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MAJOR TYPES OF FARMING IN SOUTHERN MINNESOTA

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MAJOR TYPES OF FARMING IN SOUTHERN MINNESOTA

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Farmers employ a wide variety of crop and livestock combinations in organizing a farm business. Differences in organization are the result of variations in acreage operated, soils, topography, climate, markets, prices, labor and capital. Rather well defined types of farming tend to develop in areas or regions that have some uniformity in these factors. Thus in southwestern Minnesota the dominant organization includes corn and hogs as major enterprises. In southeastern Minnesota where the average farm has some non-tillable land dairy cattle enter into the picture. Within a given area, however, there is some variation in the type of farming followed even though such factors as soil and climate are relatively uniform. This is the result of the efforts of farmers to adapt their organization to their farm, their labor supply, their market or capital resources and their personal preference.

The purpose of this study is to point out some of the factors influencing the type of farming selected for a given farm or area, the important characteristics of the more common types of farming in southern Minnesota and also to point out significant differences between these types and in their adaptation to specific situations and combinations of resources.

The sources of data are the records from the Southeastern, Southwestern and West Central Minnesota Farm Management Services for the three-year period 1954 to 1956. The farms were classified according to the proportion of the cash income received from the various livestock enterprises and from the sale of crops. The following classifications were developed:

1. Specialized farms - 70% or more of cash income was from one enterprise or source
2. Two enterprise farms - between 30 and 60% of the cash income was from each of two enterprises

3. Three enterprise farms - 20% or more of the cash income came from each of three enterprises.

This more or less mechanical classification of each record was then checked for representativeness by the fieldmen for each of the farm management services. Because of their knowledge of the farms, the fieldmen were able to spot the individuals who for some reason or other had a temporary decrease in the size of an enterprise. These farms were then reclassified according to a more normal distribution of receipts by enterprises.

A factor which made a classification somewhat difficult was the variation from year to year in the prices received for a product. This showed up primarily in the case of poultry in 1956 when the average prices received for poultry and eggs were low relative to the prices received for most of the other farm products. In many cases poultry entered into the classification as a substantial source of income in 1954 and 1955 but in 1956 low prices received reduced the proportion of income from poultry, although the number of poultry maintained was relatively constant. In this instance poultry were kept in the classification in 1956 if they were included during the previous years and the numbers maintained were not changed by a significant amount.

Although the records of approximately 350 farms were studied for each of the three years included in this study, the averages for less than half of them were included in the classification used in this report (Table 1). Some farms seemed to defy classification because of the many changes which had been made during the three-year period. In all some forty different types were noted. However, in many instances the number of records was too small to make a significant average. As a consequence the records from six types of farms were included in this report. They are dairy; dairy and hogs; dairy, hogs and cash crops; dairy, hogs and poultry; feeder cattle and hogs; and feeder cattle, hogs and cash crop farms.

Table 1. Classification of Selected Farms by Type

Type of Farm	1954	1955	1956
Dairy	19	16	17
Dairy and hogs	43	39	32
Dairy, hogs and cash crops	32	29	26
Dairy, hogs and poultry	24	26	26
Feeder cattle and hogs	16	20	21
Feeder cattle, hogs and cash crops	34	23	26
Total number of cases	168	153	148

Physical Conditions Affecting Type of Farming

In general the three most important physical factors affecting the type of farming across the southern portion of Minnesota are soil, topography and climate.

Most of the soils in the area studied are high in inherent fertility. The exceptions are the Fayette-Dubuque soils in the counties bordering on the Mississippi River in the southeastern section of the state which are rated good and a relatively small area in Dodge, Mower, Rice and LeSueur Counties which are rated as fair. 1/

Soil type and topography are closely related in this area and it is the latter item which seems to have the greater effect on the type of farming. The Fayette-Dubuque soils in southeastern Minnesota, although of good inherent productivity, range from rolling to steep in topography. As a consequence erosion is serious and there is a relatively large proportion of the land in non-tillable pasture. In order to control erosion a somewhat larger proportion of the tillable land is in hay and pasture than in the more level areas. Since dairy cattle can utilize roughage to advantage, they predominate as a livestock enterprise in this area. This relationship of topography to the dominance of dairy farming is fairly commonly observed in the entire southeastern one-fourth of the state.

1/ McMiller, P. R., "Soils of Minnesota", University of Minnesota Extension Bulletin No. 278. December 1954.

In contrast the Clarion-Nicollet-Webster soils and the Barnes-Aastad soils which cover much of southwestern and west central Minnesota are undulating to gently rolling in character and hence well adapted to the production of grain crops. As a consequence the production of hogs, beef cattle and cash crops assume greater importance.

The principal climatic factor affecting type of farming in the southern half of the state is precipitation. The average annual rainfall ranges from 32 inches in the extreme southeastern corner of the state to approximately 23 inches in the west central area. Lower average precipitation in western Minnesota serves to decrease the profitableness of roughages relative to grain crops. This situation encourages the production of those classes of livestock which are heavy grain consumers.

Although the length of the growing season is shorter in west central Minnesota as compared to the southeastern area, the difference is not sufficiently great to result in a material difference in the choice of livestock and crop combinations. The range in altitude and latitude are too narrow to be important determinants of type of farming.

Economic Factors Affecting Type of Farming

The physical factors discussed in the preceding section place some limitations on the kinds of crops which can be grown successfully and in turn influence the choice of livestock. Economic factors have an additional influence in that they affect the relative profitableness of an enterprise. It is the combined effect of the physical and economic factors which determines the type of farming which will be followed.

The principal economic factors are: (1) prices, (2) size of farm and labor supply and (3) available capital. Although these factors exert a definite influence in determining type of farming, they are often difficult

to measure and they change over time. As economic conditions vary most farmers make adjustments in their business. However adjustments are oftentimes difficult in that buildings and equipment may be specialized and difficult to convert to a new use. The uncertainty as to the permanence of changes in economic conditions often deters the farmer from shifting his organization to take advantage of them. All these factors serve to create a lag in adjustments to meet changing economic conditions.

Prices for many products tend to be highest in the area in which they are consumed and decline as the distance from a potential market increases. This reflects cost of transportation and handling charges. Fluid milk and some vegetables tend to be produced near the area of consumption since both are relatively bulky and have relatively high costs of transportation. As one extends outward from a central market less bulky products are produced. This general principle, however, is certainly not without exceptions since prices and transportation costs are only two of the various factors affecting type of farming.

Fluid milk is a major enterprise on farms near the cities of St. Paul and Minneapolis. However, hogs also are raised on many dairy farms. Part of this may be due to the desire of farmers to diversify and thus make more complete use of their labor and equipment than is possible with one class of stock. As one extends out from the Twin Cities to the southwest, hogs and corn soon press dairying as a major enterprise. To the southeast dairying continues as a major enterprise. Topography enters into the picture. The farmers in southeastern Minnesota are more limited in the production of corn as compared to farmers in south central or southwestern Minnesota because of more hilly land. Thus farmers in southeastern Minnesota produce dairy products in order to utilize roughages necessary to control erosion.

The size of farm and the available labor supply are related factors that affect a farmer's selection of crops and livestock. When labor is scarce in relation to land, little labor will be used per acre and those crops and livestock which require relatively small amounts of labor are favored. When labor is plentiful and land is scarce, crops and livestock which require relatively large amounts of labor will have a preference. Poultry and dairy cattle are examples of livestock enterprises that provide employment for rather large amounts of labor and hence are adapted to small farms. Feeder cattle and sheep, since they need relatively small amounts of labor, are better adapted to large farms. This illustrates a principle that a farmer in order to maximize income, will tend to maximize the returns from the scarce resource at his disposal - labor, land, capital or whatever it may be.

The amount of capital available to the farm operator is another economic factor which influences the choice of crops and livestock. Beginning farmers quite frequently will start with hogs and poultry because these enterprises require a minimum of capital both from the standpoint of buying foundation stock and from the standpoint of investment in equipment. Feeder cattle are probably at the other extreme in that the initial capital requirements are high and the risks involved are great. Dairy cattle are in an intermediate position in that they require a considerable investment in cows and in shelter and equipment but the steady and continuous income reduces the risk.

Size of farm, labor supply and capital available are factors that cause variations in the combinations of enterprises on farms in an area that may be quite uniform as far as soil, topography and climate are concerned.

Earnings by Type-of-Farming

The previous discussion deals with the overall effect of the physical and economic factors which affect the selection of enterprises on a farm. In

the balance of this report data from the records of the three farm management services for the years 1954 to 1956 are grouped and presented by type-of-farming. Although the number of cases are small and the period of time covered is relatively short the data do illustrate some of the differences among these various types of farms.

The average cash farm expenses of each of six types of farms are presented in Table 2. There is considerable uniformity among some of the items of expense on farms of different types. However, on farms on which feeder cattle are a major enterprise, the purchase of the feeders is a large item which has no counterpart in the list of cash expenses for other type groups.

Since the farms were classified on the basis of the proportion of farm sales from the various enterprises, the major sources of income vary by type (Table 3). The total farm sales, total farm income and labor earnings are very similar for the dairy, dairy and hog, and the dairy, hog and poultry farms. The feeder cattle, hog and cash crop farms had the highest labor earnings with an average for the three years of $5,728. Much of the variation in earnings is due to differences in average size of farm. In Table 4 are shown the average labor earnings, the earnings per acre and per tillable acre by type of farm.

Table 2. Farm Expenses, 1954-56

Items	Dairy farms	Dairy and hog farms	Dairy, hog and poultry farms	Dairy, hog and cash crop farms	Feeder cattle & hog farms	Feeder cattle, hog & cash crop farms
Acres per farm	201	193	176	292	237	343
Dairy cattle bought	$ 377	$ 214	$ 204	$ 270	$ 41	$ 28
Beef cattle bought	5	88	--	9	9236	8622
Hogs bought	77	246	188	166	584	621
Sheep bought	12	6	2	4	54	68
Poultry bought	48	78	228	57	86	78
Miscellaneous livestock expenses	546	489	441	462	505	380
Feed bought	1643	2413	2658	2402	7155	4651
Fertilizers	343	497	518	907	793	1146
Other crop expenses	392	433	421	906	661	1038
Custom work hired	791	587	608	766	646	611
Gas and oil bought (farm share)	588	675	580	965	875	1064
Rep. tractors, trucks & autos (farm share)	328	369	316	513	458	518
Rep. farm real estate	246	245	366	290	300	430
Rep. crop & general mach.	170	217	211	339	378	440
Rep. livestock equipment	123	129	147	168	199	153
Electricity expenses (farm share)	262	220	233	234	180	199
Wages of hired labor	882	696	441	1137	858	1252
Pers. prop. & real estate taxes	628	575	572	847	675	930
Telephone and general farm expense	288	253	235	265	314	340
Total cash operating expense	7749	8430	8369	10707	23998	22569
Mechanical power bought (farm share)	670	567	541	595	847	915
Crop & general machinery bought	525	564	564	868	722	1095
Livestock equipment bought	445	417	278	311	296	168
New real estate improvements	811	639	831	761	494	686
Total farm purchases	10200	10617	10583	13242	26357	25433
Interest on farm capital	1959	2001	1738	2705	2980	3903
Unpaid family labor	323	360	576	471	298	371
Board furnished hired labor	83	135	80	167	64	164
Total farm expenses	12565	13113	12977	16585	29699	29871

Table 3. Farm Receipts and Labor Earnings

Items	Dairy farms	Dairy and hog farms	Dairy, hog and poultry farms	Dairy, hog and cash crop farms	Feeder cattle & hog farms	Feeder cattle hog & cash crop farms
Dairy cattle	$ 1506	$ 1479	$ 1328	$ 1439	$ 194	$ 101
Dairy products	9872	6192	5200	6085	171	72
Beef cattle	121	94	27	39	17718	16110
Hogs	286	5186	4577	4891	10673	8357
Sheep and wool	126	104	47	57	187	314
Poultry	61	89	223	55	92	76
Eggs	449	654	2119	485	582	552
Corn	822	422	389	3491	659	3913
Small grain	65	86	102	1021	357	1662
Other crops	254	324	261	1917	344	2294
Machinery & equipment sold	108	108	135	151	109	385
Income from work off the farm	177	175	348	343	415	474
Miscellaneous	244	191	240	224	290	309
Total farm sales	14091	15104	14996	20198	31791	34619
Increase in farm capital	900	870	668	151	1873	725
Family living from the farm	262	312	353	310	253	255
Total farm receipts	15253	16286	16017	20659	33917	35599
Total farm expenses	12565	13113	12977	16585	29699	29871
Labor earnings	2688	3173	3040	4074	4218	5728

Table 4. Labor Earnings, Earnings per Acre and per Tillable Acre

Type of farm	Labor earnings	Earnings per acre in farm	Earnings per tillable acre
Dairy	$2,688	$13.44	$18.40
Dairy and hogs	3,173	16.40	20.74
Dairy, hogs and poultry	3,040	17.00	23.20
Dairy, hogs and cash crops	4,074	14.00	16.80
Feeder cattle and hogs	4,218	17.70	20.88
Feeder cattle, hogs and cash crops	5,728	16.60	19.35

Except for the classifications which include feeder cattle approximately 55 cents of each dollar of sale is required to pay the cash operating costs and another 10 to 15 cents per dollar of sales is required for capital expenditures (Table 5). The latter include the purchase of power, machinery, equipment and real estate improvements. Thus approximately 70 cents of each dollar of receipts is required to pay for farm purchases leaving 30 cents for debt servicing, family living expenses and savings. Farms on which purchased feeder cattle are fed show somewhat higher expense per dollar of receipts because of the relatively heavy expenditures for cattle purchases.

Farm earnings by type of farm have been presented on a cash basis in the preceding tables. The data in Table 6 shows the earnings on an accrual basis. The cash receipts and expenses are adjusted for changes in inventory for each enterprise and for each item of expense. Credit is given to each livestock enterprise for produce used in the farm home. Also credit is given to crops for the feed consumed by livestock. Labor earnings are the same as shown in Table 4.

Crops are a major source of income on all the farms when credit is given to crops for the feed consumed by livestock. An average of 53 to 57 per cent of the income is from crops for those classifications of farms that secure

Table 5. Expenses per $100 of Gross Income, 1954-1956

	Dairy farms	Dairy and hog farms	Dairy,hog & poultry farms	Dairy, hog & cash crop farms	Feeder cattle & hog farms	Feeder cattle, hogs & cash crop
Dairy cattle bought	2.67	1.42	1.36	1.34	.13	.08
Beef cattle bought	.03	.58	-	.04	29.04	24.92
Hogs bought	.55	1.63	1.25	.82	1.84	1.79
Sheep bought	.09	.04	.01	.02	.17	.20
Poultry bought	.34	.52	1.52	.28	.27	.23
Misc. livestock expenses	3.87	3.24	2.94	2.29	1.59	1.10
Feed bought	11.66	15.98	17.72	11.89	22.50	13.44
Fertilizers	2.43	3.29	3.45	4.49	2.49	3.31
Other crop expenses	2.78	2.87	2.81	4.49	2.08	3.00
Custom work hired	5.62	3.89	4.05	3.79	2.03	1.77
Gas and oil bought (farm share)	4.18	4.47	3.87	4.78	2.75	3.08
Rep. tractors, trucks & autos (farm share)	2.33	2.44	2.11	2.54	1.44	1.50
Rep. farm real estate	1.75	1.62	2.44	1.44	.94	1.24
Rep. crop and general mach.	1.22	1.44	1.41	1.68	1.19	1.27
Rep. livestock equipment	.87	.85	.98	.83	.63	.44
Electricity expenses (farm share)	1.86	1.47	1.55	1.16	.57	.58
Wages of hired labor	6.25	4.61	2.94	5.63	2.70	3.62
Pers. prop. & real estate taxes	4.46	3.81	3.81	4.19	2.12	2.69
Telephone & general farm expense	2.04	1.68	1.57	1.31	.99	.98
Total cash operating expense	55.00	55.85	55.79	53.01	75.47	65.24
Mechanical power bought (farm share)	4.76	3.70	3.61	2.94	2.65	2.62
Crop & general machinery bought	3.73	3.74	3.76	4.30	2.27	3.16
Livestock equipment bought	3.16	2.76	1.85	1.54	.93	.49
New real estate improvements	5.76	4.23	5.54	3.77	1.55	1.98
Total farm purchases	72.41	70.28	70.55	65.56	82.87	73.49

Table 6. Farm Earnings (Accrual Basis)

Items	Dairy farms	Dairy and hog farms	Dairy, hog and poultry farms	Dairy, hog and cash crop farms	Feeder cattle & hog farms	Feeder cattle, hog & cash crop farms
Returns and net increases						
Dairy cows	$9649	$6325	$5402	$5998	$ 199	$ 83
Other dairy cattle	1699	1589	1380	1619	113	44
Beef breeding herd	--	--	--	--	35	52
Feeder cattle	45	63	7	17	10324	8653
Hogs	274	4995	4421	4664	10158	7719
Sheep	61	99	31	42	51	109
Poultry	487	697	2202	508	612	566
All productive livestock	12215	13768	13443	12848	21492	17226
Value of feed fed to livestock	7231	8774	8892	8419	15596	12895
Return over feed from livestock	4984	4994	4551	4429	5896	4331
Crop	6190	6552	6138	10801	8695	13955
Income from labor off the farm	144	82	242	157	262	190
Agricultural conservation payments	40	34	46	58	32	58
Miscellaneous	199	140	188	160	250	249
Total returns and net increases	11557	11802	11165	15605	15135	18783
Expenses and net decreases						
Horses	10	31	30	18	1	7
Truck	191	262	207	388	281	316
Auto (farm share)	348	358	320	384	571	538
Tractor	805	823	700	1149	1030	1235
Electricity (farm share)	274	226	248	247	183	212
Hired power	391	281	291	362	310	273
Total power	2019	1981	1796	2548	2376	2581
Crop and general machinery	782	860	819	1324	1274	1487
Livestock equipment	309	281	291	376	365	270
Real estate improvements	763	794	922	965	987	1169
Misc. livestock expenses	546	489	441	462	505	380
Labor	1575	1403	1311	2039	1441	1995
Real estate taxes	488	445	443	691	496	740
Personal property taxes	140	130	129	156	179	190
Insurance	150	115	103	121	134	134
General farm expense	138	130	132	144	180	206
Interest on farm capital	1959	2001	1738	2705	2980	3903
Total expenses and net decreases	8869	8629	8125	11531	10917	13055
Labor earnings	2688	3173	3040	4074	4218	5728

their cash income from livestock (Table 7). Farms that sell crops for cash show approximately 70 per cent of the income from crops. Income from livestock makes up most of the balance of the total returns and net increases.

Table 7. Proportion of Farm Income from Livestock, Crops and Miscellaneous Sources, 1954-1956*

Item	Dairy farms	Dairy and hog farms	Dairy hog and poultry farms	Dairy hog and cash crop farms	Feeder cattle & hog farms	Feeder cattle, hog & cash crop farms
				Per cent		
Crops	53	56	55	69	57	74
Livestock	43	42	41	29	39	23
Misc.	4	2	4	2	4	3
Total	100	100	100	100	100	100

* Crops have been credited with farm raised feeds consumed by livestock

The average investment in livestock, crops and feed on hand, machinery and equipment, real estate improvements and land are shown in Table 8. These data represent values as reported by farmers and in some cases may deviate somewhat from current market values. The values placed on livestock and crops are quite representative of current market values. Machinery, equipment and real estate improvements are valued at cost and depreciated on the basis of estimated life. These "book" values tend to be below present market values because of the rise in price levels which occurred after many of these items were purchased, particularly buildings. Land, likewise, is based on cost and has not been corrected for the rise in land values which occurred after many of these farms were purchased.

Crop Acreages and Yields

It was pointed out earlier in this report that the dairy enterprise is adapted to small farms where the labor supply is relatively plentiful - at least in relationship to the quantity of land. Also dairying is adapted to farms that have considerable acreages of non-tillable land or land that is subject to erosion.

The farms on which dairy cattle were the only major livestock enterprise

Table 8. Average Farm Inventories, 1954-56

Items	Dairy farms	Dairy and hog farms	Dairy hog and poultry farms	Dairy, hog and cash crop farms	Feeder cattle & hog farms	Feeder cattle, hog & cash crop farms
Acres per farm	201	193	176	292	237	343
Dairy cattle	$7333	$5234	$3882	$5331	$ 311	$ 144
Beef cattle	30	90	9	35	9016	9187
Hogs	113	1682	1400	1452	3591	3065
Sheep	110	106	48	56	156	149
Poultry	104	141	390	114	144	137
Total livestock	7690	7253	5729	6988	13218	12682
Crop, seed and feed	4268	5134	5056	8484	7836	11841
Auto (farm share)	1080	1154	961	1260	1506	1691
Tractors and horses	1458	1639	1563	2168	2363	2739
Crop & general machinery	2917	3216	3087	4994	4173	5693
Livestock equipment	1345	1041	876	1184	1129	717
Total power, mach. & equipment	6800	7050	6487	9606	9171	10840
Real estate improvements	9842	9313	9144	10687	11529	11712
Land	10570	11260	8440	18341	17838	30993
Total farm capital	39170	40010	34856	54106	59592	78068

had a relatively large proportion of non-tillable pasture and in addition had a larger acreage in hay and less cultivated crops than any of the other groups (Table 9). This is due to quite an extent to the location of these farms. Nearly 60 per cent of these farms were located in four counties in southeastern Minnesota which adjoin the Mississippi River namely Dakota, Goodhue, Wabasha and Winona Counties. The balance of the farms in this category are scattered across southern and west central Minnesota.

The dairy and hog and the dairy, hog and poultry farms have approximately the same acreage of tillable land as the dairy farms. The acreage in non-tillable pasture is less. Approximately 25 per cent of these farms are located in the counties adjoining the Mississippi River. Most of the others are located in the area to the west which is less hilly and less subject to erosion. Only a small proportion of the farms in these two classifications are located in the southwestern or west central sections of the state.

The dairy, hog and cash crop farms are relatively large farms, averaging 393 acres in size with 242 acres of tillable land. Two thirds of these farms are located in southeastern Minnesota. The principal difference between these farms and the dairy and hog farms is size. They have approximately the same total number of livestock units as the other farms which maintain dairy cattle as an enterprise but because of the size of farms more cash crops are raised. Corn and soybeans are the principal cash crops in southeastern Minnesota. These crops plus flax are raised in southwestern and west central Minnesota.

Both feeder cattle and hogs require rather large quantities of concentrate feeds. Since the southwestern portion of the state is relatively level and needs a minimum of grasses and legumes in the rotation to prevent soil erosion a large proportion of the land in farms can be used for the production of grain with much of the grain being fed to feeder cattle and hogs. Approximately 85 per cent of the feeder cattle and hog farms included in this study were located

Table 9. Distribution of Acres in Farm, 1954-56

Crop	Dairy farms	Dairy and hog farms	Dairy, hog and poultry farms	Dairy, hog and cash crop farms	Feeder cattle & hog farms	Feeder cattle, hog & cash crop farms
Oats for grain	23.3	30.7	28.1	46.1	38.8	48.4
Oats for silage	1.8	2.0	--	--	2.1	2.0
Barley	1.9	1.4	1.0	3.0	3.3	7.9
Flax	--	.5	--	9.2	2.6	18.5
Wheat	--	.1	.4	2.5	.3	1.2
Other small grains and canning peas	1.4	2.1	.6	2.3	.6	.4
Total small grains and canning peas	28.4	36.8	30.1	63.1	47.7	78.4
Corn grain	30.7	46.6	41.4	71.4	89.2	119.5
Corn silage	8.5	6.7	5.4	6.1	7.2	8.3
Soybeans	2.2	4.4	5.0	27.4	5.9	36.9
Other cultivated crops	1.1	.3	.6	3.9	.1	.2
Total cultivated crops	42.5	58.0	52.4	108.8	102.4	164.9
Alfalfa hay	45.4	32.8	31.3	39.2	30.0	32.6
Other legumes	.8	.9	.8	.9	1.9	3.2
Non-legumes	2.9	1.4	1.0	1.4	1.7	.7
Total tillable land in hay	49.1	35.1	33.1	41.5	33.6	36.5
Alfalfa pasture	18.1	18.8	13.6	22.3	16.9	10.8
Other tillable pasture	6.8	4.0	2.0	5.1	1.3	2.9
Total tillable pasture	24.9	22.8	15.6	27.4	18.2	13.7
Tillable land not cropped	1.3	.7	.2	1.7	.5	2.4
Total tillable land	146.2	153.4	131.4	242.5	202.4	295.9
Wild hay	.4	3.1	2.5	2.3	3.3	3.1
Non-tillable pasture	36.1	21.1	18.7	16.1	16.0	20.9
Timber not pastured	3.9	2.8	6.1	7.5	.3	2.2
Roads, waste & farmstead	12.7	13.1	17.2	24.9	14.9	21.4
Total acres in farm	199.3	193.5	175.9	293.3	236.9	343.5
Per cent tillable land	73	79	75	83	85	86

in the southwestern section of the state. The farms which average over a half section in size include some cash crops in the rotation.

Average crop yields by type of farming are shown in Table 10. In general the crop yields are higher on farms maintaining dairy cattle than on the farms maintaining feeder cattle. This difference is due primarily to the precipitation in the areas in which these farms are located. Because of the higher annual precipitation rates in southeastern Minnesota, the average yields of crops are somewhat higher than in southwestern Minnesota. Since a large proportion of the farms with dairy cattle are located in southeastern Minnesota, they show somewhat higher yields per acre especially for corn and alfalfa hay.

Another factor which accounts for some of the difference in crop yields is the amount of grasses and legumes in the cropping system. The four groups of farms which include dairy cattle as a livestock enterprise have from 28 to 50 per cent of the tillable land in hay and pasture. The two groups of farms which maintain feeder cattle average only 17 and 25 per cent respectively of the tillable land in hay and pasture.

Amount of Livestock and Livestock Efficiency

The amount of livestock per farm by type of farming is shown in Table 11. The largest total number of animal units and the largest number of animal units per 100 acres of land were on the feeder cattle and hog farms. Both feeder cattle and hogs require a relatively small amount of labor per animal unit and hence it is possible for one man to take care of more units of these two classes of livestock than is possible with poultry and dairy cattle. The smallest number of animal units per 100 acres (23.3) is on the dairy, hog and cash crop farms.

The differences in livestock efficiency are relatively small (Table 12). The average butterfat production per cow on farms maintaining dairy cattle range from 314 to 323. The differences in return above feed cost per cow and returns for $100 of feed consumed are due to variations in average price received for

Table 10. Crop Yields per Acre

Crop	Dairy farms	Dairy and hog farms	Dairy, hog and poultry farms	Dairy, hog and cash crop farms	Feeder cattle & hog farms	Feeder cattle, hog & cash crop farms
Oats, bu.	47.5	47.2	49.1	47.6	45.1	49.2
Barley, bu.	32.3	29.4	39.3	31.2	38.9	32.1
Corn, grain, bu.	69.2	68.8	73.1	70.5	61.3	64.4
Soybeans, bu.	27.0	22.9	26.6	22.4	27.3	23.4
Corn, silage, tons	11.5	11.6	11.2	10.4	10.5	10.3
Alfalfa hay, tons	2.9	2.6	2.7	2.8	2.5	2.4

Table 11. Amount of Livestock per Farm, 1954-56

Items	Dairy farms	Dairy and hog farms	Dairy, hog and poultry farms	Dairy, hog and cash crop farms	Feeder cattle & hog farms	Feeder cattle, hog & cash crop farms
No. of dairy cows	31.6	22.1	19.9	21.8	1.4	.7
No. of other dairy cattle	33.7	23.3	22.6	23.6	1.9	.6
No. of beef cows	--	--	--	--	.2	1.6
No. of feeder cattle	.3	.5	.1	.1	73.3	62.9
Lbs. of beef cattle produced	189	233	64	80	42162	35882
No. litters pigs raised	1.3	18.8	17.6	18.6	36.8	28.7
Lbs. hogs produced	1881	31512	28616	29965	64948	50365
No. sheep in farm flock	7.2	7.6	3.3	4.3	4.1	5.8
No. hens	106	143	338	76	127	127
Total no. animal units	53.7	60.7	58.7	58.2	126.4	104.2
Animal units per 100 acres *	31.1	36.2	39.1	23.3	59.6	34.0

* Acres in timber not pastured, roads, waste, and farmstead were not included.

Table 12. Livestock Efficiency by Type of Farming, 1954-56

Items	Dairy farms	Dairy and hog farms	Dairy, hog and poultry farms	Dairy, hog and cash crop farms	Feeder cattle & hog farms	Feeder cattle, hog & cash crop farms
Dairy cattle						
Average B.F. per cow	323	323	314	314	--	--
Return above feed cost per cow	$154	$134	$120	$117	--	--
Return for $100 feed from dairy cows	209	196	186	183	--	--
Return for $100 feed all dairy cattle	180	180	172	169	--	--
Hogs						
Lbs. feed per cwt. hogs produced	--	469	467	451	433	405
Return above feed cost per cwt. produced	--	$4.28	$4.34	$4.08	$4.69	$4.59
Returns for $100 feed	--	$141	$142	$141	$145	$147
No. of spring litters raised	--	11.4	11.6	11.9	24.0	17.9
No. of fall litters raised	--	7.4	6.0	6.7	12.8	10.8
Total number of litters raised	--	18.8	17.6	18.6	36.8	28.7
No. pigs weaned per litter	--	7.0	6.9	7.2	7.6	7.0
Feeder cattle						
Return above feed cost per cwt. produced	--	--	--	--	$5.42	$5.37
Returns for $100 feed	--	--	--	--	$132	$133

butterfat. Farmers in the eastern section have more opportunities for marketing fluid milk than farmers in the central and western sections of the state and as a consequence receive a higher price for dairy products. Since a large proportion of the dairy farms are located along the eastern side of the state they receive a relatively high price for butterfat and hence the largest return from the dairy enterprise.

The relatively low feed requirements for hogs on farms maintaining feeder cattle is due to the fact that hogs can salvage some feed when following feeder cattle and no record of this is available. This also is reflected in the difference in the return over feed and in the returns for $100 of feed.

Size of Business and Work Accomplished per Worker

Size of business can be measured in terms of capital invested, in acres of land, in number of workers and in work units. The latter is probably the best all around measure of size since it reflects work on both crops and livestock. Average work units per farm were the highest for farms maintaining dairy cattle (Table 13). This reflects the relatively large amount of work involved in dairying. In general the work accomplished per worker (work units per worker) also is greater on farms with dairy cattle. Increasing the size of business by adding livestock generally spreads the work load throughout the year and provides for fuller employment of workers.

Summary

Differences in the organization of farms are the result of variations in acreage operated, soils, topography, climate, markets, prices, labor, capital and the farmers' experience and preference. On most farms there are limitations which makes it desirable for the operator to select some particular combination of enterprises which best fit his specific situation and resources. Many farmers are limited insofar as size of farm is concerned and hence select enterprises that fit that particular size. Others have a limited amount of labor or

Table 13. Size of Business and Work Accomplished per Worker

	Dairy farms	Dairy and hog farms	Dairy, hog and poultry farms	Dairy, hog and cash crop farms	Feeder cattle & hog farms	Feeder cattle, hog & cash crop farms
Size of business						
Acres in tillable land	146	153	131	243	202	296
Work units on crops	76	82	73	131	118	172
Work units on livestock	403	356	371	343	279	233
Other work units	14	9	26	17	28	21
Total work units	493	447	470	491	425	426
Number of family workers	1.2	1.2	1.4	1.3	1.2	1.2
Number of hired workers	.5	.4	.2	.6	.4	.6
Total number of workers	1.7	1.6	1.6	1.9	1.6	1.8
Work units per worker	290	279	294	258	267	237

Table 14. Factors Affecting Choice of Livestock Enterprises

Item	Dairy farms	Dairy and hog farms	Dairy, hog and poultry farms	Dairy, hog and cash crop farms	Feeder cattle & hog farms	Feeder cattle, hog & cash crop farms
Acres of grain per acre of roughage*	.7	1.2	1.2	2.1	1.9	3.5
Value of crops produced per worker	$ 364	$ 409	$ 384	$ 568	$ 543	$ 775
Gross returns per: **						
Worker	$8972	$10179	$10011	$10873	$15425	$11805
Work unit	31	36	34	42	58	50
Acre of land	76	84	55	117	104	62
$100 invested	39	41	46	38	41	27
$100 of feed fed	211	186	180	245	158	165

* Acres of roughage acres include acres of tillable land in hay and pasture + $\frac{1}{4}$ of the acres in non-tillable hay and pasture.

** Purchases of feeder cattle have been subtracted from sales of feeder cattle in the calculation of gross returns.

capital which they can put into a farm business and will select enterprises that fit their supply of these resources. The decision as to what to produce and how much to produce depends on many physical and economic factors.

A summary of some of the factors affecting choice of livestock is shown in Table 14. Dairying tends to be located on farms with a large amount of roughage relative to grain. Feeder cattle and hogs on the other hand require rather large amounts of grain relative to roughage.

On some farms the value of feed produced per worker is high. Where this is true feeder cattle or hogs fit the best since they require relatively small amounts of labor. The reverse is true in the case of dairy cattle and poultry. They are adapted to farms with relatively large amounts of labor as compared to amount of feed. Where labor is scarce as compared to land, the gross return per worker and per work unit should be high in order to make the best possible use of this scarce resource. Where labor is relatively plentiful in relationship to land the gross return per $100 of feed fed should be high since there is a limited amount of land on which feed can be produced.

In general we can say that a farm manager will tend to maximize the returns from his most scarce resource. If he has a large amount of labor available in relation to acres operated, he will select enterprises which will give him the greatest return from land. If land is plentiful in relation to labor, he will strive for that combination of enterprises which will yield the greatest return for his limited labor.