1934

Reaction to Price Change by South Dakota Farmers

John Gordon McNeely

Follow this and additional works at: http://openprairie.sdstate.edu/etd
Part of the Agricultural and Resource Economics Commons, Agricultural Economics Commons, and the Economics Commons

Recommended Citation
McNeely, John Gordon, "Reaction to Price Change by South Dakota Farmers" (1934). Theses and Dissertations. 1938.
http://openprairie.sdstate.edu/etd/1938

This Thesis - Open Access is brought to you for free and open access by Open PRAIRIE: Open Public Research Access Institutional Repository and Information Exchange. It has been accepted for inclusion in Theses and Dissertations by an authorized administrator of Open PRAIRIE: Open Public Research Access Institutional Repository and Information Exchange. For more information, please contact michaelbiondo@sdstate.edu.
REACTION TO PRICE CHANGE BY SOUTH DAKOTA FARMERS

By

John Gordon McNeely

Bachelor of Science Degree at South Dakota State College, 1933

A Thesis
Submitted to the Faculty
of
The South Dakota State College
of
Agriculture and Mechanic Arts
June, 1934
In Partial Fulfillment of the Requirements
For the Degree of Master of Science

SOUTH DAKOTA STATE COLLEGE LIBRARY
ACKNOWLEDGEMENT

The writer wishes to express his sincere appreciation to Professor Robert E. Post, Head of the Department of Agricultural Economics, for valuable suggestions and criticisms.
# TABLE OF CONTENTS

<table>
<thead>
<tr>
<th>Section</th>
<th>Pages</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>INTRODUCTION</strong></td>
<td>1 - 8</td>
</tr>
<tr>
<td>A. Historical background</td>
<td>1</td>
</tr>
<tr>
<td>B. Purpose of the study</td>
<td>3</td>
</tr>
<tr>
<td>C. Method of study</td>
<td>4</td>
</tr>
<tr>
<td>D. Definitions and explanations</td>
<td>7</td>
</tr>
</tbody>
</table>

**PART I - GENERAL EXTENT OF PRICE RESPONSE** 9 - 12

<table>
<thead>
<tr>
<th>Section</th>
<th>Pages</th>
</tr>
</thead>
<tbody>
<tr>
<td>A. Correlation study of all commodities</td>
<td>9</td>
</tr>
</tbody>
</table>

**PART II - PRICE RESPONSE AS SHOWN BY GROUP TRENDS** 12 - 24

<table>
<thead>
<tr>
<th>Section</th>
<th>Pages</th>
</tr>
</thead>
<tbody>
<tr>
<td>A. Study of livestock trends</td>
<td>12</td>
</tr>
<tr>
<td>B. Study of trends of the most important grain crops</td>
<td>17</td>
</tr>
<tr>
<td>C. Study of trends of miscellaneous crops</td>
<td>21</td>
</tr>
</tbody>
</table>

**PART III - TRENDS BY INDIVIDUAL COMMODITIES** 25 - 65

<table>
<thead>
<tr>
<th>Section</th>
<th>Pages</th>
</tr>
</thead>
<tbody>
<tr>
<td>A. Animal products</td>
<td>26 - 43</td>
</tr>
<tr>
<td>1. Swine</td>
<td>26</td>
</tr>
<tr>
<td>2. Beef cattle</td>
<td>31</td>
</tr>
<tr>
<td>3. Dairy cattle</td>
<td>34</td>
</tr>
<tr>
<td>4. Poultry and eggs</td>
<td>37</td>
</tr>
<tr>
<td>5. Sheep and wool</td>
<td>40</td>
</tr>
<tr>
<td>B. Field crops in South Dakota</td>
<td>43 - 65</td>
</tr>
<tr>
<td>1. Wheat</td>
<td>43</td>
</tr>
<tr>
<td>2. Corn</td>
<td>44</td>
</tr>
<tr>
<td>3. Flax</td>
<td>47</td>
</tr>
<tr>
<td>4. Barley</td>
<td>50</td>
</tr>
<tr>
<td>5. Oats</td>
<td>53</td>
</tr>
<tr>
<td>6. Potatoes</td>
<td>56</td>
</tr>
<tr>
<td>7. Hay</td>
<td>60</td>
</tr>
<tr>
<td>8. Rye</td>
<td>63</td>
</tr>
</tbody>
</table>
PART IV - SUMMARY AND CONCLUSIONS 66 - 70

A. Summary 67

B. Conclusions 69

BIBLIOGRAPHY 71
"Agricultural Reform in the United States." By John D. Black.

Chapter IV. "The Effect of Surpluses on Prices and Incomes". In this chapter, the effects of weather surpluses and overplanting surpluses on gross values of crops, net values of crops, and on subsequent production.

"Farmers' Response to Price in the Production of Market Milk."
By Mordecai Ezekiel, Emil Rauchenstein, and Oris V. Wells. U. S. Department of Agriculture. Preliminary Report. May, 1932. Study of production response to price change as shown by data furnished by the Vermont State Department of Agriculture, the Twin Cities Milk Producers' Association, and the Maryland State Dairymens' Association. A study of the reaction to the important cost factor, the price of milk relative to the price of grain and concentrated feed from the standpoint of the producers as a group.

"Farmers' Response to Price in Hog Production and Marketing."
By Oris V. Wells, United States Department of Agriculture. Technical Bulletin No. 359. April, 1933: An analysis of the farmers' response to the corn and hog price situation as shown by production increases or decreases, average weight of hogs marketed, and distribution of hog marketings.

General aspects of farmers' response to price change are discussed in most textbooks in the principles of Agricultural Economics and in other general treatises. Most of the previous studies have been made on only one commodity in an area, making comparisons between commodities almost impossible.
INTRODUCTION

Historical Background

South Dakota is one of the newest of the important agricultural states. In 1900, many parts of South Dakota were still in the process of being settled. The increase in the amount of land in crops continued almost without interruption until the time of the World War. We then find a greater demand for farm products than ever before. In response to double incentive of high prices and helping to win the war, South Dakota and United States agriculture had expanded to unprecedented levels by 1920.

As fast as agricultural production increased in the United States, demand increased in war torn Europe as thousands of acres of crop lands were taken out of production in Europe during the war. This land was all put back into production and even further increases in crop acres were made. Meanwhile, the extra land which had been put into production during the war by the United States, Canada, Argentina, and Australia was contracted very slowly, if at all. The final result was a tremendous overproduction in food products all over the world.

Several other important factors have been operating since 1920 to the especial detriment of United States Agriculture. Because of the huge amounts of foodstuffs and munitions sent to European countries
during the war, the United States found herself owed huge sums of money by these countries. In their attempts to pay this money, these countries adopted the policy of selling as much as possible to the United States and buying as little as possible from us so that there would be a balance in gold accruing to them. This provided a further incentive for these debtor countries to expand their agriculture so that they would not have to buy here. As their production of food commodities increased, the European countries raised high trade barriers to protect these industries against foreign competition, to place themselves on a more nearly self sufficient basis, to provide governmental revenues, and to provide a means of retaliation against the high trade barriers of the United States.

Consequently, from 1920 until the present time, we find a surplus of agricultural products piling up in our country because of the continued high rate of production here coupled with a lowered demand from foreign countries. There is no likelihood of foreign demand for our agricultural products increasing during the next few years, at least with the present tariff policy of our government. Along with this poor demand in foreign countries, a limiting factor is the possibility of increased consumption of agricultural products in the United States. People are already approaching the maximum in their food consumption and there is little possibility of home demand increasing sufficiently to utilize our present huge surpluses.

Faced with this situation, the United States government in 1933 attempted to help the situation by providing for the gradual withdrawal of a portion of our crop land from production. Under the provisions of the Agricultural Adjustment Act, an attempt is being made to increase the purchasing power of the farmer's dollar through increases
in the prices that he receives for his farm products. This increase is to come about through a decreased supply, the idea being to adjust supplies of agricultural products more nearly to the demand for them.

In the future, the United States plans to aid the situation still more by withdrawing from cultivation various tracts of submarginal land in South Dakota and other states and thereby placing our entire country on a better planned economic basis.

The relative strength of the various non-essential stuffs often depends upon the amount of agricultural products available for sale. The United States has been in the position of having a large amount of agricultural products to export, and as a result, the prices of those products have been lower than they would have been if we had not been able to export them.

Purpose of the Study

The purpose of this study is to show the position of South Dakota in the general production trends and their position in this program of national planning. An attempt will be made to show what reactions to price change are being made by South Dakota farmers, with the purpose of making possible a better view of the situation as we find it here. It is hoped that the subject matter may be presented in such a way that the people of South Dakota may see the problem which confronts them, and that they may have a clearer idea of what the government has in mind when it takes various amounts of crop land out of production.

If South Dakota farmers are not responding to present low prices by making the necessary crop and livestock adjustments, then, obviously, some central body must step into the picture and attempt to coordinate agricultural production in such a way as to confer the maximum benefits upon the American farmers.

In this paper, an attempt will be made to show statistically and graphically the production response to price change which has been made by South Dakota farmers since 1920 in the major agricultural commodities produced in South Dakota. By showing the price and production trends by single commodities and by related groups of commodities, a complete picture of South Dakota agriculture as it is now and its direction of
movement can easily be shown. Then, wherever possible, South Dakota farmers may cooperate with the farmers of other states to place their production on a sound economic basis. The situation in South Dakota is worse than in many other states because our production is almost entirely composed of foodstuffs, and there is very little likelihood of the market for foodstuffs expanding. In fact, in view of present huge surpluses, contraction in production of foodstuffs seems absolutely essential. The relative strength of the positions of the various commodities should be apparent from the material presented here, along with an insight into the general production trends and their position as compared to the relative.

Method of Study

The commodities selected for this study were the fifteen commodities considered most important in South Dakota. Monthly price levels of these commodities are published in the Farm Economic Review and Outlook by the Extension Service of the United States Department of Agriculture. These commodities are corn, wheat, oats, barley, rye, hay, potatoes, flax, hogs, cattle, sheep, chickens, eggs, wool, and butter. Suitable commodity price relatives for each of these commodities had previously been calculated by Professor R. E. Post of the Department of Agricultural Economics at South Dakota State College. His method of preparing these price levels may be gained from his statement in the pamphlet "South Dakota Price Levels".

"The current monthly price relative for each commodity is obtained by dividing the current price by a fixed base price. The seasonal variation is not eliminated. Prices used are those received locally
by South Dakota farmers as published by the Bureau of Agricultural Economics of the United States Department of Agriculture.

"The base price of each commodity represents the average of five weighted annual prices, covering a period from July 1910 to June 1915. The annual price for each twelve-month period is the result of weighting the monthly prices by the values of the monthly marketings. These marketings are based upon the five-year period, 1921 to 1929 inclusive."

Production figures for each of these commodities were obtained by copying state's assessors reports. These reports were used because they covered all of the commodities used, are published annually, and finally, because these figures give acres planted while all other available crop figures give acres harvested. For the purposes of this study, it was felt that acres harvested expressed much more accurately the reaction of the farmers, because drought, grasshoppers, or other unusual factors might throw off the acres harvested figures from the actual reaction. It is recognized that assessor's figures do not accurately portray the acres of crops or numbers of livestock produced in South Dakota, but since percentage change from year to year is what is desired, these figures probably serve the purpose very well because the bias is about the same from year to year.

Since the assessor's figures were complete only since 1920, the fourteen year period from 1920 to 1933 was selected for the study. The 1925 year was arbitrarily selected as a base and all crop and livestock figures were computed as a percent of the 1925 total. Since the price relatives had a 1910-1914 base, it was necessary to recompute the price relatives to a 1925 base. This was easily accomplished for each commodity by dividing the old base price by the 1925 price and multiplying the result times the price for each of the years of study. By doing
this for each commodity, a new set of price relatives was obtained having the same base as the production relatives, thereby making price readily comparable to production figures.

The next step was to determine whether the actual reaction to price change did or did not exist. Since it was recognized that most of the commodities produced in South Dakota are growing or diminishing in importance along rather definite trends, the production trend line was plotted for each commodity. A second degree parabolic curve was fitted to each set of actual data by the method of least squares. This gave the general trend for each commodity.

Reaction to price change was measured along this trend line. The difference between actual figures and trend figures for each year was determined by simple subtraction; and the production change each year was measured by the manner in which the actual figures moved upward or downward along the trend line. A sample is given below to show how the results were determined.

### Cattle

<table>
<thead>
<tr>
<th>Year</th>
<th>Actual Production</th>
<th>Trend Production</th>
<th>Actual ± Trend</th>
<th>Production change each year</th>
</tr>
</thead>
<tbody>
<tr>
<td>1920</td>
<td>117.4</td>
<td>117.7</td>
<td>- .3</td>
<td></td>
</tr>
<tr>
<td>1921</td>
<td>102.2</td>
<td>110.6</td>
<td>-8.4</td>
<td>-6.1</td>
</tr>
<tr>
<td>1922</td>
<td>103.0</td>
<td>104.4</td>
<td>-1.1</td>
<td>+7.3</td>
</tr>
<tr>
<td>1923</td>
<td>102.8</td>
<td>99.1</td>
<td>+3.7</td>
<td>+4.8</td>
</tr>
</tbody>
</table>

Price trends were figured in the same manner in order to use them for purposes of comparison with the production trend figures. After the production changes and price changes had been figured for each commodity
for each of the fourteen years of the study, much of the actual clerical work was completed. It was now necessary to take these results and examine them to determine whether or not there did exist a definite production response to price change.

Explanations and Definitions

Since reference will frequently be made to the 1910-14 prices which serve as a base for all price figures, these prices are given here to show what South Dakota farmers were receiving for their farm products at that time.

<table>
<thead>
<tr>
<th>Commodity</th>
<th>1910-14 price</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hogs</td>
<td>$6.69 per 100#</td>
</tr>
<tr>
<td>Cattle</td>
<td>5.42 per 100#</td>
</tr>
<tr>
<td>Lambs</td>
<td>5.56 per 100#</td>
</tr>
<tr>
<td>Wool</td>
<td>.17 per#</td>
</tr>
<tr>
<td>Chickens</td>
<td>.09 per#</td>
</tr>
<tr>
<td>Eggs</td>
<td>.17 per dozen</td>
</tr>
<tr>
<td>Butter</td>
<td>.24 per pound</td>
</tr>
<tr>
<td>Wheat</td>
<td>.86 per bushel</td>
</tr>
<tr>
<td>Corn</td>
<td>.51 per bushel</td>
</tr>
<tr>
<td>Flax</td>
<td>1.62 per bushel</td>
</tr>
<tr>
<td>Barley</td>
<td>.59 per bushel</td>
</tr>
<tr>
<td>Oats</td>
<td>.35 per bushel</td>
</tr>
<tr>
<td>Rye</td>
<td>.75 per bushel</td>
</tr>
<tr>
<td>Potatoes</td>
<td>.74 per bushel</td>
</tr>
<tr>
<td>Hay</td>
<td>7.17 per ton</td>
</tr>
</tbody>
</table>
As stated before, these prices were changed over to a 1925 base for the purpose of this study, but this does not change the relative values for these commodities.

Only a thirteen year trend can be shown for crop prices because prices are figured on a crop year basis starting on July 1 instead of a January-December year basis such as is used for the other commodities. Consequently, the 1933 average prices for the crops will not be available until July 1, 1934, and can not be included in this study.

Hay: Because of the difficulty of securing comparable acreages of the various types of hay, and because all hay acreage is not listed in a complete form since 1920, alfalfa hay is used as a basis for hay acreage figures.

Production: By increase in production is meant an increase in acreage of crops or in numbers of livestock. Neither average yields nor total production are taken into account here.

Dairy Cattle: Increase in the numbers of dairy cattle is figured as a response to changes in the price of butter. Prices of dairy cows sold for meat, of milk or cream sold direct to user, or of butter sold direct are not taken into account, but rather the average price for butter sold by South Dakota farmers.

In each figure were studied and the coefficient of correlation was determined. As indicated by the scatter diagram, the correlation is very low, the coefficient of correlation being only .1732. Take another diagram and association may be said price per a commodity is almost as likely to result in increased production the following year as
PART I - GENERAL EXTENT OF PRICE RESPONSE

Correlation study of all Commodities

Before undertaking the study of the different commodities separately and by groups, the entire group of commodities was examined at once to determine the year to year response to price change. By taking the production response for one year as correlated with the change in price the preceding year, the extent of year to year response to price change was measured.

To determine the amount of response, a scatter chart was made of every reaction for each commodity. (Figure 1) On the horizontal scale we have the corresponding production change for the following year. If the production changes were exactly in response to price change, the dots would all fall in the lower left hand and upper right hand corners of the chart. The scatter diagram clearly indicates that there is not any great amount of correlation between price change and production response the following year, because a large proportion of the dots fall in the upper left hand and lower right hand corners to show inverse instead of positive correlation.

To measure the amount of correlation which does exist, the dots in each square were counted and the coefficient of correlation was determined. As indicated by the scatter diagram, the correlation is very low, the coefficient of correlation being only .1762. This scatter diagram and correlation shows that a high price for a commodity is almost as likely to result in decreased production the following year as it is to result in decreased production.
Figure 1.—Scatter chart of individual production to price change of the preceding year.

Correlation = .1783
For this particular correlation, each commodity was assigned the same weight, that is, a large increase in the price of rye followed by a large decrease in acreage would affect the correlation more than if a small increase in the price of hogs brought a small increase in hog production, because the one positive result is smaller in amount than the other negative result. In order to determine whether the low correlation is caused by this equal weighting of all commodities, the results will be shown later for each commodity separately and in definite groups to show the response to price changes for these various units.

A careful examination of the scatter chart shows that the cases which prevented the correlation from being greater were not a few extreme cases, but numerically were almost as great as the positive results. In fact, a simple count of the dots in the upper right hand and lower left hand sections shows 91 positive reactions to price change, while a count of the upper left hand and lower right hand section shows 80 negative reactions to price change. Taken as a whole, there was no definite year to year response to price change by South Dakota farmers during the past fourteen years. This is true in spite of the fact that market information, probable acreage planted, and livestock figures, and accurate price information have been available to a greater degree during this period than in any period in history. This correlation shows plainly that production can not be forecast on the basis of the prices of the preceding year, at least for all commodities, and it shows further that the agricultural depression of the past few years, with its attendant low prices, has not been a powerful enough factor to cause the South Dakota farmers to reduce production.
PART II--PRICE RESPONSE AS SHOWN BY GROUP TRENDS

Although the previous data tended to show that, taken in the aggregate, there was no definite year to year response to price change, further examination was necessary in order to determine just what the general trend reaction of all the commodities are. In order to do this, the fifteen commodities were separated into three related groups and examined to trace the general response to price change as shown by production trend response to price trend.

Study of Livestock Trends

The first grouping comprises the animals and animal products, namely, hogs, cattle, lambs, wool, butter, poultry, and eggs. The animals in this group utilize very largely the same food products, and if there were a definite response to price change, in periods of low prices, some animals would be dropped out of production somewhat, or some other animal would be substituted for them. That is, either beef cattle or sheep can be pastured in our western counties; either cattle or hogs can be fed out on our corn belt farms; there is some interchange in the production of beef cattle and dairy cattle; and the number of chickens raised may be increased or decreased depending upon the feed supply available and the relative prices of other commodities.

By contrasting the production trends of these commodities and then by contrasting their price trends (Figures 2 and 3) we can see whether or not the South Dakota farmers are governing their production in accordance with the relative prices received for the products. Of the production trends, the most striking is that of sheep. Numbers of sheep raised in South Dakota are increasing very rapidly, especially from 1926 to the present time. Sheep and wool prices, on the other hand,
Figure 2.-Production trends of livestock in South Dakota

1920-1933

(1925 = 100%)
Figure 3.-Price trends of livestock products in South Dakota
1920-1933

(1925 = 100%)
have been uniformly lower than those of other animal products and in 1933 were at the bottom as far as prices of animal products were concerned. The probable reasons why sheep production has shown the trend that it has will be taken up at greater length when the commodities are examined carefully. The idea in this portion of the paper is merely to contrast the various trends in each group and ascertain whether the production and price trends move more or less parallel to each other.

The swine trends of production and price seem to move together rather more closely. Swine production climbed slowly from 1920 until 1925 and has declined rapidly from that time on. It would seem from this, that it is somewhat easier to get in and out of swine production, than of some other farm animals. There has probably been some interchange between sheep and hogs in the southeastern counties, more sheep being fed out than previously.

The production trend of cattle moves almost directly opposite to the price trend, due, perhaps, to the relative slowness of producers in getting in and out of the cattle business. Production of cattle fell steadily from 1920 to 1926, and has been rising slowly since that time. The price trend for cattle rose rapidly from 1920 to 1926 and has fallen steadily since that time. In spite of the fall in price, in relation to 1910-14 prices, beef cattle prices are more favorable than those of any other animal product. This could very readily account for the present increase in production.

The production trend for dairy cattle shows a small but steady rise in the production of dairy cows from 1920 to 1933. Butter prices rose from 1920 to 1925 and have declined since that time. Only chickens and beef cattle show a relatively higher price than butter. Consequently, the rise in numbers of dairy cows might be accounted for by the relative
stability of butter prices. There would seem to be little interchange between beef and dairy cows at the present time since both are increasing in numbers. There might have been more interchange from 1920 to 1927 when the production trend of beef cattle showed a steady drop, and dairy cattle showed a gradual rise. Perhaps some feed formerly fed to swine is now devoted to the feeding of dairy cows also.

Poultry constitutes the last commodity in this group. Figures on poultry production are available only since 1924. The production trend shows a steady increase in numbers of poultry from 1924 to 1930 and a slow decrease after that date. The price trends for poultry show that egg prices have declined steadily since 1920, while chickens gained in price from 1920 to 1925 and have fallen since that time, only cattle occupying a relatively higher position, however. The changes in poultry production seem to take place very slowly, South Dakota not being so much of a commercial poultry state. Most flocks are fairly small, poultry usually being a farm sideline to dispose of waste grains and to furnish meat and eggs for the family. Poultry would probably continue to be produced regardless of prices.

Taken as a whole, these commodities do not show a definite correlation between production trend and price trend. The price trends all fall during the last few years of the period, some, of course, falling more rapidly than others. We find sheep prices falling fastest and sheep production rising most rapidly, hog production and prices seem to be more in line, while cattle, poultry, and dairy cows vary somewhat from the expected. An important point to note is that only hogs and cattle show less production in 1933 than in 1920, and cattle production is mounting steadily at the end of the period. Taken as a group then, livestock producers do not vary their production in accordance with
price changes, and taking livestock production as a whole, South Dakota farmers are not regulating their production in accordance with present low world demand.

Study of most Important Grain Crops

The next commodities to be considered as a group are the important grains; namely, corn, wheat, oats, and barley. Barley is placed in this group ahead of flax because of the manner in which it is increasing in importance at the present time, while flax is decreasing in importance. An attempt will be made here to ascertain if production trends follow price trends for these grain crops, and if there is an interchange in the production of these various commodities in response to changes in their relative prices. (Figures 4 and 5)

The first crop to be considered is corn. The production trend for corn shows a slight rise from 1920 to 1929 and a very slight decrease since that time. The price trend shows a marked increase from 1920 to 1926 and a rapid decline since that time. As to relative position in the group, production trends of both wheat and barley are above the corn trend, while only oats shows a more favorable price position. Consequently, the two trends are at variance with one another. The relative stability of corn acreage is, no doubt, due to the relative advantages of corn as a feed and cash crop in South Dakota.

The production trend for wheat shows a slightly downward trend from 1920 to 1933 and a marked increase in acreage since that time, only barley showing a greater rise in production. The wheat price trend shows a very small rise from 1920 to 1923 and a rapid decline since that time, wheat prices being in the most unfavorable position relative to the other crops in the group. Here again, production can not be accounted for by price trend.
Figure 4.-Production trends of the four main grain crops in South Dakota - 1920-1933 (1925 = 100%)
Figure 5.--Price trends of the four main grain crops in South Dakota - 1920-1932 (1925 = 100%)
Oats production is the most stable of the grain crops. The trend line shows a very gradual rise in acreage from 1920 to 1926 and a gradual fall since that time, oats being the crop with the lowest acreage in the group relative to the base period. Oats prices rose steadily from 1920 to 1925 and declined since that time, yet the oats trend is at all times higher than the trends of any of the other crops in this group. The grain crops seem to vary consistently away from the expected as to production trends.

Barley shows the greatest upward swing in production trend. Acreage has increased consistently since 1920 and shows no signs of stopping. In contrast to this consistently upward trend in acreage, we find the price of barley rising from 1920 to 1925 and declining since that time, only wheat prices being more unfavorable.

Taken as a whole, this group shows excellent inverse correlation. Cash crop shows an opposite relationship between the position of its production trend and its price trend. Very little land interchange between these commodities could be shown because acreage of three of them is increasing while oats acreage is decreasing very slowly, giving way, perhaps, to barley in recent years because of its better drought resisting qualities. Since acreages of the entire group increased during the period, it is evident that the South Dakota farmers are not taking their crop land out of production because of lowered prices, but are continuing production on a larger scale than ever. Such action aids in explaining why surpluses are piling up in the United States in many of our grain crops.
Study of trends of Miscellaneous Crops

The price and production relationships of flax, rye, hay, and potatoes are considered in this section. (Figures 6 and 7) It was felt that there was more likelihood in most parts of the state for substitution between these crops than between any of these and the before mentioned grain crops. These crops in most sections of the state are found on smaller plots and compete between themselves for acreage, while the four other grain crops compete in most areas for the larger tracts of land. It would be better if the acreages of prairie hay, other wild hays, the legumes other than alfalfa, the sorghums, and other miscellaneous crops could be examined here, but figures are not available so that their trends could be figured.

Flax is perhaps the most important of the miscellaneous crops. The production trend for flax shows an increase in acreage from 1920 to 1927 and a gradual decrease in acreage since that date. The price trend for flax shows a gradual rise from 1920 to 1925 and a more rapid fall from 1926 to 1933. Only rye shows a more rapid fall in price than flax, while all of the commodities show a more rapid increase in production. Flax seems to be giving up some of its acreage to other crops.

Rye shows the most rapid rise in acreage planted. Although it fell in acreage from 1920 to 1926, its rise since that time has been phenomenal. This rise in acreage conflicts with its price trend which at the beginning of the period was the most favorable of these crops, and at the end of the period was the most unfavorable. Rye is usually not grown in South Dakota as a main crop, and, consequently, its production seems to proceed regardless of price relationships.
Figure 6. -- Production trends of miscellaneous crops in South Dakota - 1920-1933 (1925 = 100%).
Figure 7.—Price trends of miscellaneous crops in South Dakota - 1920-1935 (1925 = 100%)
Potatoes show the largest downward trend in production from 1920 to 1928, and a slight rise in acreage since that time. The potato price trend, on the other hand, is relatively stable, declining very slowly through the fourteen years of the study. The potato acreage is so small, and the product so perishable that yearly shortages tend to keep the price trend for potatoes rather high. Although some potato producers may increase their production in response to a high price for potatoes, the experience has usually been, in South Dakota, that a poor crop paid better than a good one because of higher prices, so that production as a whole is not encouraged.

Hay is the most stable commodity in the group. The production trend for hay shows a slow rise in acreage from 1920 to 1929 and a slower fall in acreage after that date. Hay prices have also been very stable, declining slowly since 1920, but now occupying the best position of any of the miscellaneous crops. In spite of this high price, not much hay is produced commercially in South Dakota because of the relative advantages of other commodities.

Very little response to price change in this group is expected because of the many factors other than price change which causes farmers to increase or decrease their acreages of these crops. Of these four crops, only potatoes shows a smaller acreage in 1933 than in 1920, more proof that South Dakota farmers are not contracting their acreage because of poor prices. From studying these three groups of commodities, several distinct conclusions can be drawn. The first conclusion is that the production trend line for a commodity usually bears little or no relation to the corresponding price trend line, either in direction or in its relative position to the other members of the group. The second conclusion is that interchange of acreage between crops is not
apparent without a closer examination. The third conclusion is that South Dakota farmers had expanded their production to a very high point by 1920, but that they are continuing to expand their production of most types of crops and livestock at the present time, despite the extremely low levels of prices. The individual farmer sees the problem from his own point of view, and what he must do is to produce more commodities than ever because prices are so much lower than before, and he must try to keep up his income. It is evident that the surplus problem can not be solved from within, and action by outside agencies seems essential to recovery.

PART III - TRENDS BY INDIVIDUAL COMMODITIES

It is the purpose of this section of the study to show the manner in which the producers of each of the fifteen major commodities are changing their production. The primary factor is their reaction, or lack of reaction to price change. Along with this price study goes a study of the reasons why the producers acted in the way that they did. The commodities are treated separately, but the effects of other commodities will be noted wherever it is considered advisable to do so. In order for this information to be of value to a person using a diversified form of farming, he must note the proper procedure to follow for each commodity produced. The actual form scheme to be recommended to a producer in any part of the state lies in the field of farm management. All that this study can do is to show the present production and price trend giving information concerning commodities which are in a relatively unfavorable position from the standpoint of price, and also to some extent, what their future will be.
Animal Products

Figure 5.—Annual and seasonal production and annual average price of hogs in South Dakota

Raising hogs and selling hog products constitutes the major enterprise in South Dakota from the standpoint of cash income to South Dakota farmers. From a computation of the 1926-30 five year average farm income, Professor R. E. Post of the Agricultural Economics Department at South Dakota State College finds that 32 per cent of our annual farm cash income is derived from the sale of hogs. In other words, nearly one third of all the cash income accruing to South Dakota farmers is from the sale of hogs alone. No other product approaches hogs in cash sales.

As shown by an examination of the trend lines for hogs, hog production reached its peak in 1923 and has been declining since that time. (Figure 8) Considering the 1925 production as a base of 100 per cent, we find a production of 81.9 per cent in 1920, the first year of the study, 126.0 per cent in 1923, a low point of 56.6 per cent in 1932 and a small rise of 66.6 per cent in 1933. Of course, for 1934, numbers of hogs are to be regulated somewhat by the Agricultural Adjustment Act.

Farmers seemed to be producing less of their most important cash crop. Most of the hogs in South Dakota are produced in the central, eastern, and southeastern sections. A copy of the divisions of the state as used by the Crop and Livestock Estimating Service of the United States Government is shown here. (Figure 9) The state is divided into nine more or less distinct districts. In districts five, six, and nine, the hog production of South Dakota is centered. Of the 950,000 hogs on farms in South Dakota in 1925, the base year, we find 140,000 in District five, 210,000 in District six, and 250,000 in
Figure 8.—Annual and trend production and annual average price of hogs in South Dakota 1920-1955 (1925 = 100%)
Figure 9.-Divisions of the state by the Bureau of Crop and Livestock Estimates of the U. S. D. A. SOUTH DAKOTA
District nine, or approximately 70 per cent of all hogs in South Dakota are located in these three districts.

For the state as a whole, we would expect a lessening in the production of hogs because of present poor prices. In 1932, hogs sold for less money per hundred weight than at any other time this century. Our European market for hog products has fallen off considerably since the war, due to unfavorable trade conditions. A further unfavorable factor has been increases in hog production in European countries—Germany, Denmark, and the Netherlands, since they are the chief hog producing countries in Europe. Their production fell off greatly during the war, while hog production in the United States and Canada increased in proportion to meet increased European demand. Now with European production above its former level and with exports of hog products less than before the war, and only about one third as large as the 1916-1919 level, the American farmers as a whole are producing as if there had been no change in the hog situation in Europe.

South Dakota farmers do not respond accurately to yearly fluctuations in the price of hogs. That is, out of the twelve years of the study, seven times their reaction to a higher price was lowered production the following year, or reaction to a lowered price was an increased production the following year, while only five times did an increase in price bring increased production or a decrease in price bring decreased production. Hog production has been shown to move in cycles, usually somewhat modified by the current corn hog ratio.

Although there is no positive year to year reaction to price change, none could be expected because there are not enough farmers who move in or out of production in response to the prices for one year. For the state as a whole, however, the response seems to be in the proper
direction. There seems little likelihood of our regaining our European market for hogs, and there probably will not be any market expansion in demand in the United States. Since present hog prices are ruinously low, those South Dakota farmers who do not have a good supply of cheap food available might just as well get out of the hog business before they are forced out. The sooner that the less efficient and higher cost producers are forced out, the greater is the chance for a profit for the limited number of producers in South Dakota who are favorably situated.

The three important hog producing districts register the decline in production to the greatest degree. In 1920, these three districts produced 500,000 of the 775,000 hogs produced. In 1933, they produced 380,000 of the 630,000 produced. Their decrease was 120,000, while the decrease for the state was 145,000. Production in the less important regions seems to be more stable, due, perhaps, to the fact that they are raised more in small units for nearby consumption. The corn hog region seems to be more abreast of the times, and their policy of contraction is entirely logical.

The government at the present time is aiding in the orderly retreat of producers from hog production through the Corn-hog program. With this government aid, hog supplies may be adjusted more nearly to demand until such times as our sales abroad may increase.

Another factor which is operating to keep down hog production in South Dakota is unfavorable natural conditions. Since 1920, the annual rainfall in South Dakota has been consistently below normal. Since 1920, the average corn yield for the state has been below 20 bushels per acre six times. Drought and grasshoppers have been the main factors causing this, although there is undoubtedly some decline in soil fertil-
ity also. A few bad crops quickly act to cut down hog production, because it does not pay most hog feeders to buy grain for hog feeding in South Dakota. Although past years of drought have helped to cut production, with an increase in yields, some other factors must be operative to prevent hog production from jumping back to previous levels, since price alone can not control it. Therefore, the government seems to be stepping into the picture at a highly auspicious time.

Beef Cattle

On the world market, United States beef producers find it very difficult to compete with the Argentine beef. South Dakota farmers, contributing on the average of 19 per cent of the average yearly income. The beef cattle industry in South Dakota is spread over the entire state. The extensive grazing lands in the Dakota produce make possible considerable grass feeding, while an abundance of feed grains in the eastern section of the state encourages feeding in feed lots. Most dairy cattle in the state are sold as beef cattle whenever they cut down on milk production, or when feed needs for new cattle in the central area are not adequately supplied by grass. Consequently, we find seven of the nine crop districts reported having over 150,000 cattle in 1925.

Abundance of cattle over the state and a variety of feeding conditions make for more or less stable numbers of cattle. It takes quite a long period of time for anyone to go into the cattle business because of the relatively long period of maturity as compared to hogs or sheep.

Considering the year to year response to price changes, we find that half the time high prices bring increased production and low prices bring decreased production, while the other half of the period the opposite is true. It is relatively hard to shift cattle production from year to year because plans are usually made on the basis of more than one year.
As explained earlier in this study, the present upward swing in cattle production may be accounted for by the relatively high prices of cattle products as compared to other livestock products.

From 1920 to 1927, a period of eight years, cattle dropped from a production of 1,900,000 to a low mark of 1,275,000. Since 1927, the production of cattle has increased steadily and now totals 1,700,000. (Figure 10) This increase can not be accounted for by increased demand outside of the United States because our foreign market for beef will probably never again reach the high levels that it has in the past. On the world market, United States beef producers find it very difficult to compete with the Argentine beef.

We have never reached the heights of overproduction of beef cattle in the United States as we have of many other commodities. In South Dakota, producers are finding it difficult to secure adequate prices for their blooded stock, and even on the market, low prices have caused a relatively small differential between high grade and low grade cattle. Although the present trend upward in numbers produced does not represent a need for more cattle in the United States, it will probably cause less trouble than a similar increase in hog production would cause. The United States government seems to feel that an emergency does not exist as to beef production in nearly as great a degree as in hog production, and no beef reduction has as yet been put into effect.

As to a policy for the future, it is felt that production of beef cattle is essential to South Dakota prosperity. There are considerable areas in this state where the land is unsuitable for crop production and cattle or sheep can utilize this roughage very efficiently. Furthermore, because of the distance from market, many South Dakota crop pro-
Figure 10.—Annual and trend production and annual average price of cattle in South Dakota 1920-1933. (1925 = 100%)
ducers find that their grain can be marketed much more efficiently if shipped to market as pork or beef. Because of their undoubted utility under South Dakota conditions, beef cattle will continue to be produced here. The existing favorable price relationship between cattle and hogs may be expected to continue for a few years at least.

**Dairy Cattle**

Dairy cattle occupy a relatively important role in South Dakota agriculture, 11 per cent of our total cash income being derived from the sale of dairy products. Of course this revenue is derived mainly from the sale of butterfat by farmers, although some producers near cities sell whole milk direct to consumers. Sale of dairy animals at the live stock markets is not differentiated from other cattle sold, so that revenue from this source can not be ascertained.

The chief dairy regions in the state are the three eastern districts which in 1925 contained more than one half of all the dairy animals in the state. These counties contain larger supplies of the feed crops necessary for profitable butterfat production. Even here, dairying is usually a sideline enterprise, the average farmer keeping a few cows for butterfat production, pure bred stock being the exception, and poor feeding methods usually being practiced. Under conditions such as these, high prices for butter do not have much effect on amount of butterfat produced, because most of these scrub cattle are not good dairy types.

Some interchange between beef cattle and dairy cattle has been noted before, farmers keeping their cows for butterfat production if butter prices are high, and fattening them and selling them for beef if prices are more favorable. Dairymen are not dependent upon a world
market for the disposal of their products, and consequently production can be arranged more upon a national basis. Some overproduction exists at the present time in butterfat production, but it is still profitable for South Dakota farmers to keep dairy herds. It would be much more profitable for them if they would handle more economical units and handle their herds in such a way as to increase their production per cow.

From a study of the production response to price change the preceding year, it is evident that dairymen do not change rapidly nor accurately, for in eleven cases out of twelve, an increase in price was followed by a decrease in production, or a decrease in price was followed by an increase in production. This merely indicates that it is a relatively slow matter to get in or out of butterfat production and that South Dakota farmers have not done an accurate job of forecasting future prices.

Under present conditions, dairy cows are profitable receptacles for South Dakota grain and hay. Although there is a lack of a suitable market for first class butterfat in most parts of the state, the price is still relatively favorable, and there is not as much danger of the market becoming over-stock ed in the future as there is for some other countries.

Considering the number of cows kept for dairy purpose in 1925 as 100 per cent, the production figures now show a total of 111.5 per cent for 1933. (Figure 11) If butterfat prices continue to be favorable, a continued increase in the number of dairy cows in the eastern half of South Dakota can be anticipated. Perhaps it would be more profitable for South Dakota farmers to improve the herds that they now have rather than adding to them. Feed supplies will probably be a limiting future in the future also as they have in the past.
Figure 11.—Annual and trend production of dairy cattle and annual average prices of butter in South Dakota, 1920-1933

(1925 = 100%)
Poultry and Eggs

Production of poultry and eggs in South Dakota is a quite important enterprise, four per cent of the annual cash income being derived from the sale of eggs and three being derived from the sale of chickens. This furnishes a stable enterprise under South Dakota conditions, the work usually being done by the farmer's wife or children, and the steady income from the sale of eggs is quite desirable. In most cases, the raising of poultry does not constitute the major enterprise on the farm, but is merely a side line.

Poultry raising has been increasing in importance on South Dakota farms during the past few years. State's assessors records on poultry numbers only go back to 1924, but since that time their numbers have been increasing quite steadily. (Figure 12) Considering 1925 as a base of 100 per cent, poultry production showed a gain to 112.5 per cent in 1930, a low point of 94.5 per cent in 1932, and in 1933 advanced to 103.5 per cent of the base period. The sharp decline in numbers in 1932 can readily be accounted for by the severe drought and crop failure in 1931 which decreased feed supplies tremendously and forced curtailments in virtually all animal feeding lines.

Considering the year to year response to price change, we find that poultry production seems to respond more accurately to changes in egg prices than to changes in meat prices. For eight out of the nine years for which figures are available, a raise in egg prices resulted in an increase in poultry production, and a fall in prices resulted in a decline in production. A raise in price of live poultry brought a raise in production, or a decline in price brought a decline in production the following year only five times, while the opposite was true for the other four years. In reality, there exists considerable inter-
Figure 12.—Annual and trend production of poultry and annual average prices of poultry and eggs in South Dakota, 1920-1935

(1925 = 100%)
action between egg and poultry prices to bring an increase or decline in production. Feed available also is a factor to consider. During periods of high egg prices, more hens are apt to be retained and this will be likely to cause an increase in the number of chickens the following year. It is an excellent case of joint supply goods.

The important sections of the state in respect to poultry production are districts six and nine, the southeastern districts of the state where feed supplies make poultry production more profitable and markets are more readily available. In both 1924 and 1933, these two districts contained about one half of all chickens in South Dakota. Movements in and out of poultry production in these areas bear a close relation to movements in the state as a whole, production being highest in 1930 and lowest in 1932.

Because of the shortness of the period studied, it is impossible to ascertain whether South Dakota's poultry production follows the four year cycle generally attributed to production over the United States as a whole. Production is perhaps more elastic here in response to poultry and egg prices and to the ratio between feed costs and the prices of poultry.

Poultry production is based on a United States market. Since there is an almost complete lack of disturbing foreign elements, it is easier to forecast year to year demands for poultry products. Undoubtedly, South Dakota farmer's can afford to place their poultry on the market in competition with the poultry of other states. Poultry prices are in a favorable position relative to the prices of other animal products, and this condition can be expected to continue to some extent. Our markets for poultry products are more stable and it is easier to forecast prob-
able demand which makes year to year adjustments in response to price change much easier. 

Sheep and wool production of sheep and annual average prices of lambs and wool in South Dakota, 1926-1935, (1925 = 100)

Sheep and Wool

Sheep and wool are the least important of the livestock enterprises in South Dakota, sheep and lambs furnishing only one per cent of our annual cash income from 1926 to 1930 and wool furnishing less than one per cent. However, there has been a remarkable gain in sheep production since 1926, and sheep revenues may play a larger part in the future.

Considering 1925 as a base of 100 per cent, we find sheep production at 124.2 per cent in 1920, declining steadily to a low point of 96.4 per cent in 1924, and then increasing rapidly to a high of 191.6 per cent in 1933. (Figure 13) Although district one, comprising the northwest corner of the state, is the most important sheep country, the greatest growth has taken place in other districts. This district produced about 55 per cent of our sheep in 1925, but in spite of the fact that production as a whole leaped from a point of 100 per cent in 1920 to 142.5 per cent in 1933, this district now produces only 41 per cent of South Dakota's sheep. Contrasted to this we find gains of from 170.6 per cent to 824.6 per cent in the other districts. Much of the increase in the eastern districts can be accounted for by the increase in the supplies of feeder sheep which are replacing hogs on many farms.

Production of sheep on our western ranges can be expected almost regardless of changes of price because of the area being unsuitable for anything except grazing. There is some interchange between beef cattle and sheep in these areas, but sheep are definitely more advantageous in
Figure 15.—Annual and trend production of sheep and annual average prices of lambs and wool in South Dakota, 1920-1933 (1925 = 100%)
some sections. The increase in other areas can not be attributed to markedly higher prices, because, relative to 1910-1914 price levels, sheep products are in a relatively worse position than any other animal products. Poor crop years cause sheep to increase in respect to hogs or beef cattle because of the smaller amount of concentrated feed necessary to fatten sheep.

Considering the year to year production change in response to price change, we find an increase in price bringing an increased production the following year, and a decrease in price bringing a decrease in production seven times, with the negative reaction taking place five times. Here, as elsewhere, by a reaction to price change from year to year, we mean that an increase or a decrease in the actual average price received by the farmer in South Dakota is compared to the change in production the following year as to whether it shows an increase or a decrease.

Under conditions of regular rise and fall in prices, we might expect a corresponding rise and fall in production the following year sufficient in extent to show a positive reaction, but due to prolonged periods of falling or rising prices on the one hand, and prolonged periods of increases or decreases in production on the other, we do not find the year to year changes occurring in the way that one might expect.

Sheep production could not be expected to increase in the way that it has because of price alone, because sheep occupy an unfavorable position in relation to the prices for other animal products. However, from a long-time point of view, either the wool clip or the actual mutton sales can be expected to show more stability than the prices of either hogs or cattle. We do not face as much foreign competition for mutton sales, and we do not have to depend upon a foreign market.

Of course, we must meet foreign competition in our sales of wool, but
wool is relatively unimportant item in our state cash income. We are not faced with a greatly decreased demand for sheep products, and the price evidently looks sufficiently good to South Dakota farmers to cause them to expand production.

Undoubtedly it would take a low price to force South Dakota sheep owners to curtail production. They are in a relatively favorable position as to sheep production, and can be expected to follow any rise in sheep prices with further increases in sheep production. It is probable that sheep will replace hogs to a certain extent on South Dakota farms, although this will be true to only a limited degree in the true corn and hog section.

Field Crops in South Dakota

The various field crops will now be examined to see the production and price trends, the probabilities of interchange between crops, and probable reasons for the various changes. Although the crops do not represent as large a total of our annual cash income as do the livestock products, it must be remembered that every pound of livestock products marketed represents several pounds of feed utilized in producing the livestock product marketed. Although there are large areas of sub-marginal land being cropped in South Dakota, there are also thousands of acres of first rate crop land. Undoubtedly, adjustments will have to be made in certain sections, and it is these adjustments that this study should point out.
Wheat

Wheat represents the major cash grain enterprise in South Dakota, 12 per cent of the average annual cash income being derived from this source. Spring wheat represents the major portion of this income, the winter wheat acreage in 1925 being only four per cent of the spring wheat acreage. By far the outstanding wheat section is found in districts two and three, representing the north central and northeastern portions of the state, more than 50 per cent of the wheat being grown in these sections.

Production of wheat in South Dakota was at a high point during the early years of the century, when wheat was raised year after year as the only crop on vast areas. Due to declining fertility and prices, a more diversified type of farming gradually supplanted the previous system of one crop farming. Considering 1925 acreage as a base of 100 per cent, acreage in 1920 equalled 110.8 per cent, in 1924 a low point of 85.2 per cent was reached, and since that year production has gradually increased until a high of 146.9 per cent was reached in 1933. (Figure 14) This increase did not come from increases in acreage in the wheat belt entirely, because 1933 figures for district two, the most important district, show only 115.6 per cent for 1933, and district three shows 108.3 per cent for 1933, both contrasted to a 1925 figure of 100 per cent. The greatest percentage gains in wheat acreage are evidenced in other districts, notably the three southern districts where increases to percentages of 521.9 in district seven, 446.5 in district eight, and 152.3 in district nine can be noted. These increases are due in large part to the conversion of pasture or hay-land into wheat, and some diversion of land from other crops to wheat production because of the desire for a cash crop.
Figure 14.—Annual and trend production and annual average prices of wheat in South Dakota, 1920-1935. (1925 = 100%)
This increased production can in no way be accounted for as a reaction to price change. The price trend of wheat has been consistently downward during this period, and is below the price trend of any other important grain crop in the state. Furthermore, there seems little likelihood that there will be any marked upward swing in the wheat price trend. Expansions of acreage in European and the other foreign wheat exporting countries, added to trade restrictions and expansion of acreage in wheat importing countries, places the world in a situation of marked wheat overproduction. According to the terms of the London Wheat Conference, the wheat export quota of the United States is very definitely limited. Due to the lack of a market, the United States government is attempting to help in the orderly retreat of the wheat producers in the United States. Curtailment is essential if prices are to be very high. Quantities of sub-marginal wheat land will undoubtedly be forced out of production, and some of these areas are located in South Dakota.

Yearly annual prices of wheat in South Dakota reached a low in 1932 of 25.4 per cent, compared to a 1925 base of 100 per cent. In response to the year to year fluctuations in the price of wheat, we find South Dakota farmers increasing their acreage the year after a rise in price and decreasing their acreage the year after a fall in price eight times, while in the four other years, the reaction was negative. This expresses a high year to year correlation which would be expected. It is evidently easier for farmers to respond to the year to year variations than it is to respond to the general trend. Considering the price trend and the acreage trend, wheat producers in South Dakota are heading for trouble, and must either reduce their acreage voluntarily or be forced to do so by continued low prices. Since there is land in South Dakota which is extremely favorable for wheat production, it will
continue to produce wheat, but diversified with other crops. The sub-
marginal land must drop out of production to keep wheat prices from
being depressed still more.

Corn

Corn ranks second in South Dakota as a cash crop, four per cent
of our average annual cash income being derived from the sale of corn.
It ranks first as a food crop, forming the basis for the feeding of
hogs, beef cattle, dairy cattle, poultry, and to a limited extent, sheep.
Without corn, many South Dakota farmers would soon become bankrupt.

The southeastern section of South Dakota is part of the United
States Corn Belt. In districts six and nine, we find about 45 per cent
of South Dakota's corn acreage and the highest yielding part of the
state. In the other districts, corn is raised for a grain crop, if
possible, but in poor years it at least makes fodder. Most of the
corn is used for feed in all sections except the southeastern counties.
Here enough is produced to leave a salable surplus.

The price outlook for corn has been somewhat better than for
wheat, but is not very favorable. The price trend shows a consistent
decline in line with other price declines. In the fall and winter of
1932, corn prices hit bottom, yet very little corn land dropped out of
production the next year because of these low prices. Corn is produced
in the United States on a national basis. Almost all of the corn pro-
duced finds feed or commercial utilization in the United States, so
that adjustments can be made on the basis of national demand. A decrease
in the cash price for corn is immediately reflected in increased feed-
ing operations, and a high price for corn decreases feeding operations,
so corn works in an interdependent way with livestock prices. With the
existing falling off in our market for pork and pork products abroad, some readjustments in corn production seem essential to prevent the problem of an exportable corn surplus in this country.

There is at present some indication of decreased production of corn in South Dakota, this decline being shown in all districts of the state, due perhaps to low prices for corn and livestock products. In 1920, corn production was at a level of 81.0 per cent. This rose slowly to a high of 115.4 per cent in 1931, and had declined to 102.5 per cent in 1933. (Figure 15) A period of low average yields showing figures of 16.0 bushels per acre in 1930, 5.2 bushels in 1931, 14.7 bushels in 1932, and 12.0 bushels in 1933 probably had considerable influence in causing acreage cuts. South Dakota is suitable for corn production only under conditions of an adequate moisture supply, and this has been lacking during recent years. A return to normal precipitation with resulting higher yields of corn would probably result in an upward trend of corn acreage once more. Consequently the government's program of reduced acreage of corn and reduction of numbers of hogs is probably quite essential.

Although the general trend of corn production reacts more to yield perhaps than to price received for corn, year to year increases or decreases in acreage seem to bear a close relation to increases or decreases in price the preceding year, the response being positive for nine out of the twelve years. This would indicate diversion to other enterprises following poor prices for corn. For long periods of time, however, corn acreage is more or less stable, and no rapid upward or downward trend can be detected. If crop land in sub-marginal areas is taken out of production, corn acreage will decrease along with decreased acreage of other crops grown in these areas. In the main corn areas of
Figure 15.—Annual and trend production and annual average prices of corn in South Dakota. 1920-1955 (1925 = 100%)
of the state, little decrease in production can be looked for because of the relative profitability of corn production. Increased diversification and adoption of better crop rotations may aid in decreasing corn acreage. Demand for corn for feed may be lower for a few years because of lessened hog feeding. However, not much adjustment should be necessary on corn belt farms, and corn prices should return to somewhere near normal in the future. Although numerous deterrent factors are operating against upward corn price trends, there is not as marked an unfavorable foreign trade situation as there is for wheat.

Flax

The sale of flaxseed in an average year amounts to four per cent of the South Dakota farmers' annual cash income. Almost all flax raised is shipped out of the state, and is treated commercially in the production of flaxseed meal and linseed oil. The flax straw is also readily salable. In times of depression, demand for linseed oil drops off very rapidly because of the decline in the amount of painting done, and consequently the price of flaxseed falls.

In South Dakota, the flax areas correspond very closely with the spring wheat areas, the north central and northeastern districts being the main areas devoting much acreage to flax production. These areas have declined greatly in acreage devoted to flax production since 1925. Considering the 1925 acreage as 100 per cent, flax acreage was 44.4 per cent in 1930, and in 1933 declined to a new low mark of 22.4 per cent. (Figure 16) This decline was felt in district two to 9.7 per cent of its 1920 acreage, and the decline in district three to 34.1 per cent of its 1920 acreage were the important factors in causing the state decline.
Figure 16.—Annual and trend production and annual average prices of flax in South Dakota, 1920–1933 (1925 = 100%)
Flaxseed production in the United States usually does not exceed demand, and foreign competition is excluded by a 65 per cent import tariff. This gives a relatively stable market at a good price for flax produced in the United States unless demand is cut off by unusual factors. If it were not for this tariff, flax producers would be hard pressed to meet competition from abroad. As it is, some flax products are usually shipped into the United States over the tariff to meet demand here. At the present time, however, in spite of acreage reductions, almost enough flax is produced to meet domestic requirements. Present reductions are very much in line with decreased demand, and acreage will probably increase along with a return to normal business conditions.

Because of the relatively small acreage in South Dakota, it is easy for producers to expand or contract acreage in accordance with prices.

Over a twelve year period, flax producers expanded acreage the year following an increase in price, or decreased acreage the year following a decrease in price eight times, and the response was the opposite to the expected four times. This would indicate a rather quick response to changes in price. Especially to be noted is the rapid decline in total acreage from 144.4 per cent in 1930 to 22.4 per cent in 1933.

During years previous, flax wilt was a factor in preventing increases in flax acreage in South Dakota, but with the development of wilt resistant varieties, that factor declines in importance. At the present time, price seems to be the determining factor. Therefore it can be expected that the amount of flax produced in the important flax areas should be dependent upon the revival of business with its accompanying construction boom and increased demand and utilization of linseed meal.
oil. The market for linseed meal depends, to a considerable extent, upon high prices for dairy products. Until such revival takes place, present flax production can be considered adequate.

Barley

Barley is increasing in importance as a cash and feed crop under South Dakota conditions. The average annual cash income from the sale of barley constitutes three per cent of the total annual cash income of South Dakota farmers. Barley is also growing in importance as a feed crop, and with the return of beer, an increased demand for malting barleys is also felt.

Barley is grown chiefly in districts two and three, and to a lesser extent in districts five and six. Barley production is now rapidly increasing in South Dakota. In 1920, production was 118.0 per cent of the 1925 total, it declined to a low point of 81.4 per cent in 1924, and it has increased since that time to a new high of 236.8 in 1933. (Figure 17) This increase was apparent in all districts, but was least in the districts which already had large production. Acreage in district two showed 175.6 per cent in 1933, district three was 143.8, district five 234.2 per cent, and district six 351.9 per cent. District nine represented considerable gain, its 1933 total being 535.4 per cent of its 1925 figure.

There has been considerable interchange of acreage between barley and oats during the past few years. Because of its greater drought-resistant qualities, barley has proved itself a better crop for South Dakota conditions during recent years. Based upon average yields and average prices, it is a more profitable crop. It is also more resistant to grasshoppers than is oats. This favorable price relationship is being
Figure 17.—Annual and trend production and annual average prices of barley in South Dakota.  
1920-1933  
(1925 = 100%)
expressed by a marked upward swing in the production trend. Malting barley is increasing in importance because of the demands of the beer trade. Some parts of South Dakota can produce fine, mellow malting barleys which command a premium price on the market.

Although national conditions favor barley production, the United States can not expect much in the way of barley exports because of tariff restrictions. Consequently, barley production must be based upon United States consumption. With increased utilization for malting purposes and increased use of barley to replace corn and oats as a feed crop, the demand should be sufficient to take care of the present increased supply. It will probably pay South Dakota farmers to increase their barley acreage at the expense of oats and corn.

There does not seem to be as great a positive reaction in the year to year change in the acreage of barley in response to changes in price the preceding year, since the change is positive in only half the cases and negative the other half. This would seem to indicate that the reaction has been rather more of a trend reaction toward production of barley in preference to other grain crops, rather than a year to year change because of price changes.

Oats

Production of oats as a feed crop in South Dakota has long been of importance. As a cash crop, oats furnishes only two per cent of our annual cash income. The entire eastern half of the state devotes large acreages to oats, and it is also important to a lesser degree in the western counties. South Dakota is one of the most important oats producing states in the United States.
Acreage of oats in South Dakota is very stable. In 1920, production was at a low figure of 77.4 per cent of the 1925 acreage. Production increased to its highest point in 1925, declined to 80.2 per cent in 1926, and has not varied more than 2.4 per cent from this figure in any year since. (Figure 16) This stability is uniform through all of the main producing areas, and can be expected to remain about the same in the future.

Oats will probably continue to be grown on a large proportion of the farms in eastern South Dakota because of the satisfactory nature of the crop as a feed for productive livestock as well as work stock, and because of its supplementary character in the cropping system. Because of present low hay supplies, oats is frequently sowed, especially in the western counties, with the expectation of cutting it for hay in case it does not produce grain. Because of drought and grasshopper infestations, barley and sorghums are being substituted for oats, but this has not brought about an appreciable decline in acreage as yet.

There is very little reaction to price change on an "acreage planted reaction to price change the preceding year" basis. In only five years did an increase in price bring an increase in production the following year, or a decrease in price bring a decrease in production the following year, while in seven years, the reaction was the opposite of the expected reaction. Considering the price trend of oats, we find it in a relatively more favorable position than the price trends of any of the other grain crops, and yet the acreage remains relatively constant. This shows that South Dakota farmers do not raise oats as a cash crop, but grow it for feed and sell the surplus if one exists. Price is not the determining factor. Our exports of oats from the United States are rather small, the crop being raised largely on a national basis. It fits very
Figure 18.—Annual and trend production and annual average prices of oats in South Dakota. 1920-1935 1925 = 100%
very well into almost any crop rotation advised for South Dakota farmers, and approximately the same acreage or a small decrease can be expected in the future.

Potatoes

Although potatoes are grown on a commercial scale to an important extent in only six South Dakota counties, they furnish one per cent of our annual cash income. Outside of these six east central counties, South Dakota counties either have a potato deficit or produce a very small amount more than they consume. Consequently, reactions to price change are really important only from the standpoint of these few potato surplus counties contained in districts three and six. Production in the other counties is devoted almost entirely to the satisfaction of local consumption, and variations in acreage mean very little in actual production.

Potato production in South Dakota reached its high mark of 259.7 percent of the 1925 acreage in 1922. Production declined after that to a low point of 90.6 per cent in 1926 and then rose steadily to 170.3 per cent in 1933. (Figure 19) Considering the two important districts, district three reached a high point of 344.6 per cent in 1922, declined to a low of 69.4 per cent in 1926, and increased to 219.8 per cent in 1933. District six had a high point of 248.2 in 1922, a low point of 79.3 in 1926, and a 1933 total of 165.8, so it is evident that as these two districts go, so goes the state.

Although it is usually considered true that potato production expands after a year of high prices and declines after a year of low prices, results over this fourteen-year period do not bear this out. During only five years does high production follow high price or low production follow low price, while during seven years the opposite is true. The present up-
Figure 19.—Annual and trend production and annual average prices of potatoes in South Dakota, 1920-1935
(1925 = 100%)
ward trend in potato prices could perhaps be accounted for by the relatively high level of potato prices compared to other farm prices. Since potatoes are grown entirely to meet the United States demand, that demand sets the price. Because of the inelasticity of demand for potatoes, poor crop years usually give the highest net returns because of higher prices, while low prices result during good years. Producers continue to grow potatoes because there is always the possibility of a good crop along with a failure in other regions and a corresponding high cash return per acre planted. Of course, in some years, prices paid to South Dakota potato raisers are so low that it does not even pay to dig the crop.

Studies made in South Dakota show that potatoes can be produced on a profitable basis in this one area of the state. Since there is no worry of foreign competition or loss of foreign markets, it is possible to regulate potato acreage with national demand. The present upward trend of production in South Dakota can not be accounted for by increased demand, because less potatoes are consumed than formerly. Much of the shift after 1929 is probably due to the relatively favorable position of potato prices as compared to the prices of the other crops which can be grown in the same region, and so it constitutes a trend upward in response to a relatively higher price trend. A few years of very poor potato prices would probably force South Dakota acreage downward again because of the choice of crops available and competing for this land.

Hay

Although most of the hay raised in South Dakota is used in this state for feeding purposes, sales of hay are sufficient to equal one percent of our annual cash income. Hay is an important crop in all parts of the state, prairie hay being especially important in the western half of
the state, while tame hays have become very important in the eastern half of the state. The only trends to be considered here are the production trend of alfalfa hay and the price trend of all hay. Alfalfa hay was the only hay for which figures were available in comparable form back to 1920.

The two districts which contain the greatest acreages of alfalfa hay are district four which contains the Black Hills and the surrounding irrigated regions, and district nine, the southeastern corner of the state. In all other districts, at least 25,000 acres are planted to alfalfa hay. Production has changed rather slowly over a period of years, but there was a constant increase in alfalfa acreage from 1920 to 1931. Production in 1920 was 64.6 per cent of the 1925 acreage, increasing by 1931 to 130.4 per cent, and then declining in 1933 to 102.4 per cent. (Figure 20)

The year to year changes in acreage are about as would be expected from a commodity like this. In six years out of the twelve, an increase in price was followed by an increase in acreage the following year, and a decrease in price was followed by a decrease in acreage the following year. Considering the small amount of alfalfa that is sold and the large number of fields that are sowed to alfalfa and utilized for that crop for several years, no rapid change in production would be expected.

From a long time standpoint, hay makes a very profitable crop on land that is suited to it. A stable market exists for any salable surplus, and wide price fluctuations are unusual. In the western counties, an attempt is usually made to keep a surplus of hay or land for use in bad years. In the eastern counties, it is always possible to bale the hay and dispose of it in this state or nearby states.

There are many farmers in this state who could increase their income by devoting more of their land to hay production. The problem of a large surplus is never important, and extra supplies can be retained on the farm for many years with little loss from depreciation. Considering the
Figure 20.—Annual and trend production and annual average prices of alfalfa hay in South Dakota, 1920–1935 (1925=100%)
demand and price stability, much land now devoted to unprofitable crops should be shifted to hay crops, and legume hays should also play a part in any suitable crop rotation system for South Dakota. Acreage devoted to hay is likely to increase in the future.

Rye

Rye is the only one of the fifteen commodities considered whose sales do not amount to at least one per cent of the annual cash income of South Dakota farmers. This is perhaps due to the fact that rye is utilized chiefly for a pasture crop in South Dakota, and is usually placed on small plots of land or else on land which will not grow other crops very well.

The district with the largest rye acreage is district three which contains 42 per cent of the total rye acreage. Rye acreage has fluctuated widely during the past few years. Starting with a figure of 147.1 per cent of the 1925 acreage in 1920, acreage increased to a high of 230.9 per cent in 1922, declined to a low point of 47.0 per cent in 1926, and increased to 267.0 per cent in 1933. (Figure 21)

Rye comes into special prominence in times of feed scarcity. It makes a good fall pasture crop, then furnishes good feed in the spring before other pasture crops are available, and is still able to produce a fair crop of grain. Its utility as a drought resistant crop is unquestioned. It is also valuable as a crop to grow on very weedy areas, such as spots of creeping jenny. Rye production can be expected to stay at a high level as long as low rainfall prevails in this state. It seems to increase or decrease more or less independent of price, being more dependent upon farmer's desires for a pasture crop or drought resistant crop.

In spite of the small amount of rye sold, acreage reaction to price change influences an increase or decrease in acreage devoted to rye standpoints.
Figure 21.—Annual and trend production and annual average prices of rye in South Dakota. 1920-1933  (1925 = 100%)
Acreage increase the year following a price increase, or decrease the year following price decrease occurred nine times while in only three years did the opposite action take place. This would seem to indicate that farmers plant rye with the expectancy of selling the ground for cash. This is the usual utilization of rye because of its unsuitability as a feed crop. However, only small quantities are usually sold each year. Rye will undoubtedly be unable to replace the important grain crops in South Dakota. It will continue to be used for its present purposes, but its poor feeding properties make it less desirable than the other crops of poultry, dairy cattle, and sheep. The size of the market here for feeding purposes is much smaller than in the past, while the number of head of cattle and hogs is smaller.

**Winter wheat.—This is the only important grain crop to show a decrease in 1929, following an increase in 1928. This is the only important grain crop to show a decrease in 1929.**

**Hybrid corn.—This is the only important corn crop to show a decrease in 1929.**

**Rye.—This is the only important grain crop to show a decrease in 1929.**
Part IV - Summary and Conclusions

Summary

All commodities.—The correlation study of all commodities shows a correlation of only .1762 between price change and production response the following year.

Livestock products.—Of the group of livestock commodities, the numbers of poultry, dairy cattle, and sheep are larger at the end of the period than at the beginning while numbers of beef cattle and hogs are smaller. In the case of sheep, beef cattle, and to a limited extent, the other commodities, present production trends are not in line with the relative positions of the price trends.

Important crops.—Oats is the only important grain crop to show a smaller acreage in 1933 than in 1920, while barley, wheat, and corn show increases. In no case does the production trend for a crop agree with the relative price position of that crop.

Miscellaneous crops.—Potatoes is the only miscellaneous crop to show smaller acreage in 1933 than in 1920, while rye, hay, and flax show increases. As in previous cases, none of the crops show a production trend in line with the relative position of the price trend, although hay and flax show some correlation.
Swine.—The production trend of swine at the present time is downward, in line with decreased foreign demand and with low hog prices. Production decreases were greatest in the corn belt area.

Beef Cattle.—In spite of a relatively higher price than that of any other livestock product, production of beef cattle was less at the end of the study than at the beginning. The present production trend is upward. There was no apparent year to year production response to price change. The present decline is in line with decreased world demand.

Dairy Cattle.—The production trend of dairy cattle is slowly upward, coinciding with a relatively high price for dairy products. No apparent positive year to year response exists.

Poultry.—Poultry figures have fluctuated considerably during the short period studied, the present trend being upward. This is in line with present fair prices for poultry and eggs. In most years, poultry production seems to be correlated with egg prices of the preceding year, but not with live poultry prices.

Sheep.—The present upward trend in sheep production is not in line with mutton and wool prices. South Dakota sheep raisers are favorably situated for sheep raising.

Wheat.—Although farmers are responding positively to year to year changes in price, their general production trend is not in line with the wheat price trend. Reduction in acreage devoted to wheat by sub-marginal producers is essential to the prosperity of the producers on the better land.
Corn.—The slow upward trend in corn production is not in line with the price trend, but could be expected in view of the advantages of corn raising to South Dakota farmers. Corn production seems more dependent upon yield than upon prices.

Flax.—Flax production has dropped off rapidly since 1929 because of poor demand conditions. Returning prosperity should bring increased flax production.

Barley.—The great increase in barley production is taking place largely at the expense of oats acreage. Barley is proving to be a more profitable crop for South Dakota conditions because of its drought and grasshopper resistant qualities. Further acreage increases can be expected.

Oats.—Oats production remains relatively constant because of its suitability as a feed crop and because of its supplementary character in the cropping system. There is very little correlation between oats production and oats prices.

Potatoes.—The present trend of potato production is upward, due to the fact that potato prices have not gone much lower during times of depression than they were before. The supply available to meet the inelastic demand makes the price.

Hay.—Increased acreage might be expected in the future because of stable prices and increased use of legume hays in crop rotations. The present production trend is steadily upward.
Rye.—The present upward trend is due largely to greater utilization of rye as a pasture crop and for cash sales. Increased precipitation would probably bring a decline in acreage devoted to rye production.

Conclusions

South Dakota agriculture is over-expanded in view of present United States and world demand. The greatest overproduction is in wheat and swine, because we are most dependent upon a foreign market for the sale of these products, and the foreign market has been tremendously contracted. Some contraction is essential if prices are to rise much above their present low level.

Some areas in South Dakota are relatively advantageous for the production of certain commodities, as compared to production elsewhere in the state or in the United States. The western part of the state is favorable for sheep and beef cattle grazing; the wheat area has a relative advantage in the production of that commodity; we have some very good corn land; we have a section favorable for potato raising, and relative advantages also exist for other commodities in various sections of the state.

Since contraction of production is essential along certain lines, the sub-marginal areas for each commodity must drop out of production. Such decreased production is essential if a profitable price is to be received by the more favorably situated producers. Present trends do not indicate that this necessary contraction is forthcoming. It is essential then that some governing body step in and force more rapid action, either by taking the poorest land out of production entirely, except for grazing purposes, or by the present policy of forcing uniform reductions.
in all areas. The author would advise that maximum acreages of certain crops in certain areas be regulated by law. That is, sub-marginal producers should be forced out of production more rapidly to meet existing economic pressure.

The fact is that South Dakota farmers are not regulating or changing their agricultural policy to meet price change. In some commodities they are making accurate year to year changes. Considering all commodities, their production trends are not dropping in accordance with declining price trends. Perhaps the sub-marginal producers would contract acreage if a sufficiently long period were given. However, before that time, the more favorably situated producers will also be in a very sorry plight. Since South Dakota farmers will not react to price change, reaction must be forced upon them.
Bibliography

Black, John D.
Agricultural Reform in the United States.

Bomen, C. A. and Hutson, J. E.
Profitable Farming Systems for East Central South Dakota.
South Dakota Agricultural Experiment Station Bulletin
No. 226 June, 1927

Bomen, C. A. and Rogers, R. H.
Profitable Farming Systems for the Intensive Spring Wheat Area in South Dakota.
South Dakota State Agricultural Experiment Station
Bulletin No. 235 June 1926

Bureau of Agricultural Economics
The Agricultural Outlook for 1934
United States Department of Agriculture Miscellaneous
Publication No. 162 November, 1933

Dawson, Owen L.
Farm Production and Prices 1880-1926
South Dakota State Experimt Station Bulletin
No. 225 June, 1927

Ezekiel, Horace, Rauschenstein, Emil, and Wells, Oris V.
Farmers' Response to Price in the Production of Market Milk
United States Department of Agriculture Preliminary Report May, 1932
Haas, G. C. and Ezekiel, Mordecai
Factors affecting the Price of Logs.
United States Department of Agriculture Department
Bulletin No. 1440 November, 1926

Johnson, M. B.
Cattle Ranch Organization and Management
South Dakota State Agricultural Experiment Station
Bulletin No. 225 November, 1930

Orr, J. L.
Prices Paid to Producers of South Dakota Farm Products 1890-1930
South Dakota State Agricultural Experiment Station
Bulletin No. 259 April, 1931

Rogers, R. H.
South Dakota's Agricultural Program
South Dakota State College Extension Circular
August, 1925

Rogers, R. H. and Elliot, F. F.
Types of Farming in South Dakota
South Dakota State Experiment Station Bulletin
June, 1929

Schultz, Theodore W.
Is Our National Farm Plant Too Large?
Iowa State Agricultural Experiment Station Bulletin
March, 1934
Shepherd, Geoffrey

The Economic Situation in 1933
Iowa State Agricultural Experiment Station Bulletin
No. 313 January, 1934

Shepherd, Geoffrey

National Economic Planning
Iowa State Agricultural Experiment Station Bulletin
No. 313 January, 1934

Wells, Oris V.

Farmers' Response to Price in Hog Production and Marketing
United States Department of Agriculture Technical Bulletin No. 359 April, 1933

Wertz, V. R.

South Dakota Potatoes
South Dakota State Experiment Station Bulletin
No. 234 June, 1928

Working, Holbrook

Factors Affecting the Price of Minnesota Potatoes
Minnesota Agricultural Experiment Station Technical Bulletin
No. 29 October, 1925