<table>
<thead>
<tr>
<th>Farm Business Management Reports</th>
<th>EB1715</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>1992 Estimated Cost of Producing Alfalfa Seed Under Rill Irrigation in Franklin and Grant Counties</strong></td>
<td></td>
</tr>
<tr>
<td>Herbert R. Hinman</td>
<td></td>
</tr>
<tr>
<td>Elvin Kulp</td>
<td></td>
</tr>
</tbody>
</table>
Enterprise costs and returns vary from one farm to the next and over time for any particular farm. Variability stems from differences in:

- Capital, labor, land, and management resources
- Type and size of machinery complement
- Cultural practices
- Crop yields
- Input prices
- Commodity prices

Costs can also be calculated differently depending on the intended use of the cost estimate. The information in this publication serves as a general guide for alfalfa seed grown on a modern, well-managed farm in either Franklin or Grant counties. To avoid drawing unwarranted conclusions for any particular operation, closely examine the assumptions used. If they are not appropriate for the situation at hand, you should adjust the costs and/or returns.
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About the Authors

Herbert Hinman is a Farm Management Economist, and Elvin Kulp is a Grant-Adams Area Extension Agent, Cooperative Extension, Washington State University.
INTRODUCTION

In 1990, approximately 23,000 acres of alfalfa seed were produced in Washington State. Alfalfa seed ranked 24th in agricultural commodity value within the state with a value of $18,573,000. Walla Walla County was the largest alfalfa seed producing county with 16,000 acres and a production of 106,000 cwt. of seed. Franklin and Grant counties produced a total of 5,800 acres and 36,000 cwt. of seed.¹

Rainfall in Franklin and Grant counties ranges from 6-10 inches annually. Crops grown in these counties depend largely on irrigation water pumped from behind Grand Coulee Dam. Irrigation water availability, coupled with a growing season of 140 to 200 days, makes it possible to grow alfalfa seed in this area.

The general objective of this study was to develop enterprise budgets for alfalfa seed production within Franklin and Grant counties. The specific objectives were:

1. To identify production practices representative of well-managed alfalfa seed enterprises grown under rill irrigation in Franklin and Grant counties.

2. To provide estimates of capital requirements, production costs, and returns.

3. To give producers a procedure for analyzing the profitability of their alfalfa seed enterprise.

SOURCES OF INFORMATION

The primary information for this study was obtained from a group of Franklin and Grant county alfalfa seed producers. These producers were considered representative of well-managed farms. Their production practices and requirements for labor, equipment, and supplies are the basis for the assumptions used in this study and represent what this group of producers consider to be the latest developments. Local farm suppliers provided price information on materials and other services commonly used by farmers. Machinery costs were based on current purchase prices and rates of annual use considered typical by the producer committee.

BUDGET ASSUMPTIONS

The following assumptions were made in developing the enterprise data:

1. The farm has 600 acres under rill (furrow) irrigation with 200 acres devoted to the production of alfalfa seed.

2. The enterprise budgets are for alfalfa seed established and produced under one or more 50-acre rill irrigation system.

3. The alfalfa seed field is established in late summer – early fall following the harvest of wheat. An alfalfa seed field can produce seed for three years.

4. The land is rented for $100 per acre with the landowner furnishing the irrigation system and the operator paying the water charge of $25 per acre, along with annual repairs of approximately $4 per acre.

5. Producer yields range from 550 to 800 pounds of clean seed per acre. For the initial study, management costs were calculated using an average annual yield of 700 pounds.

6. Net price to the producer ranges from $.80 to $1.25 per pound of clean seed per acre. For the initial study, management costs were calculated using an average annual price of $1.00 per pound. For management, a cost of 7% of gross receipts is used (see page 5).

7. The interest rate is 9%.

SUMMARY OF RESULTS

Table 1 presents a summary of the establishment year costs and the production costs for the three producing years. Production year costs include establishment year costs amortized over three years at 9% interest. These amortized establishment year costs must be recaptured during the three production years if the enterprise is to be profitable.

The detailed schedule of operations and itemized costs per acre for the establishment year and the three production years are presented in Tables 3.1 through Table 4.4 in Appendix I. A discussion of this budget information is presented later.
### TABLE 1. SUMMARY OF ESTABLISHMENT AND PRODUCTION COSTS PER ACRE FOR ALFALFA SEED PRODUCED UNDER RILL IRRIGATION IN FRANKLIN AND GRANT COUNTIES.

<table>
<thead>
<tr>
<th></th>
<th>ESTAB. YEAR</th>
<th>YEAR 1</th>
<th>YEAR 2</th>
<th>YEAR 3</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>$</td>
<td>$</td>
<td>$</td>
<td>$</td>
</tr>
<tr>
<td><strong>VARIABLE COSTS:</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Alfalfa Seed</td>
<td>3.75</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Soil Test</td>
<td>1.00</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Burning Cost</td>
<td>1.55</td>
<td>10.00</td>
<td>10.00</td>
<td>10.00</td>
</tr>
<tr>
<td>Pollination Cost</td>
<td>-</td>
<td>156.82</td>
<td>167.30</td>
<td>167.30</td>
</tr>
<tr>
<td>Seed Certification Fee</td>
<td>.30</td>
<td>.30</td>
<td>.30</td>
<td>.30</td>
</tr>
<tr>
<td>Seed Production Fee</td>
<td>-</td>
<td>1.75</td>
<td>1.75</td>
<td>1.75</td>
</tr>
<tr>
<td>Fertilizer</td>
<td>23.60</td>
<td>6.00</td>
<td>6.00</td>
<td>6.00</td>
</tr>
<tr>
<td>Chemicals</td>
<td>39.75</td>
<td>66.55</td>
<td>53.80</td>
<td>60.10</td>
</tr>
<tr>
<td>Water Charge</td>
<td>6.25</td>
<td>25.00</td>
<td>25.00</td>
<td>18.75</td>
</tr>
<tr>
<td>Custom Operations</td>
<td>5.00</td>
<td>12.00</td>
<td>12.00</td>
<td>12.00</td>
</tr>
<tr>
<td>Machinery Cost*</td>
<td>37.57</td>
<td>57.60</td>
<td>54.15</td>
<td>51.48</td>
</tr>
<tr>
<td>Labor</td>
<td>41.28</td>
<td>60.31</td>
<td>51.72</td>
<td>49.25</td>
</tr>
<tr>
<td>Overhead</td>
<td>12.21</td>
<td>30.43</td>
<td>29.26</td>
<td>28.85</td>
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<tr>
<td>Interest</td>
<td>2.79</td>
<td>9.36</td>
<td>8.18</td>
<td>7.79</td>
</tr>
<tr>
<td>Total Variable Cost</td>
<td>175.05</td>
<td>436.12</td>
<td>419.46</td>
<td>413.57</td>
</tr>
<tr>
<td><strong>FIXED COST:</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Machinery Cost*</td>
<td>56.11</td>
<td>104.01</td>
<td>96.89</td>
<td>94.17</td>
</tr>
<tr>
<td>Land Rent</td>
<td>25.00</td>
<td>100.00</td>
<td>100.00</td>
<td>75.00</td>
</tr>
<tr>
<td>Amort. Estab. VC**</td>
<td>-</td>
<td>69.16</td>
<td>69.16</td>
<td>69.16</td>
</tr>
<tr>
<td>Amort. Estab. FC**</td>
<td>-</td>
<td>36.88</td>
<td>36.88</td>
<td>36.88</td>
</tr>
<tr>
<td>Management</td>
<td>12.25</td>
<td>49.00</td>
<td>49.00</td>
<td>36.75</td>
</tr>
<tr>
<td>Total Fixed Cost</td>
<td>93.36</td>
<td>359.05</td>
<td>351.93</td>
<td>311.96</td>
</tr>
<tr>
<td>Total Cost</td>
<td>268.41</td>
<td>795.17</td>
<td>771.39</td>
<td>725.53</td>
</tr>
</tbody>
</table>

* Includes all machinery costs plus machine shed and shop, shop tools, and irrigation costs.

**Establishment year variable costs (VC) and fixed costs (FC) amortized over the 3-year production period at 9% interest.

From information presented in Table 1, it can be determined that the average annual variable cost (including the establishment year variable cost amortized over three years at 9% interest) encountered over the three producing years is

\[
\frac{\left(\$436.12 + \$69.16\right) + \left(\$419.46 + \$69.16\right) + \left(\$413.57 + \$69.16\right)}{3} = \$492.21
\]
The average annual total cost encountered over the three producing years is

\[
\frac{($795.17 + $771.39 + $725.53)}{3} = $764.03
\]

Table 2 presents the prices, net of seed cleaning charges, necessary at different average annual yield levels in order to cover all costs over the three-year production period.

<table>
<thead>
<tr>
<th>AVERAGE 3-YEAR YIELD LEVEL:</th>
<th>550 LBS.</th>
<th>600 LBS.</th>
<th>650 LBS.</th>
<th>700 LBS.</th>
<th>750 LBS.</th>
<th>800 LBS.</th>
</tr>
</thead>
<tbody>
<tr>
<td>PRICE/LB. NEEDED TO COVER:</td>
<td>$</td>
<td>$</td>
<td>$</td>
<td>$</td>
<td>$</td>
<td>$</td>
</tr>
<tr>
<td>VARIABLE COST*</td>
<td>.89</td>
<td>.82</td>
<td>.76</td>
<td>.70</td>
<td>.66</td>
<td>.62</td>
</tr>
<tr>
<td>TOTAL COST</td>
<td>1.39</td>
<td>1.27</td>
<td>1.18</td>
<td>1.09</td>
<td>1.02</td>
<td>.96</td>
</tr>
</tbody>
</table>

*Includes establishment year variable cost amortized over 3 years at 9% interest.

DISCUSSION OF DETAILED BUDGETS

Appendix I presents the detailed budgets developed from this study. A discussion of the data in each of the tables follows.

Schedule of Operations and Estimated Costs Per Acre

Table 3.1 outlines the schedule of field operations by month, the type of machinery and labor used, the hours of machine use per acre, and total costs for the establishment year. Tables 3.2, 3.3, and 3.4 outline the schedules of field operations by month, the type of machinery and labor used, the hours of machine use per acre, and total production costs for each of the three production years.

The costs are divided into two categories: 1) fixed costs include machinery and building ownership, land, establishment, and management costs; 2) variable costs are associated with operating machinery, hiring labor, and purchasing services and materials. Total cost is the sum of fixed and variable costs.

Machinery and building fixed costs include depreciation, interest on the investment, property taxes, and insurance. These costs are incurred whether or not a crop is grown and do not vary with the size of the enterprise, given the ownership of a specific machinery and building complement. Machinery fixed costs for a specific field operation are determined by multiplying the machine hours per acre times the per-hour fixed cost. The per-hour fixed costs, shown in Table 7, are determined by dividing the total annual fixed
cost by the annual hours of machinery use over all enterprises for
the representative farm. Building, irrigation and shop tool costs
are calculated on a per-acre basis.

Land fixed cost is equal to the gross cash rental rate typical of
the area. Much of the land used for production is rented. Even if
you produce a crop on land you own, the prevailing rental rate is
an opportunity cost or foregone return for not renting out the
land. Although individual rental arrangements vary, in many
situations the tenant pays a cash rent and the landowner pays the
property taxes.

For each production year, an establishment cost is included. This
cost represents establishment year costs amortized over three years
at 9% interest that must be recaptured during the three production
years.

An opportunity cost for management is also listed in Table 3. For
management, a cost of 7% of gross receipts is used. This is
representative of management fees charged by farm management firms
in the Columbia Basin and is an estimate of the value of an
operator's management skills. Management is regarded as a fixed
rather than a variable cost because one either uses management
skills or loses them during the production year.

Variable costs depend directly on the number of crop acres and type
of enterprise. These costs include labor, fuel, oil, repairs,
fertilizer, chemicals, custom work, interest on operating capital,
and overhead (telephone, utilities, legal, accounting, organization
dues, etc.). Also included is a dollar figure for pollination
cost. Pollination costs involving an alfalfa seed field were
calculated separately and are detailed in Appendix II.

Two pickup trucks are included in the cost estimate; one for the
manager and one for the hired labor. No labor hours are assigned
to the use of these pickups. In the manager's case, labor costs
for using this pickup are part of the management cost. For the
pickup used by the hired labor, labor cost for using the pickup are
included in the other labor figures, i.e., irrigation labor costs,
etc.

**Itemized Costs Per Acre**

Tables 4.1-4.4 provide itemized lists of the costs detailed in
Tables 3.1-3.4, respectively. Most items are self-explanatory.
However, "Tractor Interest" and "Machinery Interest" represent the
opportunity cost (returns foregone by investing in machinery rather
than in alternative investments) or interest paid to finance this
equipment. Total interest cost on these capital purchases is
calculated on the average value of the machinery over the
respective years of use. The 9% interest charge made against this "average" value is the total interest cost.

The amortization of the first year establishment cost was divided into variable cost and fixed cost. This was done so that in determining break-even prices at the variable cost level (Table 2), or average returns over variable costs (Table 6), the amortization of the establishment year variable costs would be correctly included as part of total overall variable cost.

Materials and Services Used by Operation

Tables 3.1-3.4 list the "Schedule of Operations and Estimated Cost Per Acre..." for the establishment year and each production year. The "Service" and "Materials" columns of these tables list dollar amounts spent on services and materials used with individual operations. Tables 5.1-5.4 list, by operation, the specific services and/or materials used, the quantities used, and the prices paid for the establishment year and each production year analyzed in this study.

Returns Over Variable Costs and Total Costs

Table 6 presents returns over variable cost and total cost, for each production year at different prices and yields. Prices vary from $.80 per pound of clean seed to $1.25 per pound. Yields vary from 550 lbs. to 800 lbs. of clean seed.

Returns over variable costs represent those returns over costs that occur only if the crop is maintained and harvested. If returns fail to cover these costs, alfalfa seed becomes uneconomical to produce even in the short run because the added costs of production are greater than the added returns.

Returns over total costs represent the compensation you receive for producing alfalfa seed after covering all costs of production including cash costs, depreciation, operator labor and management, and opportunity costs for investments in equipment. Failure to receive a positive return means you will not realize a return on your management, labor, and capital contributions equivalent to what you could earn from an alternative use.

Machinery and Building Cost Per Hour/Per Acre

Table 7 identifies the type of machinery and buildings used to derive machinery and building costs. It includes the type of machines used on the representative farm, their current replacement price, annual hours of use, and estimated per-hour fixed and variable costs. For buildings, irrigation tubes and dams, and shop tools it includes their current replacement price, acres covered by the asset(s), and estimated per-acre fixed and variable costs.
Machinery and building fixed costs include depreciation and interest on investment, property taxes, and insurance—costs that do not vary with the crop grown or the number of acres produced. Current replacement costs are used for all machinery and buildings. While this assumption may result in an overstatement of production costs, it is an indication of the enterprise's ability to generate the earnings needed to replace depreciable assets. Continuing increases in prices paid for machinery and buildings means that depreciation claimed on assets purchased before price advances understates the amount of capital currently required to replace assets. When an enterprise is evaluated to determine its long-run viability, it is important to consider its ability to replace depreciable assets. Interest on investment represents a 9% opportunity cost to the enterprise. These are earnings foregone by investing money in machinery and buildings rather than the next best alternative. This may also represent the interest paid on funds borrowed to finance machinery purchases.

Machinery and building variable costs include machine and building repair, fuel, and lubrication—costs that vary with the crop grown and the number of acres of crop produced.

**Input Prices**

Prices used for fuel, fertilizer, chemicals, seed, custom services, and other inputs are listed in Table 8.

**CONCLUDING NOTE**

To use these budgets you should fully comprehend the procedures and assumptions used in this study and interpret the results accordingly. The authors and producers who organized this data recognize that these budgets do not represent any one particular operation. They should be used as a general guide to help derive budgets for individual operations. Moreover, this publication does not recommend production practices. Rather, it presents current technology used to raise alfalfa seed.
APPENDIX I

Detailed Budgets
TABLE 3.1. SCHEDULE OF OPERATIONS AND ESTIMATED COSTS PER ACRE FOR **ESTABLISHING AN ALFALFA SEED FIELD, FOLLOWING WHEAT.**

<table>
<thead>
<tr>
<th>VARIABLE COST</th>
<th>TOTAL PER ACRE</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>OPERATION</strong></td>
<td><strong>FUEL, LUBE, &amp; REPAIRS</strong></td>
</tr>
<tr>
<td>PER HOURS</td>
<td>MTH</td>
</tr>
<tr>
<td><strong>BURN STUBBLE</strong></td>
<td>PERMIT, LABOR &amp; PROPANE TORCH</td>
</tr>
<tr>
<td><strong>DISK &amp; PACK</strong></td>
<td>140HP-WT, 12' DISC W/14' PACK.</td>
</tr>
<tr>
<td><strong>CORRUGATE</strong></td>
<td>140HP-WT, 5-ROW CORRUGATOR</td>
</tr>
<tr>
<td><strong>HEDLAND</strong></td>
<td>100HP-WT, HEDLAND CORRUGATOR</td>
</tr>
<tr>
<td><strong>IRRIGATE (3X)</strong></td>
<td>RILL IRRIGATION</td>
</tr>
<tr>
<td><strong>DISK &amp; PACK</strong></td>
<td>140HP-WT, 12' DISC W/14' PACK.</td>
</tr>
<tr>
<td><strong>PLow &amp; PACK</strong></td>
<td>140HP-WT, 4BTM PLOW W/7' PACK.</td>
</tr>
<tr>
<td><strong>ROTOTILL</strong></td>
<td>140HP-WT, 12'ROTOVATOR W/PACK.</td>
</tr>
<tr>
<td><strong>SOIL TEST</strong></td>
<td>CUSTOM HIRE</td>
</tr>
<tr>
<td><strong>FERTILIZE</strong></td>
<td>CUSTOM HIRE</td>
</tr>
<tr>
<td><strong>PLANT/CORRUGATE</strong></td>
<td>100HP-WT, 6R PLANTER W/CORRUG.</td>
</tr>
<tr>
<td><strong>HEDLAND</strong></td>
<td>100HP-WT, HEDLAND CORRUCATOR</td>
</tr>
<tr>
<td><strong>CULTIVATE</strong></td>
<td>100HP-WT, 6R-CULTIVATOR</td>
</tr>
<tr>
<td><strong>SPRAY</strong></td>
<td>100HP-WT, 30' PTO SPRAYER</td>
</tr>
<tr>
<td><strong>HAUL WATER</strong></td>
<td>NURSE TRUCK</td>
</tr>
<tr>
<td><strong>SPRAY</strong></td>
<td>100HP-WT, 30' PTO SPRAYER</td>
</tr>
<tr>
<td><strong>HAUL WATER</strong></td>
<td>NURSE TRUCK</td>
</tr>
<tr>
<td><strong>CERTIFICATION</strong></td>
<td>SEED CERTIFICATION FEE</td>
</tr>
<tr>
<td><strong>MISC. USE</strong></td>
<td>MANAGER'S PICKUP</td>
</tr>
<tr>
<td><strong>MISC USE</strong></td>
<td>LABOR'S PICKUP</td>
</tr>
<tr>
<td><strong>BUILDINGS</strong></td>
<td>MACHINE SHED AND SHOP</td>
</tr>
<tr>
<td><strong>MISC USE</strong></td>
<td>SHOP TOOLS</td>
</tr>
<tr>
<td><strong>OVERHEAD</strong></td>
<td>LEGAL, UTILITIES, ACCT., ETC.</td>
</tr>
<tr>
<td><strong>LAND COST</strong></td>
<td>LAND RENT</td>
</tr>
<tr>
<td><strong>MANAGEMENT</strong>*</td>
<td>MANAGEMENT COST</td>
</tr>
<tr>
<td><strong>TOTAL PER ACRE</strong></td>
<td></td>
</tr>
</tbody>
</table>

* FOR THE ESTABLISHMENT YEAR, THE FOLLOWING COSTS ARE ALLOCATED 25% ALFALFA ESTABLISHMENT AND 75% WHEAT: IRRIGATION, PICKUPS, MACHINE SHED AND SHOP, SHOP TOOLS AND LAND RENT.

** IRRIGATE ONCE IN AUGUST BEFORE PLANTING AND TWICE IN SEPTEMBER AFTER PLANTING.

***MANAGEMENT COST IS FIGURED AS 7% OF PROJECTED ANNUAL GROSS RETURNS (700 LBS. CLEAN SEED X $1.00/LB. X 7% = $49.00). FOR THE ESTABLISHMENT YEAR AND THE LAST YEAR OF PRODUCTION 25% OF THIS ANNUAL COST IS ALLOCATED TO THE ESTABLISHMENT YEAR WHILE 75% IS ALLOCATED TO THE THIRD (AND LAST) YEAR OF PRODUCTION.
<table>
<thead>
<tr>
<th>VARIABLE COSTS</th>
<th>UNIT COST/UNIT QUANTITY</th>
<th>VALUE OR COST</th>
<th>YOUR FARM</th>
</tr>
</thead>
<tbody>
<tr>
<td>ALFALFA SEED</td>
<td>LB.</td>
<td>5.00</td>
<td>.75</td>
</tr>
<tr>
<td>NITROGEN</td>
<td>LB.</td>
<td>.28</td>
<td>30.00</td>
</tr>
<tr>
<td>PHOSPHOROUS</td>
<td>LB.</td>
<td>.24</td>
<td>30.00</td>
</tr>
<tr>
<td>POTASH</td>
<td>LB.</td>
<td>.14</td>
<td>30.00</td>
</tr>
<tr>
<td>SULFUR</td>
<td>LB.</td>
<td>.11</td>
<td>10.00</td>
</tr>
<tr>
<td>BORON</td>
<td>LB.</td>
<td>2.70</td>
<td>1.00</td>
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<td>FUSILADE</td>
<td>PINT</td>
<td>15.25</td>
<td>1.50</td>
</tr>
<tr>
<td>MORACT(STICKER)</td>
<td>PINT</td>
<td>2.75</td>
<td>1.50</td>
</tr>
<tr>
<td>2,4-DB-ESTER</td>
<td>PINT</td>
<td>4.25</td>
<td>3.00</td>
</tr>
<tr>
<td>WATER CHARGE</td>
<td>ACRE</td>
<td>25.00</td>
<td>.25</td>
</tr>
<tr>
<td>CUSTOM FERTILIZATION</td>
<td>ACRE</td>
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<td>DOL.</td>
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TOTAL VARIABLE COST  175.05

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<th>FIXED COSTS</th>
<th>UNIT COST/UNIT QUANTITY</th>
<th>VALUE OR COST</th>
<th>YOUR FARM</th>
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<td>ACRE</td>
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<td>.25</td>
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TOTAL FIXED COST  93.36

TOTAL COST  268.41

*INCLUDES ALL MACHINERY PLUS MACHINE SHED AND SHOP, SHOP TOOLS, AND IRRIGATION COSTS.
<table>
<thead>
<tr>
<th>OPERATION</th>
<th>MONTH</th>
<th>MATERIAL AND/OR SERVICE</th>
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</thead>
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<td>BURN STUBBLE</td>
<td>AUGUST</td>
<td>BURN PERMIT @ $1.50/acre</td>
</tr>
<tr>
<td></td>
<td></td>
<td>PROPANE GAS @ $.05/acre</td>
</tr>
<tr>
<td>IRRIGATE (3X)</td>
<td>AUG.-SEPT.</td>
<td>25% OF THE ANNUAL IRRIGATION CHARGE @ $25.00/acre</td>
</tr>
<tr>
<td>SOIL TEST</td>
<td>AUGUST</td>
<td>CUSTOM HIRED @ $1.00/acre</td>
</tr>
<tr>
<td>FERTILIZE</td>
<td>AUGUST</td>
<td>CUSTOM FERTILIZE @ $5.00/acre</td>
</tr>
<tr>
<td></td>
<td></td>
<td>30 LBS. NITROGEN @ $.28/LB.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>30 LBS. PHOSPHORUS @ $.24/LB.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>30 LBS. POTASH @ $.14/LB.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>10 LBS. SULFUR @ $.11/LB.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>1 LB. BORON @ $2.70/LB.</td>
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<tr>
<td>PLANT/CORRUGATE</td>
<td>SEPTEMBER</td>
<td>0.75 LBS. OF ALFALFA SEED @ $5.00/LB.</td>
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<tr>
<td>SPRAY (1ST TIME)</td>
<td>OCTOBER</td>
<td>1.5 PINTS OF FUSILADE @ $15.25/PINT</td>
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<tr>
<td></td>
<td></td>
<td>1.5 PINTS OF MORACT @ $2.75/PINT</td>
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<tr>
<td>SPRAY (2nd TIME)</td>
<td>OCTOBER</td>
<td>3 PINTS OF 2,4-DB-ESTER @ $4.25/PINT</td>
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<td>OCTOBER</td>
<td>SEED CERTIFICATION FEE @ $15.00/FIELD</td>
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<tr>
<td>OVERHEAD</td>
<td>ANNUAL</td>
<td>7.5% OF VARIABLE COST</td>
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### TABLE 3.2. SCHEDULE OF OPERATIONS AND ESTIMATED COSTS PER ACRE FOR PRODUCING ALFALFA SEED THE FIRST YEAR OF PRODUCTION.

<table>
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<th>OPERATION</th>
<th>TOOLING</th>
<th>MTH YEAR</th>
<th>MACH</th>
<th>LABOR</th>
<th>TOTAL FIXED COST</th>
<th>FUEL, LUBE, &amp; REPAIRS</th>
<th>LABOR</th>
<th>SERVICE MATER.</th>
<th>INTER.</th>
<th>TOTAL VARIABLE COST</th>
<th>TOTAL COST</th>
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<td>Spray</td>
<td>100HP-WT, 30' PTO SPRAYER</td>
<td>MAR 1992</td>
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<td>.14</td>
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<td>1.38</td>
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<td>12.75</td>
<td>.92</td>
<td>16.20</td>
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<tr>
<td>Haul Water</td>
<td>Nurse Truck</td>
<td>MAR 1992</td>
<td>.04</td>
<td>.04</td>
<td>1.20</td>
<td>.35</td>
<td>.44</td>
<td>.00</td>
<td>.00</td>
<td>.05</td>
<td>.84</td>
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<tr>
<td>Cultivate/Corrug</td>
<td>100HP-WT, 6R CULTIV./CORRUGA.</td>
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<td>.29</td>
<td>.31</td>
<td>5.47</td>
<td>2.93</td>
<td>3.14</td>
<td>.00</td>
<td>.00</td>
<td>.36</td>
<td>6.44</td>
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<tr>
<td>Hedland</td>
<td>100HP-WT, HEDLAND CORRUGATOR</td>
<td>MAR 1992</td>
<td>.06</td>
<td>.07</td>
<td>1.18</td>
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<td>.66</td>
<td>.00</td>
<td>.00</td>
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<td>Herbicide Spray</td>
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<td>.00</td>
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<td>Nurse Truck</td>
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<td>.04</td>
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<td>.35</td>
<td>.44</td>
<td>.00</td>
<td>.00</td>
<td>.04</td>
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<td>RILL IRRIGATION</td>
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<td>3.92</td>
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<td>.00</td>
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<td>56.43</td>
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<td>Pre-Bloom Spray</td>
<td>Custom Aerial</td>
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<td>.00</td>
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<td>.00</td>
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<td>.00</td>
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<td>.00</td>
<td>.00</td>
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<td>Production Fee</td>
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<td>Hand Labor, Backpack Sprayer</td>
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<td>.79</td>
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<td>10.00</td>
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<td>Insectic. Spray</td>
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<td>.25</td>
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<td>Swath</td>
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<td>.67</td>
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<td>33.94</td>
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<td>.00</td>
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<td>140HP-WT, 5 ROW CORRUGATOR</td>
<td>OCT 1992</td>
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<td>.22</td>
<td>2.97</td>
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<td>2.20</td>
<td>.00</td>
<td>.03</td>
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<td>.06</td>
<td>.07</td>
<td>1.18</td>
<td>.85</td>
<td>.66</td>
<td>.00</td>
<td>.01</td>
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<td>Thin Field</td>
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<td>.00</td>
<td>.00</td>
<td>.00</td>
<td>3.06</td>
<td>2.20</td>
<td>.04</td>
<td>5.30</td>
<td>8.94</td>
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<td>Misc. Use</td>
<td>Manager's Pickup</td>
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<td>.00</td>
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<td>Labor's Pickup</td>
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<td>.00</td>
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</table>

TOTAL PER ACRE 5.13 6.03 359.05 57.61 60.31 236.30 72.55 9.36 436.12 795.17

* Irrigate twice in April, twice in July, and once in October.

** Calculated separately. See Appendix II: Pollination Cost Calculations.

***Management cost is figured as 7% of projected annual gross returns (700 lbs. of clean seed x $1.00/lb. x 7% = $49.00).
TABLE 4.2. ITEMIZED COST PER ACRE FOR PRODUCING ALFALFA SEED FOR THE FIRST YEAR OF PRODUCTION.

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<th>PRICE OR VALUE OR YOUR</th>
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<td>UNIT COST/UNIT QUANTITY</td>
<td>COST</td>
</tr>
<tr>
<td>------------------------------------------------------------------------</td>
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<tr>
<td><strong>VARIABLE COSTS</strong></td>
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<tr>
<td>2,4-DB-ESTER</td>
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<td>12.75</td>
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<tr>
<td>SONALAN</td>
<td>PINT 5.00 4.00</td>
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<tr>
<td>CAPTURE</td>
<td>OZ. 4.50 6.40</td>
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<td>FOLIAR FEED</td>
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<td>6.00</td>
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<td>ACRE 1.00 1.00</td>
<td>1.00</td>
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<td>INSECTICIDE</td>
<td>ACRE 4.00 1.00</td>
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<td>12.00</td>
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<td>HOUR 10.00 6.03</td>
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<tr>
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<tr>
<td>INTEREST ON OP. CAP.</td>
<td>DOL. .09 103.97</td>
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<td><strong>TOTAL VARIABLE COST</strong></td>
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<td>AMORT. ESTAB. FC**</td>
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<td><strong>TOTAL FIXED COST</strong></td>
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**TOTAL COST** 795.15

* INCLUDES ALL MACHINERY PLUS MACHINE SHED AND SHOP, SHOP TOOLS, AND IRRIGATION COSTS.

**ESTABLISHMENT VARIABLE COSTS (VC) AND FIXED COSTS (FC) AMORTIZED OVER THE 3-YEAR PRODUCTION PERIOD AT 9% INTEREST.
<table>
<thead>
<tr>
<th>OPERATION</th>
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<th>MATERIAL AND/OR SERVICE</th>
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<td>MARCH</td>
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<td>4 PINTS OF SONALAN @ $5.00/PINT</td>
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<td>IRRIGATION CHARGE @ 25.00/ACRE</td>
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<tr>
<td>PRE-BLOOM SPRAY</td>
<td>MAY</td>
<td>CUSTOM AERIAL @ $6.00/ACRE</td>
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<tr>
<td></td>
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<td>6.4 OUNCES OF CAPTURE @ $4.50/OZ.</td>
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<td>FOLIAR FEED @ $6.00/ACRE</td>
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<td>MAY</td>
<td>POLLINATION COSTS @ $156.82/ACRE</td>
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<td>SEED CERTIFICATION FEE @ $15.00/FIELD</td>
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<td>JUNE</td>
<td>SEED PRODUCTION FEE @ $1.75/ACRE</td>
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<td>JULY</td>
<td>ROGUING SPRAY @ $1.00/ACRE</td>
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<td>AUGUST</td>
<td>CUSTOM AERIAL @ $6.00/ACRE</td>
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<td>BURN FIELD</td>
<td>OCTOBER</td>
<td>BURNING COST @ $10.00/ACRE</td>
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<td>ANNUAL</td>
<td>7.5% OF VARIABLE COST</td>
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**TABLE 5.2. MATERIALS AND SERVICES USED BY OPERATION FOR PRODUCING ALFALFA SEED THE FIRST YEAR OF PRODUCTION.**

---

EB 1715 - Page 14
### TABLE 3.3. SCHEDULE OF OPERATIONS AND ESTIMATED COSTS PER ACRE FOR PRODUCING ALFALFA SEED THE SECOND YEAR OF PRODUCTION.

<table>
<thead>
<tr>
<th>Variable Cost</th>
<th>MTH YEAR</th>
<th>MACH</th>
<th>LABOR</th>
<th>TOTAL FIXED COST</th>
<th>FUEL, LUBE, &amp; REPAIRS</th>
<th>LABOR</th>
<th>SERVICE MATER.</th>
<th>INTER.</th>
<th>TOTAL VARIABLE COST</th>
<th>TOTAL COST</th>
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**TOTAL PER ACRE**

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</tbody>
</table>

* IRRIGATE ONCE IN APRIL, TWICE IN JULY, AND ONCE IN OCTOBER.

** CALCULATED SEPARATELY. SEE APPENDIX II: POLLINATION COST CALCULATIONS.

***MANAGEMENT COST IS FIGURED AS 7% OF PROJECTED ANNUAL GROSS RETURNS (700 LBS. OF CLEAN SEED X $1.00/LB. X 7% = $49.00).
TABLE 4.3. ITEMIZED COST PER ACRE FOR PRODUCING ALFALFA SEED
THE SECOND YEAR OF PRODUCTION.
-------------------------------------------------------------------
<table>
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<th>PRICE OR VALUE OR YOUR</th>
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<td>6.00</td>
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<tr>
<td>ROGUING SPRAY</td>
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<td>4.00</td>
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* INCLUDES ALL MACHINERY PLUS MACHINE SHED AND SHOP, SHOP TOOLS, AND IRRIGATION COSTS.

**ESTABLISHMENT VARIABLE COSTS (VC) AND FIXED COSTS (FC) AMORTIZED OVER THE 3-YEAR PRODUCTION PERIOD AT 9% INTEREST.
<table>
<thead>
<tr>
<th>OPERATION</th>
<th>MONTH</th>
<th>MATERIAL AND/OR SERVICE</th>
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<td>IRRIGATE (4X)</td>
<td>SEASON</td>
<td>IRRIGATION CHARGE @ 25.00/acre</td>
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<td>CUSTOM AERIAL @ $6.00/acre</td>
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<td>6.4 OUNCES OF CAPTURE @ $4.50/OZ.</td>
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<td>FOLIAR FEED @ $6.00/acre</td>
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<td>POLLINATION</td>
<td>MAY</td>
<td>POLLINATION COSTS @ $167.30/acre</td>
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TABLE 5.3. MATERIALS AND SERVICES USED BY OPERATION FOR PRODUCING ALFALFA SEED
THE SECOND YEAR OF PRODUCTION.
### TABLE 3.4. SCHEDULE OF OPERATIONS AND ESTIMATED COSTS PER ACRE FOR PRODUCING ALFALFA SEED THE THIRD YEAR OF PRODUCTION.*

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<th>TOOLING</th>
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<th>HOURS</th>
<th>MACH</th>
<th>LABOR</th>
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<th>FUEL,</th>
<th>LUBE, &amp;</th>
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<th>LABOR</th>
<th>SERVICE</th>
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<td>6.22</td>
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</table>

| TOTAL PER ACRE            | 4.33   | 4.93   | 311.96 | 48.48 | 52.25 | 238.95 | 66.10 | 7.79   | 413.57 | 725.53 |

* FOR THE LAST YEAR OF PRODUCTION THE FOLLOWING COSTS ARE ALLOCATED 75% ALFALFA SEED PRODUCTION AND 25% TO THE FOLLOWING CROP: IRIGATION, PICKUPS, MACHINE SHED AND SHOP, SHOP TOOLS AND LAND RENT.

** IRRIEGATE ONCE IN APRIL AND TWICE IN JULY.

*** CALCULATED SEPARATELY. SEE APPENDIX II: POLLINATION COST CALCULATIONS.

****MANAGEMENT COSTS ARE FIGURED AS 7% AS PROJECTED ANNUAL GROSS RETURNS (700 LBS. CLEAN SEED X $1.00/LB. X 7% = $49.00). FOR THE ESTABLISHMENT YEAR AND THE LAST YEARS OF PRODUCTION, 25% OF THIS ANNUAL COST IS ALLOCATED TO THE ESTABLISHMENT YEAR WHILE 75% IS ALLOCATED TO THE THIRD (AND LAST) YEAR OF PRODUCTION.
### TABLE 4.4. ITEMIZED COST PER ACRE FOR PRODUCING ALFALFA SEED

#### THE THIRD YEAR OF PRODUCTION.

<table>
<thead>
<tr>
<th>PRICE OR UNIT COST/UNIT QUANTITY</th>
<th>VALUE OR COST</th>
<th>YOUR FARM</th>
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<tr>
<td><strong>VARIABLE COSTS</strong></td>
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<td>$</td>
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<tr>
<td>SONALAN PINT</td>
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<tr>
<td>CAPTURE OZ.</td>
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<tr>
<td>FOLIAR FEED ACRE</td>
<td>6.00</td>
<td>1.00</td>
</tr>
<tr>
<td>ROGUEING SPRAY ACRE</td>
<td>1.00</td>
<td>1.00</td>
</tr>
<tr>
<td>INSECTICIDE ACRE</td>
<td>4.00</td>
<td>1.00</td>
</tr>
<tr>
<td>2,4-D QT.</td>
<td>3.15</td>
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<tr>
<td>CUSTOM AERIAL ACRE</td>
<td>6.00</td>
<td>2.00</td>
</tr>
<tr>
<td>BURNING COST ACRE</td>
<td>10.00</td>
<td>1.00</td>
</tr>
<tr>
<td>POLLINATION COST ACRE</td>
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<td>SEED CERTIFICATION FEE ACRE</td>
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<tr>
<td>SEED PRODUCTION FEE ACRE</td>
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<td>1.00</td>
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<td>WATER CHARGE ACRE</td>
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<td>IRRIGATION REPAIR ACRE</td>
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<td>TRACTOR FUEL/LUBE ACRE</td>
<td>3.75</td>
<td>1.00</td>
</tr>
<tr>
<td>MACHINERY REPAIRS ACRE</td>
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<td>MACHINE FUEL/LUBE ACRE</td>
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</tr>
<tr>
<td>LABOR HOUR</td>
<td>10.00</td>
<td>4.93</td>
</tr>
<tr>
<td>OVERHEAD ACRE</td>
<td>28.85</td>
<td>1.00</td>
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<tr>
<td>INTEREST ON OP. CAP. DOL.</td>
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<td>86.61</td>
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**TOTAL VARIABLE COST**  413.57  

| **FIXED COSTS**              | $             | $         |
| TRACTOR DEPRECIATION ACRE     | 7.64          | 1.00      | 7.64       |
| TRACTOR INTEREST ACRE         | 6.31          | 1.00      | 6.31       |
| TRACTOR INSURANCE ACRE        | .42           | 1.00      | .42        |
| TRACTOR TAxES ACRE            | 1.26          | 1.00      | 1.26       |
| MACHINE DEPRECIATION* ACRE    | 47.00         | 1.00      | 47.00      |
| MACHINE INTEREST* ACRE        | 24.90         | 1.00      | 24.90      |
| MACHINE INSURANCE* ACRE       | 1.66          | 1.00      | 1.66       |
| MACHINE TAXES* ACRE           | 4.98          | 1.00      | 4.98       |
| LAND RENT ACRE                | 100.00        | .75       | 75.00      |
| AMORT. ESTAB. VC** ACRE       | 69.16         | 1.00      | 69.16      |
| AMORT. ESTAB. FC** ACRE       | 36.88         | 1.00      | 36.88      |
| MANAGEMENT FEE ACRE           | 49.00         | .75       | 36.75      |

**TOTAL FIXED COST**  311.96  

**TOTAL COST**  725.53  

*Includes all machinery plus machine shed and shop, shop tools, and irrigation costs.

**Establishment variable costs (VC) and fixed costs (FC) amortized over the 3-year production period at 9% interest.
### TABLE 5.4. MATERIALS AND SERVICES USED BY OPERATION FOR PRODUCING ALFALFA SEED

#### THE THIRD YEAR OF PRODUCTION

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<th>OPERATION</th>
<th>MONTH</th>
<th>MATERIAL AND/OR SERVICE</th>
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<td>HERBICIDE SPRAY</td>
<td>APRIL</td>
<td>4 PINTS OF SONALAN @ $5.00/PINT</td>
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<tr>
<td>IRRIGATE (3X)</td>
<td>SEASON</td>
<td>75% OF THE ANNUAL IRRIGATION CHARGE @ $25.00/acre</td>
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<tr>
<td>PRE-BLOOM SPRAY</td>
<td>MAY</td>
<td>CUSTOM AERIAL @ $6.00/acre</td>
</tr>
<tr>
<td></td>
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<td>6.4 OUNCES OF CAPTURE @ $4.50/OZ.</td>
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<td>FOLIAR FEED @ $6.00/acre</td>
</tr>
<tr>
<td>POLLINATION</td>
<td>MAY</td>
<td>POLLINATION COSTS @ $167.30/acre</td>
</tr>
<tr>
<td>CERTIFICATION</td>
<td>JUNE</td>
<td>SEED CERTIFICATION FEE @ $15.00/FIELD</td>
</tr>
<tr>
<td>PRODUCTION FEE</td>
<td>JUNE</td>
<td>SEED PRODUCTION FEE @ $1.75/acre</td>
</tr>
<tr>
<td>ROGUE FIELD</td>
<td>JULY</td>
<td>ROGUING SPRAY @ $1.00/acre</td>
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<tr>
<td>INSECTICIDE SPRAY</td>
<td>AUGUST</td>
<td>CUSTOM AERIAL @ $6.00/acre</td>
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<td>INSECTICIDE SPRAY @ $4.00/acre</td>
</tr>
<tr>
<td>BURN FIELD</td>
<td>AUGUST</td>
<td>BURNING COST @ $10.00/acre</td>
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<tr>
<td>SPRAY</td>
<td>SEPTEMBER</td>
<td>2 QUARTS OF 2,4-D @ $3.15/QT.</td>
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<tr>
<td>OVERHEAD</td>
<td>ANNUAL</td>
<td>7.5% OF VARIABLE COST</td>
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Table 6. Returns Over Variable Costs and Total Costs.

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<th>Price/Yield*</th>
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<td>Over V.C.**</td>
<td>- 65</td>
<td>- 25</td>
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<td>55</td>
<td>95</td>
<td>135</td>
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<tr>
<td>Over T.C.***</td>
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<td>-315</td>
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<td>386</td>
<td>449</td>
<td>511</td>
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<td>393</td>
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</table>

* Price is net of seed cleaning charges and yield is clean seed.
** V.C. = Variable Cost (includes establishment year variable cost amortized over 3 years at 9% interest = $69.16)
***T.C. = Total Cost

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TABLE 7. MACHINERY AND BUILDING COST PER HOUR/PER ACRE.

<table>
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<tr>
<th>YEARS</th>
<th>PURCHASE</th>
<th>ANNUAL DEPRECIATION</th>
<th>INSURANCE</th>
<th>TAXES</th>
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<th>TOTAL VARIABLE</th>
<th>TOTAL COST</th>
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<td>EST</td>
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<th>ACRES COVERED</th>
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<td>IRRIGATION TUBES</td>
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<td>IRRIGATION DAMS</td>
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<td>SHOP TOOLS</td>
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*FUEL AND LUBE COST SHOWN AT A RATE OF 6 GALLONS PER HOUR. ANOTHER RATE USED IN THE BUDGETS IS 4 GALLONS PER HOUR AT WHICH THE FUEL AND LUBE COST IS $3.68 PER HOUR.
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<td>Irrigation Charge</td>
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<td>Soil Test</td>
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<tr>
<td>Custom Fertilize</td>
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<tr>
<td>Custom Aerial</td>
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<td>2,4-D</td>
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<td>Phosphorous (Actual)</td>
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<td>Potash (Actual)</td>
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<tr>
<td>Sulfur (Actual)</td>
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<td>Boron (Actual)</td>
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<td>Capture</td>
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<td>Foliar Feed</td>
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APPENDIX II

POLLINATION COST CALCULATIONS
The following are the basic assumptions and calculations used to estimate the per-acre cost of pollinating an alfalfa seed field with leafcutter bees.

**Basic Assumptions**

1. Bee larvae cost $60 per gallon.

2. Seventy-five percent of the bee larvae are regenerated by the existing bees each year. The bee larvae are sold at the end of year three. Thus, the current year bee cost is equivalent to the 25% bee larvae replacement cost for the following year.

3. Bee larvae requirements per acre:

<table>
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<tr>
<th>Production Year</th>
<th>Gal. of Bee Larvae Furnished</th>
<th>Gal. of Bee Larvae Returned</th>
<th>Gal. of Bee Larva Lost</th>
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<tr>
<td>1</td>
<td>3.0</td>
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<td>0.75</td>
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<tr>
<td>2</td>
<td>3.5</td>
<td>2.625</td>
<td>0.875</td>
</tr>
<tr>
<td>3</td>
<td>3.5</td>
<td>2.625</td>
<td>0.875</td>
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</table>

4. Incubator construction cost with heating and refrigeration is $100/acre with a 20-year life.

5. Incubator trays cost $10.00/tray with a 10-year life. Two trays/acre required.

6. Laminated bee boards cost $50.00/board with a 10-year life. Three and one-half boards/acre required.

7. Punch out machine cost $5,000.00 with a 10-year life. One punch out machine will handle 250 acres.

8. Cell breaker machine cost $5,000.00 with a 10-year life. One cell breaker will handle 250 acres.

9. Shelters cost $125.00/shelter with a 10-year life. One shelter will handle 2.5 acres.

10. Other costs:

- electricity, $1.50/acre/year
- labor, 3 hr./acre/year
- materials, $4.00/acre/year
- repairs, $1.00/acre/year
## Pollination Cost Per Acre

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<th>Prod. Year 1 Cost</th>
<th>Prod. Years 2-3 Cost</th>
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<td>Insurance</td>
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</tr>
<tr>
<td>Incub. trays (2/acre)</td>
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<td>0.90</td>
<td>0.06</td>
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<td>Laminated bee boards</td>
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<td>0.52</td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Punch out machine</td>
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<td>0.90</td>
<td>0.06</td>
</tr>
<tr>
<td>Cell breaker</td>
<td>2.00</td>
<td>0.90</td>
<td>0.06</td>
</tr>
<tr>
<td>Shelter</td>
<td>5.00</td>
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<td></td>
<td></td>
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</tr>
<tr>
<td>Interest on first-year bee investment ($180 at 9%)</td>
<td>16.20</td>
<td>16.20</td>
<td></td>
</tr>
<tr>
<td>Interest on additional second-year bee investment ($30 at 9%)</td>
<td>2.70</td>
<td></td>
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</tr>
</tbody>
</table>

**Annual cost per acre:**

<p>| | | |</p>
<table>
<thead>
<tr>
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</tr>
</thead>
<tbody>
<tr>
<td>Replacement bees</td>
<td>45.00</td>
<td>52.50</td>
</tr>
<tr>
<td>Electricity</td>
<td>1.50</td>
<td>1.50</td>
</tr>
<tr>
<td>Labor</td>
<td>30.00</td>
<td>30.00</td>
</tr>
<tr>
<td>Materials</td>
<td>4.00</td>
<td>4.00</td>
</tr>
<tr>
<td>Repairs</td>
<td>1.00</td>
<td>1.00</td>
</tr>
<tr>
<td>Interest on operating cost (9% for 6 mo.)</td>
<td>3.67</td>
<td>4.00</td>
</tr>
</tbody>
</table>

**Total cost per acre**

<p>| | |</p>
<table>
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<tr>
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<tbody>
<tr>
<td></td>
<td>156.82</td>
</tr>
<tr>
<td></td>
<td>167.30</td>
</tr>
</tbody>
</table>
Use pesticides with care. Apply them only to plants, animals, or sites listed on the label. When mixing and applying pesticides, follow all label precautions to protect yourself and others around you. It is violation of law to disregard label directions. If pesticides are spilled on skin or clothing, remove clothing and wash skin thoroughly. Store pesticides in their original containers and keep them out of the reach of children, pets, and livestock.

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