

South Dakota State University
**Open PRAIRIE: Open Public Research Access Institutional
Repository and Information Exchange**

Bulletins

South Dakota State University Agricultural
Experiment Station

6-1-1927

Profitable Farming Systems for East Central South Dakota

C.A. Bonnen

J.B. Hutson

Follow this and additional works at: http://openprairie.sdstate.edu/agexperimentsta_bulletins

Recommended Citation

Bonnen, C.A. and Hutson, J.B., "Profitable Farming Systems for East Central South Dakota" (1927). *Bulletins*. Paper 226.
http://openprairie.sdstate.edu/agexperimentsta_bulletins/226

This Bulletin is brought to you for free and open access by the South Dakota State University Agricultural Experiment Station at Open PRAIRIE: Open Public Research Access Institutional Repository and Information Exchange. It has been accepted for inclusion in Bulletins by an authorized administrator of Open PRAIRIE: Open Public Research Access Institutional Repository and Information Exchange. For more information, please contact michael.biondo@sdstate.edu.

Profitable Farming Systems
for
East Central South Dakota

Farm Economics Department
Agricultural Experiment Station
South Dakota State College of
Agriculture and Mechanic Arts
Brookings

co-operating with the

Bureau of Agricultural Economics
United States Department of Agriculture

Digest

Trend of production—The next 10 to 15 years in east central South Dakota will probably be characterized by an increasing importance of legumes, corn and other feed grains which will be marketed mostly in the form of pork, beef, butterfat, and other livestock products.

Better Crop and Livestock Practices—The most needed improvements on the farms in the area are better practices in producing livestock and better balanced cropping systems.

Farming Systems—Systems of farming which are most likely to prove profitable in this area during the years just ahead are outlined in the bulletin. These are suggested with a view to helping farmers in selecting systems of farming best suited to the conditions in the area.

ERRATA

Page 37 — Table 28,
under "Flax Operations"
should read as follows:

Flax operations:
Disking-- 8-foot
Harrowing 26-foot
Seeding-- 10-foot
Cutting-- 8-foot
Threshing

Page 38—In Table
29, the threshing
cost of sweet clover
should be 40 cents.

Page 39—In table 30,
the yield of wheat
should be 12 bushels
per acre.

In Table 31, line 3,
column 1, the pounds
of corn per head for
young cattle should
be 300.

Table of Contents

	Page
.....	3
.....	3
.....	5
.....	7
Variations in earning on the farm studied.....	13
Reasons for variations in farm earnings.....	14
Selection of enterprises.....	15
Cost and utilization of man labor and horse work.....	18
Crop yields and practices used in growing crops.....	23
Quality of livestock and livestock practices followed.....	27
Size of business.....	35
Managerial ability of the operator.....	36
Good systems of farming for East Central South Dakota.....	38
Systems for 160 acre farms.....	42
Systems for 240 acre farms.....	46
Systems for 320 acre farms.....	50
Appendix.....	54

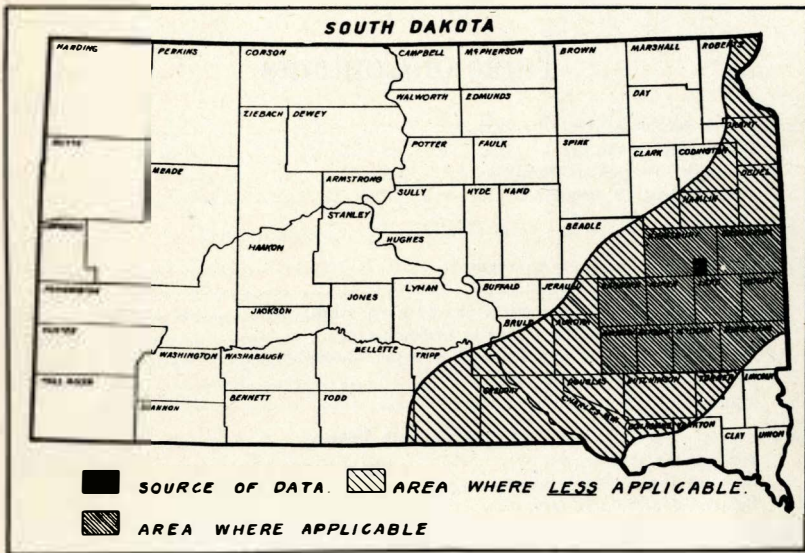


Fig. 1.—LOCATION OF THE AREA STUDIED.

Feed grains, pork, beef and butterfat are the most important products of the area.

Profitable Farming Systems For East Central South Dakota

C. A. Bonnen and J. B. Hutson¹

A detailed study was undertaken in Kingsbury County, South Dakota during the years 1922, 1923 and 1924 to obtain accurate information regarding farm organization and management problems, including farm practices and systems of farming. Data showing the man labor, horse work, and materials used in growing crops and the feed, man labor, horse work, and materials used in producing livestock and livestock products were obtained each year. The route method of obtaining data was used; that is, the farms were visited at regular intervals and the farmers were assisted in keeping a careful and complete record of all farming operations. The study was undertaken jointly by the Department of Farm Economics of the South Dakota Agricultural Experiment Station, the South Dakota State Department of Agriculture, and the Bureau of Agricultural Economics, U. S. Department of Agriculture.

In this bulletin some of the results of this study are presented as follows: First, a brief summary of the agricultural development of the area (East Central South Dakota) is given; second, data showing the financial returns secured on these farms and the factors influencing these returns; third, outlines suggesting what appear to be desirable systems of farming for the area for the years just ahead.

In the appendix, more of the details, showing the man labor, horse work and materials used in growing crops, and the feed, man labor, horse work and materials used in producing livestock and livestock products, are shown.

These data were obtained during a period of agricultural readjustment. It followed a period of rapidly falling prices. Radical changes in agriculture were being affected. This means that individual farmers were making adjustments in farming plans and practices. These facts should be kept in mind in interpreting the data presented in the bulletin.

The results obtained on the farms included in this study suggest certain adjustments that might profitably be made on other farms in the area.

Description of the Area

The farms studied are in East Central South Dakota, near Oldham, in Kingsbury County. The data from these farms are applicable to a large part of the shaded area indicated in Figure 1. This area consists of about ten counties in the east central part of the state lying between the most intensive corn producing area and the spring wheat area. Corn, oats, and tame hay are the principal crops grown, while cattle and hogs are the most important livestock enterprises. Livestock receipts made up over 50 per cent of the income on these farms. Small grains, corn, and potatoes are the other important sources of income.

¹Agricultural Economist, Bureau of Agricultural Economics, U. S. Dept. of Agriculture.

The soil of the area is principally a clay loam of the Barnes series. The topography is level to gently rolling. Most of the drainage is by natural streams and is adequate except in years of excessive rainfall. Over 90 per cent of the land in this area is improved. At Brookings (the nearest official weather reporting station for which the reports are complete) the growing season averages 135 days in length. (See Fig. 2). The shortest growing season during the 10 year period was 108 days in 1915 while the longest was 165 days in 1922.



Fig. 2.—LENGTH OF THE GROWING SEASON.

The growing season is long enough for early maturing varieties of corn.

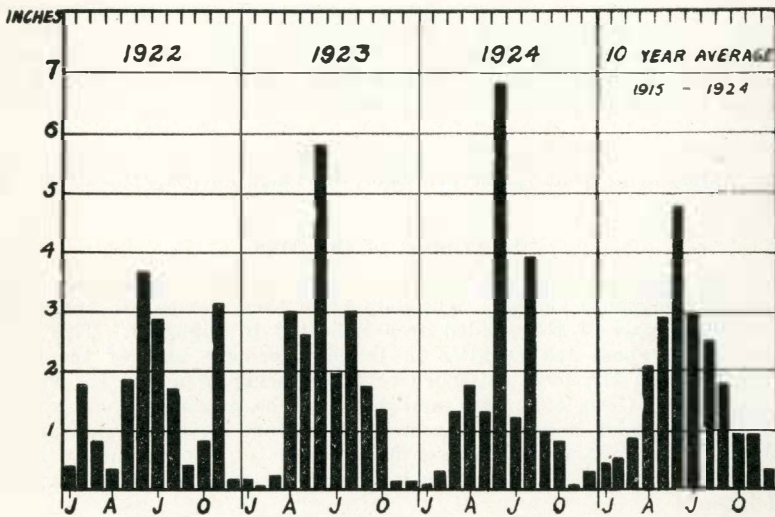


Fig. 3.—RAINFALL BY MONTHS AT BROOKINGS, SOUTH DAKOTA.

Four-fifths of the rainfall comes during the growing season.

The monthly rainfall distribution at Brookings during 1922, 1923 and 1924 and the 10 year average, 1915-1924, are shown in Figure 3. Approximately 80 per cent of the average annual rainfall of 30.9 inches comes during the six months, April 1 to September 30, and 50 per cent during May, June and July. In each of the three years and for the 10 year period, June was the month of heavy rainfall. Less than 11 inches of rain fell between April 1 and September 30, 1922. This was by far the driest year of the three-year period. In 1923 the rainfall, during the growing season, was above the average for the 10 year period. It was also the best distributed of any in the three years. In 1924 the rainfall was slightly below the average and was very poorly distributed; considerably over half of the rain falling during the two months June and August.

Settlement and Development of Kingsbury County

The first settlers came to Kingsbury County between 1870 and 1880. By 1880 there were 1,102 people living in the county. The census report for 1880 is evidently incomplete as it shows only 12 farms in the county at that time. Old settlers state that there were many more farms than the number given in the census. (See Table 1).

The first railroad was built through the county in 1880 and after this development was rapid. By 1890 the population had increased to 8,562 and 75 per cent of the land was in farms. By 1900 practically all land available for farming had been taken up. Since 1900 development has been chiefly in the improved land in farms which increased from 66.2 per cent in 1900 to 92.3 per cent in 1920.

The population has increased very little since 1910.

Table 1.—NUMBER OF FARMS, LAND IN FARMS, VALUE OF LAND AND BUILDINGS PER ACRE AND POPULATION OF KINGSBURY COUNTY, S. DAK., 1880-1925 1

Year	Farms in County	Land in Farms	Av. Acreage Per Farm	Improved Acreage Per Farm	Value of Land and Bldgs. Per A.	Pop.
1880 -----	12*	1,760	147	16	2.	1102
1890 -----	1773	367,596	207	125	9.	8562
1900 -----	1338	459,381	343	227	14.	9866
1910 -----	1523	489,092	321	268	55.	12560
1920 -----	1597	487,685	305	282	138.	12802
1925 -----	1683	469,509	279	255	81.	13068

*Data on number of farms apparently incomplete for 1880.

¹Data from United States Census.

Changes in Acreage of the Principal Crops

Wheat was the most important crop grown in the area during the early years of its development. The Federal Census for the years 1890 and 1900 (see Table 2) shows that about two-thirds of the grain acreage was devoted to the production of wheat. During the same period the feed grains, corn, oats, and barley, were grown to a very limited extent and principally to feed the small amount of livestock on the farms at that time.

Table 2.—PERCENTAGE DISTRIBUTION OF THE GRAIN ACREAGE IN THE AREA.

	Wheat		Corn		Oats		Barley		Flax		Feed Grains Corn, Oats Barley	
Year	Av. of Ten Counties*	Kingsbury County	Av. of Ten Counties	Kingsbury County	Av. of Ten Counties	Kingsbury County	Av. of Ten Counties	Kingsbury County	Av. of Ten Counties	Kingsbury County	Av. of Ten Counties	Kingsbury County
1880 -----	66	—	11.7	—	16.7	—	4.6	—	—	—	33	—
1890 -----	49	65.7	16.2	7.8	17	15.1	2.2	1.8	12	9.3	35.4	24.7
1900 -----	57	69.7	18.4	8.6	13.3	10.6	7.7	5.5	2.7	4	39.4	24.7
1910 -----	22	31.7	28	13.7	24	18.3	22	26	3.3	7.4	74	58
1920 -----	22	30.8	36	29.3	31	20.5	9.3	16.8	.7	1	76.3	66.6
1925 -----	6.5	8.1	42	41	43	35	4.5	11.1	2.1	2.7	89.5	87.1

*The ten counties are: Brookings, Davison, Hanson, Kingsbury, Lake, McCook, Minnehaha, Moody, and Sanborn.

After 1900 wheat declined rapidly in importance and feed grains, particularly corn, became the most important crops. From 1900 to 1925 wheat decreased from 57 per cent to less than 10 per cent of the grain acreage. During the same period, the feed grains increased from 35.4 per cent to 89.5 per cent of the grain acreage. Corn is now grown on more than 40 per cent of the land used for grain production. (See Figure 4).

Changes in the Numbers of Livestock

The changes in the numbers of the different classes of livestock in the area from 1880 to 1925 are shown in Table 3.

Cattle and hogs have always been the most important classes of livestock in the area. Their numbers have followed very closely the expansion of the corn acreage. They have both steadily increased in numbers since the settlement of the area.

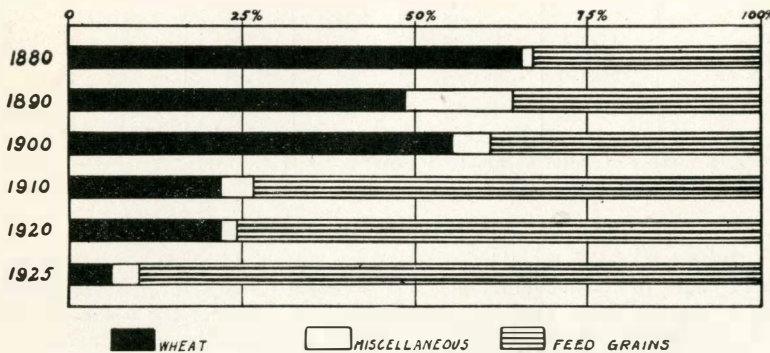


Fig. 4.—PERCENTAGE DISTRIBUTION OF THE GRAIN ACREAGE.

Wheat has been replaced by feed crops.

Table 3.—COWS, OTHER CATTLE, SWINE, AND SHEEP IN THE AREA.

Year	Cows		Other Cattle		Swine		Sheep	
	No. in 10 Counties	Kingsbury County	No. in 10 Counties	Kingsbury County	No. in 10 Counties	Kingsbury County	No. in 10 Counties	Kingsbury County
1880 -----	8301		11057		8123	-----	2783	
1890 -----	52968	5733	88342	8279	110384	6303	40557	2048
1900 -----	82288	9744	131949	14134	209557	15626	105787	9387
1910 -----	121442	12208	133050	13262	250716	22329	105519	4962
1920 -----	143779	15712	206657	23073	488878	52445	92292	14083
1925 -----	147687	17038	197913	22519	562145	54498	41745	7741

Sheep were an important class of livestock from 1900 to 1920 but have declined in numbers very rapidly since. This was probably due to the sudden drop in prices of wool and sheep following the peak of prices in 1919. With the improvement in prices after 1922, there has been a renewed interest in sheep in the area.

The number of horses has followed very closely the increase in the amount of improved land. Enough horses were kept to furnish power and when the prices of horses were good a small surplus was produced for eastern markets.

Price Changes

The changes in the prices of the principal products grown in the area are shown in Figures 5, 6, 7, 8, and 9. The average prices by five year periods from 1891 to 1925 are given in Table 4.

Table 4.—PRICE CHANGES BY FIVE-YEAR PERIODS, 1891-1925.

Average	Wheat	Corn	Oats	Barley	Potat's	Beef	Pork	Butter	Flax
1891-1895 -----	\$0.59	\$0.32	\$0.25	\$0.32	\$0.49	\$4.40	\$5.03	\$---	\$----
1896-1900 -----	.58	.23	.20	.26	.29	4.72	3.96	---	----
1901-1905 -----	.64	.38	.28	.35	.50	5.22	5.82	21.0	----
1906-1910 -----	.84	.43	.34	.48	.57	6.07	6.86	27.7	----
1911-1915 -----	.82	.49	.34	.54	.50	7.90	7.60	30.0	1.40
1916-1920 -----	1.80	.94	.52	.88	1.26	12.87	14.78	48.0	2.92
1921-1925 -----	1.03	.54	.32	.44	.85	9.46	9.04	42.0	1.98
1891-1925 -----	.89	.48	.32	.47	.63	8.30	8.82	34.0	2.08

These data show that the prices of some products have increased more rapidly than others. The price of beef cattle during the period 1921 to 1925 was 46 per cent higher than during the period 1906 to 1915. Comparing the same periods, butterfat was 45 per cent higher, potatoes were 38 per cent higher, pork 25 per cent higher, wheat 24 per cent higher, and corn 17 per cent higher while the price of oats was 6 per cent lower and the price of barley 14 per cent lower.

The Present Type of Farming

Twenty-six farms were included in the study, fourteen for the entire three year period, six for two years, and six for one year. These farms are fairly typical of the area indicated in Figure 1. The acreage of the various crops grown on these farms during each of the years studied

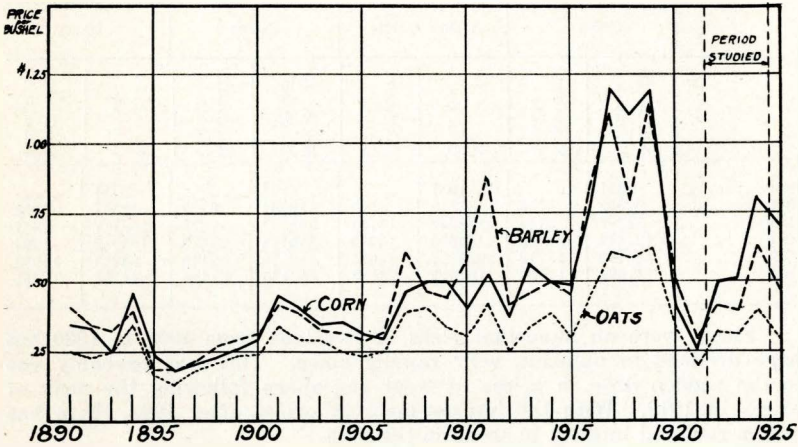


Fig. 5.—PRICES OF CORN, OATS, AND BARLEY ON DEC. 1; FROM 1891-1925.
Corn, oats and barley are the principal crops grown.

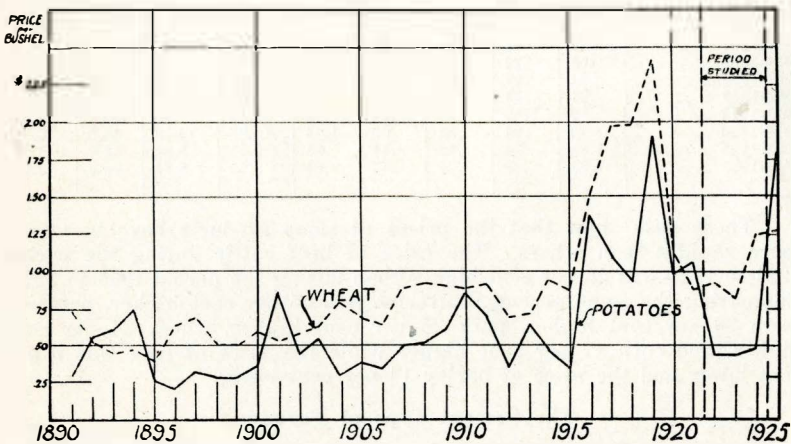


Fig. 6.—PRICES OF WHEAT AND POTATOES ON DEC. 1; FROM 1891-1925.
Wheat and potatoes are important cash crops in certain parts of the area.

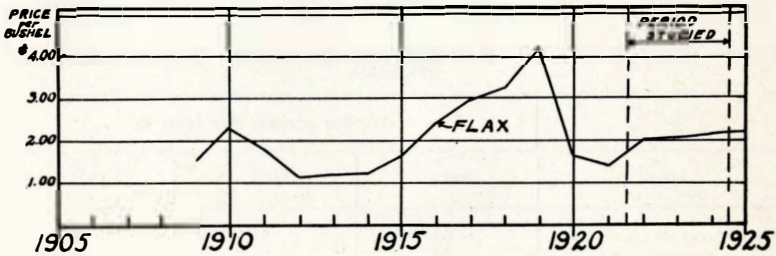


Fig. 7.—PRICE OF FLAX ON DEC. 1; FROM 1909-1925.

The acreage of flax varies greatly with the changes in price and the lateness of the season

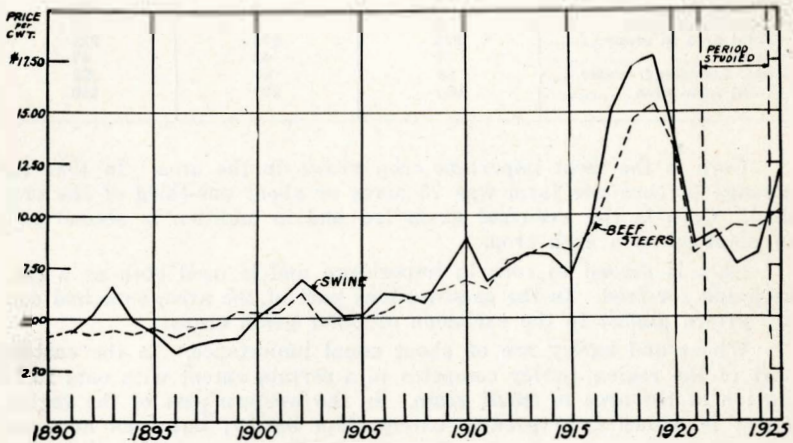


Fig. 8.—AVERAGE YEARLY PRICES OF HOGS AND GOOD BEEF STEERS AT CHICAGO, FROM 1890-1925

Pork and beef are the principal livestock products.

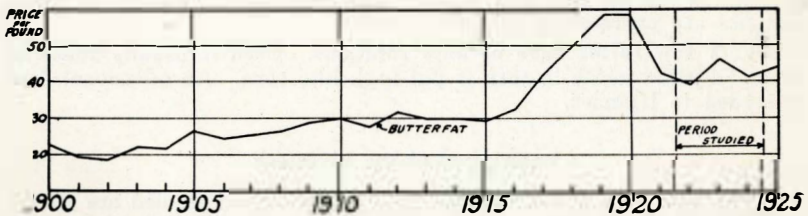


Fig. 9.—AVERAGE YEARLY PRICE OF BUTTER AT CHICAGO, 1890-1925

Sales of butterfat make up 8 per cent of the income on the farms studied. Butterfat production is increasing.

are given in Table 5. The average area of the farms included in 1924 was 290 acres of which 221 acres were in crops, and 46 acres in pasture.

Table 5.—DISTRIBUTION OF CROP ACREAGE AND TOTAL ACREAGE ON FARMS STUDIED.

Item	Average acreage per farm in		
	1922	1923	1924
Corn	60	71	73
Oats	44	61	56
Barley	41	27	17
Wheat	13	8	4
Rye	9	7	4
Flax	5	9	11
Potatoes	19	18	12
Tame hay	29	26	29
Wild hay	4	6	7
Miscellaneous crops	2	3	8
Total area in crops	226	236	221
Pasture	36	42	47
Lanes, farmstead, waste	25	20	22
Total farm area	287	298	290

Corn is the most important crop grown in the area. In 1924 the acreage of corn per farm was 73 acres or about one-third of the crop land. Corn is the principal grain fed and in addition is second only to potatoes as a cash crop.

Oats is second to corn in importance and is used both as a cash crop and for feed. In the southwestern part of the area, corn and oats are grown almost to the exclusion of other grain crops.

Wheat and barley are of about equal importance. In the eastern part of the region, barley competes to a certain extent with oats for a portion of the area in small grain. In the western part of the region, wheat is grown to a greater extent than barley; but even here the area of wheat is small in comparison to the area of corn and oats. Potatoes are an important cash crop in the northeastern part of the area. Alfalfa, clover, and timothy are the principal hay crops while millet and cane are used occasionally as hay substitutes. Wild hay is cut from the small undrained areas which occur on many of the farms. Flax and rye are minor crops in the area. Most of the pastures, especially in the western part of the region, are of native grass although legumes are pastured to a limited extent.

Very few farms have definite rotations. Corn is usually followed by small grain which in turn is put back into corn. An occasional field is seeded to legumes.

Description of the Livestock

The number and kinds of livestock on the farms studied are shown in Table 6. The horses on these farms were mostly good heavy Percherons and were kept mainly for power. The few colts that were raised hardly maintained the work stock.

Table 6.—NUMBERS OF THE VARIOUS KINDS OF LIVESTOCK ON THE FARMS STUDIED.

Livestock	Number per Farm		
	1922	1923	1924
Cows -----	6.9	7.7	8.8
Other cattle -----	17.6	17.8	17.2
Hogs -----	43.0	53.0	50.0
Sheep -----	.7	.7	.7
Poultry -----	170.0	160.0	140.0
Work horses -----	9.0	8.6	9.0
Other horses -----	2.0	2.0	2.0

The cattle were principally of the dual purpose type; that is, they were kept for the production of both beef and butterfat. Only one or two farms had cattle that might be classed as strictly dairy or strictly beef. Most of the herds were of mixed breeds and on the whole were made up of very ordinary individuals. Very few high quality steers were produced. Hogs were the largest source of income on these farms during the three year period. They were also the best bred of any class of livestock. Poultry was kept as a side line; only a small surplus above the needs of the family being produced. A few sheep were kept but on so few farms and in such small numbers as to be of little importance.

Table 7.—AVERAGE PRICES RECEIVED ON FARMS STUDIED, 1922-1924

Year	Corn	Oats	Barley	Wheat	Flax	Rye	Potat's	Hogs	Beef	But. Fat
1922-----	.36	.27	.40	.86	2.03	.58	.38	8.27	4.67	36.0
1923-----	.61	.33	.42	.77	1.95	.63	.43	6.77	4.93	36.5
1924-----	.71	.38	.61	.99	2.09	.85	.46	7.33	5.05	38.1
Ave.-----	.58	.36	.45	.84	2.03	.69	.42	7.41	4.91	37.0

Prices Received

The average prices received on the farms studied during each year of the three year period are shown in Table 7. Prices had reached a very low point during 1921 and had just started upward at the time the study was started. The years 1922 to 1924 represent a period of gradually rising prices. Wheat and hogs are exceptions in that they did not reach the low point until 1923. Flax was approximately the same price during each year of the period. All other crops, however, were higher each succeeding year.

Principal Sources of Income

The principal sources of income on the farms studied and the per cent of the total income made up by each source are shown in Table 8. More than half of the cash income of these farms or 51.2 per cent was secured from the sale of livestock and livestock products. Receipts from swine was the largest single item of income, amounting to almost one-half of the total receipts from livestock. Sales of cattle and dairy products were other important sources of income from livestock. They made up 12.5 per cent and 8 per cent of the total income respectively.

Table 8.—SOURCES OF CASH INCOME ON FARMS STUDIED

	Ave. per Farm (Dollars)	Per Cent of Total
Total cash receipts.....	4447	100
Potatoes	590	13.3
Corn	396	8.9
Barley	320	7.2
Oats	237	5.3
Flax	108	2.4
All other crops.....	396	8.9
Total crop sales.....	2047	46.0
Swine	1111	25.0
Cattle	556	12.5
Dairy products.....	357	8.0
Poultry and eggs.....	143	3.2
Other Livestock	111	2.5
Total livestock sales.....	2278	51.2
Miscellaneous receipts	122	2.8

Potatoes were the most important cash crop grown. They contributed on the average almost \$600 per year to the income of these farms. Corn sales were next in importance and were closely followed by receipts from barley and oats. Crop sales made up 46 per cent of the total income.

Miscellaneous receipts were made up chiefly of such items as rent of farm machinery, payment for work done off the farm, and sales of machinery.

Table 9.—AVERAGE CASH EXPENSES ON FARMS STUDIED.

	Ave. per Farm (Dollars)	Per Cent of Total
Labor (hired)	277	21.7
Livestock purchased	243	19.0
Equipment repairs	195	15.3
Feed purchased	136	10.6
Custom threshing	130	10.2
Miscellaneous crop expense.....	99	7.8
Seed	64	5.0
Real estate repairs.....	48	3.7
Twine	39	3.0
Livestock expense.....	37	3.0
General farm expense.....	9	.7
	1277	100.0

Principal Expenses

The average cash expenses for the three year period are shown in Table 9. Hired labor was the largest item of expense making up 21.7 per cent of the total. Purchases of livestock were next in importance and were followed by equipment repairs, purchased feed, and custom threshing. These five items made up over 75 per cent of the total cash expenses on these farms. Most of the feed purchased was corn, oats, and hay. The item of custom threshing includes the

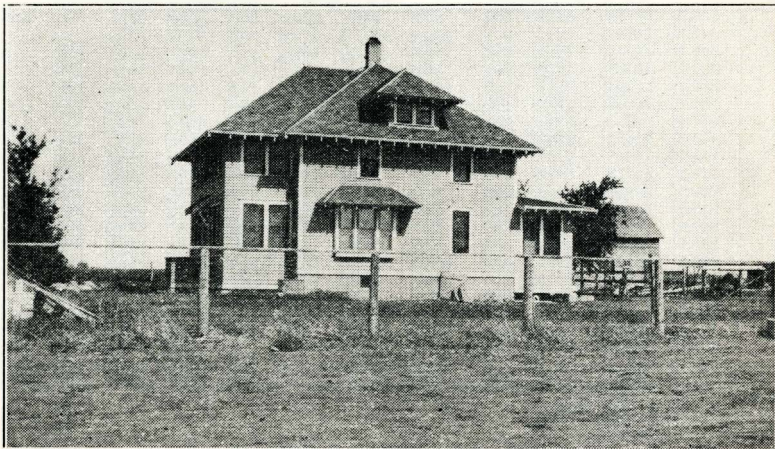


Fig. 10.—Increased earnings make possible a comfortable farm home. A pleasant home makes farm life attractive.

hire of the machine and the crew necessary to operate it. The thresherman does not furnish the bundle haulers as is often the case in other parts of the state. The item of miscellaneous crop expense is chiefly materials for treating seed, expense of marketing potatoes, corn shredding and shelling, etc. Livestock expenses were principally for vaccinating hogs, veterinary fees, medicines, horse shoeing, etc. General farm expense includes such items as telephone rent and farm papers.

Besides the expenses listed in the above table, each farm invested on the average \$339 for new equipment, and \$68 for new farm improvements.

Financial Returns from the Farms Studied

The average financial returns secured on the different farms during the three-year period are shown in Table 10. The earnings ranged from \$1362 to \$5600.

Receipts as computed include in addition to cash income increases in livestock and feed, and the value of farm products used in the home. Deductions include charges for depreciation on buildings and equipment and for the labor of the family at the usual farm wage rate. The difference between these is shown as farm earnings.

The rate earned on the investment was arrived at by deducting from the farm earnings, wages for the operator at the prevailing rate for hired labor, and dividing the remainder by the average investment.

The rate earned on the investment varied from 2.92 per cent to 9.26 per cent, the average being 5.45 per cent.

Table 10.—EARNINGS ON THE FARMS STUDIED, AVERAGE FOR 1922-1924.

Farm No.	Size—Acres	Average Investment	Cash Receipts	Value of Products Used in House	Change in Inventory	Total Credits	Cash Expenses	Unpaid Labor	Total Debits	Farm Earnings	Value of Operator's Labor	Rate Earned on Investment
1	338.9	38792	5120	364	877	6361	1301	959	2260	4101	507	9.26
2	448.8	60791	8479	340	1353	10172	3733	839	4572	5600	544	8.30
3*	301.4	36512	4484	265	1179	5928	1986	449	2435	3493	618	7.86
4	296.4	40335	4835	264	361	5460	1577	182	1759	3701	826	7.11
5*	343.1	37254	3317	289	1180	4780	701	733	1434	3352	796	6.80
6*	181.7	22072	2367	152	§	2518	366	96	462	2056	726	6.07
7**	341.5	50910	7131	297	703	8131	3947	460	4401	3730	871	5.82
8**	155.4	22372	1937	170	651	2758	621	74	695	2063	776	5.74
9	158.5	18702	2153	291	258	2702	421	619	1040	1662	612	5.62
10	116.2	19433	2684	174	272	3130	1073	229	1302	1828	822	5.17
11	208.2	34650	3581	273	406	4260	1307	379	1686	2574	799	5.12
12	207.3	35778	3025	186	820	4031	1233	310	1543	2488	664	5.10
13	293.1	30939	3282	243	214	3739	956	809	1765	1974	463	4.89
14*	233.0	35265	2624	297	574	3495	717	430	1147	2348	651	4.82
15	665.7	96186	7257	558	2772	10587	4373	1045	5418	5169	689	4.67
16	414.9	63718	5906	216	147	6269	1709	1083	2792	3477	640	4.44
17	441.5	81842	10280	206	§1421	9065	4006	929	4935	4130	700	4.21
18	354.4	50938	5123	324	99	5546	1933	1107	3040	2506	867	3.21
19	153.6	22621	1580	322	346	2248	423	463	886	1362	666	3.08
20	175.6	24787	2172	228	97	2497	711	395	1106	1391	669	2.92
Ave.	295.0	41967	4447	276	525	5249	1684	602	2286	2963	690	5.45

*2-year average, 1923-1924.

**2-year average, 1922-1923.

§Decrease in inventory.

Causes of Variations in Returns

Most of the variations in the returns from the farms studied were due to causes at least partly within the control of the farm operators. These causes are many and varied and usually interrelated. As a result, it is often difficult to determine the exact cause of a given result. However, in analyzing and comparing the records of the different farms, certain factors stand out as important causes of the variations in returns. Among these are the following:

1. The crop and livestock enterprises selected.
2. Variations in efficiency in the use of man labor and horse work.
3. Crop yields and practices used in growing crops.
4. Quality of livestock and livestock practices followed.
5. Size of business.
6. Managerial ability of the operator.

As suggested above, these factors are all closely related just as every part of the farm problem is closely related to every other part. The cost and utilization of man labor and horse work are influenced greatly by the selection of the enterprises; the kind and amount of labor available influences the practices used in growing crops; feeding practices depend to a considerable extent upon the kind and amount of feed on hand; the selection of the enterprises and the methods and practices largely determine the size of the business and the ability of the farm affects all of these. Price is also an important consideration in every decision. Perhaps the best justification of a division of this kind is that it gives opportunity to focus attention upon particular phases of the farming problem.

The Selection of Enterprises

Farmers differ widely in their judgments as to the kinds and amounts of the different crops and livestock to combine into a system of farming at a particular time. This accounts for a part of the differences in returns on the farms studied. For example farms 2 and 16 were of about equal size with about equal amounts of man, labor, horse work, equipment and other resources to produce with. The farm earnings on farm 2 were \$5,304, while the farm earnings on farm 16 were \$1231. The returns on the total investment were 7.8 per cent and 1.1 per cent respectively. The acreages of the different crops grown and the numbers of the different classes of livestock kept on these farms are shown in Table 11. While a part of the difference in earnings was due to other causes, a large part was undoubtedly due to the better combination of enterprises on farm 2.

Table 11.—ACREAGE OF CROPS AND NUMBERS OF LIVESTOCK ON FARMS 2 & 16.

Crops	Farm 2	Farm 16
Corn-----	105	77
Oats-----	72	64
Barley-----	20	84
Rye-----		7
Flax-----	26	
Potatoes-----	55	56
Alfalfa-----	24	9
Sweet clover-----	23	20
Wild hay-----	8	17
Pasture-----	45	50
Livestock		
Cows-----	7	4
Other cattle-----	6	8
Swine-----	114	68
Poultry-----	336	219
Bees-----	8	1

Major Enterprises—On the basis of usual prices, yields and production requirements, most farming areas have greater advantages for the production of some crops or classes of livestock than for others. The returns from the resources devoted to these enterprises usually are larger than the returns from similar resources expended upon other enterprises. These crops and livestock usually become the major enterprises, and generally the most profitable systems of farming of an area are built around them. The area described in this study appears to have natural advantages for the production of corn, and small grain for feed and the raising of hogs, and cattle. In some sections, potatoes are an important crop. On many of the most profitable farms, the products sold consist largely of hogs, dairy products, beef cattle, and potatoes. (For the most part potatoes are confined to Kingsbury County and three or four counties directly north and east of it.) Usually on most of the more profitable farms all the corn is grown that can be conveniently handled during the rush seasons. Hogs consume a large part of this corn and on most of these farms pork is the principal product sold. However, the seasonal requirements of corn and

hogs are such that they do not provide employment for the men and teams throughout the year. (See Figure 11) Moreover, if land is cropped continually in corn the yields will eventually be reduced. On these more profitable farms such other crops are grown, as will aid in keeping up the fertility of the soil and will contribute to a balanced ration for the livestock and such other livestock are kept as will utilize pasture and non-marketable products, and the man labor, horse work and equipment at the times during the year when they are not needed by the better adapted enterprises.

Minor Enterprises—In addition to the crops and livestock named above most of the well balanced systems of farming in the area include some flax, wheat, sweet clover seed or other minor crops. Poultry is kept on most farms and sheep on a few. On many farms cattle may be considered a minor, rather than a major enterprise. Alfalfa and sweet clover aid in keeping up the fertility of the soil and provide a protein feed or pasturage for livestock. Wild hay, if grown on land not suited for cultivated crops, and harvested when other farm work is not pressing, is a cheap source of rough feed. Poultry usually utilizes waste products around the farmstead more fully than they would be utilized by other livestock. Sheep often aid in ridding the farm of weeds and utilize pasturage that would not be fully utilized without them. Cattle when kept as a minor enterprise, largely consume rough feeds and pasturage. The minimum amount of legumes that should be grown in this area is that acreage that will insure the maintenance of soil fertility and a fairly well balanced ration for the livestock. In the case of livestock, perhaps the minimum amount is that number that will consume the pasturage and non-marketable feeds that would otherwise not be utilized. Beyond this minimum it will be profitable to expand any enterprise as long as the added returns resulting from the additional use of feed, labor, or other farm resources are more than the returns would be from alternative enterprises using the same resources. For example, suppose that on a given farm cattle are kept primarily to consume pasturage and non-marketable products; the decision as to whether or not to feed the cattle marketable grain is reached by comparing the added returns that would be obtained from the cattle if they were fed the grain as compared with the added returns that would be obtained from hogs or some other enterprise, including the cash sale alternative, if the grain were disposed of in that way.

The selection of the crop and livestock enterprises consists largely in deciding which combination of enterprises are likely to produce the largest net return. The problem is complicated by the fact that usually several crop and livestock enterprises are necessary to keep up the fertility of the soil and fully utilize the time of the men and teams. Moreover, in the case of most enterprises, there are secondary products, such as stubble pasture, straw, stover, and skimmilk for which there is little or no market but which may be used to advantage in the production of marketable products. Then there are usually other products for which there are established markets such as corn, hay and small grain, but which often can be utilized to better advantage as feed for livestock.

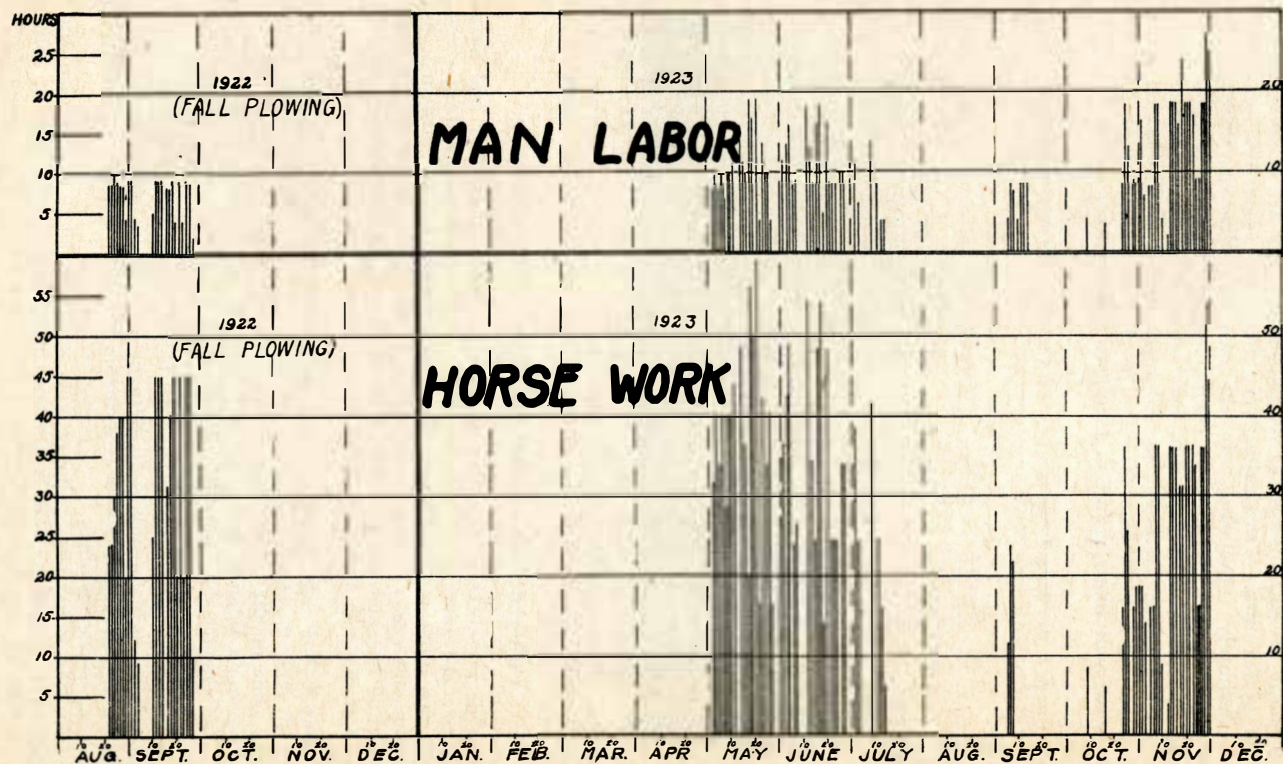


Fig. 11.—DISTRIBUTION OF MAN LABOR AND HORSE WORK ON 73 ACRES OF CORN, 1923.

Corn requires labor only at certain times in the year. Livestock and other crops must be grown with corn to give a well-balanced farming system.

Usually several enterprises related in this way are combined into a system of farming. Practically every farm has some kind of system fairly definitely established. In the case of increases, decreases or substitution it is a question of comparing the requirements and estimating the probable returns that may be expected if the contemplated changes are made. Usually the point considered is whether or not a little more or a little less of some particular enterprise or group of enterprises will likely result in increased net returns.

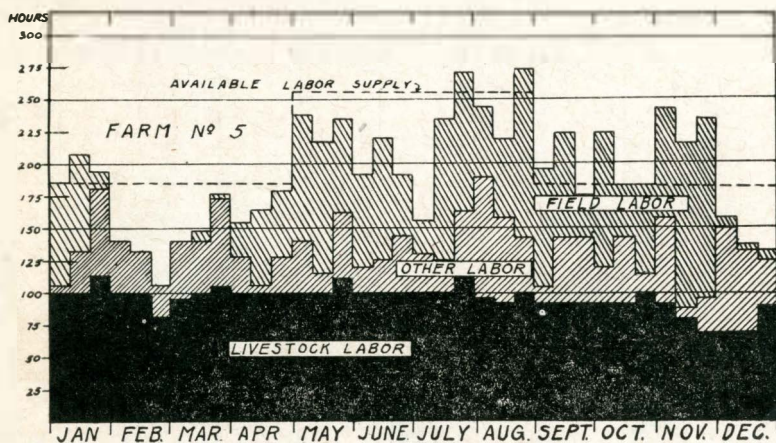


Fig. 12.—DISTRIBUTION OF LABOR BY TEN-DAY PERIODS ON FARM 5, 1923.

A well balanced crop and livestock system means good utilization of labor.

Cost and Utilization of Man Labor and Horse Work

Aside from the charge for the use of land, man labor and horse work are the most important elements in the cost of growing crops. These two items made up from 25 to 50 per cent of the estimated cost of producing crops on the farms studied during the three year period. There was considerable variation between farms in the cost and utilization of man labor and horse work.

Man Labor—The larger part of the labor on these farms was furnished by the operator and other members of the family, only about 25 per cent of the total amount being hired. The estimated value of the operator's labor and that of members of his family is equivalent to the cash expense on these farms including the expense of hired labor. The average cost of the hired labor including a fair charge for board was 26 cents per hour, cash cost being 18 cents per hour. Since man labor is such an important item in the cost of operating the farm business, the degree to which it is utilized is an important factor in determining farm earnings.

On some farms the available labor was utilized to better advantage than on other farms. This is illustrated in Figures 12 and 13 in which the amount of labor available and the amount actually used on farms

5 and 13 in 1923 are shown. Figure 12 or farm 5 represents good utilization of labor and Figure 13 or farm 13 poor utilization of labor. Farm 5 used 91 per cent of the available labor while farm 13 used only 78 per cent of the available labor. The production of crops and livestock was combined on farm 5 in such a way as to give a fairly even distribution of the labor throughout the year. This resulted in there being a large amount of profitable work to be done during the winter months.

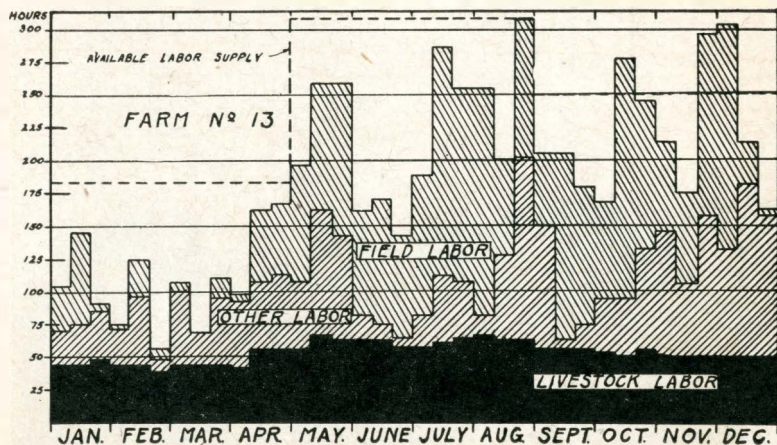


Fig. 13.—DISTRIBUTION OF LABOR BY TEN-DAY PERIODS ON FARM 13, 1923.

Farm 13 was a grain farm and very few livestock were kept. As a result, there was very little profitable work to be done in the winter time although a large amount of labor was available. The earnings on farm 13 would undoubtedly have been greater had profitable employment been found for the surplus labor available on this farm during the winter months. Labor is best utilized and earnings are generally greater on those farms where the work is carefully planned from day to day and where crops and livestock are combined in such a way as to provide profitable employment for available labor throughout the year.

In some cases, the man labor required for those operations ordinarily performed during the rush seasons may be reduced by the use of larger machines and teams. If the rush comes in June in corn cultivation, the use of two row corn cultivators may save hiring an extra man or may reduce the demand on the regular labor force to the extent that other work such as the putting up of alfalfa and clover, which usually conflicts with corn cultivation, may be done in good season.

If the rush comes in the spring, the use of the larger plows, discs, and harrows should reduce the amount of hired help or release a part of the labor for other work such as the caring for livestock. A few extra hours used in caring for the little pigs and sows at farrowing time may mean the difference between a profit or loss on the swine enterprise and result in a large return for the added investment in the larger machines.

The timeliness of performing certain operations may help reduce the amount of labor. The use of harrow attachments on plows in the spring or the harrowing of land the same day it is plowed may be the means of eliminating several subsequent harrowings. The harrowing of a corn field just as the corn is coming up will ordinarily reduce the number of regular cultivations necessary or make them more ef-

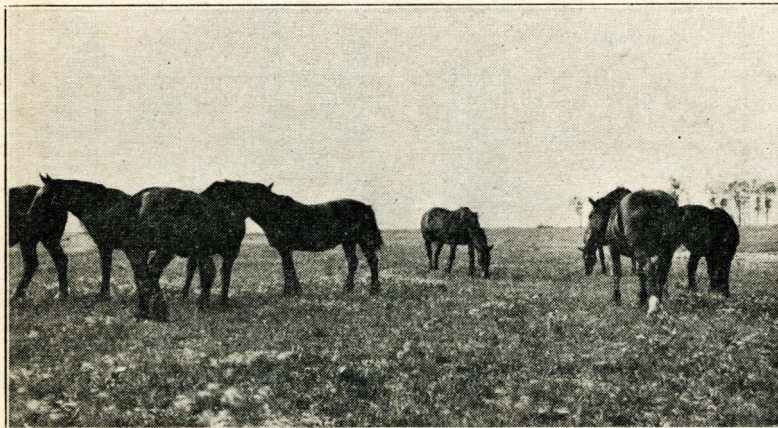


Fig. 14.—Good, heavy draft horses make it possible to use large machines, and help reduce labor costs.

fective in controlling weeds. Any device or practice which will reduce the amount of hired labor or release labor for other productive purposes without lowering the quality of the work will increase farm earnings.

Horse Work—Work horses consumed about 15 per cent of the grain and 55 per cent of the hay produced on the farms studied. Considering all crops harvested, the production from approximately 18 per cent of the acreage was fed to work stock. The per cent of the total feed produced and the per cent of the total crop acreage required to furnish feed for the work stock on the different farms are shown in Table 12. On some farms, the proportion of the total production fed to work horses was much larger than on other farms.

Horse work costs were high on some farms because more horses were kept than were actually needed to do the farm work. Table 13 shows the feed cost per horse, the cost per hour of horse work, and the number of hours worked per horse on each of the farms during 1923. The number of 10 hour days during which more than two-thirds of the horses were worked is also shown.

Table 12.—PERCENTAGE OF TOTAL CROP PRODUCTION FED TO WORK HORSES, 1923.

Farm No.	Number Work Horses	Total Crop Acres	Per Cent of Grain fed to Work Horses	Per Cent of Hay fed to Work Horses	Per Cent of Crop acres fed Work Horses
1 -----	10.66	327.5	12	86	16.0
2 -----	12.00	334.6	15	56	13.9
3 -----	6.25	205.8	12	40	13.9
4 -----	9.25	253.9	13	44	14.6
5 -----	7.08	196.1	10.5	38.5	17.2
6 -----	6.00	180.4	12	53.5	14.2
7 -----	11.25	319.5	13	45	16.7
8 -----	6.00	130.9	6	112	18.7
9 -----	6.00	118.9	12.5	45	26.3
10 -----	6.00	89.6	23	33	20.0
Av. 10 first farms -----	8.05	215.7	12.9	55	17.1
11 -----	5.66	165.7	14.5	20	17.2
12 -----	10.00	285.0	14.5	43	16.6
13 -----	7.75	229.4	14.5	75.5	19.3
14 -----	8.00	163.7	15	45.5	19.4
15 -----	17.33	543.0	14	119	22.2
16 -----	9.00	329.2	16.5	28	13.3
17 -----	11.08	342.3	21	39	22.2
18 -----	10.00	274.4	21	48	18.9
19 -----	6.83	106.9	13.5	23	19.7
20 -----	7.00	123.3	21	99	29.1
Ave. 10 last farms -----	9.27	256.3	16.5	54	19.7

These data show that the horses working a large number of hours required more feed but the cost per hour of horse work was lower than it was for the horses working a small number of hours. In general, horse costs were lower on those farms on which practically no idle horses were kept.

An example of good utilization of horse work is shown in Figure 15 while Figure 16 illustrates poor utilization of horse work.

On Farm 11, the horses were worked 1,074 hours each in 1923 and more than two-thirds of the horses were used 57 ten hour days, while on farm 20, during the same year, the horses were worked only 588 hours each and more than two-thirds of the horses were worked only 8 ten-hour days. On farm 11, the horses were used 35.8 per cent of the available hours, while on farm 20 they were used only 19.6 per cent of the available hours. Farm 11 had only the number of work horses needed to do the farm work while farm 20 had two more horses than were needed. Farm 11 worked 166 crop acres with 6 horses while farm 20 kept 7 horses to work 123 acres of crop.

Table 13.—UTILIZATION OF HORSES ON FARMS STUDIED, 1923

Farm No.	No. Horses	Crop Acreage Worked Per Horse	Hours Worked Per Horse	Feed Cost Per Horse	Feed Cost Per Hour of Horse Work	10-Hr. Days Worked by % to all Work Horses
13	7.7	29.6	1139	60.91	5.3	64
11	5.7	29.2	1074	62.62	5.8	57
16	9.0	36.5	1065	73.02	6.9	43
18	10.0	27.4	1001	76.31	7.6	50
7	11.2	28.4	982	58.20	5.9	42
4	9.2	27.4	976	74.99	7.7	40
3	6.2	32.9	951	56.01	5.9	36
5	7.1	27.6	897	63.64	7.1	41
9	6.0	19.8	885	61.04	6.9	25
17	11.1	30.8	874	77.68	8.9	54
Ave. 1st 10	8.2	28.9	1004	66.44	6.8	45
6	6.0	30.0	857	56.63	6.6	29
12	10.0	28.5	810	69.31	8.5	42
8	6.0	21.8	788	55.74	7.1	22
15	17.3	21.3	761	64.52	8.5	27
1	10.7	30.7	738	76.78	10.4	39
2	12.0	27.9	731	66.57	9.1	34
19	6.3	16.9	699	39.71	5.7	9
20	7.0	17.6	588	62.47	10.6	8
14	8.0	20.4	570	59.87	10.5	12
10	6.0	14.9	423	60.34	14.2	0
Ave. last 10	8.9	24.0	694	61.19	9.1	22

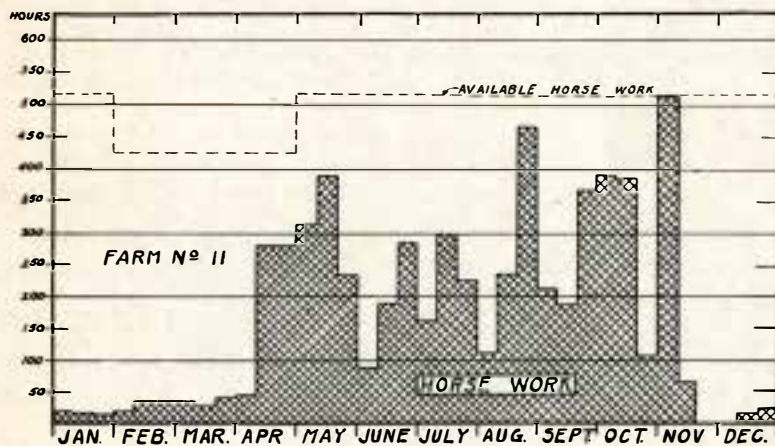


Fig. 15.—DISTRIBUTION OF HORSE WORK BY TEN-DAY PERIODS ON FARM 11, 1923.

The horses on this farm were used more than one-third of the time for which they were available for work.

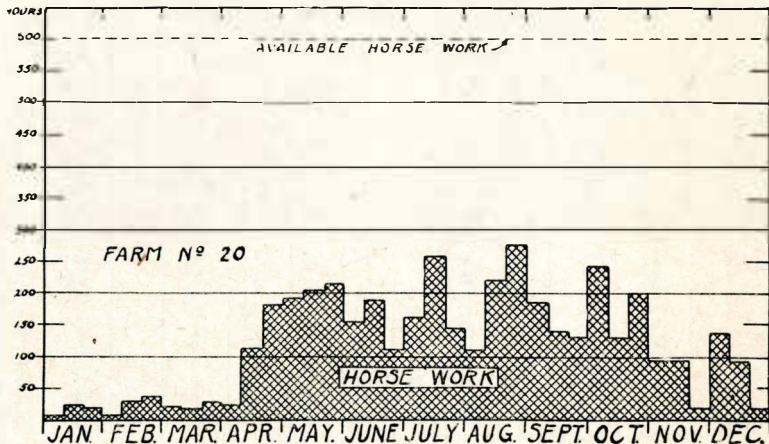


Fig. 16.—DISTRIBUTION OF HORSE WORK BY TEN-DAY PERIODS ON FARM 20, 1923.

Too many horses were kept on this farm. They were used less than one-fifth of the time for which they were available for work.

CROP YIELDS AND PRACTICES IN GROWING CROPS

Crops made up 46 per cent of the cash income on the farms included in this study and in addition supplied most of the feed for livestock. On the average, only \$136 worth of feed was purchased.

Crop yields and practices followed in growing crops are one of the most important factors in determining success or failure in the management of the farm. A farm having comparatively low crop yields will normally have lower returns than will farms having high crop yields. A farm having low crop yields may have as large earnings as another farm having high crop yields due to superior feeding and management of livestock or better marketing but the fact remains that the earnings will not be as high as they would be if high yields were secured.

Table 14 gives the index of crop yields for all crops except hay, the average yield of the four principal crops, corn, oats, barley and potatoes, and the per cent of the crop area devoted to the principal crops. The rate earned on the investment on each of the farms for the three year period is also shown.

The farms are arrayed according to the index of crop yields. Seven of the ten farms having the highest yields made better than average returns on their investments while only three of the low yield group made better than an average return. The low returns on farm 19 were caused by the low livestock returns. The earnings on farm 17 were greatly reduced because of decreased values of purebred livestock.

Farms 3 and 7 had relatively low yields and better than average earnings. Farm 7 was particularly successful in feeding hogs and cattle while the operator on farm 3 was a successful dairyman.

Table 14.—INDEX OF CROP YIELDS, YIELD PER ACRE AND PER CENT OF CROP LAND DEVOTED TO PRINCIPAL CROPS, AVERAGE 1922-1924.

Farm Number	Index of Crop Yield*	Corn		Oats		Barley		Potatoes		Per Cent of Crop Land in Other Grains	Per Cent of Crop Land in Legumes	Rate Earned on Investment
		Bushels Per acre	Per Cent of Crop Land	Bushels Per Acre	Per Cent of Crop Land	Bushels Per Acre	Per Cent of Crop Land	Bushels Per Acre	Per Cent of Crop Land			
10-----	142	36	26	60	17	26	6	178	7	--	23	5.17
5-----	138	45	42	42	42	--	--	118	2	--	--	6.86
8-----	137	44	43	38	16	30	28	77	1	--	11	5.74
1-----	129	44	33	47	29	24	17	98	11	2	2	9.26
6-----	126	29	41	50	24	37	14	97	5	12	--	6.07
2-----	125	37	30	49	16	19	6	123	17	8	20	8.30
19-----	125	40	31	43	33	30	3	93	7	5	2	3.08
4-----	121	36	37	41	28	29	5	80	4	7	11	7.11
11-----	121	36	30	50	28	34	12	105	8	5	16	5.12
17-----	116	28	26	50	24	23	8	116	12	10	18	4.21
Av. 1st 10	128	37	34	47	26	25	10	108	7.4	5	10.3	6.09
14-----	115	40	31	41	32	16	3	122	2	12	9	4.82
9-----	111	33	42	45	36	13	3	88	9	5	3	5.62
16-----	110	33	23	50	17	24	27	84	12	2	13	4.44
7-----	109	34	29	41	26	21	16	105	10	7	6	5.82
15-----	108	38	20	39	12	22	17	62	1	32	1	4.67
20-----	108	28	24	49	27	18	1	132	3	14	12	2.92
3-----	107	29	38	39	34	35	3	78	3	13	4	7.86
12-----	106	32	28	43	14	29	9	106	5	17	13	5.10
18-----	105	30	25	46	22	27	13	105	4	10	8	3.21
13-----	96	26	24	40	24	25	15	92	3	23	1	4.89
Ave. last 10	107.5	32	28	43	24	23	11	97	5.2	13.5	7	4.93

*The Index of Crop Yields is the yield of all crops except hay on these farms, expressed in percentage of the average yield for the same crops for the county.

Rotations

No systematic rotations were followed on the farms studied. The most common cropping practice was to follow corn and potatoes with small grain; the small grain in turn being followed by corn and potatoes. An occasional field was seeded to legumes. Less than ten per cent of the crop land was in legumes on these farms. As one-half of the legumes was alfalfa, the acreage of legumes in the regular cropping system on the average farm was very small.

Table 14 gives the percentage of the crop land devoted to the principal crops. The high yield farms had six per cent more corn, two per cent more potatoes, three per cent more legumes, and eight and one-half per cent less other grains (principally wheat and some flax) than did the low yield farms. In other words, the high yield farms produced more cultivated crops, feed, grains, and legumes and less regular cash crops than did the low yield farms. Of the ten high yield farms, six had more than ten per cent of their crop land in legumes while only

three of the low yield farms had more than ten per cent of the crop land in legumes. While it is not possible on the basis of the data obtained on these farms to say that legumes increased the yields, results of rotation tests at various experiment stations in areas similar to Kingsbury County show decided increases in the yield of both corn and small grain when legumes are grown in a regular rotation.

On some of the farms, especially during the first two years of the study, more small grain than cultivated crops was grown, consequently some small grain followed small grain in the rotation. The yields from these fields in comparison with the yields of grain following a cultivated crop are shown in Table 15.

Table 15.—YIELD PER ACRE OF OATS AND BARLEY FOLLOWING SMALL GRAIN AND CULTIVATED CROPS

Year	Oats		Barley	
	Following Cultivated Crops	Following Small Grain	Following Cultivated Crops	Following Small Grain
1922-----	40.2	30.2	23.5	19
1923-----	43.4	35.6	28.3	18

The acreage of small grain following small grain in 1924 was too small to give a reliable comparison.

The five farms having the highest yields of oats had only one per cent following small grain while the five low yield farms had 22 per cent following small grain. The same comparison for barley showed five per cent for the high yield group and 33 per cent for the low yield group.

A comparison of two rotations followed at the Brookings experiment station is presented in Table 16. This experiment gives support to the above data.

Table 16.—YIELDS OF BARLEY IN DIFFERENT ROTATIONS, BROOKINGS STATION, 1912-1917.

Rotation	Bushels per Acre						Ave. 6-Yr.
	1912	1913	1914	1915	1916	1917	
Barley, peas and corn-----	54.1	27.3	30.8	60.4	33.3	57.1	43.8
Barley, peas and wheat-----	30.8	18.3	23.1	48.5	19.8	44.2	30.8

The only difference between these rotations is that one contains corn and the other wheat. The yield of barley in the corn rotation exceeded the yield of barley in the wheat rotation every year of the six year period. The difference ranged from seven to twenty-four bushels and the average difference for the period was 13 bushels. Evidently a cultivated crop such as corn or potatoes has a greater value in the

rotation than is indicated by the returns from the crop itself. This is particularly true on farms where small grains have been the principal crops produced.

In east central South Dakota, the acreage of corn, or corn and potatoes, might profitably equal the acreage of small grain. It should be remembered, however, that cultivated crops particularly corn reduce the fertility and organic matter in the soil more rapidly than do small grains. This means that as the acreage of cultivated crops is increased, the acreage in legumes should also be increased in order that the soil may be kept in good physical condition and its fertility maintained. Probably the rotation which best fulfills these conditions and therefore best meets the needs of the largest number of farms in east central South Dakota is a five-year rotation of corn, small grain, corn, small grain and sweet clover.

This rotation has the following advantages:

- (1) The legume acreage is not so large but that it can be economically disposed of on most farms in the area.
- (2) The order in which the crops follow each other is almost ideal in that all of the plowing for corn may be done in the fall thus reducing the peak load of labor which usually comes during corn planting time.
- (3) All small grain follows a cultivated crop which according to the preceding data is desirable from the standpoint of yield and which also reduces the amount of work in preparing the seed bed for small grain.

Cultivation

The chief purpose of cultivation is to control or destroy weeds. Weeds are more easily destroyed when small. For that reason the timeliness of cultivation may be more important than the number of cultivations. For example, harrowing the corn field just before the corn comes up may do more to control weeds than two later cultivations. The harrowing checks the weeds and allows the corn to get a good start so that the following cultivations are made more effective.

Quality of Seed

Probably the most important factor influencing yields over which the farmer has control is the quality of seed. High yields cannot be expected if poor seed is used. High quality seed may be described briefly as seed from the best adapted varieties which has been tested for germination, treated for disease, and from which the seed of foul weeds is absent or has been removed.

Time of Seeding

An important factor influencing the yield of crops is the success of the farmer in getting his crop seeded during the most favorable season.

Data on seeding dates from the farms studied show that some of the farmers were more successful than others in getting their crops seeded in good season. The average seeding date was determined for corn, barley, and oats for each farm and for each year. The farms with seeding dates previous to the average date for the whole group were

put into one group and the farms having seeding dates later than the average of the whole group in another. The yields obtained by these groups for each of the three years are shown in Table 17.

Tabl 17.--YIELDS FROM EARLY AND LATE PLANTING.

Year	Corn		Oats		Barley	
	Early Planting	Late Planting	Early Planting	Late Planting	Early Planting	Late Planting
1922*-----	29.6	26	34.4	39.3	23.7	22.9
1923-----	47.1	37	45.2	38.7	30.8	24.4
1924-----	31.5	32.2	55.7	49.1	29	29

*Hail damaged the small grain in 1922.

Observations on these farms during the three year period lead one to the conclusion that the careful planning of farm work in order to insure timely seeding pays high wages for time so spent.

In trials conducted by the agronomy department at the various experiment fields, seeding March 15th gave the highest spring wheat yields over a period of years while seeding April 15th gave the highest yields for oats, barley, and flax. Seeding two weeks earlier or later gave lower yields.

The results of these trials and the data from the farms studied during the three year period indicate that the farmer who succeeds in getting this wheat seeded before the first of April, his oats and barley between the 10th and 20th of April, and flax between April 15th and May 1st will over a period of years have higher yields than the farmer who seeds later. Since all crops cannot be seeded at the same time, flax should ordinarily be seeded after oats and barley, as the yield of flax is not reduced as much from later seeding as that of oats and barley.

LIVESTOCK PRACTICES

Sales of livestock and livestock products made up over one-half of the cash receipts of the farms studied. This was during a period of low hog prices. Ordinarily the income from livestock and livestock products is greater than it was on the farms during the period studied. Consequently success or failure in handling livestock was an important factor in determining the relative earnings of the farms. Low crop yields may be offset by efficient feeding of livestock and the advantage of high crop yields may be lost in feeding the crops to low producing livestock. The largest returns are ordinarily made on farms where relatively high crop yields are secured which in turn are fed to high producing livestock.

Swine

The five most successful pork producers included in this study required 180 pounds less grain on the average to produce 100 pounds of pork than did the five least successful producers. (See table 18). Consequently, the costs were much lower and the net profit much greater on the first group of farms.

Table 18.—DIFFERENCES IN THE COST OF PRODUCING PORK.

Farm Number	Pork Produced Pounds	Grain to Produce 100 lbs. of Pork Pounds	Pigs Weaned Per Sow Number	Ave. Wt. of Spring Pigs on Jan. 1 Pounds	Cost of Producing 100 lbs. of Pork		Rate Earned on Total Invest- ment in Farm Per Cent
					Feed Cost Dollars	Total Cost Dollars	
17-----	31,760	357	6.1	178	4.02	5.49	4.21
10-----	10,300	400	5.2	187	4.71	6.43	5.17
9-----	12,360	462	5.2	177	5.30	7.10	5.62
1-----	18,685	468	4.3	215	5.24	6.90	9.26
11-----	16,780	474	6.4	189	5.57	7.09	5.12
Ave. 5 farms---	17,975	432	5.4	190	4.97	6.60	5.95
16-----	19,375	540	3.9	158	6.41	7.23	4.44
12-----	10,860	596	4.6	166	7.41	9.26	5.10
2-----	25,600	608	3.5	187	7.04	9.09	8.30
18-----	22,725	637	3.6	162	8.06	9.37	3.21
19-----	9,860	692	4.6	120	8.14	10.61	3.08
Ave. 5 farms---	17,685	612	4.0	159	7.41	9.11	4.82

The differences were due chiefly to large litters as measured by the number of pigs weaned per sow, and to more thrifty pigs as shown by the rate of gain of the spring pigs. The low cost farms weaned 1.4 more pigs and the spring pigs on these farms weighed 31 pounds more as an average* on the following January 1. Practically all of the pigs on these farms were farrowed in April. The advantage of early farrowing, if any, was with the high cost group. A study of records from a large number of farms shows that large litters and thrifty pigs are usually found on the same farms, and that the same practices necessary to secure large litters also insure thrifty economical pigs.

Table 19.—RELATION OF THE NUMBER OF PIGS WEANED TO THE COST OF PRODUCING PORK.*

No. Pigs Weaned Per Sow	1921		1922	
	No. of Drowes	Cost per 100 lbs. of Pork Produced	No. of Drowes	Cost per 100 lbs. of Pork Produced
One litter per year				
2 to 4-----	11	\$6.56	4	\$7.82
4 to 6-----	11	5.30	9	6.40
6 to 8-----	6	4.60	2	5.41
Two litters per year				
4 to 7-----	3	6.58	4	6.65
7 to 10-----	6	5.78	10	6.25
10 to 13-----	5	5.13	8	5.82

Successful pork production depends to a considerable extent upon large litters of thrifty pigs. Some farmers are more successful than others in saving large litters and in growing them out rapidly and economically to market weights. The difference between farmers in their success with swine can usually be traced to the practices followed in handling the sows and their litters.

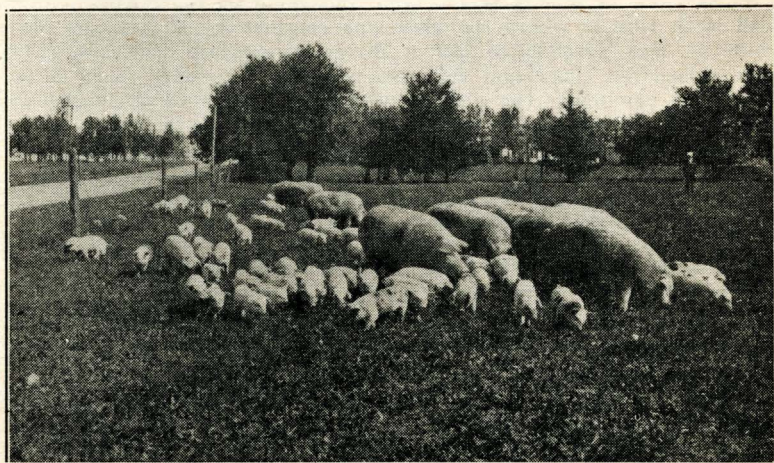


Fig. 17.—Large litters of healthy pigs are necessary for economical pork production.

The United States Department of Agriculture made a detailed study of the cost of producing pork in Illinois and Iowa in 1921 and 1922. A very close correlation was found between the number of pigs weaned per sow and the cost of producing pork. (See Table 19).

It has been definitely demonstrated in practically all of the important hog producing sections of the United States that special attention to sanitation during the first few months of the pig's life does more to insure large litters of healthy pigs than any other one swine practice. A large number of the common swine diseases and parasites, such as round worms, necrotic enteritis, bull nose, sore mouth and hemorrhagic septicemia, are carried over from year to year in hog houses and old yards in which hogs are kept continuously. These parasites and diseases can be controlled by a simple sanitation system which has proven effective on many farms in South Dakota and other Corn Belt states. This system as outlined by the Extension Department at South Dakota State College contains four simple but necessary steps. They are as follows:

1. Cleaning the farrowing pens and scrubbing them with one pound of lye to 20 gallons of boiling water and then spraying them with a solution of one pint of compound cresol solution to four gallons of water. The hot water kills the worm eggs, the lye loosens the dirt, and the disinfectant destroys disease germs.

2. Washing the sows sides and udder with soap and water before putting her in a clean farrowing pen. This removes worm eggs from the sow so that the little pigs cannot get them when they suck.

3. Hauling the sow and pigs to a clean pasture where no hogs have run for at least one year. If the field has not been cultivated since hogs were on it last, it is safer to allow two years to elapse before pasturing again with hogs.

4. Confining the pigs to clean pasture until they are at least four months old.

The value of this system is well illustrated by the results obtained with it in Illinois where the plan was originated. In 1925 on farms where it was possible to get a direct comparison, two more pigs were raised per litter and the pigs weighed 28 pounds more at four months of age under the new or sanitation system as compared with the old or "wormy way system." Under the new system, only one pig in a hundred was runty while under the old system 18 pigs out of a hundred were runts. In 1926, the new system gave one more pig per litter and the pigs weighed 11 pounds more at four months of age. The comparison for 1925 is given in Table 20.

Table 20.—COMPARISON BETWEEN "WORMY WAY" AND SANITATION PIGS*

	"Wormy Way" Pigs	Sanitation Pigs
1. Total number of litters-----	112	229
2. Average number of pigs to a litter at four months-----	5.1	7.1
3. Percentage of runts-----	18.1	1
4. Weight of pigs at 4 months (lbs.)-	68	96

*Illinois Circular 306.

Reports from other states indicate that good results have been obtained wherever the system has been carefully followed.

In addition to keeping the pigs away from filthy yards and houses, the careful selection and care of brood sows and the feeding of well balanced rations to both the sows and the pigs are profitable practices. The following table which summarizes the results of 7 trials in which corn alone was fed without pasture to pigs averaging 148 pounds, in comparison with a balanced ration of corn and tankage illustrates the value of feeding a high protein feed with corn.

Table 21.—CORN ALONE VS. CORN AND TANKAGE FOR FATTENING PIGS.*

	Average Length of Trial (Days)	Daily Gain Pounds	Feed to Produce 100 pounds of gain	
			Pounds Corn	Pounds Tankage
Corn alone -----	69	1.03	617	--
Balanced ration Corn and Tankage---	66	1.59	400	43

*From "Feeds and Feeding" by Henry and Morrison.

When the same rations were fed to younger pigs there was even greater difference in favor of the balanced ration.

Other experiments show that even when good pasture is available the feeding of a high protein feed such as skim milk, tankage or linseed oil meal greatly reduces the amount of grain required to produce a pound of pork.

Vaccination as a means of preventing disease is a practice that the farmer producing a large amount of pork cannot afford to overlook. One epidemic of cholera may offset the profit from pork production for several years.

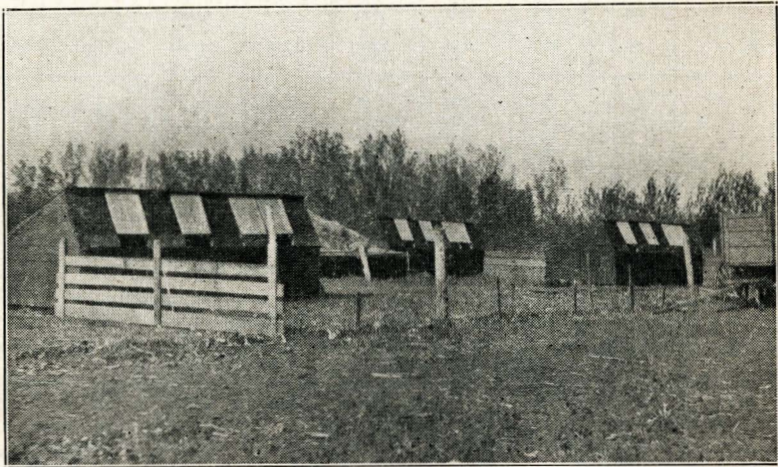


Fig. 18.—Dry, comfortable and well-ventilated quarters are all that is needed for economical pork production. Expensive equipment is not necessary.

The authorities on swine diseases agree that vaccination should be a regular practice and that the best time to vaccinate is just previous to weaning time or when the pigs are from six to eight weeks old. At this age they are easily handled and they can be vaccinated at a much lower cost and with less risk than when they are older and heavier. It is doubtful if the cost of vaccination is any greater if done regularly when the pigs are small than if practiced only at times of cholera outbreaks which come quite often when pigs are large and expensive to vaccinate. In addition it is cheap insurance against the possibility of large losses.

Milk Cows

The amount of feed fed and the production per cow for the five farms having the highest butterfat production and the five having the lowest butterfat production per cow for the three year period is shown in Table 22. The amount of labor required to care for a cow and returns per hour of labor above feed cost is also shown.

Table 22.—VARIATIONS IN PRODUCTION AND FEED CONSUMPTION PER COW.

Farm No.	No. Cows	Production Butterfat Per cow (Lbs.)	Amounts of feed fed				Man Labor Hours	Returns per hour of labor above feed cost (Cts.)
			Grain (Lbs.)	Hay (Lbs.)	Other dry roughage (Lbs.)	Silage		
10-----	9.1	233	2428	4781	1112	-----	128	45.5
3-----	14.6	182	1270	2011	1925	-----	100	43.2
4-----	9.4	165	750	1584	1270	-----	115	42.6
6-----	5.4	155	714	939	1636	4050	134	27.5
11-----	14.8	150	644	1841	272	5180	102	39.3
Averages 5 farms	10.6	177	1161	2231	1243	1846	116	39.3
18-----	14.7	138	397	2815	3065	-----	104	28.4
5-----	18.8	113	687	1403	941	-----	81	32.6
14-----	9.2	109	695	1762	670	-----	91	25.8
19-----	11.2	98	765	2555	806	-----	88	22.2
9-----	7.7	91	910	2427	1228	-----	128	16.6
Averages 5 farms	12.3	110	691	2192	1342	-----	98	25.5

The Importance of High Production per Cow

The relation between production per cow, feed costs, and the value of the product above feed cost is shown in Table 23.

Table 23.—RELATION OF PRODUCTION PER COW TO FEED COST AND VALUE OF PRODUCT ABOVE FEED COST.*

No. of Cows	Milk Production per Cow (Lbs.)	Butterfat Production per Cow (Lbs.)	Value of Production (Dolls.)	Feed Cost (Dolls.)	Value of Product above Feed Cost (Dolls.)
110-----	3058	129	49.82	27.57	22.25
233-----	4017	170	66.56	32.71	33.85
322-----	5014	205	80.75	35.85	44.90
365-----	6005	242	96.16	37.94	58.22
290-----	6954	273	107.98	42.19	65.79
203-----	7985	299	119.88	47.75	72.13
100-----	8937	336	134.16	49.29	84.87

*Cow testing association data supplied by the Dairy Department of South Dakota State College.

These data taken from the records of a large number of herds emphasize the importance of high production per cow. An examination of the data will show that as production per cow increases, the value of the product increases more rapidly than the cost of feed. This is due to the fact that a high producing cow requires very little if any more feed for maintenance than does a low producing cow and consequently uses a much larger proportion of the feed received for the production of milk and butterfat. To illustrate from the data: The second group of cows producing on an average of 170 pounds of butterfat required on an average \$32.71 worth of feed, and the value of the product above feed cost was \$33.85. The last group of cows producing 336 pounds of butterfat or almost twice the production of the others

required \$49.29 worth of feed and the value of the product above feed the product increased \$51.02. In other words, feed costs increased 50 per cent while the value of the product above feed cost increased 150 per cent.

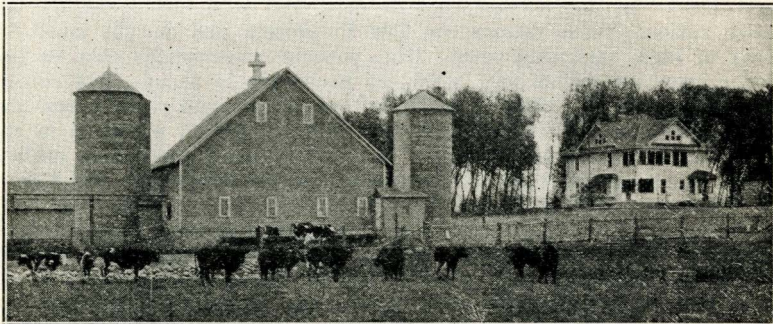


Fig. 19.—High producing cows, carefully fed, are essential to profitable dairying.

Feeding and Weeding

The importance of feeding and of the elimination of low producing cows as factors in securing high production per cow is well illustrated by the following figures taken from the records of three South Dakota cow testing associations.

Table 24.—AVERAGE YEARLY PRODUCTION OF BUTTERFAT PER COW.

Name of Association	1st Year	2nd year	3rd year
Day County -----	185 lbs.	240 lbs.	252 lbs.
East Kingsbury -----	239 lbs.	270 lbs.	332 lbs.
Watertown -----	220 lbs.	249 lbs.	250 lbs.

These figures show that over a period of three years during which time the amount of feed and the production of milk and butterfat was carefully determined, the average production per cow was greatly increased. In the Watertown association, the average production per cow increased from 220 pounds of butterfat to 250 pounds; in the East Kingsbury association, from 239 to 332 pounds; and in the Day county association from 185 to 252 pounds of butterfat per cow. These increases in production were due mainly to the feeding of better balanced rations and to the weeding out of low producing cows. Careful feeding of each cow according to its production will ordinarily give larger immediate returns than any other practice. In the ordinary farm herd, all cows are usually fed alike. This means that some are fed more than their production warrants while others could utilize more feed to advantage. Under this system, the low producing cow produces up to the limit of her ability and uses the balance of her feed to put on fat while

the high producing cow produces as much as her feed allowance permits. The result is a low return for the feed fed. When each cow is fed according to her ability to produce, the maximum return is secured from the feed fed.

On many farms, the cows get enough feed but it is not always the right kind. In many cases, bundle corn and wild hay make up the entire ration. Such rations are low in protein and do not meet the needs of high producing cows. High protein concentrates such as linseed oilmeal or cotton seed meal are necessary to secure best results with such feeds. In eastern South Dakota, alfalfa and sweet clover are easily grown and when fed with the ordinary grains produced in the area give satisfactory rations for cows of ordinary production ability.

The Effect of the Time of Freshening on the Production Per Cow

Data secured from cow testing association records show that cows freshened in the fall produce more milk and butterfat than do cows freshened in any other season of the year. (See Table 25). This is due to the fact that they produce heavily during the winter and are stimulated to further production when they go on to pasture in the spring. Spring fresh cows tend to dry up when taken from pasture. In addition to heavier production, there are other advantages in having cows freshen in the fall. The heaviest production comes during the winter months when there is plenty of time to milk and care for the cows and calves and when prices for dairy products are usually the highest. In contrast with this, cows that freshen in the spring produce most of their product during the busiest part of the crop season and when prices for dairy products are usually the lowest. Other advantages of fall freshening are that the calves are large enough by spring to make good use of pasture; and on farms where butterfat is sold a larger supply of skimmilk is available for the pigs in winter when there is the most need for it.

Table 25.—EFFECT OF TIME OF FRESHENING ON THE PRODUCTION PER COW.

Season	No. of Cows	Milk Produced	Butterfat Produced	Value of Product	Feed Cost	Value of Prod't Above Feed Cost
		Pounds	Pounds	Dollars	Dollars	Dollars
Fall-----	531	6713	268	105.07	42.55	62.55
Winter --	479	6348	249	97.93	40.78	51.15
Spring--	281	5981	236	92.99	37.50	55.49
Summer--	210	6063	236	92.80	41.01	51.76

Importance of Good Sires

The dairyman who is looking to the future will give a large amount of attention to improving the quality of his herd. As a means of breeding up the efficiency of cows or in other words of increasing the amount of butterfat they are able to produce from a given amount of feed, the use of purebred sires from high producing ancestors is of first importance.

A purebred bull should be selected on the basis of the production ability of his offspring; or if it is not possible to secure a proven sire, the selection should be made on the basis of production records of his

ancestors. Consistent high production on the part of the sire's ancestors is a good, although not an absolute, indication of a sire's value. When a sire is selected on this basis, much of the risk of not getting a good sire is eliminated.

A comparison of 58 purebred sires each having five or more tested daughters is given in circular 368 of the United States Department of Agriculture. The data for these comparisons were taken from the records of cow testing associations. This comparison shows that purebred sires vary greatly in their ability to transmit the quality of high production to their offspring. It also shows the importance of the sire in the problem of maintaining a high producing herd.

The daughters of 42 of the 58 sires included in the study produced more butterfat than did their mothers while the daughters of 16 of the sires produced less butterfat than did their mothers. The average of these two groups is shown in Table 26.

The daughters of eight of the sires exceeded the production of their mothers by more than 100 pounds of butterfat and the daughters of 22 of the sires exceeded their mothers' production by at least 50 pounds of butterfat.

On the other hand, the daughters of the 16 poorest sires failed by an average of 44 pounds to produce as much butterfat as their mothers.

Table 26.—INFLUENCE OF PUREBRED SIRES ON THE PRODUCTION OF THEIR DAUGHTERS.

	Sires No. of	Daughters No. of	Butterfat Production			
			Dams	Daughters	Increase or Decrease	
			Pounds	Pounds	Pounds	Per Cent
Sires having daughters with higher production than Dams-----	42	258	340	405	65	19.2
Sires having daughters with lower production than Dams-----	16	96	372	328	—44	—11.6
Average all sires--	58	354	349	384	35	10.2

The Size of the Business

In farming, as in most other undertakings, the size of the business is important in determining the financial returns. The larger the business the larger the net returns during a successful year and usually the larger the losses during an unprofitable year. However, within certain limits the advantage of size applies to farming as well as other industries. Under good management the returns on large farms should be larger over a period of years than on small farms.

On large farms there is a greater opportunity for the efficient use of buildings, machinery, horses, and labor than on small farms.

The buildings and machinery necessary on a 160 acre farm will almost serve the needs of a 320 acre farm. The result is a lower cost

per unit of product for these items. On large farms, fields are usually larger. Large fields make possible low labor and power costs, and a minimum of fencing.

The size, organization and returns of farms 3 and 8 are shown in Table 27.

Farm 3 had a much smaller investment per acre in buildings and machinery than did farm 8. The buildings cost on farm 3 was 48 cents and on farm 8, \$1.13 per acre. The machinery cost per acre was 35 cents on farm 3 and 96 cents on farm 8.

The fields averaged 15 acres larger and from 10 to 30 per cent less man labor was required to plow, disc, and harrow one acre of land on farm 3. In addition to taking care of more livestock, each man cared for 20 acres and each horse 9 acres more of crops on farm 3 than on farm 8.

Table 27.—THE ORGANIZATION AND EARNINGS ON A LARGE AND A SMALL FARM.

Farm No.	Size of Farm	Acres of Crops	Acres Used for				Number of animal units				Rates earned on investment
			Corn	Small Grain	Hay	Pasture	Horses	Cattle	Swine	Poultry	
3	301	232	86	117	22	57	7.8	22	5.1	2	7.86
8	155	129	56	57	15	20	6.1	9.5	2.4	2.1	5.74

This should not be taken to mean that one has only to increase the size of his business in order to increase his income. The advantage of size is entirely dependent upon the ability of the operator. A man with superior managerial ability will make more over a period of years on a large business than on a small one; while the man with only average managerial ability will probably do better on a smaller business.

From the standpoint of economical operation there are also limits to the amount of farming that can be carried on from one farmstead. As the size increases, distance to fields increase and duplication of machines and buildings become necessary.

Managerial Ability of the Farm Operator

The directing force associated with the other factors discussed is the managerial ability of the operator of the farm. Managerial ability depends upon experience, training and special talents. Other things being equal, one will usually do better with the enterprises or systems of farming with which he has had experience. The successful grain farmer will not always succeed equally with beef cattle and hogs. One who has been successful with beef cattle and hogs will not always succeed equally well with dairying. Oftentimes one's mechanical ability will be an important influence in determining whether or not it will pay to buy machinery of a particular type at a given time.

Because of these differences, a minor enterprise on one farm may well become a major enterprise on an adjoining farm. For example, one of the farmers in this study was especially successful in handling

Table 28.—STANDARD LABOR REQUIREMENTS PER ACRE OF CROPS.

Operation	Size of Machine	Man Hours	Horse Hours	Times Over	Operation	Size of Machine	Man Hours	Horse Hours	Times Over
Seed bed preparation:					Potato operations:				
Plowing	28-inch	2.25	11.25	-	Plowing	28-inch	2.25	11.25	-
Disking	8-foot	.50	2	-	Disking	8-ft.	.50	2.00	1
Harrowing	26-foot	.20	1	-	Harrowing	26-ft.	.60	3.00	3
Corn operations:					Planting	2-row	1.25	5.00	-
Plowing	28-inch	2.25	11.25	-	Cultivating	2-row	2.40	9.60	3
Disking	8-foot	1.00	4	2	Spraying		1.00	2.00	1
Harrowing	26-foot	.60	3	3	Cutting seed		4.00	-----	-
Planting	2-row	.60	1.2	-	Treating seed		.50	-----	-
Cultivating	2-row	2.40	9.6	3	Digging		2.00	8.00	-
Husking		6.00	12	-	Picking-hauling		12.00	8.00	-
Fodder Corn operations:					Wild Hay operations:				
Cutting	1-row	1.50	4.50	-	Cutting		1.20	2.40	-
Shocking		2.50	-----	-	Raking		.50	1.00	-
Oats and Barley operations:					Stacking		4.00	4.00	-
Disking	8-foot	1.00	2	2	Sweet Clover operations:				
Harrowing	26-foot	.20	1	1	Cutting		1.20	2.40	-
Seeding	10-foot	.50	2	-	Raking		.50	1.00	-
Cutting	8-foot	.60	2.4	-	Stacking		4.50	5.00	-
Shocking		1.00	-----	-	Alfalfa hay operations:				
Threshing		2.00	4	-	First cutting—				
Flax operations:					Cutting		1.20	2.40	-
Disking		1.00	2	2	Raking		.50	1.00	-
Harrowing	8-foot	.2	1	1	Stacking		3.00	4.00	-
Seeding	26-foot	.5	2	1	Second cutting—				
Cutting	10-foot	.8	3.2	-	Cutting		1.00	2.00	-
Threshing	8-foot	2.00	4	-	Raking		.50	1.00	-
					Stacking		3.00	4.00	-
					Third cutting—				
					Cutting		1.00	2.00	-
					Raking		.50	1.00	-
					Stacking		2.50	3.00	-

bees and in marketing honey. As a result, he made this a major enterprise and no doubt secured larger net returns than he would have by devoting the same attention to the more staple enterprises. Individuals with special talents and qualifications or with specially located farms will often find specialty enterprises profitable. However, one should consider carefully the advantages and disadvantages of these enterprises and exercise care lest his likes and dislikes take him too far from the enterprises best adapted to his area and farm.

Profitable Farming Systems for This Area

The data obtained in this study together with information available from other sources makes it possible to offer some suggestions regarding profitable systems of farming for this area. In making these suggestions, the more profitable farming systems followed on the farms studied are taken as a starting point. Adjustments have been made in these until combinations of crops and livestock are found which on the basis of average yields and usual price relationships and price trends appear most likely to give the best results.

The requirements of man labor and horse work for crop production used in outlining these systems are shown in Table 28. The material requirements for crops are shown in Table 29. The yields used are shown in Table 30. The feed and labor requirements for the different classes of livestock are shown in Table 31.

Table 29.—MATERIAL REQUIREMENTS OF CROPS.

Crop	Seed per Acre	Twine per Acre (Lbs.)	Threshing or Husking cost per bushel
Corn (Bu.)-----	8	4	.06
Oats (Bu.) -----	3	2.7	.03
Barley (Bu.)-----	2	2.7	.04
Wheat (Bu.) -----	1.5	2.5	.06
Potatoes (Bu.)-----	15	---	---
Flax (Bu.) -----	.7	2.0	.12
Sweet Clover (Lbs.)-----	8	---	---
Alfalfa (Lbs.) -----	12	---	---

These yields and man labor, horse work, feed and material requirements represent the yields, and production requirements of the more successful farmers following similar systems of farming. These yields are slightly better than the 10 year average yield for Kingsbury county. In the case of livestock, the approximate amounts of the different feeds required on the farms on which livestock were handled as outlined are used.

These suggested farming systems have been planned with a view to providing profitable employment for the available labor as regularly throughout the year as possible. The usual dates of performing different operations in crop production were used in estimating the labor needed for different cropping plans and in determining the amount of labor that would have to be hired at various times during the year.

These usual dates of performing crop operations are shown in Figure 20. The labor requirements for livestock production are heaviest during the winter months when no field work can be done.

Table 30.—STANDARD YIELDS USED IN PLANNING SYSTEMS OF FARMING.

	Yield per Acre Bushels or Tons
Corn -----	33
Oats -----	35
Barley -----	25
Wheat -----	25
Flax -----	9
Potatoes -----	100
Sweet Clover Seed -----	4
Alfalfa Hay -----	2
Wild Hay -----	1

Table 31.—STANDARD FEED AND LABOR REQUIREMENTS FOR LIVESTOCK.

	Corn Lbs.	Oats Lbs.	Barley Lbs.	Skim Milk Lbs.	Whole Milk Lbs.	Tame Hay Lbs.	Wild Hay Lbs.	Corn Fodder Lbs.	Veterinary & Medicine	Protein Lbs.	Hours of Labor	
											Man	Horse
Horses, per head ----	----	4000	--	----	----	2000	2000	2000	.60	----	80	10
Cows, per hd. (175 lbs. B. F.)	750	450	--	----	----	3000	----	1000	.50	----	100	12
Young Cattle per head ----	200	450	--	1000	100	1000	----	500	.25	----	20	4
Pork, per 100 lbs.---	315	25	85	150	----	----	----	----	.20	20	2.5	.5
Poultry, per 100 chickens	2500	2500	--	1000	----	----	----	----	----	20	200	10
Steers, per 100 lbs. gain--	800	----	--	----	----	450	----	----	----	100	3.5	2

The prices used in estimating the probable returns from the different alternative farming systems are shown in Table 32. These prices represent the price relationships which seem most likely to prevail in this area over a period of years. It is recognized that in any one year the prices of particular crops or livestock products are likely to be higher or lower than those used. However, in planning a long time farming system, farmers must consider probable price relationships over a period of years. In each of the following examples the quantities sold are given and the differences in returns which would result from changes in the usual price relations can be easily estimated.

In outlining these systems of farming, the possible future trends in the production of the various crop and livestock products have been taken into consideration. It is believed that the next ten to fifteen years in East Central South Dakota will be characterized by an increasing importance of legumes, corn and other feed grains which will be

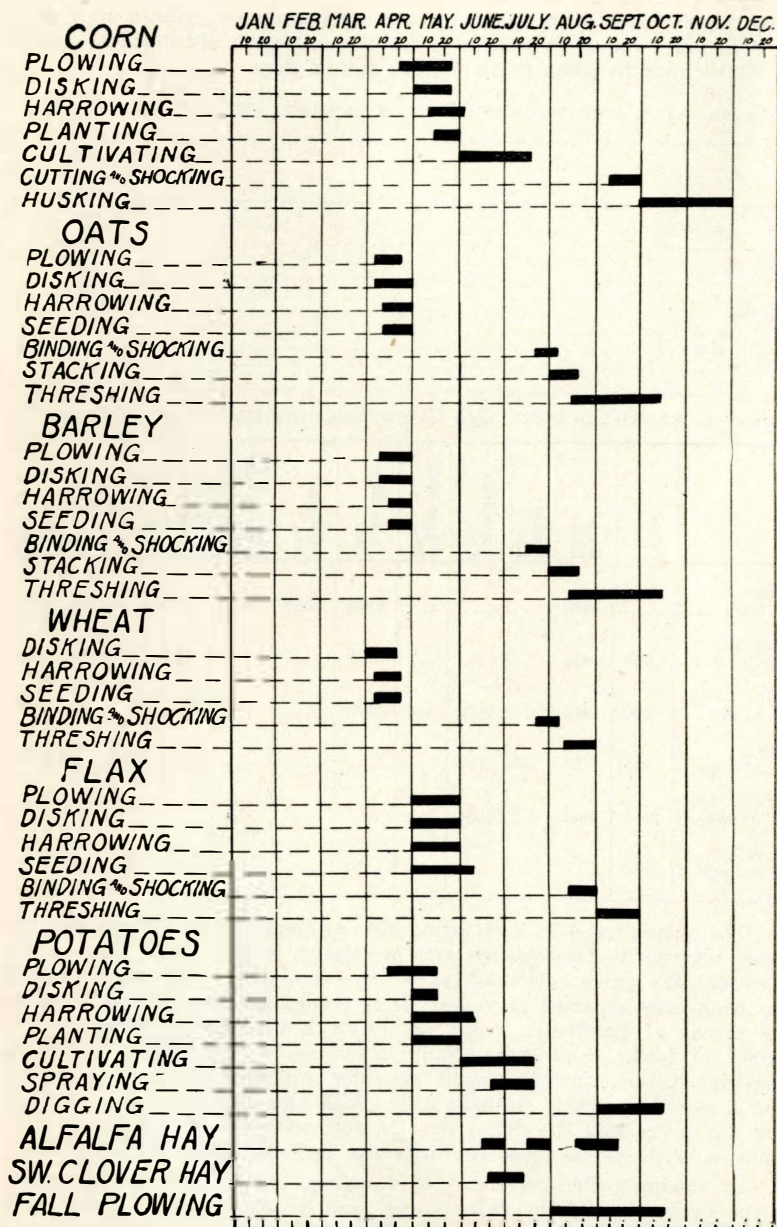


Fig. 20.—THE USUAL PERIOD FOR THE PERFORMANCE OF FIELD OPERATIONS ON CROPS IN KINGSBURY COUNTY.

The different crops use labor and equipment at different times of the year. A well balanced cropping system includes cultivated crops, small grains and legumes.

Table 32.—PRICES OF FARM PRODUCTS

	Relative Prices over a period of years
Hogs -----	\$8.00
Beef cattle -----	8.00
Cows -----	4.00
Butter Fat -----	.40
Eggs -----	.23
Corn -----	.55
Wheat -----	1.10
Oats -----	.32
Barley -----	.50
Potatoes -----	.60
Flax -----	2.00

marketed mostly in the form of pork, beef, and butterfat. This opinion is based on the following facts:

1. The greatest expansion in the production of these products in the United States in recent years has been in this area.
2. The area has natural advantages for the production of feed grains and legumes, but because of long distances to central markets it is at a disadvantage as compared to other surplus areas in marketing these crops. With the increase in transportation costs in recent years, this disadvantage has become more pronounced. The difference in the December 1 price of corn for the period 1909 to 1913 in South Dakota as compared with Illinois was three cents, from 1914 to 1920, seven cents, and from 1921 to 1925, ten cents.
3. A large part of this disadvantage is offset when these crops are fed to livestock and sent to market in a more concentrated form such as pork, beef, butterfat, and other livestock products.

A pound of pork brings to market from four to five pounds of grain, a pound of gain on a fat steer from seven to eight pounds of grain besides considerable roughage of different kinds, and a pound of butterfat produced under ordinary farm conditions markets from 40 to 60 pounds of feed which is principally hay and other roughages.

The freight rate on corn from Brookings to Chicago in 1927 was 27.5 cents per 100 pounds, while the rate on hogs was 47.5 cents per 100 pounds. On the basis of these rates and using average feed requirements for producing 100 pounds of pork, a reduction of 75 cents is made in marketing costs for every 100 pounds of pork marketed in the place of grain.

According to the 1925 United States Census, 33 per cent of all farms in ten representative counties in the area are between 100 and 174 acres in size, 21 per cent are between 175 and 259 acres and 32 per cent between 260 and 499 acres. The first group is made up largely of 160 acre farms, the second group of 240 acre farms, and the third group of 320 acre farms. These groups represent 86 per cent of all farms in the area. These three sizes of farms are used as a basis for the suggested systems of farming.

Table 33.—COMPARISON OF AN ACTUAL SYSTEM WITH TWO SUGGESTED SYSTEMS FOR 160-ACRE FARMS.

	Suggested					
	System No. 1 An Actual Farm in Kingsbury County	System No. 2 Corn and Hogs	System No. 3 Hogs and Dairying			
Crops raised—						
Corn -----	58	56	66			
Potatoes -----	7					
Oats -----	30	28	33			
Barley -----	24	14				
Flax -----		14				
Alfalfa -----		5	15			
Sweet Clover -----		28	33			
Wheat -----	16					
Wild Hay -----	2					
Unimproved land and permanent pasture -----	19	10	8			
Farmstead -----	4	5	5			
Total Crop Production—	Bushels or Tons	Bushels or Tons	Bushels or Tons			
Corn -----	1914	1848	2178			
Potatoes -----	700					
Oats -----	1050	980	1190			
Barley -----	600	350				
Flax -----		126				
Wheat -----	192					
Alfalfa -----		10	30			
Sweet Clover Hay -----		1	15			
Sweet Clover Seed -----		85				
Livestock kept—	Number	Number	Number			
Horses -----	6	6	6			
Cows -----	6	4	20			
Bull -----			1			
Young cattle -----	7	2	10			
Sows -----	8	16	11			
Poultry -----	100	200	100			
Crop Sales	Bushels	Value	Bushels	Value	Bushels	Value
Corn -----	950	522				
Potatoes -----	600	360				
Barley -----	550	275	250	125		
Flax -----			115	230		
Wheat -----	170	187				
Sweet Clover Seed -----			80	300		
Total crop sales ---		1344		655		

Table 33 (Cont.)—COMPARISON OF AN ACTUAL SYSTEM WITH TWO SUGGESTED SYSTEMS FOR 160-ACRE FARMS.

	Suggested					
	System No. 1 An Actual Farm in Kingsbury County		System No. 2 Corn and Hogs		System No. 3 Hogs and Dairying	
Livestock Sales—	Amount	Dollars	Amount	Dollars	Amount	Dollars
Pork-----	10000 lbs	800	23000 lbs	1840	15000 lbs.	1200
Cows-----			1 head	40	4 head	160
Butterfat-----	1000 lbs.	400	700 lbs.	280	5000 lbs.	2000
Young cattle---	4 head	135	3 veal	36	15 head	180
Poultry-----	370 lbs.	55	800 lbs.	120	400 lbs.	60
Eggs-----	400 dozen	92	1000 dozen	230	500 dozen	115
Total Livestock Sales-----		1482		2546		3715
Total Crop and Livestock Sales----		2826		3201		3715
Cash Expense-----	Dollars		Dollars		Dollars	
Labor @ \$50 per month*----	75		100		600	
Twine @ 13 $\frac{1}{4}$ c-----	26		27		12	
Threshing-----	97		90		36	
Livestock expense-----			52		55	
Machinery repairs-----	131		100		100	
Feed purchased-----	113					
Building repairs-----	40		40		50	
Taxes-----	144		165		175	
Total cash expense-----	626		784		1018	
Interest on investment-----	1000		1000		1150	
Depreciation-----	300		300		300	
Total deductions-----	1926		2084		2468	
OPERATOR'S LABOR INCOME -----	900		1117		1247	
Total hours of labor performed on farm-----	3266		3239		6100	
Labor force required-----	One man and a small amount of family labor.		One man and a small amount of family labor.		2 men	

*All labor performed by family other than the operator's labor is valued and included as hired labor.

Good Systems for 160-Acre Farms in East Central South Dakota

The important details of an actual system and two suggested systems for 160 acre farms are shown in Table 33. The same prices and yields used in planning the suggested systems are applied to system No. 1 to make them comparable. The actual livestock production, however, was used in system No. 1.

System No. 1—This system is operated by one man with the assistance of his wife and an extra man for a few days during harvest. It is a system that is rather common on 160 acre farms in the area.

The chief criticisms of the system are:

- (1) No systematic rotation was followed and no provision made for maintaining the fertility of the soil. During the three years that records were secured on this farm a total of 13 acres of legumes were grown. There was also a great variation in the acreage of the different crops grown from year to year. For example, the acreage of corn varied from 34 acres in 1922 to 72 acres in 1923 and 58 acres in 1924. It is difficult to plan a good livestock system on the basis of such a rotation.
- (2) Too large a proportion of the feed grains is sold for a farm of this size located in this area. Had these feed grains been fed to livestock and marketed in the form of livestock products, the size of the business would have been increased with greater possibility of a good return to the operator.

System No. 2—This system is suggested for the man who is on a farm which does not have the buildings and equipment necessary for a well balanced livestock system and who lacks the capital to provide such buildings and equipment. It is also a good system for the man who has only his own labor available; it being essentially a one man system. It is also well adapted to the conditions found on a large number of tenant farms.

A five-year rotation of corn, small grain, corn, small grain, and sweet clover, is suggested. This rotation requires somewhat less labor than the cropping system in system No. 1 and the labor is more evenly distributed. This permits more time to be spent on livestock. Twenty per cent of the land in the regular rotation would be growing legumes which should very nearly maintain the nitrogen and humus content of the soil. In addition to the regular rotation, a small field of alfalfa is suggested to provide hay for the cows.

Flax and sweet clover seed are suggested as cash crops. Flax does well in the area and when seeded early on clean ground makes a profitable cash crop. With rapid increases in the acreage of sweet clover throughout the corn and wheat belts the demand for sweet clover seed should continue to be good although the price may not remain as high as it has been during the past few years. We believe that the man who is not in a position to maintain a large cattle or sheep enterprise should take advantage of this opportunity to utilize the sweet clover so necessary in his rotation.

The livestock suggested are 6 horses, 4 cows, 16 brood sows and 200 hens. This is a good system for the man described above. Pork

production, which is the principal enterprise, requires little capital and labor as compared to other livestock enterprises. Returns from pork are quickly realized and the enterprise can be quickly expanded or reduced without disturbing the rest of the farm business.

It should be remembered, however, that this is a highly specialized system with a large part of the income from one product. Such a system is subject to extreme variation in income during years of high or low hog prices. The farmer who has the equipment and time to care for a few more cows would undoubtedly find it profitable to do so even if the swine enterprise had to be reduced in order to permit it.

The farmer who has boys who can help with the milking and chores will find it profitable to increase the cattle enterprise as they grow older and are able to do more work of this character. In this way he will increase the size of his business by more fully utilizing the sweet clover, corn fields, and other feeds and the available labor of his family. He will also have a more even income from year to year.

Possible Variations for System No. 2

In the potato sections, potatoes may be substituted for a part of the corn acreage. By reducing the amount of pork produced to 20,000 pounds and by feeding barley in place of corn, 10 to 12 acres of potatoes could be grown. If, however, barley is grown in place of flax and all of the barley fed, from 12 to 15 acres of potatoes may be grown without reducing the amount of pork produced. The production of potatoes means the addition of several highly specialized and expensive machines to the equipment on the farm. This point should be remembered in substituting potatoes for a part of another crop.

On farms where labor is available for milking, the number of cows and other cattle should be increased. By so doing, more of the sweet clover would be used for pasture and hay and less for seed. A large increase in the number of cows would necessitate substituting oats for flax in order to provide grain for the cows.

System No. 3—The man who is fairly permanently located on a well equipped farm will find system No. 3 more satisfactory over a period of years than system No. 2. It is a better balanced system and will permit of a more complete utilization of feed, labor, equipment and other farm resources.

Due to the need for a large amount of feed, a four year rotation of corn, corn, small grain, and sweet clover is suggested and the alfalfa acreage is increased from five to fifteen acres.

This rotation contains a greater acreage of corn than is ordinarily recommended for the area. However, the acreage in legumes is also large and since it is planned to feed all crops raised a much larger amount of manure than usual will be returned to the soil. Under these conditions it is believed that the fertility will be as well or better maintained than in system No. 2.

The livestock suggested are: 6 horses, 20 dairy cows, 1 bull, 10 head of young stock, 11 brood sows and 100 hens. This amount of livestock will completely utilize the crops produced, and crops and livestock together will provide full employment for two men or its equivalent in family labor for the entire year.

As the income in this system would be entirely from the sale of livestock products, its success will depend upon the ability of the farmer to manage and care for livestock. Only high producing cows should be kept and these fed carefully to insure a good return. An average of 250 pounds of butterfat per cow was assumed in planning the system. This might profitably be increased to 300 pounds.

In planning a livestock system to consume all crops raised, it was assumed that the surplus from years of high yields would be carried over to meet the needs of the system during years of low crop yields. Any variation in the livestock system due to a variation in the supply of feed would best be made in the swine enterprise. In years when the feed supply was short, the hogs could be sold at lighter than average weights and when feed was abundant fed out to heavier than average weights.

This system is especially desirable for the farmer who has a boy or two of school age who can help with the milking and chores while in school and with the field work on Saturdays and in the summer. In case a milking machine is used, an extra man may not be needed during the winter months especially if a small amount of family labor is available.

Variations for System No. 3

The amount of pork produced may be decreased and potatoes substituted for a part of the corn acreage. For every 10 acres of potatoes substituted for corn, the pork production would be reduced by approximately 4,000 pounds. The size of the dairy enterprise may be varied depending upon the amount of available labor. If the number of cows is decreased, the number of other cattle should be increased to utilize the additional feed and pasture. If the number of cows is increased, the number of other cattle and possibly the hogs would need to be reduced.

Good Systems for 240 Acre Farms in East Central South Dakota

Table 34 gives the important details of an actual system and two suggested systems for 240 acre farms.

The actual system or system No. 1 is a much better system than is found on most 240-acre farms in the area. In fact it is the best balanced system found on any of the farms included in the study. For that reason, system No. 2 or the first suggested system is planned very much like system No. 1. There are a few places, however, at which changes are desirable and these have been suggested in system No. 2.

The cropping system is not as well balanced as it should be. This is due principally to the use of permanent pastures instead of rotated pastures. In system No. 2, a rotated pasture of sweet clover is suggested and only the land that could not be cultivated is left in permanent pasture. A part of the permanent pasture should be used for hay for the horses.

While potatoes are adapted to the section in which this farm is located, they are only adapted to limited portions of the area as a whole. For this reason, potatoes are replaced by corn in system No. 2, and flax is included as a part of the small grain acreage to take the place of potatoes as a cash crop.

The alfalfa acreage is increased from five to fifteen acres in order to provide plenty of good legume hay for the cows.

This gives a standard five year rotation of corn, small grain, corn, small grain, and sweet clover with an additional field in alfalfa.

The chief weakness in the livestock plan in system No. 1 is the low production of butterfat per cow. This was due principally to the way in which the cows were fed. They received very little grain and the roughage was chiefly corn stover and wild hay. In addition they were pastured on native pasture. In system No. 2, the number of young cattle is reduced and the grain thus saved is fed to the cows. It is believed that a little additional grain fed with alfalfa hay and sweet clover pasture will easily increase the production of these same cows to the amount indicated in system No. 2. Two men can handle either system No. 1 or No. 2 equally well.

Possible Variation for System No. 2

In the potato sections, a part of the corn acreage may be replaced by potatoes. By feeding barley in place of corn at least ten acres of potatoes can be grown without any other change in the system; and if barley is grown in place of flax and all of the barley fed, as much as twenty acres of potatoes can be grown in the place of corn.

Another variation would be to replace flax with barley and to use the additional feed to increase the swine enterprise. An additional 10,000 pounds of pork could be produced without any other change in the system. If about one-third of the pigs are farrowed in the fall, the work could be handled by the same labor force.

A third variation would be to reduce the number of young cattle and to increase the number of cows. This change should depend upon the quality of cows and the amount of labor available to milk and care for them.

System No. 3

The only difference between the crop rotations in system No. 2 and No. 3 is that flax is replaced by barley in the No. 3 system and a larger part of the sweet clover is used for hay. This change was made to provide feed for the greater number of livestock called for in system No. 3.

The number of cows and young cattle have each been reduced to 12 head while a steer feeding enterprise has been added and the amount of pork produced increased to 25,000 pounds.

The poorest calves are to be vealed and only the best ones kept to replace cows in the herd and for feeding out of market. In this system, two cows are to be replaced each year and four steers and heifers are to be fed out with 24 head of purchased steers. It was assumed that these steers would weigh 700 pounds when purchased and would be fed to a weight of 1,000 pounds.

It is not intended to suggest the size and finish of steers to be fed. The above figures are used merely as a basis for calculating feed requirements and the probable returns from the system.

The plan of winter feeding of cattle which will utilize the available feed and labor to best advantage should be followed.

Table 34.—COMPARISON OF AN ACTUAL SYSTEM WITH TWO SUGGESTED SYSTEMS FOR 240-ACRE FARMS.

	Suggested					
	System No. 1 An Actual Farm in Kingsbury County		System No. 2 Cattle and Hogs		System No. 3 Beef Feeding and Hogs	
	Acres		Acres		Acres	
Corn -----	67		80		80	
Potatoes -----	16		—		—	
Oats -----	48		40		40	
Barley -----	23		20		40	
Flax -----	—		20		—	
Timothy -----	8		—		—	
Alfalfa -----	5		15		15	
Sweet Clover -----	—		40		40	
Permanent pasture -----	40		—		—	
Unimproved land -----	12		20		20	
Farmstead -----	8		5		5	
Total crop production—	Bushels or Tons		Bushels or Tons		Bushels or Tons	
Corn -----	2211		2640		2640	
Oats -----	1680		1400		1400	
Barley -----	575		500		1000	
Flax -----	—		180		—	
Alfalfa Hay -----	10		30		30	
Sweet Clover -----	—		10		18	
Wild Hay -----	—		10		10	
Livestock kept—	Number		Number		Number	
Horses -----	8		8		8	
Cows -----	16		16		12	
Bull -----	1		1		1	
Young cattle -----	25		20		12	
Steers -----	—		—		24	
Sows -----	18		16		18	
Poultry -----	100		200		200	
Crop Sales—	Bushels	Value	Bushels	Value	Bushels	Value
Potatoes -----	1360	816	—	—	—	—
Oats -----	172	55	—	—	—	—
Barley -----	500	250	460	230	—	—
Flax -----	—	—	160	320	—	—
Total crop sales -----	—	1121	—	550	—	—
Livestock Sales—	Amount	Dollars	Amount	Dollars	Amount	Dollars
Pork -----	25580 lbs.	1966	23000 lbs.	1840	25000 lbs.	2000
Cows -----	—	—	2 head	80	2 head	80
Butterfat -----	1879 lbs.	752	2800 lbs.	1120	2100 lbs.	840
Young cattle -----	12 head	370	5 veals	60	5 veal	60
Steers -----	—	—	8 head	576	28 head	2240
Poultry -----	275 lbs.	41	800 lbs.	120	800 lbs.	120
Eggs -----	536 doz.	123	1000 doz.	280	1000 doz.	250
Total Livestock Sales-----	—	3252	—	4026	—	5570
Total Crop and Livestock Sales..	—	4373	—	4576	—	5570

Table 34. (Cont.)—COMPARISON OF AN ACTUAL SYSTEM WITH TWO SUGGESTED SYSTEMS FOR 240-ACRE FARMS.

	Suggested		
	System No. 1 An Actual Farm in Kingsbury County	System No. 2 Cattle and Hogs	System No. 3 Beef Feeding and Hogs
Cash expense—	Dollars	Dollars	Dollars
Labor* -----	378	600	600
Twine -----	33	40	40
Threshing -----	115	80	80
Potato Expense -----	211		
Livestock expenses -----	131	64	64
Machine Repair -----	309	125	125
Building repair -----	50	50	50
Clover seed -----	---	32	32
Steers -----			1008
Taxes -----	248	250	250
Total cash expenses -----	1475	1241	2249
Interest on Investment -----	1450	1450	1450
Depreciation -----	350	350	350
Total deductions -----	3275	3041	4049
Operator's Labor Income ---	1098	1535	1521
Total hours of labor performed on farm -----	5971	5890	5900
Labor force required -----	2 men, 12 months	2 men, 12 months	2 men, 12 months

*All labor performed by family other than the operator's labor is valued and included as hired labor.

System No. 3 has a more even distribution of labor than No. 2 because a larger part of the livestock work is done during the winter months. For that reason, two men can handle it more easily than system No. 2. However, more skill in buying and selling cattle is required and a greater amount of risk is assumed in system No. 3. In other words, system No. 2 is a better system for the man who does not want to feed cattle or who cannot afford to take the greater risk.

On some farms where equipment and experience are available, it may be desirable to substitute sheep raising or lamb feeding for a part of the cattle and steer feeding enterprises.

Good System for 320-Acre Farms in East Central South Dakota

The system followed on a half section farm and two suggested systems are shown in Table 35. System No. 1 is rather typical of systems found on a large number of 320-acre farms in the area.

The same weaknesses exist in this system that were pointed out in the No. 1 system for 240 acre farms; that is, the rotation is badly unbalanced due to the large amount of permanent pasture and the absence of legumes in the regular rotation. There was also a great variation in the acreage of the different crops grown each year. For example, the corn acreage varied from 119 acres in 1922 to 69 acres in 1923 to 78 acres in 1924.

A standard five year rotation of corn, small grain, corn, small grain, and sweet clover is suggested for both system No. 2 and No. 3. An additional field is suggested for alfalfa and 24 acres was allowed for unimproved land. It is suggested that at least a part of the hay fed to the work horses be cut from this land. A part of the sweet clover is cut for hay and the rest is used for pasture. During years when feed is plentiful some seed may also be harvested.

The livestock plan in system No. 1 is well balanced but the numbers of the different kinds of livestock kept are too small to utilize the large amount of feed crops produced.

The livestock plan in system No. 2 calls for 10 horses, 6 colts, 12 cows, 1 bull and 12 young cattle, 40 steers purchased for fattening, 20 brood sows and 200 hens.

This area is normally in the surplus horse producing section of the country. Because of the large amount of cheap roughage available, horses can be produced to a good advantage in this area. It is on farms of this size or larger where plenty of help is available for handling colts that they can be produced to best advantage. In system No. 2, two colts would be foaled each year and the two oldest horses sold at the age of eight years. In this way, the depreciation on horses would be shifted to other areas of the country where farmers do not produce their own horses. A good type of draft horse should be produced if this plan is to be most profitable.

The rest of the livestock system is the same as the cattle and hog feeding system for 240 acre farms. The only difference being the addition of more beef cattle and hogs to consume the surplus feed grains produced.

This system would require two men during the entire year and an extra man for about four months during the busy part of the cropping season.

Possible Variations

In sections where potatoes do well they may be substituted for a part of the corn acreage. If this is done, and the flax replaced by barley, and all of the barley fed in the place of corn, from 20 to 25 acres of potatoes could be produced without reducing the number of livestock.

On farms especially equipped and planned to handle large numbers of hogs, barley could be grown in place of flax and the surplus barley used to increase the production of pork. By so doing the amount of pork produced could be increased by 10,000 pounds.

SYSTEM NO. 3 is suggested for a man who does not want to feed steers. In this system, a few more cows and young cattle are added to consume the roughage and a part of the grain required by the steers in system No. 2, and the swine enterprise is increased from 30,000 pounds to 45,000 pounds of pork to utilize the rest of the grain. On farms well equipped to handle small pigs during the winter, the extra pork should be produced from a fall litter in order to keep down the amount of labor required for farrowing during the spring months.

Variation for System No. 3

Where conditions are favorable to dairying, a dairy enterprise based on high producing cows could be substituted for the cattle enterprise in this system.

In the potato sections potatoes could be substituted for part of the corn acreage and the pork enterprise reduced accordingly. For each 25 acres of corn replaced by potatoes, the pork production would be decreased approximately 10,000 pounds.

In all of the suggested systems unless otherwise stated it is planned that the bulk of the pork production would come from spring litters. We believe that such a practice is best under the conditions prevailing on the majority of farms in the area. However, farmers that are well equipped to handle fall pigs can distribute their labor more evenly throughout the year and may find it profitable to farrow a part of the pigs in the fall.

It is also planned that the majority of the cows will be freshened in the fall or early winter in order to secure the advantages of fall freshening, namely; a better distribution of labor, higher prices for the product, and a greater annual production per cow.

It should be remembered that the success of any farm business, no matter how well organized it may be, depends to a very great extent upon the practices followed in producing and marketing the various products.

For example; two farmers may have the same number and quality of cows but because of better feeding practice one may have a more profitable dairy enterprise and a more profitable farming business than the other.

In the same way the practices followed in raising hogs give greatly different results. The farmer who provides clean houses and lots for his pigs, feeds well balanced rations, and prevents losses from disease by use of vaccination and other means, will over a period of years make a much larger profit on the feed and labor devoted to hogs than will the farmer who does not follow these practices.

The quality of seed corn, the timeliness of seeding, cultivating, and other field operations, and the skill of the farmer in buying and selling all play their part in determining the profit from a farming system.

It is realized that every farm has problems which are peculiar to itself and which make it necessary to operate it a little differently than other farms. For that reason, the foregoing suggested systems are presented merely as suggestions and are designed primarily to show the direction in which the best information available seems to indicate the development of farming in this area should take.

Table 35.—COMPARISON OF AN ACTUAL SYSTEM WITH TWO SUGGESTED SYSTEMS FOR 320-ACRE FARMS.

	Suggested					
	System No. 1 An actual farm in Kingsbury County		System No. 2 Beef feeding and Hogs		System No. 3 Cattle and Hogs	
	Acres		Acres		Acres	
Corn	69		108		108	
Potatoes	12		—		—	
Oats	79		54		54	
Barley	37		27		27	
Flax	22		27		27	
Alfalfa	22		20		20	
Sweet Clover	—		54		54	
Timothy	14		—		—	
Permanent pasture	59		—		—	
Unimproved land	2		24		24	
Farmstead	4		6		6	
Total crop production	Bushels or Tons		Bushels or Tons		Bushels or Tons	
Corn	2277		3564		3564	
Potatoes	1200		—		—	
Oats	2765		1890		1890	
Barley	925		675		675	
Flax	198		243		243	
Alfalfa	44		40		40	
Timothy	14		—		—	
Sweet clover	—		18		18	
Wild hay	—		14		14	
Livestock kept—	Number		Number		Number	
Horses	9		10		10	
Colts	3		6		6	
Cows	10		12		16	
Bull	1		1		1	
Young cattle	10		12		20	
Steers	—		40		—	
Sows	15		20		22	
Poultry	170		200		200	
Crop Sales—	Bushels	Value	Bushels	Value	Bushels	Value
Corn	200	110	—	—	—	—
Potatoes	1020	612	—	—	—	—
Oats	1665	532	—	—	—	—
Barley	800	400	250	125	150	75
Flax	180	360	223	446	223	446
Total crop sales	—	2014	—	571	—	521
Livestock sales—	Amount	Dollars	Amount	Dollars	Amount	Dollars
Pork	19000 lbs.	1520	30000 lbs.	2400	45000 lbs.	3600
Cows	3 head	120	2 head	80	2 head	80
Butterfat	1748 lbs.	699	2100 lbs.	840	2800 lbs.	1120
Young cattle	10 head	240	5 veals	60	5 veals	60
Steers	—	—	44 head	3488	8 head	576
Poultry	520 lbs.	78	800 lbs.	120	800 lbs.	120
Eggs	230 doz.	53	1000 doz.	230	1000 doz.	230
Horses	2 head	200	2 head	200	2 head	200
Total livestock sales	—	2910	—	7418	—	5986
Total crop and livestock sales	—	4924	—	7989	—	6507

Table 35 (Cont.)--COMPARISON OF AN ACTUAL SYSTEM WITH TWO SUGGESTED SYSTEMS FOR 320-ACRE FARMS.

	Suggested		
	System No. 1 An actual farm in Kingsbury County	System No. 2 Beef feeding and Hogs	System No. 3 Cattle and Hogs
Cash Expense -----	Dollars	Dollars	Dollars
Labor* -----	425	800	1200
Twine -----	47	45	45
Threshing -----	230	129	129
Livestock expense -----	123	86	110
Supplementary feed -----		245	210
Machinery repair -----	400	150	150
Building repairs -----	60	60	60
Seed -----		42	42
Breeding fees -----	25	50	50
Steers -----		1920	
Taxes -----	261	325	325
Total cash expense -----	1571	3852	2121
Interest on investment -----	1700	1800	1800
Depreciation -----	400	400	400
Total deductions -----	3671	6052	4521
Operator's Labor Income	1253	1937	1986
Total hours of labor performed on farm -----	6236	6637	9038
Labor force required ---	2 men 12 months	2 men for 12 months 1 man for 4 months	3 men 12 months

*All labor performed by family other than the operator's labor is valued and included as hired labor.

It is also recognized that farmers frequently find it necessary to make temporary adjustments in their farming plans, due to crop failures, insect pests, livestock diseases or other things of a similar nature. By keeping themselves informed as to the market outlook for particular commodities, they will be able to take advantage of such price fluctuations as can be anticipated with a reasonable degree of accuracy. Some farmers will also find it profitable to make temporary adjustments from time to time in their usual farming system, either to take advantage of a period of particularly high prices for some commodity or to avoid a year or a number of years of relatively low prices for some product. On the other hand, permanent changes in the long time farming system followed in this area should not be made until the need for such changes are indicated by changes in price relationships or costs such as result from changes in the demand for the different products, changes in the source of supply, the development of new methods of production or other factors of a rather permanent character.

APPENDIX

The following tables give the labor and material requirements for crop and livestock production on each of the farms for 1923 and also the average from all farms for each year of the three year period. The amount of labor required to perform each crop operation and the number of times each operation was performed is also shown.

These data show that there is a wide variation in the time required to perform the same operation on different farms. These variations are due to a variety of factors among which the following are important:

1. Variations in the size of machines and teams.
2. Variations in the size and quality of horses.
3. Variations in the size and shape of fields.
4. Variations in the type and condition of soils.
5. Varying weather conditions.
6. Timeliness of performing the operations.
7. Machinery trouble.
8. Down grain.
9. Differences in the standards of performance set by different farmers. With the same sized teams and machines one farmer may expect to cover 20 acres per day whereas another may figure that 15 acres is a good day's work.

Of these causes, perhaps the most important in explaining the variations between farms are the variations in the size of machines and teams, and the standards of performance set by different farmers.

Similar variations are found between farms in the amount of feed and labor required to produce livestock and livestock products. These variations are due principally to the methods of handling livestock on the different farms. Low feed and labor requirements for the production of livestock and livestock products are usually due to one or more of the following reasons:

1. High grade healthy livestock.
2. Feeding of balanced rations.
3. Small death losses.
4. Convenient arrangement of buildings and lots for handling stock.
5. Size of livestock enterprises.

It will be noted that most of the causes for variations in the case of both crops and livestock are largely within the control of the farmer.

PROFITABLE FARMING SYSTEMS

55

Tabel 36.—DISTRIBUTION OF TOTAL MAN LABOR, BY FARMS, 1923.

Farm No.	Crop Acres Per Farm	Animal Units Per Farm	Real Estate Hours	Machinery and Auto—Hours	General Ex- pense—Hours	Total Main- tenance—Hours	Livestock Hours	Crops Hours	Manure Haul- ing—Hours	Preparing, Treating and Marketing Seed and Feed—Hours	Total Labor on Farm—Hours	Percentage Main- tenance Labor of Total Labor
1	327	49.25	111	6	—	117	4096	3140	251	350	7954	1.47
2	335	50.69	265	276	107	645	3790	3805	127	371	8741	7.42
3	206	35.89	21	25	185	231	3307	1600	41	335	5514	4.18
4	254	36.93	75	92	45	212	3210	2316	189	212	6139	3.45
5	196	49.91	99	161	53	313	3590	1951	137	510	6501	4.82
6	180	19.31	43	31	2	76	1699	1495	88	136	3494	2.18
7	320	82.41	245	124	75	444	4140	3121	415	748	8868	5.00
8	131	19.95	142	41	18	201	1616	1456	56	227	3556	5.65
9	119	27.01	146	71	27	244	2488	1971	155	295	5153	4.82
10	90	28.65	139	86	55	280	2538	1141	70	279	4308	6.52
11	166	46.53	173	112	92	377	3785	2264	181	292	6899	5.47
12	285	43.47	93	187	69	349	2566	2245	174	305	5639	6.20
13	229	21.99	60	148	40	248	1962	2743	149	571	5673	4.37
14	164	43.53	166	93	39	298	2597	1280	418	395	5418	5.50
15	543	66.95	647	625	28	1301	3599	3701	286	1888	10775	12.07
16	329	31.87	197	119	42	358	2870	4543	160	542	8473	4.23
17	342	90.52	319	175	101	595	3814	3286	370	401	8466	7.02
18	274	59.53	204	125	22	351	5170	3430	309	471	9731	3.61
19	107	36.97	314	90	9	413	2465	1420	239	278	4815	8.60
20	123	22.54	381	208	70	659	2149	1339	200	119	4466	14.68
Average:												
1923	236	43.30	192	140	54	386	3073	2412	201	436	6508	5.94
1922	226	42.81	307	130	40	477	2916	2933	151	447	6924	6.89
1924	221	40.54	243	162	75	480	3010	2221	195	325	6231	7.70

Tabel 37.—DISTRIBUTION OF TOTAL HORSE WORK, BY FARMS, 1923.

Farm No.	Crop Acres Per Farm	Animal Units Per Farm	Real Estate Hours	Machinery Hours	General Ex- pense—Hours	Total Main- tenance—Hours	Livestock Hours	Crops Hours	Manure Hauling Hours	Preparing, Treating and Marketing Seed & Feed (Hrs.)	Total Labor on Farm—Hours	Percentage Main- tenance Labor of Total Labor
1	327	49.25	18	—	—	18	414	6872	460	296	8060	0.22
2	335	50.69	94	27	85	206	274	7423	178	243	8324	2.47
3	206	35.89	24	—	204	228	877	4319	62	494	5980	3.81
4	254	36.93	56	51	63	170	548	6453	400	273	7844	2.17
5	196	49.91	86	—	30	116	90	4655	373	836	6070	1.91
6	180	19.31	24	—	—	24	69	4449	195	238	4975	0.50
7	320	82.41	109	76	50	235	622	8335	885	1232	11309	2.08
8	131	19.95	28	12	30	70	94	3721	112	406	4403	1.59
9	119	27.01	30	6	4	40	75	4443	287	355	5200	0.77
10	90	28.65	27	17	6	50	100	2016	168	184	2518	0.50
11	166	46.53	22	22	20	64	104	5302	434	127	6031	1.06
12	285	43.47	10	19	60	89	139	6837	444	272	7781	1.14
13	229	21.99	22	55	34	111	186	6962	192	586	8037	1.38
14	164	43.53	28	6	22	56	120	2995	896	468	4535	1.22
15	543	66.95	132	45	28	205	283	10155	514	1496	12653	1.62
16	329	31.87	35	11	37	83	421	8308	350	378	9540	0.87
17	342	90.52	26	40	26	92	685	9561	468	282	11088	0.83
18	274	59.53	52	25	15	92	530	8191	778	304	9895	0.93
19	107	36.97	129	27	18	174	272	2784	352	220	3802	4.58
20	123	22.54	241	6	92	339	36	2935	294	94	3698	9.17
Average:												
1923	236	43.30	60	22	41	123	297	5836	392	439	7087	1.74
1922	226	42.81	121	29	24	174	266	6731	319	538	8028	2.17
1924	221	40.54	73	15	39	127	228	5665	377	289	6686	1.90

Table 38.—MAN LABOR AND HORSE WORK REQUIREMENTS PER ACRE, BY OPERATIONS, FOR SEED BED PREPARATION, 1923.

Farm No.	Plowing			Farm No.	Discing			Farm No.	Harrowing		
	Hours per Acre Man	Hours per Acre Horse	Width of Plow Inches		Hours per Acre Man	Hours per Acre Horse	Width of Disc feet		Hours per Acre Man	Hours per Acre Horse	Width of Harrow—Feet
12	1.93	10.93	28	3	.41	1.60	10	9	.18	.95	26
2	2.01	12.07	28	8	.42	2.37	10	11	.19	.70	20
7	2.25	11.15	28	9	.44	2.24	10	3	.21	1.03	20
20	2.32	10.55	28	7	.47	2.45	8&10	15	.21	1.18	26
17	2.39	11.87	28	15	.48	2.54	8	20	.22	1.08	26
1	2.43	11.47	28	12	.51	2.05	8	18	.23	.88	22
9	2.47	10.95	28	16	.53	2.11	8	16	.24	.96	26
3	2.49	10.76	28	13	.53	2.03	8	10	.24	.96	20
16	2.50	11.39	28	1	.54	2.18	8	2	.25	.96	26
5	2.50	12.51	28	18	.55	2.20	8	17	.25	.96	26
13	2.53	12.12	24	20	.55	3.17	9	8	.26	1.21	20&26
4	2.66	11.93	28	5	.56	2.25	9	12	.27	1.18	26
6	2.69	16.03	28	11	.56	2.25	8	19	.27	.95	20
18	2.71	13.76	28	2	.57	2.27	8	7	.29	1.43	26
8	2.72	12.53	28	6	.58	2.32	8	5	.31	1.45	26
15	2.80	10.44*	28	4	.60	2.40	8	6	.34	1.52	26
14	2.85	13.83	28	10	.61	2.44	8	1	.34	1.66	20&26
11	2.90	13.92	28	19	.61	2.45	7	14	.36	1.36	26
19	3.03	9.34	16	14	.63	2.53	8	13	.40	1.98	26
10	4.46	13.37	16	17	.70	2.80	7	4	.47	1.88	16&20
Ave. 20 farms 1923	2.48	12.00	--	--	.53	2.32	--	--	.27	1.17	--
Ave. 20 farms 1922	2.72	10.64	--	--	.57	2.42	--	--	.25	1.11	--
Ave. 20 farms 1924	2.36	10.98	--	--	.52	2.30	--	--	.23	1.04	--

*5 hours tractor labor in addition.

Table 39.—LABOR REQUIREMENTS PER ACRE OF FODDER CORN, 1923.

			Man Labor					Horse Work			
Farm No.	Acres per Farm	Yield per Acre Tons	Total Before Harvest Hours	Cutting Hours	Shocking Hours	Total Harvesting Operations Hours	Total Hours	Total Before Harvest-Hours	Cutting Hours	Total Hours	Cost per Ton—Dollars
3	21.9	2.37	7.85	1.02	1.37	2.39	10.24	26.73	3.08	29.81	8.60
17	33.3	2.64	6.93	1.54	2.22	3.76	10.69	30.30	4.42	34.72	9.67
18	3.8	1.80	8.50	1.84	1.05	2.89	11.39	35.91	5.53	41.44	9.06
5	17.3	2.43	8.50	1.10	1.80	2.90	11.40	29.78	3.30	33.08	7.96
7	21.0	2.38	7.42	1.90	2.10	4.00	11.42	28.73	5.70	34.43	10.12
15	18.7	1.70	7.50	1.45	2.52	3.97	11.47	27.28	4.55	31.83	9.50
1	11.4	1.80	8.75	1.93	1.49	3.42	12.17	32.75	5.79	38.54	10.80
16	10.0	2.45	8.76	1.20	3.80	5.00	13.76	29.18	3.60	32.78	9.99

PROFITABLE FARMING SYSTEMS

57

Table 39 (Cont.)—LABOR REQUIREMENTS PER ACRE OF FODDER CORN, 1923.

Farm No.	Acres per Farm	Yield per Acre Tons	Man Labor					Horse Work			Cost per Ton—Dollars
			Total Before Harvest Hours	Cutting Hours	Shocking Hours	Total Harvesting Operations Hours	Total Hours	Total Before Harvest-Hours	Hours Cutting	Total Hours	
4	7.3	2.33	7.24	1.58	5.54	7.12	14.36	27.42	4.73	32.15	10.84
10	8.5	2.60	10.22	1.60	2.80	4.40	14.62	27.25	4.30	31.55	9.56
14	5.0	3.00	10.13	1.40	3.60	5.00	15.13	25.67	4.20	29.87	7.84
13	7.0	2.10	9.53	2.10	5.14	7.24	16.77	33.89	6.43	40.32	8.78
9	3.2	2.19	11.00	1.56	4.69	6.25	17.25	31.04	4.69	35.73	7.73
19	8.4	2.86	9.58	2.32	6.42	8.74	18.32	30.33	6.96	37.29	9.13
Ave. 14 farms 1923	12.6	2.26	8.03	1.65	2.64	4.29	12.32	29.35	5.07	34.42	9.42
Ave. 16 farms 1922	13.1	1.50	8.86	1.86	2.61	4.47	13.33	28.65	5.50	34.15	11.72
Ave. 15 farms 1924	11.9	1.80	7.92	1.56	1.80	3.36	11.28	28.60	4.88	33.48	10.39

Table 40.—MAN LABOR REQUIREMENTS PER ACRE OF CORN HUSKED FROM THE STANDING STALKS, OPERATIONS PRIOR TO HARVEST, 1923.

Farm No.	Acres per Farm	Yield per Acre	Plowing		Discing		Harrowing		Planting	Cultivating		Total Hours
			Hours	Times Over	Hours	Times Over	Hours	Times Over		Hours	Times Over	
6	53.8	30.6	2.10	1.00	.49	.75	.55	3.63	.70	2.16	3.33	6.00
12	63.7	37.8	2.18	1.12	.20	.47	.67	3.10	.64	2.67	2.88	6.36
2	64.8	49.7	1.93	1.00	.44	.94	.40	2.00	.53	3.35	3.43	6.65
17	46.4	41.4	2.39	1.00	1.07	2.00	.52	2.00	.59	2.36	3.00	6.93
4	53.2	49.0	2.88	1.06	1.00	2.00	.55	2.00	.69	2.12	3.00	7.24
8	58.7	47.7	2.73	1.00	.05	.14	.43	1.13	.90	3.25	4.00	7.36
7	74.0	42.6	2.12	1.02	.34	.55	.79	2.20	.67	3.50	3.21	7.42
15	94.9	45.7	2.84	1.00	.48	1.03	.64	2.26	.64	2.89	3.00	7.50
11	40.6	44.5	2.86	1.00	1.35	2.20	.47	1.41	.90	2.19	3.00	7.77
3	51.7	36.2	2.50	1.00	.74	1.57	.52	3.00	.70	3.39	4.00	7.85
18	51.6	41.1	2.71	1.00	.64	1.29	.98	3.40	.92	3.25	3.80	8.50
5	59.0	50.9	2.50	1.00	1.06	2.00	.71	3.00	.70	3.53	3.90	8.50
20	19.8	46.6	2.47	1.00	1.18	2.20	.54	3.00	.84	3.57	4.00	8.60
1	74.1	56.3	2.52	1.00	.95	1.94	.64	3.71	.73	3.91	4.09	8.75
16	63.0	35.5	2.47	1.00	.50	1.00	.95	2.37	.50	4.34	3.00	8.76
13	64.8	28.5	2.60	1.00	1.26	2.00	.73	2.00	.65	4.29	3.00	9.53
19	28.0	50.0	3.01	1.00	.57	1.35	.73	2.00	.68	4.59	3.00	9.58
14	29.3	51.2	2.53	1.00	.43	1.00	.69	4.00	.71	5.77	2.96	10.13
10	15.0	43.6	4.50	1.00	.60	1.00	.87	4.00	.80	3.45	3.00	10.22
9	42.5	45.9	2.18	1.00	.77	1.14	.56	3.00	.97	6.52	3.63	11.00
Ave. 20 farms (1923)	52.4	43.5	2.53	1.00	.67	1.28	.65	2.52	.70	3.48	3.37	8.03
Ave. 20 farms (1922)	45.9	27.4	2.82	1.04	.78	1.37	.79	3.18	.73	3.74	3.26	8.86
Ave. 20 farms (1924)	52.8	29.4	2.27	1.00	.62	1.28	.66	3.02	.64	3.73	3.82	7.92

Table 41.—HORSE WORK REQUIREMENTS PER ACRE OF CORN HUSKED FROM THE STANDING STALKS, OPERATIONS PRIOR TO HARVEST.

Farm No.	Acres per Farm	Yield per Acre	Plowing		Discing		Harrowing		Planting	Cultivating		Total Hours
			Hours	Times Over	Hours	Times Over	Hours	Times Over	Hours	Hours	Times Over	
6	53.8	30.6	12.53	1.00	2.59	.75	2.64	3.63	1.40	8.64	3.33	27.80
12	63.7	37.8	12.31	1.12	1.02	.47	3.89	3.10	1.27	8.47	2.88	26.96
2	64.8	49.7	10.57	1.00	2.36	.94	2.11	2.00	1.05	11.03	3.43	27.12
17	46.4	41.4	11.87	1.00	4.37	2.00	2.53	2.00	1.23	10.30	3.00	30.30
4	53.2	49.0	12.89	1.06	4.02	2.00	2.08	2.00	1.30	7.13	3.00	27.42
8	58.7	47.7	12.55	1.00	.20	.14	2.25	1.13	1.18	13.00	4.00	29.18
7	74.0	42.6	10.47	1.02	1.45	.55	3.27	2.20	1.26	12.28	3.21	28.73
15	94.9	45.7	10.79	1.00	1.94	1.03	2.74	2.26	1.31	10.50	3.00	27.28
11	40.6	44.5	13.35	1.00	5.66	2.20	2.32	1.41	1.90	7.19	3.00	30.42
3	51.7	36.2	12.50	1.00	2.96	1.57	2.08	3.00	1.34	7.85	4.00	26.73
18	51.6	41.1	13.33	1.00	2.75	1.29	5.25	3.40	1.85	12.73	3.80	35.91
5	59.0	50.9	12.68	1.00	4.24	2.00	2.83	3.00	1.40	10.65	3.90	29.78
20	19.8	46.6	11.34	1.00	4.73	2.20	1.92	3.00	1.67	8.36	4.00	28.02
1	74.1	56.3	13.17	1.00	4.57	1.94	3.34	3.71	1.46	10.21	4.09	32.75
16	63.0	35.5	11.19	1.00	1.97	1.00	3.66	2.87	1.01	8.68	3.00	26.51
13	64.8	28.5	12.50	1.00	5.06	2.00	2.87	2.00	1.30	12.16	3.00	33.89
19	28.0	50.0	9.32	1.00	2.29	1.35	2.82	2.00	1.35	9.89	3.00	25.67
14	39.3	51.2	12.15	1.00	1.71	1.00	3.49	4.00	1.43	11.55	2.96	30.33
10	15.0	43.6	13.30	1.00	2.50	1.00	3.40	4.00	1.15	6.90	3.00	27.25
9	42.5	45.9	10.72	1.00	3.18	1.14	2.15	3.00	1.94	13.05	3.63	31.04
Av. 20 farms 1923	52.4	43.5	11.92	1.00	2.86	1.28	2.91	2.52	1.40	10.26	3.37	29.35
Av. 20 farms 1922	45.9	27.4	11.18	1.04	3.27	1.37	3.60	3.18	1.46	9.14	3.26	28.65
Av. 20 farms 1924	52.8	29.4	10.55	1.00	2.95	1.28	3.10	3.02	1.28	10.72	3.82	28.60

Table 42.—MAN LABOR REQUIREMENTS PER ACRE OF CORN HUSKED FROM STANDING STALKS, HARVESTING OPERATIONS, 1923.

Farm No.	Acres per Farm	Yield per Acre	Total Before Harvest—Hours	Machine Husked			Hand Husked			Cost per Bushel—Cents
				Acres Husked	Hours	Total Hours*	Acres Husked	Hours	Total Hours**	
12	63.7	37.8	6.36	63.7	3.36	9.72	---	---	---	41
2	64.8	49.7	6.65	64.8	3.39	10.04	---	---	---	38
3	51.7	36.2	7.85	49.2	2.63	10.48	2.5	5.72	13.57	47
6	53.8	30.6	6.00	---	---	---	53.8	4.70	10.70	54
17	46.4	41.4	6.93	46.4	4.58	11.51	---	---	---	54
1	74.1	56.3	8.75	62.1	3.03	11.78	12.0	6.75	15.50	33
7	74.0	42.6	7.42	74.0	4.50	11.92	---	---	---	47
15	94.9	45.7	7.50	87.1	4.42	11.92	7.8	6.00	13.50	45
4	53.2	49.0	7.24	53.2	4.69	11.93	---	---	---	42
18	51.6	41.1	8.50	---	---	---	51.6	5.14	13.64	51
11	40.6	44.5	7.77	40.6	6.06	13.83	---	---	---	49
20	19.8	46.6	8.60	---	---	---	19.8	6.84	15.44	67
5	59.0	50.9	8.50	---	---	---	59.0	7.14	15.64	40
8	58.7	47.7	7.36	---	---	---	58.7	8.60	15.96	42
10	15.0	43.6	10.22	---	---	---	15.0	6.90	17.11	56
19	28.0	50.0	9.58	---	---	---	28.0	8.02	17.60	45

Table 42 (Cont).—MAN LABOR REQUIREMENTS PER ACRE OF CORN HUSKED FROM STANDING STALKS, HARVESTING OPERATIONS, 1923.

Farm No.	Acres per Farm	Yield per Acre	Total Before Harvest-Hours	Machine Husked			Hand Husked			Cost per Bushel—Cents
				Acres Husked	Hours	Total Hours*	Acres Husked	Hours	Total Hours**	
13-----	64.8	28.5	9.53	---	---	---	64.8	8.14	17.67	60
9-----	42.5	45.9	11.00	---	---	---	42.5	7.68	18.68	44
16-----	63.0	35.5	8.76	---	---	---	63.0	10.04	18.80	53
14-----	29.3	51.2	10.13	10.9	4.13	14.26	18.4	9.95	20.08	46
Av. 20 farms 1923-----	52.4	43.5	8.03	27.6	4.10	12.13	24.8	7.47	15.50	46
Av. 20 farms 1922-----	45.9	27.4	8.86	13.5	3.80	12.66	32.4	6.50	15.36	68
Av. 20 farms 1924-----	52.8	92.4	7.29	33.4	5.95	13.87	19.4	7.48	15.40	64

*Total for the acreage husked by machine.

**Total for the acreage husked by hand.

Table 43.—HORSE WORK REQUIREMENTS PER ACRE OF CORN HUSKED FROM THE STANDING STALKS, HARVESTING OPERATIONS, 1923.

Farm No.	Acres per Farm	Yield per Acre	Total Before Harvest-Hours	Machine Husked			Hand Husked		
				Acres Husked	Hours	Total Hours*	Acres Husked	Hours	Total Hours**
12-----	63.7	37.8	26.96	63.7	11.84	38.80	---	---	---
2-----	64.8	49.7	27.11	64.8	11.88	39.00	---	---	---
3-----	51.7	36.2	26.73	49.2	9.01	35.74	2.5	11.43	38.16
6-----	53.8	30.6	27.80	---	---	---	53.8	9.40	37.20
17-----	46.4	41.4	30.30	46.4	13.90	44.20	---	---	---
1-----	74.1	56.3	32.75	62.1	4.34	37.09†	12.0	4.17	36.92
7-----	74.0	42.6	28.73	74.0	14.81	43.54	---	---	---
15-----	94.9	45.7	27.28	87.1	12.48	39.76	7.8	9.75	37.03
4-----	53.2	49.0	27.42	53.2	15.98	43.40	---	---	---
18-----	51.6	41.1	35.91	---	---	---	51.6	9.96	45.87
11-----	40.6	44.5	30.42	40.6	21.13	51.55	---	---	---
20-----	19.8	46.6	28.20	---	---	---	19.8	13.37	41.39
5-----	59.0	50.9	29.78	---	---	---	59.0	13.70	43.18
8-----	58.7	47.7	29.18	---	---	---	58.7	16.90	46.08
10-----	15.0	43.6	27.25	---	---	---	15.0	13.10	40.35
19-----	28.0	50.0	25.67	---	---	---	28.0	14.25	39.92
13-----	64.8	28.5	33.89	---	---	---	64.8	16.05	49.94
9-----	42.5	45.9	31.04	---	---	---	42.5	15.36	46.40
16-----	63.0	35.5	26.51	---	---	---	63.0	13.83	40.34
14-----	29.3	51.2	30.33	10.9	13.76	44.09	18.4	11.36	41.69
Av. 20 farms, 1923-----	52.4	43.5	29.35	27.6	12.52	41.87	24.8	13.30	42.65
Av. 20 farms, 1922-----	45.9	27.4	28.65	13.5	12.93	41.58	32.4	12.27	40.92
Av. 20 farms, 1924-----	52.8	29.4	28.60	33.4	12.02	40.82	19.4	13.18	41.78

* Total for the acreage husked by machine.

** Total for the acreage husked by hand.

† In addition to the horse hours one tractor was used.

Table 44.—MAN LABOR REQUIREMENTS PER ACRE OF POTATOES, OPERATIONS PRIOR TO HARVEST, 1923.

Farm No.	Acres per Farm	Yield per Acre	Plowing		Discing		Harrowing		Planting	Cultivating		Spraying		Preparing Seed	Total Hours
			Hours	Times Over	Hours	Times Over	Hours	Times Over		Hours	Times Over	Hours	Times Over	Hours	
5	2.8	118.0	2.50	1.00	---	---	.72	2.00	1.07	1.61	1.50	---	---	1.78	7.68
4	11.8	63.6	2.41	1.00	.93	2.00	.55	2.00	1.69	4.19	4.00	.34	---	---	10.11
17	36.7	146.0	2.39	1.00	.11	.25	.76	2.00	1.17	2.58	3.00	.78	1.50	3.18	10.97
15	9.9	53.0	2.47	1.00	---	---	---	---	2.37	3.48	2.00	---	---	3.23	11.55
6	9.2	92.4	2.50	1.00	1.08	2.00	.76	2.00	1.50	5.10	3.00	.22	1.00	5.00	14.06
12	9.4	184.7	1.70	1.00	1.18	2.00	.21	1.00	1.60	3.51	2.00	.86	1.00	.87	12.03
2	55.0	137.5	3.31	1.56	---	---	1.11	3.58	1.32	5.26	3.62	.34	.28	3.05	14.39
18	45.7	115.0	3.41	1.27	.17	.22	1.31	3.54	1.54	3.23	2.80	.64	1.00	3.76	14.06
1	32.7	102.0	2.54	1.00	.70	1.50	.61	4.00	1.38	5.04	4.80	.31	1.20	4.19	14.77
7	31.2	100.6	2.38	1.00	.96	2.00	.82	2.00	1.62	5.59	3.42	1.27	1.00	2.54	15.18
16	55.6	72.0	2.43	1.00	.95	1.00	1.42	2.61	2.25	4.15	2.67	.55	.80	3.42	15.97
19	3.6	137.5	2.50	1.00	2.77	3.00	.49	2.00	1.50	2.77	3.00	4.44	2.00	3.33	17.80
14	5.2	150.0	3.07	1.00	1.54	2.00	.86	3.00	2.11	2.40	3.00	1.82	2.00	5.96	17.86
3	8.8	79.6	2.50	1.00	.90	1.00	.40	1.00	1.80	6.53	4.00	1.02	1.28	3.46	17.89
13	9.7	96.3	2.20	1.00	.31	.68	1.76	4.00	2.60	5.77	3.66	.93	1.00	4.74	18.31
11	12.4	111.0	3.06	1.00	1.45	3.00	.75	2.00	1.20	5.48	3.00	.56	.25	5.96	18.44
9	8.2	130.0	2.22	1.00	.85	1.56	1.46	3.00	2.30	6.00	4.00	1.20	1.00	4.75	18.78
10	4.3	187.7	4.42	1.00	.93	1.00	1.51	4.00	1.50	5.46	4.00	2.32	2.00	6.04	22.17
Ave. 18 farms 1923	19.7	109.2	2.72	1.12	.63	1.07	.93	2.60	1.65	4.42	3.29	.68	1.17	3.04	14.07
Ave. 16 farms 1922	22.6	100.4	2.78	1.09	.84	1.53	.72	3.09	1.60	5.06	3.77	1.68	2.39	5.02	17.71
Ave. 14 farms 1924	14.7	98.7	2.48	1.00	.25	.44	.84	2.73	1.72	5.34	3.66	1.01	1.63	3.82	15.45

Table 45.—HORSE WORK REQUIREMENTS PER ACRE OF POTATOES, OPERATIONS PRIOR TO HARVEST, 1923.

Farm No.	Acres per Farm	Yield per Acre	Plowing		Discing		Harrowing		Planting	Cultivating		Spraying		Total Hours
			Hours	Times Over	Hours	Times Over	Hours	Times Over		Hours	Times Over	Hours	Times Over	
5	2.8	118.0	12.80	1.00	---	---	2.86	2.00	2.14	3.20	1.50	---	---	20.70
4	11.8	63.6	10.85	1.00	3.73	2.00	1.12	2.00	3.38	8.39	4.00	.68	1.00	28.15
17	36.7	146.0	11.86	1.00	.43	.25	3.52	2.00	4.69	10.35	3.00	1.22	1.50	32.07
15	9.9	53.0	7.93	1.00	---	---	---	---	4.15	6.96	2.00	---	---	19.04
6	9.2	92.4	14.60	1.00	5.52	2.00	3.70	2.00	2.90	10.52	3.00	.44	1.00	37.68
12	9.4	184.7	10.53	1.00	7.02	2.00	1.28	1.00	6.38	7.02	2.00	.86	1.00	33.09
2	55.0	137.5	21.00	1.56	---	---	4.62	3.40	2.35	10.46	3.61	.67	.28	39.10
18	45.7	115.0	17.94	1.27	2.34	1.00	4.66	2.48	4.22	7.83	2.80	1.27	1.00	39.53

Table 45 (Cont.).—HORSE WORK REQUIREMENTS PER ACRE OF POTATOES, OPERATIONS PRIOR TO HARVEST, 1923.

Farm No.	Acres per Farm	Yield per Acre	Plowing		Discing		Harrowing		Planting	Cultivating		Spraying		Total Hours
			Hours	Times Over	Hours	Times Over	Hours	Times Over		Hours	Times Over	Hours	Times Over	
1-----	32.7	102.0	13.03	1.00	3.29	1.50	3.18	4.00	2.76	10.09	4.80	.61	1.20	32.96
7-----	31.2	100.6	11.75	1.00	3.84	2.00	4.48	2.00	5.12	11.18	3.42	2.53	1.00	38.90
16-----	55.6	72.0	11.09	1.00	3.81	1.00	5.26	2.61	4.52	8.34	2.67	.46	.80	33.48
19-----	3.6	137.5	12.54	1.00	11.11	3.00	2.37	2.00	2.90	5.55	3.00	2.22	2.00	36.69
14-----	5.2	150.0	9.43	1.00	6.15	2.00	3.46	3.00	4.22	4.80	3.00	2.50	2.00	30.57
3-----	8.8	79.6	12.50	1.00	3.41	1.00	1.60	1.00	3.60	12.96	4.00	2.04	1.28	36.11
13-----	9.7	96.3	10.80	1.00	1.24	.68	7.00	4.00	5.20	11.51	3.66	1.86	1.00	37.61
11-----	12.4	111.0	15.90	1.00	5.32	3.00	3.71	2.00	2.40	13.80	3.00	.80	.25	41.93
9-----	8.2	130.0	9.00	1.00	3.42	1.56	5.85	3.00	3.00	12.40	4.00	2.40	1.00	36.07
10-----	4.3	187.7	13.38	1.00	3.72	1.00	5.34	4.00	3.02	9.52	4.00	4.64	2.00	39.62
Ave. 18 farms 1923	19.7	109.2	13.98	1.12	2.83	1.07	4.06	2.60	3.83	9.66	3.29	1.05	1.17	35.41
Ave. 16 farms 1922	22.6	100.4	11.03	1.09	3.83	1.53	3.09	3.04	3.30	11.08	3.77	2.84	2.39	35.17
Ave. 14 farms 1924	14.7	98.7	11.84	1.00	1.07	.44	3.78	2.73	3.69	12.04	3.70	1.83	1.63	34.25

Table 46.—MAN LABOR REQUIREMENTS PER ACRE OF POTATOES, HARVESTING OPERATIONS, 1923.

Farm No.	Acres per Farm	Yield per Acre	Total Before Harvest Hours	Digging Hours	Picking Hours	Total Harvesting Operations Hours	Grand Total Hours	Cost per Bushel Cent.
5-----	2.8	118.0	7.68	1.25	7.68	8.93	16.61	25
17-----	36.7	146.0	10.97	1.90	7.85	9.75	20.72	32
7-----	31.2	100.6	15.18	1.99	8.68	10.67	24.85	35
4-----	11.8	63.6	10.11	1.87	8.81	10.68	20.79	39
1-----	32.7	102.0	14.77	2.78	8.84	11.62	26.39	39
3-----	8.8	79.6	17.89	2.04	10.05	12.09	29.98	42
18-----	45.7	115.0	14.06	2.27	11.87	14.14	28.20	48
16-----	55.6	72.0	15.97	2.34	11.96	14.30	30.27	56
15-----	9.9	53.0	11.55	2.52	13.34	15.86	27.41	66
2-----	55.0	137.5	14.39	1.86	14.80	16.66	31.05	—
6-----	9.2	92.4	12.03	1.85	15.50	17.35	29.38	40
12-----	9.4	184.7	14.06	2.45	15.32	17.77	31.83	26
9-----	8.2	130.0	18.78	3.30	17.20	20.50	39.28	38
19-----	3.6	137.5	17.80	2.20	22.20	24.40	42.20	35
13-----	9.7	96.3	18.31	5.06	19.55	24.61	42.92	37
14-----	5.2	150.0	17.86	2.31	24.20	26.51	44.37	28
11-----	12.4	111.0	18.44	2.86	24.96	27.82	46.26	40
10-----	4.3	187.7	22.17	2.33	28.26	30.59	52.76	39
Average 18 farms, 1923	19.7	109.2	14.07	2.31	12.61	14.92	28.99	40
Average 16 farms, 1922	22.6	100.4	17.71	2.03	12.17	14.20	31.90	46
Average 14 farms, 1924	14.7	98.7	15.45	2.33	11.06	13.39	28.84	42

Table 47.—HORSE WORK REQUIREMENTS PER ACRE OF POTATOES, HARVESTING OPERATIONS, 1923.

Farm No.	Acres per Farm	Yield per Acre	Total Before Harvest Hours	Digging Hours	Picking Hours	Total Harvesting Operations Hours	Grand Total Hours
5-----	2.8	118.0	20.70	5.00	8.57	13.57	34.27
17-----	36.7	146.0	32.07	7.63	1.23	8.86	40.93
7-----	31.2	100.6	38.90	10.26	7.31	17.57	56.47
4-----	11.8	63.6	28.15	7.45	10.59	18.04	46.19
1-----	32.7	102.0	32.96	10.89	.69	11.56	44.52
3-----	8.8	79.6	36.11	8.20	8.90	17.10	53.21
18-----	45.7	115.0	39.53	8.62	6.94	15.56	55.09
16-----	55.6	72.0	33.48	9.34	9.23	18.57	52.05
15-----	9.9	53.0	19.04	8.29	15.40	23.69	42.73
2-----	55.0	137.5	39.10	7.37		7.37	46.47
6-----	9.2	92.4	37.68	7.39	12.50	19.89	57.57
12-----	9.4	184.7	33.09	9.79	12.13	21.92	55.01
9-----	8.2	130.0	36.07	13.20	19.50	32.70	68.77
19-----	3.6	137.5	36.69	8.91	16.14	25.05	61.74
13-----	9.7	96.3	37.61	14.47	18.85	36.32	73.93
14-----	5.2	150.0	30.57	9.23	17.69	26.92	57.49
11-----	12.4	111.0	41.93	10.80	18.75	29.55	71.48
10-----	4.3	187.7	39.62	8.84	26.05	34.89	74.51
Av. 18 farms, 1923	19.7	109.2	35.41	9.20	7.44	16.64	52.05
Av. 16 farms, 1922	22.6	100.4	35.17	8.13	8.56	16.69	51.86
Av. 14 farms, 1924	14.7	98.7	34.25	9.26	6.12	15.38	49.63

Table 48.—MAN LABOR REQUIREMENTS PER ACRE OF OATS, OPERATIONS PRIOR TO HARVEST, 1923.

Farm No.	Acres per Farm	Yield per Acre	Plowing		Discing		Harrowing		Seed- ing	Total Hours
			Hours	Times Over	Hours	Times Over	Hours	Times Over	Hours	
6-----	54.7	43.7			.65	1.2	.17	.78	.40	1.22
1-----	92.9	56.4	.16	.13	.58	1.6	.17	.73	.48	1.89
12-----	78.8	37.2			.94	2.0	.07	.33	.40	1.41
14-----	58.2	43.0			.70	2.0	.16	1.00	.56	1.42
19-----	44.3	37.3			.69	1.0	.18	1.00	.62	1.49
8-----	18.9	37.2			.90	2.0			.60	1.50
11-----	41.0	35.0			.80	1.9	.37	1.00	.46	1.63
4-----	78.5	49.3			1.28	2.0	.20	1.00	.28	1.76
18-----	69.3	43.7	.42	.14	.78	1.7	.17	1.11	.44	1.81
17-----	56.2	49.2			1.53	2.5	.07	.24	.23	1.83
2-----	71.8	48.4	.56	.28	.59	1.4	.14	.55	.54	1.83
16-----	59.7	41.8			1.05	2.0	.27	2.00	.60	1.92
15-----	55.3	30.0	.58	.24	.59	1.0	.24	1.00	.74	2.15

PROFITABLE FARMING SYSTEMS

63

Table 48 (Cont.)—MAN LABOR REQUIREMENTS PER ACRE OF OATS, OPERATIONS PRIOR TO HARVEST, 1923.

Farm No.	Acres per Farm	Yield per Acre	Plowing		Discing		Harrowing		Seed- ing	Total Hours
			Hours	Times Over	Hours	Times Over	Hours	Times Over	Hours	
13-----	34.9	33.5	.87	.40	.37	.6	.30	1.80	.63	2.17
20-----	32.7	43.7	.66	.30	.80	1.4	.34	1.00	.43	2.23
3-----	89.9	36.8	.87	.35	.79	1.3	.19	1.20	.55	2.40
7-----	104.5	42.8	.96	.40	.75	1.2	.16	.25	.57	2.44
9-----	41.8	35.6	.76	.26	1.14	2.0	.36	.85	.73	2.99
Av. 18 farms, 1923-----	59.6	42.5	.29	.12	.83	1.6	.19	.90	.50	1.82
Av. 16 farms, 1922-----	46.5	36.5	1.03	.36	.86	1.5	.24	1.00	.49	2.62
Av. 14 farms, 1924-----	77.5	51.7	.30	.11	.82	1.5	.23	1.10	.47	1.82

Table 49.—HORSE WORK REQUIREMENTS PER ACRE OF OATS OPERATIONS PRIOR TO HARVEST, 1923.

Farm No.	Acres per Farm	Yield per Acre	Plowing		Discing		Harrowing		Seed- ing	Total Hours
			Hours	Times Over	Hours	Times Over	Hours	Times Over	Hours	
6-----	45.7	43.7	(1)	.13	3.93	1.2	.70	.78	1.53	6.16
1-----	92.9	50.4			3.34	1.6	.82	.73	1.14	5.30
12-----	78.8	37.2			5.01	2.0	.28	.33	1.59	6.88
14-----	58.2	43.0			2.74	2.0	.80	1.00	2.23	5.77
19-----	44.3	37.3			2.79	1.0	.72	1.00	2.48	5.99
8-----	18.9	38.2			3.60	2.0			2.30	5.90
11-----	41.0	35.0			3.22	1.9	1.70	1.00	1.90	6.82
4-----	78.5	49.3			5.14	2.0	.81	1.00	.57	6.52
18-----	69.2	43.7	.89	.06	4.72	1.7	.67	1.11	1.76	8.04
17-----	56.2	49.2	3.33	.27	6.13	2.5	.28	.24	.70	7.11
2-----	71.8	48.4			3.35	1.4	.83	.55	2.17	9.68
16-----	59.7	41.8			4.18	2.0	1.08	2.00	2.30	7.56
15-----	55.3	30.0			2.36	1.0	1.05	1.00	2.97	8.27
13-----	34.9	33.5	4.20	.40	1.49	.8	1.20	1.81	2.52	9.41
20-----	32.7	43.7	2.94	.30	3.18	1.4	1.35	1.00	1.72	9.19
3-----	89.9	36.8	4.35	.35	3.16	1.3	.75	1.20	2.20	10.46
7-----	104.5	42.8	4.78	.40	3.00	1.2	.65	.44	2.28	10.71
9-----	41.8	35.6	3.38	.27	4.55	2.0	.94	.85	2.92	11.79
Av. 18 farms, 1923-----	59.6	42.5	1.46	.12	3.73	1.6	.79	.90	1.88	7.86
Av. 16 farms, 1922-----	46.5	36.5	3.91	.36	3.67	1.5	1.12	1.00	1.71	10.41
Av. 20 farms, 1924-----	77.5	51.7	1.42	.11	3.63	1.5	.97	1.10	1.74	7.76

(1) Tractor used.

Table 50.—MAN LABOR REQUIREMENTS PER ACRE OF OATS, HARVESTING OPERATIONS, 1923.

Farm No.	Acres per Farm	Yield per Acre	Total Before Harvest Hours	Binding Hours	Shocking Hours	Stacking Hours	Stack Threshing Hours	Shock Threshing Hours	Total Harvesting Operations Hours	Grand Total Hours	Cent per Bushel Cents
15-----	55.3	30.0	2.15	.67	.75	---	---	1.17	2.59	4.74	49
3-----	89.9	36.8	2.40	.75	.86	---	---	1.50	3.11	5.51	38
6-----	45.7	43.7	1.22	.70	.70	---	---	1.80	3.20	4.42	34
7-----	104.5	42.8	2.44	.60	1.10	---	---	1.50	3.20	5.64	37
12-----	78.8	37.2	1.41	.55	.89	---	---	1.89	3.33	4.74	34
17-----	56.2	49.2	1.83	.61	.80	---	---	2.23	3.64	5.47	37
18-----	69.3	43.7	1.81	.80	.77	---	---	2.11	3.68	5.49	37
14-----	58.2	43.0	1.42	.80	1.22	---	---	1.86	3.88	5.30	35
4-----	78.5	49.3	1.76	.66	.84	---	---	2.42	3.92	5.68	33
2-----	71.8	48.4	1.83	.50	1.00	1.66	1.08	---	4.24	6.07	32
8-----	18.9	37.2	1.50	.60	.60	2.20	.85	---	4.25	5.75	40
11-----	41.0	35.0	1.63	.76	1.10	---	---	2.40	4.26	5.89	44
1-----	92.9	50.4	1.39	.55	.91	1.60	.66	.63	4.35	5.74	27
13-----	34.9	33.5	2.17	1.15	.83	1.97	1.38	---	5.33	7.50	40
16-----	59.7	41.8	1.92	1.10	1.90	---	---	2.50	5.50	7.42	41
19-----	44.3	37.3	1.49	.99	1.23	3.38	.65	---	6.25	7.74	45
20-----	32.7	43.7	2.23	.86	1.75	---	---	4.41	7.02	9.25	47
9-----	41.8	35.6	2.99	1.14	1.02	3.64	1.38	---	7.18	10.17	37
Av. 18 farms, 1923-----	59.6	42.5	1.81	.73	1.00	2.65	1.04	2.00	3.73*	5.54*	36
Av. 16 farms, 1922-----	46.5	36.5	2.62	.78	.88	1.99	1.09	2.14	3.80*	6.42*	43
Av. 14 farms, 1924-----	77.5	51.7	1.82	.77	1.07	2.62	1.43	2.67	4.51*	6.33*	33

* Totals for shock threshed grain only. The total for stack threshed grain was 7.36 in 1922, 7.23 in 1923 and 7.71 in 1924.

Table 51.—HORSE WORK REQUIREMENTS PER ACRE OF OATS, HARVESTING OPERATIONS, 1923.

Farm No.	Acres per Farm	Yield per Acre	Total Before Harvest Hours	Binding Hours	Stacking Hours	Stack Threshing Hours	Shock Threshing Hours	Total Harvesting Operations Hours	Grand Total Hours
15.....	55.3	30.0	8.27	2.68	---	---	1.88	4.56	12.33
3.....	89.9	36.8	10.46	2.90	---	---	2.90	5.80	16.26
6.....	45.7	43.7	6.16	2.60	---	---	3.90	6.50	12.66
7.....	104.7	42.8	10.71	2.41	---	---	3.02	5.43	16.14
12.....	78.8	37.2	6.88	2.16	---	---	3.71	5.87	12.75
17.....	56.2	49.2	7.11	3.65	---	---	4.32	7.97	15.03
18.....	69.2	43.7	8.04	3.18	---	---	3.35	6.53	14.57
14.....	58.2	43.0	5.77	3.19	---	---	3.40	6.59	12.36
4.....	78.5	49.3	6.52	2.65	---	---	4.71	7.36	13.88
2.....	71.8	48.4	9.68	2.51	2.17	.40	---	5.08	14.76
8.....	18.9	37.2	5.90	2.30	6.50	1.30	---	10.10	16.00
11.....	41.0	35.0	6.82	3.03	---	---	3.50	6.53	13.35
1.....	92.9	50.4	5.30	2.20	2.92	.39	1.35	6.86	12.16
13.....	34.9	33.5	9.41	4.47	6.23	.34	---	11.04	20.45
16.....	59.7	41.8	7.56	4.40	---	---	4.20	8.60	16.16
19.....	44.3	37.3	5.99	3.97	4.24	.97	---	9.18	15.20
20.....	32.7	43.7	9.19	3.43	---	---	5.57	9.00	18.19
1.....	41.8	35.6	11.79	4.55	6.25	1.00	---	11.80	23.59
Av. 18 farms, 1923.....	59.6	42.5	7.86	3.00	4.39	.75	3.57	6.57*	14.43*
Av. 16 farms 1922.....	46.5	36.5	10.41	3.12	2.94	1.07	4.08	7.20*	17.61*
Av. 20 farms, 1924.....	77.5	51.7	7.76	3.17	4.28	.91	4.77	7.94*	15.70*

* Totals for shock threshed grain only.

Table 52.—MAN LABOR REQUIREMENTS PER ACRE OF BARLEY, OPERATIONS PRIOR TO HARVEST, 1923.

Farm No.	Acres per Farm	Yield per Acre	Plowing		Discing		Harrowing		Seed- ing	Total Hours
			Hours	Times Over	Hours	Times Over	Hours	Times Over	Hours	
17-----	24.2	32.2	---	---	.74	2.00	.25	1.00	.41	1.40
2-----	20.5	19.9	---	---	.82	2.00	.20	1.00	.39	1.41
6-----	20.4	26.0	---	---	.92	2.00	---	---	.45	1.42
18-----	35.5	30.3	.30	1.00	.41	1.00	.14	.52	.49	1.64
4-----	34.5	23.0	---	---	1.06	2.00	.24	1.00	.36	1.66
8-----	35.1	37.8	---	---	1.18	2.00	---	---	.60	1.78
12-----	14.2	35.4	---	---	1.10	2.00	.18	1.00	.55	1.83
11-----	24.2	31.6	---	---	1.07	1.45	.30	1.00	.60	1.97
13-----	25.7	21.6	1.20	.43	.29	.57	.21	1.00	.62	2.32
1-----	38.9	29.4	.84	.30	1.08	2.32	.33	1.27	.38	2.63
16-----	84.1	20.7	.61	.22	1.31	2.00	.34	1.20	.63	2.89
14-----	11.7	16.2	2.52	1.00	---	---	.23	1.00	.51	3.26
20-----	4.4	17.5	2.16	1.00	---	---	.46	2.00	.68	3.30
7-----	40.9	21.7	1.84	.78	1.14	2.00	.16	1.00	.50	3.64
Av. 14 farms, 1923---	29.6	26.8	.50	.19	.92	1.75	.21	.91	.51	2.14
Av. 17 farms, 1922---	46.1	20.6	.79	.27	.92	1.55	.24	1.00	.58	2.53
Av. 8 farms, 1924---	36.3	30.5	.52	.18	.83	1.36	.23	.95	.55	2.13

PROFITABLE FARMING SYSTEMS

67

Table 53.—HORSE WORK REQUIREMENTS PER ACRE OF BARLEY, OPERATIONS PRIOR TO HARVEST, 1923.

Farm No.	Acres per Farm	Yield per Acre	Plowing		Discing		Harrowing		Seed ing	Total Hours
			Hours	Times Oevr	Hours	Times Oevr	Hours	Times Oevr	Hours	
17-----	24.2	32.2	-----	---	2.96	2.00	.16	.16	1.66	4.78
2-----	20.5	19.9	-----	---	4.64	2.00	.80	1.00	1.56	7.00
6-----	20.4	26.0	-----	---	5.51	2.00	---	---	1.90	7.41
18-----	35.5	30.3	1.41	1.00	2.09	1.00	.56	.52	1.97	6.03
4-----	34.5	23.0	-----	---	4.26	2.00	.98	1.00	.98	6.22
8-----	35.1	37.8	-----	---	4.41	2.00	---	---	2.30	6.71
12-----	14.2	35.4	-----	---	5.04	2.00	.70	1.00	2.18	7.92
11-----	24.2	31.6	-----	---	4.29	1.45	1.50	1.00	2.50	8.29
13-----	25.7	21.6	5.54	.43	1.16	.56	.78	1.00	2.50	9.98
1-----	38.9	29.4	2.51	.30	5.51	2.32	1.83	1.27	1.34	11.19
16-----	84.1	20.7	2.80	.21	5.25	2.00	1.35	1.22	2.50	11.90
14-----	11.7	16.2	12.53	1.00	---	---	1.09	1.00	2.05	15.67
20-----	4.4	17.5	9.70	1.00	---	---	1.82	2.00	2.78	14.30
7-----	40.9	21.7	9.16	.78	4.57	2.00	.63	1.00	2.05	16.41
Av. 14 farms, 1923-----	29.6	26.8	2.39	.19	4.11	1.75	.89	.91	2.01	9.40
Av. 17 farms, 1922-----	46.1	20.6	2.93	.27	3.92	1.56	1.11	1.00	2.19	10.15
Av. 8 farms, 1924-----	36.3	30.5	2.31	.48	3.70	1.36	.93	.97	2.16	9.10

Table 54.—MAN LABOR REQUIREMENTS PER ACRE OF BARLEY, HARVESTING OPERATIONS, 1923.

Farm No.	Acres per Farm	Yield per Acre	Total Before Harvest Hours	Hedding Hours	Shocking Hours	Stacking Hours	Stack Threshing Hours	Shock Threshing Hours	Total Harvesting Operations—Hours	Total all Operations Hours	Net Cost Per Bu.—Cents
6-----	20.4	26.0	1.42	.60	.70	---	---	1.70	3.00	4.42	53
2-----	20.5	19.9	1.41	.44	.88	1.12	.85	---	3.29	4.70	64
13-----	25.7	21.6	2.32	.86	.70	1.17	.15	.78	3.66	5.98	57
14-----	11.7	16.2	3.26	.86	1.12	---	---	2.05	4.03	7.29	103
7-----	40.9	21.7	3.64	.80	1.00	---	---	2.30	4.10	7.74	69
17-----	24.2	32.2	1.40	.91	.79	---	---	2.44	4.14	5.54	55
11-----	24.2	31.6	1.97	.99	.80	---	---	2.90	4.69	6.66	51
16-----	84.1	20.7	2.89	.87	.99	1.60	1.30	---	4.76	7.65	55
1-----	38.9	29.4	2.63	1.00	.85	1.44	.59	1.00	4.88	7.51	61
18-----	35.5	30.3	1.64	.89	1.21	---	---	3.10	5.10	6.84	52
4-----	34.5	23.0	1.66	.72	.78	1.01	3.13	---	5.64	7.30	55
12-----	14.2	35.4	1.83	.46	.71	---	---	4.23	5.80	7.63	43
20-----	4.4	17.5	3.30	1.36	1.82	---	---	2.73	5.91	9.21	106
8-----	35.1	37.8	1.78	.90	.99	2.30	2.30	---	6.49	8.27	41
Ave. 14 farm (1923)	29.6	26.8	2.14	.83	.92	1.74	1.63	2.52	4.27*	6.41*	55
Ave. 17 farms (1922)	46.1	20.6	2.53	.76	.84	1.92	.74	1.14	2.74*	5.27*	72
Ave. 8 farms (1924)	36.3	30.5	2.13	.66	.97	2.57	1.00	2.09	3.74*	5.87*	50

*Averages are for shock threshed grain only. Average stack threshed for 1923 was 7.26; 1922, 6.75; 1924, 7.33.

Table 55.—HORSE WORK REQUIREMENTS PER ACRE OF BARLEY, HARVESTING OPERATIONS, 1923.

Farm No.	Acres per Farm	Yield per Acre	Total Before Harvest Hours	Baling Hours	Stacking Hours	Stack Threshing Hours	Shock Threshing Hours	Total Harvesting Operations Hours	Total all Operations Hours
6-----	20.4	26.0	7.41	2.60	---	---	3.50	6.10	13.51
2-----	20.5	19.9	7.00	2.20	1.56	.34	---	4.10	11.10
13-----	25.7	21.6	9.98	3.40	1.28	.25	1.24	6.17	16.15
14-----	11.7	16.2	15.67	3.41	---	---	3.76	7.77	22.84
7-----	40.9	21.7	16.41	3.03	---	---	4.55	7.58	23.99
17-----	24.2	32.2	4.78	4.46	---	---	4.88	9.34	14.12
11-----	24.2	31.6	8.29	3.90	---	---	5.50	9.40	17.69
16-----	84.1	20.7	11.90	3.50	1.85	2.07	---	7.42	19.32
1-----	38.9	29.4	11.19	4.00	1.44	.31	2.15	7.90	19.09
18-----	35.5	30.3	6.03	3.55	---	---	5.63	9.18	15.21
4-----	34.5	23.0	6.22	2.90	1.51	5.39	---	9.80	16.02
12-----	14.2	35.4	7.92	1.83	---	---	6.97	8.80	16.72
20-----	4.4	17.5	14.30	5.46	---	---	3.64	9.10	23.40
8-----	35.1	37.8	6.71	3.70	2.90	1.70	---	8.30	15.01
Av. 14 farms 1923-----	29.6	26.8	9.40	3.40	2.05	2.13	4.74	8.14*	17.54*
Av. 17 farms 1922-----	46.1	20.6	10.15	3.13	2.65	.70	2.20	5.33*	15.48*
Av. 8 farms 1924-----	36.3	30.6	9.10	2.67	4.99	.65	3.96	6.63*	15.73*

*Averages are for shock threshed grain only.

Table 56.—MAN LABOR REQUIREMENTS PER ACRE OF WHEAT, RYE, FLAX, AND EMMER, OPERATIONS PRIOR TO HARVEST.*

		Plowing		Discing		Harrowing		Seed- ing	
Item	Ave. Yield Per Acre	Hours	Times Over	Hours	Times Over	Hours	Times Over	Hours	Total Hours
WHEAT—									
134.9 Acres, 1923__	14.1	1.49	.66	.47	.44	.31	1.78	.57	2.84
261.2 Acres, 1922__	11.6	2.34	.81	.45	.73	.42	1.92	.57	3.78
77.2 Acres, 1924__	19.7	1.87	.80	.23	.23	.45	1.72	.72	3.27
RYE—									
127.3 Acres, 1923__	11.3	2.45	1.00	—	—	.40	1.78	.63	3.48
157.6 Acres, 1922__	17.9	2.88	1.00	—	—	.34	1.84	.59	3.81
86.6 Acres, 1924__	21.6	2.38	.91	.12	.24	.25	1.04	.59	3.34
FLAX—									
142.0 Acres, 1923__	10.8	.48†	.23	.66	1.19	.30	1.65	.52	1.96
103.1 Acres, 1922__	7.8	2.71	1.00	.92	1.33	.73	2.15	.66	5.02
168.8 Acres, 1924__	7.8	3.09‡	.75	.94	1.61	.52	1.80	.62	5.17
EMMER—									
113.4 Acres 1924__	39.8	.83	.36	.69	1.33	.31	1.25	.52	2.35

*Farms using tractors are not included in these averages.

†Discd in on potato land.

‡Breaking of new land included with plowing.

Table 57.—HORSE WORK REQUIREMENTS PER ACRE OF WHEAT, RYE, FLAX, AND EMMER, OPERATIONS PRIOR TO HARVEST.

		Plowing		Discing		Harrowing		Seed- ing	
Item	Ave. Yield Per Acre	Hours	Times Over	Hours	Times Over	Hours	Times Over	Hours	Total Hours
WHEAT—									
134.9 Acres, 1923	14.1	8.03	.66	1.97	.44	1.40	1.78	2.25	13.65
261.2 Acres, 1922	11.6	8.69	.81	2.32	.73	1.81	1.92	2.14	14.96
77.2 Acres, 1924	19.7	8.76	.80	.91	.23	1.79	1.72	2.67	14.13
RYE—									
127.3 Acres, 1923	11.3	12.32	1.00	—	—	1.77	1.78	2.47	16.56
157.6 Acres, 1922	17.9	10.74	1.00	—	—	1.26	1.84	2.18	14.18
86.6 Acres, 1924	21.6	10.71	.91	.49	.24	1.17	1.04	2.40	14.77
FLAX—									
142.0 Acres, 1923	10.8	2.65†	.23	2.82	1.19	1.26	1.65	2.06	8.79
103.1 Acres, 1922	7.8	12.32	1.00	4.15	1.33	2.00	2.15	2.57	21.04
168.8 Acres, 1924	7.8	13.94‡	.75	4.40	1.61	2.21	1.80	2.43	22.98
EMMER—									
113.4 Acres, 1924	39.8	3.86	.36	2.80	1.33	1.22	1.25	1.51	9.39

*Farms using tractor are not included in these averages.

†Discd in on potato land.

‡Breaking of new land included with plowing.

Table 58.—MAN LABOR REQUIREMENTS PER ACRE OF WHEAT, RYE, FLAX, AND EMMER, HARVESTING OPERATIONS.

Item	Ave. Yield Per Acre	Total Before Harvest Hours	Binding Hours	Shocking Hours	Stacking Hours	Threshing Hours	Total Har- vesting Oper- ations* Hours	Total all Operations* Hours	Cost per Bushel Dollars
WHEAT—									
134.9 Acres, 1923	14.1	2.84	.67	.93	---	1.92	3.52	6.36	1.11
261.2 Acres, 1922	11.6	3.78	.68	.66	---	1.52	2.86	6.64	1.40
77.2 Acres, 1924	19.7	3.27	.47	.66	---	1.99	3.12	6.39	.82
RYE—									
127.3 Acres, 1923	11.3	3.48	.68	.63	.77	1.63	2.94	6.42	1.30
157.6 Acres, 1922	17.9	3.81	.87	1.16	1.74	2.33	4.36	8.17	.87
86.6 Acres, 1924	21.6	3.34	.76	.94	1.61	2.09	3.79	7.13	.71
FLAX—									
142.0 Acres, 1923	10.8	1.96	.96	1.01	4.50	1.43	3.40	5.36	1.50
103.1 Acres, 1922	7.8	5.02	.86	.61	2.96	1.83	3.30	8.32	1.81
168.8 acres, 1924	7.8	5.17	.76	.61	2.18	2.13	3.50	8.67	2.16
EMMER—									
113.4 Acres, 1924	39.8	2.35	.63	1.13	2.76	2.88	4.64	6.99	.47

*Average shock threshing only.

Table 59.—HORSE WORK REQUIREMENTS PER ACRE OF WHEAT, RYE, FLAX, EMMER, HARVESTING OPERATIONS.

Item	Ave. Yield Per Acre	Total Before Harvest Hours	Binding Hours	Shocking Hours	Stacking Hours	Threshing Hours	Total Har- vesting Oper- ations* Hours	Total all Operations* Hours
WHEAT—								
134.9 Acres, 1923-----	14.1	13.65	3.04	---	---	3.48	6.52	20.17
261.2 Acres, 1922-----	11.6	14.96	2.98	---	---	2.92	5.90	20.86
77.2 Acres, 1924-----	19.7	14.13	2.08	---	---	3.18	5.26	19.39
RYE—								
127.3 Acres, 1923-----	11.3	16.56	2.99	---	1.03	2.70	5.69	22.25
157.6 Acres, 1922-----	17.9	14.18	3.48	---	3.02	4.02	7.50	21.68
86.6 Acres, 1924-----	21.6	14.77	3.05	---	1.51	3.57	6.62	21.39
FLAX—								
142.0 Acres, 1923-----	10.8	8.79	4.12	---	6.00	1.79	5.91	14.70
103.1 Acres, 1922-----	7.8	21.04	3.21	---	4.41	3.05	6.26	27.30
168.8 Acres, 1924-----	7.8	22.98	3.06	---	2.12	3.46	6.52	29.50
EMMER—								
113.4 Acres, 1924-----	39.8	9.39	2.67	---	3.63	5.15	7.82	17.21

*Average for shock threshing only.

Table 60.—MAN LABOR REQUIREMENTS PER ACRE OF ALFALFA.

Farm No.	Acres per Farm	Yield per Acre* Tons	Mowing Hours	Raking Hours	Stacking Hours	Hauling Hours	Total Hours	Cost per Ton Dollars
(First Cutting, 1923)								
12-----	7.0	2.0	1.00	.40	2.36	---	3.76	5.67
17-----	16.5	1.4	1.10	.55	2.32	---	3.97	12.12
19-----	5.4	1.9	1.11	.28	---	2.59	3.98	7.22
10-----	3.6	3.3	.83	.42	3.33	---	4.58	5.11
4-----	7.6	2.0	1.05	.53	3.02	---	4.60	8.44
2-----	19.9	1.6	1.00	.45	3.19	---	4.64	7.42
15-----	2.4	3.7	1.67	.83	---	2.29	4.79	4.67
14-----	11.2	1.2	1.34	.36	3.12	---	5.09	8.52
7-----	6.9	2.1	1.30	.65	2.95	.29	5.24	7.36
18-----	14.1	2.4	1.42	.89	1.99	---	5.44	7.71
11-----	12.4	2.0	1.20	.60	3.90	---	5.70	8.63
20-----	9.3	1.1	1.29	1.19	4.30	---	8.18	10.96
Ave. 13 farms 1923----	9.4		1.18	.60	2.96	2.71	4.74	8.08
Ave. 13 farms 1922----	7.3		1.38	.78	3.47	4.14	5.63	9.02
Ave. 12 farms 1924----	11.7		1.11	.54	3.20	3.52	4.85	8.13

*Total yield from all cuttings.

Table 61.—MAN LABOR REQUIREMENTS PER ACRE OF ALFALFA

Farm No.	Acres per Farm	Yield per Acre (Tons)	Mowing Hours	Raking Hours	Stacking Hours	Hauling Hours	Total Hours
(Second Cutting, 1923)							
12-----	7.0		1.14	.43	2.00	---	3.57
2-----	11.4		1.06	.53	---	2.28	3.87
4-----	7.6		.86	.53	2.56	---	3.95
14-----	5.6		.89	.72	3.40	---	5.01
11-----	12.4		1.20	.30	4.60	---	6.10
10-----	3.6		.111	.55	4.58	---	6.24
15-----	2.4		1.67	.83	---	4.80	7.30
17-----	16.5		1.09	.49	4.07	1.50	7.53
Ave. 8 farms, 1923----	9.7		1.00	.46	3.56	2.44	7.46
Ave. 10 farms, 1922----	10.9		1.13	.59	3.00	2.10	6.82
Ave. 9 farms, 1924----	12.1		1.08	.51	3.13	2.28	7.00
Third Cutting, 1923							
18-----	14.1		1.21	.53	1.63	---	3.94
4-----	7.6		1.05	.79	2.36	---	4.20
11-----	12.4		1.20	.50	2.70	---	4.40
Ave. 3 farms, 1923----	11.3		1.17	.58	2.14	---	3.89
Ave. 7 farms, 1922----	10.6		1.04	.38	2.16	2.10	3.58

PROFITABLE FARMING SYSTEMS

73

Table 62.—HORSE WORK REQUIREMENTS PER ACRE OF ALFALFA.

Farm No.	Acres per Farm	Yield per Acre* (Tons)	Mowing Hours	Raking Hours	Stacking Hours	Hauling Hours	Total Hours
First Cutting, 1923.							
12-----	7.0	2.0	2.00	.90	1.57	---	4.47
17-----	16.5	1.4	2.30	1.09	2.64	---	7.03
19-----	5.4	1.9	2.22	.56	---	2.59	5.37
10-----	3.6	3.3	1.67	.83	3.33	---	5.83
4-----	7.6	2.0	2.10	1.05	3.94	---	7.09
2-----	19.9	1.6	2.00	.90	4.07	---	6.97
15-----	2.4	3.7	3.33	1.67	---	2.50	7.50
14-----	11.2	1.2	2.68	.72	2.15	---	5.55
7-----	6.9	2.1	2.60	1.30	2.95	.58	7.43
18-----	14.1	2.4	2.84	1.77	3.12	---	7.73
11-----	12.4	2.0	2.40	1.20	5.20	---	8.80
20-----	9.3	1.1	2.58	2.38	8.60	---	13.56
Ave. 13 farms, 1923-----	9.4		2.36	1.20	3.92	3.28	1.48
Ave. 13 farms, 1922-----	7.3		2.76	1.56	4.95	5.67	9.27
Ave. 12 farms, 1924-----	11.7		2.22	1.08	3.14	5.80	6.44

*Total yield from all cuttings.

Table 63.—HORSE WORK REQUIREMENTS PER ACRE OF ALFALFA.

Farm No.	Acres per Farm	Yield per Acre—Tons	Mowing Hours	Raking Hours	Stacking Hours	Hauling Hours	Total Hours
Second Cutting, 1923.							
12-----	7.0		2.29	.86	2.00	---	5.15
2-----	11.4		2.11	1.06	---	2.11	5.28
4-----	7.6		1.71	1.05	3.42	---	6.18
14-----	5.6		1.79	1.43	2.86	---	6.08
11-----	12.4		2.40	.60	4.04	---	7.04
10-----	3.6		2.22	1.11	4.72	---	8.05
15-----	2.4		3.33	1.67	---	5.20	10.20
17-----	16.5		2.18	.98	5.13	1.50	9.79
Ave. 8 farms, 1923-----	9.7		2.00	.92	3.87	2.38	6.79
Ave. 10 farms, 1922-----	10.9		2.26	1.18	3.61	3.13	7.05
Ave. 9 farms, 1924-----	12.1		2.16	1.02	3.26	2.32	6.44
Third Cutting, 1923							
18-----	14.1		2.42	1.06	1.63	---	5.11
4-----	7.6		2.10	1.58	4.47	---	8.15
11-----	12.4		2.40	1.00	4.40	---	7.80
Ave. 3 farms, 1923-----	11.3		2.34	1.16	3.25	---	6.75
Ave. 7 farms, 1922-----	10.6		2.08	.76	2.44	3.03	5.28

Table 64.—MAN LABOR REQUIREMENTS PER ACRE OF TIMOTHY SEED AND MIXED HAY.

	Yield per Acre Tons	Mowing Hours	Raking Hours	Stacking Hours	Hauling Hours	Binding Hours	Shocking Hours	Threshing Hours	Total Hours	Cost per Ton Dollars
Timothy and Clover										
162.7 Acres, 1923-----	1.3	1.25	.54	4.67†	4.55†	---	---	---	6.46*	9.94
292.2 Acres, 1922-----	1.3	.98	.55	3.45†	3.72†	---	---	---	4.98*	9.92
162.4 Acres, 1924-----	1.4	1.19	.68	5.65†	3.56†	---	---	---	7.52*	10.20
Timothy Seed										
	Bus.									Cost per Bu.
89.4 Acres, 1923-----	4.7	---	---	---	---	.59	.59	1.23	2.41	2.25
86.4 Acres, 1922-----	6.1	---	---	---	---	.60	.75	1.50	2.85	1.70
94.2 Acres, 1924-----	3.1	---	---	---	---	.53	.29	1.14	1.96	2.56

HORSE WORK REQUIREMENTS PER ACRE OF TIMOTHY SEED AND MIXED HAY

Timothy and Clover										
	Bus.									
162.7 Acres, 1923-----	1.3	2.50	1.08	5.65†	5.75†	---	---	---	*9.23	---
292.2 Acres, 1922-----	1.3	1.96	1.10	3.50†	5.34†	---	---	---	*6.56	---
162.4 Acres, 1924-----	1.4	2.40	1.36	4.44†	4.37†	---	---	---	*8.20	---
Timothy Seed										
	Bus.									
89.4 Acres, 1923-----	4.7	---	---	---	---	3.02	---	2.15	5.17	---
86.4 Acres, 1922-----	6.1	---	---	---	---	3.06	---	2.33	5.39	---
94.2 Acres, 1924-----	3.1	---	---	---	---	2.57	---	1.79	4.36	---

*Totals for stacking only.

†Averages for acreage actually stacked or hauled.

Table 65.—MAN LABOR REQUIREMENTS PER ACRE OF SWEET CLOVER AND WILD HAY.

Item	Yield per Acre Tons	Mowing Hours	Raking Hours	Stacking Hours	Hauling Hours	Total Hours	Cost per Ton Dollars
Sweet Clover—							
54.4 Acres, 1923-----	1.4	1.18	.44	4.26*	4.62*	5.88†	8.29
23.0 Acres, 1922-----	1.4	.96	.26	4.63*	2.50*	5.85†	8.15
90.9 Acres, 1924-----	1.0	1.32	.60	3.13*	2.06*	5.05†	10.42
Wild Hay—							
110.9 Acres, 1923-----	1.5	1.23	.41	4.61*	2.47*	6.25†	5.97
82.5 Acres, 1922-----	1.2	1.36	.47	3.37*	4.66*	5.20†	8.24
152.8 Acres, 1924-----	1.0	1.11	.47	1.83*	2.91*	3.41†	8.41

HORSE WORK REQUIREMENTS PER ACRE FOR SWEET CLOVER AND WILD HAY

Sweet Clover—							
54.4 Acres, 1923-----	1.4	2.35	.88	4.84*	7.04*	8.07†	-----
23.0 Acres, 1922-----	1.4	1.91	.52	5.44*	5.00*	7.88†	-----
90.9 Acres, 1924-----	1.0	2.64	1.20	2.78*	2.61*	6.62†	-----
Wild Hay—							
110.9 Acres, 1923-----	1.5	2.46	.82	5.47*	3.94*	8.75†	-----
82.5 Acres, 1922-----	1.2	2.82	.94	3.39*	6.19*	7.15†	-----
152.8 Acres, 1924-----	1.0	2.22	.95	1.71*	3.45*	4.88†	-----

*Averages are for acreages actually stacked or hauled.

†Totals are for acreage stacked.

Table 66.—MATERIALS REQUIRED PER ACRE IN PRODUCING CROPS.

Crop	Year	Yield Bushels	Seed Bushels	Twine Pounds	Threshing Cost Dollars	Seed Treat- ment, Sacks, Etc., Dollars
Oats-----	1922	36.5	2.8	2.1	1.06	----
	1923	42.5	2.8	2.7	1.31	----
	1924	51.7	2.5	2.9	1.56	----
	3-Yr. Ave.	44.3	2.7	2.6	1.34	----
Barley -----	1922	20.6	2.0	2.1	.82	----
	1923	26.8	1.9	2.4	1.07	----
	1924	30.5	1.9	2.5	1.10	----
	3-Yr. Ave.	24.5	1.9	2.3	.95	----
Wheat -----	1922	11.6	1.4	1.7	.74	----
	1923	14.1	1.7	2.5	.87	----
	1924	19.7	1.6	2.1	1.18	----
	3-Yr. Ave.	13.4	1.5	2.0	.85	----
Flax-----	1922	7.3	.6	1.7	.88	----
	1923	10.3	.6	1.4	1.36	----
	1924	7.9	.6	1.5	.80	----
	3-Yr. Ave.	8.3	.6	1.5	1.00	----
Potatoes -----	1922	160.0	13.7	---	---	1.13
	1923	169.0	14.1	---	---	4.57
	1924	99.0	13.0	---	---	3.65
	3-Yr. Ave.	160.0	13.6	---	---	2.95

Table 67.—UNIT REQUIREMENTS OF WORK HORSES.

Farm No.	No. of Horses	Total Grain Pounds	Roughage				Pasture Days	Man Labor Hours	Horse Labor Hours	Shoeing, Veterinary & Medicine (Dollars)	Work per Horse Hours
			Bundle Corn Pounds	Tame Hay Pounds	Other Hay Pounds	Total Roughage Pounds					
13	7.7	3824	----	---	5006	5006	33	79	19	---	1139
11	5.7	4900	----	---	4029	4029	19	161	25	---	1074
16	9.0	5657	1178	---	4422	5600	27	92	22	---	1065
18	10.0	5902	100	180*	6140	6420	32	115	2	.44	1001
7	11.2	4159	----	---	4427	4427	34	96	38	---	982
4	9.2	4649	638	584	4735	5957	69	92	21	1.27	976
3	6.2	4459	----	---	3072	3072	16	108	27	.72	961
5	7.1	4456	----	---	5565	5565	34	133	14	.28	897
9	6.0	4091	----	---	6700	6700	---	119	28	.50	885
17	11.1	5755	81	---	5758	5839	51	95	12	---	874
6	6.0	3848	----	---	3933	3933	21	89	20	---	857
12	10.0	4395	240	5920	---	6160	44	68	6	---	810
8	6.0	2411	----	7266	---	7266	55	80	5	---	788
15	17.3	3920	----	---	5920	5920	47	61	15	.14	761
1	10.7	5256	94	---	5647	5741	38	100	13	.02	738
2	12.0	4894	150	---	4467	4617	27	80	9	.63	731
19	6.3	2755	----	---	2370	2370	54	99	19	.79	699
20	7.0	3886	----	---	5657	5657	56	84	---	---	588
14	8.0	3630	175	---	5500	5675	55	78	7	---	570
10	6.0	3307	482	---	5768	6250	75	91	10	---	423
Ave. 20 farms, 1923	8.6	4417	161	626	4599	5387	40	93	15	.23	841
Ave. 20 farms, 1922	9.0	4038	389	204	4895	5488	63	87	16	.60	810
Ave. 20 farms, 1924	9.0	3737	268	1120	2738	4579	58	67	10	.10	766

*Sugar Cane.

Table 68.—UNIT REQUIREMENTS PER 100 POUNDS OF PORK PRODUCED, 1923.

Farm No.	Pork Produced Pounds	Corn Pounds	Small Grain Pounds	Total Grain Pounds	Tankage Pounds	Skim milk Pounds	Potatoes Pounds	Pasture Days	Labor— Man (Hrs.)	Labor— Horse (Hrs.)	Vet. Service Dollars	Cost of Pro- ducing 100 lbs. Dollars
17-----	35,335	310	31	341	---	---	---	6.43	1.84	.10	---	4.62
7-----	29,206	355	27	382	---	108	---	11.80	2.63	.50	.04	5.89
18-----	28,892	424	120	544	1.00	158	---	18.62	3.54	1.58	.02	8.14
2-----	28,071	510	32	542	---	---	---	16.89	3.08	.20	.29	9.28
1-----	19,952	307	28	335	---	117	---	7.41	3.40	.34	.03	6.16
16-----	19,205	338	176	514	---	---	31	9.76	2.82	.25	---	7.87
14-----	18,952	579	226	805	---	122	---	17.16	3.68	1.10	.01	11.14
4-----	18,854	419	59	478	---	247	---	7.88	3.23	.80	.57	8.79
12-----	16,165	403	29	432	---	150	---	8.65	2.70	.40	---	6.92
11-----	15,862	379	93	472	---	159	---	11.28	2.54	.05	.21	7.28
15-----	15,853	560	89	649	---	10	66	10.65	4.64	.90	.18	13.04
10-----	14,201	511	81	592	.70	194	2	3.32	2.50	.26	---	6.15
9-----	13,178	527	32	559	.70	7	---	7.10	3.60	.40	.22	8.00
19-----	10,588	401	348	749	---	137	27	14.82	4.20	1.10	.38	11.80
5-----	9,510	454	34	488	---	248	---	15.97	4.15	.53	.13	8.07
3-----	9,180	325	6	331	---	114	---	12.89	3.19	.34	.42	6.62
6-----	6,635	422	66	488	---	48	---	18.73	4.08	.66	.29	8.18
20-----	6,133	371	9	380	---	69	---	6.82	3.30	1.10	---	5.92
8-----	5,170	442	20	462	---	65	12	11.09	4.00	1.60	---	7.88
13-----	3,920	418	159	577	---	229	38	11.00	4.47	1.00	---	10.17
Ave. 20 farms 1923-----	16,243	408	79	487	.18	98	7	8.42	3.20	.57	.12	7.80
Ave. 20 farms 1924-----	14,224	464	94	558	.65	98	10	6.73	2.73	.54	.05	9.45
Ave. 20 farms 1922-----	13,925	432	53	485	.68	87	8	7.50	2.98	.47	.17	5.92

Table 69.—UNIT REQUIREMENTS AND PRODUCTION OF CHICKENS, 100 HEN BASIS, 1923.

Farm No.	Number Chickens	Number Eggs	Poultry Pounds	Total Grain Pounds	Skimmilk Pounds	Supplement Pounds	Grit Pounds	Veterinary and Medicine Dollars	Labor—Man (Hrs.)	Labor—Horse (Hrs.)
8-----	154	8463	641	3883	1841		65	1.62	139	14
9-----	178	8145	363	8872	915				157	2
1-----	115	7215	624	3181				.91	326	
4-----	53	6876	1044	15185	8904	2077		3.59	648	40
13-----	102	6501	683	8110	1065	20		.49	222	31
16-----	211	6291	176	8665		24	47		210	14
2-----	356	5871	132	3425					112	
15-----	95	5871	807	8314	800		105		215	21
10-----	192	5811	638	9499	1792	52		.31	211	11
20-----	97	5715	861	5897	188	7			266	1
19-----	93	5373	358	3699	384				213	4
3-----	155	4680	374	4110	1086	16		.48	152	4
6-----	105	4020	321	4868	320				158	2
5-----	192	3846	190	2700	970	104			153	
14-----	199	2817	500	2059	917				127	
11-----	184	2100	259	2952	135				178	6
Av. 16 farms, 1923-----	155	5476	417	5326	845	80	26	.24	213	19
Av. 17 farms, 1922-----	169	4599	336	5027	1236	50	21	.74	203	12
Av. 19 farms, 1924-----	137	4483	417	5537	1041	150	64	1.86	192	

Table 70.—UNIT REQUIREMENTS PER YEAR FOR A COW, 1923.

Farm No.	Roughage		Total Grain Pounds	Alfalfa Pounds	Other Hay Pounds	Stover Pounds	Total Dry Roughage Pounds	Silage Pounds	Pasture Days	Veterinary Service (Dollars)	Labor—Man (Hrs.)	Labor—Horse (Hrs.)
	Number of Cows	Butterfat per Cow Pounds										
10-----	8.66	245	2800	---	6120	1062	7182	---	135	.03	124	16
11-----	16.25	215	730	1735	---	---	1735	3052	175	.37	86	2
4-----	9.92	135	245	807	1350	1250	3407	---	156	---	108	17
3-----	16.00	166	676	---	2437	1612	4049	---	172	.56	118	54
1-----	15.58	153	707	---	1515	488	2003	---	206	.29	93	12
13-----	4.50	153	418	---	1022	3333	4355	---	188	---	163	15
6-----	5.00	131	1153	---	500	3040	3540	2900	130	---	127	15
18-----	15.50	130	439	1174	3110	245	3548	981	162	.36	91	3
12-----	13.16	124	267	471	1261	821	2553	---	167	---	70	4
5-----	17.25	111	571	267	1009	893	2169	---	177	.24	87	7
9-----	7.00	105	444	1171	1857	400	3428	---	129	.71	129	18
19-----	11.25	97	12	534	1093	142	1939	---	158	---	80	8
20-----	5.75	97	1113	2957	---	---	2957	---	153	---	129	5
14-----	8.57	97	814	---	1352	1049	2401	---	186	---	92	2
Av. 14 farms, 1923-----	11.03	138	679	624	1633	823	3099	415	168	.22	100	13
Av. 12 farms, 1922-----	11.44	135	1025	638	2276	990	3904	1012	131	.34	104	15
Av. 16 farms, 1924-----	11.03	146	1151	999	2147	799	3945	860	127	.05	102	10

Table 71.—UNIT REQUIREMENTS OF MIXED CATTLE, ANIMAL UNIT BASIS, 1923

Farm No.	Animal Units	Number of Cows	Roughage												Vet. and Med. Dollars	Labor—Man (Hours)	Labor—Horse (Hours)
			Beef Produced Pounds	Butterfat Produced (Pounds)	Total Grain Pounds	Alfalfa Pounds	Other Hay Pounds	Stover Pounds	Bundle Corn Pounds	Total Dry Roughage (Pounds)	Silage Pounds	Pasture Days					
5-----	33.13	17.25	461	58	625	151	948	465	293	1856	-----	180	.31	60	6		
14-----	15.71	8.58	374	53	791	-----	1082	573	273	1929	-----	174	---	65	2		
18-----	20.13	15.50	372	100	473	964	4008	189	99	5260	-----	166	.27	88	4		
11-----	25.08	16.25	368	86	636	1920	-----	-----	-----	1920	-----	170	.24	74	2		
20-----	9.54	5.75	363	58	1018	2704	-----	-----	-----	2704	-----	149	---	101	4		
4-----	14.88	9.92	334	123	490	322	1209	833	322	3172	-----	140	.12	88	16		
12-----	22.79	13.16	311	71	459	421	1032	474	118	1605	-----	142	---	53	3		
1-----	26.00	15.58	288	91	724	250	1333	292	69	1945	-----	194	.19	73	11		
3-----	22.04	16.00	283	121	614	-----	1924	1171	68	3162	-----	177	.40	99	43		
10-----	11.95	8.66	268	178	2494	284	5204	770	100	6360	-----	126	.18	108	12		
13-----	8.00	4.50	256	86	574	-----	875	1685	617	3179	-----	176	---	118	11		
6-----	7.46	5.00	256	87	1207	-----	496	2037	368	2902	2631	119	.04	111	14		
9-----	10.00	7.00	203	74	489	1160	1900	280	60	3499	-----	120	.50	111	17		
19-----	19.92	11.25	104	55	35	452	798	80	-----	1365	35	156	---	61	7		
Av. 14 farms, 1923-----	17.57	11.03	318	86	679	818	1427	515	147	2676	316	163	.18	79	11		
Av. 8 farms, 1922-----	18.03	9.95	315	74	967	740	1674	572	296	3282	1486	156	.13	74	11		
Av. 15 farms, 1924-----	18.41	9.38	301	86	1049	782	1323	470	269	2844	852	166	.04	76	8		

Acknowledgments

Acknowledgment is due to the farmers in Kingsbury County who cooperated in supplying the data upon which this study is based; to Mr. C. G. Worsham, formerly of the Farm Economics Department of South Dakota State College, who supervised the collection and tabulation of the data; to Mr. R. H. Rogers, of the Extension Department of South Dakota State College, who assisted in preparing the outlines for the suggested systems of farming and the charts used in this bulletin; and Professor M. R. Benedict, head of the Farm Economics Department of South Dakota State College, and Mr. J. W. Tapp of the Bureau of Agricultural Economics, United States Department of Agriculture, for valuable criticisms and suggestions.