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An Economic Study of Farms in the Spring Wheat Area of South Dakota

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Foreword and Acknowledgments

This is one of a series of three circulars which is being published on the economics of agriculture in the Spring Wheat Area of South Dakota. The three publications are:

Experiment Station Circular 19, An Economic Study of Farming in the Spring Wheat Area.

Experiment Station Circular 20, Estimated Returns From Farms of Large, Medium and Small Size of Business in the Spring Wheat Area.

Experiment Station Circular 21, Estimated Returns From Operating Eight Hundred Acres in the Spring Wheat Area Under Four Different Plans.

Circular 19 is of historic nature, in that it gives results that have been attained. It presents a summary of four years of study of farms, and attempts to explain why some farms are more profitable than others.

Circular 20 discusses the comparative returns that may be expected from farms of large, medium and small size of business, under different situations of prices, production and land values.

Circular 21 discusses the comparative returns that may be expected from diversified farms of a given area, operated under four different plans of organization and under different price and production situations.

Acknowledgements are due to the Division of Farm Management and Costs of the Bureau of Agricultural Economics, United States Department of Agriculture for aid in collecting and tabulating data on which the publications are based. Credit is also due to the farmers who, by faithful cooperation in keeping records and supplying information, have made the study possible. The authors also appreciate the assistance given by members of the Department of Agricultural Economics of the South Dakota State College.

An Economic Study of Farms in the Spring Wheat Area of South Dakota

by

C. M. Hampson, Poul Christophersen

This is the first of a series of three circulars being published as progress reports of a five year study which was begun in 1930, on the economics of agriculture in the Spring Wheat Area of South Dakota. The study was started as a modified cost route in Potter County with 48 farmer cooperators keeping records, some of which were quite complete in that labor and feed records were also kept. During the first year a representative of the college lived at Gettysburg and visited the cooperators at least once each month to check on the completeness of the records and to secure additional information concerning crop and livestock practices. After the first year the project was made cooperative with the Division of Farm Management and Costs of the Bureau of Agricultural Economics, United States Department of Agriculture, and was enlarged to include 150 farmer cooperators living in seven counties of the Spring Wheat Area. Figure 1. Since 1930 the cooperators have been visited three or four times each year. The statements of this publication are based on data collected from a total of 283 records. Satisfactory records were secured from 44 cooperators in 1930, 29 in 1931, 112 in 1932, and 98 in 1933.

In addition to three circulars of this series, Station Circular 2 "Indebtedness on 48 Potter County Farms, 1930"; Circular 6, "Tractor and Horse Power in the Wheat Area of South Dakota"; and Circular 8, "Emergency Farm Adjustments in the Wheat Area of South Dakota" have been published to date.

The entire area operated by the 112 cooperators in 1932 was 85,536 acres, 66 per cent of which was in crops other than native hay. The total area of the seven counties represented was, according to the 1930 census, 4,900,000 acres, of which 87 per cent was in farms. Sixty-three per cent of the farm land was in crops other than native hay. The greater part of the land not in farms is public land, much of which rents for pasture and native hay at nominal rates.

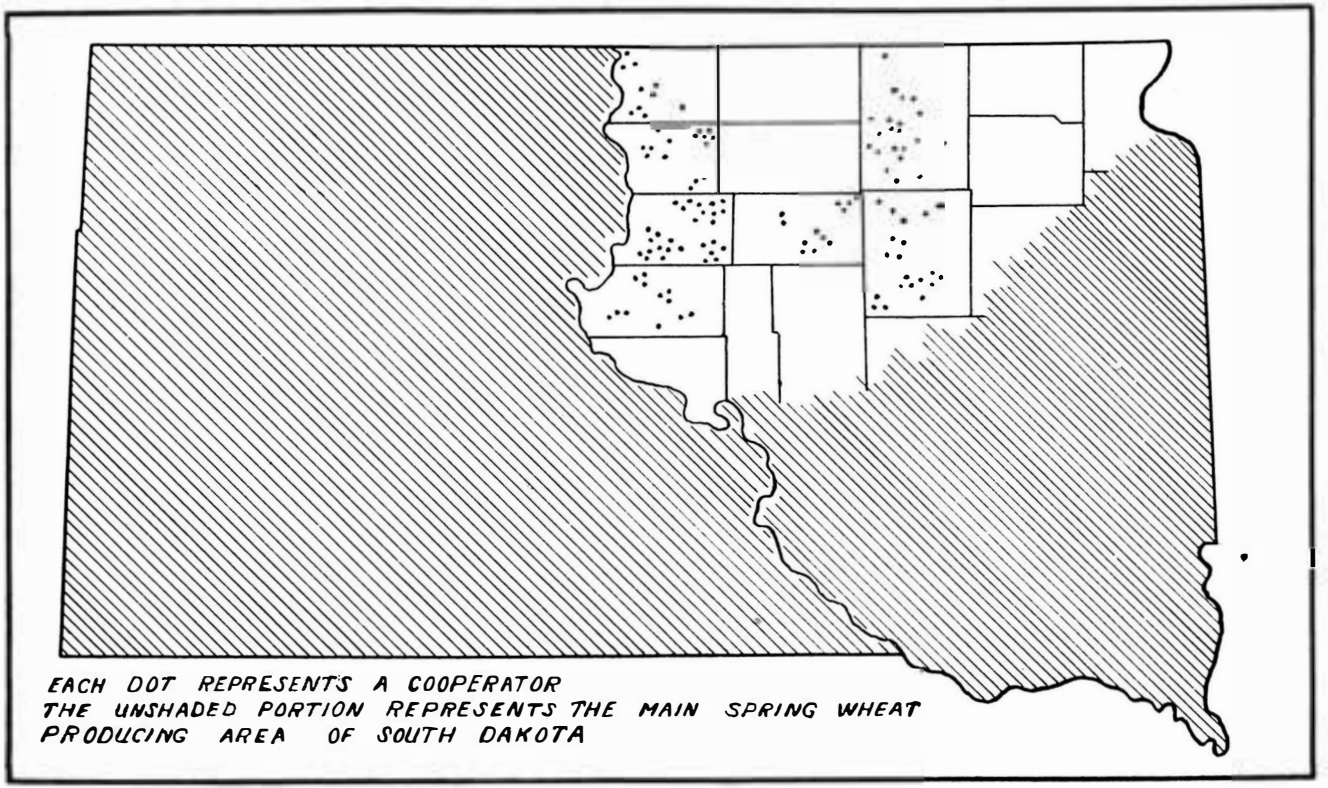

Fig. 1.—Location of farms studied. Each dot represents a cooperator. The unshaded portion represents the main spring wheat producing area of South Dakota.

The average amount of precipitation for the years 1910-1933 varied from 16 inches in the western part of the area to 23 inches in parts of Brown County. The lowest precipitation for any one year was 9.6 inches in Campbell County, the highest was 27.6 inches in Brown County.[1] Snowfall in winter frequently covers pastures for weeks at a time making it necessary to provide much winter feed. The average growing season varies from 120 days in the northwestern part to 140 days in the southeastern part of the area. Table 1 gives the average annual precipitation for the years 1910 to 1933, also the average growing season. The soil of most of Brown and Spink counties is lacustrine, while the remainder of the soil is glacial and varies considerably, often within the boundaries of a single farm. The topography of the area is generally level. However there are a few ranges of low hills extending across the western counties from northwest to southeast, and many of the farms have one or more quarters of land which are rough or stony, or at times are too low and wet for cultivation. The crop index of the seven counties over a period of years is 93 as compared with 100 for the state.

These physical conditions accompanied by long distances to the consuming markets, and relatively high land prices are the main determinants for the types of farms within the area. Size of business has, during the last generation, been determined largely by lack of command of capital, and by the fact that many small units have been established through division of estates.

The records for the year 1932 were chosen for the major part of the discussion of this publication because they better represent the farm business of the area for the four years during which records were secured. The number of records secured in 1932 was the largest of the four years, and the production of both crops and livestock was closer to the average production of the region. The crop indexes for the years 1930 to 1933 were 83, 40, 108 and 15 respectively, as compared with an average crop index of 100 for a long period of years. The low crop index of 1931 was due to grasshoppers and drouth; that of 1933 to extreme wide spread drouth. The livestock production of 1933 was curtailed on account of drouth, causing a great shortage of feed. The South Dakota farm price level (prices received by farmers) was 119 for 1930, 81 for 1931, 54 for 1932, and 58 for 1933, as compared with 100 for the year 1921. The prices of 1932 were the lowest of the four years, but were not far out of line with prices which have prevailed since.[2]

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1. Weather Bureau, United States Department of Agriculture.

2. Weighted average prices received by farmers, 1930 to 1933—Spring Wheat Area of South Dakota

	1930	1931	1932	1933
Wheat, per bu.	$.062	$0.47	$0.37	$0.53
Beef cattle, per cwt.	6.55	5.30	3.60	3.20
Hogs, per cwt.	8.60	4.65	2.85	3.55
Butterfat, per lb.	.33	.26	.18	.18

TABLE 1.—Precipitation, length of growing season, and altitude of weather stations in the Spring Wheat Area of South Dakota*

County:	Campbell	McPherson	Edmunds	Faulk	Potter	Sully	Hyde	Hand	Brown	Spink North	Spink South	Beadle	Average of 12 stations
Precipitation, inches													
1910-14	14.8	14.2	16.6	16.3	14.8	14.7	13.6	15.3	24.0	17.3	16.5	18.6	16.4
1915-19	17.2	16.8	20.4	24.3	18.0	20.0	20.2	19.2	27.6	23.2	20.5	21.7	20.8
1920-24	17.7	19.1	18.0	21.1	18.3	18.1	20.6	19.7	22.7	22.1	20.4	20.9	19.9
1925-29	15.8	16.5	16.6	16.9	17.6	15.2	15.3	14.7	21.6	20.0	17.7	16.7	17.1
1930	14.4	14.8	18.2	15.8	13.6	14.9	19.3	19.8	21.5	21.1	22.2	21.5	18.1
1931	14.1	20.0	18.1	12.5	11.9	10.4	11.1	12.4	18.8	14.8	14.8	12.8	14.3
1932	17.8	18.4	19.7	18.1	17.5	14.1	15.1	14.9	19.6	19.3	16.1	13.4	17.0
1933	9.6	14.2	12.7	13.5	12.7	12.0	12.7	16.3	12.7	12.0	14.2	12.5	12.9
Average 1910-1933	16.0	16.7	19.2	19.2	16.6	16.3	17.7	17.7	23.0	20.0	19.3	18.7	18.4
Av. growing season, days	121	131	127	140	133	136	136	141	131	132	138	139	134
Altitude, feet	1600	1900	1500	1600	2000	1600	1900	1600	1300	1300	1300	1300	

* Weather Bureau, United States Department of Agriculture.

Changes in Farming

The predominating type of farming within the wheat area has been gradually changing since the time of the earliest settlements by white men. The original type was cattle grazing on free range. Later wheat farming became common, and since 1920 diversified farming has predominated. There was but little farming in Brown and Spink counties previous to 1880, and but little in the other five counties previous to 1890. Since those dates the trend has been from less intensive to more intensive farming. Farms on which a relatively large amount of labor is applied per acre, or per animal, are considered intensive farms. For example farms with a large proportion of land in corn, or with a herd of dairy cattle are considered intensive as compared with grain farms or beef cattle farms. The latter are said to be extensive farms. Figure 2 shows the approximate total acreage in farms, and the approximate acreage used for each of the main crops of the area for the years 1890-1930.[3] The table indicates a lessened amount of pasture for grazing stock with more and more land being broken for farming, also a large increase in acreage of corn and wheat lands, the introduction of alfalfa, and an increase of acreage used for that crop.

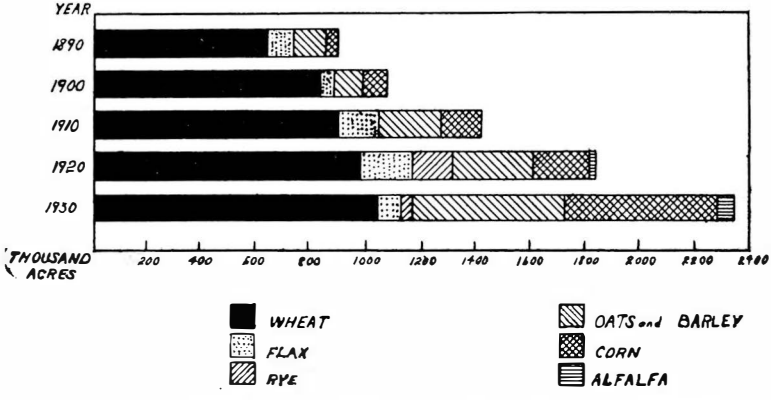

Fig. 2.—Production of crops in the Spring Wheat Area of South Dakota

The increase in numbers of livestock since 1890 is shown in Figure 3. The trend toward an increasing proportion of hogs and dairy cattle indicates a trend toward a more intensive type of farming. The number of all cattle also increased greatly, but the changes in care and feeding of the beef cattle can not be shown in the chart. Farmers of the area report that beef cattle have been given much better feed and care, including the fattening of cattle for market, during the last two decades than during the preceding years. This is another indication of more intensive farming in recent years. The decrease in the number of horses since 1920 is accounted for by the increasing number of tractors replacing horses for field work.

3. United States Census.

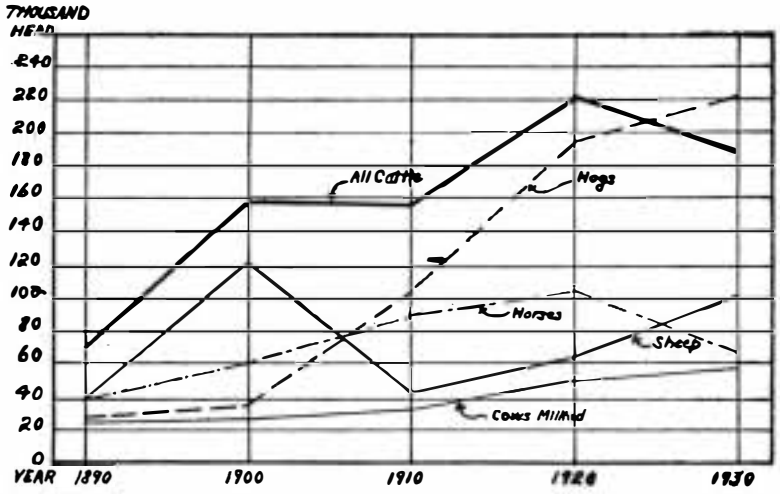

Fig. 3.—Production of livestock in the Spring Wheat Area of South Dakota

TABLE 2.—Description of nine farm types, and per cent of gross income from various enterprises, Spring Wheat Area of South Dakota, 1932

	Cash grain	Cash grain Beef cattle*	Cash grain Hogs	Cash grain Beef cattle Hogs	Cash grain Dairy Hogs	Beef cattle Cash grain Hogs	Beef cattle Hogs Dairy	Dairy	Poultry
	Type 1	Type 2	Type 3	Type 4	Type 5	Type 6	Type 7	Type 8	Type 9
Gross income from:	%	%	%	%	%	%	%	%	%
Cash grain	73	54	48	51	48	27	1	-	2
Custom work	10	13	19	11	4	6	1	-	-
Beef cattle*	5	16	4	12	13	34	41	3	2
Dairy products	4	8	2	9	16	9	14	93	-
Hogs	4	3	19	11	12	19	37	4	15
Poultry	2	3	3	3	5	4	6	-	81
Miscellaneous	2	3	3	3	2	1	-	-	-
No. farms of each type	7	14	7	14	23	37	7	2	1

* Net income from beef cattle refers particularly to grazing animals and includes small numbers of sheep and a few horses.

Types of Farms

The farms were classified by types according to the per cent of net production of each of the various enterprises found on each farm. The types of farms are described, and the average per cent of income from each enterprise within each type is shown for 1932 in Table 2. Seven farms derived 73 per cent of their income from sale of grain; 10 per cent from custom work, mostly threshing and combining and the remainder of the income from minor enterprises. These farms were classed as cash grain farms Type 1. Fourteen farms derived 34 per cent of the income from sale of grain, 13 per cent from custom work, 16 per cent from sale of beef cattle, and the remainder from minor enterprises. These were classed as cash grain-beef producing farms. The other seven types can be studied in the same way in the table. It is interesting to note that a large per cent of the income derived by farmers of the first four types was from custom work.

The United States census of 1930 classifies farms of the area as 51 per cent cash grain, 26 per cent as animal specialty, 16 per cent as general or diversified, 3 per cent as dairy, and the remainder as types infrequent in the area. These types include fruit, vegetable, truck and poultry farms, stock ranches and institutional farms. In Table 2 the corresponding classes are 36 per cent cash grain, 7 per cent animal specialty, 55 per cent diversified, 2 per cent dairy, and 1 per cent poultry.

Approximately 86 per cent of the income from cash grain in 1932 was from wheat, 2 per cent was from flax, and 12 per cent was from barley, oats, and corn. The income from beef cattle as used in connection with the types of farms refers to grazing animals, and includes the returns from small numbers of sheep and a few horses.

Organization of Farms

Table 3 gives the actual average organization of each type of farm. Table 4 gives the per cent of land used for each class of crop grown, and the average number of animal units[4] of each kind of livestock kept on the farms. A study of Table 3 along with Table 4 gives a better understanding of the different types of farms than to study either table alone, because the average size of farm was much smaller for some types than for others, and the percentage figures help to show the relative importance of the enterprises on different types of farms. For example, the farms of Type 9 are relatively small, and the 26 acres of cash grain in that type was 16 per cent of the total acreage, while on the farms of Type 6, 151 acres was 17 per cent; i. e. the same percentage may represent very different acreages. Also the 137 acres of feed grains of Type 8 farms was 39 per cent of the farm acreage, while 139 acres of feed grain of Type 6 farms was only 16 per cent of the total farm acreage. In a similar manner the other crop enterprises and the livestock enterprises may be examined.

4. An animal unit is the approximate equivalent from the standpoint of feed required, of a mature cow or horse. A unit may be one mature cow or horse, two young cattle or horses, five sows, 10 pigs, seven sheep, 14 lambs, 100 hens or 25 turkeys.

TABLE 3.—Average organization of nine types of farms, Spring Wheat Area of South Dakota, 1932

	Cash grain Type 1	Cash grain Beef cattle Type 2	Cash grain Hogs Type 3	Cash grain Beef cattle Hogs Type 4	Cash grain Dairy Hogs Type 5	Beef cattle Cash grain Hogs Type 6	Beef cattle Hogs Dairy Type 7	Dairy Type 8	Poultry Type 9
Land use, acres in:									
Wheat	450	225	248	227	111	125	---	7	26
Flax	12	10	9	13	4	6	1	-	-
Rye	47	38	66	42	18	20	11	-	-
Feed grains*	95	72	100	133	118	139	109	137	32
Corn, cane	142	112	153	180	109	153	97	80	53
Alfalfa, sweet clover	18	23	21	33	20	30	28	81	14
Miscellaneous crops	3	-	23	5	5	3	6	13	-
Total tilled land	767	479	620	633	385	476	252	318	125
Native grass land	130	287	128	263	114	379	196	27	23
Farmstead, roads, etc.	30	26	18	37	23	39	22	10	12
Total farm	927	792	766	933	522	894	470	355	160
Animal units§ on summer pasture	-	3	3	3	2	16	3	-	-
Livestock, No. head:									
Cows milked	5	9	3	9	12	9	6	20	2
Feeder cattle	-	-	-	-	2	5	10	-	-
All other cattle	14	43	14	38	25	78	29	11	2
Sheep	16	83	19	10	18	27	73	10	-
Sows	5	4	19	15	9	19	15	2	4
Laying hens	135	80	65	130	97	124	110	180	200
Turkeys	3	3	2	2	5	2	1	-	60
Horses	6	10	7	7	6	10	6	8	2
Total animal units	29	64	39	54	42	86	53	40	25
Capital investment:									
Equipment	$3478	$3074	$3749	$3303	$3902	$3159	$2021	$1199	$ 786
Livestock	998	2133	1257	1729	1439	3074	1630	1730	1306
Crops	815	798	906	789	667	1141	731	1182	301
Total	$5291	$6005	$5912	$5821	$6008	$7374	$4382	$4111	$2393
Productive work units†									
On crops	657	378	433	534	312	356	183	203	143
On livestock	117	227	146	218	231	252	190	344	78
On misc. work	45	29	40	26	12	10	1	18	-
Total	819	634	620	780	553	640	375	566	451
No. work horses	6	8	7	7	5	7	5	8	2
No. tractors	1.3	1.1	1.1	1.3	1.1	1.2	.9	1	.5
No. trucks	.4	.4	.7	.5	.2	.4	-	1	-
No. combine threshers	.4	.3	.4	.1	.1	.4	-	-	-
No. grain separators	.4	.4	.3	.3	.2	.3	-	.5	.1
Man units‡	2.7	2.2	2.0	2.3	1.8	2.2	1.5	2.0	1.5

* Feed grains include oats, barley, spelt.

§An animal unit is the approximate equivalent, from the standpoint of feed required, of a mature cow or horse. A unit may be 1 mature cow or horse, 2 young cattle or horses, 5 sows, 10 pigs, 7 sheep, 14 lambs, 100 hens or 25 turkeys.

† A productive work unit is the accomplishment expected of an average man in a 10-hour day when performing work directly connected with securing farm income. Such work as building or repairing buildings and fences, overhauling machinery, clearing land of stones, etc. is not considered productive except when done for hire.

‡ A man unit is 12 months of work of one man, or its equivalent, including the farm operator.

However, the livestock of Table 4 is presented as animal units for the purpose of comparing one class of livestock with another class. For example, in Type 7, Table 3, the average number of sheep is much greater than the average number of either sows or cattle, but when reduced to animal units, Table 4, they appear as of minor importance among the livestock.

Importance of Crops.—Thirty-three per cent of the tilled acreage of all of the farms was in spring wheat in 1932, only one per cent was in flax, six per cent was in rye, 24 per cent was in small grain for feed, 28 per cent was in corn, six percent was in alfalfa and sweet clover, and two per cent was in miscellaneous crops including sorghum, millet, and potatoes. An average of only three acres per farm was fallowed. The cash grain farms, Type 1, had 55 per cent of the whole farm area in wheat, flax and rye, 10 per cent in small grain for feed, 15 per cent in corn, and two per cent in alfalfa; only 14 per cent of the acreage was in native grass land. The cash grain-beef cattle farms, Type 2, had 34 per cent of the total acreage in cash grains, and 36 per cent in native grass land. The cash grain-hog farms, Type 3, had 42 per cent of the total acreage in cash grain, 33 per cent in corn and small feed grains, and only 17 per cent in native grass. Type 4 farms, producing cash grain, beef cattle and hogs, had 30 per cent of the land in cash grain, 33 per cent in corn and small grain for feed and 28 per cent in native grass. Type 5 farms, producing cash grain, dairy products, cattle and hogs had 25 per cent of the total acreage in cash grain, 44 per cent in corn and small grains for feed, and 22 per cent in native grass. The above types of farms, representing 58 per cent of those studied, secured more than 50 per cent of their income in 1932 directly from the sale of cash grain and from threshing grain, or doing other custom work for neighbors.

Type 6 farms secured the major share of their income from beef cattle, and the second largest share was from grain. Forty-two per cent of Type 6 farms was in native grass, 33 per cent in corn and grains for feed, and 17 per cent in cash grains. The farms of Type 7 also secured the major share of their income from beef cattle, but the second largest share was from hogs and practically no grain was sold. Forty-two per cent of the farm acreage was in native grass, and 44 per cent was in corn and small grain for feed. Almost all of the grain produced on the dairy and poultry farms, Types 8 and 9, was used for feed. Very little of the land of those farms was used for native grass, but the alfalfa acreage of the dairy farms averaged 23 per cent of the total acreage.

Importance of Livestock.—Livestock was of minor importance on the cash grain type of farms, as there was an average of only one animal unit for each 32 acres, and only 15 per cent of the total income was derived from livestock. On Type 2 farms, 24 per cent of the income was derived from beef cattle, including dairy products sold from beef cattle, and six per cent was from other livestock. Nineteen per cent of the income of Type 3 farms was derived from hogs, and nine per cent from other livestock. On Type 4 farms, 21 per cent of the income was from beef herds including dairy products, 11 per cent was from hogs, and three per cent was from other livestock. On Type 5 farms most of the cows milked were of some dairy breed, and 16 per cent of the income was from dairy pro-

TABLE 4.—Average organizations of nine types of farms, crops shown as a percentage of total acreage, livestock as animal units, Spring Wheat Area of South Dakota, 1932

	Cash grain Type 1	Cash grain Beef cattle Type 2	Cash grain Hogs Type 3	Cash grain Beef cattle Hogs Type 4	Cash grain Dairy Hogs Type 5	Beef cattle Cash grain Hogs Type 6	Beef cattle Hogs Dairy Type 7	Dairy Type 8	Poultry Type 9
Per cent of total acres in:									
Cash grain	55	34	42	30	25	17	3	2	16
Small grain for feed	10	9	13	14	23	16	23	39	20
Corn, cane	15	14	20	19	21	17	21	23	33
Alfalfa, sweet clover	2	3	3	4	4	3	6	23	9
Native hay, pasture	14	36	17	28	22	42	42	8	14
Farmstead, roads, etc.	3	3	2	4	4	4	5	3	8
Number of animal units:									
Milk cows	4	6	2	6	7	6	4	18	2
Other cattle	10	30	10	27	16	53	23	10	2
Sheep	2	14	3	2	3	5	8	2	–
Hogs	4	3	14	9	7	13	11	2	3
Poultry	3	2	2	3	2	3	2	2	16

TABLE 5.—Average production of crops and livestock on nine types of farms, Spring Wheat Area of South Dakota, 1932

	Unit	Cash grain Type 1	Cash grain Beef cattle Type 2	Cash grain Hogs Type 3	Cash grain Beef cattle Hogs Type 4	Cash grain Dairy Hogs Type 5	Beef cattle Cash grain Hogs Type 6	Beef cattle Hogs Dairy	Dairy Type 8	Poultry Type 9	High and low farms
Crop index		96	92	108	95	114	118	103	122	97	14-172
Butterfat per cow	lb	158	134	159	163	177	160	172	216	156	67-317
Eggs per hen	doz.	6.7	6.2	5.5	7.4	6.8	6.9	6.9	3.7	5.8	2- 12
Pigs per litter	1	3.8	4.7	5.3	4.9	5.3	5.6	5.5	7.2	5.8	3- 8
Calf crop	%	80	79	–	78	88	83	85	87	–	41-100
Wool per sheep	lb	–	8.8	–	–	8.6	–	–	–	–	6- 13
Lamb crop	%	–	71	–	–	90	–	–	–	–	18-160

ducts alone; 13 per cent was from other cattle, mostly veal calves, and 12 per cent was from hogs. Type 6 farms received 34 per cent of their income from the sale of beef cattle, 27 per cent from cash grain, 19 per cent from hogs, nine per cent from dairy products and 4 per cent from poultry. The income from all of the enterprises of Type 6 farms was more equally distributed than from any other type of farms. Type 7 farms, with practically no grain for sale, received 41 per cent of their income from the sale of cattle and sheep, 37 per cent from hogs, and 14 per cent from dairy products.

Practically the only income to farms of Type 8 was from dairy products and veal calves, and the income of Type 9 was from chickens, turkeys, and a few hogs. The number of farms of Types 8 and 9 was so small that statements concerning those types should carry less weight than statements concerning the types represented by more farms; however, the farms of Types 8 and 9 are typical of dairy and poultry farms within the area.

Capital Investment.—The investment of capital in land and improvements is not given in Table 3 because of the great variance in ownership of land. Ownership is discussed on page 17 of this circular. The average investment of all farms in equipment, livestock and crops is given in Table 3. The dairy and poultry farms had relatively smaller investmentments in equipment than other farms, due to the little need of harvesting equipment for small grain. The cash grain farms had the smallest investment in livestock. The farms of Type 6 with a large number of beef cattle had the largest investment in livestock of any type. Types 6 and 8 had the largest investment in crops when an inventory was taken in midwinter; Type 6 because of the need of much feed for much livestock, and Type 8 because of the large amount of alfalfa and silage on hand for dairy herds.

Labor and Power.—The relative amounts of work to be done on crops, on livestock and the total for the whole farm are given in Table 3 for each farm type. The average number of work horses and the distribution of tractors, auto trucks, combine threshers and grain separators is also given in the table.

Production of Crops and Livestock

The farm types with dairying as a major enterprise had the highest crop index, averaging 122, 118, 114 respectively, for Types 8, 6, and 5, as compared with a crop index of 108, the average of all of the farms in 1932. Types 8 and 5 with dairy breeds of cattle had higher production of butterfat per cow than the others. The best single dairy herd averaged 317 pounds of butterfat per cow; the poorest dairy herd averaged 113 pounds per cow. The dairy farms also had the highest number of calves as compared with the number of cows bred. There was little other correlation between types of farms and rates of production. A summary of the data is given in Table 5.

TABLE 6.—Average income of nine types of farms, Spring Wheat Area of South Dakota, 1932

Line	Cash grain Type 1	Cash grain Beef cattle Typo 2	Cash grain Hogs Type 3	Cash grain Beef cattle Hogs Type 4	Cash grain Dairy Hogs Type 5	Beef cattle Cash grain Hogs Type 6	Beef cattle Hogs Dairy Type 7	Dairy Type 8	Poultry Type 9
Receipts:									
1. Cash receipts to operator	$1855	$1385	$2137	$1932	$1295	$1816	$1254	$2309	$1598
2. Value of share to landlord	704	199	391	438	252	123	15	15	0
3. Increase in investment of crops and livestock	591	913	875	723	777	1243	333	−52	355
4. Total (Gross Receipts)	3150	2497	3403	3093	2324	3182	1602	2272	1953
Expenses:									
5. Cash farm expenses of operator	1539	1032	1612	1591	1115	1635	888	1471	1034
6. Landlord's costs	684	267	283	434	214	191	46	20	0
7. Net depreciation on equipment and improvements	500	478	594	414	341	519	410	264	301
8. Value of family labor	229	200	134	187	103	155	71	−50	140
9. Total	2952	1977	2623	2626	1773	2498	1415	1705	1475
10. **Farm Income**	198	520	780	467	551	684	187	567	478
11. Interest on capital investment @ 5%	2190	1495	1580	1725	1165	1660	1095	1280	535
12. Farm income minus interest*	−1992	−975	−800	−1258	−614	−976	−908	−713	−57
13. **Operator's Labor Income†**	−1002	−557	−452	−653	−317	−664	−788	−659	−57

* If all farms had been owner-operator these figures would represent labor income from the total farm business.

† The sum of lines 1 and 3 minus the sum of lines 5, 7, and 8, and minus interest on operator's capital investment at 5%.

Farm Returns to Different Types of Farms

The Farm Income and Labor Income of the nine types of farms are given in Table 6. Farm Income is the difference between the sum of the receipts and the sum of the expenses, not including interest. It represents returns for the use of the capital invested in the farm business and for the operator's services, both as a laborer and as a manager. When calculating income measures for this publication all family labor except that of the operator was charged as expenses, thus differences between farms due to unpaid labor were eliminated.

Labor Income is calculated by deducting a uniform interest charge from Farm Income. It represents net returns to the operator for his own labor and management after paying all expenses, including a charge for family labor, and a charge for the use of his capital. Labor Income is a fair measure for comparing returns to all farmers, since even those operators who have no indebtedness are charged with interest for all capital used, and those who have workers within the family are charged with family labor performed. In addition to Labor Income the farmer and his family have as income the use of the house and food and fuel furnished by the farm.

The farm income of the entire farm business was calculated when making up Tables 6 and 7; that is, in each case of rental, the landlord's share of the farm business receipts, expenses, and interest on capital were included. This is the only fair way of making comparisons between farms which vary in proportions of the owned and rented land, and vary in terms of rental. In cases where cattle were pastured at a nominal rate per head, the cost was entered as an expense for feed rather than as an expense for rent. The value of the landlord's share (Line 2 in the table) includes the value of all farm products delivered to the landlord. The large increase in investment in crops and livestock in 1932 (Line 3) was due to there being a very small inventory of crops at the beginning of the year on account of small crops in 1931; to the good small grain crops in 1932; and to a large hold-over of crops and livestock because of the very low prices during the fall of 1932. Also the total inventory values of crops and livestock at both the beginning and the end of the year were calculated by using the same prices. This was done for the purpose of making the farm returns more comparable by eliminating "paper losses" due to decreases in prices during the year. The land lord's expenses, (Line 6) were his share paid for feed, seed, twine, harvesting, taxes, etc. The depreciation on equipment and improvements (Line 7) includes depreciation on the landlord's share in the total farm business.

The average farm income and labor income of each of the nine types of farms are given in Table 6. The incomes of Types 8 and 9 are hardly comparable with the other types because so few farms are represented.

It will be observed that farms of Types 1 and 7 had the lowest incomes. It must be remembered that large minus income figures indicate greater losses, or lower incomes than small minus figures. The farms of Type 1 are highly specialized grain farms and their low income in 1932 was probably due mostly to the very low prices of grain that year, and to the fact that there was little other income to them from other sources. The

TABLE 7.—Average income of farms based on ownership and size of business, Spring Wheat Area of South Dakota, 1932

Line		Ownership 50 to 100%			Ownership 10 to 49%		Ownership Under 10%	
		Class 1	Class 2	Class 3	Class 4	Class 5	Class 6	Class 7
	Receipts: Size:	Large	Medium	Small	Medium	Small	Medium	Small
1.	Cash receipts to operator	$2608	$1470	$1329	$2120	$ 849	$1486	$1246
2.	Value of share to landlord	91	159	42	481	174	551	411
3.	Increase in investment of crops and livestock	1857	799	306	1096	324	724	491
4.	Total (Gross Income)	4556	2428	1677	3697	1347	2761	2148
	Expenses:							
5.	Cash farm expenses of operator	2516	1268	917	1591	760	1120	664
6.	Landlord's cost	166	134	28	494	126	629	406
7.	Net depreciation on equipment and improvements	742	474	354	657	251	216	270
8.	Value of family labor	230	165	60	204	43	115	90
9.	Total	3654	2041	1359	2946	1180	2080	1430
10.	**Farm Income**	902	387	318	751	167	681	718
11.	Interest on capital investment @ 5%	2450	1420	965	2075	760	1340	895
12.	Farm income minus interest*	−1548	−1033	−647	−1324	−598	−659	−177
13.	**Operator's Labor Income†**	−1258	−807	−598	−464	−419	185	258

* If all farms had been owner-operated these figures would represent labor income from the total farm business.

† The sum of lines 1 and 3 minus the sum of lines 5, 7, and 8, and minus interest on operator's capital investment at 5%.

farms of Type 7 depended largely on feeding livestock, and that type of farming averaged very low returns in 1932. Types 2 to 6 inclusive, were more diversified than the other types, and they all had better labor incomes in 1932 than the more specialized types. It may be further observed that Types 3 and 5, the most intensive of the diversified farms, had better incomes than the less intensive farms, Types 2, 4, and 6. The probable profits of intensive and extensive diversified farms are discussed in Circular 21, and the conclusion is drawn in that publication, that the more intensive types are likely to be more profitable in the Spring Wheat Area of South Dakota than the less intensive types under conditions similar to those which prevailed during 1932.

Ownership of Farms

Thirteen per cent of the 112 cooperators of 1932 owned all of the land they farmed, 19 per cent rented all they farmed, and the remaining 68 per cent owned and rented in various proportions. The owned area ranged from 80 acres to 1600 acres, and the rented land ranged from 80 acres to 1440 acres. Thirty-six of the rental agreements called for payment of cash from as low as 11 cents per acre for pasture land to $2.00 per acre for corn land. Forty-three rental agreements were on the one-fourth crop share plan, 20 were on the one-third crop share plan, 31 were on the 50-50 plan and 16 pastured livestock at a nominal rate per head for the pasture season. On many farms two or three different rental plans were used, and on some farms all five plans were used. A few of the cooperators pastured cattle for other farmers at nominal rates.

In Table 7 the farms are roughly classed according to tenure and size of business. Farmers of Classes 1, 2, and 3, owned an average of 66 per cent of the land that they operated, and rented 34 per cent. Twelve of the 70 farmers in this group also put cattle out on summer pasture. The farmers of Classes 4 and 5 owned an average of 41 per cent of their farm land and rented 59 per cent. There were only 17 farmers in this group, five of whom put cattle out on summer pasture. The farmers of Classes 6 and 7 rented 96 per cent of their farm land and owned 4 per cent. Of the 25 farmers in this group only one put cattle out on summer pasture.

According to the 1930 United States Census, 17 per cent of the farm operators of the area were full owners, 45 per cent were full tenants and 38 per cent were part owners.

Farm Returns to Different Ownership Classes

The meaning of Farm Income and of Labor Income, and methods of calculating those measures are given on page 15 of this circular. In Table 7 farm returns for 1932 are given by classes of ownership. It will be observed that the labor incomes of Classes 1, 2, and 3 are all less than those of the other classes, indicating that a farm operator in the Spring Wheat Area of South Dakota is likely to make less profit (or greater losses) during the present period of low prices for farm products, if he owns a large proportion of his farm land than if he rents most of it. The labor incomes of Classes 6 and 7, those who own the smallest shares of their farms, were largest. It must be remembered that a large minus labor income indicates a greater loss than a small minus labor income, and that a plus labor income indicates a profit to the farm business.

Size of Farm Business

Size of business in this circular is not measured in acres only, as is common in certain sections where most of the land is fertile and tillable, and most of the farms are of the same type. Size of business cannot be measured accurately, nor by a single descriptive term such as acres. It includes area farmed, the area in crop land, the amount of productive labor employed, the amount of capital used, the rate of turn-over of capital, the total production, and the quality of production. Size of business may be increased by employing a laborer for productive work, by increasing the numbers of livestock, by increasing yields per acre, or by doing work for hire outside the farm, etc.

Gross income as a measure of size of business is given in Table 7. In this table each tenure group is divided into size of business. Classes 1, 2, 3, are large, medium, and small respectively, within the group who own an average of 66 per cent of their farm land. The sizes are indicated in part by gross incomes of $4500, $2400, and $1700 respectively. Their labor incomes indicate that with the low prices of 1932, the largest farms were the least profitable.

Classes 4 and 5 are medium and small respectively, within the group who own an average of 41 per cent of their farm land. The sizes are indicated by gross incomes of $3700 and $1350 respectively, and again the smaller business was the more profitable. Classes 6 and 7 are also medium and small respectively, within the group who rent 96 per cent of their farm land. Once more gross incomes indicate the relative sizes, and the smaller farms had the greater profits under 1932 conditions.

Circular 20 discusses size of business under varying price conditions. In that publication conclusions are drawn that better net returns may be expected from a moderately large farm business of a given type, than from smaller farms of the same type when prices of farm products at the farm are on approximately the same level as the prices of 1931. A second conclusion is that with price levels similar to those of 1932 and 1933, farms with a large business are likely to be less profitable than farms with a small business.

Farm Returns for the Years 1930 to 1933

The average returns to 16 Potter County farms for the years 1930 to 1933 inclusive are shown in Table 8. These farms are typical of the area, and the labor income indicates the relative profitableness of farming for each of the four years in Northeastern South Dakota. Line 13 shows the farm operator's average labor income as it is commonly calculated (the farm inventories were valued at current prices at the beginning and end of each year). Line 14, also showing labor income, was calculated by using the same values for inventoried farm commodities at the end of the year as at the beginning of the year. This second method is valuable when comparing returns of different years, especially when price changes are violent as they have been during the years 1930 to 1933.

The labor incomes shown on Line 13, indicate that farming was more profitable during 1933 than during 1932, although the crop yields in 1933 were only 15 per cent of the long-time average, while the yields of 1932

TABLE 8.—Average income of 16 Potter county farms, 1930-33 inclusive

Line		1930	1931	1932	1933
	Receipts:				
1.	Cash receipts to operator	$5169	$3726	$2103	$2377
2.	Value of share to landlord	140	64	170	34
3.	Change in investment of crops and livestock	−239	−2742	165	−395
4.	Total (Gross Income)	5070	1048	2438	2016
	Expenses:				
5.	Cash farm expenses of operator	2927	1701	1578	1220
6.	Landlord's cost	267	238	214	217
7.	Net depreciation on equipment and improvements	418	547	529	517
8.	Value of family labor	427	334	269	150
9.	Total	4039	2820	2590	2104
10.	Farm Income	1031	−1772	−152	−88
11.	Interest on capital investment @ 5%	1357	1244	1184	1131
12.	Farm income minus interest*	−326	−528	−1336	−1219
13.	Operator's Labor Income†	−512	−3129	−1472	−1115
14.	Labor income with adjustments for paper losses§	600	−1952	−1018	−1393

* If all farms had been owner-operated these figures would represent labor income from the total farm business.

† The sum of lines 1 and 3 minus the sum of lines 5, 7, and 8, and minus interest on operator's capital investment at 5%.

† See page 15 for explanation.

were 108 per cent of the long-time average. The discrepancy is due to an extreme drop in prices of farm commodities from January to December 1932, making a large paper loss for that year; and to an extreme increase in prices from January to December 1933.[5] The labor incomes shown on Line 14 indicate 1932 to have been a more profitable year than 1933 if the paper losses on inventories are eliminated. The greatest losses of any of the four years were sustained during 1931 due to a large inventory and relatively high prices in January of that year as compared with a small inventory and low prices in December. The crop index of 1930 was 83 and that of 1931 was 40 as compared with a long-time average represented by 100.

5. The South Dakota price level as received by farmers in January was 130, 95, 66, 40, and 61 respectively for the years 1930 to 1934 inclusive. S. D. Farm Economics Review and Outlook.