Orchard Economics: Establishing and Producing Medium-Density Apples in Hood River County

Tyler West, Rebecca Sullivan, Clark Seavert, and Steve Castagnoli
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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 medium-density orchard can increase production during the establishment years and reduce the time to reach full production compared to a standard-density orchard. While the medium-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 medium-density apple orchard. It is impossible to cover all apple variety, rootstock, and training system combinations in a publication of this type, so an attempt has been made to reflect the typical production practices performed in the Hood River County apple industry.

Assumptions

In the preparation of this publication, a set of assumptions were made that reflect current trends in orchard design for establishing a medium-density apple 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 medium-density 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 the orchard under establishment.

2. Remove 5 acres of existing orchard and plant 558 apple trees per acre (6' x 13' spacing) with a productive life of 25 years, once full production of 50 bins per acre is reached.

3. The medium-density orchard is trained to a central leader on a three-wire vertical support system.

4. Apple prices are $250 per 850-pound bin return to grower after packing costs are subtracted.

5. Commercial yields begin in year 3, and full production is reached 6 years after planting with yields of 15, 25, 40, and 50 bins per acre in years 3 through 6, respectively.

6. General labor is hired at a rate of $11.50 per hour, machine labor at $13.00 per hour, and harvest labor is $20.00 per bin to harvest apples, 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 $120,000 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 the costs allocated equally across the 70 acres.

8. Foreman housing with all utilities is provided at no cost to the employee, valued at $600 per month, or $103 per acre, and is a fixed non-cash opportunity.

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cost to the operator. This is the estimated market rental rate for a three-bedroom, two-bathroom house in the area.

8. 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 used at 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 13’ tree row spacing. Gasoline and diesel costs per gallon are $4.00, respectively. Propane costs $2.25 per gallon.

9. 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.

10. Machinery and land are owned by the operator and assessed 6 and 4 percent rates of interest, respectively, as opportunity costs. Land is valued at $6,000 per acre.

11. Previous years’ establishment costs are funded by the operator at a charge of 8 percent interest and are considered an opportunity cost.

12. Herbicides used for strip maintenance are applied to 30 percent of each acre.

13. A micro-sprinkler irrigation system with poly-tube is used at an estimated cost of $1,200 per acre. The life of the system is 25 years and 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 an 8 percent interest rate \( \frac{(\text{cost} + \text{salvage value})}{2} \times 0.08 \). Repairs and maintenance for the system costs one percent of the purchase price per year.

14. The trellis system is installed at a cost of $1,800 per acre, not including stringing the wire. The life of the system is 25 years, and it 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 an 8 percent interest rate \( \frac{(\text{cost} + \text{salvage value})}{2} \times 0.08 \). Repairs and maintenance for the system costs one percent of the purchase price per year.

15. Two wind machines are used for frost control along with eight smudge pots per acre. The wind machines are valued at $28,000 each, and smudge pots cost $70 each. Depreciation periods are 25 years for the wind machines and 10 years for the smudge pots 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 consequences are also ignored for this study.
<table>
<thead>
<tr>
<th>Machine</th>
<th>Size or description</th>
<th>Market value</th>
<th>Hours or miles of annual use</th>
<th>Expected life (years)</th>
<th>Salvage Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tractor</td>
<td>4 wheel dr 70hp, new</td>
<td>$33,000</td>
<td>469</td>
<td>10</td>
<td>$9,748</td>
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<tr>
<td>Tractor</td>
<td>2 wheel dr 50hp, old</td>
<td>18,000</td>
<td>157</td>
<td>20</td>
<td>2,310</td>
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<tr>
<td>Tractor</td>
<td>2 wheel dr 35 hp, old</td>
<td>7,500</td>
<td>161</td>
<td>20</td>
<td>962</td>
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<tr>
<td>Forklift (Leased during harvest)</td>
<td>3 months @ $1,200/mon</td>
<td>NA</td>
<td>480</td>
<td>NA</td>
<td>NA</td>
</tr>
<tr>
<td>Air-blast sprayer</td>
<td>400 gallon unit, PTO, new</td>
<td>17,500</td>
<td>125</td>
<td>10</td>
<td>3,095</td>
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<tr>
<td>Air-blast sprayer</td>
<td>400 gallon unit, PTO, older</td>
<td>5,000</td>
<td>84</td>
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<td>884</td>
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<td>Flail chopper</td>
<td>8' unit</td>
<td>6,000</td>
<td>160</td>
<td>7</td>
<td>1,531</td>
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<td>Weed sprayer</td>
<td>100 gallon unit</td>
<td>2,000</td>
<td>61</td>
<td>15</td>
<td>192</td>
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<td>Fertilizer spreader</td>
<td></td>
<td>2,300</td>
<td>17</td>
<td>20</td>
<td>120</td>
</tr>
<tr>
<td>Brush windrow</td>
<td></td>
<td>3,500</td>
<td>25</td>
<td>20</td>
<td>182</td>
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<tr>
<td>Gopher machine</td>
<td></td>
<td>1,200</td>
<td>16</td>
<td>20</td>
<td>63</td>
</tr>
<tr>
<td>Pickup</td>
<td>1/2 ton 4x4, new</td>
<td>35,000</td>
<td>12,000</td>
<td>10</td>
<td>13,235</td>
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<tr>
<td>Truck</td>
<td>2 ton, used</td>
<td>18,000</td>
<td>3,500</td>
<td>20</td>
<td>2,710</td>
</tr>
<tr>
<td>Gator</td>
<td>4 wheel, new</td>
<td>8,000</td>
<td>3,000</td>
<td>5</td>
<td>3,585</td>
</tr>
<tr>
<td>Auger</td>
<td></td>
<td>1,700</td>
<td>35</td>
<td>20</td>
<td>89</td>
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<tr>
<td>Front-end loader &amp; backforks</td>
<td></td>
<td>5,800</td>
<td>64</td>
<td>10</td>
<td>1,026</td>
</tr>
<tr>
<td>Bin trailer</td>
<td></td>
<td>7,500</td>
<td>64</td>
<td>10</td>
<td>1,326</td>
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<tr>
<td>Ladders</td>
<td>35 units, per 70 acres</td>
<td>6,125</td>
<td>N/A</td>
<td>10</td>
<td>N/A</td>
</tr>
<tr>
<td>Picking bags</td>
<td>35 units, per 70 acres</td>
<td>1,500</td>
<td>N/A</td>
<td>2</td>
<td>N/A</td>
</tr>
<tr>
<td>Chain &amp; pruning saws</td>
<td>3 units each, 1-lopppers</td>
<td>3,000</td>
<td>N/A</td>
<td>3</td>
<td>N/A</td>
</tr>
<tr>
<td>Irrigation system(^1)</td>
<td>Micro, per acre</td>
<td>1,200</td>
<td>N/A</td>
<td>25</td>
<td>N/A</td>
</tr>
<tr>
<td>Wind machine</td>
<td>2 units, propane, per 70 acres</td>
<td>56,000</td>
<td>70</td>
<td>25</td>
<td>1,585</td>
</tr>
<tr>
<td>Smudge Pots</td>
<td>8 units, per acre</td>
<td>17,920</td>
<td>70</td>
<td>10</td>
<td>3,169</td>
</tr>
<tr>
<td>Trellis system(^1)</td>
<td>Three-wire vertical, per acre</td>
<td>1,800</td>
<td>N/A</td>
<td>25</td>
<td>N/A</td>
</tr>
<tr>
<td>Housing facilities</td>
<td>1 unit, per 70 acres</td>
<td>120,000</td>
<td>N/A</td>
<td>30</td>
<td>0</td>
</tr>
</tbody>
</table>

\(^1\) Included in costs are all materials and labor to install system.
Table 2. Machinery Cost Calculations.

<table>
<thead>
<tr>
<th>Machine</th>
<th>Size or description</th>
<th>Fuel &amp; Lube</th>
<th>Repairs &amp; Maint.</th>
<th>Depr. &amp; Interest</th>
<th>Insurance</th>
<th>Total cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tractor</td>
<td>4 wheel dr 70hp, new</td>
<td>$13.80</td>
<td>$0.46</td>
<td>$7.70</td>
<td>$0.41</td>
<td>$22.37</td>
</tr>
<tr>
<td>Tractor</td>
<td>2 wheel dr 50hp, old</td>
<td>10.12</td>
<td>0.40</td>
<td>$8.86</td>
<td>0.58</td>
<td>19.96</td>
</tr>
<tr>
<td>Tractor</td>
<td>2 wheel dr 35 hp, old</td>
<td>6.90</td>
<td>0.17</td>
<td>3.60</td>
<td>0.24</td>
<td>10.90</td>
</tr>
<tr>
<td>Forklift (Leased during harvest)</td>
<td>3 months @ $1,200/mon</td>
<td>8.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>8.00</td>
</tr>
<tr>
<td>Air-blast sprayer</td>
<td>400 gallon unit, PTO, new</td>
<td>0.00</td>
<td>7.68</td>
<td>16.42</td>
<td>0.49</td>
<td>24.59</td>
</tr>
<tr>
<td>Air-blast sprayer</td>
<td>400 gallon unit, PTO, older</td>
<td>0.00</td>
<td>1.94</td>
<td>7.04</td>
<td>0.21</td>
<td>9.19</td>
</tr>
<tr>
<td>Flail chopper</td>
<td>8’ unit</td>
<td>0.00</td>
<td>2.95</td>
<td>5.41</td>
<td>0.14</td>
<td>8.50</td>
</tr>
<tr>
<td>Weed sprayer</td>
<td>100 gallon unit</td>
<td>0.00</td>
<td>0.80</td>
<td>3.03</td>
<td>0.11</td>
<td>3.94</td>
</tr>
<tr>
<td>Fertilizer spreader</td>
<td></td>
<td>0.00</td>
<td>1.04</td>
<td>10.94</td>
<td>0.44</td>
<td>12.42</td>
</tr>
<tr>
<td>Brush windrow</td>
<td></td>
<td>0.00</td>
<td>0.45</td>
<td>11.13</td>
<td>0.44</td>
<td>12.03</td>
</tr>
<tr>
<td>Gopher machine</td>
<td></td>
<td>0.00</td>
<td>0.54</td>
<td>5.99</td>
<td>0.24</td>
<td>6.76</td>
</tr>
</tbody>
</table>

- **Costs per mi**
- **Costs per hour**
- **Costs per hour**

Table 4. Estimated Cost of Each Operation with Power Unit for a 13’ Between-Row Spacing.

<table>
<thead>
<tr>
<th>Operation</th>
<th>Tractor</th>
<th>Miles per hour</th>
<th>Acres per hour</th>
<th>Labor cost per acre</th>
<th>Variable cost per acre</th>
<th>Fixed cost per acre</th>
<th>Total cost per acre</th>
</tr>
</thead>
<tbody>
<tr>
<td>Air-blast sprayer</td>
<td>4 wheel dr 70hp</td>
<td>2.00</td>
<td>2.36</td>
<td>$5.50</td>
<td>$9.28</td>
<td>$10.58</td>
<td>$25.37</td>
</tr>
<tr>
<td>Flail chopper</td>
<td>4 wheel dr 70hp</td>
<td>3.00</td>
<td>4.02</td>
<td>3.23</td>
<td>4.28</td>
<td>3.40</td>
<td>10.92</td>
</tr>
<tr>
<td>Weed sprayer</td>
<td>2 wheel dr 35hp</td>
<td>2.75</td>
<td>1.63</td>
<td>8.00</td>
<td>4.84</td>
<td>4.29</td>
<td>17.13</td>
</tr>
<tr>
<td>Fertilizer spreader</td>
<td>2 wheel dr 50hp</td>
<td>3.00</td>
<td>6.62</td>
<td>1.96</td>
<td>1.75</td>
<td>3.15</td>
<td>6.86</td>
</tr>
<tr>
<td>Brush windrow</td>
<td>2 wheel dr 50hp</td>
<td>3.00</td>
<td>2.01</td>
<td>6.47</td>
<td>5.46</td>
<td>10.46</td>
<td>22.39</td>
</tr>
<tr>
<td>Gopher machine</td>
<td>2 wheel dr 50hp</td>
<td>2.50</td>
<td>3.15</td>
<td>4.12</td>
<td>3.51</td>
<td>4.97</td>
<td>12.60</td>
</tr>
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</table>
### Table 4. Input assumptions for establishing a medium-density apple orchard, (per acre basis).

<table>
<thead>
<tr>
<th></th>
<th>Year 0</th>
<th>Year 1</th>
<th>Year 2</th>
<th>Year 3</th>
<th>Year 4</th>
<th>Year 5</th>
<th>Full Prod</th>
</tr>
</thead>
<tbody>
<tr>
<td>Prices per bin</td>
<td>$250.00</td>
<td>$250.00</td>
<td>$250.00</td>
<td>$250.00</td>
<td>$250.00</td>
<td>$250.00</td>
<td>$250.00</td>
</tr>
<tr>
<td>Bins per acre</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>15</td>
<td>25</td>
<td>40</td>
<td>50</td>
</tr>
<tr>
<td>Cost of general orchard labor, per hour</td>
<td>$11.50</td>
<td>$11.50</td>
<td>$11.50</td>
<td>$11.50</td>
<td>$11.50</td>
<td>$11.50</td>
<td>$11.50</td>
</tr>
<tr>
<td>Cost of tractor driver, per hour</td>
<td>$13.00</td>
<td>$13.00</td>
<td>$13.00</td>
<td>$13.00</td>
<td>$13.00</td>
<td>$13.00</td>
<td>$13.00</td>
</tr>
<tr>
<td>Cost of harvest labor, per bin</td>
<td>$20.00</td>
<td>$20.00</td>
<td>$20.00</td>
<td>$20.00</td>
<td>$20.00</td>
<td>$20.00</td>
<td>$20.00</td>
</tr>
<tr>
<td>Leased Forklift during Harvest¹</td>
<td>$0.00</td>
<td>$0.00</td>
<td>$0.00</td>
<td>$133.33</td>
<td>$133.33</td>
<td>$133.33</td>
<td>$133.33</td>
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<tr>
<td>Production mgmt consultant fees</td>
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<td>$0.00</td>
<td>$0.00</td>
<td>$30.00</td>
<td>$30.00</td>
<td>$30.00</td>
<td>$30.00</td>
</tr>
<tr>
<td>Hours of pruning and training labor</td>
<td>0.00</td>
<td>10.00</td>
<td>20.00</td>
<td>60.00</td>
<td>60.00</td>
<td>60.00</td>
<td>60.00</td>
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<tr>
<td>Hours of thinning labor</td>
<td>0.00</td>
<td>3.50</td>
<td>3.50</td>
<td>5.00</td>
<td>5.00</td>
<td>5.00</td>
<td>5.00</td>
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<tr>
<td>Hours of irrigating labor</td>
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<td>0.00</td>
<td>0.00</td>
<td>2.25</td>
<td>2.25</td>
<td>2.25</td>
<td>2.25</td>
</tr>
<tr>
<td>Hours to Install Phermone Disruption</td>
<td>0.00</td>
<td>1.00</td>
<td>1.00</td>
<td>2.50</td>
<td>2.50</td>
<td>2.50</td>
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<tr>
<td>Hours to remove &amp; replace tree labor</td>
<td>0.00</td>
<td>0.00</td>
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<td>Hours for frost protection labor</td>
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<td>6.25</td>
<td>10.00</td>
<td>12.50</td>
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<td>Hours of General Labor during Harvest</td>
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<td>0.00</td>
<td>0.00</td>
<td>3.75</td>
<td>6.25</td>
<td>10.00</td>
<td>12.50</td>
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<tr>
<td>Cost of fertilizer - broadcast applied</td>
<td>$600.00</td>
<td>$40.00</td>
<td>$60.00</td>
<td>$130.00</td>
<td>$130.00</td>
<td>$130.00</td>
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<tr>
<td>Cost of fertilizer - lime</td>
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<td>$25.00</td>
<td>$35.00</td>
<td>$35.00</td>
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<td>Cost of herbicide strip maintenance</td>
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<td>$50.00</td>
<td>$60.00</td>
<td>$60.00</td>
<td>$60.00</td>
<td>$60.00</td>
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<tr>
<td>Cost of insecticides &amp; fungicides</td>
<td>$0.00</td>
<td>$150.00</td>
<td>$250.00</td>
<td>$570.00</td>
<td>$570.00</td>
<td>$570.00</td>
<td>$570.00</td>
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<tr>
<td>Cost of Phermone Disruption</td>
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<td>$0.00</td>
<td>$0.00</td>
<td>$200.00</td>
<td>$200.00</td>
<td>$200.00</td>
<td>$200.00</td>
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<tr>
<td>Cost of rodent materials</td>
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<td>$20.00</td>
<td>$20.00</td>
<td>$20.00</td>
<td>$20.00</td>
<td>$20.00</td>
</tr>
<tr>
<td>Cost per bee hive</td>
<td>$0.00</td>
<td>$0.00</td>
<td>$0.00</td>
<td>$50.00</td>
<td>$50.00</td>
<td>$50.00</td>
<td>$50.00</td>
</tr>
<tr>
<td>Times for fertilizer - broadcast applied</td>
<td>1.00</td>
<td>2.00</td>
<td>2.00</td>
<td>2.00</td>
<td>2.00</td>
<td>2.00</td>
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</tr>
<tr>
<td>Times for herbicide strip spray</td>
<td>0.00</td>
<td>2.00</td>
<td>2.00</td>
<td>2.00</td>
<td>2.00</td>
<td>2.00</td>
<td>2.00</td>
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<tr>
<td>Times for insecticides &amp; fungicides</td>
<td>0.00</td>
<td>4.00</td>
<td>6.00</td>
<td>10.00</td>
<td>10.00</td>
<td>10.00</td>
<td>10.00</td>
</tr>
<tr>
<td>Number of bee hives per acre</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>2.00</td>
<td>2.00</td>
<td>2.00</td>
<td>2.00</td>
</tr>
<tr>
<td>Times for rodent control</td>
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<td>1.00</td>
<td>1.00</td>
<td>1.00</td>
<td>1.00</td>
<td>1.00</td>
<td>1.00</td>
</tr>
<tr>
<td>Times for flailing/mowing orchard floor</td>
<td>0.00</td>
<td>5.00</td>
<td>5.00</td>
<td>5.00</td>
<td>5.00</td>
<td>5.00</td>
<td>5.00</td>
</tr>
<tr>
<td>Property taxes</td>
<td>$60.00</td>
<td>$60.00</td>
<td>$60.00</td>
<td>$60.00</td>
<td>$60.00</td>
<td>$60.00</td>
<td>$60.00</td>
</tr>
<tr>
<td>Property insurance</td>
<td>$25.00</td>
<td>$25.00</td>
<td>$25.00</td>
<td>$25.00</td>
<td>$25.00</td>
<td>$25.00</td>
<td>$25.00</td>
</tr>
<tr>
<td>Land values</td>
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<td>$8.00</td>
<td>$8.00</td>
<td>$8.00</td>
<td>$8.00</td>
<td>$8.00</td>
<td>$8.00</td>
</tr>
<tr>
<td>Forestry housing (per month)</td>
<td>$60.00</td>
<td>$60.00</td>
<td>$60.00</td>
<td>$60.00</td>
<td>$60.00</td>
<td>$60.00</td>
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<td>Irrigation assessment</td>
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<td>$60.00</td>
<td>$60.00</td>
<td>$60.00</td>
<td>$60.00</td>
<td>$60.00</td>
</tr>
<tr>
<td>Miscellaneos &amp; overhead</td>
<td>$75.00</td>
<td>$75.00</td>
<td>$75.00</td>
<td>$75.00</td>
<td>$75.00</td>
<td>$75.00</td>
<td>$75.00</td>
</tr>
<tr>
<td>Tree cost</td>
<td>$8.00</td>
<td>$8.00</td>
<td>$8.00</td>
<td>$8.00</td>
<td>$8.00</td>
<td>$8.00</td>
<td>$8.00</td>
</tr>
<tr>
<td>Gasoline price</td>
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<td>$4.00</td>
<td>$4.00</td>
<td>$4.00</td>
<td>$4.00</td>
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<td>Diesel fuel price</td>
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<td>$4.00</td>
<td>$4.00</td>
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<td>$4.00</td>
<td>$4.00</td>
<td>$4.00</td>
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<td>$2.25</td>
<td>$2.25</td>
<td>$2.25</td>
<td>$2.25</td>
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<tr>
<td>Operating interest rate</td>
<td>5.00%</td>
<td>5.00%</td>
<td>5.00%</td>
<td>5.00%</td>
<td>5.00%</td>
<td>5.00%</td>
<td>5.00%</td>
</tr>
<tr>
<td>Machinery interest rate</td>
<td>6.00%</td>
<td>6.00%</td>
<td>6.00%</td>
<td>6.00%</td>
<td>6.00%</td>
<td>6.00%</td>
<td>6.00%</td>
</tr>
<tr>
<td>Land interest rate</td>
<td>4.00%</td>
<td>4.00%</td>
<td>4.00%</td>
<td>4.00%</td>
<td>4.00%</td>
<td>4.00%</td>
<td>4.00%</td>
</tr>
<tr>
<td>Establishment interest rate</td>
<td>8.00%</td>
<td>8.00%</td>
<td>8.00%</td>
<td>8.00%</td>
<td>8.00%</td>
<td>8.00%</td>
<td>8.00%</td>
</tr>
<tr>
<td>% of operating capital borrowed</td>
<td>50.00%</td>
<td>50.00%</td>
<td>50.00%</td>
<td>50.00%</td>
<td>50.00%</td>
<td>50.00%</td>
<td>50.00%</td>
</tr>
<tr>
<td>Months to borrow operating capital</td>
<td>6.0</td>
<td>6.0</td>
<td>6.0</td>
<td>6.0</td>
<td>6.0</td>
<td>6.0</td>
<td>6.0</td>
</tr>
<tr>
<td>Planted trees</td>
<td>0</td>
<td>1,069</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>2</td>
</tr>
</tbody>
</table>

¹Forklift is leased to load bins of fruit onto trucks for 3 months at $1,200 per month. The total cost of the forklift is $3,600 allocated across 60 harvested acres of tree fruits.
Results of establishing a medium-density apple orchard in Hood River County

Cash flow analysis

A cash flow analysis for establishing a medium-density apple planting is presented in Table 5. It shows the cash costs required to establish an orchard. Cash costs include labor, trees, irrigation and trellis support systems, fertilizer, chemicals, bee hives, 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 5 establishment years plus first full production year. Production begins in year 3 with 15 bins of apples per acre and increases to 50 bins at full production. Total variable costs are $3,020 in the first year, with an additional $179 of cash fixed costs for a total cash cost of $3,200 per acre.

A positive cash flow begins in year 4, with gross income exceeding total cash costs by $2,096 per acre. At full production, or in 6 years after planting, the orchard does not return a sufficient amount of gross income to pay all previous years’ cash costs. There is $4,364 per acre remaining over and above prior costs, and it is not until year 7 that all previous years’ cash production costs are paid, Figure 3, page 10.

The major cost components in relation to total cash costs are shown in Figure 1 on page 10. Hired labor represents 29 percent of the total cash costs to establish this orchard, followed by tree costs at 23 percent. Machine costs, which include fuel, oil, and repairs, are third at 11 percent. Chemicals make up the fourth largest cost at 8 percent and fertilizer, at 7 percent, makes up the fifth largest cost. The trellis system is 5 percent, irrigation system costs are 4 percent, and field prep are 3 percent of the total cash costs. The remaining total cash costs are operating interest (1 percent), insurance and taxes (2 percent), and other cost items (7 percent).

Economic costs and returns

The economic costs and returns for the establishment of a medium-density apple orchard are shown in Table 6 (page 9). 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 (page 8) except that the trellis support and irrigation systems are amortized over their productive life in this analysis and included in fixed machine costs.

Gross income exceeds variable costs beginning in year 5 with $2,390 per acre return to the grower. Additionally, at the end of the establishment period, $17,647 per acre remains to repay all previous establishment costs. This cost is amortized over a 25-year period as an annual payment of $2,036 per acre, which includes principal and interest to recover the capital investment of establishing the orchard, as shown in Table 13, Full Production Years, page 18.

The relative contribution of each cost component to the total economic cost is shown in Figure 2 (page 10). When all economic costs are included, hired labor is the largest cost item, at 22 percent of the total costs for the first 7 years of establishment. Interest costs make up the second largest economic cost at 19 percent. Tree costs are third with 18 percent of the
total cost. Machine costs (fuel, oil, repairs, depreciation and interest charges) are the fourth largest cost item, with 14 percent. Fertilizer and chemicals costs make up the fifth largest costs at 11 percent. The remaining cost items, land charges and “other,” are 4 and 12 percent of the total economic costs, respectively.

The net projected returns for establishing a medium-density apple orchard are shown in Figure 3 (page 10). Both the cumulative cash and economic cost and returns are represented. The projected returns for this orchard will cover all cash costs of establishment in the seventh year. With the assumptions used in this study, this orchard covers all economic costs in year 10.
Table 5. Cash costs and returns of establishing a medium-density apple orchard.

<table>
<thead>
<tr>
<th>Income:</th>
<th>Year 0</th>
<th>Year 1</th>
<th>Year 2</th>
<th>Year 3</th>
<th>Year 4</th>
<th>Year 5</th>
<th>Full Prod</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yield (bins/acre)</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>15.00</td>
<td>25.00</td>
<td>40.00</td>
<td>50.00</td>
</tr>
<tr>
<td>Price (dollars/bin)</td>
<td>250.00</td>
<td>250.00</td>
<td>250.00</td>
<td>250.00</td>
<td>250.00</td>
<td>250.00</td>
<td>250.00</td>
</tr>
<tr>
<td>Gross income (dollars/acre)</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>3,750.00</td>
<td>6,250.00</td>
<td>10,000.00</td>
<td>12,500.00</td>
</tr>
</tbody>
</table>

Variable costs (per acre):
- Field preparation 1,000.00 30.00 0.00 0.00 0.00 0.00 0.00
- Trees 0.00 8,552.00 16.00 16.00 16.00 16.00 16.00
- Irrigation system 0.00 1,212.00 12.00 12.00 12.00 12.00 12.00
- Trellis system 0.00 1,818.00 18.00 18.00 18.00 18.00 18.00
- Paint trees 0.00 30.00 0.00 0.00 0.00 0.00 0.00
- Fertilizer 1,625.73 40.00 85.00 165.00 165.00 165.00 165.00
- Chemicals 0.00 200.00 300.00 630.00 630.00 630.00 630.00
- Pheromone Disruption 0.00 0.00 0.00 200.00 200.00 200.00 200.00
- Prod. mgmt consultant fees 0.00 0.00 0.00 30.00 30.00 30.00 30.00
- Bee rental 0.00 0.00 0.00 100.00 100.00 100.00 100.00
- Rodent materials 0.00 20.00 20.00 20.00 20.00 20.00 20.00
- Harvest labor 0.00 0.00 0.00 363.43 605.72 926.60 1,498.93
- General labor 30.96 1,349.76 367.97 1,193.46 1,308.46 1,423.46 1,538.46
- Machine costs 206.00 699.46 308.68 699.90 699.90 699.90 699.90
- Seasonal housing facilities 45.43 45.43 45.43 45.43 45.43 45.43 45.43
- Miscellaneous & overhead 75.00 75.00 75.00 75.00 75.00 75.00 75.00
- Interest: operating capital 37.29 138.40 15.60 44.60 49.07 54.52 63.11

Total variable costs 3,020.41 14,210.04 1,263.68 3,612.82 3,974.57 4,415.90 5,111.83

Gross income - variable cost -3,020.41 -14,210.04 -1,263.68 137.18 2,275.43 5,584.10 7,388.17

Fixed costs (per acre):
- Water assessment 60.00 60.00 60.00 60.00 60.00 60.00 60.00
- Property taxes 60.00 60.00 60.00 60.00 60.00 60.00 60.00

Total fixed cost 179.19 179.19 179.19 179.19 179.19 179.19 179.19

Total cost 3,199.60 14,389.23 1,442.87 3,792.01 4,153.76 4,595.09 5,291.02

Net projected returns -3,199.60 -14,389.23 -1,442.87 -42.01 2,096.24 5,404.91 7,208.98

Cumulative returns -3,199.60 -17,588.83 -19,031.70 -19,073.71 -16,977.47 -11,572.56 -4,363.57
<table>
<thead>
<tr>
<th>Income:</th>
<th>Year 0</th>
<th>Year 1</th>
<th>Year 2</th>
<th>Year 3</th>
<th>Year 4</th>
<th>Year 5</th>
<th>Full Prod</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yield (pounds/acre)</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>15.00</td>
<td>25.00</td>
<td>40.00</td>
<td>50.00</td>
</tr>
<tr>
<td>Price (dollars/pound)</td>
<td>250.00</td>
<td>250.00</td>
<td>250.00</td>
<td>250.00</td>
<td>250.00</td>
<td>250.00</td>
<td>250.00</td>
</tr>
<tr>
<td><strong>Gross income (dollars/acre)</strong></td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>3,750.00</td>
<td>6,250.00</td>
<td>10,000.00</td>
<td>12,500.00</td>
</tr>
</tbody>
</table>

**Variable costs (per acre):**

- **Field preparation**: 1,000.00
- **Trees**: 0.00 8,552.00 16.00 16.00 16.00 16.00 16.00
- **Irrigation system**: 0.00 12.00 12.00 12.00 12.00 12.00 12.00
- **Trellis system**: 0.00 18.00 18.00 18.00 18.00 18.00 18.00
- **Paint trees**: 0.00 30.00 0.00 0.00 0.00 0.00 0.00
- **Fertilizer**: 1,625.73 40.00 85.00 165.00 165.00 165.00 165.00
- **Chemicals**: 0.00 200.00 300.00 630.00 630.00 630.00 630.00
- **Pheromone Disruption**: 0.00 0.00 0.00 200.00 200.00 200.00 200.00
- **Prod. mgmt consultant fees**: 0.00 0.00 0.00 30.00 30.00 30.00 30.00
- **Bee rental**: 0.00 0.00 0.00 100.00 100.00 100.00 100.00
- **Rodent materials**: 0.00 20.00 20.00 20.00 20.00 20.00 20.00
- **Harvest labor**: 0.00 0.00 0.00 363.43 605.72 926.60 1,498.93
- **General labor**: 30.96 1,349.76 367.97 1,193.46 1,308.46 1,423.46 1,538.46
- **Machine costs**: 206.00 699.46 308.68 699.90 699.90 699.90 699.90
- **Seasonal housing facilities**: 45.43 45.43 45.43 45.43 45.43 45.43 45.43
- **Miscellaneous & overhead**: 75.00 75.00 75.00 75.00 75.00 75.00 75.00
- **Interest: operating capital**: 37.29 138.40 15.60 44.60 49.07 54.52 63.11

**Total variable costs**: 3,020.41 11,210.04 1,263.68 3,612.82 3,974.57 4,415.90 5,111.83

**Gross income - variable cost**: -3,020.41 -11,210.04 -1,263.68 137.18 2,275.43 5,384.10 7,388.17

**Fixed costs (per acre):**

- **Insurance**: 59.19 59.19 59.19 59.19 59.19 59.19 59.19
- **Water assessment**: 60.00 60.00 60.00 60.00 60.00 60.00 60.00
- **Property taxes**: 60.00 60.00 60.00 60.00 60.00 60.00 60.00
- **Machine costs**: 92.29 684.86 513.76 570.97 570.97 570.97 570.97
- **Foreman housing**: 102.86 102.86 102.86 102.86 102.86 102.86 102.86
- **Seasonal housing facilities**: 91.43 91.43 91.43 91.43 91.43 91.43 91.43
- **Land interest cost**: 520.00 520.00 520.00 520.00 520.00 520.00 520.00
- **Interest on establishment costs**: 0.00 304.49 1,335.92 1,640.42 1,861.89 1,929.96 2,036.05

**Total fixed cost**: 785.76 1,682.83 2,543.16 2,904.91 3,126.33 3,194.40 3,300.53

**Total cost**: 3,806.17 12,892.87 3,806.83 6,517.73 7,100.90 7,610.30 8,412.36

**Net projected returns**: -3,806.17 -12,892.87 -3,806.83 -2,767.73 -850.90 2,389.70 4,087.64

**Cumulative returns**: -3,806.17 -16,699.04 -20,505.88 -23,273.61 -24,124.51 -21,734.82 -17,647.18

*This cost is an annual payment, over a 25-year period, which includes principal and interest to recover the capital investment of establishing this orchard in years 0 through 5.
Figure 1. Cash Costs to Establish a Medium-Density Apple Orchard the First Seven Years of Establishment

Figure 2. Economic Costs to Establish a Medium-Density Apple Orchard the First Seven Years of Establishment

Figure 3. Economic and Cash Costs to Establish a Medium-Density Apple Orchard in Hood River County
Conclusion

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

Higher-density orchards can offer higher returns that are obtained earlier in the life of the orchard. These early returns can reduce interest costs and therefore improve the profitability and feasibility of an orchard investment. The tradeoff, 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 apple 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.

Using the AgProfit™ Program to Analyze Different Price and Yield Scenarios

Many different price and yield scenarios can occur due to freeze, rain, hail, birds and market conditions that it is next to impossible to cover even a small sample in this bulletin. However, the AgProfit™ computer program developed by Oregon State University, Washington State University, University of Arizona, and the University of California at Davis, is a Windows based program designed to help agricultural producers in making long-run cropping decisions. AgProfit™ is designed to use data from annual budgets as input and generate financial analyses of the potential economic performance of perennial crops such as tree fruit, nut, berry and wine grapes under numerous different long-run scenarios.

The AgProfit™ program can be obtained free of charge at http://agtools.org, registering on the website, and downloading the AgProfit™ program, along with the supporting files onto your computer. In addition, the data from this publication can also be downloaded by clicking on “Crop Budget Files” under “Supporting Files” and then clicking on “Apples”, “Oregon”. All assumptions as to prices received, yields obtained, or input items, amounts, and costs can be readily changed using AgProfit™ to modify the budgets provided so the user can develop a set of annual budgets that best fit his/her situation.

AgProfit™ generates three reports for each plan analyzed. “Net Returns and Present Value by Year” gives the net returns and net present value by year and the total net returns and total net present value for each plan along with the annual equivalent. “Accumulated Net Returns” shows the annual returns, annual cost, net returns, and accumulated net returns for each plan. It calculates the number of years the returns are greater than costs, the year returns are greater than total costs of previous years, and the total cash costs to establish. “Net Present Value Profile” calculates the net present value and the annual equivalent at various interest rates for the base plan and the comparison plan. AgProfit™ also graphs the net returns by year, accumulated net returns by year, the net present value at varying discount rates, and the annual equivalent at varying discount rates.

It is recommended that before investing in any long-run perennial crop, that the potential investor use the AgProfit™ program to fully analyze the potential investment under varying price and yield scenarios to help decide if the potential investment is likely to be profitable and feasible.
### APPENDIX A

Enterprise Budgets for a Medium-Density Apple Orchard in Hood River County

<table>
<thead>
<tr>
<th>VARIABLE CASH COSTS</th>
<th>Description</th>
<th>Labor</th>
<th>Machinery</th>
<th>Materials</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Remove trees, roots and rip (2x)</td>
<td>1.0 custom</td>
<td>$0.00</td>
<td>$0.00</td>
<td>$1,000.00</td>
<td>$1,000.00</td>
</tr>
<tr>
<td>Disc</td>
<td>1.0 applications</td>
<td>20.00</td>
<td>14.76</td>
<td>0.00</td>
<td>34.76</td>
</tr>
<tr>
<td>Plotting</td>
<td>1.0 x/acre</td>
<td>9.00</td>
<td>0.00</td>
<td>2.00</td>
<td>11.00</td>
</tr>
<tr>
<td>Soil sampling (1 per 5 acres)</td>
<td>1.0 x/acre</td>
<td>0.00</td>
<td>0.00</td>
<td>8.73</td>
<td>8.73</td>
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<tr>
<td>Fumigation</td>
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<td>0.00</td>
<td>875.00</td>
<td>875.00</td>
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<td>Fertilizer (Phosphorous)</td>
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<td>1.96</td>
<td>1.75</td>
<td>600.00</td>
<td>603.71</td>
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<tr>
<td>Lime</td>
<td>1.0 custom</td>
<td>0.00</td>
<td>0.00</td>
<td>140.00</td>
<td>140.00</td>
</tr>
<tr>
<td>Pickup, truck &amp; ATV</td>
<td>1.0 x/acre</td>
<td>0.00</td>
<td>189.49</td>
<td>0.00</td>
<td>189.49</td>
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<tr>
<td>Housing facilities</td>
<td>1.0 x/acre</td>
<td>0.00</td>
<td>0.00</td>
<td>45.43</td>
<td>45.43</td>
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<tr>
<td>Miscellaneous and overhead</td>
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<td>0.00</td>
<td>0.00</td>
<td>75.00</td>
<td>75.00</td>
</tr>
<tr>
<td>Interest: operating capital</td>
<td>6.0 months</td>
<td>0.00</td>
<td>0.00</td>
<td>37.29</td>
<td>37.29</td>
</tr>
<tr>
<td><strong>Total variable costs</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>30.96</td>
<td>206.00</td>
<td>2,783.45</td>
<td>3,020.41</td>
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**FIXED CASH COSTS**

<table>
<thead>
<tr>
<th>Description</th>
<th>Unit</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pickup, truck &amp; ATV insurance</td>
<td>acre</td>
<td>34.19</td>
</tr>
<tr>
<td>Water assessment</td>
<td>acre</td>
<td>60.00</td>
</tr>
<tr>
<td>Property insurance</td>
<td>acre</td>
<td>25.00</td>
</tr>
<tr>
<td>Property taxes</td>
<td>acre</td>
<td>60.00</td>
</tr>
<tr>
<td><strong>Total fixed cash costs</strong></td>
<td></td>
<td>179.19</td>
</tr>
</tbody>
</table>

**FIXED NON-CASH COSTS**

<table>
<thead>
<tr>
<th>Description</th>
<th>Unit</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Machinery and equipment insurance, depreciation &amp; interest</td>
<td>acre</td>
<td>3.15</td>
</tr>
<tr>
<td>Pickup, truck &amp; ATV - depreciation &amp; interest</td>
<td>acre</td>
<td>89.14</td>
</tr>
<tr>
<td>Foreman housing</td>
<td>acre</td>
<td>102.86</td>
</tr>
<tr>
<td>Housing facilities</td>
<td>acre</td>
<td>91.43</td>
</tr>
<tr>
<td>Land interest charge</td>
<td>acre</td>
<td>320.00</td>
</tr>
<tr>
<td><strong>Total fixed non-cash costs</strong></td>
<td></td>
<td>606.57</td>
</tr>
</tbody>
</table>

**Total fixed costs**

785.76

**Total of all costs per acre**

$3,806.17

Table 7. Year 0, medium-density apple establishment, $/acre economic costs and returns.
<table>
<thead>
<tr>
<th>Description</th>
<th>Description</th>
<th>Labor</th>
<th>Machinery</th>
<th>Materials</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Plant trees</td>
<td>40.0 hours</td>
<td>$980.00</td>
<td>$420.80</td>
<td>$8,552.00</td>
<td>$9,952.80</td>
</tr>
<tr>
<td>Painting trees</td>
<td>12.0 hours</td>
<td>138.00</td>
<td>0.00</td>
<td>30.00</td>
<td>168.00</td>
</tr>
<tr>
<td>Training trees</td>
<td>10.0 hours</td>
<td>115.00</td>
<td>0.00</td>
<td>0.00</td>
<td>115.00</td>
</tr>
<tr>
<td>Fertilizer application</td>
<td>1.0 applications</td>
<td>1.96</td>
<td>1.75</td>
<td>40.00</td>
<td>43.71</td>
</tr>
<tr>
<td>Insecticides and fungicides</td>
<td>4.0 applications</td>
<td>22.00</td>
<td>37.13</td>
<td>150.00</td>
<td>209.13</td>
</tr>
<tr>
<td>Herbicide strip maintenance (.30x)</td>
<td>2.0 applications</td>
<td>16.00</td>
<td>9.68</td>
<td>50.00</td>
<td>75.68</td>
</tr>
<tr>
<td>Seed cover crop</td>
<td>20.0 lbs</td>
<td>16.25</td>
<td>15.68</td>
<td>30.00</td>
<td>61.93</td>
</tr>
<tr>
<td>Flailing/mowing orchard floor</td>
<td>5.0 times</td>
<td>16.17</td>
<td>21.42</td>
<td>0.00</td>
<td>37.60</td>
</tr>
<tr>
<td>Rodent control</td>
<td>1.0 application</td>
<td>4.12</td>
<td>3.51</td>
<td>20.00</td>
<td>27.63</td>
</tr>
<tr>
<td>Irrigation</td>
<td>3.5 hours</td>
<td>40.25</td>
<td>0.00</td>
<td>12.00</td>
<td>52.25</td>
</tr>
<tr>
<td>Trellis System</td>
<td>1.0 x/acre</td>
<td>0.00</td>
<td>0.00</td>
<td>18.00</td>
<td>18.00</td>
</tr>
<tr>
<td>Pickup, truck &amp; ATV</td>
<td>1.0 x/acre</td>
<td>0.00</td>
<td>189.49</td>
<td>0.00</td>
<td>189.49</td>
</tr>
<tr>
<td>Housing facilities</td>
<td>1.0 x/acre</td>
<td>0.00</td>
<td>0.00</td>
<td>45.43</td>
<td>45.43</td>
</tr>
<tr>
<td>Miscellaneous and overhead</td>
<td>1.0 x/acre</td>
<td>0.00</td>
<td>0.00</td>
<td>75.00</td>
<td>75.00</td>
</tr>
<tr>
<td>Interest: operating capital</td>
<td>6.0 months</td>
<td>0.00</td>
<td>0.00</td>
<td>138.40</td>
<td>138.40</td>
</tr>
<tr>
<td><strong>Total variable costs</strong></td>
<td></td>
<td>1,349.76</td>
<td>699.46</td>
<td>9,160.82</td>
<td>11,210.04</td>
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</tbody>
</table>

**FIXED CASH COSTS**

<table>
<thead>
<tr>
<th>Description</th>
<th>Unit</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pickup, truck &amp; ATV insurance</td>
<td>acre</td>
<td>34.19</td>
</tr>
<tr>
<td>Water assessment</td>
<td>acre</td>
<td>60.00</td>
</tr>
<tr>
<td>Property insurance</td>
<td>acre</td>
<td>25.00</td>
</tr>
<tr>
<td>Property taxes</td>
<td>acre</td>
<td>60.00</td>
</tr>
<tr>
<td><strong>Total fixed cash costs</strong></td>
<td></td>
<td>179.19</td>
</tr>
</tbody>
</table>

**FIXED NON-CASH COSTS**

<table>
<thead>
<tr>
<th>Description</th>
<th>Unit</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Machinery and equipment insurance, depreciation &amp; interest</td>
<td>acre</td>
<td>595.72</td>
</tr>
<tr>
<td>Pickup, truck &amp; ATV - depreciation &amp; interest</td>
<td>acre</td>
<td>89.14</td>
</tr>
<tr>
<td>Foreman housing</td>
<td>acre</td>
<td>102.86</td>
</tr>
<tr>
<td>Housing facilities</td>
<td>acre</td>
<td>91.43</td>
</tr>
<tr>
<td>Land interest charge</td>
<td>acre</td>
<td>320.00</td>
</tr>
<tr>
<td>Prior year's establishment costs - Interest</td>
<td>acre</td>
<td>304.49</td>
</tr>
<tr>
<td><strong>Total fixed non-cash costs</strong></td>
<td></td>
<td>1,503.64</td>
</tr>
<tr>
<td><strong>Total fixed costs</strong></td>
<td></td>
<td>1,682.83</td>
</tr>
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</table>

**Total of all costs per acre** | $12,892.87 |
### VARIABLE CASH COSTS

<table>
<thead>
<tr>
<th>Description</th>
<th>Labor</th>
<th>Machinery</th>
<th>Materials</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pruning and training</td>
<td>20.0</td>
<td>$230.00</td>
<td>$0.00</td>
<td>$230.00</td>
</tr>
<tr>
<td>Tree removal &amp; tree replacement</td>
<td>1.0</td>
<td>24.50</td>
<td>10.66</td>
<td>51.16</td>
</tr>
<tr>
<td>Fertilizer &amp; lime application</td>
<td>2.0</td>
<td>3.93</td>
<td>3.49</td>
<td>92.42</td>
</tr>
<tr>
<td>Herbicide strip maintenance (.30x)</td>
<td>2.0</td>
<td>16.00</td>
<td>9.68</td>
<td>75.68</td>
</tr>
<tr>
<td>Insecticides and fungicides</td>
<td>6.0</td>
<td>33.00</td>
<td>55.69</td>
<td>338.69</td>
</tr>
<tr>
<td>Flailing/mowing orchard floor</td>
<td>5.0</td>
<td>16.17</td>
<td>21.42</td>
<td>37.60</td>
</tr>
<tr>
<td>Rodent control</td>
<td>1.0</td>
<td>4.12</td>
<td>3.51</td>
<td>27.63</td>
</tr>
<tr>
<td>Irrigation</td>
<td>3.5</td>
<td>40.25</td>
<td>0.00</td>
<td>52.25</td>
</tr>
<tr>
<td>Trellis System</td>
<td>1.0</td>
<td>0.00</td>
<td>0.00</td>
<td>18.00</td>
</tr>
<tr>
<td>Ladders &amp; pruning equip.</td>
<td>1.0</td>
<td>0.00</td>
<td>14.72</td>
<td>14.72</td>
</tr>
<tr>
<td>Pickup, truck &amp; ATV</td>
<td>1.0</td>
<td>0.00</td>
<td>189.49</td>
<td>189.49</td>
</tr>
<tr>
<td>Housing facilities</td>
<td>1.0</td>
<td>0.00</td>
<td>45.43</td>
<td>45.43</td>
</tr>
<tr>
<td>Miscellaneous and overhead</td>
<td>1.0</td>
<td>0.00</td>
<td>75.00</td>
<td>75.00</td>
</tr>
<tr>
<td>Interest: operating capital</td>
<td>6.0</td>
<td>0.00</td>
<td>15.60</td>
<td>15.60</td>
</tr>
<tr>
<td><strong>Total variable costs</strong></td>
<td></td>
<td>367.97</td>
<td>308.68</td>
<td>1,263.68</td>
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</table>

### FIXED CASH COSTS

<table>
<thead>
<tr>
<th>Description</th>
<th>Unit</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pickup, truck &amp; ATV insurance</td>
<td>acre</td>
<td>34.19</td>
</tr>
<tr>
<td>Water assessment</td>
<td>acre</td>
<td>60.00</td>
</tr>
<tr>
<td>Property insurance</td>
<td>acre</td>
<td>25.00</td>
</tr>
<tr>
<td>Property taxes</td>
<td>acre</td>
<td>60.00</td>
</tr>
<tr>
<td><strong>Total fixed cash costs</strong></td>
<td></td>
<td>179.19</td>
</tr>
</tbody>
</table>

### FIXED NON-CASH COSTS

<table>
<thead>
<tr>
<th>Description</th>
<th>Unit</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Machinery and equipment insurance, depreciation &amp; interest</td>
<td>acre</td>
<td>424.62</td>
</tr>
<tr>
<td>Pickup, truck &amp; ATV - depreciation &amp; interest</td>
<td>acre</td>
<td>89.14</td>
</tr>
<tr>
<td>Foreman housing</td>
<td>acre</td>
<td>102.86</td>
</tr>
<tr>
<td>Housing facilities</td>
<td>acre</td>
<td>91.43</td>
</tr>
<tr>
<td>Land interest charge</td>
<td>acre</td>
<td>320.00</td>
</tr>
<tr>
<td>Prior year's establishment costs - Interest</td>
<td>acre</td>
<td>1,335.92</td>
</tr>
<tr>
<td><strong>Total fixed non-cash costs</strong></td>
<td></td>
<td>2,363.97</td>
</tr>
<tr>
<td><strong>Total fixed costs</strong></td>
<td></td>
<td>2,543.16</td>
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</tbody>
</table>

**Total of all costs per acre** $3,806.83
Table 10. Year 3, medium-density apple establishment, $/acre economic costs and returns.

<table>
<thead>
<tr>
<th>GROSS INCOME</th>
<th>Quantity</th>
<th>Unit</th>
<th>$/Unit</th>
<th>Total</th>
<th>Price/bin</th>
</tr>
</thead>
<tbody>
<tr>
<td>Apples</td>
<td>15.00</td>
<td>bins</td>
<td>250.00</td>
<td>3,750.00</td>
<td>250.00</td>
</tr>
<tr>
<td>Total gross income</td>
<td></td>
<td></td>
<td></td>
<td>3,750.00</td>
<td>250.00</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>VARIABLE CASH COSTS</th>
<th>Description</th>
<th>Labor</th>
<th>Machinery</th>
<th>Materials</th>
<th>Total</th>
<th>Cost/bin</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pruning and training</td>
<td>60.0 hours</td>
<td>$690.00</td>
<td>$0.00</td>
<td>$0.00</td>
<td>$690.00</td>
<td>$46.00</td>
</tr>
<tr>
<td>Thinning</td>
<td>20.0 hours</td>
<td>230.00</td>
<td>0.00</td>
<td>0.00</td>
<td>230.00</td>
<td>15.33</td>
</tr>
<tr>
<td>Tree removal &amp; tree replacement</td>
<td>2.5 hours</td>
<td>61.25</td>
<td>26.65</td>
<td>16.00</td>
<td>103.90</td>
<td>6.93</td>
</tr>
<tr>
<td>Raking and shedding brush</td>
<td>1.0 x/acre</td>
<td>9.70</td>
<td>9.74</td>
<td>0.00</td>
<td>19.45</td>
<td>1.30</td>
</tr>
<tr>
<td>Fertilizer and lime - custom applied</td>
<td>2.0 applications</td>
<td>1.96</td>
<td>3.49</td>
<td>165.00</td>
<td>170.46</td>
<td>11.36</td>
</tr>
<tr>
<td>Herbicide strip maintenance (.30x)</td>
<td>2.0 applications</td>
<td>16.00</td>
<td>9.68</td>
<td>60.00</td>
<td>85.68</td>
<td>5.71</td>
</tr>
<tr>
<td>Insecticides and fungicides</td>
<td>10.0 applications</td>
<td>54.99</td>
<td>92.82</td>
<td>570.00</td>
<td>717.81</td>
<td>47.85</td>
</tr>
<tr>
<td>Pheromone disruption (1/2 rate)</td>
<td>2.5 hours</td>
<td>28.75</td>
<td>0.00</td>
<td>200.00</td>
<td>228.75</td>
<td>15.25</td>
</tr>
<tr>
<td>Production mgmt consultant fees</td>
<td>1.0 x/acre</td>
<td>0.00</td>
<td>0.00</td>
<td>30.00</td>
<td>30.00</td>
<td>2.00</td>
</tr>
<tr>
<td>Bee rental</td>
<td>2.0 hives</td>
<td>0.00</td>
<td>0.00</td>
<td>100.00</td>
<td>100.00</td>
<td>6.67</td>
</tr>
<tr>
<td>Flailing/mowing orchard floor</td>
<td>5.0 times</td>
<td>16.17</td>
<td>21.42</td>
<td>0.00</td>
<td>37.60</td>
<td>2.51</td>
</tr>
<tr>
<td>Rodent control</td>
<td>1.0 hours</td>
<td>4.12</td>
<td>3.51</td>
<td>20.00</td>
<td>27.63</td>
<td>1.84</td>
</tr>
<tr>
<td>Frost protection</td>
<td>2.0 hour</td>
<td>23.00</td>
<td>98.33</td>
<td>0.00</td>
<td>121.33</td>
<td>8.09</td>
</tr>
<tr>
<td>Irrigation</td>
<td>5.0 hours</td>
<td>57.50</td>
<td>0.00</td>
<td>12.00</td>
<td>69.50</td>
<td>4.63</td>
</tr>
<tr>
<td>Trellis System</td>
<td>1.0 x/acre</td>
<td>0.00</td>
<td>0.00</td>
<td>18.00</td>
<td>18.00</td>
<td>1.20</td>
</tr>
<tr>
<td>Ladders, pruning, &amp; picking equip.</td>
<td>1.0 x/acre</td>
<td>0.00</td>
<td>16.01</td>
<td>0.00</td>
<td>16.01</td>
<td>1.07</td>
</tr>
<tr>
<td>Harvesting costs</td>
<td>15.0 bins</td>
<td>363.43</td>
<td>95.41</td>
<td>133.33</td>
<td>592.18</td>
<td>39.48</td>
</tr>
<tr>
<td>Supervisory labor</td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Tractor drivers</td>
<td>1.6 hours</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pickup, truck &amp; ATV</td>
<td>1.0 x/acre</td>
<td>0.00</td>
<td>189.49</td>
<td>0.00</td>
<td>189.49</td>
<td>12.63</td>
</tr>
<tr>
<td>Housing facilities</td>
<td>1.0 x/acre</td>
<td>0.00</td>
<td>0.00</td>
<td>45.43</td>
<td>45.43</td>
<td>3.03</td>
</tr>
<tr>
<td>Miscellaneous and overhead</td>
<td>1.0 x/acre</td>
<td>0.00</td>
<td>0.00</td>
<td>75.00</td>
<td>75.00</td>
<td>5.00</td>
</tr>
<tr>
<td>Interest: operating capital</td>
<td>6.0 months</td>
<td>0.00</td>
<td>0.00</td>
<td>44.60</td>
<td>44.60</td>
<td>2.97</td>
</tr>
<tr>
<td>Total variable costs</td>
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<td>566.56</td>
<td>1,489.36</td>
<td>3,612.82</td>
<td>240.85</td>
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</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>FIXED CASH COSTS</th>
<th>Unit</th>
<th>Total</th>
<th>Cost/bin</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pickup, truck &amp; ATV insurance</td>
<td>acre</td>
<td>34.19</td>
<td>2.28</td>
</tr>
<tr>
<td>Water assessment</td>
<td>acre</td>
<td>60.00</td>
<td>4.00</td>
</tr>
<tr>
<td>Property insurance</td>
<td>acre</td>
<td>25.00</td>
<td>1.67</td>
</tr>
<tr>
<td>Property taxes</td>
<td>acre</td>
<td>60.00</td>
<td>4.00</td>
</tr>
<tr>
<td>Total fixed cash costs</td>
<td></td>
<td>179.19</td>
<td>11.95</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>FIXED NON-CASH COSTS</th>
<th>Unit</th>
<th>Total</th>
<th>Cost/bin</th>
</tr>
</thead>
<tbody>
<tr>
<td>Machinery and equipment insurance, depreciation &amp; interest</td>
<td>acre</td>
<td>481.83</td>
<td>32.12</td>
</tr>
<tr>
<td>Pickup, truck &amp; ATV - depreciation &amp; interest</td>
<td>acre</td>
<td>89.14</td>
<td>5.94</td>
</tr>
<tr>
<td>Foreman housing</td>
<td>acre</td>
<td>102.86</td>
<td>6.86</td>
</tr>
<tr>
<td>Housing facilities</td>
<td>acre</td>
<td>91.43</td>
<td>6.10</td>
</tr>
<tr>
<td>Land interest charge</td>
<td>acre</td>
<td>320.00</td>
<td>21.33</td>
</tr>
<tr>
<td>Prior year's establishment costs - Interest</td>
<td>acre</td>
<td>1,640.47</td>
<td>109.36</td>
</tr>
<tr>
<td>Total fixed non-cash costs</td>
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<td>2,725.72</td>
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<tr>
<td>Total fixed costs</td>
<td></td>
<td>2,904.91</td>
<td>193.66</td>
</tr>
</tbody>
</table>

| Total of all costs per acre | $6,517.73 | $434.52 |
| Net projected returns      | -$2,767.73 | -$184.52 |
### Table 11. Year 4, medium-density apple establishment, $/acre economic costs and returns.

<table>
<thead>
<tr>
<th>GROSS INCOME</th>
<th>Quantity</th>
<th>Unit</th>
<th>$/Unit</th>
<th>Total</th>
<th>Price/bin</th>
</tr>
</thead>
<tbody>
<tr>
<td>Apples</td>
<td>25.00</td>
<td>bins</td>
<td>250.00</td>
<td>6,250.00</td>
<td>250.00</td>
</tr>
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<td>Total gross income</td>
<td>6,250.00</td>
<td></td>
<td></td>
<td></td>
<td>250.00</td>
</tr>
</tbody>
</table>

#### VARIABLE CASH COSTS

<table>
<thead>
<tr>
<th>Description</th>
<th>Labor</th>
<th>Machinery</th>
<th>Materials</th>
<th>Total</th>
<th>Cost/bin</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pruning and training</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Thinning</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Tree removal &amp; tree replacement</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Raking and shredding brush</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fertilizer &amp; lime application</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Herbicide strip maintenance (.30x)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Insecticides and fungicides</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pheromone disruption (1/2 rate)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Production mgmt consultant fees</td>
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<td>Bee rental</td>
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</tr>
<tr>
<td>Flailing/mowing orchard floor</td>
<td></td>
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</tr>
<tr>
<td>Rodent control</td>
<td></td>
<td></td>
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</tr>
<tr>
<td>Frost protection</td>
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<td></td>
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</tr>
<tr>
<td>Irrigation</td>
<td></td>
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<tr>
<td>Trellis System</td>
<td></td>
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<td></td>
</tr>
<tr>
<td>Ladders, pruning, &amp; picking equipment</td>
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<td>Pickup, truck &amp; ATV</td>
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<td></td>
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<td>1.82</td>
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<td>Miscellaneous and overhead</td>
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<td>3.00</td>
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<tr>
<td>Interest: operating capital</td>
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#### FIXED CASH COSTS

<table>
<thead>
<tr>
<th>Description</th>
<th>Unit</th>
<th>Total</th>
<th>Cost/bin</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pickup, truck &amp; ATV insurance</td>
<td>acre</td>
<td>34.19</td>
<td>1.37</td>
</tr>
<tr>
<td>Water assessment</td>
<td>acre</td>
<td>60.00</td>
<td>2.40</td>
</tr>
<tr>
<td>Property insurance</td>
<td>acre</td>
<td>25.00</td>
<td>1.00</td>
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<tr>
<td>Property taxes</td>
<td>acre</td>
<td>60.00</td>
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</tr>
<tr>
<td>Total fixed cash costs</td>
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<td>179.19</td>
<td>7.17</td>
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#### FIXED NON-CASH COSTS

<table>
<thead>
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<th>Description</th>
<th>Unit</th>
<th>Total</th>
<th>Cost/bin</th>
</tr>
</thead>
<tbody>
<tr>
<td>Machinery and equipment insurance, depreciation &amp; interest</td>
<td>acre</td>
<td>481.83</td>
<td>19.27</td>
</tr>
<tr>
<td>Pickup, truck &amp; ATV - depreciation &amp; interest</td>
<td>acre</td>
<td>89.14</td>
<td>3.57</td>
</tr>
<tr>
<td>Foreman housing</td>
<td>acre</td>
<td>102.86</td>
<td>4.11</td>
</tr>
<tr>
<td>Housing facilities</td>
<td>acre</td>
<td>91.43</td>
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</tr>
<tr>
<td>Land interest charge</td>
<td>acre</td>
<td>320.00</td>
<td>12.80</td>
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<tr>
<td>Prior year's establishment costs - Interest</td>
<td>acre</td>
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</table>

#### Total of all costs per acre

| Total of all costs per acre | $7,100.90 | $284.04 |
| Total projected returns     | -$850.90  | -$34.04 |
### Table 12. Year 5, medium-density apple establishment, $/acre economic costs and returns.

<table>
<thead>
<tr>
<th>GROSS INCOME</th>
<th>Quantity</th>
<th>Unit</th>
<th>S/Unit</th>
<th>Total</th>
<th>Price/bin</th>
</tr>
</thead>
<tbody>
<tr>
<td>Apples</td>
<td>40.00</td>
<td>bins</td>
<td>250.00</td>
<td>10,000.00</td>
<td>250.00</td>
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<tr>
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<td></td>
<td></td>
<td>10,000.00</td>
<td>250.00</td>
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<table>
<thead>
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<th>Description</th>
<th>Labor</th>
<th>Machinery</th>
<th>Materials</th>
<th>Total</th>
<th>Cost/bin</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pruning and training</td>
<td>60.0 hours</td>
<td>$690.00</td>
<td>$0.00</td>
<td>$0.00</td>
<td>$690.00</td>
<td>$17.25</td>
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<td>40.0 hours</td>
<td>460.00</td>
<td>0.00</td>
<td>0.00</td>
<td>460.00</td>
<td>11.50</td>
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<tr>
<td>Tree removal &amp; tree replacement</td>
<td>2.5 hours</td>
<td>61.25</td>
<td>26.65</td>
<td>16.00</td>
<td>103.90</td>
<td>2.60</td>
</tr>
<tr>
<td>Raking and shredding brush</td>
<td>1.0 x/acre</td>
<td>9.70</td>
<td>9.74</td>
<td>0.00</td>
<td>19.45</td>
<td>0.49</td>
</tr>
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<td>170.46</td>
<td>4.26</td>
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<td>2.0 applications</td>
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<td>9.68</td>
<td>60.00</td>
<td>85.68</td>
<td>2.14</td>
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<tr>
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<td>10.0 applications</td>
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<td>92.82</td>
<td>570.00</td>
<td>717.81</td>
<td>17.95</td>
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<tr>
<td>Pheromone disruption (1/2 rate)</td>
<td>2.5 hours</td>
<td>28.75</td>
<td>0.00</td>
<td>200.00</td>
<td>228.75</td>
<td>5.72</td>
</tr>
<tr>
<td>Production mgmt consultant fees</td>
<td>1.0 x/acre</td>
<td>0.00</td>
<td>0.00</td>
<td>30.00</td>
<td>30.00</td>
<td>0.75</td>
</tr>
<tr>
<td>Bee rental</td>
<td>2.0 hives</td>
<td>0.00</td>
<td>0.00</td>
<td>100.00</td>
<td>100.00</td>
<td>2.50</td>
</tr>
<tr>
<td>Flailing/mowing orchard floor</td>
<td>5.0 times</td>
<td>16.17</td>
<td>21.42</td>
<td>0.00</td>
<td>37.60</td>
<td>0.94</td>
</tr>
<tr>
<td>Rodent control</td>
<td>1.0 hours</td>
<td>4.12</td>
<td>3.51</td>
<td>20.00</td>
<td>27.63</td>
<td>0.69</td>
</tr>
<tr>
<td>Frost protection</td>
<td>2.0 hour</td>
<td>23.00</td>
<td>98.33</td>
<td>0.00</td>
<td>121.33</td>
<td>3.03</td>
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<tr>
<td>Irrigation</td>
<td>5.0 hours</td>
<td>57.50</td>
<td>0.00</td>
<td>12.00</td>
<td>69.50</td>
<td>1.74</td>
</tr>
<tr>
<td>Trellis System</td>
<td>1.0 x/acre</td>
<td>0.00</td>
<td>0.00</td>
<td>18.00</td>
<td>18.00</td>
<td>0.45</td>
</tr>
<tr>
<td>Ladders, pruning, &amp; picking equip.</td>
<td>1.0 x/acre</td>
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<td>16.01</td>
<td>0.00</td>
<td>16.01</td>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Tractor drivers</td>
<td>4.2 hours</td>
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<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Pickup, truck &amp; ATV</td>
<td>1.0 x/acre</td>
<td>0.00</td>
<td>189.49</td>
<td>0.00</td>
<td>189.49</td>
<td>4.74</td>
</tr>
<tr>
<td>Housing facilities</td>
<td>1.0 x/acre</td>
<td>0.00</td>
<td>0.00</td>
<td>45.43</td>
<td>45.43</td>
<td>1.14</td>
</tr>
<tr>
<td>Miscellaneous and overhead</td>
<td>1.0 x/acre</td>
<td>0.00</td>
<td>0.00</td>
<td>75.00</td>
<td>75.00</td>
<td>1.88</td>
</tr>
<tr>
<td>Interest: operating capital</td>
<td>6.0 months</td>
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<td>0.00</td>
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<td>54.52</td>
<td>1.36</td>
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<table>
<thead>
<tr>
<th>FIXED CASH COSTS</th>
<th>Unit</th>
<th>Total</th>
<th>Cost/bin</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pickup, truck &amp; ATV insurance</td>
<td>acre</td>
<td>34.19</td>
<td>0.85</td>
</tr>
<tr>
<td>Water assessment</td>
<td>acre</td>
<td>60.00</td>
<td>1.50</td>
</tr>
<tr>
<td>Property insurance</td>
<td>acre</td>
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</tr>
<tr>
<td>Property taxes</td>
<td>acre</td>
<td>60.00</td>
<td>1.50</td>
</tr>
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<table>
<thead>
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<th>FIXED NON-CASH COSTS</th>
<th>Unit</th>
<th>Total</th>
<th>Cost/bin</th>
</tr>
</thead>
<tbody>
<tr>
<td>Machinery and equipment insurance</td>
<td>acre</td>
<td>481.83</td>
<td>12.05</td>
</tr>
<tr>
<td>Pickup, truck &amp; ATV - depreciation &amp; interest</td>
<td>acre</td>
<td>89.14</td>
<td>2.23</td>
</tr>
<tr>
<td>Foreman housing</td>
<td>acre</td>
<td>102.86</td>
<td>2.57</td>
</tr>
<tr>
<td>Housing facilities</td>
<td>acre</td>
<td>91.43</td>
<td>2.29</td>
</tr>
<tr>
<td>Land interest charge</td>
<td>acre</td>
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<td>8.00</td>
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<tr>
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Net projected returns

| Total of all costs per acre         | $7,610.30 | $190.26 |
| Net projected returns              | $2,389.70 | $59.74  |
Table 13. Full production, medium-density apple establishment, $/acre economic costs and returns.

<table>
<thead>
<tr>
<th>GROSS INCOME</th>
<th>Description</th>
<th>Quantity</th>
<th>Unit</th>
<th>$/Unit</th>
<th>Total</th>
<th>Price/bin</th>
</tr>
</thead>
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<tr>
<td></td>
<td>Apples</td>
<td>50.00</td>
<td>bins</td>
<td>250.00</td>
<td>12,500.00</td>
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<td>12,500.00</td>
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<th>Description</th>
<th>Labor</th>
<th>Machinery</th>
<th>Materials</th>
<th>Total</th>
<th>Cost/bin</th>
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</thead>
<tbody>
<tr>
<td>Pruning and training</td>
<td>60.0 hours</td>
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<td>$0.00</td>
<td>$0.00</td>
<td>$690.00</td>
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<tr>
<td>Thinning</td>
<td>50.0 hours</td>
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<td>0.00</td>
<td>0.00</td>
<td>575.00</td>
<td>11.50</td>
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<td>Tree removal &amp; tree replacement</td>
<td>2.5 hours</td>
<td>61.25</td>
<td>26.65</td>
<td>16.00</td>
<td>103.90</td>
<td>2.08</td>
</tr>
<tr>
<td>Raking and shredding brush</td>
<td>9.70</td>
<td>9.74</td>
<td>0.00</td>
<td>19.45</td>
<td>0.89</td>
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<tr>
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<td>3.49</td>
<td>165.00</td>
<td>170.46</td>
<td>3.41</td>
</tr>
<tr>
<td>Herbicide strip maintenance (.30x)</td>
<td>2.0 applications</td>
<td>16.00</td>
<td>9.68</td>
<td>60.00</td>
<td>85.68</td>
<td>1.71</td>
</tr>
<tr>
<td>Insecticides and fungicides</td>
<td>10.0 applications</td>
<td>54.99</td>
<td>92.82</td>
<td>570.00</td>
<td>717.81</td>
<td>14.36</td>
</tr>
<tr>
<td>Pheromone disruption (1/2 rate)</td>
<td>2.5 hours</td>
<td>28.75</td>
<td>0.00</td>
<td>200.00</td>
<td>228.75</td>
<td>4.58</td>
</tr>
<tr>
<td>Production mgnt consultant fees</td>
<td>1.0 x/acre</td>
<td>0.00</td>
<td>0.00</td>
<td>30.00</td>
<td>30.00</td>
<td>0.60</td>
</tr>
<tr>
<td>Bee rental</td>
<td>2.0 hives</td>
<td>0.00</td>
<td>0.00</td>
<td>100.00</td>
<td>100.00</td>
<td>2.00</td>
</tr>
<tr>
<td>Failing/mowing orchard floor</td>
<td>5.0 times</td>
<td>16.17</td>
<td>21.42</td>
<td>0.00</td>
<td>37.60</td>
<td>0.75</td>
</tr>
<tr>
<td>Rodent control</td>
<td>1.0 hours</td>
<td>4.12</td>
<td>3.51</td>
<td>20.00</td>
<td>27.63</td>
<td>0.55</td>
</tr>
<tr>
<td>Frost protection</td>
<td>2.0 hour</td>
<td>23.00</td>
<td>98.33</td>
<td>0.00</td>
<td>121.33</td>
<td>2.43</td>
</tr>
<tr>
<td>Irrigation</td>
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<td>0.00</td>
<td>12.00</td>
<td>69.50</td>
<td>1.39</td>
</tr>
<tr>
<td>Trellis System</td>
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<td>0.00</td>
<td>18.00</td>
<td>18.00</td>
<td>0.36</td>
</tr>
<tr>
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<td>16.01</td>
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<td>0.00</td>
<td>30.00</td>
<td>30.00</td>
<td>0.60</td>
</tr>
<tr>
<td>Tractor drivers</td>
<td>5.2 hours</td>
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<td>0.00</td>
<td>100.00</td>
<td>100.00</td>
<td>2.00</td>
</tr>
<tr>
<td>Pickup, truck &amp; ATV</td>
<td>1.0 x/acre</td>
<td>0.00</td>
<td>189.49</td>
<td>0.00</td>
<td>189.49</td>
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</tr>
<tr>
<td>Housing facilities</td>
<td>1.0 x/acre</td>
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<td>45.43</td>
<td>45.43</td>
<td>0.91</td>
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<tr>
<td>Miscellaneous and overhead</td>
<td>1.0 x/acre</td>
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<td>0.00</td>
<td>75.00</td>
<td>75.00</td>
<td>1.50</td>
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<tr>
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<td>0.00</td>
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<td>63.11</td>
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<tr>
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<table>
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<th>Description</th>
<th>Unit</th>
<th>Total</th>
<th>Cost/bin</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pickup, truck &amp; ATV insurance</td>
<td>acre</td>
<td>34.19</td>
<td>0.68</td>
<td></td>
</tr>
<tr>
<td>Water assessment</td>
<td>acre</td>
<td>60.00</td>
<td>1.20</td>
<td></td>
</tr>
<tr>
<td>Property insurance</td>
<td>acre</td>
<td>25.00</td>
<td>0.50</td>
<td></td>
</tr>
<tr>
<td>Property taxes</td>
<td>acre</td>
<td>60.00</td>
<td>1.20</td>
<td></td>
</tr>
<tr>
<td>Total fixed cash costs</td>
<td></td>
<td>179.19</td>
<td>3.58</td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>FIXED NON-CASH COSTS</th>
<th>Description</th>
<th>Unit</th>
<th>Total</th>
<th>Cost/bin</th>
</tr>
</thead>
<tbody>
<tr>
<td>Machinery and equipment insurance, depreciation &amp; interest</td>
<td>acre</td>
<td>481.83</td>
<td>9.64</td>
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</tr>
<tr>
<td>Pickup, truck &amp; ATV - depreciation &amp; interest</td>
<td>acre</td>
<td>89.14</td>
<td>1.78</td>
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<tr>
<td>Foreman housing</td>
<td>acre</td>
<td>102.86</td>
<td>2.06</td>
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<tr>
<td>Housing facilities</td>
<td>acre</td>
<td>91.43</td>
<td>1.83</td>
<td></td>
</tr>
<tr>
<td>Land interest charge</td>
<td>acre</td>
<td>320.00</td>
<td>6.40</td>
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</tr>
<tr>
<td>Amortized establishment costs</td>
<td>acre</td>
<td>2,036.09</td>
<td>40.72</td>
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</tr>
<tr>
<td>Total fixed non-cash costs</td>
<td></td>
<td>3,121.34</td>
<td>62.43</td>
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</tr>
<tr>
<td>Total fixed costs</td>
<td></td>
<td>3,300.53</td>
<td>66.01</td>
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</tr>
</tbody>
</table>

Total of all costs per acre | $8,412.36 | $168.25 |
Net projected returns | $4,087.64 | $81.75 |