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South Dakota Potatoes: Production, Prices, Destinations

V.R. Wertz

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SOUTH DAKOTA POTATOES

Production, Prices, Destinations

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SOUTH DAKOTA POTATOES

Production, Prices, Destinations

V. R. WERTZ*

The primary purpose of this study is to set forth some of the more important physical and economic aspects involved in the production and marketing of South Dakota potatoes. Such information is needed concerning our crop and livestock enterprises in order to enable us to plan our agricultural development for the future. The history of agriculture shows that there has been almost a continual shift in the types of agriculture in the various regions and that many important shifts will probably take place in the future. This bulletin is intended to aid those who are interested in guiding the agriculture of South Dakota along most economical lines. This concerns itself with potatoes only, but the plan is to make similar studies of each important crop in order to aid in formulating a more comprehensive policy for the development of agriculture in this state.

Physical Aspects of Potato Production

Location of Potato-Producing Areas in South Dakota and United States. In general, the chief potato-producing area of South Dakota is located in the east-central part of the state, the main potato producing counties being Clark, Codington, Hamlin, Deuel, Kingsbury, and Brookings. A three-year average production of potatoes in South Dakota is given in Table III, column 5, and is also pictured in Figure 1. Table I and Figure 2 show the leading potato-producing states of the union to be located in the northeastern quarter of the United States, Maine, New York, Michigan, Wisconsin, and Minnesota, being the outstanding potato-producing states.

The main physical causes for the large production of potatoes in these north-eastern states are suitable soil and climatic conditions, but in addition there is another important factor which is economic as well as physical in nature; this is the relative bulkiness of potatoes which prevents the shipment of them such great distances as more highly concentrated products. Undoubtedly this factor as well as suitability of climate and soil accounts for the production of most of our potatoes in areas relatively near to centers of population.

A fundamental principle which governs our main potato areas is the comparative cost of producing this crop in different localities. This principle or law is frequently stated as follows: Each locality tends to produce those goods which it can produce at the greatest advantage or at the least disadvantage. In so far as soil and climate are concerned, Maine may surpass all other states in the union in the production of potatoes, or it may be that Minnesota could produce and market as many more potatoes as are produced and marketed by South Dakota each year at less cost than they can be produced and marketed by South Dakota.

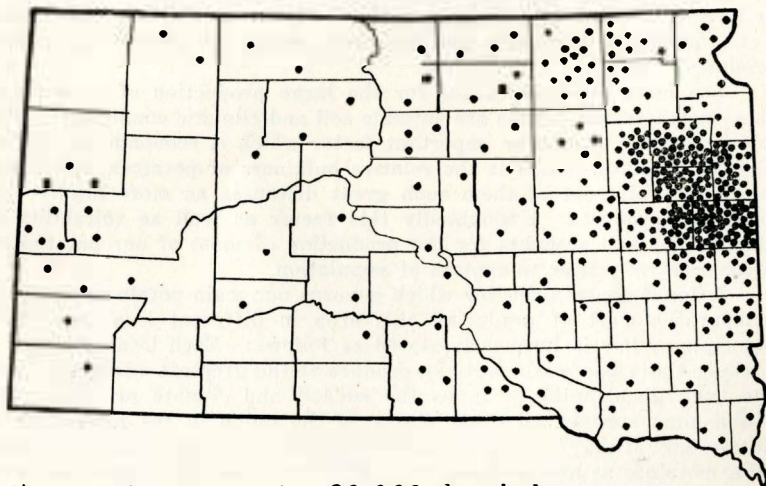
*Credit is given colleagues in the Farm Economics Department at South Dakota State College for their helpful suggestions and criticisms in the preparation of this bulletin. Special credit is due Mr. O. L. Dawson, former Agricultural Statistician, Brookings, S. D., and other members of the Bureau of Agricultural Economics for furnishing much of the information upon which this study is based.

Table I.—A THREE-YEAR AVERAGE PRODUCTION OF WHITE POTATOES IN THE UNITED STATES, BY STATES, 1922-24

State	Bushels (thousands)	State	Bushels (thousands)
Maine	33,779	Missouri	7,677
New Hampshire	1,913	North Dakota	14,505
Vermont	3,720	South Dakota	7,355
Massachusetts	3,180	Nebraska	9,433
Rhode Island	293	Kansas	4,673
Connecticut	2,943	Kentucky	4,816
New York	40,176	Tennessee	2,747
New Jersey	11,425	Alabama	3,293
Pennsylvania	26,316	Mississippi	1,147
Delaware	797	Louisiana	1,766
Maryland	4,354	Texas	2,008
Virginia	16,354	Oklahoma	2,577
West Virginia	5,002	Arizona	2,084
North Carolina	5,065	Montana	4,207
South Carolina	3,045	Wyoming	1,882
Georgia	1,560	Colorado	15,063
Florida	2,387	New Mexico	151
Ohio	11,022	Arizona	304
Indiana	6,216	Utah	2,909
Illinois	8,369	Nevada	780
Michigan	35,813	Idaho	12,698
Wisconsin	32,748	Washington	8,378
Minnesota	43,106	Oregon	4,388
Iowa	8,824	California	8,347

Yet it does not follow that Minnesota should produce and market South Dakota's quota of potatoes, for the latter may not have an alternative crop to produce in its potato area which will yield as much as potatoes. When unhindered, agricultural production has worked itself out in accordance with this principle within nations as well as between nations.

In order to anticipate probable future developments, it is necessary



Each dot represents 20,000 bushels

Fig. 1.—A THREE-YEAR AVERAGE PRODUCTION OF WHITE POTATOES IN SOUTH DAKOTA BY COUNTIES, AVERAGE 1922-1924 (Incl.)

South Dakota's potatoes are produced east of the Missouri River for the most part. The heaviest producing counties are Clark, Codington, Hamlin, Deuel, Kingsbury, and Brookings.

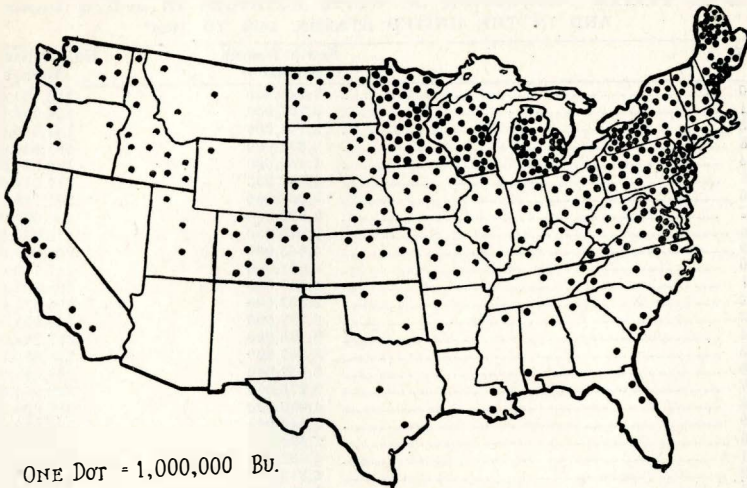


Fig. 2.—POTATO PRODUCTION IN THE UNITED STATES, AVERAGE 1922-1924. (Incl.)

The heaviest potato-producing region in the United States is located in the northeastern quarter of the country. The outstanding potato-producing states are Maine, New York, Michigan, Wisconsin, and Minnesota.

to take account of these physical and economic advantages which one state or locality may have over another. It was with this fundamental principle in mind that the present study was undertaken. The main objective is to take account of some of the more outstanding physical and economic advantages and disadvantages of producing potatoes in South Dakota in order that we may better find the position of South Dakota among potato producing states in the future.

Trend of Potato Production in South Dakota and United States from 1890 to 1924. The following tables and charts picture the production of potatoes in South Dakota and in the United States for the thirty-five years, 1890 to 1924. Table II, and Figure 3 show that the trend of potato production has been upward in South Dakota from approximately 2,200,000 bushels in 1890 to 6,800,000 bushels in 1924, an increase of 4,600,000 bushels in thirty-four years. During the same period of time, there has been a gradual increase in potato production in the United States from approximately 190,000,000 bushels in 1890 to 434,000,000 bushels in 1924. Production in South Dakota has followed production in the United States rather closely, except during the period between 1901 and 1912. It is possible that production in South Dakota did not follow United States production so closely during this period, but it is the opinion of the writer that crop reports were not as authentic during this period as since and that this may account for some of the disparity between these two lines of production.

Relationship Between Production in South Dakota and in the United States. A glance at Figure 3 would give the impression that production had increased more rapidly in the United States than in South Dakota, whereas this is not the case. In order to present this relationship in a

Table II.—YEARLY PRODUCTION OF WHITE POTATOES IN SOUTH DAKOTA AND IN THE UNITED STATES, 1890 TO 1924*

Year	South Dakota (bushels)	United States (bushels)
1890	1,746,000	150,494,000
1891	3,707,000	256,122,000
1892	2,764,000	164,516,000
1893	2,378,000	195,040,000
1894	1,135,000	183,841,000
1895	4,037,000	317,114,000
1896	6,048,000	271,769,000
1897	5,093,000	191,025,000
1898	3,979,000	218,772,000
1899	4,445,000	260,257,000
1900	4,031,000	247,759,000
1901	1,445,000	198,626,000
1902	2,353,000	293,918,000
1903	2,887,000	262,053,000
1904	3,176,000	352,268,000
1905	3,367,000	278,885,000
1906	3,542,000	331,685,000
1907	3,276,000	322,954,000
1908	4,050,000	302,000,000
1909	3,442,000	394,553,000
1910	2,420,000	349,032,000
1911	4,032,000	292,737,000
1912	6,510,000	420,647,000
1913	4,630,000	331,525,000
1914	5,670,000	409,921,000
1915	7,820,000	359,721,000
1916	4,290,000	286,953,000
1917	7,200,000	442,108,000
1918	8,645,000	411,860,000
1919	4,050,000	322,867,000
1920	7,950,000	403,296,000
1921	5,490,000	361,659,000
1922	8,580,000	453,396,000
1923	7,744,000	412,392,000
1924	5,822,000	455,000,000
Total	157,799,000	10,906,765,000
Average	4,509,000	311,621,000

*Figures secured from U. S. D. A. yearbooks and from the office of O. L. Dawson, Agricultural Statistician, Brookings, South Dakota.

little clearer light, the figures¹ representing the trend of production in South Dakota and in the United States are plotted on a logarithmic scale in Figure 4. This chart shows the percentage growth of potato production in South Dakota as compared with that of the United States. If the percentage increase had been the same in both cases, the two trends would have been parallel on the chart. The percentage increase in production has been considerably greater in South Dakota than in the United States. This percentage gain is shown by the difference between the two shaded areas in the chart, Figure 4.

Comparison of the Per Capita Production in South Dakota With That of the United States. The picture of potato production in this state is not complete until it is shown in bushels per capita, for an increasing population requires an increase in production in order to maintain a normal trend. Per capita production² is shown in Figure 5. These figures show South Dakota to be a surplus potato-producing state, for while the actual consumption of potatoes as human food, used for seed,

1 For table see appendix, page 36.

2 For table see appendix, page 37.

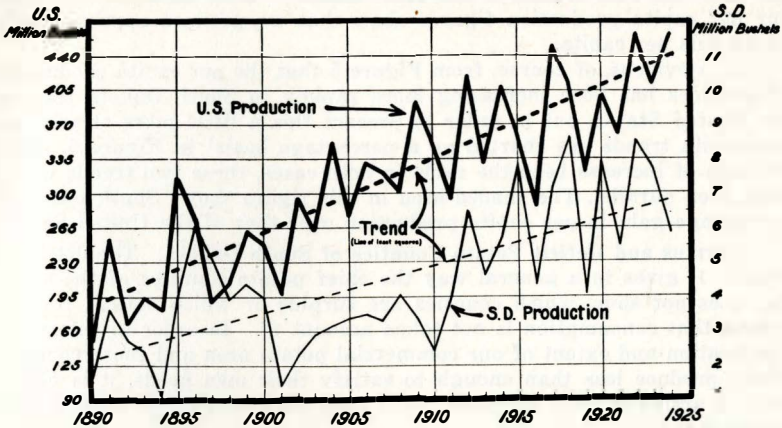


Fig. 3.—PRODUCTION OF WHITE POTATOES IN THE UNITED STATES, AND IN SOUTH DAKOTA, 1890-1925.

Potato production increased from approximately 2,200,000 bushels in South Dakota from 1890 to 1924, while production in the United States increased from about 190,000,000 to 434,000,000 bushels. See Table XVI, page 36.

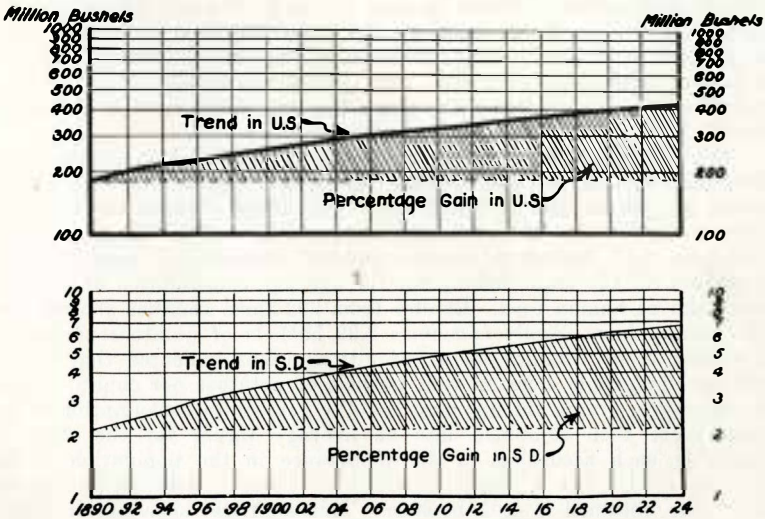


Fig. 4.—PERCENTAGE INCREASE IN THE TREND OF PRODUCTION OF WHITE POTATOES IN SOUTH DAKOTA AND IN THE UNITED STATES, 1890-1924.

A comparison of the two shaded areas representing percentage gain in potato production in the United States and in South Dakota shows a substantial gain of the latter over the former.

and unfit for food or seed in this state amounts to 6.9 bushels per capita, our per capita production figures show that we produce approximately 10 bushels per capita.

It is evident, of course, from Figure 5 that the per capita production of potatoes has been increasing more rapidly in South Dakota than in the United States, but in order to present this a little more clearly the per capita trends are charted on a percentage basis¹ in Figure 6. Had the rate of increase been the same in both cases, these two trends would have been parallel. The shaded area in this figure shows South Dakota's percentage gain in per capita production over that of the United States.

Surplus and Deficit Potato Counties of South Dakota. The dot map, Figure 1, gives in a general way the chief potato counties of the state, but does not show which counties are surplus or which deficit, for the reason that consumption is not taken account of. In order to determine the location and extent of our commercial potato area and those counties which produce less than enough to satisfy their own needs, it is necessary to arrive at total production and total consumption for each county in the state.

One method of determining surplus and deficit counties would be to take account of all railroad loading and unloading in each county. This method was not used in the present study for two reasons, mainly: In the first place, it is very difficult to get a complete record of loadings and unloadings from all railroads operating within the state; in the second place, potatoes moved by truck would be unaccounted for, and such movement is probably large enough to be significant. The method used in this study was to take the figures compiled by the Federal Agricultural Statistician of South Dakota, Mr. O. L. Dawson, giving the production of potatoes by counties for the state and then to subtract from the production of each county the quantity consumed as human food, the number of bushels used for seed, and the amount calculated as unfit for food or seed. The amount remaining after this subtraction is surplus or deficit.

The production figures used were the averages for the three years, 1922, 1923 and 1924. The average production figures for each county appear in column five of Table III. With the assistance of the Agricultural Statistician at Brookings, approximately four thousand questionnaires were mailed to country and city residents in representative localities over the state, asking for the average consumption of potatoes per capita as human food. Replies from 292 farm families showed that the average farm family consumes 5.29 bushels of potatoes per capita as human food. Replies from 244 city families indicated that on the average city people consume 3.61 bushels of potatoes per capita. These two averages, giving the city and country per capita consumption of potatoes were then combined into an average figure for the state by weighting each according to its importance in the population of the state in 1920. The weighted average of potato consumption for the state thus obtained is 5.02 bushels. This average consumption figure multiplied by the population of each county gives the total consumption of potatoes for each county. This figure appears in column one in Table III.

¹ For table see appendix, page 37.

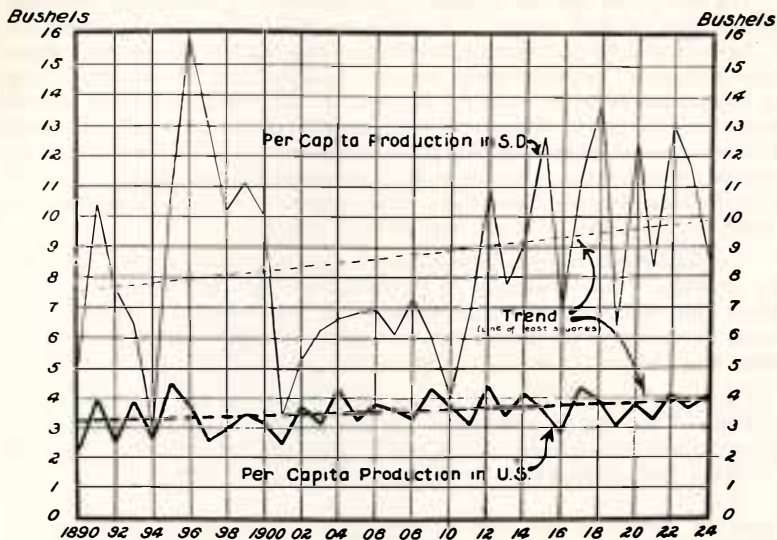


Fig. 5.—PER CAPITA PRODUCTION OF WHITE POTATOES IN SOUTH DAKOTA AND IN THE UNITED STATES, 1890-1924. The per capita production of white potatoes increased from 3.3 bushels to 3.9 bushels in the United States from 1890 to 1924, while South Dakota's per capita production increased from 7.5 bushels to 9.8 bushels. See Table XVII, page 37.

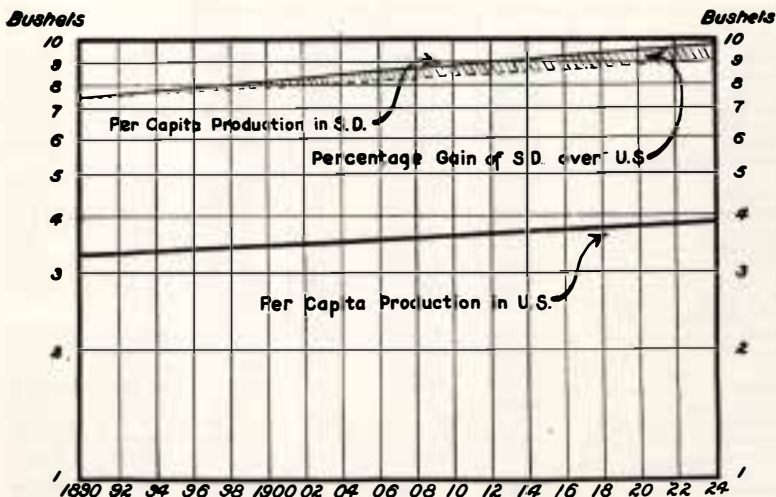


Fig. 6.—PERCENTAGE INCREASE IN THE TREND OF PER CAPITA PRODUCTION OF WHITE POTATOES IN SOUTH DAKOTA AND IN THE UNITED STATES, 1890-1924. The shaded area represents the percentage gain of South Dakota over the United States in per capita potato production from 1890 to 1924.

The next step was to determine the number of bushels of potatoes used as seed in each county. A study of data previously compiled by the Agricultural Statistician at Brookings showed that the average number of bushels of potatoes used for seed amounted to 7.9 bushels in the less important districts, and 9.9 bushels in the more important potato districts of the state. The number of bushels of potatoes used for seed was then secured by multiplying the average number of acres planted to potatoes by 9.9 in the more important potato-producing counties and by 7.9 in the less important counties. The number of bushels used for seed in each county appears in column three, Table III.

A considerable number of potatoes is also accounted for as unfit for food or seed. Figures secured from the Agricultural Statistician's office showed that 9.5 per cent of the potatoes in South Dakota are unfit for food or for seed. This percentage was applied to the production of each county and the result placed in column two of Table III.

Column four in Table III gives total consumption of potatoes by counties. This figure subtracted from the total production gives the figures in the last column of the table which are referred to as surplus or deficit. Deficit counties are marked with a minus sign.

Table III.—SURPLUS AND DEFICIT POTATO COUNTIES IN SOUTH DAKOTA

Counties	Number bushels of potatoes consumed as human food	Number bushels of potatoes unfit for food or seed	Number bushels of potatoes used as seed	Total Consumption	Number bushels of potatoes produced	Surplus or Deficit
North Western Section						
Butte	34,231	4,822	3,779	42,832	50,700	7,868
Corson	36,390	2,882	3,484	42,756	30,300	-12,456
Dewey	24,106	3,330	4,179	31,615	35,017	3,402
Harding	19,844	1,341	1,358	22,543	14,100	-8,443
Perkins	40,125	3,290	3,460	46,875	34,600	-12,275
Ziebach	18,664	1,070	1,326	21,060	11,250	-9,810
North Central Section						
Brown	148,135	28,343	30,442	206,920	298,033	91,113
Campbell	26,631	2,431	2,581	31,643	25,567	-6,076
Edmunds	41,847	6,716	6,720	55,263	70,623	15,340
Faulk	32,339	3,750	5,042	41,131	39,433	-1,698
McPherson	38,679	5,552	5,777	50,008	58,383	8,375
Potter	21,998	5,104	4,602	31,704	53,667	21,963
Spink	79,155	12,464	15,445	107,064	131,067	24,003
Walworth	42,404	3,056	3,084	48,544	32,133	-16,411
North Eastern Section						
Clark	55,903	37,358	59,024	152,285	392,833	240,548
Codington	83,076	60,268	85,143	228,487	633,733	405,246
Day	76,274	13,273	17,360	106,907	139,567	32,660
Deuel	43,970	53,345	56,802	154,117	560,933	406,816
Grant	54,618	9,152	10,714	74,484	96,233	21,749
Hamlin	40,431	58,464	81,374	180,269	614,767	434,498
Marshall	48,172	14,462	18,451	81,085	152,067	70,982
Roberts	82,900	11,472	14,384	108,756	120,633	11,877
West Central Section						
Hankon	23,072	1,512	1,862	26,446	15,900	-10,546
Jackson	12,409	1,224	1,222	14,855	12,867	-1,988
Lawrence	65,406	6,712	6,576	78,694	70,583	-8,111

SOUTH DAKOTA POTATOES

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Table III.—(Continued)

Counties	Number bushels of potatoes consumed as human food	Number bushels of potatoes unfit for food or seed	Number bushels of potatoes used as seed	Total Consumption	Number bushels of potatoes produced	Surplus or Deficit
Meade -----	47,022	3,465	3,915	54,402	36,433	-17,969
Pennington -----	63,854	4,790	4,954	73,598	50,367	-23,231
Stanley -----	14,598	967	1,302	16,867	10,167	-6,700
Central Section						
Aurora -----	36,375	3,034	5,059	44,468	31,900	12,568
Beadle -----	96,750	20,225	27,280	144,255	212,667	68,412
Brule -----	35,848	2,609	4,127	42,584	27,433	-15,151
Buffalo -----	8,609	1,138	1,349	11,096	11,967	871
Hand -----	44,066	6,067	8,293	58,426	63,800	5,374
Hughes -----	28,669	2,523	3,204	34,396	26,533	-7,863
Hyde -----	16,641	2,114	3,135	21,890	22,233	343
Jerauld -----	31,817	3,103	3,928	38,848	32,633	-6,215
Sully -----	14,212	2,637	3,601	20,450	27,733	7,283
East Central Section						
Brookings -----	80,917	87,200	94,002	262,119	916,933	654,819
Davison -----	70,978	4,549	5,615	81,142	47,833	-33,309
Hanson -----	31,134	3,116	4,365	38,615	32,767	-5,848
Kingsbury -----	64,266	59,913	73,269	197,448	630,000	432,552
Lake -----	61,530	17,841	20,991	100,362	187,600	87,238
McCook -----	50,150	5,376	7,004	62,530	56,533	-5,997
Miner -----	42,971	5,173	7,142	55,286	54,400	-886
Minnehaha -----	213,300	21,144	25,822	260,266	222,333	-37,933
Moody -----	48,305	13,457	15,108	77,470	141,500	64,030
Sanborn -----	39,543	4,712	4,424	48,679	49,530	871
South Western Section						
Bennett -----	9,659	682	2,797	13,138	7,167	-5,971
Custer -----	19,613	2,682	2,980	25,275	28,200	2,925
Fall River -----	35,065	1,707	2,157	38,929	17,950	-20,979
Washington -----	7,635			7,635		-7,635
Shannon -----	10,055			10,055		-10,055
Washabaugh -----	5,853			5,853		-5,853
South Central Section						
Gregory -----	63,754	8,023	7,535	79,312	84,367	5,055
Jones -----	15,080	1,239	1,199	17,518	13,033	-4,485
Lyman -----	33,087	2,693	3,220	39,000	28,317	-10,683
Mellette -----	19,327	2,015	1,862	23,204	21,183	-2,021
Tripp -----	60,089	9,410	9,268	78,767	98,950	20,183
Todd -----	13,976			13,976		-13,976
South Eastern Section						
Bon Homme -----	59,939	3,429	3,899	67,267	36,057	-31,210
Charles Mix -----	81,605	5,838	6,712	94,155	61,387	-32,768
Clay -----	48,463	2,929	2,797	54,189	30,800	-23,389
Douglas -----	35,105	3,344	3,396	41,845	35,167	-6,678
Hutchinson -----	67,645	5,250	4,634	77,529	55,200	-22,329
Lincoln -----	69,743	2,698	2,725	75,166	28,373	-46,793
Turner -----	74,652	5,783	5,977	86,412	60,807	-25,605
Union -----	55,717	4,704	4,019	64,440	49,467	-14,973
Yankton -----	76,470	4,467	3,083	84,740	46,967	-37,773

This map shows that the main surplus producing area is located in the north-eastern quarter of the state, while fewer potatoes are produced than are required in the western half and the southeastern quarter of the state. Those counties having an exportable surplus of 300,000 bushels or above are Deuel, Hamlin, Codington, Kingsbury and Brookings, and those counties having a deficit of 25,000 bushels or above are Davison, Minnehaha¹, Turner, Lincoln and Charles Mix.

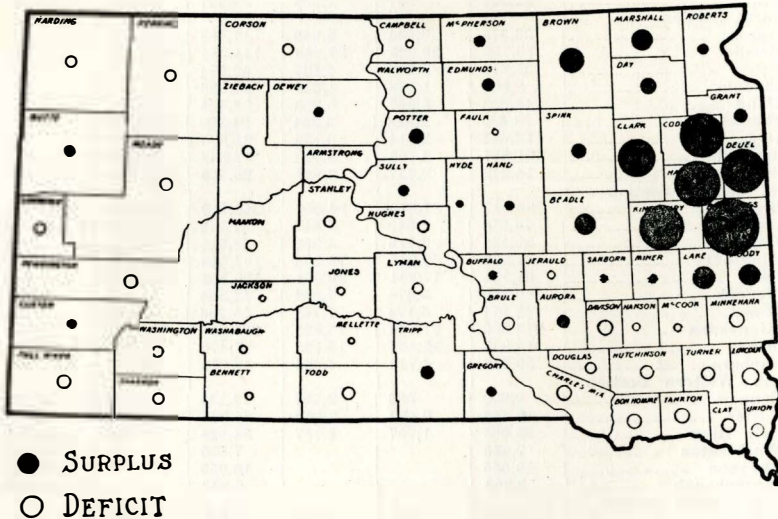


Fig. 7.—SURPLUS AND DEFICIT WHITE POTATO AREAS IN SOUTH DAKOTA. AVERAGE 1922-1924 (Incl.)

More potatoes are produced than are consumed in the northeastern quarter of the state, whereas more are consumed than are produced in the western half and in the southeastern quarter of the state.

Comparison of Yield per Acre in South Dakota With Yield in Other States. A comparison of the figures in Table IV, or the bars in Figure 8, giving a ten-year average yield of white potatoes in the forty-eight states, shows South Dakota to rank thirty-first, with an average yield of 84 bushels. The state of Maine stands at the top of the list with an average yield of 212 bushels per acre. The high yields in such states as Utah, Idaho and Nevada are accounted for in part no doubt by irrigation in these states. North Dakota, Minnesota, Wisconsin and Michigan, South Dakota's main competitors on the Chicago market, exceed South Dakota's yield by 1, 11, 13, and 6 bushels respectively.

It is interesting to note that the average yield of potatoes for South Dakota was 84 bushels for the ten year period, 1905 to 1914, exactly the average for the ten year period, 1915 to 1924. As pointed out previously, however, it is somewhat doubtful whether or not crop estimate figures

¹ The city of Sioux Falls, being located in this county, is largely responsible for this deficit.

for the state were sufficiently accurate during this early period to warrant us in placing a great amount of confidence in them. Yield figures for the United States show an average production of 96.5 bushels per acre for the ten year period, 1905 to 1914, and an average yield of 100.8 bushels for the latter period, an increase of 4.3 bushels per acre.

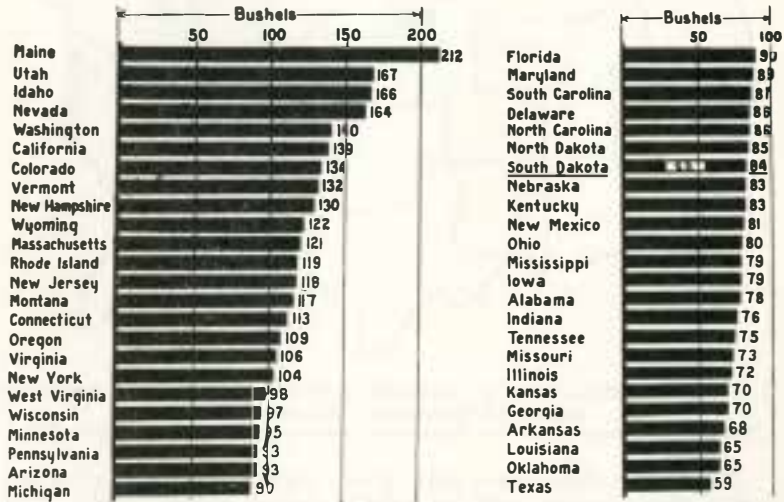


Fig. 8.—A TEN-YEAR AVERAGE YIELD OF WHITE POTATOES BY STATES, AVERAGE 1914-1923. On the basis of a ten-year average yield, Suth Dakta ranks thirty-first in the United States, with a yield of 84 bushels per acre.

Table IV.—A TEN-YEAR AVERAGE YIELD OF WHITE POTATOES BY STATES (AV. FOR THE CALENDAR YEARS 1914 to 1923 INCLUSIVE)*

State	Bu. per acre	State	Bu. per acre
Maine	211.8	Florida	90.0
Utah	166.5	Maryland	89.2
Idaho	165.6	South Carolina	87.2
Nevada	163.6	Delaware	86.2
Washington	140.0	North Carolina	86.1
California	138.7	North Dakota	84.5
Colorado	134.3	South Dakota	83.5
Vermont	131.8	Nebraska	82.7
New Hampshire	130.0	Kentucky	82.5
Wyoming	121.6	New Mexico	81.1
Massachusetts	121.4	Ohio	79.7
Rhode Island	119.4	Mississippi	79.2
New Jersey	118.1	Iowa	78.8
Montana	117.1	Alabama	78.3
Connecticut	112.8	Indiana	76.3
Oregon	109.4	Tennessee	74.9
Virginia	105.5	Missouri	72.6
New York	104.0	Illinois	71.5
West Virginia	97.5	Kansas	70.1
Wisconsin	97.2	Georgia	69.6
Minnesota	95.0	Arkansas	67.8
Pennsylvania	93.3	Louisiana	65.3
Arizona	93.0	Oklahoma	65.2
Michigan	90.2	Texas	58.9

*This average was compiled from the 1923 "Agricultural Year Book," U. S. D. A. and "Crops and Markets."

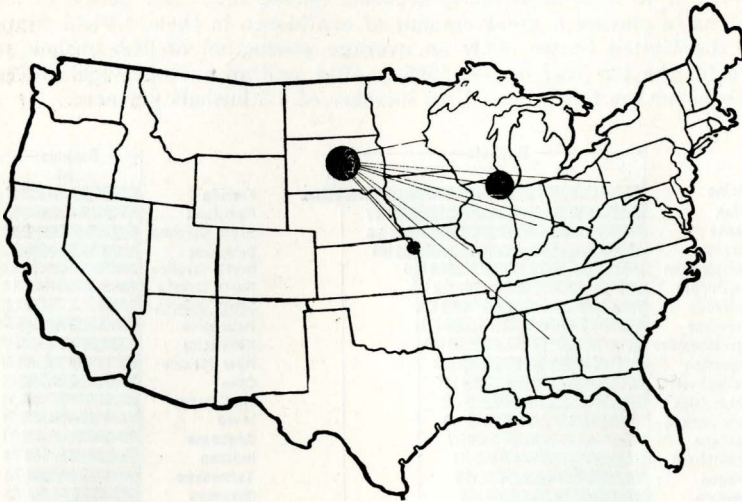


Fig. 9.—THE DESTINATION OF CAR-LOT SHIPMENTS OF WHITE POTATOES FROM SOUTH DAKOTA, 1921-1924 (Incl.)
Most of South Dakota's surplus potatoes are shipped to Chicago and Kansas City.

As regards yield alone, then, South Dakota is at a slight disadvantage when compared with her chief competing states. Yield is, however, only one of the factors which must be considered in such an analysis. Other considerations, such as the cost of production, freight rates, quantity of land in other states suitable for growing potatoes, etc., must also be taken account of. Yield alone tells us little about the amount of effort which has been expended to produce a bushel of potatoes. An irrigated section can produce enormous crops, but may not return high profits. Costs and freight rates will be considered a little later in this study.

Economic Aspects of Potato Production

The Destination of South Dakota's Surplus Potatoes. As pointed out at the beginning of this study, South Dakota has been increasing her per capita production of potatoes for the past thirty-five years. Now it is necessary to inquire where these surplus potatoes are going in order to determine our chief competitors in the marketing of this crop. Table V, and Figure 9 give the destination of carlot shipments of potatoes from South Dakota to the principal outside markets for the four-year period, 1921 to 1924. These figures show that Chicago and Kansas City are our outstanding markets. By far the greatest consignments were to Chicago.

A Comparison of Freight Rates on Potatoes from South Dakota and from Some Competing Points to Chicago. Table VI and its accompanying bar chart in Figure 10 show that over fifty per cent of Chicago's receipts of potatoes came from the three states—Wisconsin, Minnesota

and Idaho—and that the remainder comes from the fifteen states: Michigan, North Dakota, South Dakota, Colorado, Nebraska, New Jersey, Montana, Maine, Oregon, Wyoming, California, Washington, Utah, Iowa, and New York. South Dakota ranks sixth in importance of receipts at Chicago.

Table V.—DESTINATION OF CARLOT SHIPMENTS OF WHITE POTATOES FROM SOUTH DAKOTA, 1921 TO 1924 INCLUSIVE*

Destination	Total Cars	Destination	Total Cars
Chicago	1,596	St. Louis	5
Kansas City	167	Omaha	3
Cincinnati	9	Pittsburgh	2
St. Paul	9	Indianapolis	1
Minneapolis	5	Birmingham	1

*This does not constitute the total shipment of potatoes from stations in South Dakota. Many move to points within the state and some to still other outside points.

Table VI.—CAR-LOT RECEIPTS OF WHITE POTATOES AT CHICAGO FROM EIGHTEEN PRINCIPAL LATE-CROP STATES (Average, 1921-24 Inclusive)

State	1921	1922	1923	1924	Total	Av.	Per Cent
Wisconsin	4143	4257	5222	5488	19,110	4777	33.47
Minnesota	1395	1809	1865	2435	7,504	1876	13.14
Idaho	1499	1547	1538	1163	5,747	1437	10.07
Michigan	998	694	562	559	2,813	703	4.93
North Dakota	680	225	470	319	1,695	423	2.97
South Dakota	378	407	315	296	1,596	399	2.79
Colorado	210	527	280	144	1,161	290	2.03
Nebraska	234	185	238	285	942	235	1.65
New Jersey	131	458		160	749	187	1.31
Montana	115	67	147	61	390	97	.07
Maine	242	45			287	71	.05
Oregon	44	63	101	18	226	56	.04
Wyoming	30	60	81	52	223	55	.04
California	139	20	47	1	207	51	.04
Washington	116	44	21	15	196	49	.03
Utah	38	51	33	29	151	37	.03
Iowa	26	34	4	47	111	27	.02
New York	32	8			40	10	.01

Table VII and the bars in the lower half of Figure 10 give a comparison of freight rates on potatoes from the leading counties of each of the above mentioned states to Chicago. In freight rate advantages Wisconsin ranks first, Iowa second, Michigan third, and North and South Dakota fourth with an average rate of 36 cents per hundred. On this basis alone the Dakotas were in a fairly good position to compete at Chicago during this period, 1921 to 1924.

Freight Rates on Potatoes from South Dakota and Some Competing Points to Kansas City. Table VIII and the bar chart, Figure 11, indicate that 28.6 per cent of Kansas City's supply of potatoes comes from Minnesota; 15.8 per cent from North Dakota; 13.2 per cent from Colorado, 6.2 per cent from Idaho; 4.9 per cent from Nebraska; 1.8 per cent from Wisconsin; and 1.7 per cent from South Dakota. This places South Dakota seventh in receipts at the Kansas City market.

On the basis of freight rates as shown by Table IX these states rank as follows: Iowa first, with a rate of 30 cents per hundred; Nebraska second; Wisconsin third; Minnesota fourth; North Dakota fifth; and South Dakota sixth with a rate of 46 cents per hundred.

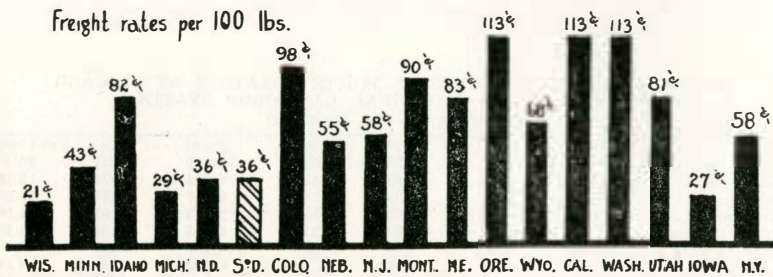
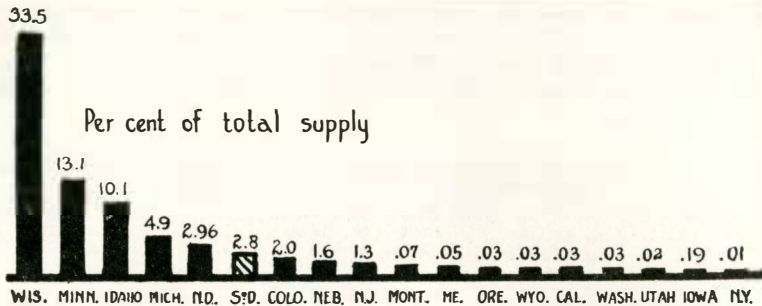


Fig. 10.—THE MAIN SOURCES OF CHICAGO'S POTATO SUPPLY AND FREIGHT RATES FROM THESE SOURCES, AVERAGE 1921-1924 (incl.) South Dakota ranks sixth in importance in furnishing Chicago her potato consignments, and fourth in freight rate advantage.

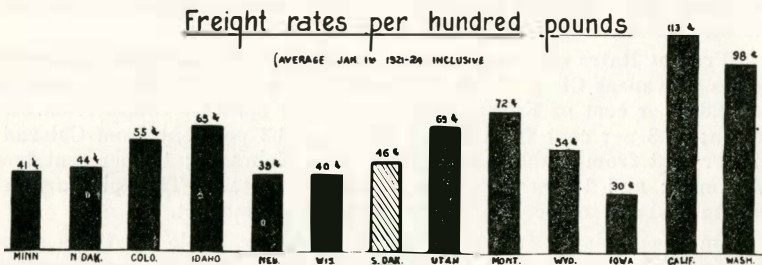
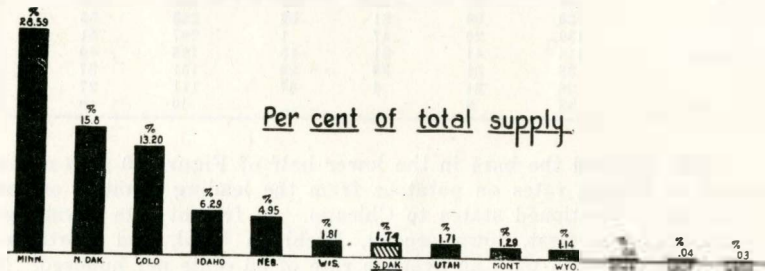


Fig. 11.—THE MAIN SOURCE OF KANSAS CITY'S POTATO SUPPLY AND FREIGHT RATES FROM THESE SOURCES, AVERAGE 1921-1924 (incl.) South Dakota ranks seventh among the states supplying Kansas City with potatoes, and sixth in advantageous freight rates.

Table VII. — FREIGHT* RATES PER HUNDREDWEIGHT ON POTATOES TO CHICAGO, ILL., FROM

State	Station	Year	Cen'ts	State	Station	Year	Cents	State	Station	Year	Cents
Wisconsin	Waupaca	1921	23.0	Minnesota	Hawley	1921	46.0	Iowa	St. Ansgar	1921	29.0
		1922	20.5			1922	41.5			1922	26.0
		1923	20.5			1923	41.5			1923	26.0
		1924	20.5			1924	41.5			1924	26.0
		Average 21.1				Average 42.6				Average 26.8	
North Dakota	Thompson	1921	39.0	South Dakota	Henry	1921	39.5	Nebraska	Hemingford	1921	59.5
		1922	35.0			1922	35.0			1922	53.5
		1923	35.0			1923	35.0			1923	53.5
		1924	35.0			1924	35.0			1924	53.5
		Average 36.0				Average 36.0				Average 55.0	
Montana	Kalispell	1921	97.4	Wyoming	Powell	1921	89.5	Colorado	Monte Vista	1921	108.0
		1922	87.0			1922	73.9			1922	95.9
		1923	87.0			1923	77.9			1923	93.5
		1924	87.0			1924	75.0			1924	93.5
		Average 89.6				Average 79.05				Average 97.7	
Idaho	Idaho Falls	1921	90.83	Washington	Toppenish	1921	122.9	California	Stockton	1921	123.0
		1922	82.50			1922	110.0			1922	110.0
		1923	77.00			1923	110.0			1923	110.0
		1924	77.00			1924	110.0			1924	110.0
		Average 81.83				Average 113.2				Average 113.25	
Utah	Ogden	1921	92.00	Michigan	Greenville	1921	31.0	Missouri	Caribou	1921	89.5
		1922	77.62			1922	29.25			1922	82.75
		1923	77.00			1923	27.5			1923	80.5
		1924	77.00			1924	27.5			1924	80.5
		Average 80.9				Average 28.8				Average 83.3	
New Jersey	Hightstown	1921	63.0	New York	Riverhead	1921	63.0	Oregon	Canby	1921	123.0
		1922	56.5			1922	56.5			1922	110.0
		1923	56.5			1923	56.5			1923	110.0
		1924	56.5			1924	56.5			1924	110.0
		Average 58.1				Average 58.1				Average 113.3	

*Weighted averages compiled from figures furnished by the Interstate Commerce Commission and the State Railway Commission at Pierre, South Dakota.

**Table VIII.—CAR-LOT RECEIPTS OF WHITE POTATOES AT KANSAS CITY
FROM THIRTEEN PRINCIPAL LATE-CROP STATES
(Average 1921-24 Inclusive)**

State	1921	1922	1923	1924	Total	Av.	Per Cent
Minnesota	556	542	676	875	2749	687	28.60
North Dakota	157	266	553	514	1523	380	15.84
Colorado	241	458	308	263	1270	317	13.21
Idaho	90	127	254	202	673	168	7.00
Nebraska	161	171	89	55	476	119	4.95
Wisconsin	131	16	4	24	175	43	1.82
South Dakota	30	58	29	50	167	41	1.74
Utah	52	51	46	16	165	41	1.72
Montana	45	51	17	11	124	31	1.29
Wyoming	41	35	25	9	110	27	1.14
Iowa	16	9	2	13	40	10	.04
California	21	7	10		38	9	.04
Washington	5	16	4	1	26	7	.03

On the basis of freight rates alone then, it seems that South Dakota occupies a fairly favorable position, for while the state ranks sixth in shipments to Chicago it holds fourth place in advantageous freight rates. In the Kansas City market South Dakota receipts occupy seventh position, and in freight rate advantages it stands sixth. From the standpoint of distance alone South Dakota should, it seems, enjoy some advantage over North Dakota, but the average for these four years shows South Dakota's rate two cents higher than that of North Dakota. From the standpoint of freight rates to these two principal markets South Dakota is fairly well situated, it seems, to expand her surplus production of potatoes.

Cost of Producing Potatoes in South Dakota and in Some Competing Territories. Doubtless one of the outstanding reasons why a locality should or should not engage in a given enterprise is the cost of carrying on this enterprise. As pointed out previously, cost alone is not the determining factor in locating an industry, yet it is certainly one of the strongest indications of its profitableness.

Table X gives the man and horse hour requirements per acre and per 100 bushels of potatoes in South Dakota, and in four competing states, North Dakota, Minnesota, Wisconsin, and Michigan. Labor requirements are used here instead of cost of labor or total costs in order to avoid comparing data which might not be exactly comparable in the different states. Since man and horse labor accounts for approximately fifty per cent of the total cost of producing potatoes and since practices are quite similar in these five states these two items of cost should, it seems, give a fair indication of the relative costs in these different states.

The man and horse hour requirements in Table X are not all for the same number of farms nor for the same years. The figures for South Dakota are averages compiled from detailed cost records kept on twenty farms in Kingsbury County for three years, 1922, 1923 and 1924. The figures for North Dakota are from detailed records kept on thirty-seven farms in 1921 and twenty-seven farms in 1922. Man and horse hours for Minnesota, Wisconsin and Michigan were taken from the results of an enterprise survey made in 1920 by the United States Department of

Table IX.—FREIGHT RATES* PER HUNDREDWEIGHT ON POTATOES TO KANSAS CITY, MO., FROM

State	Station	Year	Cents	State	Station	Year	Cents	State	Station	Year	Cents
Wisconsin	Waupaca	1921	42.5	Nebraska	Hemingford	1921	42.5	Washington	Toppenish	1921	106.25
		1922	38.5			1922	38.3			1922	95.0
		1923	38.5			1923	38.5			1923	95.0
		1924	38.5			1924	38.5			1924	95.0
		Average 39.50				Average 39.45				Average 97.8	
Minnesota	Hawley	1921	44.5	Montana	Kalispell	1921	71.0	California	Stockton	1921	123.0
		1922	40.0			1922	71.0			1922	110.0
		1923	40.0			1923	71.0			1923	110.0
		1924	40.0			1924	75.0			1924	110.0
		Average 41.13				Average 72.00				Average 113.25	
Iowa	St. Ansgar	1921	33.0	Wyoming	Powell	1921	58.5	Utah	Ogden	1921	74.83
		1922	29.5			1922	52.5			1922	62.62
		1923	29.5			1923	52.5			1923	61.17
		1924	29.5			1924	52.5			1924	62.00
		Average 30.37				Average 54.00				Average 65.15	
North Dakota	Thompson	1921	47.5	Colorado	Monte Vista	1921	58.5				
		1922	43.0			1922	59.5				
		1923	43.0			1923	53.5				
		1924	43.0			1924	50.0				
		Average 44.13				Average 55.37					
South Dakota	Henry	1921	49.5	Idaho	Idaho Falls	1921	71.5				
		1922	44.5			1922	64.5				
		1923	44.5			1923	62.0				
		1924	44.5			1924	62.0				
		Average 45.75				Average 65.00					

*Weighted averages compiled from figures furnished by the Interstate Commerce Commission and the State Railway Commission at Pierre, South Dakota. The rates were weighted according to the number of months in which they were effective.

Table X.—MAN AND HORSE LABOR REQUIREMENTS PER ACRE AND PER 100 BUSHELS OF POTATOES IN SOUTH DAKOTA, NORTH DAKOTA, MINNESOTA, WISCONSIN, AND MICHIGAN.

State	County	Man Hours Per Acre	Horse Hours Per Acre	Man Hours per 100 Bu. ²	Horse Hours per 100 Bu.*
South Dakota—Kingsbury	31.1‡	51.5‡	36.0	61.7
North Dakota—Red River Valley		42.5‡	49.6‡	50.3	58.7
Minnesota—Anoka	-----	63.7**	86.9**	67.1	91.5
Wisconsin—Barron	-----	92.7**	100.3**	95.4	103.2
Michigan—Montcalm	-----	73.9**	85.5**	81.9	94.8

‡Data secured from the Department of Farm Economics, South Dakota State College, Brookings, South Dakota.

†"Potato Handbook", Circular 50 of the Agricultural Extension Division, Agricultural College, Fargo, North Dakota.

**"Labor and Material Requirements of Field Crops"; U. S. D. A. Bulletin No. 1000.

*Calculated on the basis of ten year average potato yields in these states. For ten year average yields see Table IV, Page 11.

Agriculture. Fifty-four records were analyzed in Anoka County, Minnesota, forty-seven in Barron County, Wisconsin, and forty-nine in Montcalm County, Michigan.

These records show the highest man hours per acre and per bushel in Wisconsin and the lowest in South Dakota. The highest horse hour requirements per acre and per bushel are in Wisconsin also, lowest in North Dakota, and second lowest in South Dakota.

Since South Dakota ranks lowest in man hour requirements and next to lowest in horse hour requirements for producing potatoes it seems that so far as costs are concerned she is in a fair position to compete with these nearby states in the production of potatoes.

The fact that a locality has been found to be fairly well situated with respect to yield per acre and cost of producing and marketing of a given crop does not allow one to conclude definitely that such crop should be greatly expanded, for the reason that its place in the system of farming has not been taken account of. The question is, it seems, is there any other crop which would fit in with the general practices of farming in this territory and yield a higher total labor income than potatoes? The answer to this question would carry us beyond the scope of this study. The foregoing are intended to act merely as guides in answering such questions.

Economic Conditions Affecting the Profitableness of Potato Production

The main object of the foregoing analysis has been to point out some of the advantages and disadvantages of South Dakota as a commercial potato state. In what follows the aim is to point out some of the economic conditions which affect the profitableness of potato production in this state.

In what months are potato prices usually highest in our primary markets—Chicago and Kansas City? To answer this question the wholesale prices of white potatoes were averaged by months for the four

year period, 1922 to 1925, and reduced to relatives with the September average as a base. These figures showing the trend of monthly prices from the September price appear in Table XI, and Figure 12. As a rule prices fall from September to October and remain relatively low during the months of November and December. This three month period of low prices is a result of heavy marketing. The bulk of potatoes move to market during these three months. Prices in both

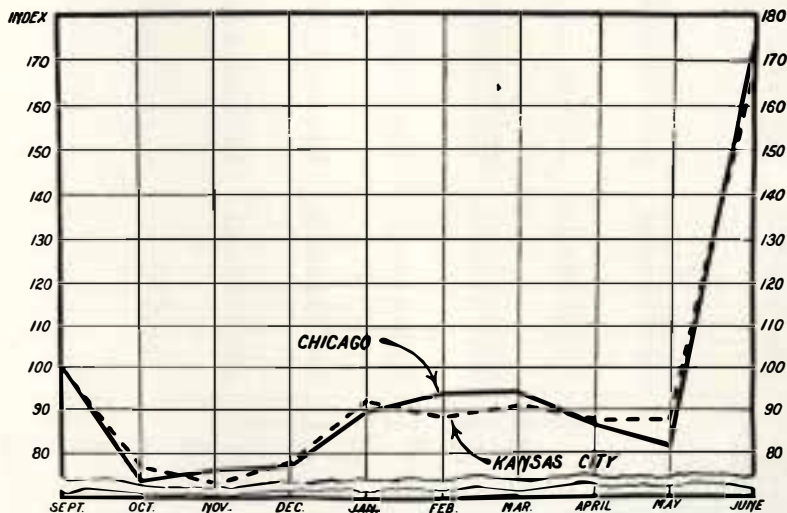


Fig. 12.—SEASONAL VARIATION IN THE PRICE OF WHITE POTATOES AT CHICAGO AND KANSAS CITY (Monthly Average 1922-1925, Inclusive).

The price of potatoes usually reaches its lowest level at Chicago and Kansas City in October, November, and December. The price remains fairly high during the months of January, February, and March; takes a dip in April and May, reaching its highest level after May.

markets rise from December to January, and remain relatively high during February and March, the months of lighter marketing. During the months of April and May prices again fall, as a rule, reflecting the movement of early potatoes. After May, prices reach their highest point for the reason that few potatoes remain to be sold, and also because there is a demand for seed potatoes at this season of the year. For the four years here considered it seems, on the average, to have been more profitable to sell potatoes in the months of January, February and March than in October, November and December¹. It would not have paid to hold until April and May².

¹The cost of carrying must, of course, be considered.

²"In some years the price of potatoes rises from October to May enough to pay handsomely those who store them. In the twelve years from 1909 to 1921 four years paid well for storage and eight years did not pay for it. In five years of these eight years the spring price was actually lower than the fall price." From page 9, Minnesota Agricultural Experiment Station Bulletin 211, "Cooperative Central Marketing Organization."

Table XI.—SEASONAL VARIATION IN THE PRICE OF WHITE POTATOES AT CHICAGO AND KANSAS CITY, 1922 TO 1925, INCLUSIVE.
Chicago

	1922		1923		1924		1925	
	Price*	Adjusted Price**	Price	Adjusted Price	Price	Adjusted Price	Price	Adjusted Price
Sept. -----	265	173	117	76	170	114	132	83
Oct. -----	200	130	100	65	114	75	97	61
Nov. -----	175	112	105	69	124	81	131	83
Dec. -----	183	117	96	64	127	81	136	87
Jan. -----	198	143	102	65	158	105	147	92
Feb. -----	196	139	107	68	171	113	163	101
Mar. -----	180	127	135	85	175	117	144	89
Apr. -----	169	118	153	96	179	121	84	54
May -----	170	115	113	72	150	102	118	76
June -----	303	202	315	206	265	183	296	189
Kansas City								
Sept. -----	263	172	123	80	152	102	140	88
Oct. -----	197	128	112	73	116	76	105	66
Nov. -----	151	97	107	70	130	85	110	70
Dec. -----	165	106	103	68	130	83	143	92
Jan. -----	204	148	105	67	162	107	135	84
Feb. -----	199	141	107	68	157	103	134	83
Mar. -----	188	132	124	78	165	110	132	82
Apr. -----	177	124	121	76	189	128	97	62
May -----	184	124	105	67	170	116	132	85
June -----	287	191	299	195	255	176	275	175

Adjusted Index (†) of Seasonal Variation

	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June
Chicago -----	100	74	77	78	90	94	94	87	81	174
Kansas City -----	100	77	73	78	92	89	91	88	88	166

*Prices secured from U. S. D. A. Statistical Bulletin No. 10.

**Price divided by all-commodity index number.

†The average September price is used as a base.

With a few exceptions the ups and downs in these two markets coincide. On the basis of this four year average, the Kansas City price fell below the September price more than did the Chicago price during the months of November, February and March. During the month of May, however, the price remained relatively higher at Kansas City than at Chicago.

Some Relationships Between Production, Farm Price, and Farm Value of Potatoes in South Dakota and in 26 Late-Crop States. It is frequently stated by producers and others that prices are low in years when producers have large crops to sell and high in years of short crops, and that farmers as a whole are about as well off in years of low production and high price as they are in years of high production and low price. It seems that there must be some truth in this statement, but just what are the facts? Will low production and high price give a higher farm value than high production and low price? Do the same relationships hold for the state of South Dakota as hold for the United States? Is there a fairly definite acreage of potatoes which can be recommended to produce the highest farm value for South Dakota or for the United States?

To answer such questions figures giving the production, December 1st farm price, and December 1st farm value of white potatoes were compiled for the thirty-five year period, 1890 to 1924, for South Dakota and for the twenty-six leading late-crop states¹. The original figures appear in the appendix, beginning on page 36. Farm price and farm values were corrected for changes in the general price level², and these corrected figures likewise appear in the appendix. Graphs for each of these sets of data are presented in figures 13, 14, 15, 16, 17, and 18. Trends were also calculated for each of these series. The ordinates of these trends are also given in the appendix.

Some Relationships Existing Between Production and Farm Prices of White Potatoes in South Dakota and in 26 Late-Crop States. A study of the four charts presented in figures 14, 15, 16 and 17 reveals two very interesting inverse correlations between the production and prices of potatoes in the state of South Dakota as well as in the twenty-six commercial states here considered. In the first place, there is a very definite relationship between production and price each year. As a rule when production rises above its normal the farm price of potatoes falls below its normal and vice versa. In the second place, a very striking relationship exists between the trends of production and price of potatoes, both in South Dakota and in the 26 main late-crop states. Whereas production has been on the increase, the farm price of potatoes has been slightly on the decline. This long-time inverse correlation is, of course, to be expected when we remember, as pointed out earlier in this study, that there has been an increase in the trend of per-capita production during this period in this state and in the United States. We can be induced to consume more potatoes only by a falling price.

It is interesting to note in this connection that while agriculture is generally classed with the extractive industries, as one of increasing costs, potatoes seem to fall in the category of decreasing-cost industries over the thirty-five year period here under consideration, for the price trend of potatoes has been down rather than up.

Farm Values of Potatoes. Farm value of potatoes is the quantity of money derived by multiplying the December 1st farm price by the annual production of potatoes. The farm value curves together with their trends are pictured in Figures 17 and 18. The farm value curves have both been very irregular in shape. In South Dakota, as well as in the other 26 states, the trend was upward for the 16 years between 1900 and 1916 and downward from 1916 to 1924. Both of these lines seem to follow fairly closely a third degree trend. Such a trend seems to fit the data for the 26 states, Figure 18, almost perfectly.

As an explanation of the rather peculiar shape of these value curves it will be noticed by referring to Figures 18 and 19 that the most rapid increase in potato production took place during the war period while

¹The states selected as the chief late-potato producing states were as follows: Maine, New Hampshire, Vermont, Massachusetts, Rhode Island, Connecticut, New York, New Jersey, Pennsylvania, West Virginia, Ohio, Indiana, Michigan, Wisconsin, Minnesota, Iowa, North Dakota, South Dakota, Nebraska, Montana, Wyoming, Colorado, Idaho, Washington, Oregon, and California.

²The all-commodity index number of the Bureau of Labor was used in making this adjustment. Since price and value are for December each year, a December index number would have been used if it had been available back as far as 1890.

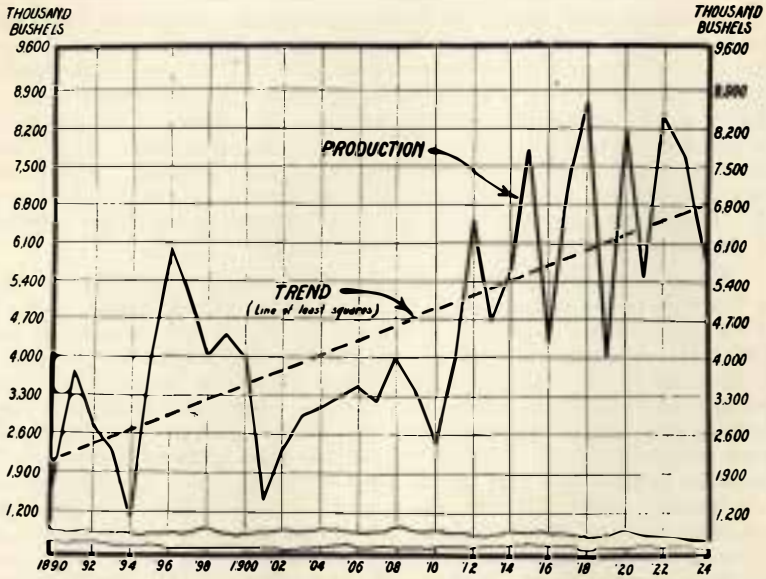


Fig. 13.—THE PRODUCTION OF WHITE POTATOES IN SOUTH DAKOTA, 1890-1924. The trend of potato production in South Dakota has been decidedly upward since 1890. Production has varied greatly from year to year. See Table XVI, page 36.

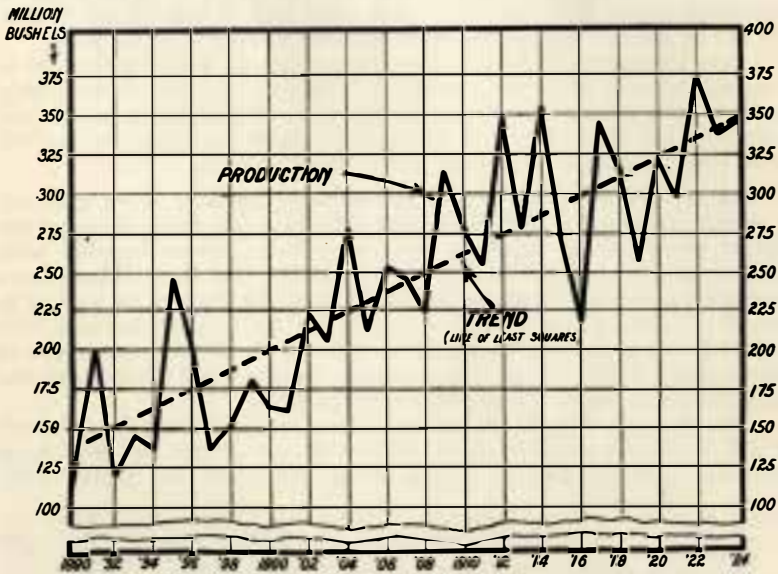


Fig. 14.—PRODUCTION OF WHITE POTATOES IN 26 LATE CROP STATES, 1890-1924 (Incl.) The trend of potato production in the 26 leading late-crop states has been sharply upward since 1890. Due to a change in acreage and in weather conditions production has varied from year to year. See Table XVI, page 36.

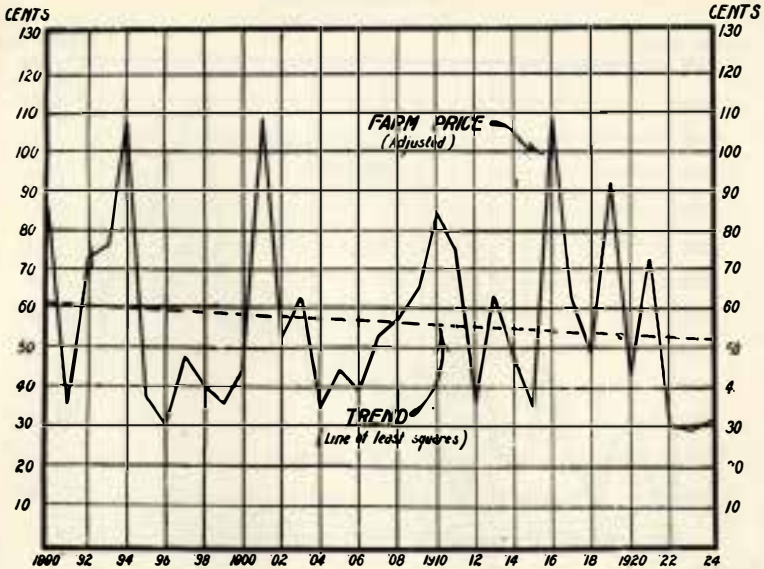


Fig. 15.—THE DECEMBER FIRST FARM PRICE OF WHITE POTATOES IN SOUTH DAKOTA, 1890-1924. The trend of the farm price of potatoes in South Dakota has been slightly downward since 1890, with wide fluctuations from year to year. See Table XIX, page 39.

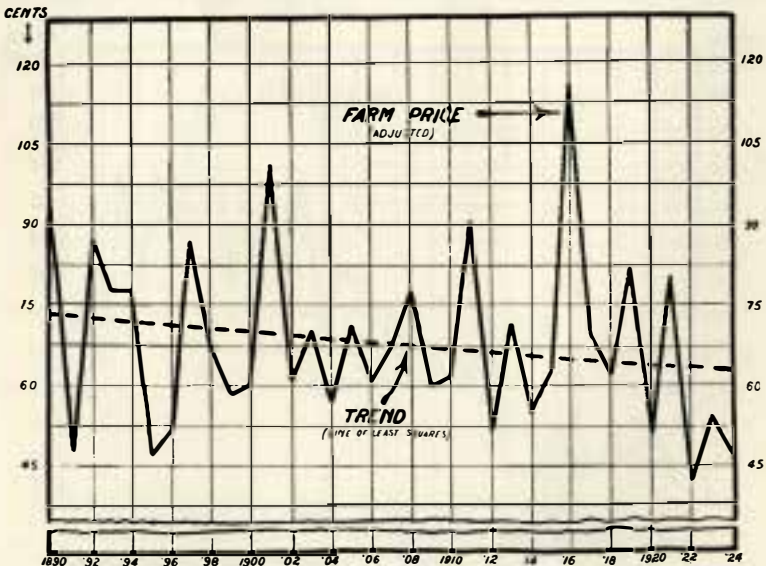


Fig. 16.—THE AVERAGE DECEMBER FIRST PRICE OF WHITE POTATOES IN 26 LATE CROP STATES, 1890-1924 (Incl.) The farm price of potatoes in the 26 principal late-crop states has had a slight tendency downward since 1890. The price has been quite irregular from year to year. See Table XX, page 40.

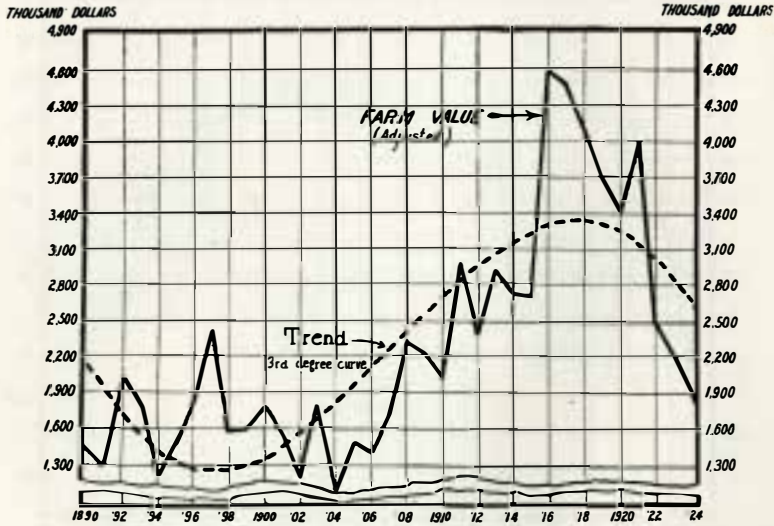


Fig. 17.—THE DECEMBER FIRST FARM VALUE OF WHITE POTATOES IN SOUTH DAKOTA, 1890-1924.

The trend of farm value of potatoes in South Dakota shows three tendencies over this thirty-five year period: A slight tendency downward from 1890 to 1904; a sharp upward slope from 1904 to 1916; and a dip downward again from 1916 to 1924. See Table XVIII, page 38.

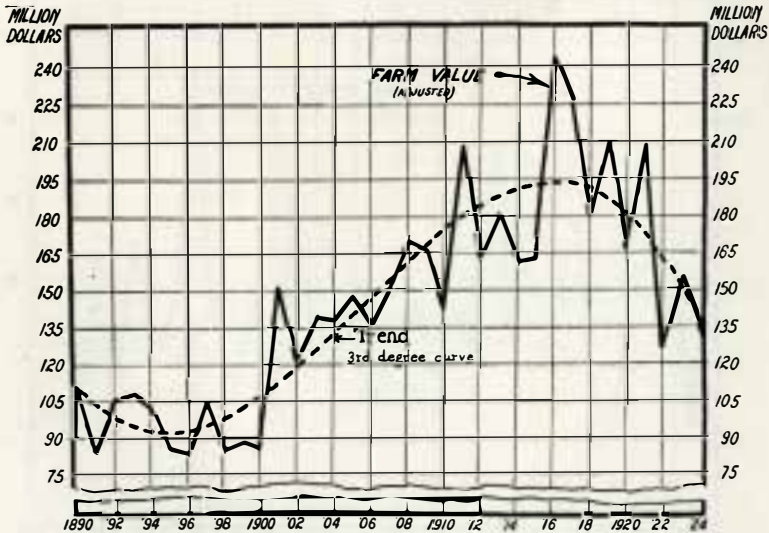


Fig. 18.—THE DECEMBER FIRST FARM VALUE OF WHITE POTATOES IN 26 LATE-CROP STATES, 1890-1924 (Incl.)

The trend of farm value of potatoes in the 26 late-crop states is quite similar to that of South Dakota: A very slight tendency downward from 1890 to 1900; an upward movement from 1900 to 1916; and a rather sharp slope downward from 1916 to 1924. See Table XVIII, page 38.

the price of potatoes remained higher than usual during this period. Since farm value is a result of quantity produced times the price, the product—farm value—must also rise. This, no doubt, was mainly responsible for the rather sharp upward trends in the farm value curves which terminated about the close of the war period.

From a farm value point of view, is it more important to produce a large crop at a low price or a small crop at a high price? The charts in Figures 19 and 20 express the percentage deviations of production, farm price, and farm value from their respective trends in the state of South Dakota and in the other twenty-six states considered in this study from 1890 to 1924. A careful analysis of these two charts shows a fairly close direct correlation between farm price and farm value of potatoes and an inverse correlation between production and farm value in the twenty-six states. For the state of South Dakota, there seems to be very little relation between either production and farm value or between farm price and farm value, or in other words, high farm value of potatoes in this state is as often the result of high production and low price as of low production and high price.

The coefficient of correlation between production and farm value of potatoes in the twenty-six states is $-.52$ with a probable error of $.08$, whereas the correlation between farm price and farm value amounts to $.78$ with a probable error of $.045$. The coefficient of correlation between production and farm value of potatoes in South Dakota is $.21$ and between farm price and farm value $.31$. Neither of these latter two coefficients are significant except to show that there is little or no correlation between price and farm value or production and farm value.

The conclusion is evident from this analysis that high farm price has contributed more to high farm value of potatoes in these twenty-six states than has high production over this thirty-five year period. This same situation does not hold, however, for a single state such as South Dakota. It appears that it is as reasonable to expect an increase in farm value of potatoes in this state from an increase in production as from lower production. The reason for this is, of course, that the price of potatoes is made by total demand and supply conditions rather than by demand and supply in a single state. A smaller potato crop in the United States is sufficient to bring about an increase in price, whereas a reduction in the output of one state is insufficient to affect any material increase in price. A single state seems to be situated somewhat like an individual producer in this respect. It does a single producer no good to curtail his production unless a sufficient number of other producers follow suit to affect a change in price. As an individual he might gain more by increasing his output.

The relation between production and farm value of potatoes is further elaborated upon in Table XII and Figure 21, and Table XIII and Figure 22. The scatter diagram presented in Figure 21 shows the relation between the two variables, production and farm value of potatoes in South Dakota. Production is plotted on the horizontal axis and farm value on the vertical axis. If there were positive correlation between production and farm value of potatoes in this state, a production

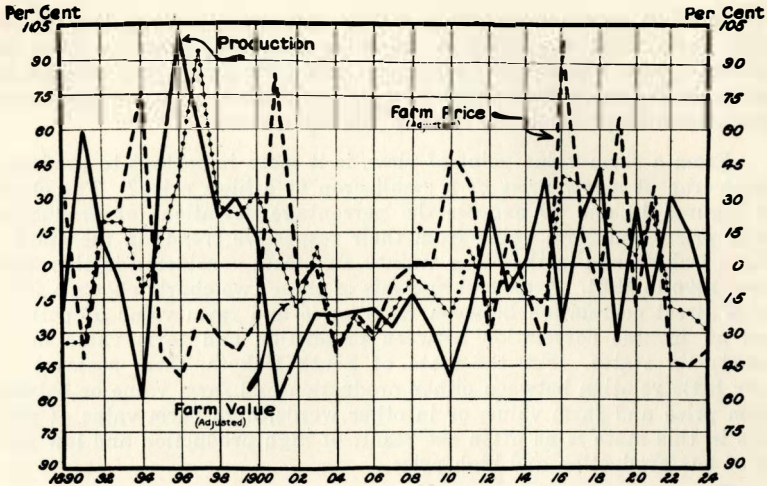


Fig. 19.—THE PERCENTAGE DEVIATION OF PRODUCTION, PRICE, AND FARM VALUE OF POTATOES FROM THEIR TRENDS IN SOUTH DAKOTA, 1890-1924. There is very little relationship between either production and farm value or farm price and farm value in South Dakota. The farm value curve does not always fall between the production and farm price curves because of the trends do not fit perfectly in every case. This is especially true of value in 1897.

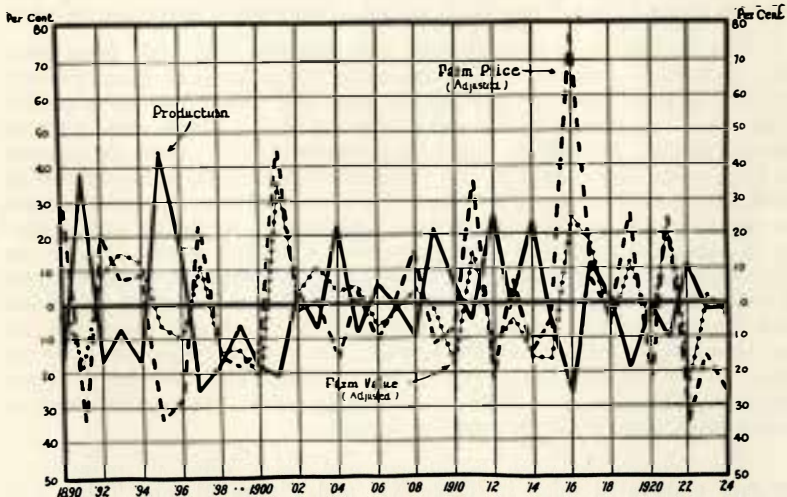


Fig. 20.—THE PERCENTAGE DEVIATION OF PRODUCTION, PRICE, AND FARM VALUE OF POTATOES FROM THEIR TREND IN 26 LATE-CROP STATES, 1890-1924 (Incl.).

There is a fair degree of inverse correlation between production and farm price of potatoes in the 26 late-crop states, r equals plus or minus .78. The correlation between production and farm value is inverse, r equals minus .52.

above normal (100%) would result in a farm value above normal (100%) and vice versa. A study of Figure 21 shows that in the sixteen years when production was above normal in this state, farm value was above normal ten times and below normal six times. In the nineteen years when production was below normal farm value was above normal seven times and below normal twelve times. These figures indicate that production above normal has been more important in increasing the farm value of the potato crop of this state than a crop under normal, but certainly no very pronounced relationship exists here.

Table XII.—PRODUCTION AND FARM VALUE OF WHITE POTATOES IN SOUTH DAKOTA EXPRESSED IN PER CENT OF THEIR TRENDS, 1890-1924.

	Production Per Cent of Normal	Farm Value Per Cent of Normal		Production Per Cent of Normal	Farm Value Per Cent of Normal
1890	79.8	67.1	1908	87.2	96.4
91	159.5	67.5	09	72.0	88.2
94	91.6	118.3	11	79.8	107.7
94	41.5	86.1	12	125.4	80.3
95	140.7	113.3	13	87.8	96.3
96	201.1	142.1	14	103.8	86.0
97	182.0	194.2	15	139.6	83.6
98	121.3	126.2	16	74.8	140.3
99	130.0	123.1	17	122.6	135.5
1900	113.5	131.7	18	143.8	124.1
01	39.2	107.8	19	65.9	112.7
02	61.5	79.7	20	126.5	104.9
03	78.3	109.0	21	85.5	126.5
04	77.5	61.8	22	130.8	83.7
05	79.5	76.9	23	115.7	77.6
06	81.0	67.0	24	85.2	70.9
07	72.7	78.1			

Table XIII.—PRODUCTION AND FARM VALUE OF WHITE POTATOES IN 26 LATE-CROP STATES, EXPRESSED IN PER CENT OF NORMAL, 1890 to 1924.

	Production Per Cent of Normal	Farm Value Per Cent of Normal		Production Per Cent of Normal	Farm Value Per Cent of Normal
1890	88.15	100.3	1908	89.91	104.4
91	139.09	81.9	09	122.83	98.4
92	82.54	108.9	10	106.18	81.9
93	92.75	115.4	11	95.02	116.1
94	84.01	111.7	12	127.06	88.3
95	145.08	92.9	13	99.36	95.9
96	115.03	89.6	14	123.65	83.8
97	74.70	111.7	15	93.53	83.4
98	81.26	86.1	16	72.40	125.7
99	93.74	86.5	17	112.70	117.7
1900	80.69	78.7	18	101.10	94.0
01	78.49	134.5	19	80.77	112.3
02	104.21	102.6	20	99.68	92.0
03	93.33	110.8	21	89.65	120.2
04	123.51	103.9	22	111.49	76.8
05	91.32	105.9	23	98.65	102.4
06	106.87	92.4	24	98.85	96.0
07	100.53	97.6			

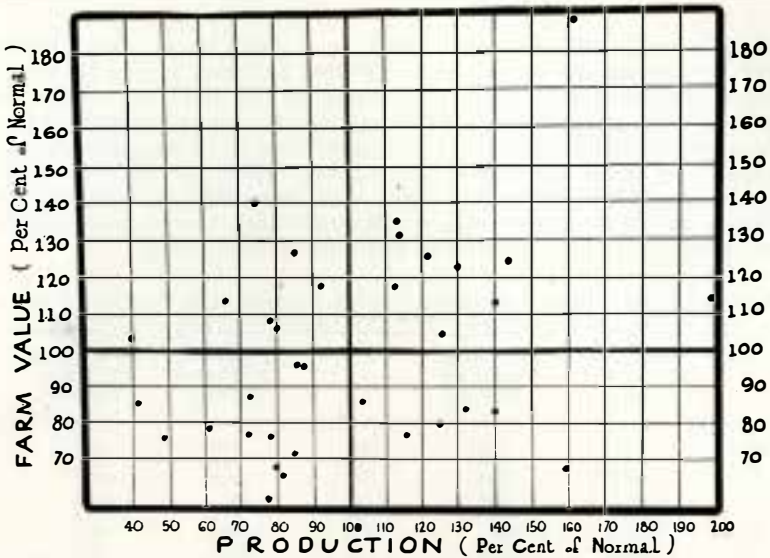


Fig. 21.—RELATION BETWEEN PRODUCTION AND FARM VALUE OF WHITE POTATOES IN SOUTH DAKOTA, 1890-1924.
In South Dakota a potato crop above normal (100%) has resulted in a farm value above normal (100%) slightly more frequently than in a farm value below normal.

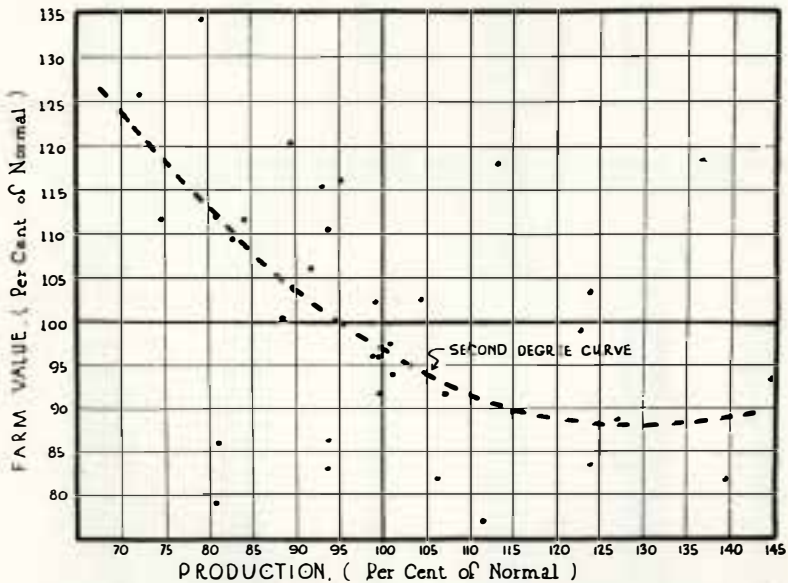


Fig. 22.—THE RELATION BETWEEN PRODUCTION AND FARM VALUE OF WHITE POTATOES IN 26 LATE-CROP STATES, 1890-1924.
As a rule, when the production of potatoes is above normal (100%) in the 26 late-crop states, farm value is below normal (100%), and VICE VERSA.

A study of the table and scatter diagram shows that in the fourteen years when production was above normal in the twenty-six states, in only three years was the value of the crop above normal. During the twenty-one years when production was below normal the farm value of the crop was above normal thirteen years. This shows clearly that there is a fairly close inverse correlation between production and farm value.

From the foregoing analysis it appears that the farm value of the potato crop in the main late-potato sections has been increased more by a relatively low production than by a high production, but for a single state such as South Dakota increased farm value is almost as likely to result from an abnormally high as from an abnormally low production.

It should also be born in mind that in so far as increased production has been the result of greater acreage and more intensive cultivation in these principal potato states the value return to potato producers as a whole has been even less than pictured above, for while the total output of an increased production has been of less gross value, it has cost more than a smaller crop would have cost. If, on the other hand, this increased production has been due mainly to weather conditions and not to increased plantings or more intensive cultivation, costs need not be considered for they are the same for either a small or a large crop except for costs of harvesting and marketing. To what extent acreage has varied with production can be seen by comparing yearly production, Figure 13, with acreage planted to potatoes¹, Figure 23. It will be observed that there has been a considerable variation in acreage from year to year, and that change in acreage has been responsible in part for the variation in production.

What Relation Exists Between Farm Price and Farm Value of Potatoes One Year and Acreage Planted to Potatoes the Following Year? It is usually assumed that a year of high prices is followed by an expansion in the acreage of a crop the following year and that low prices one year will result in a curtailment of acreage the next. What has been the situation in the case of potatoes? To answer this question percentage deviations from their trend have been calculated for potato acreage in South Dakota and in the United States from 1891 to 1925 and plotted together with percentage deviations of farm price and farm value of potatoes in South Dakota and in the twenty-six states in Figures 25 and 26.

Figure 25 shows that there has been some connection between farm price and farm value of potatoes and acreage planted the following year in South Dakota. This conclusion is more easily arrived at by studying the scatter diagram in Figure 27. In this diagram farm values percentages (of normal) are plotted on the horizontal axis and acreage percentages (of normal) are plotted on the vertical axis. This figure shows that when farm value is above normal, acreage the following year is likely to be above normal. The coefficient of correlation between farm value and acreage the following year in South Dakota was found to be .56 with a probable error of .078.

¹ In using acreage figures it should be borne in mind that they are, no doubt, influenced considerably by acreage harvested, i.e., when a high per cent of the crop is harvested the acreage will appear high and vice versa.

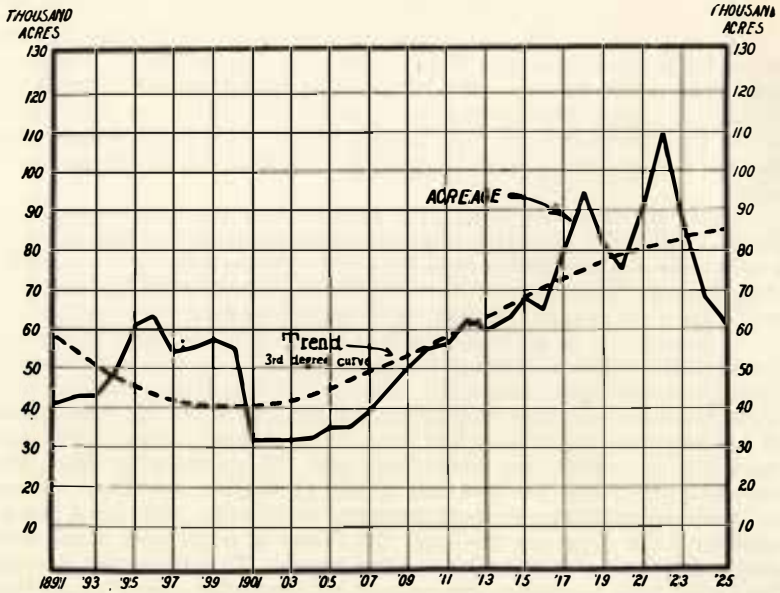


Fig. 23.—THE ACREAGE OF WHITE POTATOES IN SOUTH DAKOTA, 1891-1925. There has been a fairly gradual increase in potato acreage in South Dakota since 1901. See Table XIX, page 39.

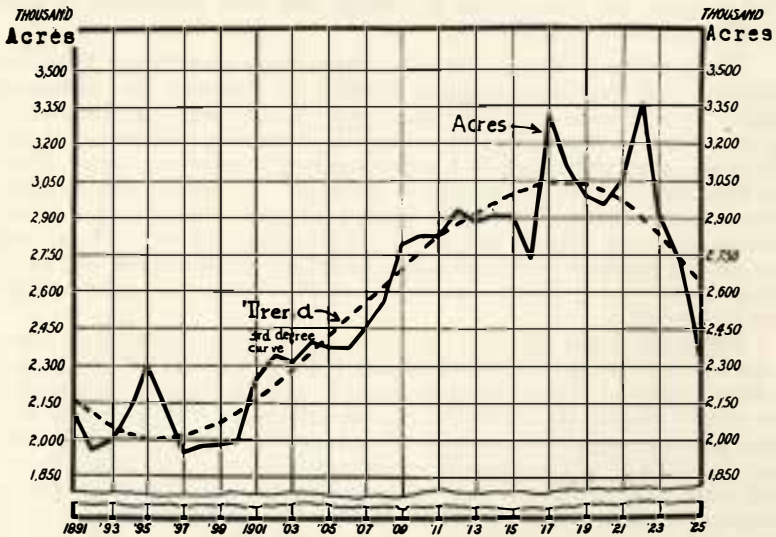


Fig. 24.—THE ACREAGE OF WHITE POTATOES IN 26 LATE-CROP STATES, 1891-1925 (Incl.). The trend of potato acreage in the 26 late-crop states is very similar to the farm value trend for these states. Acreage increased from 1897 to 1917 and decreased from 1917 to 1925. See Table XX, page 40.

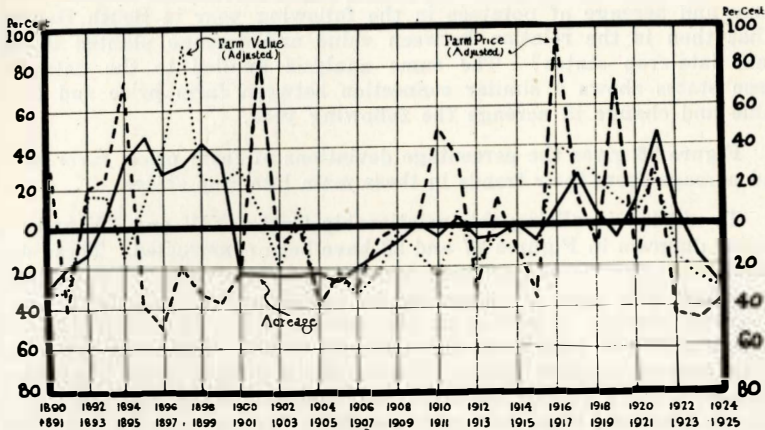


Fig. 25.—PERCENTAGE DEVIATION OF FARM PRICE, FARM VALUE AND ACREAGE OF WHITE POTATOES FROM THEIR TRENDS IN SOUTH DAKOTA, 1890-1924.

There seems to be some relation between farm value of potatoes and acreage planted the following year in South Dakota.

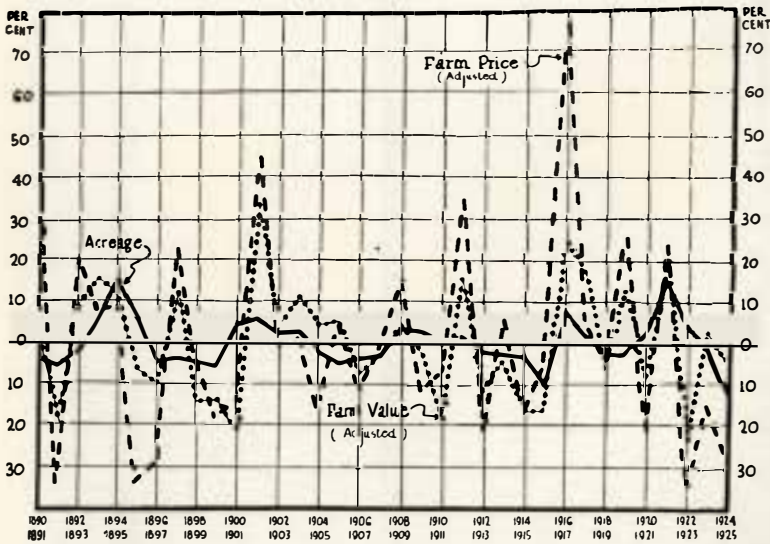


Fig. 26.—PERCENTAGE DEVIATION OF FARM PRICE, FARM VALUE AND ACREAGE OF WHITE POTATOES FROM THEIR TRENDS IN 26 LATE-CROP STATES, 1890-1924.

There seems to be some direct correlation between farm price and farm value, and acreage planted to potatoes the following year in these twenty-six states, but certainly less than is usually thought to exist.

We have seen that there has been a slight correlation between farm value and acreage of potatoes in the following year in South Dakota. What then is the relation between value and acreage planted in the main late-crop states? The same analysis applied to the data for these states shows a similar connection between farm price and farm value and change in acreage the following year.

Figure 26 gives the percentage deviations of farm price, farm value and acreage from their trends in these main late-crop states.

To aid in visualizing this relationship Tables XIV and XV and the scatter diagram in Figures 27 and 28 have been constructed. These diagrams show the relation between acreage and farm value. The per cent of normal farm value is plotted on the horizontal axis and the per cent of normal acreage is plotted on the vertical axis. In Figure 28 farm value is shown to have been above normal (100%) seventeen years and below normal eighteen years. During the seventeen years that farm value was above normal, acreage (the following year) was above normal ten times and below normal seven times. In the eighteen years that

Table XIV.—FARM VALUE AND ACREAGE OF POTATOES IN SOUTH DAKOTA, EXPRESSED IN PER CENT OF NORMAL, 1890-1924.

Year	Farm Value (Per Cent of Normal)	Acreage (Per Cent of Normal)
1890	67	71
91	68	80
92	119	86
93	118	102
94	86	136
95	113	147
96	142	129
97	194	134
98	126	143
99	123	138
1900	132	78
01	108	78
02	80	76
03	103	77
04	62	78
05	77	75
06	67	80
07	78	88
08	96	94
09	88	100
1910	76	97
11	108	103
12	80	95
13	96	97
14	86	100
15	84	93
16	140	110
17	136	127
18	124	105
19	113	95
1920	105	111
21	127	146
22	84	106
23	78	83
24	71	72
25		

farm value was below normal, acreage fell below normal thirteen times and rose above normal five times. The conclusion, then, is that there is a slight amount of correlation between farm value and acreage planted to potatoes the following year in the twenty-six important late-potato states. The coefficient of correlation between farm value and acreage in these states was found to be .52 with a probable error of .08.

This relationship between price and value one year and acreage planted the next is perhaps less than is generally thought to exist. Other factors which influence acreage planted are the price of seed potatoes, the weather conditions, etc.

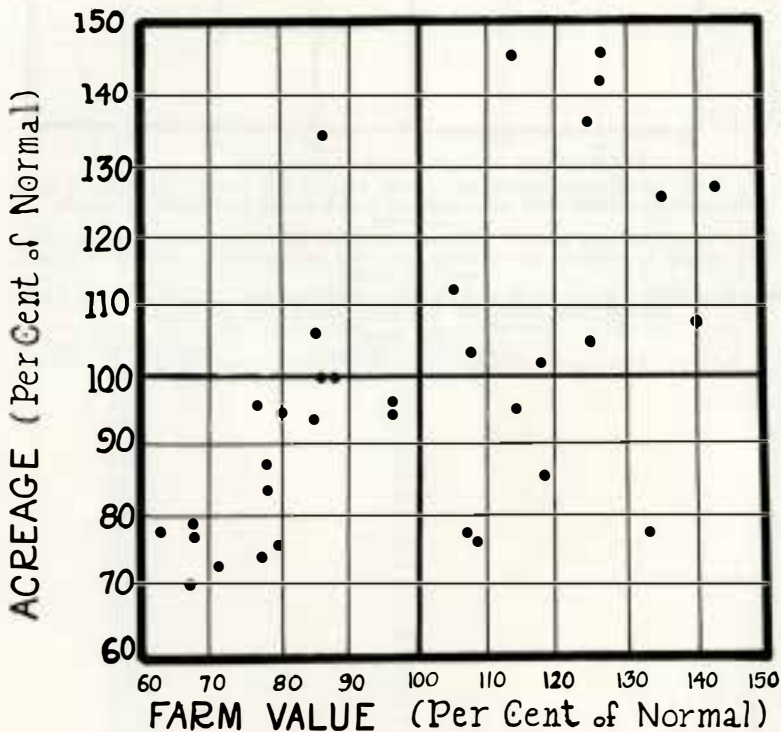


Fig. 27.—THE RELATION BETWEEN FARM VALUE OF WHITE POTATOES AND ACREAGE PLANTED THE FOLLOWING YEAR IN SOUTH DAKOTA, 1890-1924.

There seems to be a slight tendency for an increase in acreage to follow an increase in farm value of potatoes the previous year in South Dakota.

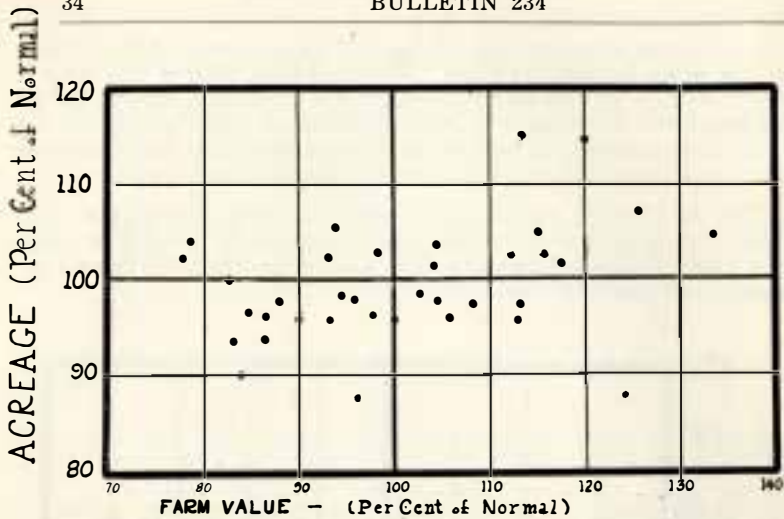


Fig. 28.—THE RELATION BETWEEN FARM VALUE OF WHITE POTATOES AND ACREAGE PLANTED THE FOLLOWING YEAR IN 26 LATE-CROP STATES, 1890-1924.

As a rule when the farm value of potatoes rises above normal in these twenty-six states acreage planted to potatoes the following year may be expected to rise above normal, and vice versa.

Table XV.—FARM VALUE AND ACREAGE OF POTATOES IN 26 STATES EXPRESSED IN PER CENT OF NORMAL FROM 1890 TO 1924.

Year	Farm Value (Per Cent of Normal)	Acreage (Per Cent of Normal)
1890	100	97
91	82	93
92	109	98
93	115	105
94	112	115
95	93	107
96	90	96
97	112	96
98	86	96
99	87	95
1900	79	104
01	135	105
02	103	102
03	111	102
04	104	98
05	106	96
06	92	97
07	98	98
08	104	103
09	98	102
1910	82	100
11	116	102
12	88	98
13	96	98
14	84	97
15	83	90
16	126	109
17	118	101
18	94	98
19	112	98
1920	92	103
21	120	115
22	77	103
23	102	99
24	96	88
25		

S U M M A R Y

The state of South Dakota is becoming more important as a surplus potato state. The chief potato counties of the state are Clark, Codington, Hamlin, Deuel, Kingsbury, and Brookings.

On the basis of a ten-year average yield per acre, South Dakota ranks thirty-first in the United States with a yield of eighty-four bushels per acre.

The larger part of South Dakota's surplus potatoes is consigned to Chicago and Kansas City. A comparison of South Dakota's freight rates to these two markets with rates from important competing territory shows South Dakota in a fairly favorable position to compete at these markets.

A comparison of man and horse hour requirements for producing potatoes in five of the principal late-crop states of the Northwest shows South Dakota to rank lowest in man hour requirements and next to lowest in horse hour requirements.

A monthly average of potato prices at Chicago and Kansas City shows prices relatively low in October, November, and December, higher in January, February and March, and lower again in April and May.

An analysis of production, farm price and farm value of potatoes in twenty-six important late-crop states shows that production below normal has resulted in raising farm value of potatoes above normal, as a rule, while production above normal has usually reduced farm value below normal. On the other hand in the state of South Dakota farm value has been increased about as often by high production as by low production.

A study of farm price, farm value, and acreage planted to potatoes the following year reveals the fact that, in South Dakota as well as in the main late-crop states, when the farm value of potatoes rises above normal, acreage is likely to increase the following year and vice versa.

TABLE XVI.—DEVIATIONS FROM TRENDS¹ IN WHITE POTATO PRODUCTION, SOUTH DAKOTA, UNITED STATES, AND TWENTY-SIX LATE CROP STATES

Year	In South Dakota			In the United States			In the Twenty-Six Late Crop States		
	Production ² (Thous. Bu.)	Trend ³ (Thous. Bu.)	Per Cent Deviation from Trend	Production ² (Thous. Bu.)	Trend ³ (Thous. Bu.)	Per Cent Deviation from Trend	Production ⁴ (Thous. Bu.)	Trend ³ (Thous. Bu.)	Per Cent Deviation from Trend
1890	1,746	2,187	-20.2	150,494	189,681	-20.7	121,252	137,559	-11.85
1891	3,707	2,324	59.5	256,122	196,854	30.1	199,989	143,776	39.09
1892	2,764	2,460	12.4	164,516	204,027	-19.4	123,806	149,993	-17.46
1893	2,378	2,597	- 8.4	195,040	211,200	- 7.7	144,889	156,210	- 7.25
1894	1,135	2,734	-58.5	183,841	218,373	-15.8	136,460	162,427	-15.99
1895	4,037	2,870	40.7	317,114	225,546	40.6	244,670	168,644	45.08
1896	6,048	3,007	101.1	271,769	232,719	16.8	201,141	174,861	15.03
1897	5,093	3,143	62.0	191,025	239,892	-20.4	135,271	181,078	-25.30
1898	3,979	3,280	21.3	218,772	247,065	-11.5	152,195	187,295	-18.74
1899	4,440	3,416	30.0	260,257	254,238	- 2.4	181,405	193,512	- 6.26
1900	4,031	3,553	13.5	247,759	261,411	- 5.2	163,169	199,729	-19.31
1901	1,445	3,690	-60.8	198,626	268,584	-26.1	161,643	205,946	-21.51
1902	2,353	3,826	-38.5	293,918	275,757	6.6	221,091	212,163	4.21
1903	2,887	3,963	-21.7	262,053	282,930	- 7.4	203,821	218,380	- 6.67
1904	3,176	4,099	-22.5	352,268	290,103	21.4	277,391	224,597	23.51
1906	3,367	4,236	-20.5	278,885	297,276	- 6.2	210,733	230,814	- 8.68
1905	3,542	4,372	-19.0	331,685	304,449	9.0	253,323	237,031	6.87
1907	3,276	4,509	-27.3	322,954	311,622	3.6	244,523	243,248	.53
1908	4,050	4,646	-12.8	302,000	318,795	- 5.3	224,033	249,465	-10.19
1909	3,442	4,782	-28.0	394,553	325,968	21.0	314,062	255,682	22.83
1910	2,420	4,919	-50.8	349,032	333,141	4.8	278,093	261,899	6.18
1911	4,032	5,055	-20.2	292,737	340,314	-14.0	254,754	268,116	- 4.98
1912	6,510	5,192	25.4	420,647	347,487	21.1	348,570	274,333	27.06
1913	4,680	5,328	-12.2	331,525	354,660	- 6.5	278,762	280,550	- .64
1914	5,670	5,465	3.8	409,921	361,833	13.3	354,593	286,767	23.65
1915	7,820	5,602	39.6	359,721	369,006	- 2.5	274,039	292,984	- 6.47
1916	4,290	5,738	-25.2	286,953	376,179	-23.7	216,641	299,201	-27.60
1917	7,200	5,875	22.6	442,108	383,352	15.3	344,217	305,418	12.70
1918	8,645	6,011	43.8	411,860	390,525	5.5	315,052	311,635	1.16
1919	4,050	6,148	-34.1	322,867	397,698	-18.8	256,717	317,852	-19.23
1920	7,950	6,284	26.5	403,296	404,871	- .4	323,021	324,069	-.32
1921	5,490	6,421	-14.5	361,659	412,044	-12.2	296,097	330,286	-10.35
1922	8,580	6,558	30.8	453,396	419,217	8.2	375,161	336,503	11.49
1923	7,744	6,694	15.7	412,392	426,390	- 3.3	338,097	342,720	- 1.35
1924	5,822	6,831	-14.8	455,000	433,563	4.9	344,941	348,937	- 1.15
Total	157,799			311,621,850			8,513,680		
Average	4,509			10,906,765			243,248		

¹Trend is the long-time movement in production and shows whether the tendency is toward increased or decreased production, and the degree of such increase or decrease.

²Figures secured from Mr. O. L. Dawson, Federal Agricultural Statistician at Brookings, South Dakota.

³Line of least squares.

⁴Figures secured from U. S. D. A. yearbooks and from the office of the Bureau of Crop and Livestock Estimates, Washington, D. C.

TABLE XVII.—TRENDS IN WHITE POTATO PRODUCTION PER CAPITA IN SOUTH DAKOTA AND THE UNITED STATES

Year	South Dakota				The United States			
	Population ¹ (Thou. People)	Potato Production (Thous. Bu.)	Production per Capita	Trend ²	Population ¹ (Thou. People)	Production (Thous. Bu.)	Production per Capita	Trend ²
1890	349	1,746	5.01	7.51	62,948	105,494	2.39	3.29
1891	354	3,707	10.46	7.58	64,361	256,122	2.98	3.31
1892	360	2,764	7.69	7.64	65,666	164,516	2.51	3.33
1893	365	2,378	6.52	7.71	66,970	195,040	2.91	3.34
1894	370	1,135	3.07	7.78	68,255	183,841	2.69	3.36
1895	376	4,037	10.75	7.85	69,580	317,114	4.56	3.39
1896	381	6,048	15.88	7.92	70,885	271,769	3.83	3.40
1897	386	5,093	13.19	7.99	72,189	191,025	2.65	3.42
1898	391	3,979	10.16	8.05	73,494	218,772	2.98	3.44
1899	397	4,440	11.19	8.12	74,799	260,257	3.48	3.45
1900	402	4,031	10.03	8.19	75,995	247,759	3.26	3.47
1901	422	1,445	3.43	8.26	77,747	198,626	2.55	3.49
1902	440	2,353	5.35	8.33	79,365	293,918	3.70	3.51
1903	458	2,887	6.23	8.40	80,983	262,053	3.24	3.53
1904	477	3,176	6.66	8.46	82,601	352,268	4.26	3.55
1905	495	3,367	6.80	8.53	84,219	278,885	3.31	3.56
1906	514	3,542	6.89	8.60	85,837	331,685	3.86	3.58
1907	532	3,276	6.15	8.67	87,455	322,954	3.69	3.60
1908	511	4,050	7.35	8.74	89,073	302,000	3.39	3.62
1909	569	3,442	6.05	8.81	90,619	394,553	4.35	3.64
1910	584	2,420	4.14	8.88	91,972	349,032	3.79	3.62
1911	590	4,032	6.83	8.94	93,682	292,737	3.12	3.65
1912	596	6,510	10.92	9.01	95,097	420,647	4.42	3.67
1913	601	4,680	7.78	9.08	96,512	331,525	3.44	3.69
1914	607	5,670	9.35	9.15	97,927	409,921	4.19	3.71
1915	612	7,820	12.77	9.22	99,433	359,721	3.62	3.73
1916	618	4,290	6.95	9.29	100,758	286,953	2.85	3.75
1917	623	7,200	11.55	9.35	102,173	442,108	4.33	3.76
1918	628	8,645	13.75	9.42	103,588	411,860	3.98	3.78
1919	634	4,050	6.39	9.49	105,003	322,867	3.07	3.80
1920	637	7,950	12.49	9.56	105,711	403,296	3.82	3.84
1921	649	5,490	8.46	9.63	108,445	361,659	3.33	3.86
1922	657	8,580	13.04	9.70	109,893	453,396	4.13	3.87
1923	666	7,744	11.62	9.76	111,693	412,392	3.69	3.89
1924	674	5,822	8.63	9.83	113,727	455,000	4.00	3.91
1925	681	3,965	5.82	9.90	115,378	323,243	2.80	3.93
Total			303.57				126.09	
Average			8.67				3.60	

¹Estimated as of July 1 by the Bureau of the Census, Washington, D. C.

²Line of least squares.

TABLE XVIII.—DEVIATIONS FROM TRENDS IN FARM VALUES OF WHITE POTATO CROPS IN SOUTH DAKOTA AND TWENTY-SIX LATE CROP STATES

Year	South Dakota					Twenty-six Late Crop States				
	Farm Values ² (Thous. Dollars)	Farm Values Adjusted ²	Trend ³	Deviations from Trend	Per Cent Deviation	Farm Values ⁴ (Thous. Dollars)	Farm Values Adjusted ²	Trend ³	Deviations from Trend	Per Cent Deviation
1890	1,187	1,465	2,184	— 719	—32.9	89,845	110,475	110,154	321	0.3
1891	1,038	1,298	1,923	— 625	—32.5	67,212	84,015	102,876	—18,861	—18.2
1892	1,520	2,027	1,709	318	18.6	79,662	106,216	97,494	8,722	8.2
1893	1,403	1,822	1,540	282	18.3	83,439	108,362	93,877	14,485	15.4
1894	840	1,217	1,413	— 196	—13.9	70,840	102,666	91,893	10,773	11.7
1895	1,050	1,500	1,324	176	13.3	59,466	84,951	91,412	— 6,416	— 7.1
1896	1,210	1,806	1,271	535	42.1	55,433	82,735	92,300	— 9,565	—10.4
1897	1,630	2,433	1,251	1,182	94.2	70,677	105,488	94,424	11,064	11.7
1898	1,114	1,591	1,261	330	26.2	58,806	84,008	97,654	—13,646	—13.9
1899	1,199	1,599	1,299	300	23.1	66,093	88,124	101,857	—13,733	—13.5
1900	1,451	1,791	1,360	431	31.7	68,178	84,170	106,902	—22,732	—21.3
1901	1,229	1,556	1,444	112	7.8	119,692	151,508	112,655	38,853	34.5
1902	1,035	1,232	1,545	— 313	—20.3	102,554	122,088	118,987	3,101	2.6
1903	1,559	1,813	1,663	150	9.0	119,543	139,003	125,463	13,540	10.8
1904	953	1,108	1,793	— 685	—38.2	118,682	138,002	132,853	5,149	3.9
1905	1,279	1,487	1,933	— 446	—23.1	127,694	148,481	140,125	8,356	5.9
1906	1,240	1,393	2,080	— 687	—33.0	121,187	136,165	147,446	—11,281	— 7.8
1907	1,638	1,743	2,231	— 488	—21.9	141,959	151,020	154,684	— 3,664	— 2.4
1908	2,066	2,296	2,383	— 87	— 3.6	151,942	168,824	161,708	7,116	4.4
1909	2,168	2,235	2,534	— 299	—11.8	160,729	165,700	168,385	— 2,685	— 1.6
1910	2,057	2,037	2,680	— 643	—24.0	144,369	142,939	174,585	—31,646	—18.1
1911	2,822	3,034	2,818	216	7.7	194,611	209,259	180,173	29,086	16.7
1912	2,344	2,368	2,947	— 579	—19.7	161,809	163,443	185,019	—21,576	—11.7
1913	2,948	2,948	3,062	— 114	— 3.7	181,142	181,142	188,991	— 7,849	— 4.1
1914	2,665	2,719	3,161	— 442	—14.0	157,701	160,919	191,956	— 31,037	—16.1
1915	2,737	2,710	3,241	— 531	—16.4	163,138	161,522	193,785	—32,263	—16.6
1916	5,877	4,628	3,299	1,329	40.3	310,186	244,240	194,342	49,898	25.1
1917	7,992	4,515	3,332	1,183	35.5	403,258	227,821	193,496	34,325	17.7
1918	8,040	4,144	3,338	806	24.1	348,612	179,696	191,116	—11,420	— 6.0
1919	7,695	3,735	3,313	422	12.7	432,805	210,099	187,070	23,029	12.3
1920	7,712	3,412	3,254	158	4.9	376,942	166,788	181,227	—14,439	— 8.3
1921	5,874	3,996	3,160	836	26.5	306,519	208,526	173,453	35,065	20.3
1922	3,775	2,534	3,026	— 429	—16.3	187,269	125,683	163,616	—37,933	—23.7
1923	3,407	2,212	2,850	— 638	—22.4	239,113	155,268	151,586	3,682	2.4
1924	2,795	1,863	2,692	— 766	—29.1	197,638	131,758	137,230	— 5,472	— 4.0
Total		80,267					\$5,831,094			
Average		2,293					143,745			

¹Figures secured from O. L. Dawson, Agricultural Statistician, Brookings, South Dakota.

²The all-commodity index number, published by the Bureau of Labor was used in adjusting for the change in the general price level.

³A third-degree curve.

⁴Farm value figures secured from U. S. D. A. Yearbooks and from the office of the Division of Crop and Livestock Estimates, Bureau of Agricultural Economics, Washington, D. C.

TABLE XIX.—DEVIATION FROM TRENDS IN FARM PRICES AND ACREAGES OF WHITE POTATOES IN SOUTH DAKOTA

Year	December 1st Farm Prices					Acres Planted to Potatoes			
	Prices ¹ (Cents)	Prices Adjusted ²	Trends ³	Deviation from Trend	Per Cent Deviation	Acres ¹ (Thousands)	Trend ⁴	Deviation from Trend	Per Cent Deviation
1880	68	84	61.5	22.4	36.5				
1881	28	35	61.2	-26.2	-42.8	41	58	-17	-29.3
1882	55	73	60.9	12.4	20.3	43	54	-11	-20.4
1883	59	77	60.6	16.0	26.3	44	51	-7	-13.7
1884	74	107	60.4	46.8	77.6	49	48	1	2.1
1885	26	37	60.1	-23.0	-38.3	61	45	16	35.5
1886	20	30	59.8	-29.9	-50.0	63	43	20	46.5
1887	32	48	59.5	-11.7	-19.7	54	42	12	28.5
1888	28	40	59.2	-19.2	-32.5	55	41	14	34.1
1889	27	36	59.0	-23.0	-38.9	57	40	17	42.5
1890	36	44	58.7	-14.3	-24.3	55	40	15	37.5
1891	85	108	58.4	49.2	84.3	32	41	-9	-22.0
1892	44	52	58.1	-5.7	-9.8	32	41	-9	-22.0
1893	54	63	57.8	5.0	.9	32	42	-10	-23.8
1894	30	35	57.6	-22.7	-39.4	33	43	-10	-23.3
1895	38	44	57.3	-13.1	-22.8	35	45	-10	-22.2
1896	35	39	57.0	-17.7	-31.1	35	47	-12	-25.5
1897	50	53	56.7	-3.5	-6.2	39	49	-10	-20.5
1898	51	57	56.4	-.3	.5	45	51	-6	-11.8
1899	63	65	56.2	8.7	.2	50	53	-3	-5.7
1900	85	84	55.9	28.3	50.7	55	55	0	.0
1901	70	75	55.6	19.7	35.4	56	58	-2	-3.4
1902	36	36	55.3	-18.9	-34.2	62	60	2	3.3
1903	63	63	55.0	8.0	14.5	60	63	-3	-4.8
1904	47	48	54.8	-6.9	-12.5	63	65	-2	-3.1
1905	35	35	54.5	-19.8	-36.3	68	68	0	.0
1906	137	108	54.2	53.7	99.1	65	70	-5	-7.1
1907	111	63	53.9	8.8	16.3	80	73	7	9.6
1908	93	48	53.6	-5.7	-10.7	95	75	20	26.7
1909	190	92	53.4	38.9	73.0	81	77	4	5.2
1910	97	43	53.1	-10.2	-19.2	75	79	-4	-5.1
1911	107	73	52.8	20.0	37.9	90	81	9	11.1
1912	44	30	52.5	-23.0	-43.8	110	82	38	46.3
1913	44	29	52.2	-23.6	-45.3	88	83	5	6.0
1914	48	32	52.0	-20.0	-38.4	70	84	-14	-16.7
1915						61	85	-24	-28.2
Total	-----	1,985	-----	-----	-----	2,034			
Average		57				58			

¹Figures secured from O. L. Dawson, Agricultural Statistician, Brookings, South Dakota.

²The all-commodity index number published by the Bureau of Labor was used in adjusting for the change in the general price level.

³Line of least squares.

⁴A third-degree curve.

TABLE XX.—DEVIATIONS FROM TRENDS IN FARM PRICES AND ACREAGES OF WHITE POTATOES IN TWENTY-SIX LATE-CROP STATES

Year	December 1st Prices					Acres Planted to Potatoes			
	Prices ¹ (Cents)	Prices Adjusted ²	Trends ³	Deviation from Trend	Per Cent Deviation	Acres ¹ (Thousands)	Trends ⁴	Deviation from Trend	Per cent Deviation
1890	75	93	72.8	20.2	27.8				
1891	38	48	72.5	-24.5	-33.8	2,085	2,153	-68	3.2
1892	65	87	72.2	14.8	20.5	1,950	2,094	-144	6.9
1893	60	78	71.9	6.1	8.5	2,003	2,050	-47	2.3
1894	54	78	71.6	6.4	8.9	2,121	2,023	98	4.8
1895	33	47	71.4	-24.4	-34.1	2,309	2,009	300	14.9
1896	34	51	71.1	-20.1	-28.2	2,139	2,009	130	6.5
1897	58	87	70.8	16.2	22.9	1,941	2,021	-80	4.0
1898	47	67	70.5	-3.5	-5.0	1,971	2,044	-73	3.6
1899	43	57	70.2	-13.2	-18.8	1,986	2,077	-91	4.4
1900	49	60	70.0	-10.0	-14.2	2,002	2,118	-116	5.5
1901	80	101	69.7	31.3	44.9	2,253	2,167	86	4.0
1902	51	61	69.4	-8.4	-1.2	2,341	2,223	118	5.3
1903	60	70	69.1	.9	1.3	2,317	2,283	34	1.5
1904	50	58	68.8	-10.8	-15.7	2,399	2,348	51	2.1
1905	61	71	68.6	2.4	3.6	2,370	2,415	-45	1.9
1906	54	61	68.3	-7.3	-10.6	2,377	2,485	-108	4.3
1907	63	67	68.0	-1.0	-1.5	2,466	2,555	-89	3.5
1908	70	78	67.7	10.3	15.2	2,559	2,625	-66	2.5
1909	58	60	67.4	-7.4	-11.0	2,778	2,693	85	3.2
1910	63	62	67.2	-5.2	-7.7	2,821	2,758	63	2.3
1911	85	91	66.9	24.1	36.1	2,822	2,820	2	.1
1912	51	52	66.6	-14.6	-21.9	2,922	2,877	45	1.6
1913	71	71	66.3	4.7	7.1	2,876	2,927	-51	1.7
1914	54	55	66.0	-11.0	-16.7	2,906	2,970	-64	2.2
1915	64	63	65.8	-2.8	-4.2	2,910	3,005	-95	3.2
1916	147	116	65.5	50.5	77.2	2,728	3,031	-303	-10.0
1917	124	70	65.2	4.8	7.4	3,304	3,045	259	8.5
1918	120	62	64.9	-2.9	-4.5	3,090	3,048	42	1.4
1919	168	82	64.6	17.4	26.8	2,978	3,038	-60	2.0
1920	116	51	64.4	-13.4	-20.8	2,950	3,014	-64	2.1
1921	117	80	64.1	15.9	24.8	3,048	2,974	74	2.5
1922	62	42	63.8	-21.8	-34.2	3,363	2,918	445	15.3
1923	83	54	63.5	-9.5	-15.0	2,917	2,845	72	2.5
1924	71	47	63.2	-16.2	-25.7	2,725	2,753	-28	1.0
1925	-----	-----	-----	-----	-----	2,331	2,641	-310	-11.7
Total		2,378				89,058			
Average		68				2,545			

¹These figures were compiled from U. S. D. A. Yearbooks and from data secured directly from the Division of Crop and Livestock Estimates, Bureau of Agricultural Economics, Washington, D. C.

²The all-commodity index number published by the Bureau of Labor was used in adjusting for the change in the general price level.

³Line of least squares.

⁴A third-degree curve.