Economics of SUGAR BEET PRODUCTION in Colorado

R. T. Burdick

Colorado State College
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Fort Collins

The search for a perfect sugar beet should include similar search for a perfect economic organization of the industry.
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Cover illustration is by courtesy of the United States Department of Agriculture.
Economics Of Sugar Beet Production In Colorado

R. T. Burdick, Associate Economist

THE SUGAR beet industry is an important part of the economic life of Colorado. It has been almost continuously in the news. Its history has been filled with dramatic episode and strife.

During the years beginning with 1922, the staff members* of the Rural Economics and Sociology Section of the Colorado Experiment Station have had the privilege of working with men who have been closely identified with the sugar beet industry in Colorado, either as farmers or processors, or as officers of organizations whose primary purpose is to promote better conditions in the sugar beet producing areas. The writer has made cost of production studies on sugar beet farms; has represented either the farmers or the state in important railroad rate case hearings and tariff hearings; has represented the Federal Government on the N. R. A. committee which dealt with the beet sugar industry; and has worked with farmer groups as they struggled with economic problems.

These 17 years of experience have covered some of the most critical periods in the beet sugar industry. It is the purpose of this bulletin to summarize some of the economic data available in the files of the Economics Section and to use these data in an attempt to make some contribution to a better public understanding of the problems involved in the industry.

This report is an experiment in applied economics. It is more than a mere report on the financial facts of the sugar beet industry; it is an attempt to show the relationship of these facts to the welfare of the state. No one economic fact can be considered independently. Too many times the sugar beet industry has been viewed as being just one problem—the corporation striving for profits; the contract beet worker struggling for a living; the tenant or landlord seeking a personal advantage; the farmer faced with uncertain yields, costs, and prices; the irrigation company seeking a guarantee of abundant water; the merchant hoping for improved business. Each of these has its own problem, but none of them has time to stand back and look at the entire industry.

The author will be the first to admit the difficulty of seeing the industry as a whole. It is more than one man can do accurately. But, in a sense, this report is far more than the work of one man.

*Special credit should go to H. B. Pingrey, whose accurate work in the early years made these data available for analysis.
It is offered with full recognition of its limitations, but offered sincerely as an attempt to bring some of these conflicting views together, and out of them to bring some suggestion upon which, or around which, men can unite for a greater Colorado. While this is primarily a Colorado study, it must be admitted that the Federal Government has an important part in the industry. It is less clear with the passing years just what the Government wants. But it is in the picture and must be reckoned with, which is all the more reason that Colorado must put her house in order and face the future with united purpose.

It is impossible to deal with the production of sugar beets independent of farming as a whole. Nor can one ignore its relation to the industry and trade of the state as a whole. In recent years, also, the national and international aspects of the industry have tended to dominate the public’s attention. Sugar beet labor has had its share of misunderstanding and adverse publicity. Obviously, some of these phases of the industry have problems which require more space and attention than can be given within the limits of one study. The data which are available deal primarily with the farmer’s income in a small area of the northern Colorado sugar beet district and with the corporation summaries of their annual reports.

**History of Sugar Beet Production in Colorado**

Alvin T. Steinel (1)* states that Peter Magnes of Arapahoe County grew the first Colorado sugar beets during the 1860’s. He reviews the hopes and losses attendant upon the establishment of the industry in Colorado. The first sugar beet factory in the state was established at Grand Junction in 1899. The first factory in northern Colorado started operation in 1901 at Loveland. Factories at Rocky Ford and Sugar City were built in 1900.

In 1926 Steinel (1) reports 17 factories in operation in Colorado in the following towns: Brighton, Fort Lupton, Longmont, Loveland, Fort Collins, Windsor, Eaton, Greeley, Fort Morgan, Brush, Sterling, Ovid, Rocky Ford, Swink, Sugar City, Grand Junction, and Delta; in addition, there was a molasses plant at Johnstown. In 1938 this list is unchanged, indicating either that the growth of the industry has reached its limit in the State or that economic factors have been unfavorable to further expansion since 1926, the date when the Ovid and Johnstown factories were erected. This list of active factories omits some factories which have ceased operation for one reason or another. The area adapted to sugar beets had to be found by actual trial. If soil conditions or other reasons handicapped farmers, it was

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*Numbers in parentheses refer to bibliography, p. 55.
inevitable that some factories were built in anticipation of a volume of business which did not materialize.

According to the Colorado Crop and Livestock Reporting Service (2), the peak of sugar beet production in Colorado was in 1930, when 242,000 acres were harvested. The report for the year 1925 showed the lowest area of any year since the World War, with 1938 and 1935 next in line. This same relationship exists for the northern Colorado district.

The 1930 United States Census reported for Colorado an average of 25.1 acres of sugar beets per farm producing beets. The 1935 United States Census indicated that this had dropped to 21.2 acres per farm. In northern Colorado the comparable areas were 27.5 and 23.6.

Economic Study of a Few Farms

For the years 1922 to 1936, the average sugar beet area per farm on the Weld County farms for which data are available in the office of the Economics Section of the Colorado Experiment Station was 30.7 acres. These few Weld County irrigated farms furnish data that will permit analysis of their sugar beet production costs and returns.

How Representative Are These Few Farms?

Before using the records of these few farms as a basis for discussion, something more should be said as to their contrast with data
for a wider area. The chief difficulty in making such a contrast arises from the difficulty of finding comparable data. The 1930 Census (3) furnishes some possible area comparisons; the Colorado Crop Reporting Service (2) records permit others.

For example, the 1930 Census (3) reports 713,371 acres of irrigated land in the counties along the South Platte River. (These counties are included in "crop reporting district 2".) Of this area, 152,929 acres, or 21.4 percent, were in sugar beets. For the same year, Weld County had 24.5 percent of its irrigated area in sugar beets. The few farms included in this study had 13.49 percent of their crop area in sugar beets in 1929, or less than the census indicates.

Data for 1 year are interesting but do not permit a study of changes which take place. During the years 1924 to 1936, the Colorado Crop Reporting Service shows that the area of sugar beets harvested in district 2 has varied from 82,619 acres to 177,880 acres. If the census statement of irrigated area be used throughout for ease of contrast, it indicates that the sugar beet area might have varied between 11.6 percent and 24.9 percent of the irrigated area. The farms in this study during the same years had from 3.7 percent (1928) to 30.2 percent (1927) of their crop land in beets. For those 13 years, the district 2 data show 19.79 percent of the 1930 Census irrigated area in harvested sugar beets. The farms studied for these

Figure 2.—Sugar beets as a percentage of the crop area on Weld County cooperating farms.
same 13 years show 17.96 percent of their crop areas in planted sugar beets. Again, these farmers apparently grew a smaller relative area of beets. Incidentally, for the 10 years 1929-38, 8.65 percent of the planted sugar beet area in northern Colorado was not harvested.

The Colorado Crop Reporting Service (2) reports the sugar beet yields for the entire state during the years 1922 to 1936 as ranging from 9.3 tons in 1934 to 13.8 tons in 1926, with a 15-year simple average of 12.18 tons. The farms in this study had yields of sugar beets during those same years that varied from 9.8 tons (1934) to 18.5 tons (1926), with a simple average of 14.78 tons, or 21 percent greater than the state average.

It is impossible to secure comparable data for income. However, the Colorado Crop Reporting Service prepares an annual summary showing the value of all crops produced in Colorado. From these reports (4) it is apparent that sugar beet values (usually reported as including the value of tops) were 14.9 percent of the value of all crops as a simple average for the years 1922 to 1936. During these same years, the income from sugar beets on the cooperating farms amounted to 25.8 percent of the gross receipts. The sale of sugar beets represented approximately 45.2 percent of all crop receipts on these farms. This is not a comparable figure, but it suggests at least that sugar beets probably furnished a greater proportion of the income on these farms than for the state as a whole. The
Crop Reporting Service does not subdivide its data for parts of Colorado; hence no contrast can be made for district 2. Obviously, the state figure includes the plains area and livestock ranches, as well as all other sections of the state.

Several studies were made by the U. S. Department of Agriculture in northern Colorado for the years 1914 to 1918 (5) (6) (7), and the Economics Section made a survey of more than 150 individual farms in this same area (8). A few comparative figures from these earlier studies will aid in judging as to the representativeness of the present study. More of these early data may be found in Colorado Experiment Station bulletin 451 (9).

Table 1.—Importance of sugar beets in northern Colorado.

<table>
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<tr>
<th></th>
<th>1914</th>
<th>1915</th>
<th>1921</th>
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<tbody>
<tr>
<td>Number of farms studied</td>
<td>216</td>
<td>182</td>
<td>150</td>
</tr>
<tr>
<td>Number with beets</td>
<td>190</td>
<td>153</td>
<td>119</td>
</tr>
<tr>
<td>Percentage with beets</td>
<td>88.0</td>
<td>84.1</td>
<td>79.3</td>
</tr>
<tr>
<td>Percentage of crop area in sugar beets:</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Owners</td>
<td>17.4</td>
<td>10.4</td>
<td>18.2</td>
</tr>
<tr>
<td>Tenants</td>
<td>23.5</td>
<td>23.7</td>
<td>18.9</td>
</tr>
<tr>
<td>Average yield per acre of sugar beets; tons:</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Owners</td>
<td>15.1</td>
<td>14.0</td>
<td>15.4</td>
</tr>
<tr>
<td>Tenants</td>
<td>15.7</td>
<td>14.7</td>
<td>16.2</td>
</tr>
</tbody>
</table>

All records used for the years 1922 to 1936 showed 78.8 percent of the farms studied growing sugar beets.
If one may judge from these earlier records, the importance of sugar beets and the average yields on the farms studied are representative of the situation in the same sections of northern Colorado. If one includes the entire Platte Valley of northern Colorado, it may be concluded that the farms in this study, in contrast to the entire district, had slightly less area in beets, but better yields. This conforms to the general belief that these are better than average farms. Consequently, one would be justified in discounting the income shown for these farms before attempting to use them as typical of the entire northern Colorado irrigated area. If better than average farms are compared with sugar corporation income, it should be apparent that the average farm would not make so favorable a showing.

The farms included in this study varied in size from 80 to 400 acres. They included farms with and without winter feeding, tenants and owners, men who grew beets some years and did not grow them other years. In short, the variations were representative of conditions in the northern Colorado area in many respects. When all records for all years are considered, sugar beets furnished 25.8 percent of the gross receipts from all sources. The total cash crop receipts were 57.1 percent; the livestock receipts 41.1 percent; and miscellaneous receipts 1.8 percent. In 1925 sugar beet receipts amounted to 8.1 percent of all receipts due primarily to the effect of a spring drought on beet seeding and to the favorable potato prices that year. In 1928 sugar beet receipts again amounted to 8.1 percent due to the fact that many farmers did not grow sugar beets that year.

In 1926 sugar beet receipts were 38.2 percent of all receipts due primarily to a $2 increase in the contract price for beets and to the largest area per farm of any of the years studied.

The tenant farms in this study (included in the figures just given) had 20.7 percent of all their receipts from sugar beets. Their lowest percentages were 12.1 in 1925 and 12.7 in 1928. The highest percentage was 40.7 in 1926.

Sugar beets have an important place in the organization of these farms. It is because of the importance of this crop, and because of the interest that has become apparent at some points, that this analysis has been made. Naturally, it would require revamping of the entire farm organization to shift permanently to other crops. It would be preferable to make minor adjustments that would retain the sugar beet industry rather than to discard it entirely. Abandonment of the crop should be made only after a careful analysis which could show that the net income of the farm was improved by the change. This is largely a private matter.
Earnings Made by Cooperating Farmers

During the years 1922 to 1936, inclusive, the records show that as a 15-year average the combined income of all farms studied, whether operated by owners or by tenants, amounted to $13.87 per acre of crops. Landlords made earnings of $10.19 per acre of crops. This is not a figure which can be compared directly with the $7.88 landlord earnings per acre as shown on page 11 of Colorado Experiment Station bulletin 451 (9). The difference arises from the fact that crop sales in this case were shown for the year the crop was grown, regardless of the date the crop was sold, while page 11 of

![Dollars Graph]

Figure 5.—Net earnings from all sources per acre of all crops on Weld County cooperating owner farms.
bulletin 451 shows the farm income with inventory changes. Also, a few farms are included in one table which were not included in the other.

During these 15 years, the investment on each farm was handled as follows: The farmer's estimate of the value of real estate, machinery, and livestock was secured at the start of each farm record. Each year new purchases of equipment were added, and depreciation was deducted on improvements, equipment, and work stock. No attempt was made to adjust farm values from year to year in accordance with market quotations. The values originally given by the farmers were close to prevailing market prices at the time taken, or represented actual purchases. The 15-year average shows $256 as the average investment of all farms per acre of crops. The landlord's investment was $219 per acre of crops. These values may be higher than would prevail generally in the irrigated areas.

![Dollars](figures)

**Figure 6.**—Net earnings from all sources per acre of all crops on Weld County cooperating tenant farms. Above the zero line, unshaded bars represent tenant income, shaded bars landlord income. Below the zero line, black bars represent tenant loss.

With these comparative figures, all farms showed earnings of 5.42 percent on their investment as a 15-year average, while all landlords showed 4.65 percent earned on their investment. These percentages compare quite closely with earnings reported on farms in other parts of the United States, although the valuations in this area are
higher than the general level of land values throughout the irrigated area.

**Cost of Producing Sugar Beets**

Complete data were secured on these cooperating farms during the years 1922 to 1931, inclusive, and on a few farms for 1932 and 1933. Since 1933 no labor or material data have been secured, making it impossible to report on sugar beet costs since 1933.

Table 2 summarizes the yearly average costs for sugar beets for the 12 years 1922 to 1933. As previously stated, these farms produced better yields per acre than the Colorado state average. Line 5 shows the average yield on these few farms. Line 17 shows the Colorado average sugar beet yield. Line 19 shows the yearly variable costs of producing beets which are directly associated with yield; these costs include contract topping, hauling to the beet dump, and manure charges. The 12-year average for these items was $2.00 per ton. By reducing the actual reported operating and total costs as shown in lines 12 and 14 by the amount of these variable costs, to bring the costs in line with average state yields, a calculated operating and total cost was secured for the average Colorado yield. These costs are shown on lines 21 and 22. The meaning of these costs is as follows: Assuming that farmers had followed the same practices which they did follow, and had secured 12.18 tons per acre rather than 15.17 tons, then their costs would have been reduced because of less contract labor, less hauling, and less fertility removed. Obviously, this does not assume that all farmers in Colorado followed identical practices in producing sugar beets. In fact, it is generally conceded that farmers in this area studied do not plow as large a proportion of their land as is customary in some sections of the state. Colorado Experiment Station bulletin 353, page 38 (10), in commenting on this fact, indicates that $4.39 per acre should be added to the 1926 costs in order to cover costs of plowing the entire area. Similar analysis has not been made for other years. However, a comparison between plowing costs for sugar beets and for potatoes for the entire period studied indicates approximately $2.12 greater plowing cost per acre for potatoes. If this $2.12 were added to the sugar beet costs, these costs would be equivalent to 17 cents per ton for the average Colorado sugar beet production. If the “sunk” costs on abandoned acreage, amounting to 3 cents per ton, be added, it is apparent that the calculated Colorado costs shown on lines 23 and 24 might be at least 20 cents per ton lower than could be expected. This would give $5.36 and $6.49 per ton, rather than $5.16 and $6.29 as shown for the 12-year average, lines 23 and 24.

The costs in table 2 for the years 1928, 1932, and 1933 are based upon data from so few farms that their value is questionable, except
for the fact that data from these same farms occur in the data for other years and their costs are calculated upon the same basis.

Any "average" cost is valid for the farms and for the conditions which obtained during the period when the cost data were collected. It should not be assumed that these costs represent conditions elsewhere in Colorado. The calculations merely indicate approximately the cost in this area if yields were similar to state-wide yields.

The United States Tariff Commission, in report 73 (11), shows for the 3 years 1929 to 1931, inclusive, that the farmer's cost of producing a ton of beets, for the entire United States, was $5.485; and on page 53 the cost at Greeley for 1930 was reported as $4.50 and for 1931 $5.64, with 16.81 tons and 11.52 tons per acre for the 2 years.

A simple average of the costs on line 24 for the 3 years 1929 to 1931 is $6.33 and on line 16 is $5.57. The Tariff Commission cost of $4.50 at Greeley for a 16.81-ton yield compares to table 2, 1930 cost of $5.36 for a 16.12-ton yield, and the 1931 Greeley cost of $5.64 for a 11.52-ton yield compares to table 2, line 16, cost of $5.08 for 13.77 tons. The calculated cost for a Colorado yield of 11.3 tons in

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**Figure 7.**—A comparison between contract sugar beet labor and all work performed by farmers. Unshaded bars represent the value per acre of all work on sugar beets performed by farmers with complete cost records. Shaded bars represent the contract labor per acre on the same farms.
1931 (line 24) is $5.82. When the effect of yield upon variable cost and final cost per ton is considered, these different studies show reasonably close agreement.

**Contract Labor Costs**

During the years 1922 to 1933, inclusive, the actual contract labor paid by the cooperating farmers was $20.84 per acre of beets. It varied from a low of $12.09 in 1932 to $26.33 in 1926. During these same years, the value of all work done by the farmers and their horses and equipment averaged $19.46 per acre.

![Graph](image)

**Figure 8.—Contract beet labor on Weld County cooperating farms. Unshaded bars represent contract labor as a percentage of the value of the sugar beet crop. Shaded bars represent contract labor in terms of dollars per acre.**

Using financial records to carry through the year 1937 and making an estimate for the year 1938, the 17-year average contract labor cost per acre was $20.97, or 20.95 percent of the value of the beets during these 17 years. In 1937 the contract labor cost apparently rose to 28.18 percent of the value of the crop, which was the highest for any of the 17 years (assuming $5.75 per ton as the final price of beets in 1938 and 18.05 tons per acre for the yield).

There is some variation in actual contract rates for sugar beet labor in northern Colorado. However, data assembled by sugar company officials appear to indicate that topping is approximately one-half the total when the yield is 15 tons per acre. For the 12 years
1922 to 1933, inclusive, the application of these standard labor contracts to the actual tonnage on the cooperating farms shows a topping rate per ton varying from $0.45 in 1933 to $0.84 in 1927 and averaging $0.71 per ton. During these same years, the actual cost per ton for hauling beets to the beet dump varied from $0.35 in 1933 to $1.08 in 1928, with an average of $0.69 per ton.

The striking thing in these comparisons is the close agreement between farmer costs and contract labor costs, either for harvesting or for the entire direct labor. No material costs are included in this comparison. They are obviously in addition to the work costs.

The low cost of hauling beets in 1933 reflected a situation where men with motor trucks were working for little more than their out-of-pocket costs. Since that time, hauling costs per ton have increased until they apparently cover truck replacement and all other costs. Since the Economics Section has not kept cost records since 1933, local practice must be relied upon. In the fall of 1938, cooperating farmers were paying from 50 to 65 cents per ton for hauling sugar beets. The customary rate for hauling wet pulp to farms in winter has been 50 cents per ton for some years. This would indicate a hauling cost slightly lower than in the early 20's but higher than that of 1932 and 1933.

What changes in costs have occurred since 1933? Unfortunately, there are no detailed cost figures available from which to secure an answer. Records are available, however, on a few farms which show

Figure 9.—Speeding up the hauling of sugar beets. The horse-drawn wagon in the left background has been loaded with beets while the automobile truck was being used to haul a load of beets to the beet dump. Now its load of beets is being added to those in the automobile truck for the next trip to the dump.
the cash farm expenses year by year through 1937. These have been calculated per acre of all crops to give some clue as to the possible trend of individual crop costs. The individual costs merely show the results from analysis and distribution of the total farm expenses. Changes in cropping systems would, of course, affect the results. No correction has been attempted for this factor.

Records are available for four farms continuously from 1922 to 1937. Using the average cash farm expense per crop acre for the 12 years 1922-33 as a base, the 1937 cash expense per crop acre on these four farms was 103.4 percent of the average for the 12 years. If 1936 and 1937 are combined, the average for these 2 years is 113.5 percent of the 12-year average. If the 1931-33 average cash expense per crop acre for the four farms be used as a base, the 1937 expense is 121.1 percent of the 3-year average. There are three other farms whose records can be used continuously from 1931 to 1937. Adding these to make a total of seven farms, the 1937 cash expense per crop acre was 126 percent of the 1931-33 average.

These are rather meager data from which to draw conclusions. They indicate that farm expenses in 1936-37 were higher than they were in 1922-33. Possibly it would be safe to modify this to read, "Apparentl farm expenses per crop acre in 1936-37 were not less than they were in 1922-33." This is an agreement with a recent statement from Illinois that "farm expenses for power and labor on tractor farms are as high per acre as on horse farms" (1935-36 Ann. Rpt. Ill. Agr. Exp. Sta.).

No depreciation or allowance for the value of the operator's labor has been included in these calculations, although depreciation of tractors and tractor equipment in the later years were quite heavy. Neither has any added expense for horse feed in the early years nor credit for its absence in later years been included. The record has been limited to "cash farm expenses other than winter feeding." The data indicate that the costs calculated for 1922-33 can be used without any apparent or excessive error as an indication of 1936-37 costs on the farms studied.

Variations in Sugar Beet Costs

As suggested previously, the records available for analysis are too few to permit of any but the simplest direct analysis. In Colorado Experiment Station bulletin 451 (9), some attention was given to the possibilities of using long-time average labor and material requirements as the basis for studying the possible effect of arbitrarily changing the conditions of production. In bulletin 451 the 1938 situation as to contract labor on sugar beets was used, rather than the long-time average of contract labor costs. As a result, the variable
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<th>1923</th>
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<td>45.14</td>
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<td>5.30</td>
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<td>5.98</td>
<td>4.14</td>
<td>4.04</td>
<td>5.44</td>
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<td>Colo. av. sugar beet yield, ton</td>
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<td>12.15</td>
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<td>12.60</td>
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<td>1.08</td>
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<td>6.42</td>
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<td>5.82</td>
<td>4.82</td>
<td>4.52</td>
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</tr>
</tbody>
</table>

*This is based upon the area planted. In 1925, 142.9 additional acres were abandoned on farms where no beets were harvested. Using this additional area, the abandonment for the 12 years was 10.15 percent in place of 7.15 percent. The lost or "sunk" costs on these 142.9 acres amounted to $1,594.82, or $0.40 per acre harvested, or 3 cents per ton harvested.
costs per ton of beets used in bulletin 451 were the equivalent of $2.16. As shown on line 19 of table 2, the variable expense per ton for the 12 years 1922 to 1933, inclusive, was $2.00 per ton. The 1938 labor contract for a 15.3-ton yield would show $0.88 per ton as the topping contract cost. The 12-year average was $0.71. The difference of $0.17 accounts for $0.01 more than the difference in the two rates, which is primarily a mathematical difference in handling the figures in the averages. The use of the higher figure partly offsets the lower cost for other items as shown on p. 14 (see note a, p. 57).

Prior to 1932, labor contracts included a flat charge per acre for topping all yields up to 12 tons. Above 12 tons there were some variations from year to year, either as to the exact tonnage above which extra nav would be given or as to the extra payment per ton for the additional yield. The payment fluctuated between 50 and 65 cents per ton until 1938, when an 80-cent rate was established for all production above 12 tons per acre. Consequently, it is not literally correct for the years 1922 to 1933 to consider topping as a uniformly variable cost per ton. It cost a farmer as much to hire topping for a 6-ton yield as for a 12-ton yield in any one year. The actual contract topping cost per acre for a 12-ton yield varied between years from a low of $8.00 per acre in 1922 to $11.00 per acre in the years 1927 to 1930, inclusive. The operating cost and total cost per ton for all yields below 12 tons, as shown in table 3, are lower than would be the case if topping were handled as a flat rate per acre up to 12 tons.

But the 1932 labor contract and the 1938 contract had a variable topping charge for all yields. Since this is the apparent tendency, table 3 has been prepared to show the relationship between the yield per acre of sugar beets and the total of fixed and variable costs per acre and the resultant cost per ton of beets produced. Since this table was prepared by the use of a uniform variable expense of $2.16 per ton of beets it naturally will not agree with the actual expense on an actual farm in any individual year. It does reflect a normal tendency and may be considered as reasonably accurate under average conditions as found during the years 1922 to 1933, with the one modification that 1938 labor contract costs were used instead of the 12-year average. Under these assumed conditions, a yield of more than 14 tons per acre would be necessary in order for a $6.00 per ton price to cover the costs of production; and approximately 20-ton yields would be necessary with a $5.00 per ton price. These, again, reflect average conditions. Since beet prices also vary with the sugar content, individual farmers may have satisfactory prices because of high sugar content, while the average price that particular year was below the average cost of production.
The operating cost has been calculated after eliminating the flat $8.00-per-acre land use charge included in the total costs. These "operating costs" include interest on investment in horses and equipment, since hour rates for all work operations have been calculated on this basis. The interest charge on horses and equipment is a comparatively minor part of operating costs. A test calculation at several yield levels shows it to be slightly more than 2 percent of the operating cost.

One further caution deserves attention before the cost per ton shown either in table 2 or table 3 is used as a guide. Farmers produce many crops. The costs of direct labor and materials used on these crops are comparatively easy to calculate, but many joint costs and general farm expenses are necessary in managing a farm. Charging an individual crop for these items becomes more or less arbitrary. Further than that, many crops need for their best growth a certain soil condition which can be maintained only by growing other crops. This introduces the whole problem of a rotation. If to grow one crop another must be grown, the cost of the entire rotation becomes more significant than the cost of an individual crop.

This study has been prepared with these broader problems in mind. The costs shown in tables 2 and 3 may be useful as guides to the choice between sugar beets and some other crop which competes directly with sugar beets for a similar place in the crop rotation, as, for example, potatoes, corn, or beans, or as an indication of the effect of yield upon cost per ton; but it is an unsafe guide to help arrive at the comparative cost and return to the farmer as compared with the processor. For such a comparison, the farm as a whole should be compared with the sugar company as a whole.

Again, such costs are "historical." They cannot anticipate such changes as the need for new items of expense such as spraying or the introduction of new methods and equipment such as tractor equipment. It would be a study in itself to explore these items and test their effects.

These average costs cannot adequately handle such unknowns as the risk of loss from hail or drought. They, at best, stand as statements of historical fact on a few farms in a comparatively small area.

All these things should be kept in mind as one considers these brief cost comparisons.

Sugar Beets on Tenant Farms

From 50 to 65 percent of the farms in the northern Colorado sugar beet producing areas are operated by tenants; consequently, a statement showing total costs is not sufficient to assist tenant farmers to study their costs. Landlords furnish the land and seldom pay any
Table 3.—Effect of sugar beet yield upon cost per acre and cost per ton.

<table>
<thead>
<tr>
<th>Yield</th>
<th>Total costs per acre</th>
<th>Total cost per ton</th>
<th>Operating cost per ton*</th>
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<td>Dollars</td>
</tr>
<tr>
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<td>109.58</td>
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*Calculated after omitting the $8-per-acre uniform “use of land” charge from total costs.

Figure 10.—Effect of yield of sugar beets per acre upon total cost per ton, based upon data in Colorado Experiment Station bulletin 451.
other expenses in connection with sugar beet production. Consequently, the tenant will have all the variable expenses. Colorado Experiment Station bulletin 451 (9), page 20, shows the tenant's and the landlord's fixed and variable expense per acre under the customary one-fourth share rent. If the landlord had more than one-fourth of the crop, the rates per ton for the tenant would be at higher amounts for his share of the crop.

The tenant's variable expenses were $2.91 per ton of the tenant's share up to 12 tons total yield, and $2.78 per ton of the tenant's share for all additional yields above 12 tons total. The tenant's fixed costs were $39.08 per acre, and the landlord's fixed costs were $16.50 per acre, including $8.00 for use of land.

Figure 11.—Effect of yield of sugar beets per acre upon total expense per acre, based upon data in Colorado Experiment Station bulletin 451.
Figure 11 shows the effect of yield upon the total cost for yields from 5 to 25 tons per acre.

Figure 12 has been prepared with a flat $6.00-per ton price for sugar beets to show the possibilities of net income to tenant and landlord with a one-fourth share rent. It is apparent that the tenant suffers more loss from low yields. If the share rent was higher than one-fourth, the tenant's loss would be increased.

![Graph showing yield per acre and net income](image)

**Figure 12**—Effect of yield of sugar beets per acre upon net incomes of tenant and landlord at a price of $6 per ton.

Figure 12 is based upon total costs, including 6 percent interest on tenant's equipment and a uniform charge of $8.00 per acre for the landlord's use of land. As stated previously the interest on horses and equipment amounts to approximately 2 percent of the costs other than use of land. Consequently, the situation for the tenant would be improved very little, as shown by figure 12, by eliminating interest on his investment. The landlord's costs would be cut nearly in half by eliminating interest, so that with a one-fourth share of the beets the landlord would show some return for his investment when the total yield rose above 6 tons per acre.

**The Colorado Sugar Beet Factory**

The previous discussion has dealt with the financial records from a few farms and with the relative importance of the sugar beet in the state. The manufacture of sugar is equally important. The results of factory operation are published in the annual reports of the sugar companies. The "Manual of Sugar Companies" (12) will
be used as a source of certain data, supplemented by statistics from the 1938 "Agricultural Statistics" (13).

Company reports deal with the entire company operation. The companies which handle the greater part of the sugar beet business of the West operate in more than one state; consequently, it is necessary to approach an analysis of sugar company operation from a slightly different angle than can be used in discussing individual farms.

**Companies Studied**

The five sugar companies—the Amalgamated, American Crystal, Great Western, Holly, and Utah-Idaho—were selected for special study. In the 15 years 1922 to 1936, inclusive, those five companies manufactured 73.2 percent of all the beet sugar produced in the United States for that period. The net income reports are complete for these five companies, except for the smallest company of the five for 2 years, during which sugar production was reported but no income was reported. After some comparisons, it seemed to be desirable to include this company for the entire 15 years and to assume that its earnings for those 2 years were zero.

Since 73.2 percent of the entire United States beet sugar production was included in the reports of the five companies, it seemed reasonable to assume that production within these companies was fairly representative of conditions generally.

In the 15 years 1922 to 1936, the total production of beet sugar for the entire United States amounted to 282 pounds of sugar per ton of sugar beets (13). For the same 15 years, Colorado statistics (2) show a production of 283 pounds of sugar per ton of sugar beets. This close agreement suggests that the five company reports might be applied to Colorado with a comparatively small error. (See table 6 for a comment on sugar per ton of beets; see also note b, p. 57).

**Sugar Company Income**

During the 15 years, if the early results be used as the basis of a simple average, the five-company average becomes $0.503 net income per bag of sugar.

During these 15 years, there was considerable variation in sugar production, both in the amount of sugar per ton of beets and in the total United States and Colorado production. Under these circumstances, it is desirable to analyze the data in such a way that one can determine what happened from year to year. If the net income per bag, as an average for the five companies, were calculated each year and the result applied to the Colorado average sugar per acre each year based upon United States average sugar per ton, the simple
average of these yearly calculations would show a five-company net income per acre of sugar beets of $16.46 for Colorado as a whole and $20.03 per acre for the beets on the cooperating farms. This $20.03 would compare directly with the $13.87 15-year net earnings per acre of crop land for the cooperating farmers.

Sugar Company Investment

The farmers included in this study reported their valuations at the beginning of the study. They gave their estimate of the probable life of their buildings, machinery, and power. On the basis of their estimates, the valuation was depreciated yearly during the period of the study, but no revision was made in the original estimates as to the property valuations. Valuation is a highly controversial matter, not within the scope of this study. The Experiment Station policy was to accept the farmer's valuation without question. Presumably, it was rather closely related either to actual cost or present market valuations. During the period of the study, any new investment was entered at cost.

An inspection of the balance sheet statements of the five companies as shown in the Manual (12) would indicate a very similar procedure on the part of sugar company accountants. There was no radical change in plant valuation during the depression, and depreciation was deducted every year or shown in the statement.

Accordingly, the farmer's depreciated investment in real estate, machinery, and livestock was used to find his investment per crop acre yearly; and the five-company depreciated investment in "plants,
real estate, and equipment” was similarly used. No use was made of the farmer’s investment in cash, feed, supplies, or crops held for sale. These same items were ignored in the five-company balance sheet statements. No deductions were made for farmer debts or mortgages; none was made for company liabilities. The result was a somewhat comparable investment in “productive plant” for both farmer and sugar companies (see note c, p. 57).

As previously stated, the farmer’s investment was expressed in relation to the area of crops. Any statement as to investment per acre for farmers and sugar companies, to be of value, should relate to comparable items. It is comparatively easy to show a farmer’s investment in relation to his crop area. There is very little change in the crop area of a farm from year to year. But what is the crop area that should be used as a basis for analyzing sugar company investment? If the actual number of acres of sugar beets each year were used, it would result in a highly variable figure, since the actual beet area is never twice the same from year to year. The largest beet area ever grown might be used. It would come closer to being similar to a farmer’s crop area, because a farmer’s investment in equipment and power has been built up with the area to be farmed in mind. Or, if the data were available the entire farm area contributory to the sugar factories might be considered as in a rotation suitable for sugar beets. If one-fifth of the land should prove to be the maximum safe proportion, then one-fifth of this entire land area tributary to a factory might be used as a basis for distributing the factory investment.

Or an arbitrary ratio might be used, such as “investment per bag of sugar produced,” and this, in turn, arbitrarily calculated on an acre basis. For example, the five companies during the 9 years 1928 to 1936 had plant investments that varied from $2.81 in 1933 to $4.96 in 1928 per bag of sugar produced. During these same years, the bags of sugar produced per acre in Colorado based upon Colorado sugar produced per ton varied from 38.18 in 1933 to 42.94 in 1928. On this basis the five-company investment, calculated to a sugar beet area basis, would vary from $107.32 to $212.98, with a 9-year average of $132.39.

If the total plant and equipment investment of the five companies for the 9 years 1928 to 1936 be divided by 73.2 percent of the entire sugar beet area of the United States for the same 9 years, the result shows $127.58 company investment per acre of sugar beets.

If one uses the 1933 United States area of sugar beets, during which year the five companies produced 73.36 percent of all the beet sugar in the United States, then the five-company investment per acre of sugar beets would be $93.90.
Comparable data for the period beginning 1922 were not quickly available. However, one of the five companies made an investment statement for the year 1922 which shows an investment per acre of beets ranging from $78.44 in 1921 to $151.00 in 1922, based on investment per bag of sugar. The 9-year investment (1928 to 1936) for this same company was $105.95 on a Colorado basis and $128.08 per acre of beets, based on the higher sugar production on the cooperating farms.

A witness at a Congressional hearing in 1937 (14) presented

Figure 14.—Cooperating farmers' real estate and equipment investment per acre of all crops and corporation plant investment per acre of sugar beets.
from Dun and Bradstreet’s reports for 1932 a table showing the book value of all beet mills in operation as $116,000,000. The United States Department of Agriculture reported 764,000 acres of beets harvested in 1932 and 983,000 in 1933 (13). On the basis of these two areas, the book value per acre of sugar beets of all the factories in the United States would be $152 in 1932 and $118 in 1933.

These calculations indicate the wide variation in results which would follow the selection of any arbitrary basis for determining company investment in relation to sugar beet area. Because of the longer period included, the five-company plant investment per acre of beets, based on the investment per bag of sugar for the 9 years 1928 to 1936, inclusive, will be used. This was $132.39. If the “total assets” or “net assets” of the five sugar companies were used, this figure would be increased to approximately the farmer’s investment per acre as shown for the cooperating farmers.

Farmer vs. Factory Earnings per Crop Area

With the previous discussion in mind, it may be desirable to summarize the data and reduce them to one contrasting figure. The farmers who cooperated in this study had an investment in real estate, equipment, and farm livestock (mostly horses) which averaged $255.96 per acre of crops as a 15-year average. On this investment they earned $13.87 per crop acre.

The five sugar companies, for the 9 years 1928 to 1936, had an investment in real estate, plant, and equipment that averaged $132.39 per acre of sugar beets on the basis of the sugar production in Colorado for those same 9 years. If the net assets of the five companies are used as the basis for comparison, the five companies earned $16.46 per acre (Colorado sugar production basis) on net assets of $217.00 per acre of sugar beets.

Factory Expense in Sugar Production

Details showing factory production expenses for the 15 years 1922 to 1936 are not quickly available. However, there are some short-time samples of these years which permit of some analysis.

The United States Tariff Commission report (11) includes some factory production costs for the years 1929 to 1931, inclusive. During those years the Commission studied beet sugar factories which processed from 90 to 93 percent of all the beet sugar produced in the United States in the 3 years.

From tables found in this report, the following summary has been made.

On page 55 of the report (11), the statement was made that the average price paid to farmers for their sugar beets during the years
Table 4.—Factory cost of producing beet sugar, 1929 to 1931.

<table>
<thead>
<tr>
<th>Item</th>
<th>Sugar company expense per 100 pounds sugar</th>
<th>Dollars</th>
</tr>
</thead>
<tbody>
<tr>
<td>Freight and hauling beets to factories, including</td>
<td></td>
<td>.480</td>
</tr>
<tr>
<td>receiving expense and material</td>
<td></td>
<td>1.293</td>
</tr>
<tr>
<td>Conversion cost within the sugar mill</td>
<td></td>
<td>.383</td>
</tr>
<tr>
<td>Interest on investment @ 6%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Subtotal</td>
<td></td>
<td>2.156</td>
</tr>
<tr>
<td>Less credits deducted (page 88 of report)</td>
<td></td>
<td>.250</td>
</tr>
<tr>
<td>Net factory cost per cwt.</td>
<td></td>
<td>1.906</td>
</tr>
</tbody>
</table>

1929 to 1931 was $6.705 per ton, which amounted to $2.481 per hundredweight of sugar for beets with 272 pounds of sugar per ton. The further statement was made that these beets cost the farmer $5.485 per ton or $2.022 per hundredweight of sugar.

On page 76 the Commission reported (11) that the average cost of transporting sugar from the factories to market was $0.496 per hundredweight. This, however, should be considered as a marketing cost rather than a production cost.

The $1.906 net factory cost per hundred pounds can be compared to the $2.022 reported farmer’s cost. It would seem reasonable to assume from this report that the costs incurred by farmers and by sugar factories were nearly equal, on the basis of sugar content of beets.

A witness at a Congressional hearing in 1934 submitted a statement of the “estimated expenditures of beet sugar manufacturers of the United States during the campaign of 1933-34” (15). These expenditures apparently included all selling expenses and amounted to $122,480,000, including an estimated 55 million dollars paid to farmers for beets. The revised reports of the U. S. Department of Agriculture (13) show the final payment to farmers as $5.13 per ton for the 1933 crop of 11,030,000 tons from 983,000 acres of beets.

Table 5.—Factory expenses for the 1933 U. S. beet sugar crop.

<table>
<thead>
<tr>
<th>Item</th>
<th>Per acre of beets</th>
<th>Per ton of beets</th>
</tr>
</thead>
<tbody>
<tr>
<td>Payment to farmers for beets†</td>
<td>$57.58</td>
<td>$5.13</td>
</tr>
<tr>
<td>Payment for freight</td>
<td>$31.95</td>
<td>2.84</td>
</tr>
<tr>
<td>Payment for all factory and other labor</td>
<td>$15.93</td>
<td>1.42</td>
</tr>
<tr>
<td>Payment for supplies and all else</td>
<td>$20.77</td>
<td>1.86</td>
</tr>
<tr>
<td>Total</td>
<td>$126.23</td>
<td>$11.25</td>
</tr>
</tbody>
</table>

†Substituting the revised U. S. D. A. statement for the amount paid to farmers.
or $56,599,000. Using this in place of 55 million dollars permits the following analysis (see table 5, also note d, p. 57).

These are nation-wide calculations. For individual states or individual sugar companies, quite different results might be expected. However, for that year the payment of $1.00 to farmers was accompanied by the payment of $1.19 to all other agencies and to labor. These other payments were $6.12 per ton, or $68.65 per acre. It is not possible to separate the payment of selling expenses in this analysis, but apparently in 1933 company expenses were somewhat larger than the payments they made to farmers. The Tariff Commission report (11) indicated that the company expenses were somewhat less.

Analysis of the annual report of one of the five sugar companies for the years 1936 and 1937 indicates that their factory expenses, when translated to a "per ton of beets" basis, were lower one year and higher the other year than the average price paid to farmers for sugar beets in Colorado in these same years.

While the samples of cost just reviewed give some valuable indication as to probable cost of processing sugar beets, there remains another method of analysis which might be used as a check on the sample. The net price per bag of sugar must pay for all costs per bag and leave a profit, if any.

Since prices of sugar for the entire beet sugar industry are not readily available, the northern Colorado price will serve for purposes of illustration. Table 6, using the average pounds of sugar per ton as reported for the entire state of Colorado (12) and for the United

![Graph](image)

Figure 15.—Pounds of sugar per ton of beets calculated from government reports (2) (13). Unshaded bars represent Colorado sugar per ton of beets, shaded bars United States sugar per ton of beets.
States (13) shows the equivalent factory cost per hundredweight of sugar and per ton of beets. Separate calculations are shown for Colorado and for the United States because the Colorado figures of "pounds of sugar per ton of beets" apparently are affected by interstate shipments during the factory campaign, while the United States figures avoid any possible error from interstate shipments (see note b, p. 57).

If the actual sugar production per ton of beets in northern Colorado were available and used in these calculations, some further differences would be found. Also, the use of the entire net income affects the factory cost per bag of sugar.

The 11-year calculated cost of $1.657 per bag of sugar and the 5-year figure $1.269, for northern Colorado, estimated from the United States sugar per ton, might be compared with the "conversion cost" of $1.293 shown in table 4.

The question frequently arises. What is the effect of the price of sugar upon factory and farmer? When farmers were paid a flat price per ton for their beets, the answer was comparatively easy, as the entire effect fell upon the factory. The "net per bag" by years would measure the margin on the sugar price.

With a sliding scale of payment, the answer is not so easy. Each reduction in price would mean a lower price per ton of beets and would need a new calculation. For example, assume a $0.40 change in the price per ton of beets for every $0.25 change in the price of sugar (this is close to the terms of the 1938 northern Colorado contract). Since the 1937 net per bag for the Great Western Sugar Company was $0.772, it would appear from the record that a $0.75 reduction in sugar price would absorb about all the company's net income. However, such a reduction would take $1.20 from the price paid farmers, so that sugar purchased in a ton of beets would cost $3.56 for the ton, or $1.20 less than the $4.76 average northern Colorado price from the factory as paid to farmers. The assumed $0.75 reduction in sugar price, then, would apparently decrease the total cost of sugar by $0.410; if the United States figure of 292.4 pounds be used this would result in a revised net income per bag of $0.432 in place of the actual $0.772. This is a reduction of $0.340 in the net income per bag of sugar, while the sugar price fell $0.75 and the farmer's price had fallen $1.20 per ton.

In these calculations the entire corporation income is set against the sugar produced. Actually, some profit or loss was obtained from other activities. If these could be eliminated, it would obviously increase or decrease the calculated factory cost per bag of sugar. No interest on the plant is included in these calculations; hence, the
$1.657 factory cost per bag of sugar for the 11 years 1922 to 1932, inclusive, (table 6), should have an interest charge added to bring it up to the Tariff Commission costs (table 4). Using the United States pounds of sugar per ton of beets at $1.657 per bag equals $4.54 factory cost per ton of beets for 1922 to 1932, inclusive, which could be compared with the 12-year "operating cost" on table 2 for farmers of $4.54 per ton.

All three of these sample studies and the special calculation for one company tend to group around one interesting point: The factory expenses when reduced to a per-ton basis are quite similar to the price paid to farmers for their beets, or to the "cost of producing beets."

Table 6.—Calculated factory cost per bag of sugar, northern Colorado.*

<table>
<thead>
<tr>
<th>Item</th>
<th>11-year average</th>
<th>5-year average</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1922-32</td>
<td>1933-37</td>
</tr>
<tr>
<td>Colorado:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pounds sugar per ton of beets.............</td>
<td>272.3</td>
<td>316.5</td>
</tr>
<tr>
<td>Calculated factory cost per bag of sugar..</td>
<td>$1.643</td>
<td>$1.375</td>
</tr>
<tr>
<td>Equivalent cost per ton of beets..........</td>
<td>$4.47</td>
<td>$4.35</td>
</tr>
<tr>
<td>United States:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pounds sugar per ton of beets.............</td>
<td>273.8</td>
<td>297.4</td>
</tr>
<tr>
<td>Calculated factory cost per bag of sugar..</td>
<td>$1.557</td>
<td>$1.269</td>
</tr>
<tr>
<td>Equivalent cost per ton of beets..........</td>
<td>$4.34</td>
<td>$3.77</td>
</tr>
</tbody>
</table>

*The Colorado Statistics (2) show for the years 1925-34 a sugar content which is 96.1 percent of that for the U. S. A. for the same years. Data were not available to permit the use of this factor for the analysis for all the years included in this table. This percentage comparison was based upon "the tons of beets sliced." The pounds of sugar per ton in this table are in every instance based upon "tons of beets purchased."

Friction Points in the Colorado Sugar Beet Industry

There are several points regarding which discontent has been most pronounced during recent years. The events of the 1938 season have tended to crystallize sentiment on several of these points. They deserve careful study. They will be reviewed briefly, using the same order for discussion that occurs in growing the crop.

Contract Labor

Beet workers have full-time employment during blocking and thinning in June and early July and again during the beet harvest, which is seldom more than 6 weeks in duration during October and early November. Part-time employment is available during July for beet hoeing. The blocking and thinning and beet-topping operations
are of such a nature that farmers, their families and their regular workers are not interested in performing them. They would classify as hand labor, while present-day farming is increasingly mechanical. For this reason, "day laborers" or "hand workers" are the only ones available.

![Image of workers in a field](image)

Figure 16.—Thinning sugar beets.

Inevitably this has led to misunderstanding and sentimentalism. The present trend is toward development of mechanical devices which will relieve workers of the physical toil of these operations. This will tend to attract other groups of workers and may lead ultimately to a considerable reduction in the total man-hours required in sugar beet production. This will permit the working out of more satisfactory year-long employment and should reduce the public relief problems attendant upon the present highly seasonal employment for the contract-labor group.

The absence of hand-labor work on other crops and the lack of training of beet contract workers for use of mechanical equipment has handicapped this group of workers. Significantly, those workers who secure training with power equipment usually find some regular employment and abandon the hand-labor tasks. This suggests that the probable solution of seasonal employment will come from the introduction of labor-saving equipment for these operations.

What Is a Fair Contract Wage?

To answer this question satisfactorily requires a large volume of
facts showing actual contract payments, hours worked, and similar data for regular farm employees.

**Figure 17.**—Topping sugar beets.

**Figure 18.**—Comparative sugar beet harvesting costs. Unshaded bars represent contract topping costs per ton on farms with complete cost records. Shaded bars represent all costs per ton for hauling beets on the same farms.
L. A. Moorhouse (5) reported on the average hours of work for contract operations in 1914 and 1915. Since these are all hand work, there is little reason to suspect that the hours have changed significantly since the year this study was made. Any change might be toward a reduction in hours rather than an increase, due to some tendency to introduce cross-blocking and other aids. A recent study (16) confirms this possible reduction in hours.

As stated on page 17, the contract labor per ton of beets for topping during the years 1922 to 1933, inclusive, was $0.71 per ton on the farms with complete cost records.

Table 7 has been prepared to show total contract costs by years, with comparisons with the price of sugar beets.

Table 7.—Sugar beet contract labor, northern Colorado cooperating farms.

<table>
<thead>
<tr>
<th>Year</th>
<th>Yield per acre Tons</th>
<th>Contract labor per acre Dollars</th>
<th>Equivalent contract labor per ton Dollars</th>
<th>Northern Colorado price per ton of beets Dollars</th>
<th>Contract labor per ton as percentage of Colo. price per ton Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>1922</td>
<td>11.31</td>
<td>17.28</td>
<td>1.38</td>
<td>7.88</td>
<td>19.42</td>
</tr>
<tr>
<td>1923</td>
<td>15.32</td>
<td>21.17</td>
<td>1.38</td>
<td>8.19</td>
<td>16.85</td>
</tr>
<tr>
<td>1924</td>
<td>15.90</td>
<td>23.53</td>
<td>1.48</td>
<td>7.50</td>
<td>19.73</td>
</tr>
<tr>
<td>1925</td>
<td>13.08</td>
<td>19.37</td>
<td>1.71</td>
<td>6.10</td>
<td>23.57</td>
</tr>
<tr>
<td>1926</td>
<td>13.22</td>
<td>25.36</td>
<td>1.42</td>
<td>7.50</td>
<td>19.75</td>
</tr>
<tr>
<td>1927</td>
<td>14.82</td>
<td>24.56</td>
<td>1.66</td>
<td>7.40</td>
<td>19.14</td>
</tr>
<tr>
<td>1928</td>
<td>17.90</td>
<td>23.97</td>
<td>1.34</td>
<td>7.00</td>
<td>24.00</td>
</tr>
<tr>
<td>1929</td>
<td>13.26</td>
<td>25.57</td>
<td>1.85</td>
<td>7.00</td>
<td>24.00</td>
</tr>
<tr>
<td>1930</td>
<td>16.12</td>
<td>24.68</td>
<td>1.53</td>
<td>7.00</td>
<td>21.86</td>
</tr>
<tr>
<td>1931</td>
<td>13.77</td>
<td>18.09</td>
<td>1.31</td>
<td>5.50</td>
<td>23.82</td>
</tr>
<tr>
<td>1932</td>
<td>14.55</td>
<td>12.90</td>
<td>.83</td>
<td>4.76</td>
<td>17.44</td>
</tr>
<tr>
<td>1933</td>
<td>14.83</td>
<td>13.42</td>
<td>.90</td>
<td>4.76</td>
<td>18.95</td>
</tr>
<tr>
<td>1934</td>
<td>9.83</td>
<td>13.19</td>
<td>1.34</td>
<td>7.40</td>
<td>17.49</td>
</tr>
<tr>
<td>1935</td>
<td>15.78</td>
<td>18.96</td>
<td>1.20</td>
<td>7.05</td>
<td>17.02</td>
</tr>
<tr>
<td>1936</td>
<td>14.11</td>
<td>22.12</td>
<td>1.57</td>
<td>5.90</td>
<td>26.61</td>
</tr>
<tr>
<td>1937</td>
<td>13.32</td>
<td>24.48</td>
<td>1.84</td>
<td>6.53</td>
<td>28.18</td>
</tr>
<tr>
<td>Av. 1922-37</td>
<td>14.69</td>
<td>20.55</td>
<td>1.40</td>
<td>6.80</td>
<td>27.59</td>
</tr>
<tr>
<td>1938</td>
<td>18.05</td>
<td>27.64</td>
<td>1.53</td>
<td>5.75</td>
<td>26.61</td>
</tr>
</tbody>
</table>

1Actual plus 12c ton arbitrary.

Some further analysis may aid in an understanding of the problem.

A recent study (16) states that the hours of contract labor per acre for Colorado were 66.5 in 1915, 55 in 1930, and 53 in 1936. By using 66.5 hours, the 16-year average contract labor cost shown in table 7 becomes $0.309 per hour; if the 55 hours is used, the $20.55 per acre contract labor amounts to $0.374 per hour.
The detailed labor rates for man labor are available on these farms for the years 1922 to 1933. For these years the labor rate averaged $0.295 per hour.

The 1938 contract when applied to the 1938 crop on these cooperating farms, amounts to $27.64 per acre for an 18.05-ton yield, or $1.53 per ton, or 26.61 percent of the value of the sugar beets, if a $5.75 price per ton is used as an estimate of the final price (see note a, p. 57).

If the 16-year average relationship of contract labor to the value of a ton of beets be used, namely, 20.59 percent, it would require a total price from all sources of $7.43 per ton in 1938 for the farmer to give the same relative basis with labor that existed during the years 1922 to 1937, inclusive. This compares with a probable total price of $5.75.

The 1938 schedule apparently paid approximately 22 percent more than the actual contract payment for the same yield per acre during the years 1922 to 1937. (The 14.69-ton 16-year average yield would have a contract labor cost of $24.95, according to the 1938 schedule, while it was actually $20.55.) This increase, with no change in the hours per acre, would mean labor rates per hour for contract labor in 1938 somewhere between $0.375 and $0.455, if the 66.5 or 55 hours per acre were used as the basis of calculation. Assuming 250 hours of work per month as full employment for farm labor, this would be from $93 to $114 per month in contrast to farm wages of approximately $40 to $60 per month plus the value of board and farm privileges. The 12-year rate of $0.295 on the same basis would be $74 per month. The Colorado rate on October 1, 1937, was reported as $48.75 without board and $32.75 if board was furnished (13, p. 448).

The contract rates might be higher per hour than the wage for regular employment with some justification, because of the uncertainty of full-time employment. However, it is easy to overemphasize this condition. Due to the comparatively short time available for beet contract work, it is customary for members of the family of a beet contract worker to work in the field. The 16-year average shows $613 per contract as the average payment by the cooperating farmers for a 29.86-acre contract. This is more than $50 cash per month for the beet worker and his family. If average hours per acre are used (66.5 or 55 hours), it will be apparent that the total hours of work by the contract beet worker and his family will be from 1,600 to 2,000 for this $613, while the regular farm workers, in order to earn this income, will work an entire year, or from 2,500 to 3,000 hours.
The 1938 scale will give more than $755 per contract for the 1938 acreage on the cooperating farms.

In actual fact, contract beet workers secure additional income from day labor and other work in the community. No analysis of our data has been made to find what these additional payments might be. On farms with potatoes, the potato picking is frequently done by the family having the beet contract. These workers also cut potato seed in the spring and supply the day labor in haying.

Beet workers frequently have a garden, chickens, a cow, and some pigs. When all of these are added to the beet pay and the opportunity for other day work, it is apparent that an ambitious beet worker and his family can make very satisfactory wages for the 6-month period.

The difficulty in this assumption arises from the fact that the average area of sugar beets per farm is not so large as the 29.86 acres for the cooperating farmers.

If farmers have a small average area of sugar beets, it is apparent that some offsetting advantage must be offered the worker, either in an opportunity to combine the beet contracts on several farms under one family, or by the farmer paying what amounts to higher wages per hour worked in order to compensate for the reduced area handled. That is approximately the assumption back of the 1938 labor contract. It is apparent that a rigid contract with no chance of modification according to conditions on individual farms may prove to be just as unfair to the farmer as the former contract rates might be to some individual beet worker on a small beet acreage where little other work was available.

It has been said that beet-worker pay should be on a basis that would permit the head of the family to earn enough to support his family. That would be true if beet workers worked enough hours. Actually, regular laborers in northern Colorado work from 2,500 to 3,000 hours per worker per year, which is from four to five times as many hours as the average beet worker on 10 acres of beets. If this beet worker found other labor for all his spare time, he could show approximately 1,500 hours for the 6-month beet season. Then, if he remained in the community and secured winter work, he would approach the hours of the regular worker. Under these conditions, the head of the family could earn enough to support his family. But to assume that farmers should pay for from 450 to 665 hours of beet-contract work a wage sufficiently high to support a worker the remainder of the year is to shut one's eyes to economic facts. No industry can pay high wages for short-time employment. Workers,
just as farmers, must either seek opportunities for year-long employment at average wages or retire during the season of non-employment to some area where living costs are very low.

This report does not cover some of the social aspects of this question. It seems evident, however, that much could be said in support of a change in payment plans which would furnish the beet worker with continuous monthly wages that would, in a year, amount to the present lump-sum payment at the end of the season.

**Share Rent**

The sugar beet crop has been the scene of an interesting development in landlord and tenant relationships. It is not always easy to discover the true reasons back of some things. In the war years, it was easy to increase the rental share of sugar beets from one-fourth to one-third in the northern Colorado area. The prices of everything were high, and landlords found tenants bidding for their farms. Such a situation usually results in a change in the price for the thing desired.

Then in the 20's, the share in most instances dropped back to one-fourth of the beets. Now, in the past few years (1934 to 1938), there has been a tendency for a return in some communities to one-third share or, in some instances, it has been a three-tenths share. The cause of this return of the war-time share is not so obvious nor so easy to discover. Some explanations of this increased share have been: "Sugar beets are hard on the land, and the landlord should receive a larger share of the crop to compensate for this loss of fertility." "The landlord must assume the financial risk of loss from feeding sheep in order to produce manure to make it possible to maintain the high yields." "Farms are level, close to the beet dumps, and easy to work. The landlord should receive some extra return for these advantages."

These may have grains of truth in them but not the entire truth. One suspects that the real reason can be traced to a feeling on the part of the landlord that, with low prices for farm products and general uncertainty, increased rents on sugar beets are necessary in order that the landlord may maintain his former income. This may be fine for the landlord, but it will tend to reduce tenants to a hired-labor basis, with more risk than a hired man but no greater income.

If the sugar beet industry is to be continued as an important part of western irrigated agriculture, all interested parties will find it necessary to make some concessions. Landlords who force their tenants
to produce sugar beets with little or no chance for profit are hastening the day when tenants will refuse to grow sugar beets. Fortunately such cases are comparatively few in number. The majority of landlords arrange terms which aid their tenants.

Records of comparative cost indicate that a rental of one-fifth of the beets is nearer a division of the crop on the basis that corresponds to the division of the cost as between landlord and tenant. In the Arkansas Valley, sugar beet rent is from one-fifth to one-fourth, which is much nearer the ratio of comparative expense of tenant and landlord.

Merchants should inform themselves on the facts of the industry and then ask landlords to be tolerant with tenants; also, they should ask beet workers to consider the whole industry, not merely their own side.

Federal Supervision

Federal supervision in its present form is comparatively new. The entire sugar beet industry has developed under a protective tariff. A review of this historical development would be interesting but is not vital in the present search for improved future relationships. This much should be considered: On the basis of past Federal policy, the sugar beet industry has developed, especially in the western states, until it is an important phase of the economic life of the West. Railroads, towns, workers, farmers—all have a direct interest in its future stability. Sugar is one of the few United States farm products which is not produced in surplus.

Figure 19.—Gross value per acre of sugar beets, based upon northern Colorado beet prices. Unshaded bars represent average for Weld County cooperating farms, shaded bars average for entire state of Colorado.
The Federal program for sugar beets since 1933 has been somewhat confusing in its operation. It has greatly complicated the price situation and made it difficult for farmers to estimate their probable returns from sugar beets.

The published reports of the five sugar companies show better incomes during the years of the Federal program due to various reasons. During the 8 years 1925 to 1932, inclusive, the net income of the five companies varied from $0.483 per bag of sugar in 1928 to a $0.323 loss per bag in 1930, with a simple average for the 8 years of $0.15 per bag. But in the 4 years 1933 to 1936, inclusive, the net income per bag for the five companies varied from $0.445 to $0.778, with a simple average of $0.62 per bag. The gross value of sugar beets per acre on cooperating farms was $103.16 as an average for the 8 years 1925 to 1932, and $86.92 for the 4 years 1933 to 1936.

Regardless of how beneficial the Federal program may have been to farmers, it is doubtful that it increased the farmers' net earning in the years 1933 to 1936 by so large a ratio (see note e, p. 57).

Table 8 has been prepared to aid in comparing the farmer's share of the value of the sugar. All calculations have been based upon the average pounds of sugar per ton of beets for the United States as a whole. Similar data for Colorado, while in close agreement with the United States data, have some interstate shipments involved; hence the United States data were used (see note b, p. 57).

The last two lines in table 8 show the farmer's share of sugar in a ton of beets. In the 11 years 1922 to 1932, inclusive, this amounted to 51.81 percent and in the 4 years 1933 to 1936, inclusive, it was 48.91 percent as paid by the sugar company and 57.27 percent including government payments. It is interesting to note that despite the larger share of the sugar received by the farmer from all sources in the 4-year period, his gross receipts from beets, including government payments, averaged $75.54 during the period 1933 to 1936 compared to $85.62 from the sugar company only in the 11 years 1922 to 1932, inclusive. As shown previously, the five sugar companies made very favorable net incomes during these 4 years, 1933 to 1936, which were not due entirely to the Federal program but arose from many other causal factors. Without the Federal program the farmer's income during the 4 years 1933-36 would have been even worse. Table 8 shows $64.54 as the farmer's gross value per acre for those years without Federal payments.

In 1937 the Federal Government began another sugar program. Accordingly, the record for 1937 is shown separately. The factory
paid farmers 44.86 percent of the value of the sugar, and the Federal payments brought this up to 61.55 percent. As a result of this increase, the farmer’s gross receipts per acre rose approximately $4.00 per acre, and the net income per bag for the northern Colorado processor rose from a 4-year average of $0.734 to $0.772 (see note f, p. 57).

A study of the individual years (figure 20) indicates a decided tendency for the factory payment to the farmer to keep between 40 and 50 percent. In the years 1922 to 1925 it hovered close to 45 percent of the value of the sugar. In the years 1934 to 1937 it hovered close to 48 percent. For individual years it rose to more than 50 percent, reaching 69.38 in 1930. These were years of price uncertainty, when the minimum price per ton was in effect. In the years 1933 to 1937, when prices also were uncertain, the minimum had been cut from the sliding scale payment, and the percentage of sugar paid to the farmer stayed close to 48 percent, averaging 48.03 for those years. The abandonment of the minimum guarantee was an important element in reducing the processor’s risk. Processors reported a wide variation in their net income per bag during the years 1922 to 1932, when minimum beet prices were in effect, and quite narrow fluctuations during the years 1933 to 1937 when a sliding-scale contract was used.

Figure 20.—Northern Colorado sugar beet price as a percentage of northern Colorado value of sugar per ton of beets, based upon northern Colorado net sugar prices. Unshaded bar represents factory price only, based upon Colorado pounds of sugar per ton. Cross-hatched bar represents factory price based upon United States pounds of sugar per ton of beets. Black and double-hatched bars represent added percentage when all Federal payments on sugar beets are included in the price per ton of beets.
Meanwhile, farmers received positive benefit from the Federal program in the 5 years 1933 to 1937, raising their average price per ton from the $5.25 received from the sugar company to $6.34, so that in the face of a drop in sugar prices from the 11-year average of $4.942 per hundredweight to a 5-year average of $3.675, or a 25.5 percent reduction, their gross receipts from beets fell from $85.62 per acre to $76.37, or a 10.8 percent reduction in value per acre. This restricted loss assumes less importance when one considers the fact that the 5-year average net income per bag for the northern Colorado sugar company increased by 2.2 percent in the same period.

The average income per bag for all five companies increased from $0.461, the 11-year average, to $0.593, the 5-year average (one company was omitted in 1937 in securing this average), or an increase of 28.6 percent compared with the Great Western increase of 2.2 percent. During these same years the Great Western increased its sugar production about 1 percent, while the remaining four companies increased over 50 percent.

The average price and yield of sugar beets for the entire United States (13) by calculation show that the gross value of an acre of sugar beets for the 11 years 1922 to 1932, inclusive, was $77.34 and for the 5 years 1933 to 1937, $61.26, a reduction of 20.79 percent. Yields were less in the 5-year period, and the amount of sugar produced per ton of beets had increased; yet the Federal program did not prevent a reduction in the gross value per acre of about $16. Accurate cost records for farms are not available for this period, yet it appears doubtful that farmers’ costs in the 5 years 1933 to 1937 had fallen in comparison with the 11 years 1922 to 1932 enough to offset

**Table 8.—Production, value, and division of sugar beet income in Colorado, 1922 to 1937, inclusive.***

<table>
<thead>
<tr>
<th>Item</th>
<th>11-year average 1922-22</th>
<th>4-year average 1933-36</th>
<th>1937</th>
</tr>
</thead>
<tbody>
<tr>
<td>Colorado average yield beets, tons</td>
<td>12.25</td>
<td>12.0</td>
<td>12.2</td>
</tr>
<tr>
<td>Northern Colorado factory price, ton</td>
<td>$ 6.99</td>
<td>$ 5.38</td>
<td>$ 4.76</td>
</tr>
<tr>
<td>Gross value per acre</td>
<td>85.62</td>
<td>64.54</td>
<td>58.97</td>
</tr>
<tr>
<td>Price, including government payments</td>
<td>..........................</td>
<td>6.30</td>
<td>6.53</td>
</tr>
<tr>
<td>Gross value per acre, including government payments</td>
<td>..........................</td>
<td>75.54</td>
<td>79.67</td>
</tr>
<tr>
<td>Pounds sugar per ton (U. S. A.)</td>
<td>273.8</td>
<td>298.7</td>
<td>292.4</td>
</tr>
<tr>
<td>Northern Colorado sugar price per bag</td>
<td>$ 4.942</td>
<td>$ 3.883</td>
<td>$ 3.627</td>
</tr>
<tr>
<td>Value sugar per ton of beets</td>
<td>13.53</td>
<td>11.00</td>
<td>10.69</td>
</tr>
<tr>
<td>Farmer’s price per ton as a percentage of the value of sugar per ton:</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Based on factory price only</td>
<td>51.81</td>
<td>48.91</td>
<td>44.86</td>
</tr>
<tr>
<td>Including government payment</td>
<td>..........................</td>
<td>57.27</td>
<td>61.55</td>
</tr>
</tbody>
</table>

*See footnote table 6 for comment concerning sugar per ton. These data show sugar per ton of beets purchased.
a $16-drop in gross value per acre and to show an increase in their net income. Corporation records of five companies show a 28.6-per-
cent increase in sugar company net income per bag of sugar during these comparative periods. This indicates a need for a careful study of the entire Federal sugar program (see note g, p. 57).

The Sugar Company and the Farmer

It is difficult to state the problem of the sugar company and the farmer in a few words. Some general discussion seems necessary to properly "get the feel" of the situation. The northern Colorado area offers an excellent illustration of the problem.

![Dollars](image)

**Figure 21.** Cooperating farmers' net earnings per acre of all crops and corporation income per acre of sugar beets.

By accident or by design, the processing of sugar in northern Colorado has developed under the control of a single corporation. This confuses the operation of the forces of free competition.

The outcome has been unexpected results—unexpected by the managers of the processing company, but not unpredictable if one
considered the forces involved. On the one side there is a corporation operating for profit, guided by experienced corporation executives, with every move directed to the end of making a profit. This is a laudable motive in corporate management (see note h, p. 58).

On the other side is an unorganized or at best semi-organized group of independent farmers who consider sugar beets as "just one more crop." Confusing the issue, these men are again divided into three groups. The landlord group has sought the maximum rental share in the leasing of land for sugar beet production. Landlords have seen the sugar beet as a very important source of income. The tenant group has not been so fortunate. They have had an actual reduction in their sugar beet income because of several factors. The most important of these factors have been uncertainty as to sugar beet prices, low yields under conditions of water shortage, increased expenses of production such as spraying and fertilization, and an increase in the prices paid for contract labor during the years 1937 and 1938. With low yields or low prices, the tenant's income has been reduced relatively more than the landlord's (9); thus the tenant has seen his comparative expenses increase and his net income decrease.

Members of the owner group, operating their own farms, have been between the landlords and the tenants in their attitudes. Their feeling toward sugar beet production has fluctuated with the passing years, dependent upon their experience with yields and prices and upon income from competing crops.

Taken together, the landlords, tenants, and owners may be considered as one group of growers. That they have differed among themselves as to the sugar beet industry is obvious; that this internal difference within the grower group in part explains the present condition of the industry is not so obvious. Any attempt to solidify grower sentiment behind any program for change has mired down in the conflicting interests of the grower group. It is necessary to understand this situation in order to understand the reason for the halting progress of grower attempts at cooperative action.

With this general situation in mind, it is necessary to consider another aspect of the situation. This deals with the general attitude of farmers toward the production of other crops in contrast to their attitude toward producing sugar beets. This in itself has been an outgrowth of years of experience.

First, farmers have been accustomed through the years to produce crops in anticipation of an unknown price at market time. The offer of a guaranteed price prior to seed time was a novelty when the
sugar beet first came into the area. Experience was necessary before farmers could decide in their own minds "how it worked."

Second, farmers found it necessary to change their entire farming system and plan it around the sugar beet. Again, a lapse of time was necessary before they were in a position to judge the wisdom of the change.

Third, the method of arriving at a contract price has never been understood by the farmers, and recent Federal participation has introduced delays which still further complicate the issue.

Fourth, the final conclusion on the part of the farmers was that the sugar beet was not a crop like other crops, but a peculiar crop. There was no market for this crop other than to sugar companies. Its bulk made a long haul unprofitable; therefore the production and processing of the beet was a local monopoly in a very real sense. There was not only one party, however, but two parties concerned in the monopoly—the company which processed the beets and the farmers who grew them.

Figure 22.—Mechanical piling equipment has helped to speed up delivery of sugar beets.

This, in brief, lays the background for the situation. When two monopolies strive for control, there are obviously several possible outcomes. These possibilities may be summarized as follows: One monopoly might destroy the other; one might force the other to become a weak and helpless subsidiary; one might buy out the other, or—and this would seem to indicate that wisdom had prevailed in the councils of men—the two monopolies might combine, or join, to their mutual benefit. Briefly stated, these are the possibilities which face the beet sugar industry in northern Colorado.
Suggestions for Promoting Harmony

The sugar beet industry in the West has been fortunate in the high calibre of men attracted to its executive positions but unfortunate in the public reaction to some of their decisions. This is in part a problem of human relationships and in part a problem of misunderstanding. From a necessarily incomplete observation of the situation, the writer concludes that there is nothing about it that is hopeless or incapable of solution. Misunderstanding is an important factor. Incomplete information available to farmers is a contributing factor.

The major problem is the destiny of a great industry, not the protection of the interests of any one group. Each group may find it necessary to make some apparent sacrifice of immediate benefits in return for the prospect of a more durable future prosperity for all concerned.

In discussing the difficulties which have developed in connection with contract labor, landlord and tenant relationships, and the Federal sugar program, some comment has been made as to possibilities for improvement. The factory and farmer situation needs further analysis.

Fifty-Fifty Contract in Theory and Practice

The proposal to treat the sugar beet industry as a cooperative venture, in which the sugar corporation matches its costs against those of the farmer, with each taking one-half of the resulting sugar, has been much in the public eye in the past 15 years. The theory possibly arose in the minds of those who contemplated two facts: First, the sugar companies' expenses were quite similar to the amounts paid to the farmers for their beets; second, no one knew, until the season was over and the sugar had been sold, what would be the yield of sugar per ton of beets or what would be the price received for the sugar.

If the sugar companies were asked to bear the risk of both these unknowns, naturally the inherent caution of successful business men would cause their officials to pay a price for sugar beets low enough to protect the companies against these risks and show a profit. Otherwise the corporation would fail. A review of the past history of the sugar beet industry would show illustrations of each of these possibilities.

While the sugar beet industry grew, few paid much attention to this situation. But during the World War the domestic sugar
industry "became of age," if not legally, at least in its national importance. The wide price fluctuations of those war years, together with the natural conservatism which characterizes any successful sugar company official combined to show some fine profits. In the crash of 1920, companies and farmers alike were thrown into confusion and loss. Sugar company officials began to "trim their sails." They reduced some farming activities and temporarily reduced the production of sugar beet seed; they reduced the prices paid for sugar beets. It was inevitable that farmers who were none too happy over the course of events should discover in the sugar companies a possible source of some of their difficulties.

For example, in the 5 years 1917 to 1921, inclusive, one sugar company paid approximately $9.30 per ton for sugar beets and at the same time made a net income of approximately $2.34 per ton of beets purchased. In 1921 the price paid was approximately one-half that paid in 1920. In 1922 it was increased to $7.88 per ton, from less than $6.50 in 1921. Farmers who had studied the published reports of this company decided that it was time to work for a new method of handling the sugar beet situation. They came out for a fifty-fifty contract.

A review of the available evidence on sugar company expenses would indicate that, as an average proposition, company expenses and farmer expenses were quite similar when expressed on a "per ton" basis.

Analysis of company plant investments would suggest that they are approximately one-half as great per acre of beets as the farmer's investment per crop acre, while total company investments were approximately the same as the investment for the farms studied. If lower farm values were used then total company investments would be higher per acre.

If one may accept, for the purpose of illustration, the theory that sugar companies and farmers represent two separate groups, each of which has a monopoly of its side of the sugar industry, and yet with each in a way dependent upon the other for ultimate prosperity, then it may be illuminating to explore the possibilities of the fifty-fifty sugar beet contract.

Division of Net Sugar Values

As indicated in another part of this study, the evidence seems to suggest that farmers and factory have quite similar costs when expressed as "costs per ton of beets." For this reason, it would simplify the process of improving grower-factory good will if each
would agree to an arbitrary division of the net proceeds from sales and let each party make such profits or losses as would naturally result from his internal management of his business. This would mean a share of sugar, molasses, and pulp—probably fifty-fifty share, since costs seem to be so nearly equal. And all studies of factory cost make no division to allow for "cost of by-products;" therefore, receipts from by-products should be included in the division of net sales.

Figure 23.—Sugar company income per acre of sugar beets based on net income per bag, Colorado pounds of sugar per ton, and Colorado average yields.

This is not a new idea. The records show a surprisingly large number of sugar beet factories which now offer a contract paying the farmer for one-half the net sales from sugar, pulp, and molasses.

Some companies add to this a guaranteed minimum of $4.50, $5.00, or $5.50 per ton which, as a down payment at the time the beets are harvested, permits farmers to pay their expenses promptly. These fifty-fifty contracts also contain certain provisions as to the farmers bearing the cost of delivery of beets and as to restricted delivery which should be studied carefully. Many of these factories are small, therefore presumably operating under some handicaps; yet they sell in a limited market. The condensed information in the 1938
Manual of Sugar Companies (12) indicates that several have no funded debt or are paying dividends. Others have no financial data, and at least one has been reorganized. This is a sketchy indication, but at least it suggests that companies can and do operate when paying farmers one-half of all the net sales from beets. It does not answer the question of whether a fifty-fifty division of net sugar values would be fair to both parties.

A special government report (17) available after this study was underway indicated (page 38 of the report) that beet factories operating under fifty-fifty contracts extracted about 15 less pounds of sugar from a 16 percent beet, which would indicate a further reason for careful study before accepting the fifty-fifty contract as a satisfactory solution of grower-processor problems.

Effect of 1937 Federal Program

How does the fifty-fifty contract compare with the 1937 Federal program?

The purpose of this review of the history of the sugar beet industry in Colorado has been to seek some solution of the more important problems that confront the industry.

It would seem that the sharing of the net proceeds from sugar and by-products might offer such a solution. Before accepting it, one should consider the 1937 Federal sugar program. As shown by table 8, the farmer received 61.55 percent of all the sugar in a ton of beets in 1937, this figure being based of course on the average amount of sugar for the entire United States and the actual price for northern Colorado, which introduces some error but not enough to destroy the significance of the answer. Since the calculated value of the sugar per ton of beets (table 8) was $10.61 in 1937, one-half of this would be $5.30. The total price per ton paid to farmers in 1937 from all sources was $6.53, or $1.23 more than one-half the value of the sugar. It is doubtful whether all the by-products would ever amount to $1.23 per ton of beets. Consequently, it would seem reasonable to conclude that the 1937 Federal program as it operated in 1937, added to the factory contract, was better than a fifty-fifty contract. If this should continue during 1938 and subsequent years, it would seem reasonable to conclude that the sugar industry needs something more than a fifty-fifty contract. Possibly it needs better sugar prices and a more universal understanding of what is happening, with some added tolerance on the part of all interested groups.

It also suggests that, at some future time, when Federal programs may be removed from the scene, farmers should seek some di-
vision of the sugar other than fifty-fifty division of sugar and by-products.

The 1938 Contract

All the previous analysis has been based upon entire sugar crops. The individual farmer is paid for sugar beets on the basis of the sugar content. For convenience in comparison, the following table has been prepared from the 1938 contract in northern Colorado. Sugar prices of 3.25 cents, 4 cents, and 6 cents, together with 18 percent and 14 percent sugar content of the beets, were used as the basis of the calculations. Since the actual extraction of sugar varies, calculations have been made with a 90-percent extraction and with an 85-percent extraction. The farmer’s price per ton would remain the same in either case; hence, his proportionate share of the value of the sugar extracted would vary with the actual extraction, if other things remained unchanged.

Table 9.—Percentage division of sugar in 1938 contract.*

<table>
<thead>
<tr>
<th>Line</th>
<th>18-percent sugar in beet</th>
<th>14-percent sugar in beet</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1</td>
<td>360</td>
</tr>
<tr>
<td>Price paid to farmer when</td>
<td></td>
<td></td>
</tr>
<tr>
<td>price is:</td>
<td>3.25c</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>4.00c</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>6.00c</td>
<td>4</td>
</tr>
<tr>
<td>90 percent extraction results in sugar</td>
<td></td>
<td></td>
</tr>
<tr>
<td>per ton, pounds</td>
<td>3.25c</td>
<td>6</td>
</tr>
<tr>
<td>Equivalent value sugar @</td>
<td>4.00c</td>
<td>7</td>
</tr>
<tr>
<td></td>
<td>6.00c</td>
<td>8</td>
</tr>
<tr>
<td>85 percent extraction results in sugar</td>
<td></td>
<td></td>
</tr>
<tr>
<td>per ton, pounds</td>
<td>3.25c</td>
<td>10</td>
</tr>
<tr>
<td>Equivalent value sugar @</td>
<td>4.00c</td>
<td>11</td>
</tr>
<tr>
<td></td>
<td>6.00c</td>
<td>12</td>
</tr>
</tbody>
</table>

Farmer’s price per ton of sugar beets as a percentage of value of sugar:

1. With 90% extraction and 3.25c sugar .......... 13 47.67 46.64
   4.00c sugar ....... 14 49.15 48.12
   6.00c sugar ....... 15 51.50 50.86
2. With 85% extraction and 3.25c sugar .......... 16 50.50 49.35
   4.00c sugar ....... 17 52.91 50.95
   6.00c sugar ....... 18 54.85 53.85

*The Sugar Division, United States Department of Agriculture (17), calculated for the years 1922-37, for the entire U. S. beet crop, an extraction of 90.5 percent, based upon cossette sugar content. The tons of beets sliced for these same 16 years amounted to 98.2 percent of the tons purchased. This indicates an extraction of approximately 87 percent of the sugar in the original beet.
Lines 13, 14, and 15 of table 9 show the farmer's price per ton as a percentage of the value of sugar with a 90-percent extraction. The lowest percentage of 46.64 was with a 14-percent sugar content and 3.25-cent sugar. The highest percentage, 51.80, was with an 18-percent sugar content and 6-cent sugar. The range between these two was 5.18 percent.

Lines 16, 17, and 18 show similar calculations for an 85-percent extraction. The farmer's percentage is nearly 3 percent higher at every point, but the range from lowest to highest was 5.5 percent. In each case the farmer receives a higher percentage of the sugar from a beet containing 18 percent sugar than from the 14-percent beet.

Since the extreme variation in the proportion of the sugar paid to the farmer does not exceed 5.5 percent, it is apparent that a uniform percentage at all points in the contract would not increase or decrease the percentage by more than 5.5 percent. Farmers generally have protested against the low prices paid for beets with a low sugar content. It would seem that a uniform percentage which raised the rate for low sugar contents would help to remove that source of complaint (see note i, p. 58).

At one time such a condition did exist under the guise of a "minimum guarantee." For example, the 1929 contract had a $6.50 minimum in the main body of the contract which would have operated to give the farmer 68.28 percent of the sugar from an 85 percent extraction and 4-cent sugar with a 14-percent beet. Actually, a $7 minimum price was paid, due to other provisions in the contract, which resulted in 73.5 percent of the sugar value in a 14-percent beet going to the farmer for 4-cent sugar and an 85 percent extraction. At the higher price levels of the 1929 contract, the calculated percentage was less than in the 1938 contract. For example, with 6-cent sugar and an 18-percent beet the 1929 contract paid the farmer 50.54 percent with an 85 percent extraction while the 1938 contract paid 54.85 percent (see line 18, table 9).

In actual operation the 1929 contract was unfair to the sugar company because of the unexpected drop in sugar prices. However, the principle of giving the farmer a protection against low beet prices by placing a flat price per ton or minimum guarantee has been widely used. It would seem preferable, and fairer to all concerned, to substitute a flat percentage of the value of the sugar at harvest time.

It would seem from this analysis that a uniform percentage of sugar paid to farmers, and incorporated in the contract, would not
involve insurmountable difficulties. In actual operation, it would have less threat of wide variation than a minimum guarantee per ton, hence would be more fair to the factory.

Some may infer that this "uniform percentage" relates to the sugar extracted. The writer is not in a position to do more than suggest that farmers and processors might give very careful consideration to the possibilities of developing a contract based upon percentages of the original sugar in the beet, rather than attempting to divide the extracted sugar. The apparent advantages of such a method rest on the greater simplicity of the necessary information. If beets contain 15 percent of sugar at harvest time, and the farmer is to receive a definite percentage of that sugar, regardless of extraction uncertainties, much suspicion is at once removed. It will tend to further emphasize the need for all interested parties joining in working for better sugar prices. It will leave the processor free to make any change in extraction without a feeling that "he must divide the result with the farmer." It will permit changes in this basic share as changes in the industry seem to indicate a need. It will spur a concerted search for higher sugar content in the beet.

What that uniform percentage should be would be a matter for common agreement after thorough consideration. Once accepted, it should aid in removing friction and in establishing peace and cooperation in the industry.

This is not the place to digress into a discussion of social philosophy. But it is necessary to recognize a change in the attitude of society in order to understand the present discontent with former business practices. This is what is meant by "The world is struggling toward a level of greater social-mindedness . . . wise executives will lead that trend."

The relative costs and past investments of farmers and sugar companies are not the vital points at issue. The future of the industry is at stake. Real, sincere cooperation which places the welfare of the community ahead of the profit of the individual seems worth consideration. As stated earlier, it seems that this can be achieved by farmers and sugar companies joining in a combined attack upon their problems. As stated earlier, it seemed at first glance that this might mean a fifty-fifty division of the extracted sugar. The previous analysis has been given in some detail to help arrive at a fair division. It would seem desirable to give considerable thought to the possibilities of basing a contract upon the original sugar in the beet.
SUMMARY OF RECOMMENDATIONS

1. Farmers should continue their study of methods and machinery which will reduce the cost of producing crops and increase their net income.

2. Landlords should consider the possibilities of lease terms which will attract better tenants and give tenants an inducement to use better methods.

3. Beet workers should consider the entire industry in formulating their demands for contract rates.

4. Beet workers should seek contracts with farmers who can offer other employment to supplement the beet contract earnings.

5. Federal representatives should avoid scheduling hearings and conferences at dates which delay processors and farmers in making plans and contracts for a new crop year.

6. Processors should arrange conferences with farmers and merchants for discussion of mutual problems.

7. Merchants should secure accurate information and assist in developing a fair solution of differences.

8. Representatives of the people should work for such modification and interpretation of Federal sugar beet legislation as will result in shifting sugar prices to a slightly higher level than the 1938-39 market.
CONCLUSION

In this comparatively brief review of the sugar beet industry in Colorado, one purpose has been kept uppermost, namely, to state the essential facts so far as they are available, upon which one might base an approach toward an era of better mutual understanding and of united effort toward the further growth and prosperity of Colorado. It has been suggested that several groups might find it necessary to make some concessions from present practice in order to allay suspicion and to secure whole-hearted cooperation.

The world is struggling toward a level of greater social-mindedness. It is the frank opinion of the writer that wise industrial executives will lead that trend.

BIBLIOGRAPHY


(8) Unpublished records in Rural Economics and Sociology Section file.


(14) Extracts from a Hearing before a Special Subcommittee on Agriculture. House of Representatives, 75th Congress on H. R. 5326, Serial B. March 22, 1937. p. 11.


ADDENDA

(Certain sugar beet information not available at the time this study was made, but available before publication, is here added in order to bring the report up-to-date. References to these notes will be found in the text).

a—1939 labor contract topping rates have been set at 10 cents per ton below the 1938 rates.

b—Comments in a government report (17) indicate that the Colorado sugar per ton when interstate shipments are excluded would be approximately 97 percent of the United States figure, which would show 274 pounds as the Colorado average.

c—The conditions related to manufacture and marketing of sugar apparently necessitate rather heavy investments in stored sugar and other items. When these are included, the net assets for sugar companies are nearly double the plant investment, while the addition of similar items on farms adds a comparatively small amount to the farmers’ "plant investment."

d—The 1933 factory costs are not representative, however, of customary factory expense, because the 1933 sugar beet crop was larger than normal, and many items of factory cost were at the lowest relative price level of any year since the World War.

e—Since there is a lag of about 1 year in the effect of the Federal program upon sugar company income as compared to farmer income, the actual influence of the Federal program is not the sole factor at work to increase company income during the years 1933 to 1936. The absence of the minimum guarantee in sugar beet contracts and the low wage and material levels following the depth of the depression were also important. The first Federal program did not directly affect company income until 1934. The 1937 Federal program, on the other hand, is showing its greatest effect upon sugar company income in 1938 and 1939.

f—If actual sugar extraction for northern Colorado were used in these calculations, it would increase the percentage of sugar value paid to farmers both as shown in table 8 and in figure 20 for the Colorado bars.

g—The increased company incomes shown for the years ending 1936 have not been maintained in the following years. In 1937 available reports for four of these companies show a net income of about 71 percent of their 1936 income, and reports for two companies for 1938 show a further reduction in their income to about 53 percent of their 1937 income. These reflect the effect of low sugar prices and suggest, at least, that the 1937 Federal program has reduced sugar company income.
Incidentally, the farmers included in this study reported cash incomes for 1938 which were approximately one-half those for the years 1931 and 1932.

h—The northern Colorado sugar company deserves further recognition for its efforts to improve the quality of sugar beet seed, and to aid farmers in developing practices which will increase sugar beet yields. Also, proper recognition should be given to the confusion which has attended the present situation whereby three or more separate sugar beet payments (either corporation or Federal) are necessary, compared to a former single payment from the company.

i—The 1939 contract, developed after this study was practically completed, did this very thing. It placed a limit for low sugar content as follows: "The average sugar content in said beets shall not be deemed to be lower than one percent . . . . . below the average percent sugar in all beets of the 1939 crop . . . . . from all Colorado factories."
NOTES
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