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ORCHARD ECONOMICS: ESTABLISHING AND PRODUCING D'ANJOU AND FRESH BARTLETT PEARS IN HOOD RIVER COUNTY

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Photo: A pear orchard at the base of Mount Hood near Parkdale, Oregon by David Halliday.

Orchard Economics: Establishing and Producing d'Anjou and Fresh Bartlett Pears in Hood River County

David W. Halliday, Clark Seavert, and Steve Castagnoli,*

Introduction

Many factors enter into the decision to renew an existing orchard or develop a new one. Both require the commitment of considerable effort and financial resources. Planting a high-density orchard can increase production during the establishment years and reduce the time to reach full production compared to those of a standard-density orchard. While the high-density orchard has higher economic potential, it also has greater financial risk associated with it.

This analysis is intended for growers and investors who are considering the economic and financial consequences of planting a higher-density d'Anjou and fresh Bartlett pear orchard. It is impossible to cover all pear variety, rootstock, and training system combinations in a publication of this type so an attempt has been made to reflect the typical production practices in the Hood River County pear industry.

Assumptions

In the preparation of this publication, assumptions were made that reflect current trends in orchard design for establishing a d'Anjou and fresh Bartlett pear orchard. These assumptions are:

1. Typical acreage for a farm in Hood River County is 70 acres of irrigated land. Bearing acres include: 30 acres of winter pears, 12 acres of fresh market Bartlett pears, 8 acres of d'Anjou and fresh Bartlett pears, 5 acres of medium-density apples, 5 acres of high-density sweet cherries or wine grapes, and 10 acres, or approximately 15 percent, of orchard under establishment.

2. Remove 8 acres of existing orchard and plant 242 pear trees per acre (10' x 18') spacing, with 75 percent d'Anjou and 25 percent Bartlett trees.
3. The productive life of this orchard is 25 years, once full production of 50 bins per acre is reached.
3. The d'Anjou and fresh Bartlett pear orchard is trained to a central leader system.
4. The average pear prices are \$217.50 per 1,050 pound bin return to grower after packing costs have been subtracted.
5. Commercial yields begin in year 4 and full production is reached 8 years after planting with 10, 20, 30, 40, and 50 bins per acre in years 4 through 8, respectively.
6. General labor is hired at a rate of \$12.50 per hour, machine labor at \$17.25 per hour, and harvest labor earns \$29.50 per bin, which includes worker's compensation, unemployment insurance, and other labor overhead expenses. All labor is treated as a cash variable expense.
7. The owner provides housing facilities for seasonal labor at a cost of \$300,000 for a 10-person unit. The life of the facility is 30 years, depreciated using the straight-line method of depreciation with a zero salvage value, and costs allocated across the 70 acres.

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8. Foreman housing with all utilities is provided at no cost to the employee, valued at \$1,000 per month, or \$171 per acre, and is a fixed non-cash opportunity cost to the operator. This is the estimated market rental rate for a three bedroom, two-bathroom house in the area.
9. The machinery and equipment used in the budget reflects the typical machinery complement of a farm in Hood River County. A detailed breakdown of machinery values is shown in Table 1. Estimated machinery costs from the American Society of Agricultural Engineers are shown in Table 2. The 70-hp tractor is used for flailing, shredding brush, pulling an air-blast sprayer, and during harvest. The 50-hp tractor is used to auger holes for new trees, spread fertilizer, pull an older air-blast sprayer, apply gopher bait, and during harvest. The 35-hp tractor is used to spray weeds, assist in harvest, and as a general utility tractor. Table 3 lists the estimated cost of each operation with 18' tree row spacing. Gasoline and diesel costs per gallon are \$3.75 and \$3.35 respectively. Propane costs \$2.25 per gallon.
10. The interest rate on operating funds is 5 percent, which is treated as a cash expense. One-half of the cash expenses are borrowed for a six-month period.
11. Machinery and land are owned by the operator and assessed a 5 percent rate of interest as opportunity costs. Land is valued at \$15,000 per acre.
12. Previous years' establishment costs are funded by the operator at a charge of 5 percent interest and are considered an opportunity cost.
13. Herbicides used for strip maintenance are applied to 30 percent of each acre.
14. A micro-sprinkler irrigation system with poly-tube is used at an estimated cost of \$2,100 per acre. The life of the system is 20 years and is depreciated using the straight-line method of depreciation with a zero salvage value. Interest is calculated using the average value of the system multiplied by a 5 percent interest rate $((\text{cost} + \text{salvage value}) \div 2 \times .05)$. Repairs and maintenance for the system cost one percent of the purchase price per year.
15. Three wind machines are used for frost control for the entire orchard along with an average of 15 propane heaters per acre. The wind machines are valued at \$33,000 each and propane heaters cost \$5,460 each. Depreciation periods are 30 years for the wind machines and 10 years for the propane heaters using the straight-line method of depreciation.
16. Additional assumptions for variable, cash fixed, and non-cash fixed cost are listed in Table 4.
17. Price inflation for the duration of this study is ignored.
18. Income tax considerations are also ignored for this study.

Table 1. Machinery Cost Assumptions.

Machine	Size or description	Market value	Hours or miles of annual use	Expected life (years)	Salvage Value
Tractor	4 wheel dr 70hp, new	\$ 39,000	455	10	\$ 11,520
Tractor	2 wheel dr 50hp, old	5,000	171	20	642
Tractor	2 wheel dr 35 hp, old	3,000	52	20	385
Air-blast sprayer	400 gallon unit, PTO, new	19,000	107	10	3,360
Air-blast sprayer	400 gallon unit, PTO, older	10,000	72	10	1,768
Flail chopper	8' unit	7,000	152	7	1,786
Weed sprayer	100 gallon unit	2,500	52	15	240
Fertilizer spreader		3,075	13	20	160
Brush rake		3,500	21	20	182
Gopher machine		2,400	13	20	125
Pickup	1/2 ton 4x4, new	35,000	12,000	10	13,235
Truck	2 ton, used	18,000	3,500	20	2,710
Gator	4 wheel, new	14,000	3,000	5	6,274
Auger		3,200	35	20	167
Front-end loader & backforks		5,800	64	10	1,026
Ladders	20 units, per 70 acres	3,185	N/A	10	N/A
Picking bags	20 units, per 70 acres	480	N/A	2	N/A
Chain & pruning saws	3 units each, 1-loppers	3,000	N/A	3	N/A
Irrigation system ¹	Micro, per acre	2,100	N/A	20	N/A
Wind machine	3 units, propane, per 70 acres	99,000	70	30	1,521
Propane heaters	15 units, per acre	81,900	70	10	9,656
Housing facilities	1 unit, per 70 acres	300,000	N/A	30	0

¹Included in costs are all materials and labor to install system.

Table 2. Machinery Cost Calculations.

Machine	Size or description	--- Variable costs ---		-- Fixed costs --		Total cost
		Fuel & Lube	Repairs & Maint.	Depreciation & Interest		
----- Costs per hour -----						
Tractor	4 wheel dr 70hp, new	\$11.56	\$0.53	\$8.82		\$20.91
Tractor	2 wheel dr 50hp, old	8.48	0.12	\$2.10		10.69
Tractor	2 wheel dr 35 hp, old	5.78	0.02	4.16		9.96
Air-blast sprayer	400 gallon unit, PTO, new	0.00	7.96	19.78		27.74
Air-blast sprayer	400 gallon unit, PTO, older	0.00	3.71	15.62		19.32
Flail chopper	8' unit	0.00	3.28	6.33		9.62
Weed sprayer	100 gallon unit	0.00	0.95	4.23		5.18
Fertilizer spreader		0.00	1.29	17.44		18.73
Brush rake		0.00	0.42	12.31		12.73
Gopher machine		0.00	1.02	13.24		14.26
----- Costs per mile -----						
Pickup	1/2 ton 4x4, new	\$0.36	\$0.05	\$0.28		\$0.69
Truck	2 ton, used	0.72	0.57	0.37		1.66
Gator	4 wheel, new	1.04	0.02	0.68		1.74
----- Costs per acre -----						
Auger		\$0.00	\$0.27	\$3.37		\$3.64
Front-end loader & backforks		0.00	\$2.89	10.13		13.02
Ladders	20 units, per 70 acres	0.00	2.73	5.69		8.42
Picking bags	20 units, per 70 acres	0.00	0.41	3.60		4.01
Chain & pruning saws	3 units each, 1-loppers	6.47	2.57	15.36		24.40
Irrigation system	Micro, per acre	0.00	21.00	157.50		178.50
Wind machine	3 units, propane, per 70 acres	62.10	30.90	82.32		175.32
Propane heaters	15 units, per acre	18.00	11.70	0.00		29.70
Housing facilities	1 unit, per 70 acres	0.00	113.57	250.00		363.57

Table 3. Estimated Cost of Each Operation with Power Unit for an 18' Between-Row Spacing.							
Operation	Tractor	Miles per hour	Acres per hour	Labor cost per acre	-- Machine costs --		Total cost per acre
					Variable cost per acre	Fixed cost per acre	
Air-blast sprayer	4 wheel dr 70hp	2.00	3.27	\$5.27	\$6.12	\$8.74	\$20.13
Flail chopper	4 wheel dr 70hp	3.00	2.78	6.20	5.53	5.44	17.17
Weed sprayer	2 wheel dr 35hp	2.75	2.25	7.67	3.00	3.73	14.39
Fertilizer spreader	2 wheel dr 50hp	3.00	9.16	1.88	1.08	2.13	5.09
Brush rake ¹	N/A	N/A	N/A	0.00	0.15	4.42	4.58
Gopher machine	2 wheel dr 50hp	2.50	4.36	3.95	2.20	3.51	9.67

¹Included with flail chopper as one operation.

Table 4. Input assumptions for establishing a d'Anjou and fresh Bartlett pear orchard, (per acre basis).

	Year 0	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Full Prod
Prices per bin	\$217.50	\$217.50	\$217.50	\$217.50	\$217.50	\$217.50	\$217.50	\$217.50	\$217.50
Bins per acre	0.00	0.00	0.00	0.00	10	20	30	40	50
Cost of general orchard labor, per hour	\$12.50	\$12.50	\$12.50	\$12.50	\$12.50	\$12.50	\$12.50	\$12.50	\$12.50
Cost of tractor driver, per hour	\$17.25	\$17.25	\$17.25	\$17.25	\$17.25	\$17.25	\$17.25	\$17.25	\$17.25
Cost of harvest labor, per bin	\$29.50	\$29.50	\$29.50	\$29.50	\$29.50	\$29.50	\$29.50	\$29.50	\$29.50
Hauling fruit to packinghouse	\$0.00	\$0.00	\$0.00	\$0.00	\$3.50	\$3.50	\$3.50	\$3.50	\$3.50
Hours of pruning and training labor	0.00	10.00	20.00	30.00	40.00	40.00	25.00	25.00	25.00
Hours of thinning labor	0.00	0.00	0.00	0.00	0.00	10.00	15.00	15.00	18.00
Hours of irrigating labor	0.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00
Hours to install codling moth pheromone dispensers	0.00	0.00	0.00	0.00	2.25	2.25	2.25	2.25	2.25
Hours to remove & replace tree labor	0.00	0.50	1.00	1.00	2.50	2.50	2.50	2.50	2.50
Hours for frost protection labor	0.00	0.00	0.00	0.00	2.00	2.00	2.00	2.00	2.00
Hours of supervisory labor during harvest	0.00	0.00	0.00	0.00	2.50	5.00	7.50	10.00	12.50
Cost of fertilizer - broadcast applied	\$920.00	\$0.00	\$60.00	\$60.00	\$120.00	\$120.00	\$240.00	\$240.00	\$240.00
Cost of fertilizer - lime	\$220.00	\$0.00	\$0.00	\$0.00	\$220.00	\$0.00	\$0.00	\$0.00	\$55.00
Cost of herbicide strip maintenance	\$0.00	\$50.00	\$50.00	\$50.00	\$50.00	\$50.00	\$50.00	\$50.00	\$50.00
Cost of insecticides & fungicides	\$0.00	\$0.00	\$200.00	\$400.00	\$800.00	\$800.00	\$800.00	\$800.00	\$800.00
Cost of pheromone dispensers	\$0.00	\$0.00	\$0.00	\$0.00	\$110.00	\$110.00	\$110.00	\$110.00	\$110.00
Cost of rodent materials & trapping	\$0.00	\$40.00	\$40.00	\$40.00	\$40.00	\$40.00	\$40.00	\$40.00	\$40.00
Cost per beehive	\$0.00	\$0.00	\$0.00	\$0.00	\$55.00	\$55.00	\$55.00	\$55.00	\$55.00
Times for fertilizer - broadcast applied	1.00	1.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Times for herbicide strip spray	1.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Times for insecticides & fungicides	0.00	0.00	2.00	4.00	10.00	10.00	10.00	10.00	10.00
Number of beehives per acre	0.00	0.00	0.00	0.00	1.50	2.00	2.00	2.00	2.00
Times for rodent control	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Times for flailing/mowing orchard floor	0.00	2.00	4.00	8.00	8.00	8.00	8.00	8.00	8.00

Table 4 continues on next page

Table 4. Input assumptions for establishing a d'Anjou and fresh Bartlett pear orchard, (per acre basis) (continued).

	Year 0	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Full Prod
Property taxes	\$60.00	\$60.00	\$60.00	\$60.00	\$60.00	\$60.00	\$60.00	\$60.00	\$60.00
Property insurance	\$25.00	\$25.00	\$25.00	\$25.00	\$25.00	\$25.00	\$25.00	\$25.00	\$25.00
Land values	\$15,000	\$15,000	\$15,000	\$15,000	\$15,000	\$15,000	\$15,000	\$15,000	\$15,000
Foreman housing (per month)	\$1,000	\$1,000	\$1,000	\$1,000	\$1,000	\$1,000	\$1,000	\$1,000	\$1,000
Irrigation assessment	\$80.00	\$80.00	\$80.00	\$80.00	\$80.00	\$80.00	\$80.00	\$80.00	\$80.00
Miscellaneous & overhead	\$125.00	\$125.00	\$125.00	\$125.00	\$125.00	\$125.00	\$125.00	\$125.00	\$125.00
Tree cost	\$8.00	\$8.00	\$8.00	\$8.00	\$8.00	\$8.00	\$8.00	\$8.00	\$8.00
Gasoline price	\$3.75	\$3.75	\$3.75	\$3.75	\$3.75	\$3.75	\$3.75	\$3.75	\$3.75
Diesel fuel price	\$3.35	\$3.35	\$3.35	\$3.35	\$3.35	\$3.35	\$3.35	\$3.35	\$3.35
Propane Price	\$2.25	\$2.25	\$2.25	\$2.25	\$2.25	\$2.25	\$2.25	\$2.25	\$2.25
Operating interest rate	5.00%	5.00%	5.00%	5.00%	5.00%	5.00%	5.00%	5.00%	5.00%
Machinery interest rate	5.00%	5.00%	5.00%	5.00%	5.00%	5.00%	5.00%	5.00%	5.00%
Land interest rate	5.00%	5.00%	5.00%	5.00%	5.00%	5.00%	5.00%	5.00%	5.00%
Establishment interest rate	5.00%	5.00%	5.00%	5.00%	5.00%	5.00%	5.00%	5.00%	5.00%
% of operating capital borrowed	50.00%	50.00%	50.00%	50.00%	50.00%	50.00%	50.00%	50.00%	50.00%
Months to borrow operating capital	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Planted trees	0.00	242	2	2	2	2	2	2	2

Results of establishing a d’Anjou and fresh Bartlett pear orchard in Hood River County

Cash flow analysis

A cash flow analysis for establishing a d’Anjou and fresh Bartlett pear planting is presented in Table 5. It shows the cash costs required to establish an orchard. Cash costs include labor, trees, irrigation system, fertilizer, chemicals, beehives, machinery repairs, fuel, lube and oil, labor housing repairs and maintenance, operating (short-term) interest, machinery and housing insurance, irrigation water assessments, and property taxes. The income, variable costs, and cash fixed costs are shown for each of the eight establishment years plus first full production year. Production begins in year 4 with 10 bins of pears per acre and increases to 50 bins at full production. Total variable costs are \$2,672 in the first year with an additional \$140 of cash fixed costs for a total cash cost of \$2,812 per acre.

A positive cash flow begins in year 5 with gross income exceeding total cash costs by \$446 per acre. At full production, or in eight years after planting, the orchard does not return a sufficient amount of gross income to pay all previous years’ cash costs. There is \$1,251 per acre remaining over and above prior costs and it is not until year 11 that all previous years’ cash production costs are paid, Figure 1, page 11.

The major cost components in relation to total cash costs are shown in Figure 2 on page 11. Hired labor represents 56 percent of the total cash costs to establish this orchard. Together, fertilizer and chemicals is the second largest cost item, making up 19 percent of the total cash costs. Machine costs, which include fuel, oil, and repairs, are 11 percent of the cash costs. Tree and irrigation costs are only 5 and 6 percent of the total cash costs, respectively. The

remaining 3 percent of the total cash costs are operating interest (1 percent) and field preparations (2 percent).

Economic costs and returns

The economic costs and returns for the establishment of a d’Anjou and fresh Bartlett pear orchard are shown in Table 6. Economic costs include all cash costs and ownership costs that are either an opportunity cost to the owner or money borrowed from a financial institution. These ownership costs include the principal and interest payments or a return on investment to the grower, or both, for machinery, housing, land, and funds to pay for previous years’ establishment costs. The gross income and variable cash costs remain the same as in Table 5 except that the irrigation system is amortized over its productive life in this analysis and included in fixed machine costs.

Gross income exceeds variable costs beginning in Year 5 with a \$586 per acre return to the grower. Additionally, at the end of the establishment period, \$21,903 per acre remains to be paid for all previous establishment costs. This cost is amortized over a 25-year period as an annual payment of \$1,726 per acre, which includes principal and interest to recover the capital investment of establishing the orchard, as shown in Table 15, Full Production Years, page 21.

The relative contribution of each cost component to the total economic cost is shown in Figure 3 on page 11. When all economic costs are included, labor is the largest item equaling 21 percent of the total costs for the first 8 years of establishment. Machine costs (fuel, oil, repairs, depreciation, and interest charges) and interest costs are 16 and 15 percent of the total economic costs, respectively. Excluding the “other” cost category (18 percent), fertilizer and chemicals, and land

charges are the third and fourth largest cost items at 14 and 12 percent of the total economic costs respectively. Trees are 4 percent of the total economic costs. The net projected returns and economic costs to establish a d'Anjou and fresh

Bartlett pear orchard are shown in Figure 3, page 11. With the assumptions in this study, this orchard will generate sufficient gross incomes to cover all economic costs in year 20.

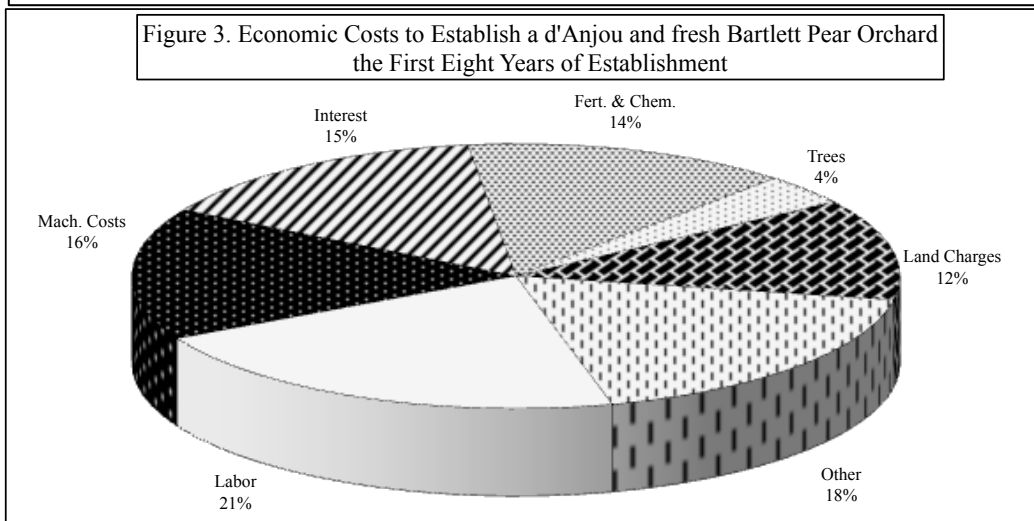
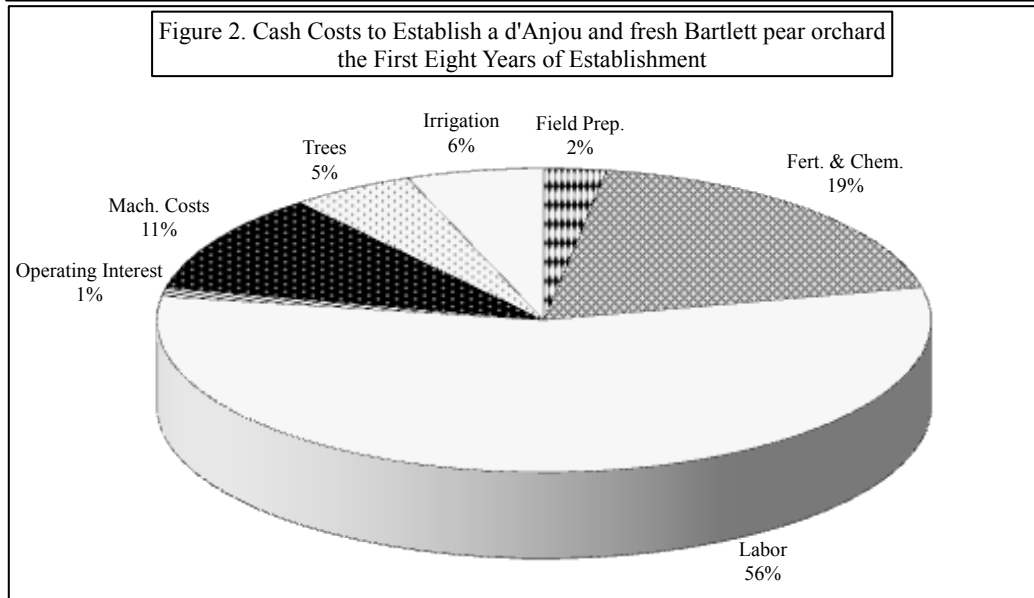
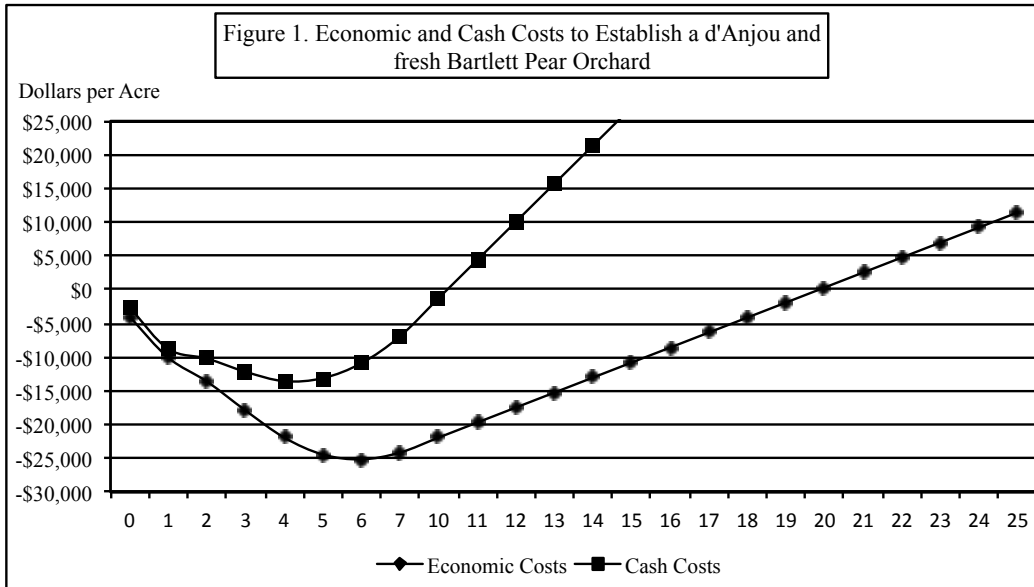
Table 5. Cash costs and returns of establishing a d'Anjou and fresh Bartlett pear orchard.

Income:	Year 0	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Full Prod
Yield (bins/acre)	0.00	0.00	0.00	0.00	10.00	20.00	30.00	40.00	50.00
Price (dollars/bin)	<u>217.50</u>	<u>217.50</u>	<u>217.50</u>	<u>217.50</u>	<u>217.50</u>	<u>217.50</u>	<u>217.50</u>	<u>217.50</u>	<u>217.50</u>
Gross income (dollars/acre)	0.00	0.00	0.00	0.00	2,175.00	4,350.00	6,525.00	8,700.00	10,875.00
Variable costs (per acre):									
Field preparation	1,002.00	30.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Trees	0.00	1,936.00	16.00	16.00	16.00	16.00	16.00	16.00	16.00
Irrigation system	0.00	2,121.00	21.00	21.00	21.00	21.00	21.00	21.00	21.00
Paint trees	0.00	30.00	0.00	30.00	0.00	0.00	0.00	0.00	0.00
Fertilizer	1,151.20	0.00	60.00	60.00	340.00	120.00	240.00	240.00	295.00
Chemicals	0.00	50.00	250.00	450.00	850.00	850.00	850.00	850.00	850.00
Codling moth pheromone disruption	0.00	0.00	0.00	0.00	110.00	110.00	110.00	110.00	110.00
Bee rental	0.00	0.00	0.00	0.00	82.50	110.00	110.00	110.00	110.00
Rodent control w/ trapping	0.00	40.00	40.00	40.00	40.00	40.00	40.00	40.00	40.00
Harvest labor	0.00	0.00	0.00	0.00	344.21	688.42	1,032.64	1,376.85	1,721.06
General labor	43.50	1,010.43	400.64	667.18	821.55	946.55	821.55	821.55	859.05
Machine costs	204.21	334.81	233.62	273.65	517.72	577.27	636.83	696.38	755.93
Seasonal housing facilities	113.57	113.57	113.57	113.57	113.57	113.57	113.57	113.57	113.57
Miscellaneous & overhead	125.00	125.00	125.00	125.00	125.00	125.00	125.00	125.00	125.00
Interest: operating capital	<u>32.99</u>	<u>46.14</u>	<u>15.75</u>	<u>22.46</u>	<u>42.27</u>	<u>46.47</u>	<u>51.46</u>	<u>56.50</u>	<u>62.71</u>
Total variable costs	2,672.48	5,836.95	1,275.58	1,818.86	3,423.83	3,764.30	4,168.04	4,576.85	5,079.32
Gross income - variable cost	-2,672.48	-5,836.95	-1,275.58	-1,818.86	-1,248.83	585.70	2,356.96	4,123.15	5,795.68
Cash fixed costs (per acre):									
Water assessment	80.00	80.00	80.00	80.00	80.00	80.00	80.00	80.00	80.00
Property taxes	<u>60.00</u>	<u>60.00</u>	<u>60.00</u>	<u>60.00</u>	<u>60.00</u>	<u>60.00</u>	<u>60.00</u>	<u>60.00</u>	<u>60.00</u>
Total fixed cost	140.00	140.00	140.00	140.00	140.00	140.00	140.00	140.00	140.00
Total cost	2,812.48	5,976.95	1,415.58	1,958.86	3,563.83	3,904.30	4,308.04	4,716.85	5,219.32
Net projected returns	-2,812.48	-5,976.95	-1,415.58	-1,958.86	-1,388.83	445.70	2,216.96	3,983.15	5,655.68
Cumulative returns	-2,812.48	-8,789.43	-10,205.01	-12,163.87	-13,552.70	-13,106.99	-10,890.04	-6,906.89	-1,251.21

Table 6. Economic costs and returns of establishing a d'Anjou and fresh Bartlett pear orchard.

Income:	Year 0	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Full Prod
Yield (bins/acre)	0.00	0.00	0.00	0.00	10.00	20.00	30.00	40.00	50.00
Price (dollars/bin)	<u>217.50</u>	<u>217.50</u>	<u>217.50</u>	<u>217.50</u>	<u>217.50</u>	<u>217.50</u>	<u>217.50</u>	<u>217.50</u>	<u>217.50</u>
Gross income (dollars/acre)	0.00	0.00	0.00	0.00	2,175.00	4,350.00	6,525.00	8,700.00	10,875.00
Variable costs (per acre):									
Field preparation	1,002.00	30.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Trees	0.00	1,936.00	16.00	16.00	16.00	16.00	16.00	16.00	16.00
Irrigation system	0.00	21.00	21.00	21.00	21.00	21.00	21.00	21.00	21.00
Paint trees	0.00	30.00	0.00	30.00	0.00	0.00	0.00	0.00	0.00
Fertilizer	1,151.20	0.00	60.00	60.00	340.00	120.00	240.00	240.00	295.00
Chemicals	0.00	50.00	250.00	450.00	850.00	850.00	850.00	850.00	850.00
Codling moth pheromone disruption	0.00	0.00	0.00	0.00	110.00	110.00	110.00	110.00	110.00
Bee rental	0.00	0.00	0.00	0.00	82.50	110.00	110.00	110.00	110.00
Rodent control w/ trapping	0.00	40.00	40.00	40.00	40.00	40.00	40.00	40.00	40.00
Harvest labor	0.00	0.00	0.00	0.00	344.21	688.42	1,032.64	1,376.85	1,721.06
General labor	43.50	1,010.43	400.64	667.18	821.55	946.55	821.55	821.55	859.05
Machine costs	204.21	334.81	233.62	273.65	517.72	577.27	636.83	696.38	755.93
Housing facilities	113.57	113.57	113.57	113.57	113.57	113.57	113.57	113.57	113.57
Miscellaneous & overhead	125.00	125.00	125.00	125.00	125.00	125.00	125.00	125.00	125.00
Interest: operating capital	<u>32.99</u>	<u>46.14</u>	<u>15.75</u>	<u>22.46</u>	<u>42.27</u>	<u>46.47</u>	<u>51.46</u>	<u>56.50</u>	<u>62.71</u>
Total variable costs	2,672.48	3,736.95	1,275.58	1,818.86	3,423.83	3,764.30	4,168.04	4,576.85	5,079.32
Gross income - variable cost	-2,672.48	-3,736.95	-1,275.58	-1,818.86	-1,248.83	585.70	2,356.96	4,123.15	5,795.68
Fixed costs (per acre):									
Water assessment	80.00	80.00	80.00	80.00	80.00	80.00	80.00	80.00	80.00
Property taxes	60.00	60.00	60.00	60.00	60.00	60.00	60.00	60.00	60.00
Machine costs	113.59	739.45	430.49	479.62	535.19	685.07	535.19	535.19	535.19
Foreman housing	171.43	171.43	171.43	171.43	171.43	171.43	171.43	171.43	171.43
Seasonal housing facilities	250.00	250.00	250.00	250.00	250.00	250.00	250.00	250.00	250.00
Land interest costs	750.00	750.00	750.00	750.00	750.00	750.00	750.00	750.00	750.00
Interest on establishment costs	<u>0.00</u>	<u>206.12</u>	<u>507.07</u>	<u>684.55</u>	<u>900.52</u>	<u>1,101.57</u>	<u>1,228.44</u>	<u>1,265.60</u>	¹ <u>1,702.28</u>
Total fixed cost	1,425.01	2,257.00	2,249.00	2,475.60	2,747.14	3,098.07	3,075.06	3,112.21	3,572.60
Total cost	4,097.49	5,993.96	3,524.57	4,294.45	6,170.97	6,862.37	7,243.10	7,689.07	8,651.92
Net projected returns	-4,097.49	-5,993.96	-3,524.57	-4,294.45	-3,995.97	-2,512.37	-718.10	1,010.93	2,223.08
Cumulative returns	-4,097.49	-10,091.45	-13,616.02	-17,910.47	-21,906.44	-24,418.81	-25,136.91	-24,125.98	-21,902.90

¹This cost is an annual payment, amortized over a 25-year period, which includes principal and interest to recover the capital investment of establishing this orchard in years 0 through 7.



Conclusion

Historically, most growers have renewed orchards only when production levels no longer covered the cost of production. Today, however, poor pear production and poor market performance of apples in the Hood River Valley have increased interest in replacing old orchards with modern higher-density pear orchards.

Under normal production and market conditions high-density orchards will offer higher returns that are obtained earlier in the life of the orchard. These early returns reduce interest costs and therefore improve the profitability and feasibility of an orchard investment. The trade off, however, is higher risk due to larger up-front costs and significantly greater management expertise requirements.

This cost of establishment study is meant to provide useful information to pear producers who are considering replacing an existing orchard or planting a new block. As with any enterprise budget, using your own current costs in the analysis will make it more meaningful. Furthermore, actual price and yield can significantly alter results of orchard establishment.

Using *AgBiz Logic*[™] to Analyze Different Price and Yield Scenarios

Using different price and yield scenarios can provide growers with a greater appreciation of the risk involved in orchard

establishment or renewal. Because numerous factors and unforeseen events (e.g. damage from freeze, rain, hail, birds, changes in market conditions) can impact yield and price scenarios, analyses of these are not presented in this bulletin.

AgBiz Logic is a suite of economic, financial, and environmental decision tools for businesses that grow, harvest, package, add-value and sell agricultural products. The *AgBizProfit* program is designed to help agricultural producers make long-run capital investment decisions about enterprises such as orchard establishment or renewal. The *AgBizLease* program helps landowners and tenants establish equitable short- and long-run crop and livestock leases. *AgBizFinance* is a whole farm and ranch program that generates 19 financial ratios and performance measures when considering long-run investments.

These *AgBiz Logic* decision tools can be accessed at <http://www.agbizlogic.com>. In addition, the data from this publication will be provided.

It is recommended that before investing in any long-run perennial crop, that the potential investor use *AgBiz Logic* programs to fully analyze the profitability and feasibility of potential investments under varying price and yield scenarios.

APPENDIX A

Enterprise Budgets for Establishing a d'Anjou and fresh Bartlett Pear Orchard

Table 7. Year 0, d'Anjou and fresh Bartlett pear establishment, \$/acre economic costs and returns.					
VARIABLE CASH COSTS	Description	Labor	Machinery	Materials	Total
Tree and root removal, ripping (2x)	2.0 custom	\$0.00	\$0.00	\$1,000.00	\$1,000.00
Disc	2.0 hours	34.50	24.18	0.00	58.68
Plotting	1.0 x/acre	9.00	0.00	2.00	11.00
Soil sampling (1 per 5 acres)	1.0 x/acre	0.00	0.00	11.20	11.20
Fumigation	1.0 custom	0.00	0.00	920.00	920.00
Liming	1.0 custom	0.00	0.00	220.00	220.00
Pickup, truck & Gator	1.0 x/acre	0.00	180.03	0.00	180.03
Housing facilities	1.0 x/acre	0.00	0.00	113.57	113.57
Miscellaneous and overhead	1.0 x/acre	0.00	0.00	125.00	125.00
Interest: operating capital	6.0 months	<u>0.00</u>	<u>0.00</u>	<u>32.99</u>	<u>32.99</u>
Total variable costs		43.50	204.21	2,424.76	2,672.48
FIXED CASH COSTS				Unit	Total
Water assessment				acre	80.00
Property insurance				acre	25.00
Property taxes				acre	<u>60.00</u>
Total fixed cash costs					165.00
FIXED NON-CASH COSTS				Unit	Total
Machinery and equipment - depreciation & interest				acre	17.63
Pickup, truck & Gator - depreciation & interest				acre	95.95
Foreman housing				acre	171.43
Housing facilities				acre	250.00
Land interest charge				acre	<u>750.00</u>
Total fixed non-cash costs					1,285.01
Total fixed costs					1,450.01
Total of all costs per acre					\$4,122.49

Table 8. Year 1, d'Anjou and fresh Bartlett pear establishment, \$/acre economic costs and returns.						
VARIABLE CASH COSTS	Description	Labor	Machinery	Materials	Total	
Augering holes	14.0 hours	\$175.00	\$31.07	\$0.00	\$206.07	
Planting trees	40.0 hours	500.00	\$88.77	1,936.00	2,524.77	
Painting trees	8.0 hours	100.00	0.00	30.00	130.00	
Training trees	10.0 hours	125.00	0.00	0.00	125.00	
Herbicide strip maintenance (.30x)	2.0 applications	15.33	6.00	50.00	71.33	
Seed cover crop	20.0 lbs	16.25	15.68	30.00	61.93	
Flailing/mowing orchard floor	2.0 times	12.40	11.05	0.00	23.45	
Rodent control w/ trapping	1.0 applications	3.95	2.20	40.00	46.16	
Irrigation	5.0 hours	62.50	0.00	21.00	83.50	
Pickup, truck & Gator	1.0 x/acre	0.00	180.03	0.00	180.03	
Seasonal housing facilities	1.0 x/acre	0.00	0.00	113.57	113.57	
Miscellaneous and overhead	1.0 x/acre	0.00	0.00	125.00	125.00	
Interest: operating capital	6.0 months	<u>0.00</u>	<u>0.00</u>	<u>46.14</u>	<u>46.14</u>	
Total variable costs		1,010.43	334.81	2,391.71	3,736.95	
FIXED CASH COSTS				Unit	Total	
Water assessment				acre	80.00	
Property insurance				acre	25.00	
Property taxes				acre	<u>60.00</u>	
Total fixed cash costs					165.00	
FIXED NON-CASH COSTS				Unit	Total	
Machinery and equipment - depreciation & interest				acre	643.50	
Pickup, truck & Gator - depreciation & interest				acre	95.95	
Foreman housing				acre	171.43	
Seasonal housing facilities				acre	250.00	
Land interest charge				acre	750.00	
Prior year's establishment costs - Interest				acre	<u>206.12</u>	
Total fixed non-cash costs					2,117.00	
Total fixed costs					2,282.00	
Total of all costs per acre					\$6,018.96	

Table 9. Year 2, d'Anjou and fresh Bartlett pear establishment, \$/acre economic costs and returns.

Table 9. Year 2, d'Anjou and fresh Bartlett pear establishment, \$/acre economic costs and returns.						
VARIABLE CASH COSTS	Description	Labor	Machinery	Materials	Total	
Pruning and training	20.0 hours	\$250.00	\$0.00	\$0.00	\$250.00	
Tree removal & tree replacement	1.0 hours	29.75	8.87	16.00	54.62	
Fertilizer & custom lime	2.0 applications	3.76	2.16	60.00	65.92	
Herbicide strip maintenance (.30x)	2.0 applications	15.33	6.00	50.00	71.33	
Insecticides & fungicides	2.0 applications	10.54	12.25	200.00	222.79	
Flailing/mowing orchard floor	4.0 times	24.80	22.10	0.00	46.91	
Rodent control w/ trapping	1.0 applications	3.95	2.20	40.00	46.16	
Irrigation	5.0 hours	62.50	0.00	21.00	83.50	
Pickup, truck & Gator	1.0 x/acre	0.00	180.03	0.00	180.03	
Seasonal housing facilities	1.0 x/acre	0.00	0.00	113.57	113.57	
Miscellaneous and overhead	1.0 x/acre	0.00	0.00	125.00	125.00	
Interest: operating capital	6.0 months	<u>0.00</u>	<u>0.00</u>	<u>15.75</u>	<u>15.75</u>	
Total variable costs		400.64	233.62	641.32	1,275.58	
FIXED CASH COSTS				Unit	Total	
Water assessment				acre	80.00	
Property insurance				acre	25.00	
Property taxes				acre	<u>60.00</u>	
Total fixed cash costs					165.00	
FIXED NON-CASH COSTS				Unit	Total	
Machinery and equipment - depreciation & interest				acre	334.54	
Pickup, truck & Gator - depreciation & interest				acre	95.95	
Foreman housing				acre	171.43	
Seasonal housing facilities				acre	250.00	
Land interest charge				acre	750.00	
Prior year's establishment costs - Interest				acre	<u>507.07</u>	
Total fixed non-cash costs					2,109.00	
Total fixed costs					2,274.00	
Total of all costs per acre					\$3,549.57	

Table 10. Year 3, d'Anjou and fresh Bartlett pear establishment, \$/acre economic costs and returns.

VARIABLE CASH COSTS	Description	Labor	Machinery	Materials	Total
Pruning and training	30.0 hours	\$375.00	\$0.00	\$0.00	\$375.00
Painting trees	8.0 hours	100.00	0.00	30.00	130.00
Tree removal & tree replacement	1.0 hours	29.75	8.87	16.00	54.62
Raking and shredding brush	1.0 x/acre	6.20	5.68	0.00	11.88
Fertilizer & custom lime	2.0 applications	3.76	2.16	60.00	65.92
Herbicide strip maintenance (.30x)	2.0 applications	15.33	6.00	50.00	71.33
Insecticides & fungicides	4.0 applications	21.08	24.50	400.00	445.58
Flailing/mowing orchard floor	8.0 times	49.60	44.21	0.00	93.81
Rodent control w/ trapping	1.0 applications	3.95	2.20	40.00	46.16
Irrigation	5.0 hours	62.50	0.00	21.00	83.50
Pickup, truck & Gator	1.0 x/acre	0.00	180.03	0.00	180.03
Seasonal housing facilities	1.0 x/acre	0.00	0.00	113.57	113.57
Miscellaneous and overhead	1.0 x/acre	0.00	0.00	125.00	125.00
Interest: operating capital	6.0 months	<u>0.00</u>	<u>0.00</u>	<u>22.46</u>	<u>22.46</u>
Total variable costs		667.18	273.65	878.03	1,818.86
FIXED CASH COSTS				Unit	Total
Water assessment				acre	80.00
Property insurance				acre	25.00
Property taxes				acre	<u>60.00</u>
Total fixed cash costs					165.00
FIXED NON-CASH COSTS				Unit	Total
Machinery and equipment - depreciation & interest				acre	383.66
Pickup, truck & Gator - depreciation & interest				acre	95.95
Foreman housing				acre	171.43
Seasonal housing facilities				acre	250.00
Land interest charge				acre	750.00
Prior year's establishment costs - Interest				acre	<u>684.55</u>
Total fixed non-cash costs					2,335.60
Total fixed costs					2,500.60
Total of all costs per acre					\$4,319.45

Table 11. Year 4, d'Anjou and fresh Bartlett pear establishment, \$/acre economic costs and returns.

GROSS INCOME						
	Quantity	Unit	\$/Unit	Total	Price/bin	
Pears	10.00	bins	217.50	<u>2,175.00</u>	<u>217.50</u>	
Total gross income				2,175.00	217.50	
VARIABLE CASH COSTS						
	Description	Labor	Machinery	Materials	Total	Cost/bin
Pruning and training	40.0 hours	\$500.00	\$0.00	\$0.00	\$500.00	\$50.00
Tree removal & tree replacement	2.5 hours	74.38	21.76	16.00	112.14	11.21
Raking and shredding brush	1.0 x/acre	6.20	5.68	0.00	11.88	1.19
Fertilizer & custom lime	2.0 applications	3.76	2.16	340.00	345.92	34.59
Herbicide strip maintenance (.30x)	2.0 applications	15.33	6.00	50.00	71.33	7.13
Insecticides & fungicides	10.0 applications	52.70	61.25	800.00	913.95	91.39
Codling moth pheromone disruption	2.3 hours	28.13	0.00	110.00	138.13	13.81
Bee rental	1.5 hives	0.00	0.00	82.50	82.50	8.25
Flailing/mowing orchard floor	8.0 times	49.60	44.21	0.00	93.81	9.38
Rodent control w/ trapping	1.0 applications	3.95	2.20	40.00	46.16	4.62
Frost protection	2.0 hour	25.00	122.70	0.00	147.70	14.77
Irrigation	5.0 hours	62.50	0.00	21.00	83.50	8.35
Ladders, pruning, & picking equip.	1.0 x/acre	0.00	12.18	0.00	12.18	1.22
Harvesting costs	10.0 bins	344.21	24.55	35.00	403.76	40.38
Checkers & supervisors	2.5 hours					
Tractor drivers	1.0 hours					
Hauling fruit to packinghouse	3.50 \$/bin					
Pickup, truck & Gator	1.0 x/acre	0.00	180.03	0.00	180.03	18.00
Seasonal housing facilities	1.0 x/acre	0.00	0.00	113.57	113.57	11.36
Miscellaneous and overhead	1.0 x/acre	0.00	0.00	125.00	125.00	12.50
Interest: operating capital	6.0 months	<u>0.00</u>	<u>0.00</u>	<u>42.27</u>	<u>42.27</u>	<u>4.23</u>
Total variable costs		1,165.76	482.72	1,775.34	3,423.83	342.38
FIXED CASH COSTS						
				Unit	Total	Cost/bin
Water assessment				acre	80.00	8.00
Property insurance				acre	25.00	2.50
Property taxes				acre	<u>60.00</u>	<u>6.00</u>
Total fixed cash costs					165.00	16.50
FIXED NON-CASH COSTS						
				Unit	Total	Cost/bin
Machinery and equipment - depreciation & interest				acre	439.24	43.92
Pickup, truck & Gator - depreciation & interest				acre	95.95	9.60
Foreman housing				acre	171.43	17.14
Seasonal housing facilities				acre	250.00	25.00
Land interest charge				acre	750.00	75.00
Prior year's establishment costs - Interest				acre	<u>900.52</u>	<u>90.05</u>
Total fixed non-cash costs					2,607.14	260.71
Total fixed costs					2,772.14	277.21
Total of all costs per acre					\$6,195.97	\$619.60
Net projected returns					<u>-\$4,020.97</u>	<u>-\$402.10</u>

Table 12. Year 5, d'Anjou and fresh Bartlett pear establishment, \$/acre economic costs and returns.

GROSS INCOME							
	Quantity	Unit	\$/Unit	Total	Price/bin		
Pears	20.00	bins	217.50	<u>4,350.00</u>	<u>217.50</u>		
Total gross income				4,350.00	217.50		
VARIABLE CASH COSTS							
	Description	Labor	Machinery	Materials	Total	Cost/bin	
	Pruning and training	40.0 hours	\$500.00	\$0.00	\$0.00	\$500.00	\$25.00
	Thinning	10.0 hours	125.00	0.00	0.00	125.00	6.25
	Tree removal & tree replacement	2.5 hours	74.38	21.76	16.00	112.14	5.61
	Raking and shredding brush	1.0 x/acre	6.20	5.68	0.00	11.88	0.59
	Fertilizer & custom lime	2.0 applications	3.76	2.16	120.00	125.92	6.30
	Herbicide strip maintenance (.30x)	2.0 applications	15.33	6.00	50.00	71.33	3.57
	Insecticides & fungicides	10.0 applications	52.70	61.25	800.00	913.95	45.70
	Codling moth pheromone disruption	2.3 hours	28.13	0.00	110.00	138.13	6.91
	Bee rental	2.0 hives	0.00	0.00	110.00	110.00	5.50
	Flailing/mowing orchard floor	8.0 times	49.60	44.21	0.00	93.81	4.69
	Rodent control w/ trapping	1.0 applications	3.95	2.20	40.00	46.16	2.31
	Frost protection	2.0 hour	25.00	122.70	0.00	147.70	7.39
	Irrigation	5.0 hours	62.50	0.00	21.00	83.50	4.18
	Ladders, pruning, & picking equip.	1.0 x/acre	0.00	12.18	0.00	12.18	0.61
	Harvesting costs	20.0 bins	688.42	49.10	70.00	807.53	40.38
	Checkers & supervisors	5.0 hours					
	Tractor drivers	2.1 hours					
	Hauling fruit to packinghouse	3.50 \$/bin					
	Pickup, truck & Gator	1.0 x/acre	0.00	180.03	0.00	180.03	9.00
	Seasonal housing facilities	1.0 x/acre	0.00	0.00	113.57	113.57	5.68
	Miscellaneous and overhead	1.0 x/acre	0.00	0.00	125.00	125.00	6.25
	Interest: operating capital	6.0 months	<u>0.00</u>	<u>0.00</u>	<u>46.47</u>	<u>46.47</u>	<u>2.32</u>
Total variable costs			1,634.98	507.27	1,622.04	3,764.30	188.21
FIXED CASH COSTS							
				Unit	Total	Cost/bin	
	Water assessment			acre	80.00	4.00	
	Property insurance			acre	25.00	1.25	
	Property taxes			acre	<u>60.00</u>	<u>3.00</u>	
Total fixed cash costs					165.00	8.25	
FIXED NON-CASH COSTS							
				Unit	Total	Cost/bin	
	Machinery and equipment - depreciation & interest			acre	589.12	29.46	
	Pickup, truck & Gator - depreciation & interest			acre	95.95	4.80	
	Foreman housing			acre	171.43	8.57	
	Seasonal housing facilities			acre	250.00	12.50	
	Land interest charge			acre	750.00	37.50	
	Prior year's establishment costs - Interest			acre	<u>1,101.57</u>	<u>55.08</u>	
Total fixed non-cash costs					2,958.07	147.90	
Total fixed costs					3,123.07	156.15	
Total of all costs per acre					\$6,887.37	\$344.37	
Net projected returns					-\$2,537.37	-\$126.87	

Table 13. Year 6, d'Anjou and fresh Bartlett pear establishment, \$/acre economic costs and returns.

GROSS INCOME							
	Quantity	Unit	\$/Unit	Total	Price/bin		
Pears	30.00	bins	217.50	<u>6,525.00</u>	<u>217.50</u>		
Total gross income				6,525.00	217.50		
VARIABLE CASH COSTS							
	Description	Labor	Machinery	Materials	Total	Cost/bin	
	Pruning and training	25.0 hours	\$312.50	\$0.00	\$0.00	\$312.50	\$10.42
	Thinning	15.0 hours	187.50	0.00	0.00	187.50	6.25
	Tree removal & tree replacement	2.5 hours	74.38	21.76	16.00	112.14	3.74
	Raking and shredding brush	1.0 x/acre	6.20	5.68	0.00	11.88	0.40
	Fertilizer & Custom Lime	2.0 applications	3.76	2.16	240.00	245.92	8.20
	Herbicide strip maintenance (.30x)	2.0 applications	15.33	6.00	50.00	71.33	2.38
	Insecticides & fungicides	10.0 applications	52.70	61.25	800.00	913.95	30.46
	Codling moth pheromone disruption	2.3 hours	28.13	0.00	110.00	138.13	4.60
	Bee rental	2.0 hives	0.00	0.00	110.00	110.00	3.67
	Flailing/mowing orchard floor	8.0 times	49.60	44.21	0.00	93.81	3.13
	Rodent control w/ trapping	1.0 applications	3.95	2.20	40.00	46.16	1.54
	Frost protection	2.0 hour	25.00	122.70	0.00	147.70	4.92
	Irrigation	5.0 hours	62.50	0.00	21.00	83.50	2.78
	Ladders, pruning, & picking equip.	1.0 x/acre	0.00	12.18	0.00	12.18	0.41
	Harvesting costs	30.0 bins	1,032.64	73.65	105.00	1,211.29	40.38
	Checkers & supervisors	7.5 hours					
	Tractor drivers	3.1 hours					
	Hauling fruit to packinghouse	3.50 \$/bin					
	Pickup, truck & Gator	1.0 x/acre	0.00	180.03	0.00	180.03	6.00
	Seasonal housing facilities	1.0 x/acre	0.00	0.00	113.57	113.57	3.79
	Miscellaneous and overhead	1.0 x/acre	0.00	0.00	125.00	125.00	4.17
	Interest: operating capital	6.0 months	<u>0.00</u>	<u>0.00</u>	<u>51.46</u>	<u>51.46</u>	<u>1.72</u>
Total variable costs			1,854.19	531.83	1,782.03	4,168.04	138.93
FIXED CASH COSTS							
				Unit	Total	Cost/bin	
	Water assessment			acre	80.00	2.67	
	Property insurance			acre	25.00	0.83	
	Property taxes			acre	<u>60.00</u>	<u>2.00</u>	
Total fixed cash costs					165.00	5.50	
FIXED NON-CASH COSTS							
				Unit	Total	Cost/bin	
	Machinery and equipment - depreciation & interest			acre	439.24	14.64	
	Pickup, truck & Gator - depreciation & interest			acre	95.95	3.20	
	Foreman housing			acre	171.43	5.71	
	Seasonal housing facilities			acre	250.00	8.33	
	Land interest charge			acre	750.00	25.00	
	Prior year's establishment costs - Interest			acre	<u>1,228.44</u>	<u>40.95</u>	
Total fixed non-cash costs					2,935.06	97.84	
Total fixed costs					3,100.06	103.34	
Total of all costs per acre					\$7,268.10	\$242.27	
Net projected returns					-\$743.10	-\$24.77	

Table 14. Year 7, d'Anjou and fresh Bartlett pear establishment, \$/acre economic costs and returns.

Table 14. Year 7, d'Anjou and fresh Bartlett pear establishment, \$/acre economic costs and returns.							
GROSS INCOME		Quantity	Unit	\$/Unit	Total	Price/bin	
Pears		40.00	bins	217.50	<u>8,700.00</u>	<u>217.50</u>	
Total gross income					8,700.00	217.50	
VARIABLE CASH COSTS		Description	Labor	Machinery	Materials	Total	Cost/bin
Pruning and training	25.0	hours	\$312.50	\$0.00	\$0.00	\$312.50	\$7.81
Thinning	15.0	hours	187.50	0.00	0.00	187.50	4.69
Tree removal & tree replacement	2.5	hours	74.38	21.76	16.00	112.14	2.80
Raking and shredding brush	1.0	x/acre	6.20	5.68	0.00	11.88	0.30
Fertilizer	2.0	applications	3.76	2.16	240.00	245.92	6.15
Herbicide strip maintenance (.30x)	2.0	applications	15.33	6.00	50.00	71.33	1.78
Insecticides & fungicides	10.0	applications	52.70	61.25	800.00	913.95	22.85
Codling moth pheromone disruption	2.3	hours	28.13	0.00	110.00	138.13	3.45
Bee rental	2.0	hives	0.00	0.00	110.00	110.00	2.75
Flailing/mowing orchard floor	8.0	times	49.60	44.21	0.00	93.81	2.35
Rodent control w/ trapping	1.0	applications	3.95	2.20	40.00	46.16	1.15
Frost protection	2.0	hour	25.00	122.70	0.00	147.70	3.69
Irrigation	5.0	hours	62.50	0.00	21.00	83.50	2.09
Ladders, pruning, & picking equip.	1.0	x/acre	0.00	12.18	0.00	12.18	0.30
Harvesting costs	40.0	bins	1,376.85	98.20	140.00	1,615.05	40.38
Checkers & supervisors	10.0	hours					
Tractor drivers	4.2	hours					
Hauling fruit to packinghouse	3.50	\$/bin					
Pickup, truck & Gator	1.0	x/acre	0.00	180.03	0.00	180.03	4.50
Seasonal housing facilities	1.0	x/acre	0.00	0.00	113.57	113.57	2.84
Miscellaneous and overhead	1.0	x/acre	0.00	0.00	125.00	125.00	3.13
Interest: operating capital	6.0	months	<u>0.00</u>	<u>0.00</u>	<u>56.50</u>	<u>56.50</u>	<u>1.41</u>
Total variable costs			2,198.40	556.38	1,822.08	4,576.85	114.42
FIXED CASH COSTS				Unit	Total	Cost/bin	
Water assessment				acre	80.00	2.00	
Property insurance				acre	25.00	0.63	
Property taxes				acre	<u>60.00</u>	<u>1.50</u>	
Total fixed cash costs					165.00	4.13	
FIXED NON-CASH COSTS				Unit	Total	Cost/bin	
Machinery and equipment - depreciation & interest				acre	439.24	10.98	
Pickup, truck & Gator - depreciation & interest				acre	95.95	2.40	
Foreman housing				acre	171.43	4.29	
Seasonal housing facilities				acre	250.00	6.25	
Land interest charge				acre	750.00	18.75	
Prior year's establishment costs - Interest				acre	<u>1,265.60</u>	<u>31.64</u>	
Total fixed non-cash costs					2,972.21	74.31	
Total fixed costs					3,137.21	78.43	
Total of all costs per acre					\$7,714.07	\$192.85	
Net projected returns					\$985.93	\$24.65	

Table 15. Full production, d'Anjou and fresh Bartlett pear establishment, \$/acre economic costs and returns.

GROSS INCOME						
	Quantity	Unit	\$/unit	Total	Price/bin	
Pears	50.00	bins	217.50	<u>10,875.00</u>	<u>217.50</u>	
Total gross income				10,875.00	217.50	
VARIABLE CASH COSTS						
	Description	Labor	Machinery	Materials	Total	Cost/bin
Pruning and training	25.0 hours	\$312.50	\$0.00	\$0.00	\$312.50	\$6.25
Thinning	18.0 hours	225.00	0.00	0.00	225.00	4.50
Tree removal & tree replacement	2.5 hours	74.38	21.76	16.00	112.14	2.24
Raking and shredding brush	1.0 x/acre	6.20	5.68	0.00	11.88	0.24
Fertilizer & Custom Lime	2.0 applications	3.76	2.16	295.00	300.92	6.02
Herbicide strip maintenance (.30x)	2.0 applications	15.33	6.00	50.00	71.33	1.43
Insecticides & fungicides	10.0 applications	52.70	61.25	800.00	913.95	18.28
Codling moth pheromone disruption	2.3 hours	28.13	0.00	110.00	138.13	2.76
Bee rental	2.0 hives	0.00	0.00	110.00	110.00	2.20
Flailing/mowing orchard floor	8.0 times	49.60	44.21	0.00	93.81	1.88
Rodent control w/ trapping	1.0 applications	3.95	2.20	40.00	46.16	0.92
Frost protection	2.0 hour	25.00	122.70	0.00	147.70	2.95
Irrigation	5.0 hours	62.50	0.00	21.00	83.50	1.67
Ladders, pruning, & picking equip.	1.0 x/acre	0.00	12.18	0.00	12.18	0.24
Harvesting costs	50.0 bins	1,721.06	122.75	175.00	2,018.81	40.38
Checkers & supervisors	12.5 hours					
Tractor drivers	5.2 hours					
Hauling fruit to packinghouse	3.50 \$/bin					
Pickup, truck & Gator	1.0 x/acre	0.00	180.03	0.00	180.03	3.60
Seasonal housing facilities	1.0 x/acre	0.00	0.00	113.57	113.57	2.27
Miscellaneous and overhead	1.0 x/acre	0.00	0.00	125.00	125.00	2.50
Interest: operating capital	6.0 months	<u>0.00</u>	<u>0.00</u>	<u>62.71</u>	<u>62.71</u>	<u>1.25</u>
Total variable costs		2,580.11	580.93	1,918.28	5,079.32	101.59
FIXED CASH COSTS						
				Unit	Total	Cost/bin
Water assessment				acre	80.00	1.60
Property insurance				acre	25.00	0.50
Property taxes				acre	<u>60.00</u>	<u>1.20</u>
Total fixed cash costs					165.00	3.30
FIXED NON-CASH COSTS						
				Unit	Total	Cost/bin
Machinery and equipment - depreciation & interest				acre	439.24	8.78
Pickup, truck & Gator - depreciation & interest				acre	95.95	1.92
Foreman housing				acre	171.43	3.43
Seasonal housing facilities				acre	250.00	5.00
Land interest charge				acre	750.00	15.00
Amortized establishment costs				acre	<u>1,725.99</u>	<u>34.52</u>
Total fixed non-cash costs					3,432.60	68.65
Total fixed costs					3,597.60	71.95
Total of all costs per acre					\$8,676.92	\$173.54
Net projected returns					\$2,198.08	\$43.96