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UNIVERSITY OF MINNESOTA
Department of Agriculture
and
UNITED STATES DEPARTMENT OF AGRICULTURE
Bureau of Agricultural Economics
Cooperating

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F A R M C O S T S - 1951

SOUTHERN MINNESOTA

by

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Introduction

A study of farm labor and farm costs was begun on a selected group of farms in southern Minnesota on January 1, 1951. This is part of a broad study of farm organization and factors affecting earnings of farmers in Minnesota. The specific objectives of this phase of the study are: (1) to determine the labor requirement and factors affecting labor efficiency on farms; (2) to compare the costs and returns for different crops and livestock enterprises, and (3) to obtain data on the costs of operating farm machinery.

Data were obtained from 32 farms, scattered over the southern quarter of the state. All of these men were members of the Southeast and Southwest Minnesota Farm Management Services. In connection with those services they kept records of their inventories, purchases, sales, crops produced, feeds fed, livestock changes, and farm products used in the house. In addition they kept records of the use of their labor and power and of the operations performed on their crops. These records were kept by the farmers, but were checked at intervals by the research workers to insure uniformity.

The counties in which these farmers were located, and the number in each were:

Rock --- 2	Jackson --- 3	LeSueur --- 2
Nobles - 5	Faribault - 2	Goodhue --- 3
Murray - 1	Freeborn -- 4	Wabasha --- 2
Redwood- 2	Steele ---- 2	Winona ---- 4

Some of the data obtained in 1951 are presented in this report. Data for 1951 and 1952 will be published in 1953.

This report presents mostly averages for the various items. For some tables the farms are divided into two groups -- those with emphasis on dairying and those with emphasis on feeder cattle and hogs. Other analyses are made for some of the entries. These data will serve as a source of information for any persons interested in agriculture. They will provide useful information in planning farming operations.^{1/}

Only direct costs have been used in the calculation of enterprise costs and returns and of the machinery and power costs. Some of the overhead costs and joint costs which can be allocated only arbitrarily have been omitted. Therefore, the enterprise costs presented in the report do not represent the total costs of production. These summaries of the more direct costs and returns provide data which the farmer can use for comparison with his own business. Since the data for different enterprises have been calculated on a comparable basis they can also be used in the selection of alternative enterprises.

^{1/} The annual reports for the Southeast Minnesota Farm Management Service (Mimeographed Report No. 195) and for the Southwest Service (Mimeographed Report No. 197) present averages for a larger number of farms for inventories, earnings, use of land, crop yields, feed for livestock, and production of livestock. These reports are available from the Division of Agricultural Economics, University Farm, St. Paul 1, Minnesota.

Description of the Farms

Records were obtained from 32 farms. Dairy cattle provided a major source of income on 21 of these farms; 17 of them were in southeastern and 4 in southwestern Minnesota. Feeder cattle or hogs or both were the major source of income on 10 of the farms -- all in southwestern Minnesota. One farm had a beef breeding herd. Since the type of farming is not comparable with the others, this farm is not included in Tables 1 - 4.

The use of land on these farms is shown in Table 1. The feeder cattle and hog farms are larger than the dairy farms. They raise more corn and cash crops.

The amount of livestock on these farms is summarized in Table 2. The farmers on the feeder cattle and hog farms had more livestock than the dairy farmers, but they also operated larger farms. The intensity of stocking, as measured by animal units per 100 acres was approximately the same for the two groups.

The average inventories of these farms are presented in Table 3. The values used are those which the farmers carry in their accounts, and are somewhat conservative. In most cases land is carried on the books at cost, and building and machinery are carried at cost depreciated to present age. Much of the land and buildings and some of the machinery could be sold today for more than the value shown here. Many of the dairy herds also are valued at less than current market value.

The average earnings of these farms are presented in Table 4. These data are presented here in order that the reader will be able to interpret more accurately the information presented in the remainder of this report. They do not constitute evidence that dairy farms generally are more profitable than feeder cattle-hog farms. At least two important factors cause the earnings of these feeder cattle-hog farms to be low. First, four of these ten farmers have just begun to farm, and have not had time to develop their efficiency to the level of established farmers. Among the dairy farmers, 19 of the 21 are well-established farmers. Second, the cool summer and early frost of 1951 reduced the yield of corn more on the feeder-cattle-hog farms in the southwestern part of the state than on the dairy farms, most of which are located in the southeast. Corn yields averaged 34 bushels to the acre on the feeder cattle-hog farms and 52 bushels on the dairy farms. Normally the yields would be approximately the same in the two areas.

Table 1. Use of Land

Southern Minnesota Detailed Accounting Farms - 1951

Crops	21 Dairy Farms		10 Feeder Cattle-Hog Farms	
	Number growing this crop	Average acres per farm	Number growing this crop	Average acres per farm
Oats	19	33.9	10	35.2
Barley	7	6.2	6	17.8
Flax	4	4.2	5	22.4
Other small grain	3	3.4	-	-
Total small grains		47.7		75.4
Corn (husked)	21	42.5	10	81.5
Corn silage	6	7.4	3	9.4
Soybeans	5	8.2	5	17.1
Other intertilled crops	2	1.1	1	1.7
Total intertilled crops		59.2		109.7
Alfalfa mixtures	21	33.1	10	25.9
Other tame hay	3	1.2	2	6.3
Legume or grass seed	1	.2	1	.5
Total hay and seed harvested		34.5		32.7
Tillable pastures	20	22.3	9	23.2
Tillable land not cropped	3	.9	2	6.6
Total tillable acres		164.6		247.6
Non-tillable hay and pasture	15	17.5	5	22.3
Farmstead		6.5		10.4
Timber, waste, and roads		13.1		13.4
Total acres in farm		201.7		293.7

Table 2. Livestock and Livestock Production per Farm

Southern Minnesota Detailed Accounting Farms - 1951

Item	21 Dairy Farms		10 Feeder Cattle-Hog Farms	
	Number producing this livestock	Average	Number producing this livestock	Average
Average acres per farm		202		294
Number of dairy cows	21	20.3	6	1.5
Animal units of other dairy cattle	21	11.6	6	.8
Pounds of beef produced	2	314	9	17,154
Pounds of pork produced	18	24,009	10	48,691
Number of hens	16	189	10	136
Total animal units per farm		55.2		83.7
Animal units per 100 acres		27.4		28.5

Table 3. Summary of Farm Inventories per Farm
Southern Minnesota Detailed Accounting Farms - 1951

Item	21 Dairy Farms		10 Feeder Cattle-Hog Farms	
	January 1	December 31	January 1	December 31
Size of farm (acres)	202		294	
Dairy and dual purpose cows	\$ 2,756	\$ 3,091	\$ 218	\$ 261
Other dairy & dual purpose cattle	1,796	2,282	88	99
Beef cattle (incl. feeders)	96	442	6,572	9,556
Hogs	1,249	1,501	2,721	2,945
Sheep (including feeders)	153	194	317	534
Poultry (including turkeys)	247	250	150	146
Productive livestock (total)	(6,297)	(7,760)	(10,066)	(13,541)
Horses	39	30	46	50
Crop, seed, and feed	4,598	4,581	9,541	7,493
Power mach. (farm share)	2,707	2,979	3,942	4,323
Crop and general mach. (farm share)	3,246	3,895	3,702	4,333
Livestock equipment & supplies	675	650	512	611
Mach. & equipment (total)	(6,628)	(7,524)	(8,156)	(9,267)
Buildings, fences, etc.	11,526	12,283	10,743	10,878
Land	11,434	11,434	20,251	20,251
Total farm capital	\$ 40,522	\$ 43,612	\$ 58,803	\$ 61,480

Table 4. Summary of Farm Earnings per Farm
Southern Minnesota Detailed Accounting Farms - 1951

	21 Dairy Farms :	10 Feeder Cattle- Hog Farms
FARM RECEIPTS		
Dairy and dual-purpose cows	\$ 1,428	\$ 140
Dairy products	6,182	173
Other dairy & dual-purpose cattle	1,092	9
Beef cattle (including feeders)	-	13,907
Hogs	4,522	8,834
Sheep and wool (including feeders)	124	766
Poultry (including turkeys)	551	411
Eggs	1,445	623
Corn	508	243
Small grain	473	1,881
Other crops	399	1,033
Machinery & equip. sold	357	490
Agricultural adjustment payments	60	79
Income from work off the farm	313	102
Miscellaneous	82	100
(1) Total farm sales	\$ 17,536	\$ 28,790
(2) Increase in farm capital	3,090	2,677
(3) Family living from the farm	854	727
(4) Total farm receipts (1)+(2)+(3)	\$ 21,480	\$ 32,194
FARM EXPENSES		
Dairy and dual-purpose cows bought	\$ 222	\$ 82
Other dairy & dual-pur. cattle bought	407	28
Beef cattle bought (incl. feeders)	244	10,352
Hogs bought	276	186
Sheep bought (including feeders)	10	690
Poultry bought (including turkeys)	154	173
Misc. livestock expenses	393	365
Misc. crop expenses	700	1,611
Feed bought	2,902	4,210
Custom work hired	540	358
Mech. power mach. (farm share)(new)	862	1,281
Mech. power mach. (farm share)(upkp.)	201	296
Mech. power (farm share)(gas, oil, etc.)	835	1,072
Crop and general mach. (new)	1,323	1,378
Crop and general mach. (upkp.)	204	367
Livestock equipment (new)	92	186
Livestock equipment (upkp.)	126	164
Buildings and fencing (new)	1,368	628
Buildings and fencing (upkp.)	316	340
Hired labor	921	1,139
Taxes	534	570
General farm and insurance	220	269
(5) Total farm purchases	\$ 12,850	\$ 25,745
(6) Decrease in farm capital	-	-
(7) Interest on farm capital	2,103	3,007
(8) Unpaid family labor	450	491
(9) Board furnished hired labor	202	31
(10) Total farm exp. (sum of (5) to (9))	15,605	29,274
(11) Operator's labor earnings (4) - (10)	5,875	2,920

Comparative Costs and Returns for Crops

Data on costs and returns for the principal crops grown on these farms are presented in Table 5. As stated previously, only those items which aid in determining the most profitable combination of crops are presented. The overhead cost of management, for example, is not included.

The methods used in computing these data were:

Man labor was charged at a uniform rate of 80 cents per hour for all labor. This rate is the average of what farmers in the area paid, or estimated they would have to pay, to a married man. It includes a charge for house, garden, and a certain amount of farm produce.

Tractor power was charged at cost for each individual farm. A weighted average was used for all tractor hours wherever the farmer used more than one tractor.

Truck was charged at 10 cents per mile.

Auto was charged at 6 cents per mile.

Horse power was charged at cost for individual farms.

Seed was charged at cost. In the cases where seed was home grown the average 1951 market price plus a cleaning charge was used.

Manure was charged at one dollar per ton plus the cost of hauling. The charge was distributed to the crops in the following way: 40% to the field to which the manure was applied, and 60% to other fields normally receiving manure.

Commercial fertilizer was charged at cost excluding P.M.A. refunds. The entire charge was made to the crop to which the fertilizer was applied.

Crop machinery was charged according to the number of acres on which each machine or group of machines was used for a particular crop.

Land charge. A uniform charge of \$10 per acre was used. This represents a close approximation of the average cash rent for land without buildings in 1951.

Building charge. No building charge was made for the storage of crops.

Prices used in determining value produced represent an average of 1951 prices received in the area.

Weighted averages are presented here. That is, the total costs or returns for all farmers have been divided by the total acres.

Table 5. Selected Costs and Returns for Crop Production
Southern Minnesota Detailed Accounting Farms - 1951

	Oats	Barley	Flax	Soy- beans	Corn (Husk- ed)	Corn for Silage	Alfalfa Hay and Silage
Number of farms	29	12	10	9	31	20	30
Acres of crop per farm	36	24	32	34	56	12	31
Production per acre	48.5bu.	26.3bu.	8.0bu.	14.3bu.	44.6bu.	6.3ton	2.9 ^a ton
<u>Costs and returns per acre</u>							
<u>Pre-harvest costs</u>							
Man labor	\$ 1.38	\$ 1.33	\$ 1.46	\$ 2.53	\$ 3.14	\$ 3.20	\$ -
Power	1.45	1.35	1.63	3.10	3.50	3.61	-
Seed	3.27	2.79	4.06	4.55	1.70	1.75	6.06
Manure	1.71	.99	1.02	.94	2.30	2.44	2.39
Comm. fert.	1.34	1.66	.52	-	3.12	.95	.25
Machinery	3.39	2.03	2.10	2.31	3.33	3.66	-
Other	.04	-	.20	-	.29	-	1.52
Total pre-harvest	\$12.58	\$10.15	\$10.99	\$13.43	\$17.38	\$15.61	\$10.22
<u>Harvest costs</u>							
Man labor	\$ 3.14	\$ 2.40	\$ 1.94	\$.79	\$ 1.97	\$ 4.44	\$ 5.53
Power	2.01	1.57	1.31	.60	1.61	2.82	4.18
Twine	.22	.08	.02	-	-	.07	-
Machinery	3.20	2.74	3.18	2.26	2.56	5.51	8.16
Other	.62	.39	.22	-	.32	.67	-
Total harvest	\$ 9.19	\$ 7.18	\$ 6.67	\$ 3.65	\$ 6.46	\$13.51	\$17.87
Land charge	\$10.00	\$10.00	\$10.00	\$10.00	\$10.00	\$10.00	\$10.00
Total cost	\$31.77	\$27.33	\$27.66	\$27.08	\$33.84	\$39.12	\$38.09
Value of crop	\$39.27	\$32.30	\$31.62	\$40.30	\$60.62	\$37.80	\$55.10
Return above costs	\$ 7.50	\$ 4.97	\$ 3.96	\$13.22	\$26.78	\$-1.32	\$17.01
Cost per bushel or ton	\$.66	\$ 1.04	\$ 3.46	\$ 1.89	\$.76	\$ 6.21	\$13.13
Ave. price (calendar year)	\$.81	\$ 1.23	\$ 3.95	\$ 2.82	\$ 1.36	\$ 6.00	\$19.00
<u>Hours of labor and power per acre</u>							
<u>Pre-harvest</u>							
Man labor	1.7	1.5	1.8	3.2	3.9	4.0	-
Tractor	1.6	1.6	1.6	3.1	3.7	3.8	-
Horse	-	.1	-	-	.1	.1	-
<u>Harvest</u>							
Man labor	3.9	3.0	2.4	1.0	2.5	5.6	6.6
Tractor	2.1	1.8	1.3	.6	1.7	3.1	4.3
Horse	.4	-	-	-	.1	-	.4
Total							
Man labor	5.6	4.5	4.2	4.2	6.4	9.6	6.6
Tractor	3.7	3.4	2.9	3.7	5.4	6.9	4.3
Horse	.4	.1	-	-	.2	.1	.4
Bu. of seed per acre	2.6	1.8	1.1	1.2	.13	.18	

^a/ Hay equivalent tons (3 tons of hay silage equivalent to 1 ton of dry hay).

The lowest costs per acre were for barley, flax, and soybeans. (Table 5) These are the principal cash crops in the area. The costs for oats and for husked corn were a little higher. The costs per acre for corn silage and alfalfa were the highest among these seven crops. The crops fall into approximately the same groups if classified by hours of man labor per acre.

The value of the crop and the return above the costs listed are shown in Table 5. However, because of variations in crop yields, comparisons based upon the data for one year do not reflect accurately the long time relationship. The data in Table 6 and 7 give a better basis for selection of crops. These show the average yields for all of the members of the Southeast and Southwest Minnesota Farm Management Services for the 10-year period 1942-51.

Table 6. Comparative Costs for Producing Feed Nutrients
Southern Minnesota

	Average yield 1942-51	T. D. N.* per acre 1942-51	Cost per acre 1951	Cost per 100 lbs. of T.D.N.	Man hours per 100 lbs. of T.D.N.
Grain	bushels				
Corn	48.7	2,223	\$ 34.00	\$ 1.53	.29
Barley	25.5**	944	30.00	3.18	.57
Oats	51.0**	1,134	31.00	2.73	.49
Roughages	tons				
Corn silage	8.5	2,856	41.00	1.44	.34
Alfalfa hay	2.3	2,369	38.00	1.60	.28

* Total digestible nutrients.

** Yields adjusted to 48 and 32 pounds per bushel from an estimated test weight of 44 and 36 pounds.

Most of the crops produced on these farms are used for feed. Farmers, therefore, will be interested in high production per acre, and in low costs per pound of feed nutrients. These comparisons are shown in Table 6. The costs per acre shown in Table 6 (and 7) are not the same as in Table 5. The costs have been adjusted to the long time average yields, and to eliminate some chance variations among crops. Corn, either for grain or for silage, and alfalfa produce the most feed per acre; they produce more than twice as much as barley or oats. These crops also produce feed at the lowest cost per pound of nutrients. Alfalfa will yield more protein per acre than will corn, and usually will contribute more to soil conservation. Corn and alfalfa should be the main crops in sound crop rotations in this area.

Many of these farmers also grow some crops for sale. For this the farmer generally wants a crop with a high net return per acre. Here, too, corn leads (see Table 7). Flax and soybeans are approximately equal, with barley and oats giving the smallest returns.

Table 7. Comparative Returns for Cash Crops
Southern Minnesota

Crop	Bushels per acre 1942-51	Average price 1949-51	Average income per acre	Cost per acre 1951	Return over cost
Soybeans	15.8	\$ 2.44	\$ 38.55	\$ 28.00	\$ 10.55
Flax	11.5	3.64	41.86	29.00	12.86
Barley	25.5*	1.24	31.62	30.00	1.62
Oats	51.0*	.72	36.72	31.00	5.72
Corn	48.7	1.37	66.72	34.00	32.72

* Yields adjusted to 48 and 32 pounds per bushel from an estimated test weight of 44 and 36 pounds.

These data have shown alfalfa to be a desirable feed crop. For maximum benefit in conservation of the soil, alfalfa should be rotated around the farm as rapidly as possible, this means leaving the stand for only a short period. The cost of seeding is a factor affecting this decision. These farmers seeded a total of 374 acres of alfalfa or mixtures of alfalfa with other legumes or grasses. As an average for this acreage they used as seed:

Alfalfa -----	7.0 lbs. per acre
Other legumes -----	1.4 lbs. per acre
Brome grass -----	2.3 lbs. per acre
Timothy -----	.5 lbs. per acre

The average cost of seed was \$6.62 per acre. Commercial fertilizer was applied to 70 per cent of this acreage. Fifteen per cent of the cost of this fertilizer was charged to the nurse crop and the remainder to the alfalfa seeding. The average fertilizer charge per acre seeded was \$4.91. This gives a total seeding cost of \$11.53 per acre. Since most of this alfalfa was seeded along with a nurse crop, it is very difficult to determine the cost of labor, machinery, and other costs that should be charged against the seedings. The costs would be relatively small since most of the work can be done simultaneous with planting of the nurse crop.

Comparative Costs and Returns for Livestock

The data on costs and returns for some of the livestock enterprises produced on these farms for the calendar year 1951 are presented in Table 8. The methods of determining man labor, tractor, truck, auto, and horse, charges are the same as those used for crops. The methods of computation peculiar to the livestock enterprises are:

Feed costs include all feeds bought, home grown feeds at average 1951 farm prices and a charge for pasture ranging from \$.30 per head-month for hogs to \$1.50 per head-month for cows and feeder cattle.

Shelter costs were computed by taking two times the annual depreciation plus interest on investment. This figure was distributed between individual livestock enterprises according to floor space occupied.

Equipment costs for livestock were computed by adding together depreciation, interest on investment, repairs and maintenance.

Interest on livestock was figured at 5% of the average inventory value.

Value produced represents the sum of products marketed, used in the house, fed to livestock, and changes in inventory. All dairy cattle were valued on the basis of sale prices for 1951. This value was used as the basis for computing the interest charge and also the value of young cattle produced.

Only those enterprises of sufficient size to be important to the farm business are included in the averages. Although the number of farms included in the livestock analysis are small, the averages for feed fed and returns for all classes of livestock are similar to those found on other farms in the area keeping less detailed records.

The ranges of important items which may aid in interpreting the data in Table 8 are:

	Size of Enterprise	Man labor (hours)	Total cost (dollars)
Dairy cows	7 - 35 cows	73-150 per cow	202-342 per cow
Feeder cattle	19,000-29,000 lbs. produced	1.8 - 4.6 per 100 lbs.	20-45 per 100 lbs.
Hogs	14,000-83,000 lbs. produced	1.1 - 2.8 per 100 lbs.	11-23 per 100 lbs.
Chickens	50 - 483 hens	1.2 - 5.4 per hen	4-13 per hen

The relative average profits from the four major enterprises do not differ greatly. The costs and returns are influenced by the cost-price relationships in the particular accounting year. These relationships may not reflect the long time picture or those to be expected in the future. For longtime planning, therefore, it is wise to adjust the figures for production and prices to those you expect in the future.

The relative returns from the different livestock enterprises can be measured in several ways. The return per \$100 of total costs in 1951 was highest for feeder cattle and lowest for chickens, although the differences were too small to be very important. A return of \$100 for each \$100 total costs would have meant that the livestock would have paid only market prices for the feed, labor and other costs. Since the returns ranged from \$110 to \$131, the livestock were also able to help carry the overhead costs of the farm and pay better than market prices for some costs.

Table 8. Selected Costs and Returns for Livestock Enterprises
Southern Minnesota Detailed Accounting Farms - 1951

	Dairy cows	Other Dairy Cattle	All Dairy Cattle	Feeder Cattle ^{a/}	Hogs	Chickens
	(per cow)	(per head)	(per cow)	(per 100 pounds)	(per 100 pounds)	(per hen)
Number of farms	22	22	22	6	25	27
Average size of enterprise	19.8	22.2	19.8	24,257	39,583	205 hens
Production per animal	325 lbs. B.F.		325 lbs. B.F.			205 eggs
Costs						
Feed	\$140.77	\$56.25	\$203.88	\$ 24.14	\$ 13.58	\$ 5.14
Man labor	84.05	16.06	102.06	2.08	1.39	1.66
Interest	13.79	6.87	21.48	2.25	.28	.06
Shelter	14.17	8.38	23.57	.86	.29	.30
Equipment	8.05	-	8.05	.21	.18	.23
Power	2.70	.98	3.81	.41	.20	.10
Misc. cash	24.91	2.07	27.24	.47	.54	.21
Total cost	\$288.44	\$ 90.61	\$390.09	\$ 30.42	\$ 16.46	\$ 7.70
Value of production						
Animal	\$ -4.55	\$118.60	\$128.51	\$ 37.01	\$ 18.73	\$ 1.05
Product	323.30	-	323.30	-	-	7.40
Total value produced	\$318.75	\$118.60	\$451.81	\$ 37.01	\$ 18.73	\$ 8.45
Returns above costs	\$ 30.31	\$ 27.99	\$ 61.72	\$ 6.59	\$ 2.27	\$.75
Returns per \$100 total cost	110.	131	116	122	114	110
Returns per \$100 feed fed	226	211	222	153	138	164
Returns per \$100 feed fed necessary to pay all costs	205	161	191	126	121	150
Net return per hour of labor	1.09	2.20	1.28	3.33	2.15	1.15
Man hours per year	105	20	128	2.6	1.7	2.1
Feeds fed (pounds)						
Concentrates						
Corn	1161	316	1516	666	322	40
Small grains	992	287	1314	44	104	55
Commercial feeds	474	131	620	35	52	58
Total concentrates	2627	734	3450	745	478	153
Roughages						
Hay	4228	1622	6049	418	-	-
Silage	7124	2628	9849	342	-	-
Milk						
Skim	-	263	295	-	34	1
Whole	-	307	345	-	-	-

^{a/} Records of purchased feeder cattle are more meaningful when they cover the time from purchase to sale. A less detailed summary of feeder cattle costs and returns for the feeding years 1940-1951 is found in Mimeo. Report 200 and is available on request from the Division of Agricultural Economics.

Return per \$100 feed fed is frequently used as a measure for comparing the efficiency of feeding for one farmer with that of other farmers who have the same classes of livestock. This measure can also be used to compare the relative profitability of different classes of livestock, by considering the relationship of feed costs to total costs as shown in Table 8. For example, for dairy cows the total costs is \$288 and the feed cost is \$141, a \$205 total cost per \$100 feed cost. This can be considered as a "break even" point for return per \$100 feed fed. A farmer can then compare his returns for the different classes of livestock with the "break even" returns.

In some cases a farmer will want to compare the returns per hour of labor. For 1951, feeder cattle produced the highest return per hour; dairy cattle and chickens produced the lowest returns. When studying the selection of livestock enterprises a farmer must consider the number of hours of labor he can market as well as the return per hour in order to obtain total returns to labor.

A large part of the shelter and equipment costs in Table 8 are for depreciation and interest on investment. These are based upon the valuations shown in the farmers account books, and are usually the original costs depreciated to present age. If these were adjusted to present price levels, the shelter costs would be about twice as high as shown here, and the equipment costs would be 25 to 50% higher. All of the other costs have been adjusted to 1951 prices.

Costs of Operating Power and Machinery

The costs of operating tractors and crop machinery are presented in Tables 9 and 10. Data on machinery costs and use were available for 33 farms. The methods of determining the cost items for power and machinery were as follows:

Depreciation was copied directly from the farmer's account book. No attempt was made to standardize depreciation schedules for similar machines except to the extent that this was done in the regular accounting work.

Interest was charged at 5 per cent of the average inventory value of the machines.

Fuel, oil, and grease were determined from the record of purchases, with the farmer estimating the quantities used by each tractor or machine.

Repairs and maintenance were the cash cost of repairs and service.

Servicing includes the charge for farm labor, power, and truck used in servicing the machines.

The operating cost data for tractors are grouped by size of tractor, based upon the Nebraska tractor tests of drawbar horsepower. The range in total costs per hour are:

\$.25 - .90 for 7 - 11 D.H.P. tractors
 .35 - 1.57 for 14 - 22 D.H.P. tractors
 .69 - 1.89 for 25 - 27 D.H.P. tractors
 1.17 - 1.58 for 30 - 32 D.H.P. tractors

Table 9. Costs per Hour for Tractors, by Size of Tractor
 Southern Minnesota Detailed Accounting Farms - 1951

	Rated Drawbar Horse Power*			
	7 - 11	14 - 22	25 - 27	30 - 32
Number of tractors	5	44	17	3
Costs				
Depreciation	.20	.20	.31	.23
Interest at 5%	.03	.06	.10	.09
Fuel	.30	.35	.47	.62
Oil and grease	.05	.03	.02	.04
Repairs and maintenance	.02	.13	.13	.12
Servicing	.03	.03	.02	.14
Total cost per hour	.63	.80	1.05	1.24
Average hours used	263	477	545	475

* 75 per cent of maximum drawbar horse power developed in plow gear.
 (Nebraska tractor tests)

The costs per hour tend to vary with the hours used. For instance, of the 44 tractors with ratings of 14 - 22 drawbar horsepower, 19 were used more than 500 hours, with an average cost of \$.74 per hour; 15 were used less than 500 hours with an average cost of \$.90 per hour.

The average tractor hours per farm used for the different enterprises is shown in Table 10.

The costs of crop machinery are shown in Table 11. The data in the table are the costs per farm or per acre for the farmers who owned and used the particular kinds or groups of machines. Whenever a farmer owned a machine in partnership with another, only the cost of his share is shown here. The total cost is shown for farmers who do custom work; the acres of use includes the acres of custom work done.

Table 10. Summary of Tractor Use by Type of Farm
Southern Minnesota Detailed Accounting Farms - 1951

	Dairy Farms	Feeder Cattle and Hog Farms
Number of farms	22	10
Acres per farm	202	294
Use of tractor	Hours per farm	Hours per farm
Crops		
Grain	167	204
Corn	283	428
Soybeans	32	52
Hay	166	165
Other crops	23	23
Haul manure	85	86
Fall work	<u>50</u>	<u>116</u>
Total crop	806	1074
Livestock	66	125
Building, machinery and equipment	18	53
Miscellaneous	26	50
Work for others	<u>120</u>	<u>120</u>
Total hours	1036	1422

No farmer owned all of the different machines shown in Table 11. Taking into account the kinds of machines that these farmers owned, the average crop machinery cost per farm was:

Depreciation	\$ 473
Interest	169
Fuel	6
Repairs and upkeep	172
Servicing	<u>155</u>
Total	<u>975</u>
Crop acres	174.3
Cost per crop acre	\$ 5.59

In figuring the above costs, only that part which can be charged against the work on the farm has been included. When custom work was done for others, a proportionate share of the expense was omitted.

Table 11. Costs of Operating Crop Machinery
Southern Minnesota Detailed Accounting Farms - 1951

Kind of Machinery	Number of Farms	Costs per Farm					Total Cost	Acres of Use ^{a/}	Cost per Acre
		Depre- ciation	Inter- est	Fuel	Repairs and Main- tenance	Servic- ing			
General crop machinery	33	\$ 92	\$ 33	\$ -	\$ 44	\$ 34	\$203	174.3	\$1.17
Tillage machinery	33	66	23	-	37	18	144	134.4	1.07
Corn planter and cultivator	32	41	15	-	13	14	83	73.0	1.14
Grain drill and fanning mill	25	29	14	-	4	5	552	67.9	.77
Grain binder	8	21	7	-	12	13	53	60.1	.88
Thresher	7	45	13	-	7	5	70	55.8	1.25
Swathers	13	13	4	-	11	15	43	79.4	.55
Combines									
5-6 ft.	11	107	48	2	29	31	217	91.4	2.37
8-12 ft.	5	191	70	24	80	88	453	125.0	3.63
Hay mowers and rakes	33	31	12	-	15	12	70	130.4	.54
Other general hay machinery	18	16	5	-	1	5	27	29.1	.93
Field chopper and blowers	12	137	42	9	29	40	257	76.4	3.36
Balers	3	203	59	32	74	41	409	292.3	1.40
Corn pickers									
1 row	10	67	19	-	12	9	107	40.5	2.65
2 row	13	120	33	-	43	29	225	115.5	1.95
Portable elevator	23	32	15	-	5	17	69	140.7	.49
Crop sprayers	19	22	6	-	7	6	41	b/	b/

a/ Includes custom work done.

b/ Record of acres used not available.

The relationship of cost per acre to acres of cropland is shown in Table 12. Of the farmers with 175 acres of cropland or less, the 8 who owned only one or none of the larger harvesting machines had lower costs per acre than those who owned two or more. These men used other types of equipment, such as hay loaders, or they hired the use of the large machines. Therefore, their expenditures for custom work were larger.

Table 12. Crop Machinery Costs as Related to Acres of Cropland
Southern Minnesota Detailed Accounting Farms - 1951

Acres of cropland per farm	Number of farms	Cost per acre		
		General, til- lage & plant- ing machinery	Harvest Machinery	Custom work hired
50 - 175 acres				
1 or no large harvesting machines*	8	\$ 2.73	\$ 1.20	\$ 3.21
2 or more large machines*	14	3.76	3.95	1.21
176 - 300 acres	9	2.44	2.96	.62
301 acres or more	2	2.32	3.27	.59

* Baler, field chopper, combine, corn picker.

The amount of time used by these farmers in covering an acre for different field operations are shown in Table 13.

Source and Use of Labor

The hours of labor per farm worked by the different types of workers and the hours spent on each enterprise are shown in Table 14. More labor was used on the dairy farms than on the feeder cattle and hog farms.

Some of these farms had two operators. The average number of operators per farm was 1.12 for the dairy farms and 1.13 for the feeder cattle and hog farms. Dividing this into the number of hours of operator labor per farm, gives 3,054 hours per operator and 2,818 hours per operator, respectively. This is an average of 8.4 and 7.7 hours per day, for the full year.

The seasonal distribution of this labor is shown in Table 15.

Table 13. Average Rates of Performance for Fieldwork
Southern Minnesota Detailed Accounting Farms - 1951

Kind	Machine		Number of farms	Av. per Acre		Man hours per acre	
	Size			Man hours	Power hours	low	high
T. Disc.	7'-10'		12	.40	.40	.32	.59
S. Disc.	10'-18'		16	.22	.22	.14	.40
2 bottom plow			15	1.13	1.12	.61	1.82
3 bottom plow			10	1.02	1.02	.72	1.65
Spring-tooth	7'-12'		16	.34	.34	.26	.75
Spring-tooth	15'-20'		2	.27	.23	.16	.36
Spike-tooth	18'-21'		20	.14	.14	.10	.23
Grain drill	8'-10'		18	.41	.38	.11	.69
Grain drill	11'-12'		6	.30	.28	.23	.40
Drill:							
Corn planter	Tractor						
	2-row		22	.54	.54	.30	.79
Corn planter	4-row		3	.46	.43	.29	.75
Check:							
Corn planter	2-row		6	.66	.62	.48	1.26
Corn planter	4-row		3	.44	.38	.30	.54
Cultivator	2-row		25	.46	.45	.28	.77
Corn picker	1-row		5	4.99	3.32	1.71	8.28
Corn picker	2-row		9	1.53	1.26	.42	2.27
Corn, field chopper			18	5.36	3.10	2.23	10.77
Mower	7 ft.		22	.49	.47	.29	.76
Side del. rake			27	.36	.35	.17	1.02
Sweep rake			3	2.21	1.47	1.33	3.12
Hay loader			7	2.59	.97	1.68	4.67
Hay baler			3	3.05	1.41	2.61	3.71
Hay, field chopper			6	2.57	2.57	1.20	3.57
Grain binder	7'-8'		3	1.11	.61	.87	1.85
Shock			7	1.26	-	.75	1.81
Thresh			7	3.41	1.26*	2.09	3.95
Swather	6'-7'-8'		6	.67	.64	.27	1.30
Swather	12'		3	.42	.35	.26	.51
Combine	5'-6'		7	1.63	1.08	.97	3.04
Combine	12'		3	1.38	.42	.72	1.84

* Plus 1.75 hours of horse work.

Table 14. Source and Use of Labor by Type of Farm
Southern Minnesota Detailed Accounting Farms - 1951

	Dairy Farms	Feeder Cattle and Hog Farms
Number of farms	22	10
Acres per farm	202	294
Source of labor	Hours per farm	Hours per farm
Operator	3421	3184
Family	721	400
Hired	1694	1327
Exchange and gratis received	<u>144</u>	<u>180</u>
Total hours of labor	5980	5091
Use of Labor		
Crops		
Grain	260	297
Corn	352	464
Soybeans	36	66
Hay	262	255
Other crops	83	154
Haul manure	155	147
Fall work	<u>51</u>	<u>120</u>
Total crops	1199	1503
Livestock		
Dairy cattle	2597	285
Feeder cattle	18	530
Hogs	464	775
Chickens	452	222
Sheep	22	67
Horses	<u>38</u>	<u>15</u>
Total livestock	3591	1894
Miscellaneous		
Buildings and fence	356	542
Machinery and equipment	194	355
Power	34	102
Miscellaneous	332	433
Work for others -paid, exchange, or gratis	<u>274</u>	<u>262</u>
Total miscellaneous	1190	1694
Total hours of labor	5980	5091

Table 15. Seasonal Distribution of Man Labor by Source
and by Selected Enterprises
Southern Minnesota Detailed Accounting Farms - 1951

Month	Source of Labor				Livestock			
	Total labor	Operator	Family	Hired	Dairy Cattle	Hogs	Chick-ens	Feeder Cattle
	Hours per farm							
Jan.	374	227	34	112	266	42	34	51
Feb.	358	212	32	114	242	55	32	55
March	420	254	38	126	270	77	40	65
April	430	267	44	116	243	77	43	56
May	570	341	65	151	208	49	39	40
June	557	307	69	153	170	41	38	32
July	531	296	72	144	166	37	36	19
Aug.	546	302	66	149	158	43	33	27
Sept.	482	285	44	128	159	48	33	32
Oct.	502	305	53	122	176	48	32	40
Nov.	463	279	51	122	218	48	32	50
Dec.	392	252	45	94	248	51	33	82
Total	5625	3327	613	1531	2524	616	425	549
No. of farms	32	32	32	32	22	29	27	9

Month	Crops						
	Small Grain	Flax	Corn	Soy-beans	Alf. mixt.	Manure hauling	Misc.**
	Hours per farm						
Jan.	-	-	-	-	-	14	70
Feb.	-	-	-	-	-	16	56
March	1	-	-	-	-	10	75
April	10	8	1	5	-	17	77
May	49	22	107	39	1	27	105
June	*	11	53	43	85	6	164
July	7	7	49	39	81	8	147
Aug.	137	38	30	-	20	8	152
Sept.	24	33	54	5	38	14	132
Oct.	1	5	85	38	4	13	157
Nov.	*	-	6	4	-	11	111
Dec.	-	-	-	-	-	12	85
Total	229	124	385	173	229	156	331
No. of farms	31	10	32	8	32	31	32

* Less than 1/2 hour.

** Includes repair work on buildings, snow clearing, upkeep of farmstead and roads, farm meetings, farm business, etc.