Bulletin No. 25 - Results of Three Years' Experiments in Cost and Profit of Growing Wheat

University of Wyoming Agricultural Experiment Station

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UNIVERSITY OF WYOMING.
Agricultural College Department.

Wyoming Experiment Station,
LARAMIE, WYOMING.

BULLETIN NO. 25.
NOVEMBER, 1895.

RESULTS OF THREE YEARS' EXPERIMENTS IN COST AND PROFIT OF GROWING WHEAT.

BY THE AGRICULTURIST.

Bulletins will be sent free upon request. Address: Director Experiment Station, Laramie, Wyo.
Wyoming Agricultural Experiment Station.

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Excepting in two or three localities sufficient wheat is not yet being grown in Wyoming to supply the home market. This is not due to any unfavorable conditions of soil or climate, but may be attributed to lack of agricultural development. Three years ago the Experiment Station took up the subject of wheat growing and instituted experiments to be carried out upon each of the Experiment Farms to determine the place this important product would occupy as a general farm crop in this State.

Naturally the first question in any farming operation is, or should be, will it pay? Many have expressed the opinion that wheat would not pay in this State, as, owing to the extra expense of irrigation, we could not compete with such large wheat-growing States as the Dakotas and Minnesota. Such an opinion, however, is fallacious, as there are several points of advantage in an irrigated crop, any one of which will give a return more than sufficient to meet the comparatively small expense attached to watering the land. The advantages of raising grain under irrigation may be summed up briefly as follows:
1.—With plenty of water for irrigation there never need be a failure of crop. The results of our experiments indicate that the failure of a wheat crop for a single season would entail a loss equivalent to the expense of irrigating the land for not less than ten years.

2.—Larger yields are obtained from irrigated farms. The Statistician’s Report for 1890 gives the average yield of wheat in the United States for the preceding period of ten years as twelve bushels per acre. In no irrigated state was it as low as twelve bushels, Wyoming and Colorado being the highest with eighteen and nineteen and one-half bushels respectively. The value of the Wyoming crop was placed at $14.87 per acre. But little land was cultivated in this State during the period covered by the report. I believe an average of eighteen bushels per acre too low at the present time. Since 1890 the acreage of wheat has been greatly increased. The census for 1890 gave the area in wheat as 4,538 acres. The State Engineer’s Report for 1892 shows that Uinta County alone had as great an acreage and that the increase in Carbon and Converse Counties was from 56 acres and 6 acres respectively in 1890 to 1,000 acres in Carbon and 1,200 in Converse County in 1892. In the last five years wheat yields of less than twenty bushels per acre rarely have been obtained either upon the Station Farms or, so far as we have records, upon other farms in the State.

In our three years’ experiments upon the different Experiment Farms, one of them being unirrigated, the average yield is 32.9 bushels per acre. (See Table IV.) An increase of two bushels per acre more than pays the cost of irrigation.

3.—Irrigated grain is heavier and of better quality than grain raised without irrigation. Some of our varieties of
wheat at the World’s Fair weighed sixty-six pounds per bushel and sixty pound wheat is below the average. Such grain is of greater value than a lighter and poorer product. To illustrate the difference in value between irrigated and unirrigated grain, I may mention that at the present time in the Laramie market oats from irrigated districts are selling for twenty cents more per hundred pounds than oats from unirrigated farms.

4.—Irrigation tends to keep up the fertility of the soil. This is especially true where the water contains sediment. I believe this item alone of sufficient value to overbalance the expense of irrigation.

COST OF RAISING WHEAT.

The cost will vary in different localities. It is influenced by the price of labor, the kind and condition of the soil, the season, whether wet or dry, the extent to which improved machinery is used, and the manner in which the farmer plans and executes the work.

As has been stated,* the cost in North Dakota upon large areas, unirrigated and with the use of improved machinery, has been reduced to $4.50 and $5.00 per acre. In Arkansas† several years ago, the total average cost of raising wheat was placed at $7.50 per acre. In Nebraska in 1893‡ the cost of raising wheat is shown to be from $6.13 to $10.32 per acre.

The results of our experiments given in Tables I, II and III, show a variation in the cost of producing an acre of wheat from $7.30 to $13.36, the average cost given in Table

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IV being $10.38. This is the actual cost upon single acres of land, the expense being computed from the actual time spent, at the local price for labor. The cost of threshing only has been estimated the same for each place at five cents per bushel. Generally the plats were harvested by hand, thus increasing the expense, and the cost of irrigation is greater in proportion than upon larger areas.

The present season the expense upon the Laramie Farm, with the use of improved machinery, would not have exceeded $7.60 per acre, while the actual expense as given in the table was $9.11. It may be safely stated that, where fields of forty acres or more are grown under average conditions, the total expense, including water, need not exceed $7.75 per acre.

PROFIT.

The profit will vary with: 1st—The cost of producing the crop. Every cent saved in producing the crop, so long as the yield is not affected, is clear gain. 2nd.—It will vary with the yield. Any increase in yield over the amount required for the expense of raising the crop is almost clear profit. 3rd.—It will vary with the market price realized. While none of our experiments have shown the expense to be greater than the value of the crop, still the apparent profit in one instance is only $1.73 per acre. This is a little less than an income of seven per cent. upon a land valuation of $25.00 per acre, and shows that wheat might not be profitable when the expense of raising the crop is large and the yield comparatively small. The profit ranges from $1.73 to $16.70 per acre, the average for the State in the three years' experiment being $10.16 per acre. With
land at $25.00 per acre this profit would be over forty per cent. on the investment, or a return of ten per cent. on a land valuation of $100.16 per acre.

In the State Engineer's Report for 1892, (Page 31) it is stated that the average value of irrigated land for the arid region is $83.28 per acre, but that the value of irrigated land in Wyoming is lower than this. It shows that if the land was given in homesteads, the average cost of land and water would not exceed $10.00 per acre. But even with the larger valuation our results show that wheat is a profitable crop.

It may be noted that in the tables the cost of keeping up the ditches is included in the cost of irrigation. The first cost of getting the water to the land need not be taken into account as it is a part of the investment, the land valuation carrying the cost of water right with it. There is no way of determining the exact amount of taxes, so no account is taken of them. In computing his profit each farmer should deduct the amount of taxes from his total earnings.

**Explanation of Tables.**—Tables I, II and III give the results for 1893, 1894 and 1895. The price per pound is the price at the local market at the time of harvest. Where two or three varieties were grown the acre plats were divided into two or three equal parts and the yield given is the total yield from the whole acre plat.

Table IV gives the averages for the time the experiment was in progress. Results from Saratoga are for only one season and consequently are not an average. The averages are for two seasons at Laramie and for three seasons at the other farms, excepting Saratoga.
Table I. Cost and Profit of Growing Wheat. 1893.

<table>
<thead>
<tr>
<th>Place</th>
<th>Variety</th>
<th>Yield, Pounds per Acre</th>
<th>Price per Pound</th>
<th>Value of Crop</th>
<th>Cost of Seed</th>
<th>Cost of Labor Putting in Crop</th>
<th>Cost of Irrigation</th>
<th>Cost of Harvesting</th>
<th>Cost of Threshing</th>
<th>Total Cost</th>
<th>Profit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lander</td>
<td>Spring Fife</td>
<td>1,440</td>
<td>1½</td>
<td>$21.60</td>
<td>$1.86</td>
<td>$5.00</td>
<td>$1.00</td>
<td>$3.50</td>
<td>$2.00</td>
<td>$13.36</td>
<td>$8.24</td>
</tr>
<tr>
<td>Sheridan</td>
<td>Saskatchewan Fife</td>
<td>1,860</td>
<td>1</td>
<td>18.60</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>$11.71</td>
<td>6.89</td>
</tr>
<tr>
<td>Sundance</td>
<td>Red Oregon</td>
<td>1,038</td>
<td>1</td>
<td>22.38</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>$7.75</td>
<td>14.63</td>
</tr>
<tr>
<td></td>
<td>Velvet Chaff</td>
<td>1,200</td>
<td>1</td>
<td>18.98</td>
<td>.80</td>
<td>4.50</td>
<td>4.00</td>
<td>2.00</td>
<td>2.00</td>
<td>13.30</td>
<td>5.68</td>
</tr>
<tr>
<td>Wheatland</td>
<td>White Russian</td>
<td>1,898</td>
<td>1</td>
<td>18.98</td>
<td>.80</td>
<td>4.50</td>
<td>4.00</td>
<td>2.00</td>
<td>2.00</td>
<td>13.30</td>
<td>5.68</td>
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Table II. Cost and Profit of Growing Wheat. 1894.

<table>
<thead>
<tr>
<th>Place</th>
<th>Variety</th>
<th>Yield, in Pounds per Acre</th>
<th>Price per Pound</th>
<th>Value of Crop</th>
<th>Cost of Seed</th>
<th>Cost of Labor Putting in Crop</th>
<th>Cost of Irrigation</th>
<th>Cost of Harvesting</th>
<th>Cost of Threshing</th>
<th>Total Cost</th>
<th>Profit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Laramie</td>
<td>White Russian</td>
<td>2,100</td>
<td>1 ct.</td>
<td>$21.00</td>
<td>$1.75</td>
<td>$3.50</td>
<td>$2.25</td>
<td>$1.60</td>
<td>$2.10</td>
<td>$11.20</td>
<td>$9.80</td>
</tr>
<tr>
<td></td>
<td>Velvet Chaff</td>
<td>2,100</td>
<td>1 &quot;</td>
<td>21.60</td>
<td>1.72</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>$13.06</td>
<td>8.54</td>
</tr>
<tr>
<td>Lander</td>
<td>Saskatchewan Fife</td>
<td>1,200</td>
<td>1 &quot;</td>
<td>12.00</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>$10.27</td>
<td>1.73</td>
</tr>
<tr>
<td>Sheridan</td>
<td>Velvet Chaff</td>
<td>2,160</td>
<td>1 &quot;</td>
<td>21.60</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>$13.06</td>
<td>8.54</td>
</tr>
<tr>
<td>Sundance</td>
<td>Red Oregon</td>
<td>1,440</td>
<td>1 &quot;</td>
<td>14.40</td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td>$10.80</td>
<td>3.60</td>
</tr>
<tr>
<td></td>
<td>Velvet Chaff</td>
<td>1,440</td>
<td>1 &quot;</td>
<td>14.40</td>
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<td></td>
<td></td>
<td></td>
<td>$10.80</td>
<td>3.60</td>
</tr>
<tr>
<td></td>
<td>Northcote's Amber</td>
<td>2,400</td>
<td>1 &quot;</td>
<td>24.00</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>$13.00</td>
<td>11.00</td>
</tr>
<tr>
<td>Saratoga</td>
<td>Saskatchewan Fife</td>
<td>2,400</td>
<td>1 &quot;</td>
<td>24.00</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>$13.00</td>
<td>11.00</td>
</tr>
<tr>
<td>Wheatland</td>
<td>White Russian</td>
<td>2,400</td>
<td>1 &quot;</td>
<td>24.00</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>$13.00</td>
<td>11.00</td>
</tr>
<tr>
<td>Place</td>
<td>Variety</td>
<td>Yield, Pounds per Acre</td>
<td>Price per Pound</td>
<td>Value of Crop</td>
<td>Cost of Seed</td>
<td>Labor in Putting in Crop</td>
<td>Cost of Irrigation</td>
<td>Cost of Harvesting</td>
<td>Cost of Threshing</td>
<td>Total Cost</td>
<td>Profit</td>
</tr>
<tr>
<td>-------------</td>
<td>--------------------------</td>
<td>------------------------</td>
<td>----------------</td>
<td>--------------</td>
<td>--------------</td>
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<td>-------------------</td>
<td>-------------------</td>
<td>------------------</td>
<td>-----------</td>
<td>---------</td>
</tr>
<tr>
<td>Laramie</td>
<td>White Russian</td>
<td>1,707.5</td>
<td>1</td>
<td>$17.07</td>
<td>$1.26</td>
<td>$2.60</td>
<td>$8.75</td>
<td>$3.00</td>
<td>$1.50</td>
<td>$9.11</td>
<td>$7.06</td>
</tr>
<tr>
<td>Lander</td>
<td>Saskatchewan Flie</td>
<td>2,100</td>
<td>1/2</td>
<td>26.25</td>
<td>1.53</td>
<td>2.43</td>
<td>0.88</td>
<td>2.13</td>
<td>1.75</td>
<td>8.72</td>
<td>17.53</td>
</tr>
<tr>
<td>Sheridan</td>
<td>Velvet Chaff</td>
<td>3,542.5</td>
<td>1/2</td>
<td>26.57</td>
<td>0.67</td>
<td>3.60</td>
<td>2.25</td>
<td>2.89</td>
<td>2.73</td>
<td>11.54</td>
<td>15.03</td>
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<tr>
<td>Sundance</td>
<td>Whittington</td>
<td>1,320</td>
<td>5/6</td>
<td>11.00</td>
<td>1.00</td>
<td>3.00</td>
<td>2.10</td>
<td>3.00</td>
<td>1.52</td>
<td>8.52</td>
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<td>Wheatland</td>
<td>Velvet Chaff</td>
<td>2,143</td>
<td>1 1/12</td>
<td>23.23</td>
<td>1.30</td>
<td>3.00</td>
<td>2.40</td>
<td>2.20</td>
<td>3.60</td>
<td>12.50</td>
<td>10.73</td>
</tr>
</tbody>
</table>

**Table IV.**

Average Cost and Profit.

<table>
<thead>
<tr>
<th>Place</th>
<th>Years</th>
<th>Yield per Acre, Pounds</th>
<th>Value per Acre, Bushels</th>
<th>Cost per Acre</th>
<th>Profit per Acre</th>
</tr>
</thead>
<tbody>
<tr>
<td>Laramie</td>
<td>1894 and 1895</td>
<td>1.904</td>
<td>31.7</td>
<td>$19.03</td>
<td>$8.88</td>
</tr>
<tr>
<td>Lander</td>
<td>1893, 1894 and 1895</td>
<td>1.580</td>
<td>26.5</td>
<td>19.95</td>
<td>10.78</td>
</tr>
<tr>
<td>Sheridan</td>
<td>1893, 1894 and 1895</td>
<td>2.410</td>
<td>40.2</td>
<td>24.00</td>
<td>7.30</td>
</tr>
<tr>
<td>Sundance</td>
<td>1893, 1894 and 1895</td>
<td>2.521</td>
<td>42.0</td>
<td>22.25</td>
<td>12.10</td>
</tr>
<tr>
<td>Wheatland</td>
<td>1893, 1894 and 1895</td>
<td>1.976</td>
<td>32.9</td>
<td>20.54</td>
<td>10.38</td>
</tr>
<tr>
<td>Average for the State -</td>
<td></td>
<td></td>
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</tbody>
</table>

*Only one year, not averaged.*
SUMMARY.

Advantages of raising wheat under irrigation are: 1st, an assured crop; 2nd, larger yields; 3rd, heavier and better grain; 4th, maintaining fertility of the soil.

The cost of raising wheat varies from $7.30 to $13.36 per acre. Estimated cost upon 40 acres or more by the use of improved machinery, $7.75 per acre.

Profit varies from $1.73 to $16.70 per acre.

Average profit is $10.16 per acre, which is a ten per cent. income upon a land valuation of over $100 per acre, or over forty per cent. upon a land valuation of $25 per acre.