COST OF PRODUCING FORAGEGRASS SEED IN THE LINCOLN - ADAMS AREA UNDER DRYLAND CONDITIONS

Herbert R. Hinman, Thomas Hoffmann, and Brent Faulkner
Note

Enterprise costs and returns vary from one farm to the next and over time for any particular farm. Variability stems from differences in the following:

- Capital, labor, and management resources.
- Type and size of machinery complement.
- Cultural practices.
- Size of farm enterprise.
- 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 growing foragegrass seed under dryland conditions in the Lincoln-Adams Area. To avoid drawing unwarranted conclusions for any particular farm or group of farms, the reader must closely examine the assumptions used. If they are not appropriate for the situation at hand, adjustments in the costs and/or returns should be made.
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Introduction

This publication examines representative field operations and costs associated with establishing and producing foragegrass seed under dryland conditions within Adams and Lincoln counties. The study area annually receives 10-14 inches of precipitation. Traditionally, a three-year rotation, the cropping sequence includes winter wheat-spring grain-summer fallow.

Production of foragegrass seed under dryland conditions occurred on a limited scale prior to 1985. A steady demand by the reclamation and pasture industry consumed 75-80 percent of the foragegrass seed produced west of the Mississippi River. In response to the Conservation Reserve Program (CRP) provision of the 1985 Food Security Act, the demand for foragegrass seed, primarily wheat grasses, bromes, and fescues, increased dramatically. Acreage dedicated to foragegrass seed production has increased from 1,000 to 3,000 acres during the past three years. The outlook for continued expansion of acreage is dependent upon a shift in production areas rather than in demand for foragegrass seed. The principle production districts for foragegrass seed are located in North and South Dakota, Montana, Utah, and Colorado. Because of drought induced problems, Montana and the Dakotas are deemed undependable suppliers of seedstocks. Less prone to climatic vagaries and, therefore, erratic production, seed suppliers are shifting production to east-central Washington. A potential of 5,000 acres of foragegrass seed production within Adams and Lincoln counties is possible.

Objective of the Study

The objective of this study is to present estimated costs of establishing and producing foragegrass seed under dryland conditions in the Lincoln-Adams area of Washington State. Consequently, many factors may alter the costs reported in the publication when compared to a particular individual’s operation. Therefore, we recommend that individual growers use the blanks provided on the right-hand side of various budget tables to reflect their own costs and returns. The primary value in a report of this kind is to identify the type of production practices and management techniques considered to be typical of a well-managed foragegrass seed enterprise. While not intended to represent a "typical" grass seed production enterprise, this publication does reflect current management practices. As such, it should be helpful in estimating the operational and financial requirements of establishing and producing foragegrass seed.

Budget Assumptions

The following assumptions were made in developing the enterprise data:

1. This is a dryland operation. There is a summer fallow year and an establishment year followed by five years of production.
2. Price for clean seed ranges from $0.75 to $1.25 per lb. minus $0.10 per lb. for cleaning.
3. Land is valued at $550 per acre. Land taxes are estimated at $3.50 per acre.
4. Interest on operating loans is 13 percent. Interest charged against the value of land and machinery is 10 percent.

* Extension Economist, Department of Agricultural Economics; County Agent, Adams County Extension; and Research Associate, respectively, Washington State University, Pullman, Washington.
Sources of Information

A committee of area producers identified the operations, machinery complement, and the assumptions under which these budgets were developed. These producers were considered to be representative of well-managed foragegrass seed farms. The quantities and types of materials used in the budget were based on widely accepted practices. Local farm suppliers were contacted to obtain price information on materials and other services commonly used by farmers. Machinery costs were based on current replacement prices and rates of annual use considered to be typical.

DISCUSSION OF BUDGET INFORMATION

This budget information for the foragegrass seed enterprise is reported in 17 separate tables. A summary of the data in each table is presented below.

Table 1: Schedule of Operations and Estimated Cost per Acre for Summer Fallow Prior to Establishment of Dryland Foragegrass. Table 1 outlines the schedule of field operations by calendar month, the type of machinery and labor used, and the hours used per acre for the summer fallow in the year before the establishment of foragegrass.

The costs of field operations are divided into two categories. The first is the cost of equipment and land ownership or fixed costs. The second category, variable costs, is associated with operating machinery, hiring labor, and purchasing services and materials. Total cost is the sum of fixed costs and variable costs.

Machinery fixed costs include depreciation, interest on the average investment, property taxes, housing, and insurance. These costs are incurred whether or not a crop is grown and do not vary, given ownership of a specific equipment complement. Per hour fixed costs for machinery are determined by dividing the total annual fixed cost per machine by the annual hours of machinery use for the representative farm. Machinery fixed costs for a specific field operation are determined by multiplying the machine hours per acre times the machinery per-hour fixed cost figure.

Land fixed cost included taxes and interest on land investment. Land is valued at $550 per acre and the annual interest charged against land is 10 percent. As used in this publication, the land cost is termed an opportunity cost to indicate that it is not an out-of-pocket expense, but rather a return that is foregone by the producer as a result of choosing to undertake the production of an enterprise. Of course, for the individual producer, cash costs such as interest payments on loans used to buy land or land rent payments, must be identified and treated as cash costs and not as opportunity costs.

Variable costs depend directly on the number of acres produced. These costs include fuel, oil, repairs, fertilizer, chemicals, custom work, overhead, (5 percent of variable costs), and interest on operating capital. Hand labor and machinery operating labor are also included as variable costs.

Table 2: Materials and Service Used During Summer Fallow Prior to Establishment of Dryland Foragegrass. Table 2 lists by operation the materials and/or services that comprise the figures reported in Figure 1.

Table 3: Itemized Cost per Acre for Summer Fallow Before the Establishment of Dryland Foragegrass. An itemized list of the costs in Table 1 is presented in Table 3. Most items are self-explanatory or have been previously explained. However, "Tractor Interest and Machine Interest" warrants additional explanation. It represents an opportunity cost (returns that are foregone by investing in the given equipment complement rather than in alternative investments) or interest paid to finance the given equipment—or both. The total interest cost on these capital purchases is calculated on the average value of the machinery over their respective years of use. The 10 percent interest charge made against this "average" value represents the annual interest cost.

Table 4: Schedule of Operations and Estimated Costs per Acre for Establishment of Dryland Foragegrass After Summer Fallow. The schedule of field operation by calendar month, the type of machinery and labor used, and the hours used per acre for the establishment of foragegrass after summer fallow are outlined in Table 4. This table also includes interest cost (at 13 percent) of the preceding summer fallow year.

Table 5: Materials and Services Provided by Operation for the Establishment of Dryland Foragegrass. Table 5 lists by operation the materials and/or services that go into making up the respective figures in Table 4.
Production were 75 percent, and Valuation. costs, "management" firms.

Table 10: Total Cost of Producing Dryland Foragegrass Seed During the First Year of Production Given Different Levels of Machinery Valuation. In determining these budgets, machinery was valued at costs incurred if they were replaced. In determining these replacement costs, basically new prices were used. Table 10 shows the total cost of production at 100 percent, 75 percent, and 50 percent of the given replacement values used in developing the budgets (Table 17).

Table 11: Break-Even Prices Necessary for Dryland Foragegrass Seed to Cover First Year Production Costs. Table 11 shows the break-even prices necessary to cover all variable costs and total costs (assuming 100 percent machinery replacement) at different levels of clean seed production during the first year of production. These break-even prices do not take into consideration income from government programs or the sale of grass hay.

Table 12: Annual Schedule of Operations and Estimated Costs per Acre for Second through Fifth Year of Production of Dryland Foragegrass Seed. Table 12 outlines the schedule of field operations by calendar month, type of machinery and labor used, and hours per acre for foragegrass seed during the second through fifth year of production. This table does the same for the second through fifth year of production as Table 7 does for the first year of production. The main difference between production practices during the first year of production and the second through the fifth year, is aeration of the grass stand in the spring.

Table 13: Annual Materials and Services Provided by Operation for Production of Dryland Foragegrass Seed (the Second through the Fifth Year). Table 13 lists by operation materials and/or services that go into making up the respective figures in Table 12.

Table 14: Annual Itemized Cost per Acre for Second through Fifth Year of Production of Dryland Foragegrass Seed. Annual costs in the schedule of operations for foragegrass seed during the second through fifth production years are summarized in Table 14 in the same way that costs during the first production year are summarized in Table 9.

Table 15: Total Annual Cost of Producing Foragegrass Seed During Year Two Through Five of Production Given Different Levels of Machinery Valuation. Table 15 shows the total annual cost of production at 100 percent, 75 percent, and 50 percent of given machinery replacement values used in developing the budgets.

Table 16: Break-Even Prices Necessary for Dryland Foragegrass Seed to Cover Second Through Fifth Year Costs. Table 16 shows the
necessary break-even prices necessary to cover all variable costs and total costs (assuming 100 percent machinery replacement values) at different levels of clean seed production during the second through the fifth year of production.

*Table 17: Machinery Complement.* Table 17 identifies the machinery complement used to derive cost estimates. It includes current purchase prices, annual hours of use, and per hour or per acre, fixed and variable costs. Fixed costs include depreciation and interest on investment, property taxes, and insurance—costs that do not vary with the number of acres produced. Interest on investment represents a 10 percent opportunity cost to the enterprise. Variable costs included machine repair, fuel and lubrication costs; costs that vary with the number of acres produced.
# TABLE 1: SCHEDULE OF OPERATIONS AND ESTIMATED COSTS PER ACRE FOR SUMMER FALLOW PRIOR TO ESTABLISHMENT OF DRYLAND FORAGEGRASS.

<table>
<thead>
<tr>
<th>OPERATION</th>
<th>TOOLING</th>
<th>MTH</th>
<th>YEAR</th>
<th>HOURS</th>
<th>TOTAL Fixed</th>
<th>FUEL, LUBE, &amp; REPAIRS</th>
<th>LABOR</th>
<th>SERVICE MATER.</th>
<th>INTER.</th>
<th>TOTAL VARIABLE</th>
<th>TOTAL Variable</th>
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<td>4.30</td>
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<td>31.43</td>
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Table 2: Material and Services Used During Summer Fallow prior to Establishment of Dryland Foragegrass (Year 1).

<table>
<thead>
<tr>
<th>Operation</th>
<th>Month and Year</th>
<th>Material and/or Service</th>
</tr>
</thead>
</table>
| Spray     | May 1988       | Rental Sprayer @ $1.00/acre  
|           |                | .375 gal. of Landmaster @ $25.60/gal. |
| Spray     | July 1988      | Rental sprayer @ $1.00/acre  
|           |                | .375 gal. of Landmaster @ $25.60/gal. |
TABLE 3: ITEMIZED COST PER ACRE FOR SUMMER FALLOW BEFORE THE ESTABLISHMENT OF DRYLAND FORAGEGRASS.

<table>
<thead>
<tr>
<th>VARIABLE COSTS</th>
<th>UNIT COST/UNIT QUANTITY</th>
<th>VALUE OR COST</th>
<th>YOUR FARM</th>
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<td>RENTAL SPRAYER</td>
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<td>LANDMASTER</td>
<td>GAL 25.60</td>
<td>.76</td>
<td>19.20</td>
</tr>
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</tr>
<tr>
<td>TRACTOR FUEL/LUBE</td>
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<td>1.00</td>
<td>1.01</td>
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<tr>
<td>MACHINERY REPAIRS</td>
<td>ACRE .56</td>
<td>1.00</td>
<td>.56</td>
</tr>
<tr>
<td>MACHINE FUEL/LUBE</td>
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<td>1.00</td>
<td>.56</td>
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<td>LABOR (TRAC/MACH)</td>
<td>ACRE 4.30</td>
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<td>4.30</td>
</tr>
<tr>
<td>OVERHEAD</td>
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<td>1.00</td>
<td>1.50</td>
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<td>INTEREST ON OP. CAP.</td>
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<td>31.43</td>
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<table>
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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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TABLE 4: SCHEDULE OF OPERATIONS AND ESTIMATED COSTS PER ACRE FOR THE ESTABLISHMENT OF DRYLAND FORAGEGRASS AFTER SUMMER FALLOW *

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<tr>
<th>OPERATION</th>
<th>TOOLING</th>
<th>MACH MTH</th>
<th>LABOR YEAR</th>
<th>HOURS</th>
<th>TOTAL</th>
<th>FUEL, FIXED</th>
<th>LUBE, &amp;</th>
<th>REPAIRS</th>
<th>LABOR</th>
<th>SERVICE</th>
<th>MATER.</th>
<th>INTER.</th>
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<th>TOTAL COST</th>
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<td>CULTIVATE (2X)</td>
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<td></td>
<td></td>
<td></td>
<td>44</td>
<td>46</td>
<td>83.66</td>
<td>4.20</td>
<td>4.59</td>
<td>10.18</td>
<td>44.50</td>
<td>3.33</td>
<td>66.80</td>
<td>150.46</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

* APPROXIMATELY 25% OF THE PRODUCERS WILL CROP THEIR GRASS WITH A FLAIL AT AN APPROXIMATE TOTAL COST OF $7.20/ACRE TO HELP CONTROL CHEATGRASS.
Table 5: Material and Services Provided by Operation for the Establishment of Dryland Foragegrass (Year 2).

<table>
<thead>
<tr>
<th>Operation</th>
<th>Month and Year</th>
<th>Material and/or Service</th>
</tr>
</thead>
<tbody>
<tr>
<td>Plant</td>
<td>April 1989</td>
<td>5 lbs. grass seed @ $4.50/lb.</td>
</tr>
<tr>
<td>Spray</td>
<td>May 1989</td>
<td>Custom aerial application @ $3.50/acre</td>
</tr>
<tr>
<td></td>
<td></td>
<td>2 pt. Bronate @ $5.50/pt.</td>
</tr>
<tr>
<td>Spray</td>
<td>July 1989</td>
<td>Custom aerial application @ $3.50/acre</td>
</tr>
<tr>
<td></td>
<td></td>
<td>2 pt. Bronate @ $5.50/pt</td>
</tr>
<tr>
<td>VARIABLE COSTS</td>
<td>UNIT COST/UNIT</td>
<td>QUANTITY</td>
</tr>
<tr>
<td>-----------------------</td>
<td>----------------</td>
<td>----------</td>
</tr>
<tr>
<td>GRASS SEED</td>
<td>LB.</td>
<td>4.50</td>
</tr>
<tr>
<td>BRONATE</td>
<td>GAL.</td>
<td>44.00</td>
</tr>
<tr>
<td>CUSTOM AERIAL</td>
<td>ACRE</td>
<td>3.50</td>
</tr>
<tr>
<td>OVERHEAD</td>
<td>ACRE</td>
<td>3.18</td>
</tr>
<tr>
<td>INTEREST ON OP. CAP.</td>
<td>DOL.</td>
<td>.13</td>
</tr>
<tr>
<td>TRACTOR REPAIR</td>
<td>ACRE</td>
<td>1.37</td>
</tr>
<tr>
<td>TRACTOR FUEL/LUBE</td>
<td>ACRE</td>
<td>1.33</td>
</tr>
<tr>
<td>MACHINERY REPAIRS</td>
<td>ACRE</td>
<td>.95</td>
</tr>
<tr>
<td>MACHINE FUEL/LUBE</td>
<td>ACRE</td>
<td>.56</td>
</tr>
<tr>
<td>LABOR(TRAC/MACH)</td>
<td>ACRE</td>
<td>4.59</td>
</tr>
<tr>
<td><strong>TOTAL VARIABLE COST</strong></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>FIXED COSTS</th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>TRACTOR DEPRECIATION</td>
<td>ACRE</td>
<td>2.46</td>
<td>1.00</td>
<td>2.46</td>
</tr>
<tr>
<td>TRACTOR INTEREST</td>
<td>ACRE</td>
<td>2.26</td>
<td>1.00</td>
<td>2.26</td>
</tr>
<tr>
<td>TRACTOR INSURANCE</td>
<td>ACRE</td>
<td>.14</td>
<td>1.00</td>
<td>.14</td>
</tr>
<tr>
<td>TRACTOR TAXES</td>
<td>ACRE</td>
<td>.41</td>
<td>1.00</td>
<td>.41</td>
</tr>
<tr>
<td>TRACTOR HOUSING</td>
<td>ACRE</td>
<td>.07</td>
<td>1.00</td>
<td>.07</td>
</tr>
<tr>
<td>MACHINE DEPRECIATION</td>
<td>ACRE</td>
<td>4.24</td>
<td>1.00</td>
<td>4.24</td>
</tr>
<tr>
<td>MACHINE INTEREST</td>
<td>ACRE</td>
<td>2.32</td>
<td>1.00</td>
<td>2.32</td>
</tr>
<tr>
<td>MACHINE INSURANCE</td>
<td>ACRE</td>
<td>.14</td>
<td>1.00</td>
<td>.14</td>
</tr>
<tr>
<td>MACHINE TAXES</td>
<td>ACRE</td>
<td>.42</td>
<td>1.00</td>
<td>.42</td>
</tr>
<tr>
<td>MACHINE HOUSING</td>
<td>ACRE</td>
<td>.05</td>
<td>1.00</td>
<td>.05</td>
</tr>
<tr>
<td>LAND TAX</td>
<td>ACRE</td>
<td>3.50</td>
<td>1.00</td>
<td>3.50</td>
</tr>
<tr>
<td>INT. ON LAND</td>
<td>ACRE</td>
<td>55.00</td>
<td>1.00</td>
<td>55.00</td>
</tr>
<tr>
<td>INT. ON S. FALLOW *</td>
<td>ACRE</td>
<td>12.67</td>
<td>1.00</td>
<td>12.67</td>
</tr>
<tr>
<td><strong>TOTAL FIXED COST</strong></td>
<td></td>
<td></td>
<td></td>
<td>83.66</td>
</tr>
</tbody>
</table>

**TOTAL COST** 150.46

* 13% OF SUMMER FALLOW COST
<table>
<thead>
<tr>
<th>TABLE 7: SCHEDULE OF OPERATIONS AND ESTIMATED COSTS PER ACRE FOR THE FIRST YEAR OF PRODUCTION OF DRYLAND FORAGEGRASS SEED *</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>OPERATION</strong></td>
</tr>
<tr>
<td>----------------</td>
</tr>
<tr>
<td>FERTILIZE (DRY)</td>
</tr>
<tr>
<td>SPRAY</td>
</tr>
<tr>
<td>COMBINE</td>
</tr>
<tr>
<td>LOADING DRYMASS</td>
</tr>
<tr>
<td>TRANSPORTATION</td>
</tr>
<tr>
<td>BURN</td>
</tr>
<tr>
<td>MISC. USE</td>
</tr>
<tr>
<td>TAKES</td>
</tr>
<tr>
<td>ESTABLISMT COST</td>
</tr>
<tr>
<td>OVERHEAD</td>
</tr>
<tr>
<td>MISC. USE</td>
</tr>
<tr>
<td>LAND COST</td>
</tr>
</tbody>
</table>

**TOTAL PER ACRE** | **.49** | **.40** | **140.88** | **4.13** | **4.00** | **10.79** | **27.72** | **1.52** | **48.17** | **189.05** |

* APPROXIMATELY 25% OF THE PRODUCERS SWATH BEFORE COMBINING AT AN APPROXIMATE TOTAL COST OF $5.30/acre.
Table 8: Material and Services Provided by Operation for the First Year of Production of Dryland Foragegrass Seed (Year 3).

<table>
<thead>
<tr>
<th>Operation</th>
<th>Month and Year</th>
<th>Material and/or Service</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fertilize</td>
<td>October 1989</td>
<td>Custom application @ 2.50/acre</td>
</tr>
<tr>
<td></td>
<td></td>
<td>55 lbs. nitrogen @ $.25/lb.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>7.5 lbs. phosphorous @ $.26/lb.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>7.5 lbs. sulfur @ $.13/lb.</td>
</tr>
<tr>
<td>Spray</td>
<td>March 1990</td>
<td>Custom aerial application @ $3.50/acre</td>
</tr>
<tr>
<td></td>
<td></td>
<td>2 pt. Bronate @ $5.50/pt.</td>
</tr>
<tr>
<td>Transportation</td>
<td>July 1990</td>
<td>Custom hauling @ $2.00/acre</td>
</tr>
<tr>
<td>Burn stubble</td>
<td>October 1990</td>
<td>Propane gas @ $.05/acre</td>
</tr>
<tr>
<td></td>
<td></td>
<td>DOE burn fee @ $.50/acre</td>
</tr>
</tbody>
</table>
TABLE 9: ITEMIZED COST PER ACRE FOR THE FIRST YEAR OF PRODUCTION OF DRYLAND FORAGEGRASS SEED *

<table>
<thead>
<tr>
<th>VARIABLE COSTS</th>
<th>PRICE OR UNIT COST/UNIT QUANTITY</th>
<th>VALUE OR COST</th>
</tr>
</thead>
<tbody>
<tr>
<td>NITROGEN</td>
<td>LB. .25</td>
<td>55.00</td>
</tr>
<tr>
<td>PHOSPHOROUS</td>
<td>LB. .26</td>
<td>7.50</td>
</tr>
<tr>
<td>SULFUR</td>
<td>LB. .13</td>
<td>7.50</td>
</tr>
<tr>
<td>BRONATE</td>
<td>GAL. 44.00</td>
<td>.25</td>
</tr>
<tr>
<td>CUSTOM FERT.</td>
<td>ACRE 2.50</td>
<td>1.00</td>
</tr>
<tr>
<td>CUSTOM AERIAL</td>
<td>ACRE 3.50</td>
<td>1.00</td>
</tr>
<tr>
<td>CUSTOM HAULING</td>
<td>ACRE 2.00</td>
<td>1.00</td>
</tr>
<tr>
<td>DOE BURN FEE</td>
<td>ACRE .50</td>
<td>1.00</td>
</tr>
<tr>
<td>PROPANE GAS</td>
<td>ACRE .05</td>
<td>1.00</td>
</tr>
<tr>
<td>OVERHEAD</td>
<td>ACRE 2.29</td>
<td>1.00</td>
</tr>
<tr>
<td>INTEREST ON OP. CAP.</td>
<td>DOL. .13</td>
<td>11.72</td>
</tr>
<tr>
<td>TRACTOR REPAIR</td>
<td>ACRE 1.07</td>
<td>1.00</td>
</tr>
<tr>
<td>TRACTOR FUEL/LUBE</td>
<td>ACRE 1.26</td>
<td>1.00</td>
</tr>
<tr>
<td>MACHINERY REPAIRS</td>
<td>ACRE 1.32</td>
<td>1.00</td>
</tr>
<tr>
<td>MACHINE FUEL/LUBE</td>
<td>ACRE .48</td>
<td>1.00</td>
</tr>
<tr>
<td>LABOR (TRAC/MACH)</td>
<td>ACRE 4.00</td>
<td>1.00</td>
</tr>
</tbody>
</table>

TOTAL VARIABLE COST       48.17

<table>
<thead>
<tr>
<th>FIXED COSTS</th>
<th>PRICE OR UNIT COST/UNIT QUANTITY</th>
<th>VALUE OR COST</th>
</tr>
</thead>
<tbody>
<tr>
<td>TRACTOR DEPRECIATION</td>
<td>ACRE 1.00</td>
<td>1.00</td>
</tr>
<tr>
<td>TRACTOR INTEREST</td>
<td>ACRE .79</td>
<td>1.00</td>
</tr>
<tr>
<td>TRACTOR INSURANCE</td>
<td>ACRE .05</td>
<td>1.00</td>
</tr>
<tr>
<td>TRACTOR TAXES</td>
<td>ACRE .14</td>
<td>1.00</td>
</tr>
<tr>
<td>TRACTOR HOUSING</td>
<td>ACRE .06</td>
<td>1.00</td>
</tr>
<tr>
<td>MACHINE DEPRECIATION</td>
<td>ACRE 5.64</td>
<td>1.00</td>
</tr>
<tr>
<td>MACHINE INTEREST</td>
<td>ACRE 3.26</td>
<td>1.00</td>
</tr>
<tr>
<td>MACHINE INSURANCE</td>
<td>ACRE .20</td>
<td>1.00</td>
</tr>
<tr>
<td>MACHINE TAXES</td>
<td>ACRE .59</td>
<td>1.00</td>
</tr>
<tr>
<td>MACHINE HOUSING</td>
<td>ACRE .18</td>
<td>1.00</td>
</tr>
<tr>
<td>LAND TAX</td>
<td>ACRE 3.50</td>
<td>1.00</td>
</tr>
<tr>
<td>AM. ESTAB. COST</td>
<td>ACRE 70.49</td>
<td>1.00</td>
</tr>
<tr>
<td>INT. ON LAND</td>
<td>ACRE 55.00</td>
<td>1.00</td>
</tr>
</tbody>
</table>

TOTAL FIXED COST          140.88

TOTAL COST                189.05

* DOES NOT INCLUDE A CHARGE FOR MANAGEMENT WHICH IS TYPICALLY ESTIMATED AS BEING 7% OF ESTIMATED GROSS REVENUE.

** SUMMER FALLOW AND ESTABLISHMENT YEAR COST AMORTIZED OVER A 5 YEAR PERIOD AT 13% INTEREST.
Table 10: Total Per Acre Cost of Producing Dryland Foragegrass Seed During the First Year of Production Given Different Levels of Machinery Valuation (Year 3).*

<table>
<thead>
<tr>
<th>Value of Machinery</th>
<th>Total Cost of Production</th>
</tr>
</thead>
<tbody>
<tr>
<td>100% replacement value</td>
<td>$189.05</td>
</tr>
<tr>
<td>75% replacement value</td>
<td>184.65</td>
</tr>
<tr>
<td>50% replacement value</td>
<td>180.26</td>
</tr>
</tbody>
</table>

* Does not consider cost to management.
Table 11: Break-Even Price Necessary for Dryland Foragegrass Seed Cover First Year Costs.

<table>
<thead>
<tr>
<th>Weight (lbs.)</th>
<th>Variable Cost + Amortized Establishment Cost Year</th>
<th>Total Cost (100% Replacement Value)</th>
</tr>
</thead>
<tbody>
<tr>
<td>170</td>
<td>((48.17 + 29.09*)/170) = $0.45</td>
<td>(189.05/170) = $1.11</td>
</tr>
<tr>
<td>190</td>
<td>((48.17 + 29.09*)/190) = $0.41</td>
<td>(189.05/190) = $1.00</td>
</tr>
<tr>
<td>210</td>
<td>((48.17 + 29.09*)/210) = $0.37</td>
<td>(189.05/210) = $0.90</td>
</tr>
<tr>
<td>230</td>
<td>((48.17 + 29.09*)/230) = $0.34</td>
<td>(189.05/230) = $0.82</td>
</tr>
<tr>
<td>260</td>
<td>((48.17 + 29.09*)/260) = $0.31</td>
<td>(189.05/260) = $0.76</td>
</tr>
</tbody>
</table>

* Summer fallow variable cost ($31.43) + Interest on summer fallow variable cost ($4.09) + Establishment year variable cost ($66.80) amortized over five years at 13%.
<table>
<thead>
<tr>
<th>OPERATION DESCRIPTION</th>
<th>MACH MTH YEAR</th>
<th>MACH HOURS</th>
<th>LABOR HOURS</th>
<th>TOTAL FIXED $</th>
<th>FUEL, LUBE, &amp; REPAIRS $</th>
<th>LABOR SERVICE MATER. $</th>
<th>INTER. INTER. $</th>
<th>TOTAL VARIABLE COST $</th>
<th>TOTAL COST $</th>
</tr>
</thead>
<tbody>
<tr>
<td>AERATION &amp; FERT. 225HP-WT, RENT AERIATOR, (N,P,K)</td>
<td>MAR 1991</td>
<td>0.13</td>
<td>0.14</td>
<td>3.18</td>
<td>1.61</td>
<td>1.38</td>
<td>5.00</td>
<td>16.67</td>
<td>1.87</td>
</tr>
<tr>
<td>SPRAY</td>
<td>CUSTOM AERIAL</td>
<td>MAR 1991</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>3.50</td>
<td>11.00</td>
<td>1.10</td>
</tr>
<tr>
<td>COMBINE</td>
<td>COMBINE WITH PICK-UP HEADER</td>
<td>JUL 1991</td>
<td>0.10</td>
<td>0.11</td>
<td>6.00</td>
<td>1.20</td>
<td>1.10</td>
<td>0.00</td>
<td>0.00</td>
</tr>
<tr>
<td>LOADING &amp; DRYMASS</td>
<td>130HP-WT, FORAGE BLOWER</td>
<td>JUL 1991</td>
<td>0.10</td>
<td>0.00</td>
<td>2.06</td>
<td>2.12</td>
<td>0.00</td>
<td>0.00</td>
<td>0.07</td>
</tr>
<tr>
<td>TRANSPORTATION</td>
<td>CUSTOM HIRE</td>
<td>JUL 1991</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>2.00</td>
<td>0.00</td>
<td>0.06</td>
</tr>
<tr>
<td>BURN</td>
<td>BURN STUBBLE</td>
<td>OCT 1991</td>
<td>0.04</td>
<td>0.04</td>
<td>0.04</td>
<td>0.00</td>
<td>0.40</td>
<td>0.50</td>
<td>0.05</td>
</tr>
<tr>
<td>MISC. USE</td>
<td>PICK-UP</td>
<td>ANN 1991</td>
<td>0.25</td>
<td>0.25</td>
<td>1.18</td>
<td>0.81</td>
<td>2.50</td>
<td>0.00</td>
<td>0.00</td>
</tr>
<tr>
<td>MISC. USE</td>
<td>SHOP TOOLS</td>
<td>ANN 1991</td>
<td>0.00</td>
<td>0.00</td>
<td>2.62</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
</tr>
<tr>
<td>TAXES</td>
<td>LAND TAXES</td>
<td>ANN 1991</td>
<td>0.00</td>
<td>0.00</td>
<td>3.50</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
</tr>
<tr>
<td>LAND COST</td>
<td>INTEREST ON LAND INVESTMENT</td>
<td>SEA 1991</td>
<td>0.00</td>
<td>0.00</td>
<td>55.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
</tr>
<tr>
<td>ESTABLISHMENT COST</td>
<td>AMORTIZED ESTABLISHMENT COST</td>
<td>ANN 1991</td>
<td>0.00</td>
<td>0.00</td>
<td>70.49</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
</tr>
<tr>
<td>OVERHEAD</td>
<td>UTILITIES, LEGAL, ACCT., ECT.</td>
<td>ANN 1991</td>
<td>0.00</td>
<td>0.00</td>
<td>2.66</td>
<td>0.00</td>
<td>0.00</td>
<td>2.66</td>
<td>0.00</td>
</tr>
<tr>
<td>TOTAL PER ACRE</td>
<td></td>
<td></td>
<td></td>
<td>.62</td>
<td>.54</td>
<td>144.07</td>
<td>5.74</td>
<td>5.38</td>
<td>13.66</td>
</tr>
</tbody>
</table>

* APPROXIMATELY 25% OF THE PRODUCERS SWATH BEFORE COMBINING AT AN APPROXIMATE TOTAL COST OF $5.30/ACRE.
Table 13: Annual Materials and Services Provided by Operation for the Second through Fifth Year of Production of Dryland Foragegrass Seed (Years 4-7).

<table>
<thead>
<tr>
<th>Operation</th>
<th>Month and Year</th>
<th>Material and/or Service</th>
</tr>
</thead>
<tbody>
<tr>
<td>Aeration and fertilizer</td>
<td>March 1991</td>
<td>Rent aerator @ $5.00/acre&lt;br&gt;55 lbs. Nitrogen @ $ .25/lb.&lt;br&gt;7.5 lbs. phosphorus @ $ .26/lb.&lt;br&gt;7.5 lbs sulfur @ $.13/lb.</td>
</tr>
<tr>
<td>Spray</td>
<td>March 1991</td>
<td>Custom aerial application @ $3.50/acre&lt;br&gt;2 pt. Bronate @ $5.50/pt.</td>
</tr>
<tr>
<td>Transportation</td>
<td>July 1991</td>
<td>Custom hauling @ $2.00/acre</td>
</tr>
<tr>
<td>Burn stubble</td>
<td>October 1991</td>
<td>Propane gas @ $.05/acre&lt;br&gt;DOE burn fee @ $.50/acre</td>
</tr>
</tbody>
</table>
### TABLE 14: ANNUAL ITEMIZED COST PER ACRE FOR SECOND THROUGH FIFTH YEAR PRODUCTION OF DRYLAND FORAGEGRASS SEED *

<table>
<thead>
<tr>
<th>Variable Costs</th>
<th>Price or Value or Your Unit Cost/Unit Quantity</th>
<th>Farm Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>VARIABLE COSTS</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Nitrogen</td>
<td>$0.25 LB. 55.00</td>
<td>$13.75</td>
</tr>
<tr>
<td>Phosphorous</td>
<td>$0.26 LB. 7.50</td>
<td>$1.95</td>
</tr>
<tr>
<td>Sulfur</td>
<td>$0.13 LB. 7.50</td>
<td>$0.97</td>
</tr>
<tr>
<td>Bronate</td>
<td>$44.00 GAL. 0.25</td>
<td>$11.00</td>
</tr>
<tr>
<td>Doe Burn Fee</td>
<td>$0.50 ACRE 1.00</td>
<td>$0.50</td>
</tr>
<tr>
<td>Propane Gas</td>
<td>$0.05 ACRE 1.00</td>
<td>$0.05</td>
</tr>
<tr>
<td>Rental Aerator</td>
<td>$5.00 ACRE 1.00</td>
<td>$5.00</td>
</tr>
<tr>
<td>Custom Aerial</td>
<td>$3.50 ACRE 1.00</td>
<td>$3.50</td>
</tr>
<tr>
<td>Custom Hauling</td>
<td>$2.00 ACRE 1.00</td>
<td>$2.00</td>
</tr>
<tr>
<td>Tractor Repair</td>
<td>$1.89 ACRE 1.00</td>
<td>$1.89</td>
</tr>
<tr>
<td>Tractor Fuel/Lube</td>
<td>$2.05 ACRE 1.00</td>
<td>$2.05</td>
</tr>
<tr>
<td>Machinery Repairs</td>
<td>$1.32 ACRE 1.00</td>
<td>$1.32</td>
</tr>
<tr>
<td>Machine Fuel/Lube</td>
<td>$0.48 ACRE 1.00</td>
<td>$0.48</td>
</tr>
<tr>
<td>Labor (Trac/Mach)</td>
<td>$5.38 ACRE 1.00</td>
<td>$5.38</td>
</tr>
<tr>
<td>Overhead</td>
<td>$2.66 ACRE 1.00</td>
<td>$2.66</td>
</tr>
<tr>
<td>Interest on Op. Cap.</td>
<td>$0.13 DOL. 26.10</td>
<td>$3.39</td>
</tr>
</tbody>
</table>

**TOTAL VARIABLE COST**  
55.89

| Fixed Costs                 |                                               |           |
|------------------------------|                                               |           |
| Tractor Depreciation        | $2.47 ACRE 1.00                              | $2.47     |
| Tractor Interest            | $2.14 ACRE 1.00                              | $2.14     |
| Tractor Insurance           | $0.13 ACRE 1.00                              | $0.13     |
| Tractor Taxes               | $0.39 ACRE 1.00                              | $0.39     |
| Tractor Housing             | $0.10 ACRE 1.00                              | $0.10     |
| Machine Depreciation        | $5.64 ACRE 1.00                              | $5.64     |
| Machine Interest            | $3.26 ACRE 1.00                              | $3.26     |
| Machine Insurance           | $0.20 ACRE 1.00                              | $0.20     |
| Machine Taxes               | $0.59 ACRE 1.00                              | $0.59     |
| Machine Housing             | $0.18 ACRE 1.00                              | $0.18     |
| Land Tax                    | $3.50 ACRE 1.00                              | $3.50     |
| Am. Estab. Cost **          | $70.49 ACRE 1.00                             | $70.49    |
| Int. On Land                | $55.00 ACRE 1.00                             | $55.00    |

**TOTAL FIXED COST**  
144.07

**TOTAL COST**  
199.96

---

* DOES NOT INCLUDE A CHARGE FOR MANAGEMENT WHICH IS TYPICALLY ESTIMATED AS BEING 7% OF ESTIMATED GROSS REVENUE.

** SUMMER FALLOW AND ESTABLISHMENT YEAR COST AMORTIZED OVER A 5 YEAR PERIOD AT 13% INTEREST.
Table 15: Total Annual Cost Per Acre of Producing Foragegrass Seed During Year Two Through Five of Production Given Different Levels of Machinery Valuation.

<table>
<thead>
<tr>
<th>Value of Machinery</th>
<th>Total Cost of Production</th>
</tr>
</thead>
<tbody>
<tr>
<td>100% replacement value</td>
<td>$199.96</td>
</tr>
<tr>
<td>75% replacement value</td>
<td>194.78</td>
</tr>
<tr>
<td>50% replacement value</td>
<td>189.60</td>
</tr>
</tbody>
</table>

* Does not consider cost to management.
Table 16: Break-Even Prices Necessary for Foragegrass Seed to Cover Second Through Fifth Year Costs.

Variable cost plus amortized variable cost of summer fallow and establishment cost year:

\[
\frac{(55.89 + 29.09^*)}{170 \text{ lbs.}} = .50 \\
\frac{(55.89 + 29.09^*)}{190 \text{ lbs.}} = .45 \\
\frac{(55.89 + 29.09^*)}{210 \text{ lbs.}} = .40 \\
\frac{(55.89 + 29.09^*)}{230 \text{ lbs.}} = .37 \\
\frac{(55.89 + 29.09^*)}{250 \text{ lbs.}} = .34 
\]

Total cost (100% replacement value)

\[
\frac{199.96}{170 \text{ lbs.}} = 1.18 \\
\frac{199.96}{190 \text{ lbs.}} = 1.05 \\
\frac{199.96}{210 \text{ lbs.}} = .95 \\
\frac{199.96}{230 \text{ lbs.}} = .87 \\
\frac{199.96}{250 \text{ lbs.}} = .80 
\]

* Summer fallow variable costs ($31.43) + Interest on summer fallow variable costs ($4.09) + Establishment year cost ($66.80) amortized over five years at 13%.
<table>
<thead>
<tr>
<th>MACHINERY</th>
<th>PURCHASE PRICE</th>
<th>YEARS TO TRADE HOURS</th>
<th>ANNUAL DEPRECIATION</th>
<th>INTEREST</th>
<th>INSURANCE</th>
<th>TAXES</th>
<th>HOUSING</th>
<th>TOTAL FIXED COST</th>
<th>FUEL AND VARIABLE COST</th>
<th>TOTAL COST</th>
</tr>
</thead>
<tbody>
<tr>
<td>130HP-WT</td>
<td>41,250.00</td>
<td>10 800</td>
<td>3.64</td>
<td>3.34</td>
<td>.20</td>
<td>.60</td>
<td>.10</td>
<td>7.88</td>
<td>7.50</td>
<td>6.35</td>
</tr>
<tr>
<td>80HP-WT</td>
<td>27,750.00</td>
<td>10 800</td>
<td>2.45</td>
<td>2.25</td>
<td>.13</td>
<td>.40</td>
<td>.07</td>
<td>5.30</td>
<td>5.00</td>
<td>3.17</td>
</tr>
<tr>
<td>225HP-WT</td>
<td>100,000.00</td>
<td>10 600</td>
<td>11.75</td>
<td>10.79</td>
<td>.65</td>
<td>1.94</td>
<td>.32</td>
<td>25.46</td>
<td>6.35</td>
<td>12.88</td>
</tr>
<tr>
<td>COMBINE</td>
<td>95,000.00</td>
<td>10 250</td>
<td>30.82</td>
<td>22.59</td>
<td>1.36</td>
<td>4.07</td>
<td>1.13</td>
<td>59.96</td>
<td>7.22</td>
<td>11.98</td>
</tr>
<tr>
<td>.75T PICKUP</td>
<td>14,500.00</td>
<td>10 500</td>
<td>2.39</td>
<td>1.71</td>
<td>.10</td>
<td>.31</td>
<td>.20</td>
<td>4.71</td>
<td>.99</td>
<td>2.23</td>
</tr>
<tr>
<td>18' CHISEL PLOW</td>
<td>6,500.00</td>
<td>15 100</td>
<td>3.92</td>
<td>3.56</td>
<td>.21</td>
<td>.64</td>
<td>.00</td>
<td>8.33</td>
<td>3.50</td>
<td>3.50</td>
</tr>
<tr>
<td>50' RODWEEDER</td>
<td>18,000.00</td>
<td>15 270</td>
<td>4.02</td>
<td>3.65</td>
<td>.22</td>
<td>.66</td>
<td>.00</td>
<td>8.55</td>
<td>1.76</td>
<td>1.76</td>
</tr>
<tr>
<td>48' DISC DRILL</td>
<td>30,500.00</td>
<td>12 120</td>
<td>18.24</td>
<td>14.47</td>
<td>.87</td>
<td>2.61</td>
<td>.00</td>
<td>36.19</td>
<td>4.14</td>
<td>4.14</td>
</tr>
<tr>
<td>20' FLAIL</td>
<td>10,500.00</td>
<td>15 50</td>
<td>12.67</td>
<td>11.50</td>
<td>.69</td>
<td>2.07</td>
<td>2.18</td>
<td>29.11</td>
<td>7.50</td>
<td>7.50</td>
</tr>
<tr>
<td>FORAGE BLOWER</td>
<td>1,300.00</td>
<td>10 20</td>
<td>5.29</td>
<td>4.86</td>
<td>.29</td>
<td>.87</td>
<td>.63</td>
<td>11.94</td>
<td>6.01</td>
<td>6.01</td>
</tr>
<tr>
<td>PROPANE TORCH</td>
<td>250.00</td>
<td>10 40</td>
<td>.63</td>
<td>.31</td>
<td>.02</td>
<td>.06</td>
<td>.00</td>
<td>1.01</td>
<td>.00</td>
<td>.00</td>
</tr>
<tr>
<td>SWATHING</td>
<td>12,000.00</td>
<td>10 150</td>
<td>6.49</td>
<td>4.76</td>
<td>.29</td>
<td>.86</td>
<td>.62</td>
<td>13.00</td>
<td>4.00</td>
<td>4.00</td>
</tr>
<tr>
<td>SHOP TOOLS</td>
<td>15,000.00</td>
<td>5</td>
<td>2.00</td>
<td>.50</td>
<td>.03</td>
<td>.09</td>
<td>.00</td>
<td>2.62</td>
<td>.00</td>
<td>.00</td>
</tr>
</tbody>
</table>

**COST PER HOUR**

**COST PER ACRE**
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