by a farm lending agency in January 2007.

Land. Of the 20 acres, approximately, six acres are allocated to the orchard with five acres in production and the remaining acre to roads, irrigation system and buildings. Bare agricultural land in El Dorado County based on recent farm real estate sales in the area is estimated at $60,000 per acre for the 20 acres. Small parcels, 20 acres and under, are being purchased for homesites with values ranging from $500,000 to $1,500,000 plus per site. This site is located in the prime agritourism area and is good for farm market sales. Outlying areas may be less expensive.

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

Ladders/Picking Bags. This includes ten 10-foot tripod aluminum orchard ladders and ten picking bags. Costs are retail costs without discounts for volume purchase.

Fuel Tanks. One 100-gallon fuel tank using gravity feed is on metal stand. The tank is setup in a cement containment pad that meets federal, state, and county regulations.

Irrigation System. A five horsepower booster pump, filtration station, micro sprinkler and overhead sprinkler irrigation system was installed prior to planting. The irrigation system is considered an improvement to the property and has a 25 year lifespan.

Establishment Costs. The cost to establish the orchard is used to determine the non-cash overhead expenses: capital recovery on investment for the production years. The establishment costs is the sum of cash costs for land preparation, planting, trees, production expenses, and cash overhead for growing apple trees through the first year fruit is harvested minus any returns from production. The total accumulated net cash cost in the third year represents the establishment cost per acre. The estimated cost is $10,527 per acre or $52,633 for the five acre orchard. To calculate the annual capital recovery cost, the establishment cost is amortized beginning in the fourth year over the remaining 22 years of orchard 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 40% to indicate a mix of new and used equipment. Annual ownership costs for equipment and other investments are shown in Table 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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REFERENCES

American Society of Agricultural Engineers. (ASAE). 1994. *American Society of Agricultural Engineers Standards Yearbook*. St. Joseph, MO.

Boehlje, Michael D., and Vernon R. Eidman. 1984. *Farm Management*. John Wiley and Sons. New York, NY.

California Chapter of the American Society of Farm Managers and Rural Appraisers. 2007. *Trends in Agricultural Land and Lease Values.* California Chapter of the American Society of Farm Managers and Rural Appraisers, Inc. Woodbridge, CA.

California State Automobile Association. 2007. *Gas Price Survey 2006.* AAA Public Affairs, San Francisco, CA.

California State Board of Equalization. *Fuel Tax Division Tax Rates.* Internet accessed January 2007. http://www.boe.ca.gov/sptaxprog/spftdrates.htm

Doanes. 1984. *Facts and Figures for Farmers.* 1984. Doane Publishing, St. Louis, MO.

Energy Information Administration. 2006. *Weekly Retail on Highway Diesel Prices.* Internet accessed January

Frost, Bill, Karen M. Klonsky, and Richard L. De Moura. 2000. *Sample Costs to Produce Apples, Sierra Nevada Foothills.* University of California Cooperative Extension, Department of Agriculture and Resource Economics, Davis, CA.

Statewide IPM Project. 1981. *Integrated Pest Management for Apples and Pears.* Pub. 3312. University of California, Division of Agriculture and Natural Resources. Oakland, CA.

Tyler, R. H., W. C. Micke. D. S. Brown and F. G. Mitchell. 1985. *Commercial Apple Growing in California.* Leaflet 2456. Cooperative Extension, University of California, Division of Agriculture and Natural Resources. Oakland, CA.

University of California Statewide Integrated Pest Management Program. *UC Pest Management Guidelines, Apples*. 2007. University of California, Davis, CA. http://www.ipm.ucdavis.edu

UC COOPERATIVE EXTENSION

Table 1. COSTS PER ACRE TO ESTABLISH AN APPLE ORCHARD

INTERMOUNTAIN - EL DORADO COUNTY 2007

	Cost Per Acre				
Year:	1st	2nd	3rd	4th	5th
Tons Per Acre:			0.75	3.00	6.00
Planting Costs:					
Subsoil/Rip 3 ft deep (custom)	240				
Disk 2X	12				
Covercrop: Plant (Ryegrass)	26				
Disk Covercrop 2X	12				
Plant: Layout & Stake	137				
Plant: Auger, Plant, Fertilize (0-45-0)	466	17			
Plant: Trees @ 272 per acre	2,176	112			
TOTAL PLANTING COSTS	3,069	129			
Cultural Costs:					
Irrigate: (water & labor)	119	144	177	210	243
Vertebrate: Gopher control (bait)	21	21			
Prune: Cut trees at knee	26				
Prune: Place milk cartons around trees	14				
Weed: Disk Middles (year 1). Mow Middles (year 2+)	24	34	34	34	34
Weed: Spray tree row (Roundup) Yr 1 w/hand wand. Yr 2+ w/boom	22	26	13	13	13
Fertilize: Fall in Alternate Years (15.5-0-0)	14	14	15	15	15
Weed: Tree row, Winter (Princep, Roundup)	29	29	29	29	29
Covercrop: Disk 2X, Hand Plant (Orchard Mix)	56				
Prune: Dormant hand prune		126	263	515	629
Prune: Tie Branches		320	309	515	
Prune: Remove and Burn Prunings		20	20	38	38
Weed: Spray (Roundup). Fertilize: Boron (Solubor)			21	21	21
Fertilize: Leaf Sampling (analysis)			6	6	6
Insect: Aphid (Assail, Oil)			69	69	69
Insect: Codling Moth (Intrepid, Oil)			55	55	55
Insect: Codling Moth (Assail, Oil)			147	147	147
Insect: Codling Moth (Rimon, Oil)			74	74	74
Insect: Codling Moth (Cyd X)			88	88	88
Disease: Scale, Blight (Flint, Mycoshield)				61	61
Insect: Delayed Dormant. Aphids, Mites, Scale (Oil)				17	17
Disease: Scab @ Greentip (Dithane)				22	22
Insect: Codling Moth. PCA Hang Pheromones (Isomate TT)				133	133
Disease: Mildew & Scab @ Pinkbud (Dithane)				22	22
Disease: Scab @ Pinkbud (Rally)				15	15
Prune: Thin Fruit				412	778
PCA			145	145	145
Pickup	168	168	168	168	168
TOTAL CULTURAL COSTS	493	902	1,633	2,824	2,823
Harvest Costs:					
Pick			86	343	686
Haul to Shed			106	169	338
Sort, Pack, Sell Fresh Fruit			304	1,200	2,400
TOTAL HARVEST COSTS			496	1,712	3,425
Interest On Operating Capital @ 10.00%	276	77	90	173	170
TOTAL OPERATING COSTS/ACRE	3,838	1,108	2,219	4,710	6,417

Table 1. continued

	Cost Per Acre				
Year:	1st	2nd	3rd	4th	5th
Tons Per Acre:			0.75	3.00	6.00
Cash Overhead Costs:					
Office Expense	500	500	500	500	500
Liability Insurance	87	87	86	86	86
Sanitation Fees	90	90	90	90	90
Marketing				45	45
Property Taxes	720	715	738	740	741
Property Insurance	63	60	76	77	78
Investment Repairs	298	298	334	334	334
TOTAL CASH OVERHEAD COSTS	1,758	1,751	1,823	1,871	1,874
TOTAL CASH COSTS/ACRE	5,597	2,859	4,041	6,581	8,291
INCOME/ACRE FROM PRODUCTION			1,970	6,060	12,120
NET CASH COSTS/ACRE FOR THE YEAR	5,597	2,859	2,071	521	
PROFIT/ACRE ABOVE CASH COSTS					3,829
ACCUMULATED NET CASH COSTS/ACRE	5,597	8,455	**10,527**	11,047	6,698
Non-Cash (Capital Recovery):					
Buildings	793	793	793	793	793
Land	4,579	4,579	4,579	4,579	4,579
Fuel Tanks	18	18	18	18	18
Sprinkler System	219	219	219	219	219
Shop/Field Tools	244	244	244	244	244
Bins			62	62	62
Ladders (10)			41	41	41
Picking Bags			21	21	21
Equipment	206	133	430	463	486
TOTAL INTEREST ON INVESTMENT	6,059	5,986	6,406	6,440	6,463
TOTAL COST/ACRE FOR THE YEAR	11,656	8,845	10,448	13,020	14,754
INCOME/ACRE FROM PRODUCTION			1,970	6,060	12,120
TOTAL NET COST/ACRE FOR THE YEAR	11,656	8,845	8,478	6,960	2,634
NET PROFIT/ACRE ABOVE TOTAL COST					0
TOTAL ACCUMULATED NET COST/ACRE	11,656	20,501	28,978	35,939	38,572

UC COOPERATIVE EXTENSION

Table 2. COSTS PER ACRE TO PRODUCE APPLES

INTERMOUNTAIN – EL DORADO COUNTY 2007

	Operation	Cash and Labor Costs per Acre					
Operation	Time (Hrs/A)	Labor Cost	Fuel, Lube & Repairs	Material Cost	Custom/ Rent	Total Cost	Your Cost
Cultural:							
Prune (hand) Dormant & Summer pruning	113.00	1,293	0	0	0	1,293	
Prune: Brush Removal & Burn	1.50	117	16	0	0	134	
Insect: Delayed Dormant-Mites, Aphids, Scale (Oil)	0.34	6	4	8	0	17	
Disease: @ Greentip-Mildew, Scab (Dithane)	0.34	6	4	12	0	22	
Weed: Tree Row (Roundup) Fertilize: (Solubor)	0.32	5	3	12	0	21	
Insect: Codling Moth-Hang Pheromones (Isomate)	1.00	11	0	122	0	133	
Disease: @ Pinkbud-Mildew, Scab (Rally)	0.34	6	4	6	0	15	
Disease: @ Pinkbud, Scab (Dithane)	0.34	6	4	12	0	22	
Disease: Scab, Blight (Flint, Mycoshield)	0.34	6	4	51	0	61	
Insect: @ Pinkbud to Petal Fall, Aphid (Assail)	0.34	6	4	59	0	69	
Insect: Codling Moth (Intrepid, Oil)	0.34	6	4	45	0	55	
Mow Middles	1.16	20	14	0	0	34	
Thin Fruit: Hand	113.00	1,293	0	0	0	1,293	
Irrigate: (water & labor)	3.96	45	0	198	0	243	
Weed: Tree Row (Roundup)	0.32	5	3	4	0	13	
Insect: Codling Moth (Assail, Oil)	0.69	12	7	128	0	147	
Insect: Codling Moth (Rimon, Oil)	0.34	6	4	64	0	74	
Fertilize: Leaf Sampling	0.00	0	0	0	6	6	
Insect: Codling Moth (Cyd X)	0.69	12	7	69	0	88	
Fertilize: Alternate Years (CaNO3)	0.12	2	2	11	0	15	
Weed: Winter Strip (Princep, Roundup)	0.32	5	3	21	0	29	
PCA (Crop Consultant)	0.00	0	0	0	145	145	
Pickup Truck Use	6.33	109	59	0	0	168	
TOTAL CULTURAL COSTS	245.13	2,977	145	822	151	4,096	
Harvest:							
1st Pick	50.00	572	0	0	0	572	
2nd Pick	40.00	458	0	0	0	458	
Haul To Shed (1st & 2d picks)	18.00	309	198	0	0	507	
Sort, Pack, Sell Fruit	0.00	0	0	0	3,600	3,600	
TOTAL HARVEST COSTS	108.00	1,338	198	0	3,600	5,137	
Interest on operating capital @ 10.00%						226	
TOTAL OPERATING COSTS/ACRE		4,316	344	822	3,751	9,459	
TOTAL OPERATING COSTS/TON						1,051	
CASH OVERHEAD:							
Office Expense						500	
Liability Insurance						87	
Sanitation Fees						90	
Marketing						45	
Property Taxes						795	
Property Insurance						117	
Investment Repairs						386	
TOTAL CASH OVERHEAD COSTS						2,020	
TOTAL CASH COSTS/ACRE						11,479	
TOTAL CASH COSTS/TON						1,275	

UC COOPERATIVE EXTENSION

Table 2. Continued

Operation	Operation Time (Hrs/A)	Cash and Labor Costs per Acre: Labor Cost	Fuel, Lube & Repairs	Material Cost	Custom/ Rent	Total Cost	Your Cost
NON-CASH OVERHEAD:							
Investment		Per producing Acre		Annual Cost Capital Recovery			
Buildings 1500 sqft		9,600		793		793	
Land		63,158		4,579		4,579	
Fuel Tanks: one 300 gal		200		18		18	
Sprinkler System		2,500		219		219	
Shop/Field Tools		2,600		244		244	
Ladders - 10 each		300		41		41	
Picking Bags		84		21		21	
Bins		640		62		62	
Orchard Establishment		10,527		971		971	
Equipment		5,342		510		510	
TOTAL NON-CASH OVERHEAD COSTS		94,951		7,458		7,458	
TOTAL COSTS/ACRE						18,938	
TOTAL COSTS/TON						2,104	

UC COOPERATIVE EXTENSION

Table 3. COSTS AND RETURNS PER ACRE TO PRODUCE APPLES

INTERMOUNTAIN – EL DORADO COUNTY 2007

	*Quantity/ Acre	Unit	Price or Cost/Unit	Value or Cost/Acre	Your Cost
GROSS RETURNS					
Fresh Premium ($1.50/lb)	2.70	ton	3,000.00	8,100	
Fresh Standard ($1.00/lb)	4.50	ton	2,000.00	9,000	
Fresh Utility ($0.30/lb)	1.80	ton	600.00	1,080	
TOTAL GROSS RETURNS	9.00			18,180	
OPERATING COSTS					
Insecticide:					
Dormant Oil	2.00	gal	3.85	8	
Assail 70WP	10.20	oz	17.47	178	
Intrepid 2F	14.00	floz	2.88	40	
Supreme Oil	4.00	gal	4.60	18	
Rimon 0.83EC	32.00	floz	1.86	60	
Cyd-X Insecticidal Virus	6.00	floz	11.54	69	
Fungicide:					
Dithane DF	6.40	lb	3.89	25	
Rally 40WSP	1.25	oz	4.45	6	
Flint	2.00	oz	16.50	33	
Mycoshield (Terramycin)	0.50	lb	36.15	18	
Contract/Custom:					
Leaf Analysis	0.20	each	32.00	6	
Sort, Pack (40 lb box), Sell	450.00	box	8.00	3,600	
Pest Control Adviser (PCA)	1.00	acre	145.00	145	
Fertilizer:					
Solubor (boron)	10.00	lb	0.80	8	
Calcium Nitrate (15.5-0-0-19Ca)	21.00	lb N	0.54	11	
Herbicide:					
Roundup Ultra Max	3.00	pint	7.80	23	
Princep Caliber 90	1.02	lb	4.90	5	
Dispensers/Mating Disruption:					
Isomate C TT	0.50	case	243.00	122	
Irrigation:					
Water - District	36.00	acin	5.50	198	
Labor (machine)	38.63	hrs	14.30	552	
Labor (non-machine)	328.96	hrs	11.44	3,763	
Fuel - Gas	15.83	gal	2.80	44	
Fuel - Diesel	86.57	gal	2.30	199	
Lube				37	
Machinery repair				64	
Interest on operating capital @ 10.00%				226	
TOTAL OPERATING COSTS/ACRE				9,459	
TOTAL OPERATING COSTS/TON				1,051	
NET RETURNS ABOVE OPERATING COSTS				8,721	

*Total amount per acre applied or used during season

Table 3. continued

	Quantity/ Acre	Unit	Price or Cost/Unit	Value or Cost/Acre	Your Cost
CASH OVERHEAD COSTS:					
Office Expense				500	
Liability Insurance				87	
Sanitation Fees				90	
Marketing				45	
Property Taxes				795	
Property Insurance				117	
Investment Repairs				386	
TOTAL CASH OVERHEAD COSTS/ACRE				2,020	
TOTAL CASH COSTS/TON				224	
NON-CASH OVERHEAD COSTS (Capital Recovery):					
Buildings 1500 sqft				793	
Land				4,579	
Fuel Tanks: one 300 gal				18	
Sprinkler System				219	
Shop/Field Tools				244	
Ladders - 10 each				41	
Picking Bags				21	
Bins				62	
Orchard Establishment				971	
Equipment				510	
TOTAL NON-CASH OVERHEAD COSTS/ACRE				7,458	
TOTAL COSTS/ACRE				18,938	
TOTAL COSTS/TON				2,104	
NET RETURNS ABOVE TOTAL COSTS				-758	

UC COOPERATIVE EXTENSION

Table 4. MONTHLY PER ACRE CASH COSTS TO PRODUCE APPLES

INTERMOUNTAIN– EL DORADO COUNTY 2007

Beginning JAN 07 Ending DEC 07	JAN 07	FEB 07	MAR 07	APR 07	MAY 07	JUN 07	JUL 07	AUG 07	SEP 07	OCT 07	NOV 07	DEC 07	TOTAL
Cultural:													
Prune (hand) Dormant & Summer pruning	515						778						1,293
Prune: Brush Removal & Burn	44						90						134
Insect: Delayed Dormant-Mites, Aphids, Scale (Oil)			17										17
Disease: @ Greentip-Mildew, Scab (Dithane)			22										22
Weed: Tree Row (Roundup) Fertilize: (Solubor)			21										21
Insect: Codling Moth-Hang Pheromones (Isomate)				133									133
Disease: @ Pinkbud-Mildew, Scab (Rally)				15									15
Disease: @ Pinkbud, Scab (Dithane)				22									22
Disease: Scab, Blight (Flint, Mycoshield)					61								61
Insect: @ Pinkbud to Petal Fall, Aphid (Assail)					69								69
Insect: Codling Moth (Intrepid, Oil)					55								55
Mow Middles					9	9	9	9					34
Thin Fruit: Hand						1,293							1,293
Irrigate: (water & labor)						41	61	61	41	41			243
Weed: Tree Row (Roundup)						13							13
Insect: Codling Moth (Assail, Oil)						74	74						147
Insect: Codling Moth (Rimon, Oil)						74							74
Fertilize: Leaf Sampling							6						6
Insect: Codling Moth (Cyd X)								88					88
Fertilize: Alternate Years (CaNO3)											15		15
Weed: Winter Strip (Princep, Roundup)											29		29
PCA (Crop Consultant)	13	13	13	13	13	13	13	13	13	13	13		145
Pickup Truck Use	14	14	14	14	14	14	14	14	14	14	14	14	168
TOTAL CULTURAL COSTS	586	27	87	197	220	1,529	1,044	185	68	68	72	14	4,096
Harvest:													
1st Pick										572			572
2nd Pick										458			458
Haul To Shed (1st & 2d picks)										507			507
Sort, Pack, Sell Fruit										3,600			3,600
TOTAL HARVEST COSTS										5,137			5,137

Table 4. continued

Beginning JAN 07	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	TOTAL
Ending DEC 07	07	07	07	07	07	07	07	07	07	07	07	07	
Interest on operating capital @ 10.00%	5	5	6	7	9	22	31	32	33	76	-1	0	226
TOTAL OPERATING COSTS/ACRE	591	32	93	205	229	1,551	1,075	217	101	5,281	71	14	9,459
TOTAL OPERATING COSTS/TON	49	3	8	17	19	129	90	18	8	440	6	1	788
CASH OVERHEAD:													
Office Expense	45	45	45	45	45	45	45	45	45	45	45		500
Liability Insurance	87												87
Sanitation Fees										90			90
Marketing			45										45
Property Taxes	398						398						795
Property Insurance				58								58	117
Investment Repairs	32	32	32	32	32	32	32	32	32	32	32	32	386
TOTAL CASH OVERHEAD COSTS	563	78	123	136	78	78	475	78	78	168	78	91	2,020
TOTAL CASH COSTS/ACRE	1,153	110	216	341	307	1,629	1,550	295	178	5,449	149	104	11,480
TOTAL CASH COSTS/TON	96	9	18	28	26	136	129	25	15	454	12	9	957

UC COOPERATIVE EXTENSION

Table 5. RANGING ANALYSIS (Yields vs. Prices)

INTERMOUNTAIN REGION - EL DORADO COUNTY 2007

COSTS PER ACRE AT VARYING YIELDS TO PRODUCE APPLES

	TOTAL YIELD (tons/acre)						
	6.00	7.00	8.00	9.00	10.00	11.00	12.00
OPERATING COSTS/ACRE:							
Cultural Cost	4,096	4,096	4,096	4,096	4,096	4,096	4,096
Harvest Cost	3,387	3,970	4,554	5,137	5,720	6,304	6,887
Interest on operating capital @ 10.00%	211	216	221	226	231	236	241
TOTAL OPERATING COSTS/ACRE	7,694	8,282	8,871	9,459	10,047	10,636	11,224
TOTAL OPERATING COSTS/TON	1,282	1,183	1,109	1,051	1,005	967	935
CASH OVERHEAD COSTS/ACRE	2,018	2,019	2,020	2,020	2,021	2,022	2,022
TOTAL CASH COSTS/ACRE	9,712	10,301	10,891	11,479	12,068	12,658	13,246
TOTAL CASH COSTS/TON	1,619	1,472	1,361	1,275	1,207	1,151	1,104
NON-CASH OVERHEAD COSTS/ACRE	7,432	7,443	7,452	7,459	7,466	7,472	7,477
TOTAL COSTS/ACRE	17,144	17,744	18,343	18,938	19,534	20,130	20,723
TOTAL COSTS/TON	2,857	2,535	2,293	2,104	1,953	1,830	1,727

NET RETURNS PER ACRE ABOVE OPERATING COSTS

Weighted*	YIELD (tons/acre)						
$/ton	6.00	7.00	8.00	9.00	10.00	11.00	12.00
1,420	826	1,658	2,489	3,321	4,153	4,984	5,816
1,620	2,026	3,058	4,089	5,121	6,153	7,184	8,216
1,820	3,226	4,458	5,689	6,921	8,153	9,384	10,616
2,020	4,426	5,858	7,289	8,721	10,153	11,584	13,016
2,220	5,626	7,258	8,889	10,521	12,153	13,784	15,416
2,420	6,826	8,658	10,489	12,321	14,153	15,984	17,816
2,620	8,026	10,058	12,089	14,121	16,153	18,184	20,216

NET RETURNS ABOVE CASH COSTS

Weighted*	YIELD (tons/acre)						
$/ton	6.00	7.00	8.00	9.00	10.00	11.00	12.00
1,420	-1,192	-361	469	1,301	2,132	2,962	3,794
1,620	8	1,039	2,069	3,101	4,132	5,162	6,194
1,820	1,208	2,439	3,669	4,901	6,132	7,362	8,594
2,020	2,408	3,839	5,269	6,701	8,132	9,562	10,994
2,220	3,608	5,239	6,869	8,501	10,132	11,762	13,394
2,420	4,808	6,639	8,469	10,301	12,132	13,962	15,794
2,620	6,008	8,039	10,069	12,101	14,132	16,162	18,194

UC COOPERATIVE EXTENSION

Table 5. continued

NET RETURNS PER ACRE ABOVE TOTAL COSTS

Weighted*	YIELD (tons/acre)						
$/ton	6.00	7.00	8.00	9.00	10.00	11.00	12.00
1,420	-8,624	-7,804	-6,983	-6,158	-5,334	-4,510	-3,683
1,620	-7,424	-6,404	-5,383	-4,358	-3,334	-2,310	-1,283
1,820	-6,224	-5,004	-3,783	-2,558	-1,334	-110	1,117
2,020	-5,024	-3,604	-2,183	-758	666	2,090	3,517
2,220	-3,824	-2,204	-583	1,042	2,666	4,290	5,917
2,420	-2,624	-804	1,017	2,842	4,666	6,490	8,317
2,620	-1,424	596	2,617	4,642	6,666	8,690	10,717

*Weighted is the weighted average of the 3 market categories (premium + standard + utility yields x price)/total yield

UC COOPERATIVE EXTENSION

Table 6. WHOLE FARM ANNUAL EQUIPMENT, INVESTMENT and BUSINESS OVERHEAD COSTS

INTERMOUNTAIN – EL DORADO COUNTY 2007

ANNUAL EQUIPMENT COSTS

						Cash Overhead		
Yr	Description	Price	Yrs Life	Salvage Value	Capital Recovery	Insur-ance	Taxes	Total
07	3 Point Forks	1,000	20	52	95	4	5	104
07	62 HP 2WD Tractor	46,230	20	5,932	4,308	186	261	4,755
07	Air Blast 3 point 100 gal sprayer	5,000	20	261	475	19	26	520
07	Bin Trailer #1	1,800	20	94	171	7	9	187
07	Brush Rake - 10'	2,500	25	71	218	9	13	240
07	Front End Loader	5,500	20	287	522	21	29	572
07	Loader Forks	1,000	20	52	95	4	5	104
07	Mower/Chopper - 8'	8,500	20	443	807	32	45	884
07	Pickup Truck 1/2 T	26,000	10	7,680	3,195	120	168	3,484
07	Spreader Fertilizer	12,000	20	625	1,140	45	63	1,248
07	Weed Sprayer 100 G	4,000	20	208	380	15	21	416
TOTAL		113,530		15,705	11,408	461	646	12,515
40% of New Costs *		45,412		6,282	4,563	185	258	5,006

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

ANNUAL INVESTMENT COSTS

					Cash Overhead			
Description	Price	Yrs Life	Salvage Value	Capital Recovery	Insur-ance	Taxes	Repairs	Total
INVESTMENT								
Apple Establishment	52,633	22		4,857	188	263	263	5,571
Bins 1000 lb (40)	3,200	20		309	11	16	64	400
Buildings 1500 sqft	48,000	30		3,966	171	240	960	5,337
Fuel Tank 300 gal	1,000	20	300	89	5	7	20	120
Ladders - 10 each	1,500	10	150	205	6	8	30	249
Land 20 acres	1,200,000	25	1,200,000	87,000	0	12,000	0	99,000
Picking Bags	420	5		103	2	2	84	191
Shop/Field Tools	13,000	20	1,300	1,220	51	72	260	1,603
Sprinkler System	12,500	25		1,097	45	63	250	1,454
TOTAL INVESTMENT	1,332,253		1,201,750	98,847	478	12,670	1,931	113,926

ANNUAL BUSINESS OVERHEAD COSTS

Description	Units/ Farm	Unit	Price/ Unit	Total Cost
Marketing (Apple Hill Growers)	5	acre	45.00	225
Liability Insurance	5	acre	87.40	437
Office Expense	5	acre	500.00	2,500
Sanitation Fees	5	acre	90.00	450

UC COOPERATIVE EXTENSION

Table 7. HOURLY EQUIPMENT COSTS

INTERMOUNTAIN– EL DORADO COUNTY 2007

			COSTS PER HOUR						
		Actual		Cash Overhead		Operating			
Yr	Description	Hours Used	Capital Recovery	Insur-ance	Taxes	Repairs	Fuel & Lube	Total Oper.	Total Costs/Hr.
07	3 Point Forks	90	0.42	0.02	0.02	0.09	0.00	0.09	0.55
07	62 HP 2WD Tractor	192	8.97	0.39	0.54	1.20	8.05	9.25	19.15
07	Air Blast 3 point 100 gal sprayer	21	9.21	0.36	0.51	0.51	0.00	0.51	10.59
07	Bin Trailer #1	90	0.76	0.03	0.04	0.16	0.00	0.16	0.99
07	Brush Rake - 10'	8	11.64	0.49	0.69	0.22	0.00	0.22	13.04
07	Front End Loader	108	1.94	0.08	0.11	0.50	0.00	0.50	2.63
07	Loader Forks	100	0.38	0.02	0.02	0.09	0.00	0.09	0.51
07	Mower/Chopper - 8'	56	5.79	0.23	0.32	2.09	0.00	2.09	8.43
07	Pickup Truck 1/2 T	200	6.40	0.24	0.34	1.24	8.05	9.29	16.27
07	Spreader Fertilizer	1	735.47	29.08	40.73	2.90	0.00	2.90	808.18
07	Weed Sprayer 100 G	55	2.78	0.11	0.15	0.67	0.00	0.67	3.71

UC COOPERATIVE EXTENSION

Table 8. OPERATIONS WITH EQUIPMENT

INTERMOUNTAIN– EL DORADO COUNTY 2007

Operation	Operation Month	Equipment Tractor	Implement	Non-Mach Labor hrs/acre	Material	Broadcast Rate/acre	Unit
Cultural:							
Prune: Winter	January			45.00			
Brush Removal	January	62 HP 2WD	Front End Loader Brush Rake	2.00			
Insect: Delayed Dormant.	March	62 HP 2WD	Air Blast Sprayer		Dormant Oil	2.00	gal
Disease: Scab @ greentip	March	62 HP 2WD	Air Blast Sprayer		Dithane	3.20	lb
Weed/Fertilize: Tree Row	March	62 HP 2WD	Weed Sprayer		Roundup	0.50	pint
					Solubor	10.00	lb
Insect: Codling Moth Hang Pheromone	April	Custom		1.00	Isomate TT	0.50	case
Fertilizer: Leaf Analysis	April	Custom			Analysis	0.20	each
Disease: Mildew, Scab @ pinkbud	April	62 HP 2WD	Air Blast Sprayer		Rally	1.25	oz
Disease: Scab @ pinkbud	April	62 HP 2WD	Air Blast Sprayer		Dithane	3.20	lb
Disease: Scab, Fireblight	May	62 HP 2WD	Air Blast Sprayer		Flint	16.50	oz
					Mycoshield	0.50	lb
Insect: Aphid @ pinkbud to petal fall	May	62 HP 2WD	Air Blast Sprayer		Assail	3.40	oz
Insect: Codling Moth	May	62 HP 2WD	Air Blast Sprayer		Intrepid	14.00	floz
					Supreme Oil	1.00	gal
Weed: Mow Middles	May	62 HP 2WD	Mower/Chopper				
Thin Fruit	June			113.00			
Irrigate	June			0.66	Water	6.00	acin
Weed: Spray Tree Row	June	62 HP 2WD	Weed Sprayer		Roundup	0.50	pint
Weed: Mow Middles	June	62 HP 2WD	Mower/Chopper				
Insect: Codling Moth	June	62 HP 2WD	Air Blast Sprayer		Assail	3.40	oz
					Supreme Oil	1.00	gal
Insect: Codling Moth	June	62 HP 2WD	Air Blast Sprayer		Rimon	32.00	floz
					Supreme Oil	1.00	gal
Weed: Mow Middles	July	62 HP 2WD	Mower/Chopper				
Prune: Summer	July			68.00			
Brush Removal	July	62 HP 2WD	Front End Loader Brush Rake	6.00			
Insect: Codling Moth	July	62 HP 2WD	Air Blast Sprayer		Assail	3.40	oz
					Supreme Oil	1.00	gal
Irrigate	July			0.99	Water	9.00	acin
Insect: Codling Moth	August	62 HP 2WD	Air Blast Sprayer		Cyd X	3.00	floz
Irrigate				0.99	Water	9.00	acin
Insect: Codling Moth	August	62 HP 2WD	Air Blast Sprayer		Cyd X	3.00	floz
Weed: Mow Middles	August	62 HP 2WD	Mower/Chopper				
Irrigate	September			0.66	Water	6.00	acin
Harvest: 1st pick	October			50.00			
Harvest: 2d pick	October			40.00			
Haul to Shed	October	62 HP 2WD	Front End Loader Loader Forks Bin Trailer 3-Point Forks				
Sort, Pack, Sell Fruit					Pack	450.00	box
Irrigate	October				Water	6.00	acin
Fertilize: N in alternate years	November	62 HP 2WD	Spreader		15.5-0-0	21.00	lb N
Weed: Dormant Tree Row	November	62 HP 2WD	Weed Sprayer		Roundup	2.00	pint
					Princep	1.02	lb