

Readjusting Montana's Agriculture

II. Montana Farm Prices

BY

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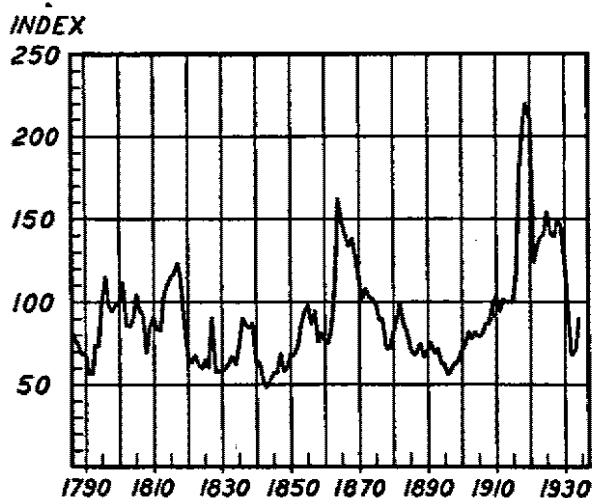


Fig. 1.—Index numbers of farm prices in the United States, 1786-1934. (1910-14=100)

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BOZEMAN, MONTANA

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CONTENTS

	Page		Page
Introduction	2	District prices	10
Trends of Montana farm prices	4	Prices paid by farmers	12
Seasonality of Montana farm prices	8	Index numbers of Montana farm prices	14

INTRODUCTION

The price mechanism in a fully competitive society acts as a governor and regulator of economic activity. All business decisions generally center around prices, present or prospective. Profit and loss calculations are functions of prices and production. Higher prices, current or anticipated, generally encourage greater production.

In agriculture, prices are a dominant influence in income, in standard of living, and in community stability. Farm plans and programs are, in considerable measure, functions of price relationships between various alternative crops and livestock. Where a choice in crops is possible, one major consideration is price. There is to some extent, therefore, competition between crops and livestock for the use of land, labor, and capital. Moreover, there is competition between uses of various crops. If in any area feed is expensive and livestock high, the feed tends to be sold direct; if the reverse situation prevails, the feed tends to be sold in the form of livestock.

The social importance of the price level is evidenced by the problems accompanying material price declines, such as occurred following the World War and again in 1930-32. Depression, unemployment, material falling off in total purchasing power, reversal of the usual farm migration cityward, loss of equities and values, foreclosures, farm strikes, and so on—these are some of the problems arising out of precipitous price declines.

Not only wide price swings themselves, but also the unequal movements of various prices are significant and disturbing. In a period of depression, farm prices commonly fall considerably, while agricultural production maintains a high level. In many branches of industry, the reverse generally has occurred, namely, falling pro-

duction but relatively stable prices. For example, with 1929=100, *agricultural production* was about 99 in 1932 and 90 in 1934; *prices* of farm products, on the same basis, dropped to less than 55 in 1932 and 1933 and were 80 in 1934. *Industrial production*, on the other hand, dropped from 100 in 1929 to less than 55 in 1932 and was less than 75 in 1934; *industrial prices* fell to about 80 in 1932 and were over 85 in 1934¹.

Other items, such as taxes and interest, likewise tend to remain relatively stable in a period of business depression. Such price disparities cause a two-fold pressure on farm incomes, lower gross income without a corresponding reduction in cost.

Rapidly increasing prices also may bring about instability. Some values increase out of proportion to others, speculation runs rampant, and the emphasis upon sound agricultural production and development is neglected. The difficulties in a depression period are closely correlated with the degree of speculation and the departure from sound activity during so-called "prosperity periods."

An analysis of long-time movements of farm prices in the United States shows three periods of major upheaval, as indicated by figure 1². (See title page.)

The first major price peak was reached in 1817, following the War of 1812. Farm prices, however, rose much less than other prices during this period. Except for a sharp rise in 1835-36, prices declined for a period of over 25 years, or up to 1843. A second major rise in prices came during the Civil War, with the peak in 1864. This increase was considerably greater than the one of 1817, and again with farm prices rising less than other prices. Except for a substantial bulge in 1881-82, prices declined for a period of about 30 years, or to 1896. The third major price upheaval began in 1917, with our entry into the World War. The peak reached was considerably higher than during the preceding wars, with agricultural and other prices gaining about equally. Prices began tumbling in 1921, but, at first, fell only part way to earlier levels. A breathing spell

¹See Senate Document No. 13, "Industrial Prices and Relative Inflexibility." See also: December 7, 1935, issue of Wallace's Farmer. The operation of the two types of markets influencing price disparity is discussed in A. A. A. circular, G 2, October, 1935.

²Data from "Prices," by G. F. Warren and F. A. Pearson, John Wiley & Sons, 1933; and from "Farm Economics," issued currently by Cornell University, Ithaca, New York.

in the decline occurred from 1921 to 1929, when it was resumed; the level reached still is not as low as the levels reached in 1843 and 1896. The low points reached were 48 in 1843, and 56 in 1896; in 1921 the figure was 119, and in 1932 it was 59. The 1934 figure was 90.

The chief characteristic of the price level evidently is *instability*. It has been correctly stated that the time a person is born is an important factor in determining his success. If a person starts in business during a period of gradually rising prices, success may be achieved even though fortuitous circumstances take the place of good management. During a period of falling prices or of substantial price fluctuations, good management is more necessary.

The future of prices always is wrapped up in national and international policies and politics, domestic, economic and social stability, and similar uncertainties. Some knowledge of basic price movements and price factors, however, is necessary, even though accurate forecasts are not possible.

The price data used in the following analysis were obtained from the United States Division of Crop and Livestock Estimates, through the Federal Statistician's office in Helena, where original price data are received monthly from cooperating farmers and business houses throughout the state. It is the aim to get a sufficient number of reports from each area to represent actual conditions.

A current analysis of these price data is made by the Department of Agricultural Economics of the Montana Agricultural Experiment Station.

TRENDS OF MONTANA FARM PRICES

Figures 2 and 3 show the movements of wheat, flax, hay, wool, and sugar beet prices in Montana for the past 50 years. These prices are as of December 1 of each year.

Wheat prices were relatively stable from 1890 to 1915, ranging between 55 and 90 cents. The war and immediate postwar years saw the price of wheat rise considerably above \$2 per bushel. Since 1920, wheat prices have fluctuated much more widely than before. The general trend was downward to 1932, reaching a low point of about 30 cents. In 1934 the price was 86 cents. Flaxseed prices show much greater fluctuations than wheat prices during the period covered; they reached a peak of over \$4 per bushel in 1918; in 1931 the price was \$1.10, and \$1.52 in 1934*.

*None of the prices quoted include benefit payments under the Agricultural Adjustment Act.

DOLLARS PER BU.

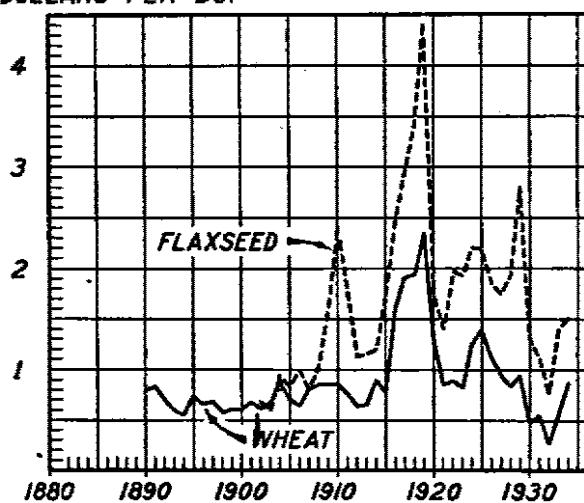


Fig. 2.—Montana farm prices, wheat and flaxseed

DOLLARS PER TON

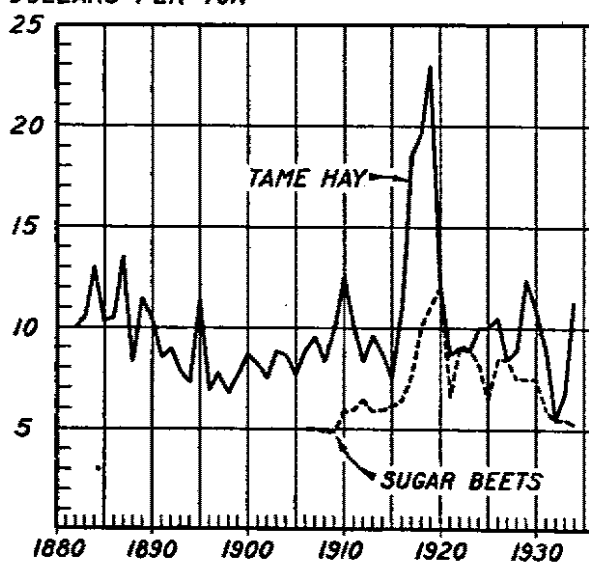


Fig. 3.—Montana farm prices, tame hay and sugar beets

Sugar beet prices likewise show material fluctuations from year to year. The price in 1920 reached a peak of \$12 per ton; in 1932 the price was \$5.39, and in 1934 it was \$5.21 per ton. Hay prices have fluctuated considerably since 1880, reaching a high of \$23 per ton in 1919 and a low of \$6.80 per ton in 1898; in 1934 the price was \$11.30 per ton.

Figures 4 and 5 show price relatives for some Montana farm products. These all are calculated from monthly price data, with the 1924, 1925, 1926 average price as the base, hence they show the relationship in price changes between commodities.

Alfalfa hay prices show the greatest relative fluctuations during the period covered, reaching a peak of 334 in the crop year 1919-1920, and a low of 55 in 1932-1933¹. Wheat prices reached a high of 193 in 1919 and a low of less than 30 in 1932. Potato prices fluctuate considerably from year to year and show the greatest instability of any price series analyzed. Prices for all the products mentioned above show a postwar level not materially different from their prewar level.

Beef prices show a definite cycle of alternating high and low prices, the peaks coming about 10 years apart². Wool and lamb prices move together quite closely and both likewise show certain cyclical tendencies; lamb and wool prices were relatively lower than beef prices during the immediate prewar period and declined more in 1930-1932. It is interesting to note that beef prices rose very substantially between 1926 and 1928-29, while practically all other farm prices declined continuously from about 1925 to 1932-33.

Most farm products have certain limits at which substitution takes place, namely, one kind of meat for another, one kind of feed for another, etc. Only temporarily, therefore, is the trend of individual prices likely to deviate from the trend of the general farm price level. The farm price level in turn is a function of general supply and demand conditions, such as the status of industrial activity, foreign demand, monetary stability, market supplies, etc.

¹All figures based on 1924, 1925, 1926 prices=100.

²The price cycle generally coincides with the production cycle.

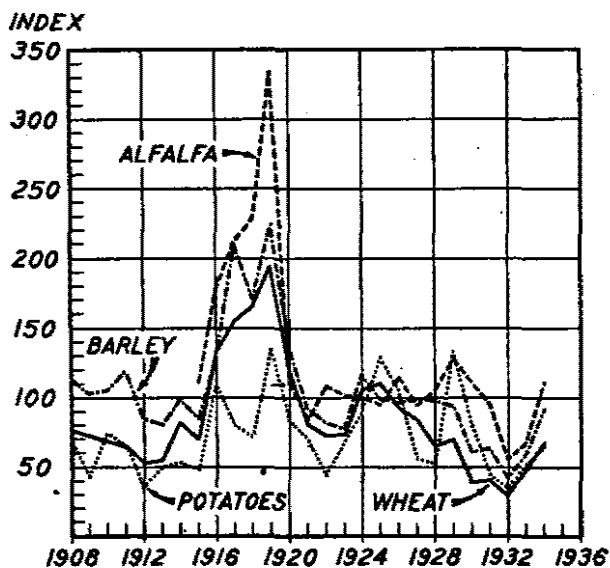


Fig. 4.—Montana farm price relatives, 1908-1934.
(1924-25-26=100)

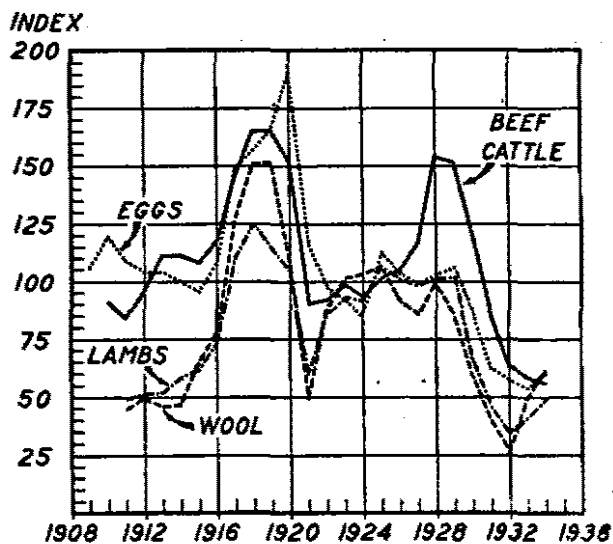


Fig. 5.—Montana farm price relatives, 1908-1934.
(1924-25-26=100)

SEASONALITY OF MONTANA FARM PRICES

One major problem generally facing a farmer is the determination of when to sell his non-perishable and semi-perishable products. Commodities like wheat may be stored for a considerable period. Many farmers attempt to gain by holding wheat from fall till spring or from year to year. An analysis of the average seasonal movement of prices of various farm products shows the difficulty of attempting to make consistent gains from forecasting a sound storage or selling policy. Also, it shows the possibility of gains from changes in farm organization to take advantage of seasonal price advantages for perishable products.

Table 1 shows the average seasonal farm prices for a few Montana products.

TABLE 1.—SEASONAL VARIATION IN MONTANA FARM PRICES

	Jan.	Feb.	Mar.	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
Wheat ^a	1.05	1.06	1.06	1.11	1.15	1.13	1.14	1.09	1.04	1.03	1.02	1.03
Flax ^b	1.98	2.05	2.11	2.16	2.21	2.11	2.08	2.12	2.07	1.97	1.94	1.96
Barley ^c	.67	.66	.65	.69	.71	.68	.70	.69	.63	.59	.57	.60
Hay ^c	11.94	11.96	12.50	12.78	13.85	13.63	12.20	11.68	11.67	11.69	11.78	11.92
Lamb ^a	8.45	8.84	9.20	9.23	9.32	9.16	8.54	8.28	8.29	8.29	8.09	8.29
Cattle ^d	6.28	6.51	6.73	7.07	7.12	7.02	6.61	6.49	6.30	6.31	6.21	6.06
Hogs ^e	8.20	8.24	8.62	8.98	8.90	8.82	8.80	9.01	9.26	9.01	8.41	8.05
Butter ^f	.39	.37	.36	.35	.35	.33	.32	.33	.35	.37	.39	.40
Eggs ^g	.42	.34	.26	.21	.21	.22	.24	.27	.30	.35	.43	.48

^aAverage prices 1908-1934; ^baverage prices 1913-1934; ^caverage prices 1915-1934; ^daverage prices 1911-1934; ^eaverage prices 1910-1934; ^faverage prices 1909-1934.

Figure 6 shows the seasonal price movements of a few Montana farm products¹.

Wheat.—Wheat prices are highest in May but, during the past 14 years, by an average amount of less than the cost of storage¹. The May wheat price was *below* the average August-September price in 12 of the past 27 years, or 45 per cent of the time. In 5 additional years, the May price was above the fall price by less than carrying charges. The differential between August-September and May averaged less than 3 cents per bushel in favor of May for the 14 years beginning in 1921. The May price has been \$1.06 above the fall

¹The seasonal index was constructed as follows: All prices were averaged by months, viz. all January's, all February's, and so on. The annual average price was then calculated from these monthly averages; the seasonal index was derived by dividing the annual average price by the monthly average price. If there has been a decided trend in one direction during the period covered, this method will give slightly inaccurate results unless a correction for the trend is made.

²Generally figured about 1.5 cents per month, including interest.

price; however it also has been \$1.06 below. It is apparent, therefore, that there is no consistent price advantage in spring over fall and also that selling the same percentage of the crop in the fall and spring each year generally will strike the high as well as the low points in wheat prices over a period of time.

Eggs.—Egg prices are highest in December and lowest in April, May, and June; the price about doubles between May and December. The difference between average high and average low prices for the past 25 years has been about 27 cents per dozen.

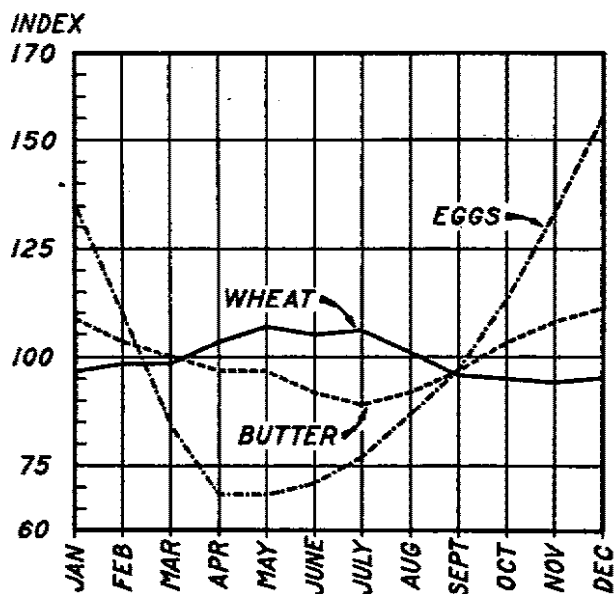


Fig. 6.—Seasonal index of Montana farm prices of wheat, butter, and eggs, 1908-1934

Butter.—Butter prices are highest in November, December, and January, and lowest in June and July. The increase in price during the winter months has averaged about 8 cents per pound during the past 25 years.

Some farmers can change their production set-up to take advantage of higher prices of butter and eggs during the winter months. However, the costs also are greater during winter than summer; hence a balance between additional income and additional costs must determine prospective changes in production.

While it is current production and marketing practices which make the seasonal prices what they are, and while a change in practices would change the seasonal price, it is not likely that enough farmers would change their practices sufficiently to change the basic relationships shown above. Farmers who can make shifts, therefore, may gain from adjustments to seasonal peaks of prices, if the price spread justifies the necessary change. It should be pointed out again that price-making forces are so numerous and operate in so many ways that forecasts, especially covering a substantial period, are subject to considerable error.

It is important, however, to know the approximate seasonal movements of farm prices and especially to be able to distinguish between changes in the price level and a seasonal change. For example, a rise in egg prices in the fall has been an annual occurrence and must not be confused with a rise in the price level. Seasonal prices should be analyzed to answer questions regarding the time to sell; the price level should be analyzed to answer questions regarding long-time production policies²; the question as to whether to incur large expenditures for a dairy plant, for example, depends upon future price relationships.

DISTRICT PRICES

In a state as large as Montana, local variations in prices generally are quite important. Prices reported for each area represent reflections of quality, special local market conditions, variations in freight rates, and so on. If quality were identical in all areas, prices of farm products shipped to central markets would reflect only differences in freight rates. However, for products like wheat, quality differs even between counties, tending to cause a differential in addition to that caused by differences in freight rates.

Figure 7 shows local price variations for wheat in Montana. The base price used was the average for 1910-14³.

²There is also the question of price differences between various grades of the same product, such as between fat and feeder cattle, hard and soft wheat, and so on.

³The analysis was made from protein data as reported by local grain elevators and corrected for variations in freight rates. The quoted price for wheat was based on 11 per cent protein content. The average protein content for the entire state is 13½ per cent. This extra 2½ per cent has been paid for at the rate of approximately 4c for each per cent of protein, an average premium of 10c per bushel. Because of the decrease in protein premiums in recent years, an allowance of 2c for each per cent of protein over 11 per cent was allowed. The variations, not the absolute amounts, are important.

Wheat prices are highest in the east and northeast part of the state and lowest in the western counties.

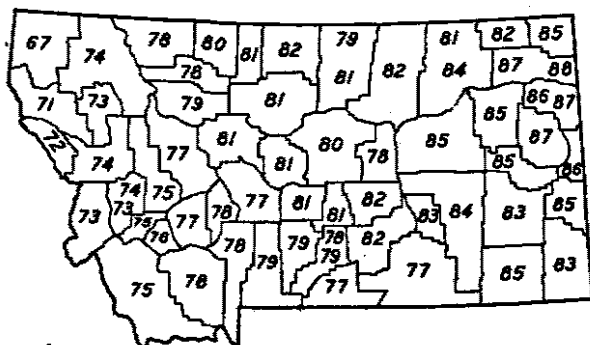


Fig. 7.—Local variations in wheat prices, by counties. Average prices, 1910-1914, corrected for protein and freight differences.

Data on local variations in prices of butterfat are readily available only for a few points in the state and for a period of only about 5 years¹⁰. Figure 8 shows these data summarized.

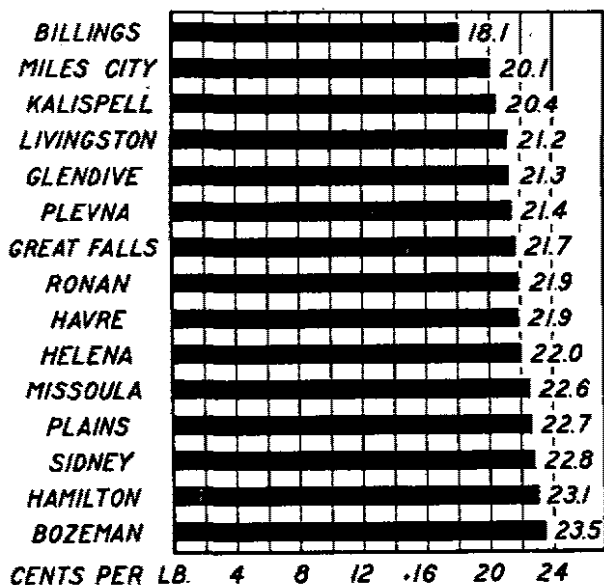


Fig. 8.—Local variations in butterfat prices, average 1931-35, inclusive.

¹⁰These data are reported by local creameries directly to the Department of Agricultural Economics, Montana Experiment Station.

Bozeman has paid the highest average prices for butterfat, according to the data, with Hamilton next. Miles City and Billings show the lowest prices. It should be pointed out that quality of the product no doubt is a material factor in accounting for these price variations.

For crop and price reporting purposes, the Division of Crop and Livestock Estimates has divided Montana into 7 districts¹. Since sufficient district price data were not available in all cases, the district prices were combined for three major divisions in the state, the eastern, central, and western. The crop reporting districts and the way they were combined are shown in figure 9. Average annual prices were compared for the period 1924-1934 for a few products.

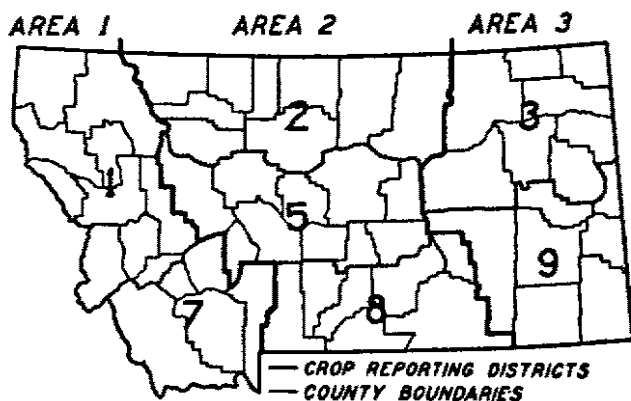


Fig. 9.—Montana crop reporting districts

Wheat prices generally have been highest in the eastern and lowest in the western area. Potato prices have been highest in the eastern and lowest in the western area; the difference has ranged from 10 cents to \$1.25 per bushel. Alfalfa hay prices have been highest in the eastern area in dry years, as for example in 1931 and 1934; no consistent price differentials are evident, however. Barley prices generally have been highest in the western and lowest in the eastern area, the difference ranging from nothing to 20 cents per bushel.

One importance of local variations in prices is the effect on income and values. A difference of 5 cents per bushel on wheat

¹Formerly 9. Districts 1, 4, and 7 were combined into districts 1 and 7. Districts 3, 6, and 9 were combined into districts 3 and 9.

between two points, with land yielding 20 bushels per acre, means \$1 difference per acre in gross income. This, again, if capitalized represents a substantial difference in land values and, therefore, is of material importance to prospective land buyers and to lenders on farm property". It likewise is a significant factor in developing sound crop and livestock combinations. Problems of regional competition and comparative advantage, income and land values, and marketing problems, are intimately tied up with price variations between areas.

PRICES PAID BY FARMERS

The economic position of farmers depends upon prices paid as well as upon prices received. Table 2 shows the index of prices paid by farmers in the United States and also indices of Montana farm machinery prices and farm real estate taxes. The base used in each case is averages for 1924-26, inclusive.

TABLE 2.—INDICES OF PRICES PAID BY FARMERS

Year	Index of prices paid ^a	Index of Montana machin- ery prices	Index of Montana real estate taxes ^b	Year	Index of prices paid ^a	Index of Montana machin- ery prices	Index of Montana real estate taxes ^c
1910.....	59.2	70.6	—	1923.....	98.4	99.0	104.6
1911.....	60.4	72.6	—	1924.....	98.5	99.8	101.3
1912.....	60.4	74.3	—	1925.....	101.5	99.8	97.2
1913.....	60.9	76.2	52.4	1926.....	100.0	100.4	101.3
1914.....	60.9	79.0	55.2	1927.....	99.5	101.4	96.7
1915.....	63.9	81.4	58.8	1928.....	100.0	101.4	96.2
1916.....	74.8	84.8	64.1	1929.....	99.0	101.3	100.8
1917.....	88.8	90.5	72.5	1930.....	94.2	99.2	97.7
1918.....	104.5	94.4	77.2	1931.....	82.1	96.2	92.5
1919.....	120.7	97.3	98.2	1932.....	71.8	92.0	87.2
1920.....	122.5	100.7	111.8	1933.....	70.7	—	85.1
1921.....	97.7	98.6	117.8	1934.....	76.7	—	80.7 ^c
1922.....	96.7	99.5	107.7				

^aData from U. S. Department of Agriculture, Bureau of Agricultural Economics. This index includes interest and taxes payable. ^bData from "Montana Farm Taxes," Bulletin 286, Montana Agricultural Experiment Station. ^cEstimated.

^dThere may also be an additional difference in land values between the same points due to differences in cost items, especially if one point is on a main line and the other on a branch line of a railroad.

INDEX NUMBERS OF MONTANA FARM PRICES

A monthly index number of Montana farm prices has been constructed to show the relationship of current to past prices. A simple weighted aggregative formula was used in constructing the index¹.

The prices combined in the index cover the following products: wheat, barley, rye, flaxseed, potatoes, dry beans, sugar beets, all hay, beef cattle, lambs, hogs, wool and butter. The base used is the average monthly prices for 1924, 1925, and 1926.²

An index of marketings was constructed from the carlot shipment data. The base used in this case was the average monthly shipments for the years 1924, 1925, 1926; the average prices for 1924-1929, inclusive, were used for weights. Considerable quantities of some farm products are shipped by motor carrier, and, hence, are not shown in railway shipment data. Except for butter and potatoes, however, most of the products included in this index are shipped by rail. Since so many products are combined, the error due to the exclusion of part of the shipments is not significant.

The quantity index multiplied by the index of prices is used to represent an index of income. While some farm products are not included, the index shows the trends in income adequately. A separate index is shown for crops and for livestock.

Table 3 shows the annual index of prices, quantities shipped, and gross income, covering the period for which all or some price and shipment data are available. The data are for the crop year, August to July.

The index of crop income shows the influence of low prices and relatively poor crops in 1931 and of low prices in 1932. Income from livestock has been relatively higher than income from crops since 1928.

¹The formula used is as follows:
$$\frac{\sum P_t Q_t}{\sum P_b Q_t}$$
 where P_t =prices in any given month or year, P_b =prices in the base period, Q_t =the weights used. These weights were based on the average monthly quantity of each product shipped in carlots for the years 1925-1929, inclusive. These data were obtained from the Montana Railroad Commission at Helena.

²The index may be converted to any base desired by dividing each figure by the figure for the particular base chosen. For example, to convert to a 1913 base, divide each figure in the index by the 1913 figure.

TABLE 3.—INDEXES OF MONTANA FARM PRICES, QUANTITIES SHIPPED, AND GROSS CASH INCOME^a

Period	General Index			Crop Index			Livestock Index ^b		
	Price	Quantity	Income	Price	Quantity	Income	Price	Quantity	Income
1910.....	71.2	—	—	68.9	—	—	76.4	—	—
1911.....	68.2	—	—	85.1	—	—	67.7	—	—
1912.....	63.8	—	—	53.1	—	—	79.3	—	—
1913.....	65.5	—	—	55.5	—	—	80.6	—	—
1914.....	82.2	—	—	81.9	—	—	83.1	—	—
1915.....	79.2	—	—	73.2	—	—	88.6	—	—
1916.....	126.5	—	—	134.4	—	—	114.4	—	—
1917.....	154	—	—	158.9	—	—	146.3	—	—
1918.....	155.2	—	—	158.1	—	—	163.3	—	—
1919.....	171.6	63.4	108.8	190.3	25.0	47.6	142.9	112.1	160.3
1920.....	104	78.5	79.8	112.1	89.2	100.0	91.4	58.4	53.3
1921.....	80.7	74.7	60.3	82.2	85.7	70.4	78.5	60.6	47.6
1922.....	84	103.8	87.2	76.6	124.5	95.4	95.5	74.8	71.4
1923.....	83.2	94.7	78.8	76.9	101.2	77.8	93.1	85.7	79.8
1924.....	103.4	102.1	105.5	105.7	105.8	111.9	99.7	100.4	100.1
1925.....	107.1	99.6	106.7	108.5	98.6	107.0	104.9	98.6	103.4
1926.....	98.5	86.9	83.9	94.1	95.6	89.9	100.3	96.9	97.1
1927.....	98.2	129.2	126.8	87.8	159.5	140.0	114.3	86.6	99.0
1928.....	92.8	128	118.8	71.1	157.3	111.8	126.2	99.1	125.0
1929.....	88.4	101.2	89.5	75.9	100.7	76.4	107.9	102.9	111.1
1930.....	55.9	100.1	55.9	44.7	93.0	41.6	73.1	98.8	72.3
1931.....	46.5	58.3	25.8	42.1	34.7	14.6	50.9	80.7	41.0
1932.....	47.6	88.9	33.5	31.7	100.9	31.9	47.0	81.0	38.0
1933.....	52.0	83.0	44.0	50.2	74.1	38.3	54.8	84.5	50.6

^aCrop year, August-July. Calculated from monthly data. ^bLivestock and livestock products.

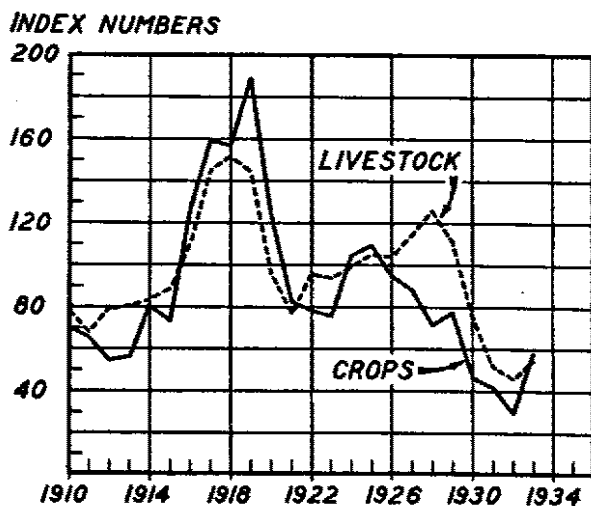


Fig. 10.—Index numbers of Montana farm prices for crops and livestock. (1924-25-26=100)

Figures 10 and 11 show the price indices for crops and livestock and the indices of gross farm income.

The index of livestock prices has been above the index of crop prices since 1926; the influence of beef prices on the livestock index for 1928 is very evident. During the period 1916 to 1921, inclusive the index of crop prices was considerably above the index of livestock prices. The low point for both indices was reached in 1932, being 31.7 for crops and 47 for livestock.

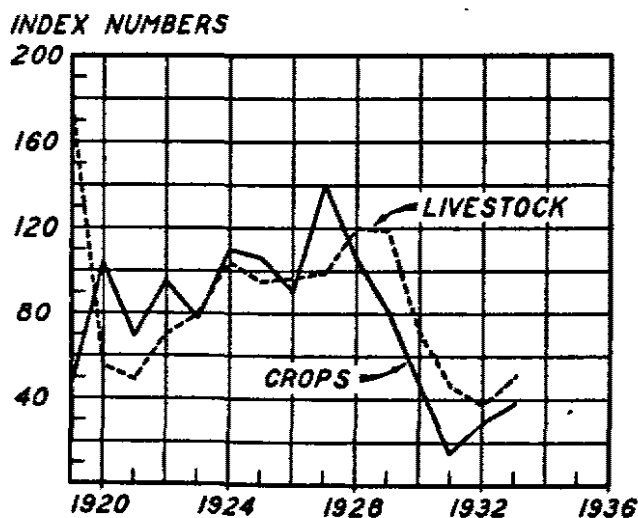


Fig. 11.—Index of Montana farm income, crops, and livestock. (1924-25-26=100)