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AGRICULTURAL EXTENSION DIVISION  
UNIVERSITY OF MINNESOTA

F. W. Peck, Director

MINNESOTA FARM BUSINESS NOTES

February 20, 1932

Prepared by the Division of Agricultural Economics  
University Farm, St. Paul, Minnesota

MINNESOTA FARMERS' RESPONSE TO PRICE RELATIONSHIPS  
IN THE PRODUCTION OF SELECTED CROPS

Prepared by R. W. Cox and P. E. Quintus

10. 111

A study of the year-to-year variations in acreage of different crops indicates clearly that farmers continually make shifts in their production programs. A number of factors account for the variations in acreage. The more important are the price of the commodity, the prices of alternative crops, damage from disease and insect pests, improvements in varieties, changes in the cost of producing the crop or competing crops, and weather conditions which result in relatively high or low yields. The most important single factor probably is price, not only the price of the commodity in question, but also the relation of this price to that of alternative or competing crops.

Farmers are inclined to adjust acreages of crops in accordance with expectations of their relative profitableness. If the price of the crop is high, there is a tendency to increase the acreage of that crop. A price is high or low, however, only by comparison with the prices of other crops. Hence, the response in production of a particular commodity is influenced by the possibilities of engaging in other lines of production. It is to be expected then that increases in production as a result of price relationships take place in one crop at the expense of some other. If the opportunities in alternative lines of production are limited, it is likely that the producers of the particular commodity will respond less quickly to given changes in price than they will if numerous alternatives are available. Conditions of soil, climate and topography, established rotations, and location with reference to the market may retard or even prevent the shifting from one enterprise to another even though price relationships are favorable for such a shift. Customs and habits of farmers also exert their influence in retarding changes.

A favorable price relationship extending over a period of years is of more influence in bringing about a response than if it has existed for one year only. For crops which require specialized equipment, favorable price returns over a period of years probably are necessary in order to bring about a significant change of acreage. Furthermore, since relatively high prices do not always result in correspondingly higher returns because of fluctuations in yields, farmers are likely to take both relative yields and relative prices into consideration when deciding what to do.

A shift in the acreage from cash to feed crops usually occurs as the number of livestock increases. The shifts in acreage among the cash crops may reasonably be expected to be influenced largely by the prospective cash returns. It is not so often recognized, however, that even among the feed crops there is also a tendency to shift acreage from year-to-year, the degree of shifting depending on the relative acre returns of the two crops. This is the case with corn and barley in Minnesota as is shown by the analysis below.

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Corn

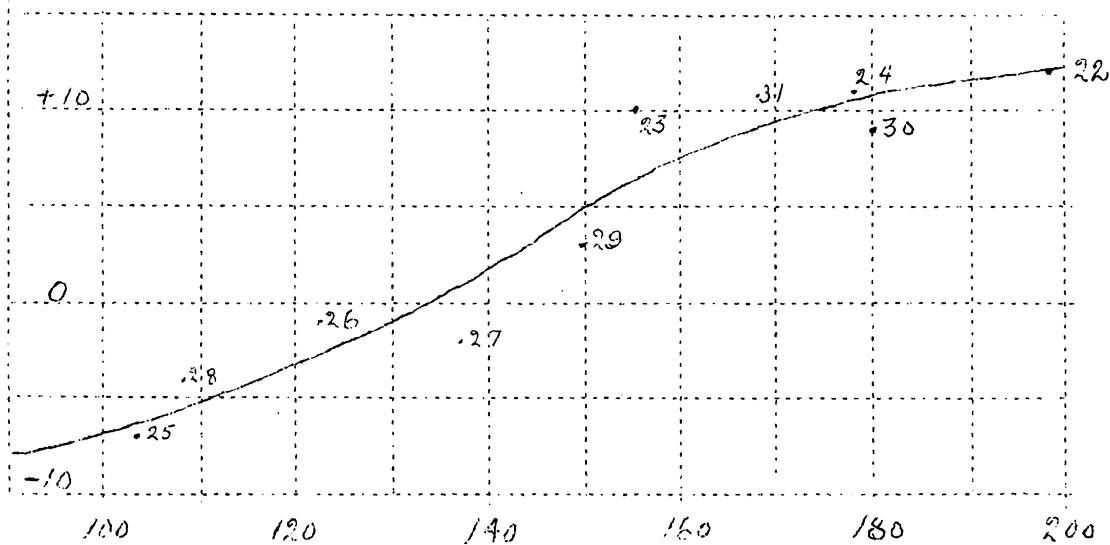
Corn acreage shows less percentage variation than that of other crops. Since 1921, the changes in acreage have ranged from 7 per cent below to 12 per cent above the average acreage of the two preceding years. The actual and anticipated acre returns from barley production appear to exert a considerable influence upon these changes.

The relative acre returns of corn to barley may be represented by the ratio of the acre value of corn to the acre value of barley. The acre returns used are the average of the fall and spring values. The average farm price during the months when most of the crop is being marketed was multiplied by the average yield per acre. The same was done in the case of the farm prices at seeding time, and an average of the two was then obtained. The relationship between the ratios and the changes in corn acreage for the ten-year period 1922-1931 is shown in Figure 1. The lowest ratio was in 1924-25 followed by a harvested acreage of corn in 1925 which was 93 per cent of the average acreage of the two preceding years. As the ratio increases up to 160, corn acreage tends to increase, but beyond this point acreage changes only slightly. The prices that have prevailed during the past fall and early winter indicate a slight decrease in corn acreage in 1932. This tendency towards reduction may be overcome in part by the increase in number of livestock on farms.

Figure 1.

The Relation between the Ratio of the Average Acre Returns of Corn to Barley and the Percentage Changes in Minnesota Corn Acreage from 1922 thru 1931

Per cent change  
in corn acreage



Ratio of average acre returns of corn to barley.

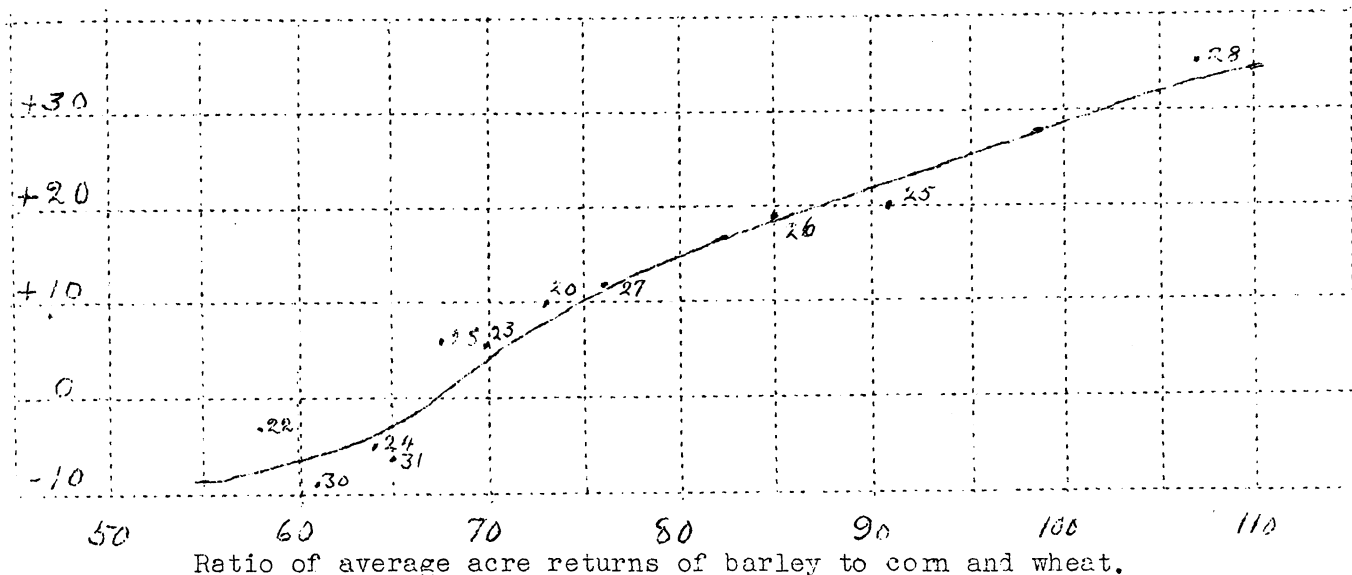
Barley

Changes in the acreage of barley, which is also an important feed crop, appear to be influenced by the returns from wheat in addition to the returns from corn. The relation between the ratio of the acre returns from barley and the combined acre returns of corn and wheat, and the subsequent changes in barley acreage is shown in Figure 2. A ratio below 70 produces little change in barley acreage, but an increase above 70 is followed by an increase in acreage. In 1927-28, the average ratio between barley and the two crops of corn and wheat was 106, which was the highest ratio recorded during the period of ten years included in the study.

The acreage of barley in 1928 was 135 per cent of the acreage in 1927 which represented the largest increase during the period. During the past marketing season, the returns from barley have been relatively high as compared to the returns from corn and wheat, which under normal conditions would indicate a substantial increase in barley acreage in 1932.

Figure 2.

The Relation between the Ratio of the average Acre Returns of Barley to Corn and Wheat and the Percentage Changes in Minnesota Barley Acreage from 1922 thru 1931

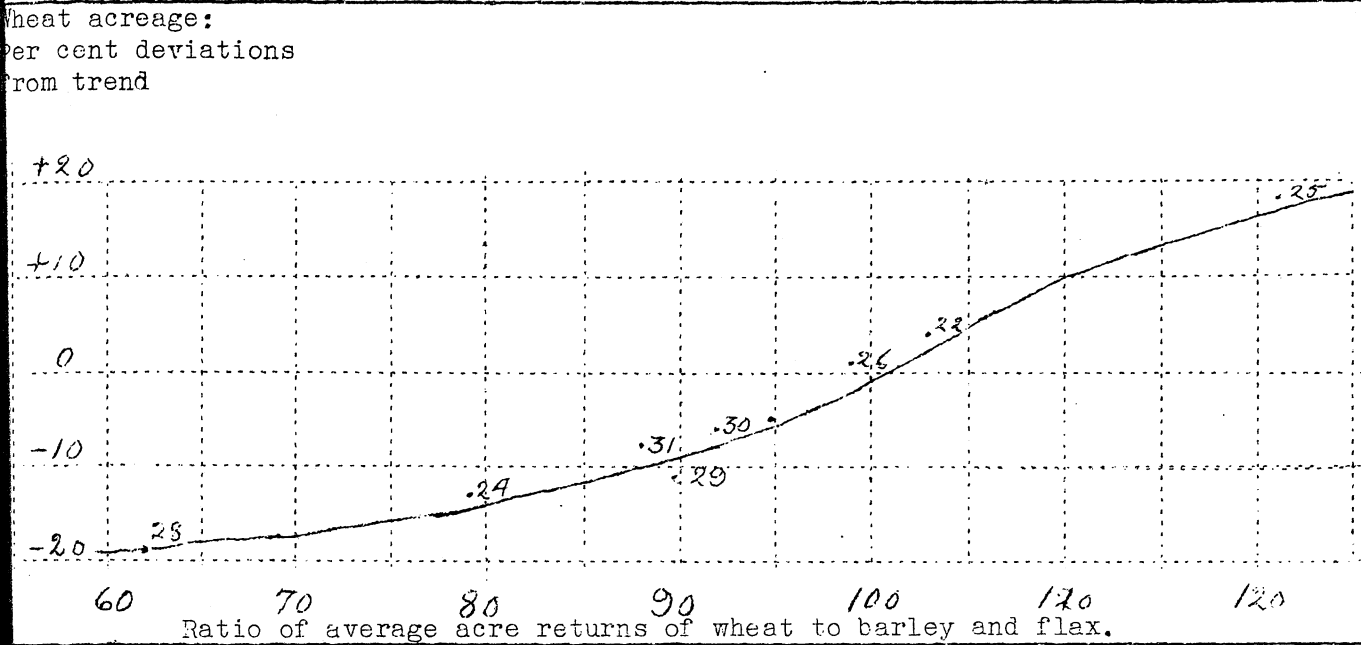


Spring Wheat

The acreage devoted to spring wheat in Minnesota has shown a distinct downward trend during the past twenty years. Since 1919, the acreage of each year, with the exception of 1925, has been less than that of the preceding year. The principal crops which now occupy the land on which wheat formerly was grown are corn, oats, barley and flax. In order to study the year to year variations in wheat acreage, the trend in acreage has been determined and the acreage in any one year expressed as a percentage deviation from the trend. These deviations are partially explained by the changes in the ratio of the acre returns of wheat to the combined or composite acre returns of barley and flax. As is indicated by Figure 3, the acreage planted to wheat is especially responsive to increases in the ratio when the ratio is above 90. The response is of less degree when the ratio is between 60 and 80. In 1924-25, the high average fall and spring ratio of 121 resulted in a large increase in wheat acreage in 1925. In the latter year, the harvested acreage was 18 per cent above the general trend. The relative acre returns of wheat to flax and barley as indicated by the prices that have prevailed during the past marketing season suggests the possibility of an increase in spring wheat acreage in 1932.

Figure 3.

The Relation between the Ratio of the Average Acre Returns of Wheat to Barley and Flax and the Percentage Deviations from Trend of Wheat Acreage in Minnesota from 1922 thru 1931



Flax

Flax acreage comprises a relatively small per cent of the total crop area in Minnesota. It is, however, becoming increasingly important and the acreage now compared quite favorably with that of spring wheat. In 1931, the harvested acreage of flax was 861,000 acres, and that of spring wheat 1,067,000 acres.

There is a close relationship between the ratio of acre returns of flax to the acre returns of corn and spring wheat as illustrated by Figure 4. The acre returns again are based on farm prices prevailing during the fall when the greater part of the crops are marketed and during March and April, when plans are being made for the current year.

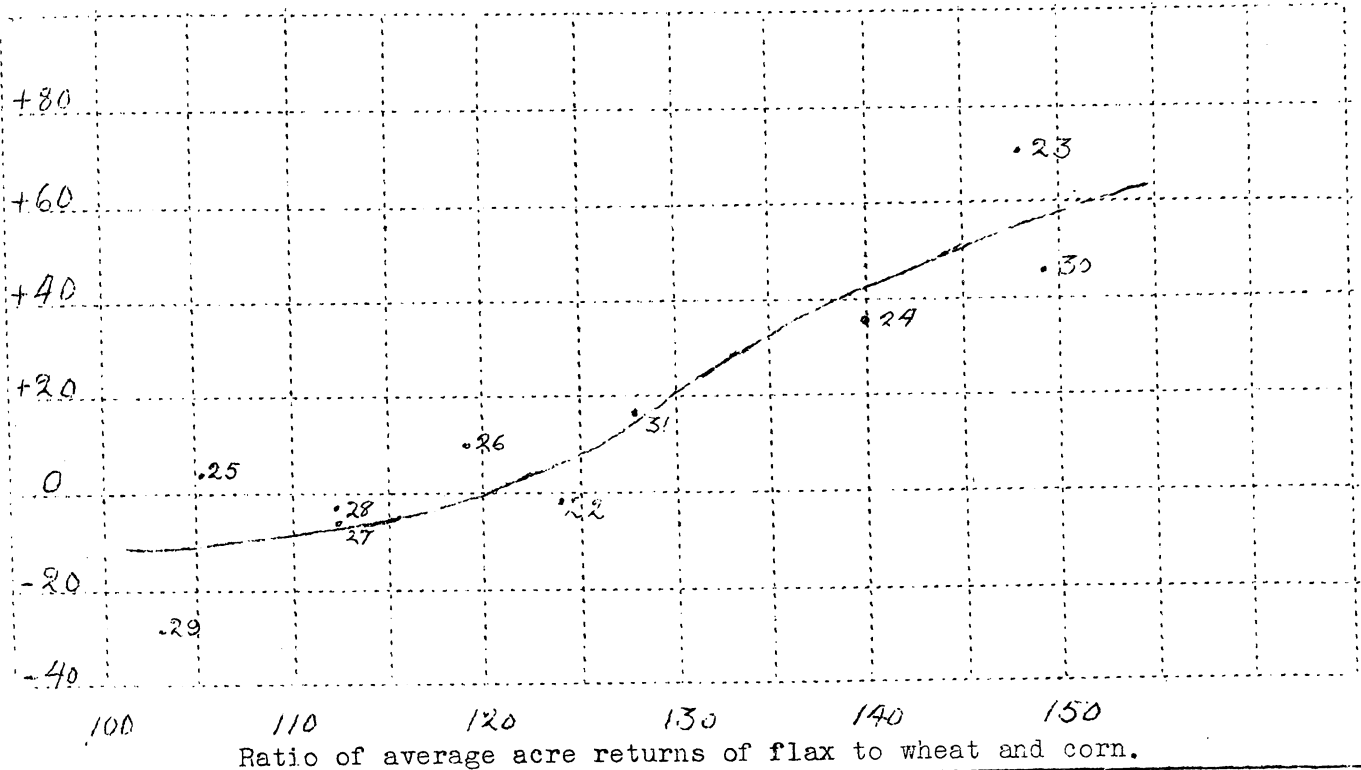
The flax acreage in 1923 was 70 per cent greater than in 1922. The comparative acre returns of flax to corn and wheat in 1922-23 were such as to encourage a substantial increase in acreage. The effect of this particular influence probably was increased by propaganda from flax enthusiasts.

The largest decrease in flax acreage occurred in 1929, when the harvested acreage was 71 per cent of 1928. This decrease was greater than might have been expected according to the relative acre return of flax to corn and wheat in 1928-29. The flax crop in 1928 was attacked by rust and it is reasonable to believe that farmers anticipated the same difficulty in 1929 and reduced flax acreage further. According to the relative acre returns as determined by the prices of the past few months, it is reasonable to expect a decrease in flax acreage during the coming season.

Figure 4.

The Relation between the Ratio of the Average Acre Returns of Flax to Wheat and Corn and the Percentage Changes in Minnesota Flax acreage from 1922 thru 1931

Per cent change  
in flax acreage



Potatoes

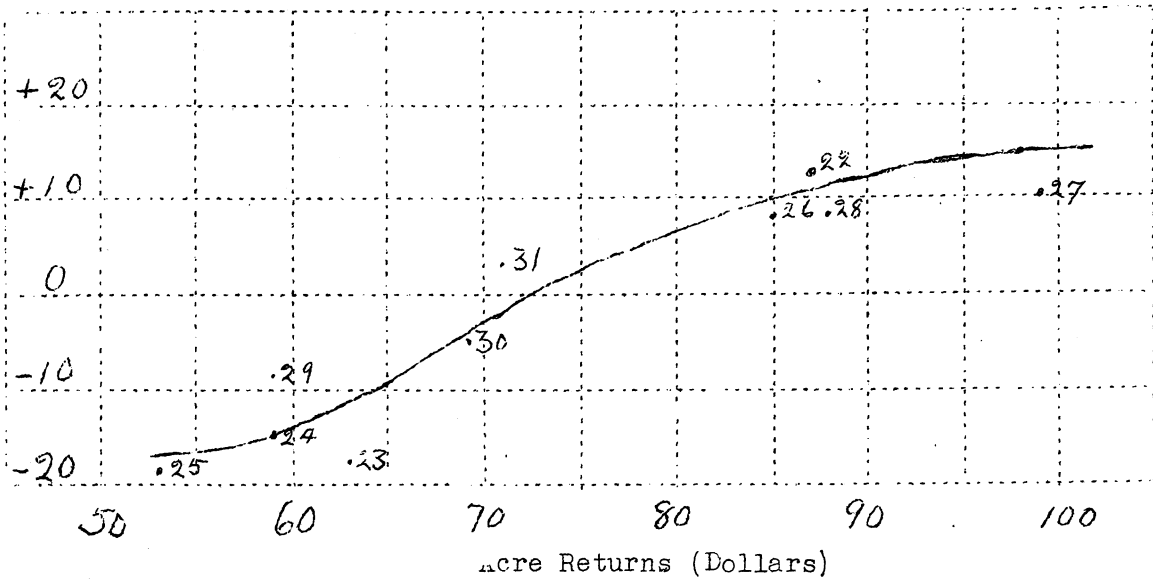
Changes in potato acreage during the past ten years have been closely related to the acre return of the potato crops of the preceding seasons. The acre returns are determined by multiplying the average September-March farm price (adjusted for changes in the general level of prices) by the yield. In order to account of the change in acreage, it is necessary to consider the acre returns not only of the first preceding season, but also the returns of the second and third preceding seasons. The movement in and out of potato production is retarded by the specialized equipment required for the enterprise. In the case of wheat, barley, flax and oats, substitution of one crop for the other may occur with little accompanying change in the type of equipment. Two or three years of relatively high or low acre returns are necessary to effect a significant change in the subsequent potato acreage.

As shown by Figure 5, the low acre returns of the three crop seasons preceding 1925 resulted in a greatly reduced acreage in 1925. The acreage of this year was 81 per cent of that of the previous year. This is indicative of the type of response which farmers make to successive years of relatively low acre returns. The response becomes comparatively inelastic when the returns are relatively high. That is, even though the price situation may be especially favorable, the acreage increases but slightly due to other factors limiting expansion. The fact is illustrated by a comparison of the changes of acreage in 1926, 1927 and 1928. The relatively low average acre returns of the past three seasons point to a decrease in potato acreage during the coming season.

Figure 5.

The Relation between the Acre Returns of Potatoes and the Percentage Changes  
in Minnesota Potato Acreage from 1922 thru 1931

Per cent change  
in potato acreage



MINNESOTA FARM PRICES FOR JANUARY 1932

Prepared by A. E. Erickson

The index number of Minnesota farm prices for the month of January 1932 was 49.3. When the average of farm prices of the three Januarys of 1924-25-26 is represented by 100, the indexes for January of each year from 1924 to date are as follows:

January 1924	-	85.5
"	1925	- 101.6
"	1926	- 112.6
"	1927	- 112.4
"	1928	- 99.5
"	1929	- 101.2
"	1930	- 99.6*
"	1931	- 72.4*
"	1932	- 48.2*

\*Preliminary

The price index of 48.2 for the past month is the net result of increases and decreases in the prices of farm products in January 1932 over the average of January 1924-25-26 weighted according to their relative importance.

Average Farm Prices Used in Computing the Minnesota Farm Price Index,  
January 15, 1932 with Comparisons\*

	Jan.15, 1932	Dec.15, 1931	Jan.15, 1931	Av. Jan. 1924-25- 26	% Jan.15, 1932 is of Dec. 15, 1931	% Jan.15, 1932 is of Jan. 15, 1931	% Jan.15, 1932 is of Jan. 15, 1924-25-26
Wheat	.55	.55	.59	1.46	100	93	38
Corn	.36	.36	.49	.69	100	74	52
Oats	.21	.21	.24	.40	100	88	53
Barley	.35	.36	.32	.64	97	109	55
Rye	.33	.33	.28	.98	100	118	34
Flax	1.19	1.22	1.38	2.59	98	86	46
Potatoes	.31	.30	.65	.77	103	48	40
Hogs	3.30	3.40	7.00	8.63	97	47	38
Cattle	4.10	4.10	6.20	5.41	100	66	76
Calves	5.00	4.60	8.90	8.25	109	56	61
Lambs-Sheep	4.54	4.34	6.56	11.85	105	69	38
Chickens	.110	.114	.139	.158	96	79	70
Eggs	.13	.23	.18	.35	57	72	37
Butterfat	.24	.30	.29	.47	80	83	51
Hay	9.02	8.20	9.40	11.38	110	96	79
Milk	1.39	1.50	1.69	2.24	93	82	62

\*Except for milk, these are the average prices for Minnesota as reported by the United States Department of Agriculture.