FARM BUSINESS MANAGEMENT REPORT
1977 ESTIMATED PRODUCTION COSTS
FOR AN ASOTIN COUNTY WHEAT FARM
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1977 ESTIMATED PRODUCTION COSTS FOR AN ASOTIN COUNTY WHEAT FARM

by

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Introduction

Wheat production is the predominant cropping activity in Asotin County. Of approximately 85.5 thousand acres of crop land in the county, \(^{1/}\) 35,600 were planted to wheat in 1975. \(^{2/}\) Since virtually all wheat produced in Asotin County is grown in a wheat-summer fallow rotation, this indicates that approximately 72 thousand acres, or about 85 percent of the total cropland in the county was committed to wheat production.

Because of the importance of wheat production and rapidly changing prices on farm machinery and other inputs used in wheat production, a study was conducted to estimate the 1977 costs associated with producing wheat in Asotin County. This report summarizes the procedures used and the results of that study.

Procedures Used in the Study

A committee of experienced wheat growers in Asotin County was assembled at the request of the county agent. These producers outlined what they believed to be the typical operating practices for growing wheat in Asotin County. The information gathered included the machinery, cultural practices, and quantities of various inputs used in producing wheat.

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Assumptions Used in the Study

A number of specific assumptions were used in the study. They are outlined so that each reader of this report can determine how his own operation differs from the "typical" operation outlined in the study.

1. The study farm consists of 2,000 acres of cropland, or which 1,000 are in wheat and 1,000 in fallow each crop year.
2. A wheat yield of 40 bushels per acre.
3. The operation is a combined wheat and cattle farming operation. For purposes of the study, however, only those costs associated with wheat production are included. Although it is common to graze and winter feed cattle on wheat stubble, none of those costs or benefits were attributed to the wheat operation.
4. Fuel prices used in the analysis were 38.4 cents per gallon for diesel fuel and 55.5 cents per gallon for gasoline.
5. Wage rates used in the study were $3.50 per hour for all operations except the combine operator where a rate of $4.50 per hour was used.

Results of the Study

Data obtained from the study are presented in five tables. The tables are discussed below as an overview of the data presented.
Schedule of Operations and Operating Costs

Information in Table 1 indicates the schedule of operations and the associated costs for a wheat-fallow production system. The type and number of machinery operations are indicated. Machines used for the listed operations are shown in Table 4.

Costs associated with the various operations are presented in three categories: 1) machinery fixed costs; 2) variable costs; and 3) total costs. Machinery fixed costs may be thought of as the costs of machinery ownership regardless of whether it is used or not. These costs include depreciation, interest on the investment in machinery, property taxes, and insurance. Variable costs include the cost of machinery operation (repairs, fuel, and lubricants); labor to operate and service the machinery; custom services; materials; etc.

The per acre fixed and variable machinery costs were calculated by multiplying the "hours per acre" figure in Table 1 by the appropriate hourly cost figure from Table 4.

Column summaries indicate that the machinery fixed costs amounted to $23.15 per harvested acre. The variable costs per harvested acre consisted of $15.54 for machinery operations, $6.41 for labor, $8.35 for services, and $22.50 for materials. This results in a variable cost of $51.90 per harvested acre, or about $1.30 per bushel at the assumed yield level.
Table 1. Schedule of Operations and Selected Costs Per Harvested Acre, Winter Wheat - Fallow Rotation, Asotin County, 1977.

<table>
<thead>
<tr>
<th>Cultural Operations</th>
<th>Times Over</th>
<th>Hours Per Acre</th>
<th>Mach. Fixed Costs</th>
<th>Variable Costs</th>
<th>Total Costs</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Machine</td>
<td>Labor</td>
<td>$</td>
<td>$</td>
</tr>
<tr>
<td>Preharvest</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Chisel</td>
<td>1.0</td>
<td>.14</td>
<td>.15</td>
<td>1.92</td>
<td>1.57</td>
</tr>
<tr>
<td>Disc</td>
<td>1.0</td>
<td>.14</td>
<td>.15</td>
<td>2.04</td>
<td>1.64</td>
</tr>
<tr>
<td>Cultivate</td>
<td>1.5</td>
<td>.10</td>
<td>.11</td>
<td>1.29</td>
<td>1.07</td>
</tr>
<tr>
<td>Fertilize(^1/)</td>
<td>1.0</td>
<td>.04</td>
<td>.05</td>
<td>.36</td>
<td>.15</td>
</tr>
<tr>
<td>Rod Weed</td>
<td>4.0</td>
<td>.27</td>
<td>.29</td>
<td>3.20</td>
<td>2.97</td>
</tr>
<tr>
<td>Plant(^2/)</td>
<td>1.0</td>
<td>.10</td>
<td>.11</td>
<td>2.17</td>
<td>1.12</td>
</tr>
<tr>
<td>Weed Control(^3/)</td>
<td>1.0</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Harvest</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Combine</td>
<td>1.0</td>
<td>.20</td>
<td>.22</td>
<td>8.12</td>
<td>3.59</td>
</tr>
<tr>
<td>Haul</td>
<td></td>
<td>.25</td>
<td>.30</td>
<td>2.19</td>
<td>1.76</td>
</tr>
<tr>
<td>Other Charges</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pickup(^4/)</td>
<td></td>
<td>.30</td>
<td>.33</td>
<td>1.19</td>
<td>1.47</td>
</tr>
<tr>
<td>Machinery Moving</td>
<td></td>
<td>.05</td>
<td>.06</td>
<td>.67</td>
<td>.21</td>
</tr>
<tr>
<td>Crop Insurance</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>2.25</td>
</tr>
<tr>
<td>Interest on Op. Capital(^5/)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>2.20</td>
</tr>
<tr>
<td>Column Total</td>
<td>1.54</td>
<td>1.71</td>
<td>23.15</td>
<td>15.54</td>
<td>6.41</td>
</tr>
<tr>
<td>Total Variable Cost</td>
<td>15.54</td>
<td>6.41</td>
<td>23.15</td>
<td>15.54</td>
<td>6.41</td>
</tr>
</tbody>
</table>

1/ Anhydrous ammonia; 50 lbs. N; liquid Nitr. 10 lbs. N; aerial applied with weed control.
2/ Sixty pounds of seed per acre.
3/ Custom aerial, cost will vary based on variety and severity of infestation.
4/ Based on 7.5 miles per acre in farm and 25 mph average speed.
5/ Based on preharvest variable costs at 9% interest for 1/2 year.
Cost Summary for Winter Wheat Production

Data in Table 2 presents the total economic costs of producing wheat in the study area on a wheat-fallow rotation basis. The costs included in Table 1 are repeated in Table 2 along with a number of fixed costs associated with the farm operation, that are not solely attributable to wheat production. These costs include real property taxes, interest on the land investment, general farm liability insurance and "general overhead" expenses. The "general overhead" expenses include non-residential electricity; subscriptions to management and marketing information services; accounting and other business service fees; and etc.

Preharvest operating costs were estimated at $48.00, and harvest costs at $17.70 per acre harvested. "Other" costs amounted to $62.99, for a total of all costs of $128.69 per harvested acre. At the yield level assumed in this study, this amounts to $3.22 per bushel of wheat produced. This level of costs includes opportunity charges of $3.50 per hour for the operator's labor; seven percent annual return on capital invested in land (assuming a full equity land position); nine percent annual return on capital invested in machinery; and no specific charge made for management.

Because operating conditions from farm to farm are variable, farmers are encouraged to make their own cost estimates in the column provided.
Table 2. Summary of Costs Per Harvested Acre, Winter Wheat - Fallow Rotation, Asotin County, 1977.

<table>
<thead>
<tr>
<th>Item</th>
<th>Study Estimate</th>
<th>Your Farm</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Preharvest Costs</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fallow operations</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Chisel</td>
<td>4.01</td>
<td></td>
</tr>
<tr>
<td>Disc</td>
<td>4.20</td>
<td></td>
</tr>
<tr>
<td>Cultivate</td>
<td>2.74</td>
<td></td>
</tr>
<tr>
<td>Rod Weed</td>
<td>7.19</td>
<td></td>
</tr>
<tr>
<td>Fertilize</td>
<td>18.14</td>
<td></td>
</tr>
<tr>
<td>Seed</td>
<td>9.69</td>
<td></td>
</tr>
<tr>
<td>Weed Control</td>
<td>10.17</td>
<td></td>
</tr>
<tr>
<td><strong>TOTAL PREHARVEST</strong></td>
<td>48.00</td>
<td></td>
</tr>
</tbody>
</table>

| **Harvest Costs**     |                |           |
| Combine               | 12.70          |           |
| Haul                  | 5.00           |           |
| **TOTAL HARVEST AND PREHARVEST** | 17.70          |           |

| **Other Costs**       |                |           |
| Pickup                | 3.81           |           |
| Machinery moving      | 1.09           |           |
| Interest on op. capital | 2.20           |           |
| Gen. overhead (5% of var. costs) | 2.64    |           |
| Real estate taxes    | ($4.00 x 2 acres) 8.00 |           |
| Interest on land investment .07 @ $300 x 2 acres 42.00 |           |
| General farm liability insurance | 1.00 |           |
| Crop insurance       | 2.25           |           |
| **TOTAL ALL COSTS**   | 62.99          |           |

Cost per bushel at 40 bushel yield = $3.22
Machinery Data

Information in Table 3 describes the machinery considered typical on wheat ranches of the size assumed for the study. 1976 purchase prices for the various implements along with the estimated annual hours of use are also indicated. The hours of annual use are based on the operations indicated in Table 1. The fixed, variable, and total hourly costs of owning and operating these machines are also indicated.

<table>
<thead>
<tr>
<th>Implement Description</th>
<th>List Price</th>
<th>Annual Hours of Use</th>
<th>Cost Per Hour of Operation (Excluding Labor)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>Fixed</td>
</tr>
<tr>
<td>Tractor, 150 hp Diesel</td>
<td>$47,000</td>
<td>800</td>
<td>8.71</td>
</tr>
<tr>
<td>Tractor, 100 hp Diesel (used)</td>
<td>$12,000</td>
<td>200</td>
<td>8.89</td>
</tr>
<tr>
<td>Chisel, 20 ft.</td>
<td>$6,100</td>
<td>150</td>
<td>4.99</td>
</tr>
<tr>
<td>Heavy Disc, 18 ft.</td>
<td>$7,200</td>
<td>150</td>
<td>5.88</td>
</tr>
<tr>
<td>Field Cultivator - 36 ft.</td>
<td>$5,100</td>
<td>150</td>
<td>4.18</td>
</tr>
<tr>
<td>Rod Weeder - 36 ft.</td>
<td>$5,500</td>
<td>270</td>
<td>3.16</td>
</tr>
<tr>
<td>Drill, 24 ft.</td>
<td>$9,000</td>
<td>110</td>
<td>12.85</td>
</tr>
<tr>
<td>Combine, 18 ft. hillside</td>
<td>$50,500</td>
<td>200</td>
<td>40.60</td>
</tr>
<tr>
<td>Rockpicker</td>
<td>$4,000</td>
<td>100</td>
<td>7.78</td>
</tr>
<tr>
<td>Machinery Trailer</td>
<td>$1,500</td>
<td>50</td>
<td>4.48</td>
</tr>
<tr>
<td>Truck, 2 ton</td>
<td>$12,000</td>
<td>350</td>
<td>8.77</td>
</tr>
<tr>
<td>Pickup, 2 WD</td>
<td>$5,500</td>
<td>400</td>
<td>3.42</td>
</tr>
<tr>
<td>Pickup, 4 WD (.5 use)</td>
<td>$7,200</td>
<td>200</td>
<td>4.48</td>
</tr>
</tbody>
</table>

Hourly Machinery Costs for Selected Operations

The combined hourly costs of implements used to perform various operations are indicated in Table 4. Hourly costs are the sum of those for the tractor and implement. For example, the fixed cost for the chisel operation ($13.70) is the $8.71 fixed cost for the 150 HP tractor (Table 3), plus the $4.99 fixed cost for the 20 foot chisel (Table 3).

Labor charges are not included in Tables 3 or 4, but are included in the cost calculations in Table 1.
Table 4. Hourly Cost of Operating Multi-Implement Combinations, Wheat-Fallow Rotation, Asotin County, 1977.

<table>
<thead>
<tr>
<th>Operation and Tooling</th>
<th>Fixed</th>
<th>Variable</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chisel: 150 hp Tractor, 20' Chisel</td>
<td>13.70</td>
<td>11.20</td>
<td>24.90</td>
</tr>
<tr>
<td>Disc: 150 hp Tractor, 18' Heavy Disc</td>
<td>14.59</td>
<td>11.71</td>
<td>26.30</td>
</tr>
<tr>
<td>Cultivate: 150 hp Tractor, 36 ft. Cultivator</td>
<td>12.89</td>
<td>10.74</td>
<td>23.63</td>
</tr>
<tr>
<td>Fertilize: 100 hp Tractor, Dealer Applicator</td>
<td>8.89</td>
<td>3.70</td>
<td>12.59</td>
</tr>
<tr>
<td>Rod Weed: 150 hp Tractor, 36 ft. Rodweeder</td>
<td>11.87</td>
<td>11.01</td>
<td>22.88</td>
</tr>
<tr>
<td>Plant: 100 hp Tractor, 24 ft. Drill</td>
<td>21.74</td>
<td>11.23</td>
<td>32.97</td>
</tr>
<tr>
<td>Machinery Transport: 100 hp Tractor, 21 ft. Trailer</td>
<td>13.37</td>
<td>4.20</td>
<td>17.57</td>
</tr>
<tr>
<td>Rock Removal: 100 hp Tractor, Rockpicker</td>
<td>16.67</td>
<td>4.90</td>
<td>21.57</td>
</tr>
</tbody>
</table>

Source: Developed from data in Table 3.
Breakeven Wheat Prices at Selected Cost and Yield Levels

The information in Table 5 is not specific to this study, but may be useful to wheat producers who use the data in this report. Table 5 indicates for selected combinations of yields and production costs, the selling price for wheat that will just cover the costs incurred. Every farm has a specific combination of fixed and variable costs at any point in time. Hence, each farm has its own level of costs that must be covered in the short or intermediate run in order to continue in business. For this reason the range of costs from $70 to $150 per acre were included. An example, using Table 5, would be that the operating costs in Table 1 of $75.05 could be covered with a 40 bushel yield at slightly over $1.75 per bushel. On the other hand, if the yield were only 30 bushels per acre and the total costs of nearly $130 (Table 2) were to be covered, a wheat price of $4.33 per bushel would be required to break even.

Since every wheat ranch has certain factors which are unique, producers are encouraged to estimate their own costs of production. Although other crop alternatives may not be financially competitive with wheat for the use of resources in Asotin County, at least two important uses can be made of production cost data. First, if there are parts of the farm where expected yields are inadequate to cover the variable costs of production at the anticipated selling price for wheat, profits would be increased if that land were diverted from wheat production. Second, as farmers develop wheat marketing strategies such as target pricing, forward contracts, and the use of "futures" contracts; knowledge of production costs is essential to executing their marketing plan.
Table 5. Breakeven Wheat Prices Per Bushel at Selected Per Acre Costs and Yields.

<table>
<thead>
<tr>
<th>Yield Per Acre (Bu.)</th>
<th>Costs Per Harvested Acre</th>
<th>DOLLARS PER BUSHEL</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>$70</td>
<td>$80</td>
</tr>
<tr>
<td>30</td>
<td>2.33</td>
<td>2.67</td>
</tr>
<tr>
<td>35</td>
<td>2.00</td>
<td>2.28</td>
</tr>
<tr>
<td>40</td>
<td>1.75</td>
<td>2.00</td>
</tr>
<tr>
<td>45</td>
<td>1.56</td>
<td>1.78</td>
</tr>
<tr>
<td>50</td>
<td>1.40</td>
<td>1.60</td>
</tr>
</tbody>
</table>