# 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.