Bulletin No. 294 - Condition of Wyoming's Agricultural Land

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Condition of Wyoming's Agricultural Land

By
E. Dean Vaughan

University of Wyoming
Agricultural Experiment Station
Laramie
UNIVERSITY OF WYOMING
AGRICULTURAL EXPERIMENT STATION

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†In cooperation with U. S. Department of Agriculture.
**Condition of Wyoming’s Agricultural Land**

By E. Dean Vaughan*

*Assistant Agricultural Economist*

**Introduction**

During the recent past there has been much interest and discussion among both farm and non-farm people concerning soil-conservation practices, soil fertility, range conditions, crop yields, and livestock numbers. There has been a tendency, even among specialists, to take an extreme view on conservation matters. At one extreme is the view that agriculture in general is headed for disaster because of unwise use of our land resources. The opposite viewpoint is that there is no need for alarm since the owners and users of our farm and ranch lands soon learn that it is to their own as well as to society’s advantage to conserve the land and use it wisely.

The purpose of this study is to record farmer and rancher opinion of the condition of Wyoming’s agricultural land.

**Procedure**

Information for the study was gathered through use of questionnaires mailed to a random sample of farmers and ranchers in every county in Wyoming. The number of questionnaires mailed to each county was varied according to the number of farms and ranches within each county. Thus the information recorded herein represents a cross section of opinion from operators of all types of farming and ranching found in the state.

**GENERAL INFORMATION**

According to the information received the average Wyoming farmer and rancher in 1947 was 50 years old, had been farming or ranching for 29 years, and had been operating his present farm or ranch for 21 years. Two-thirds of the operators were classed as part-owners of their farms and ranches and over three-fourths of them received the major portion of their income from livestock.

Tables 1 to 5 present a breakdown of age, number of years in farming and ranching, number of years operating present place, and major sources of income.

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*The author wishes to express grateful appreciation to the many farmers and ranchers throughout Wyoming and to the county agricultural agents who all contributed their time and information to this study.*
### TABLE 1—AGE OF OPERATORS, 1947

<table>
<thead>
<tr>
<th>Below 19 yr.</th>
<th>20-29 yr.</th>
<th>30-39 yr.</th>
<th>40-49 yr.</th>
<th>50-59 yr.</th>
<th>60 yr. and over</th>
<th>Unknown</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Percent-</td>
<td>0%</td>
<td>4.5%</td>
<td>11.7%</td>
<td>29.1%</td>
<td>31.8%</td>
<td>19.0%</td>
<td>3.9%</td>
</tr>
<tr>
<td>age of</td>
<td>operators</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### TABLE 2—NUMBER OF YEARS FARMING OR RANCHING, 1947

<table>
<thead>
<tr>
<th>Less than 9 yr.</th>
<th>10-19 yr.</th>
<th>20-29 yr.</th>
<th>30-39 yr.</th>
<th>40-49 yr.</th>
<th>50 yr. and over</th>
<th>Unknown</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Percentage of</td>
<td>4.5%</td>
<td>16.2%</td>
<td>31.3%</td>
<td>20.1%</td>
<td>19.6%</td>
<td>6.1%</td>
<td>2.2%</td>
</tr>
<tr>
<td>operators</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### TABLE 3—NUMBER OF YEARS OPERATING PRESENT FARM OR RANCH, 1947

<table>
<thead>
<tr>
<th>Less than 9 years</th>
<th>10-19 yr.</th>
<th>20-29 yr.</th>
<th>30-39 yr.</th>
<th>40-49 yr.</th>
<th>50 yr. and over</th>
<th>Unknown</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Percentage of</td>
<td>22.9%</td>
<td>20.1%</td>
<td>27.4%</td>
<td>17.3%</td>
<td>7.8%</td>
<td>1.7%</td>
<td>2.8%</td>
</tr>
<tr>
<td>operators</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### TABLE 4—CLASSIFICATION OF OWNERSHIP, 1947

<table>
<thead>
<tr>
<th>Operating all owned land</th>
<th>Operating both owned and leased land</th>
<th>Operating all leased or rented land</th>
<th>Operating as a manager</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Percentage of operators</td>
<td>30.2%</td>
<td>65.9%</td>
<td>3.4%</td>
<td>100%</td>
</tr>
</tbody>
</table>

### TABLE 5—MAJOR SOURCE OF INCOME, 1947

<table>
<thead>
<tr>
<th>Livestock</th>
<th>Crops</th>
<th>Combination livestock and crops</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Percentage of operators</td>
<td>77.7%</td>
<td>20.1%</td>
<td>2.2%</td>
</tr>
</tbody>
</table>
From the preceding tables it appears that a large number of Wyoming farmers and ranchers are at, or approaching, the age of retirement. If these older men retire in large numbers within the next few years many problems of inheritance, tenancy, farm finance, etc. are likely to arise because of the high cost of entering into farming and ranching at this time. The next decade may well see a recession in farm prices. If many young people go into farming and ranching under present-day high prices, mortgage indebtedness may become serious during the 1950's and thereafter.

The high percentage of operators classed as part-owners can be explained by the fact that a large percentage of the operators were livestock men whose operations normally include public lands.

**Pattern of Land Ownership and Use**

The operators were asked to give information on the size of farms and ranches, the number of acres owned and leased or rented, and the various uses of the land for 1947 and for the years in which they first started operating their present places.

The average operator by 1947 had increased the size of his farm or ranch by 157 percent over the number of acres he operated when he started farming or ranching his present place, but in 1947 he had increased the number of acres owned by only 2.6 percent. This indicates a large increase in the number of acres rented, leased, or operated under government permits.

The following figures from 1947 give the sources of the rented land:

1. 48 percent of the part-owners and tenants rented federally owned land.
2. 51 percent of the part-owners and tenants rented state-owned land.
3. 69 percent of the part-owners and tenants rented land owned by private individuals.
4. 7 percent of the part-owners and tenants rented other owned land.

The following figures from 1947 give the percentage of the land owned by each source:

1. 43.8 percent of the rented land was federally owned.
2. 30.2 percent of the rented land was state-owned.
3. 22.5 percent of the rented land was owned by private individuals.
4. 3.5 percent of the rented land was owned in other ways.

A comparison of land uses in 1947 with the time of entrance into farming or ranching is presented in Tables 6 and 7.

---

1 The term “rented” for the sake of brevity includes land rented, leased, or used under permits.
2 "Other" includes land owned by railroads, banks, other corporations, etc.
<table>
<thead>
<tr>
<th>Land use</th>
<th>Land use when starting operation of present ranch or farm (Percentage of operators)</th>
<th>Land use in 1947 (Percentage of operators)</th>
<th>Percentage increase in number of operators</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dryland crops...</td>
<td>39%</td>
<td>43%</td>
<td>4%</td>
</tr>
<tr>
<td>Irrigated crops.</td>
<td>63%</td>
<td>67%</td>
<td>4%</td>
</tr>
<tr>
<td>Dryland grazing.</td>
<td>87%</td>
<td>92%</td>
<td>5%</td>
</tr>
<tr>
<td>Irrigated pasture.</td>
<td>31%</td>
<td>46%</td>
<td>15%</td>
</tr>
</tbody>
</table>

**TABLE 7—PERCENTAGE OF ACRES IN VARIOUS LAND USES COMPARING 1947 WITH TIME WHEN THEY STARTED OPERATING PRESENT FARMS AND RANCHES**

<table>
<thead>
<tr>
<th>Land use</th>
<th>When starting operation of present farm or ranch (Percentage of acres)</th>
<th>In 1947 (Percentage of total acres)</th>
<th>Increase in percentage of total acres</th>
<th>Decrease in percentage of total acres</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dryland crops...</td>
<td>2.0%</td>
<td>1.9%</td>
<td>..</td>
<td>0.1%</td>
</tr>
<tr>
<td>Irrigated crops.</td>
<td>3.9%</td>
<td>2.5%</td>
<td>..</td>
<td>1.4%</td>
</tr>
<tr>
<td>Dryland grazing.</td>
<td>92.8%</td>
<td>94.4%</td>
<td>1.6%</td>
<td>..</td>
</tr>
<tr>
<td>Irrigated pasture.</td>
<td>1.3%</td>
<td>1.2%</td>
<td>..</td>
<td>0.1%</td>
</tr>
</tbody>
</table>

From Table 6 is apparent there has been a relatively small increase in diversification of land uses, the increase in numbers of operators having irrigated pasture land being the most significant. While diversification increased, the total number of acres devoted to the various uses decreased slightly in all uses except dryland grazing, which increased by 1.6 percent.

**Livestock and Crops**

Conclusive figures for livestock numbers, crop yields, and the composition of each cannot be given here. For various reasons many of the operators who returned the questionnaires gave conflicting or incomplete information concerning their livestock and crops. However, several trends which have been observed in Wyoming agriculture were given support by the questionnaires which were complete in this section.

In livestock the information received indicated that:

1. There has been a substantial increase in the diversification of types of livestock on farms and ranches.
2. Most farms and ranches in 1947 had a wider variety in types of livestock; the composition of livestock numbers had changed in the following manner:

a. The average number of sheep, horses, and mules per farm or ranch had declined considerably.

b. The average number of swine per farm or ranch had decreased slightly.

c. There was a small increase in the average number of dairy cattle per farm or ranch.

d. A moderate increase had taken place in the average number of beef cattle and poultry per farm or ranch.

In the matter of crop yields and trend in yields, a majority of the operators felt that, between 1947 and the time in which they began operations on their present farms and ranches, there had been an increase in yields of all Wyoming's principal crops. There were, of course, exceptions in certain counties and districts. Examination of yield data issued by the Federal-State Agricultural Statistician bears out the opinion that yields have increased. Figures 1 to 10 present graphically the yield of Wyoming crops and the five-year moving average trends in yields for the years 1927 to 1947 inclusive.*

The period 1927 through 1947 was chosen for such presentation of crop yields because it was during this period that the majority of the operators had been operating their present places.

Selection of that period may be criticized on the grounds that, for example, from 1935 to 1947 weather conditions were vastly more favorable than during the earlier 1930's. As a consequence the upward trend in

*All data in Figures 1 to 10 are taken from "Wyoming Agriculture," Bulletins 14 and 15, as compiled by the Wyoming and the U.S. Departments of Agriculture.
yields was due to favorable weather. Nevertheless, it was the period 1927-1947 with which the operators were familiar, and, so far as they were concerned, crop yields in general had been rising, whatever the cause. The period 1927-1947 may also be criticized on the grounds that 21 years is too short an interval to give a true picture of trends in yields. Had a 50- or 75-year period been chosen, the trend in yield for certain crops might have been downward. Even so, it must be remembered that there has been, in the past 50 to 75 years, great expansion in the number of acres of cropland in Wyoming. Naturally the better lands were taken up first, and, as agri-
culture expanded in numbers of acres farmed, there was only one way to expand—onto land of lesser fertility. That alone, rather than a general decline in fertility of the soil, may account for any long-time downward trends in yields.

Condition of Soil and Range

The operators contacted by the survey were asked to evaluate soil fertility, soil erosion, and range conditions on their own as well as their neighbors' farms and ranches. Tables 8 through 10 summarize their opinions.
**FIG. 6**—Wyoming Rye Yields, 1927-1947

Annual Yield

...5-year Moving Average

**Fig. 7**—Wyoming Potato Yields, 1927-1947

Annual Yield

...5-year Moving Average
TABLE 8—EVALUATION OF CHANGES IN SOIL FERTILITY

<table>
<thead>
<tr>
<th>Percentage of operators</th>
<th>Own farm or ranch</th>
<th>Neighbors’ farms or ranches</th>
</tr>
</thead>
<tbody>
<tr>
<td>Increasing fertility</td>
<td>55%</td>
<td>30%</td>
</tr>
<tr>
<td>Decreasing fertility</td>
<td>14%</td>
<td>26%</td>
</tr>
<tr>
<td>No change</td>
<td>23%</td>
<td>31%</td>
</tr>
<tr>
<td>No opinion</td>
<td>8%</td>
<td>13%</td>
</tr>
</tbody>
</table>

TABLE 9—EVALUATION OF THE IMPORTANCE OF SOIL EROSION

<table>
<thead>
<tr>
<th>Percentage of operators</th>
<th>Own farm or ranch</th>
<th>Neighbors’ farms or ranches</th>
</tr>
</thead>
<tbody>
<tr>
<td>Serious erosion</td>
<td>16%</td>
<td>31%</td>
</tr>
<tr>
<td>No serious erosion</td>
<td>82%</td>
<td>65%</td>
</tr>
<tr>
<td>No opinion</td>
<td>2%</td>
<td>4%</td>
</tr>
</tbody>
</table>

TABLE 10—EVALUATION OF RANGE CONDITIONS

<table>
<thead>
<tr>
<th>Percentage of operators</th>
<th>Own farm or ranch</th>
<th>Neighbors’ farms or ranches</th>
</tr>
</thead>
<tbody>
<tr>
<td>Range overgrazed</td>
<td>8%</td>
<td>26%</td>
</tr>
<tr>
<td>Range not overgrazed</td>
<td>84%</td>
<td>64%</td>
</tr>
<tr>
<td>No opinion</td>
<td>8%</td>
<td>10%</td>
</tr>
</tbody>
</table>

Quite understandably, and as might have been expected, the operators were inclined to be more critical of the condition of their neighbors’ farms and range lands than of their own. It was encouraging to note that many of the 14 percent whose own soils were declining in fertility, along with the 16 percent whose own land was subject to serious erosion and the 8 percent whose own ranges were overgrazed—indicated that they were undertaking or at least planning to put into effect various conservation measures designed to correct the adverse conditions.
QUALITY CHANGES IN CROPS AND LIVESTOCK

In recent years there has been increasing concern as to whether or not crops, grasses, and consequently livestock are becoming deficient in various essential minerals. On the assumption that such deficiencies are recognizable in the condition of livestock and in the growth and yields of crops, the operators contacted were asked to evaluate the condition of livestock and crops under the general term “quality.” Quality is an admittedly vague, largely undefinable term with serious limitations in a study of this nature. Nevertheless it would seem reasonable to assume that, if there had been any great change in the quality of crops and livestock, the producers would have been in good position to recognize such changes. With full recognition of the limitations of the term “quality” a summary of opinion is presented in Table 11.
TABLE II—EVALUATION OF QUALITY CHANGES IN LIVESTOCK AND CROPS

<table>
<thead>
<tr>
<th></th>
<th>Percentage of operators (Crops)</th>
<th>Percentage of operators (Livestock)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Increasing quality</td>
<td>60.9%</td>
<td>55.3%</td>
</tr>
<tr>
<td>Decreasing quality</td>
<td>9.5%</td>
<td>5.6%</td>
</tr>
<tr>
<td>No change</td>
<td>21.8</td>
<td>20.1%</td>
</tr>
<tr>
<td>No opinion</td>
<td>7.8%</td>
<td>19.0%</td>
</tr>
</tbody>
</table>

Obviously the majority was of the opinion that both crops and livestock quality had been increasing. Apparently it was more difficult to evaluate livestock quality than crops, judging from the relatively large percentage of operators who had no opinion in the matter.

SOIL-CONSERVATION PRACTICES

The questionnaire listed several conservation practices. It was requested that the operators indicate which practices they were using, how long they had been using them, and which practices had been the most successful and the least successful. Table 12 summarizes this information.

Grass reseeding was in first place in terms of the greater number of operators making use of the practice. The practice having been in use for the greater length of time was crop rotation. The most successful practice was summer fallowing; the least successful was weed control.

The average farmer and rancher was making use of three conservation practices in 1947.
### TABLE 12—SOIL-CONSERVATION PRACTICES

<table>
<thead>
<tr>
<th>Conservation practice</th>
<th>Percentage of operators using conservation practices</th>
<th>Average years in use</th>
<th>Percentage of operators saying practice was most successful one used</th>
<th>Percentage of operators saying practice was least successful one used</th>
</tr>
</thead>
<tbody>
<tr>
<td>Grass reseeding</td>
<td>58%</td>
<td>8 yr.</td>
<td>22%</td>
<td>14%</td>
</tr>
<tr>
<td>Crop rotation</td>
<td>53%</td>
<td>17 yr.</td>
<td>20%</td>
<td>0%</td>
</tr>
<tr>
<td>Grazing rotation</td>
<td>51%</td>
<td>14 yr.</td>
<td>20%</td>
<td>1%</td>
</tr>
<tr>
<td>Stock-water dams</td>
<td>46%</td>
<td>13 yr.</td>
<td>38%</td>
<td>9%</td>
</tr>
<tr>
<td>Weed control</td>
<td>45%</td>
<td>8 yr.</td>
<td>0%</td>
<td>34%</td>
</tr>
<tr>
<td>Summer fallow</td>
<td>31%</td>
<td>12 yr.</td>
<td>45%</td>
<td>7%</td>
</tr>
<tr>
<td>Shelterbelts</td>
<td>27%</td>
<td>11 yr.</td>
<td>2%</td>
<td>12%</td>
</tr>
<tr>
<td>Drainage</td>
<td>19%</td>
<td>9 yr.</td>
<td>17%</td>
<td>6%</td>
</tr>
<tr>
<td>Strip cropping</td>
<td>15%</td>
<td>10 yr.</td>
<td>19%</td>
<td>15%</td>
</tr>
<tr>
<td>Contour plowing</td>
<td>12%</td>
<td>5 yr.</td>
<td>26%</td>
<td>10%</td>
</tr>
<tr>
<td>Pitting</td>
<td>6%</td>
<td>3 yr.</td>
<td>0%</td>
<td>0%</td>
</tr>
<tr>
<td>Terracing</td>
<td>3%</td>
<td>6 yr.</td>
<td>0%</td>
<td>0%</td>
</tr>
<tr>
<td>Leveling</td>
<td>3%</td>
<td>5 yr.</td>
<td>33%</td>
<td>16%</td>
</tr>
<tr>
<td>Stock wells</td>
<td>2%</td>
<td>6 yr.</td>
<td>0%</td>
<td>0%</td>
</tr>
<tr>
<td>Rodent control</td>
<td>1%</td>
<td>8 yr.</td>
<td>0%</td>
<td>0%</td>
</tr>
<tr>
<td>Clearing</td>
<td>1%</td>
<td>5 yr.</td>
<td>0%</td>
<td>0%</td>
</tr>
</tbody>
</table>

### GENERAL COMMENTS

The operators were asked to make any additional comments they might have on the condition of Wyoming agriculture, especially conservation matters. The following statements, taken from such comments, are representative of the observations which appeared most often.

"Weed control is a very serious problem. More emphasis should be placed on it."

"There is great need for experienced help and advice on irrigation and drainage methods, especially on hay lands. Our high mountain meadows are being leached by overirrigation, and the hay lands in the valleys need proper drainage as they are becoming swampy."

"Research on grass and other range plants should be stepped up."

"What we need is detailed soils analysis."

"Overgrazing is not as serious as most people seem to think."
Many of us need more education on how to determine carrying capacities.

Much of our dryland range should be reseeded.

Tell us when a drought is coming and how to get rid of grasshoppers, and there won’t be any overgrazing.

High prices in the past few years have encouraged too heavy use of our farm lands and have discouraged soil-conserving practices.

CONCLUSIONS

1. To judge from the age composition of the farmers and ranchers contacted, a large number of operators may be expected to retire within the next few years. This is particularly significant to young beginning farmers and ranchers and to agricultural lending agencies in view of the fact that it appears that the postwar inflation has reached its peak and is in the process of turning downward.

2. Along with general increase in the size of farms and ranches, tenancy has decreased slightly, while diversification in both crops and livestock has increased.

3. During the experience of the operators contacted there has been a moderate increase in the yields of most crops. Even though the emphasis of this study has been on soil fertility, it should be pointed out that the increase in crop yields for the period covered cannot be attributed to any particular factor. The increase may have been caused by increased soil fertility; adoption of improved varieties; more effective insect, weed, and pest controls; generally favorable climatic conditions; improved management practices; or a combination of these and other factors. Purely as a matter of conjecture it is conceivable that, even though soil fertility might decline, crop yields could increase because of the other factors listed above.

4. According to farmer and rancher opinion their own farms and ranches were generally in good condition, but approximately one-fourth of the operators felt that their neighbors had serious soil-erosion problems, were overgrazing their ranges, and were experiencing a decline in soil fertility.

5. The majority of operators said that the quality of both crops and livestock had improved.

6. Wyoming farmers and ranchers are definitely conservation-minded. (Every farmer and rancher contacted was making use of one or more soil- or water-conservation practices.) The importance of soil and water conservation is generally recognized and is being practiced wherever possible.

7. According to the farmers and ranchers their greatest problems of conservation lie in weed control, irrigation and drainage, and reseeding.
PUBLICATIONS AT YOUR SERVICE

The Wyoming Agricultural Experiment Station publishes numerous bulletins, circulars, and reports based on agricultural research. They are free to residents of the state. A few representative titles are listed here for your guidance. A more complete list of publications is also available.


Bul. 232. Breastbones of Turkeys in Relation to Roosting, by M. O. North.


Bul. 281. Multiple Vitamin Concentrates in Turkey Breeding Rations, by Lawrence Morris.


Bul. 286. Effect of Holstein Birthweight on Calf Gain and Final Weight, by H. S. Willard.


51st to 59th Annual Reports (1940 to 1949).

All these publications are available to Wyoming farmers and ranchers on request sent to Bulletin Mailing Room, College of Agriculture, Laramie, Wyoming.