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UNIVERSITY OF MINNESOTA
Department of Agriculture
and the
TENNESSEE VALLEY AUTHORITY
and the
County Extension Services of
Kittson, Mahnomen, Marshall, Norman,
Pennington, Polk, Red Lake and Roseau Counties
Cooperating

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Annual Report of the Farm Management Service for T.V.A. Phosphate-Test Demonstration Cooperators in Northwestern Minnesota

(Mar. 1, 1940 to Feb. 28, 1941)

-0-

Cooperator _____

Mimeographed Report No. 127
Division of Agricultural Economics
University Farm
St. Paul, Minnesota
June, 1941

FIRST ANNUAL REPORT OF THE FARM MANAGEMENT SERVICE FOR T.V.A. PHOSPHATE TEST DEMONSTRATION COOPERATORS IN NORTHWESTERN MINNESOTA FOR THE YEAR 1940

Prepared by T. R. Nodland, G. A. Pond, and J. R. Burkholder

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INTRODUCTION

The Division of Agricultural Economics and the Division of Agricultural Extension of the University of Minnesota, the Tennessee Valley Authority and the county extension services of several northwestern Minnesota counties are cooperating in a phosphate test demonstration project and in a farm management service. This service is offered to a selected group of farmers who have agreed to demonstrate the value of phosphate fertilizer and who have also agreed to keep farm business records. The phosphate is provided by the T.V.A. and the fieldman is provided by the T.V.A. and the Agricultural Extension Service. Each farmer pays the freight and other miscellaneous expenses that may occur between the point of shipment and the farm on all the T.V.A. phosphate furnished and $10.00 per year to cover the summarization of the records and other miscellaneous expenses. The balance of the cost is defrayed by the University of Minnesota.

The analysis of the farm business record and the preparation of the reports are handled by the Division of Agricultural Economics under the direction of G. A. Pond and T. R. Nodland. The field organization is handled by the Division of Agricultural Extension with C. L. McNelly in charge of this work. J. R. Burkholder has been fieldman since the organization of the project. County agricultural agents who cooperated in this project include Howard Grow, W. L. Beneditz, Ray Reierson, George Landsverk, Lester Lerud, Carl G. Ash, Rudolph Stolen, John Dysart, M. C. Wangsness and J. A. Salisbury.

The following tabulation shows by counties the number of cooperators who completed records in 1940:

Kittson	8	Polk	18
Mahnomen	9	Red Lake	10
Marshall	15	Roseau	15
Norman	15		
Pennington	10	Total	100

The tables on page 4 and succeeding pages show data for 98 farms. Two farms have been omitted from all the averages in the tables because the records were not sufficiently complete for a full analysis.

The records kept by the cooperators include inventories at the beginning and end of the year, cash receipts and expenses and a record of the farm produce used by the farm family. Complete household and personal records were also kept by 30 cooperators. Supplementary information was secured during the year regarding crop and livestock production practices.

At the end of the year, the books were taken to the central office at University Farm, where they were checked and summarized. For the purpose of comparison, the earnings as shown in this report are computed as if each operator was a full owner; however, each tenant is supplied a statement of his earnings on the basis of the rental system under which he is operating.

TYPE OF FARMING*

Wheat, flax, sugar beets, potatoes and legume seeds are grown for sale as cash crops. Dairying is the most important livestock enterprise with sheep ranking second. Some beef cattle and poultry and a small amount of hogs are also raised. Oats, barley, hay and pasture are important feed crops.

TOPOGRAPHY, SOILS AND WEATHER

The Red River Valley in the western part of the area is very level with black surface soils that are free of stone except in a few places where the deposit from glacial Lake Agassiz is very shallow. Along the beaches of the glacial lake the soils are gravelly and interspersed with poorly drained areas. In extremely wet seasons the surplus water can be drained from the land only very slowly. A large acreage of poorly drained land is used for hay.

East of the Red River Valley is an area lying within the old lake bed that is also very level. The soils are complexly intermixed and poorly drained. Bog areas are numerous, part open and part timbered with tamarack and spruce. A large amount of peat is found in the eastern portion of the territory.

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*For a more complete description of the area see Engene, S. A., and Pond, G. A., "Agricultural Production and Types of Farming in Minnesota", Minnesota Bulletin No. 347, May, 1940.

Table 1. Monthly and Annual Precipitation

	Ada		Fosston		Angus		Roseau	
	Precipitation	Departure from normal	Precipitation	Departure from normal	Precipitation	Departure from normal	Precipitation	Departure from normal
	Inches	Inches	Inches	Inches	Inches	Inches	Inches	Inches
January	0.11	-0.33	0.37	-0.07	0.16	-0.20	0.29	-0.28
February	0.74	+0.25	0.87	+0.27	0.48	+0.03	0.52	+0.02
March	1.06	+0.39	1.15	+0.19	0.65	+0.09	0.73	-0.22
April	1.51	-0.15	2.76	+0.49	1.98	+0.44	2.56	+1.30
May	1.79	-1.04	1.62	-1.02	1.16	-1.22	0.40	-1.89
June	2.84	-0.81	1.68	-2.01	0.61	-2.81	1.64	-1.53
July	3.06	+0.10	3.64	+0.79	5.56	+2.60	3.88	+0.62
August	2.83	-0.01	1.71	-1.13	2.44	-0.30	2.09	-0.76
September	0.34	-1.90	0.80	-1.66	1.44	-0.61	2.40	-0.15
October	1.90	+0.41	2.20	+0.68	1.84	+0.40	3.47	+2.02
November	0.84	+0.09	2.81	+1.93	1.30	+0.58	1.33	+0.44
December	0.66	+0.10	0.35	-0.31	1.13	+0.61	0.48	-0.12
1940 total	17.68	-2.90	19.96	-0.85	18.75	-0.39	19.79	-0.55
1939 total	16.91	-3.67	17.18	-3.63	17.95	-1.19	16.44	-3.90
1938 total	23.10	+2.52	19.06	-1.75	15.06	-4.08	17.16	-3.18
Normal annual precipitation	20.58		20.81		19.14		20.34	

The year 1940 as a whole was normal in regard to temperature. The early spring was considerably cooler and slightly drier than usual. All the crops were damaged materially by a drought in June and by warm dry weather in early July. Precipitation was below normal in August and September.

Table 2. Monthly and Annual Temperature, 1940

	Ada		Fosston		Angus		Roseau	
	Temperature (degrees, F.)	Departure from normal	Temperature (degrees, F.)	Departure from normal	Temperature (degrees, F.)	Departure from normal	Temperature (degrees, F.)	Departure from normal
January	2.3	-1.9	1.0	-1.4	2.4	+0.4	0.2	-0.7
February	14.2	+6.7	13.4	+5.1	12.4	+5.8	9.1	+3.9
March	19.5	-3.4	19.0	-4.5	17.2	-5.1	14.1	-6.2
April	39.6	-2.5	37.8	-3.4	37.6	-3.1	34.6	-5.7
May	54.4	+0.4	53.2	+0.6	53.4	+0.9	51.0	-1.4
June	62.8	-0.9	61.7	-1.4	60.7	-1.7	58.6	-4.1
July	72.3	+3.7	69.3	+1.7	69.2	+2.5	67.3	+0.8
August	66.0	-0.1	65.1	+0.1	64.6	+0.1	64.1	+0.3
September	63.6	+6.6	62.0	+5.6	60.4	+4.4	59.0	+3.9
October	51.6	+7.8	48.8	+5.0	49.2	+6.1	46.6	+4.1
November	23.5	-2.6	22.6	-3.6	22.7	-3.4	21.0	-3.4
December	17.2	+6.4	16.1	+6.0	15.0	+5.9	13.6	+5.4

Summary of Farm Inventories (Beginning of Year), 1940

Items	Your farm	Average of 98 farms	20 most profitable farms	20 least profitable farms
Size of farm (acres)	_____	397	585	419
Size of business (work units)*	_____	456	622	463
Horses	$_____	$ 336	$ 380	$ 329
Productive livestock (total)	_____	1,461	1,773	1,385
Dairy and dual purpose cows	_____	618	675	649
Other dairy & dual purpose cattle	_____	340	398	382
Beef cattle (including feeders)	_____	156	269	0
Hogs	_____	55	67	56
Sheep (farm flock)	_____	249	310	263
Poultry (including turkeys)	_____	43	54	35
Crop, seed, and feed	_____	870	1,318	1,076
Mach. & equipment (total)	_____	2,141	2,982	2,490
Power mach. (f. share)	_____	957	1,276	1,115
Crop & gen. mach.	_____	1,009	1,497	1,194
Livestock equip. & supplies	_____	175	209	181
Buildings, fences, etc.	_____	3,585	4,046	4,150
Land	_____	5,246	8,026	5,819
Total farm capital	$_____	$13,639	$18,525	$15,249

*Explanation of term: "Work units."

The total "work units" for any one farm is a measure of size of that farm business. It is the accomplishment of a farm worker in a ten-hour day working on crops and productive livestock at average efficiency.

The number of work units for each animal and each acre of crops used in this report are listed as follows:

Item	Per	No. of work units	Item	Per	No. of work units
Dairy and dual purpose cows	cow	15.5	Small grain	acre	.6
			Seed potatoes	"	4.3
Other dairy & dual purpose cattle	animal	2.4	Other potatoes	"	3.8
			Sugar beets	"	2.5
Beef breeding herd	unit*	4.3	Corn, husked	"	1.3
Sheep - farm flock		2.2	Corn, shredded	"	2.0
Hens	100 hens	28.0	Corn silage	"	1.4
Feeder cattle		.3	Corn fodder	"	1.1
Hogs	100 lbs.	.3	Alfalfa hay	"	.8
Turkeys	produced	.7	Other hay crops	"	.6
			Legume seed	"	1.0

*Animal unit represents one cow, one bull, one feeder steer or heifer, two head of other cattle, seven head of sheep, fourteen lambs, five hogs, ten pigs, 100 hens, or 1,400 lbs. turkeys produced.

Summary of Farm Inventories (End of Year), 1940

Items	Your farm	Average of 98 farms	20 most profitable farms	20 least profitable farms
Horses	$_____	$ 318	$ 366	$ 310
Productive livestock (total)	_____	1,639	2,018	1,697
Dairy & dual purpose cows	_____	635	766	661
Other dairy & dual purpose cattle	_____	401	400	535
Beef cattle (including feeders)	_____	194	395	0
Hogs	_____	76	110	80
Sheep (farm flock)	_____	290	286	384
Poultry (including turkeys)	_____	43	61	37
Crop, seeds, and feed	_____	977	1,716	855
Mach. & equipment (total)	_____	2,234	3,143	2,457
Power machinery (f. share)	_____	972	1,313	1,025
Crop and gen. machinery	_____	1,082	1,600	1,256
Livestock equipment & supplies	_____	180	230	176
Buildings, fences, etc.	_____	3,585	4,071	4,172
Land	_____	5,250	8,032	5,828
Total farm capital	$_____	$14,003	$19,346	$15,319

Summary of Amount of Livestock

Items	Your farm	Average of 98 farms	20 most profitable farms	20 least profitable farms
No. of horses	_____	4.0	4.5	4.1
No. of colts	_____	.7	.6	.6
No. of dairy & dual purpose cows	_____	11.2	12.5	11.5
Head of other dairy & dual purpose cattle	_____	13.2	13.6	15.3
Head of cattle kept in beef breeding herd	_____	3.1	5.7	0
Litters of pigs raised	_____	2.3	3.0	3.0
Pounds of hogs produced	_____	3,586	5,350	3,774
Head of sheep (2 lambs = 1 head)	_____	38.8	40.7	48.4
No. of hens	_____	60	73	48
Total no. of prod.livestock animal units	_____	28.7	34.0	29.0
% of total that are:				
Dairy and dual purpose cows	_____	42.0	39.4	43.2
Other dairy and dual purpose cattle	_____	25.7	21.7	31.6
Beef cattle (including feeders)	_____	6.4	9.6	0
Sheep - farm flock	_____	16.1	15.7	15.6
Hogs	_____	5.2	6.0	5.8
Turkeys	_____	2.2	5.4	1.8
Chickens	_____	2.4	2.2	2.0

Summary of Farm Earnings (Cash Statement), 1940

Items	Your farm	Average of 98 farms	20 most profitable farms	20 least profitable farms
FARM EXPENSES				
Horses bought	$_____	$ 20	$ 26	$ 13
Dairy and dual purpose cows bought	_____	30	27	0
Other dairy & dual purpose cattle bought	_____	41	19	64
Beef cattle bought (including feeders)	_____	9	7	0
Hogs bought	_____	10	13	7
Sheep bought	_____	31	6	113
Poultry bought (including turkeys)	_____	24	54	20
Misc. crop expenses	_____	149	170	151
Feed bought	_____	138	154	190
Power mach. (farm share) (new)	_____	226	267	157
Power mach. (farm share) (upkeep)	_____	330	466	370
Custom work hired	_____	74	73	46
Crop and general mach. (new)	_____	195	287	209
Crop and general mach. (upkeep)	_____	50	91	46
Livestock equipment (new)	_____	29	46	19
Livestock equipment (upkeep)	_____	5	6	9
Misc. livestock expense	_____	13	20	14
Buildings and fencing (new)	_____	154	166	170
Buildings and fencing (upkeep)	_____	79	84	99
Hired labor	_____	211	355	223
Taxes (real estate and personal prop.)	_____	193	276	206
Insurance	_____	5	3	7
General farm	_____	24	30	25
(1) Total farm purchases	_____	2040	2646	2158
(2) Decrease in farm capital	_____	-	-	-
(3) Board furnished hired labor	_____	103	169	103
(4) Interest on farm capital	_____	691	947	764
(5) Unpaid family labor	_____	295	285	463
(6) Total farm expenses (Sum of (1) to (5)	_____	3129	4047	3488
FARM RECEIPTS				
Horses	_____	30	28	12
Dairy and dual purpose cows	_____	122	103	90
Dairy products	_____	610	752	540
Other dairy and dual purpose cattle	_____	203	218	172
Beef cattle (including feeders)	_____	77	88	0
Hogs	_____	166	255	154
Sheep and wool	_____	222	297	282
Poultry (including turkeys)	_____	173	405	124
Eggs	_____	65	80	37
Potatoes	_____	120	281	182
Small grain	_____	560	1110	629
Other crops	_____	123	257	81
Power machinery sold	_____	84	104	76
Crop and gen. mach. sold	_____	32	50	37
Misc.	_____	133	184	37
Income from work off the farm	_____	116	206	74
Agricultural adjustment payments	_____	252	327	270
(7) Total farm sales	_____	3088	4745	2797
(8) Increase in farm capital	_____	364	821	70
(9) Farm prod.used in house + house rent	_____	366	397	433
(10) Total farm receipts (7) + (8) + (9)	_____	3818	5963	3300
(6) Total farm expenses	_____	3129	4047	3488
(11) Operator's labor earnings (10) - (6)	_____	689	1916	-188

Summary of Farm Earnings (Enterprise Statement), 1940 (A)

Items	Your farm	Average of 98 farms	20 most profitable farms	20 least profitable farms
EXPENSES AND NET DECREASES				
Total power	$_____	$ 582	$ 706	$ 681
Horses	_____	132	157	130
Tractor	_____	251	312	347
Truck	_____	47	95	50
Auto (farm share)	_____	107	96	120
Gas engine (farm share)	_____	6	3	8
Elec. plant or current (farm share)	_____	8	13	8
Hired power	_____	31	30	18
Crop and general machinery	_____	138	187	166
Livestock equipment	_____	25	25	27
Buildings, fencing and tiling	_____	107	120	138
Misc. productive livestock expense	_____	13	20	14
Labor	_____	628	829	803
Real estate taxes	_____	170	245	184
Personal property tax	_____	23	31	22
Insurance	_____	5	3	7
General farm	_____	24	30	25
Interest on farm capital	_____	691	947	764
(1) Total expenses and net decreases	$_____	$ 2,406	$ 3,143	$ 2,831
RETURNS AND NET INCREASES				
All productive livestock	$_____	$ 1,881	$ 2,559	$ 1,751
Dairy and dual purpose cows	_____	735	934	677
Other dairy and dual purpose cattle	_____	351	340	406
Beef cattle (including feeders)	_____	117	223	0
Hogs	_____	208	325	203
Sheep - farm flock	_____	232	268	292
Turkeys	_____	135	327	90
Chickens	_____	103	142	83
Crops, seed and feed	_____	757	1,879	450
Income from work off the farm	_____	116	206	74
Agricultural conservation payments	_____	252	327	270
Miscellaneous	_____	89	88	98
(2) Total returns and net increases	$_____	$ 3,095	$ 5,059	$ 2,643
(1) Total expenses and net decreases	$_____	$ 2,406	$ 3,143	$ 2,831
(3) Oper. labor earnings (2) minus (1)	$_____	$ 689	$ 1,916	$ -188

(A) Cash receipts and expenses are adjusted for changes in inventory for each enterprise and for each item of expense in order to show total receipts and net increases, and total expenses and net decreases. The operator's labor earnings are the same as those on page 6.

ANALYSIS OF THE REASONS FOR DIFFERENCES IN OPERATOR'S EARNINGS

The financial statement on the preceding pages shows that there is a wide range in earnings. The average operator's labor earnings for the 20 most profitable farms was $1,916, and for the 20 least profitable farms $-188. The difference between the averages for these two groups was $2,104. Some of the causes for these differences in earnings may be beyond the control of the farmer. It is significant, however, that the data in this report indicate that there are several factors which show definite relationships with operator's labor earnings and which suggest opportunities for increased earnings. The more important of these factors and their relationship with earnings are presented in the following tables.

Table 3. Relation of Crop Yields to Farm Earnings

Per cent crop yields were of the average for all 98 farms		No. of farms	Average operator's labor earnings
Group	Average		
Below 80	64	23	$ 311
80-123	99	54	694
124 and above	141	21	1,093

High production per acre, up to certain limits, tends to lower the cost per bushel of grain or per ton of hay. Any possible method of management that will increase crop yields and therefore lower cost of production more than the extra expense incurred in securing the higher yields should be given consideration.

Table 4. Relation of Choice of Crops to Farm Earnings

Per cent of tillable land in high return crops*		No. of farms	Average operator's labor earnings
Group	Average		
Below 25.0	20.2	21	$ 439
25.0-42.9	33.8	52	690
43.0 and above	49.5	25	898

*Crops are marked on page 14 as (A), (B), (C), and (D). All of acres in (A) crops, one half of acres in (B) crops, and one-fourth of acres in (C) crops are used in calculating per cent of tillable land in high return crops.

As a rule, on these farms, such crops as alfalfa, hard spring wheat, flax, barley, sugar beets, and potatoes bring a higher net return per acre than other crops usually grown. Additions can be made to earnings by putting as high a percentage as possible of the tillable land into these higher return crops.

Table 5. Relation of Returns from Productive Livestock to Farm Earnings

Index of gross returns from productive livestock*		No. of farms	Average operator's labor earnings
Group	Average		
Below 88	76	24	$ 398
89-112	99	50	777
113 and above	124	24	798

*Feed records were not kept on these farms. The index represents gross returns and is weighted by the number of animal units of each class of livestock.

Many of these farms are livestock farms. High gross returns from livestock are accompanied by high farm income. A large proportion of the crops raised are fed on the farm and some additional feed is purchased. Feed is the major item of cost in livestock production and livestock constitute an important source of income on these farms. There are a number of reasons for differences among farms in livestock returns. High productivity per animal and economy in the use of feed and labor are important. Other factors of considerable importance are kind of feed used, quality of pastures, balance of ration, degree of sanitation, and kind of shelter and equipment.

Table 6. Relation of Amount of Productive Livestock to Farm Earnings

Productive livestock units per 100 acres*		No. of farms	Average operator's labor earnings
Group	Average		
Below 6.9	5.4	19	$ 531
6.9-12.9	9.4	57	630
13.0 & above	15.5	19	761

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

Three very specialized crops farms having more than 60% of the income from crops were omitted from the averages in table 6. The amount of livestock is an important factor only on livestock farms. If the livestock is yielding a net return, an increased amount of livestock adds to size of business and the opportunity to increase the farm earnings. Livestock produces manure and aids in keeping up the fertility of the land, and utilizes waste products on the farm. Livestock also helps to provide productive employment throughout the year. Any method that aids in utilizing the available resources to full and efficient capacity should add to the farm income.

Table 7. Relation of Size of Business (Work Units) to Farm Earnings

No. of work units		No. of farms	Average operator's labor earnings
Group	Average		
Below 325	270	24	$ 396
325-549	423	52	600
550 and above	735	22	1,220

The size of the farm business is measured in terms of work units. A work unit is the accomplishment of a farm worker in a ten-hour day, working on crops and productive livestock at average efficiency or ten hours of work off the farm for pay. Average farm earnings tend to increase with an increase in size of business. For farmers operating their farms at a loss, the larger the volume of business, the larger will be the loss, but a farmer who is making a profit could make a larger profit if he increased his size of business, providing that in so doing he does not lower materially the efficiency in some one or more important branches of his business. Those farmers who have large businesses usually have more flexibility of their organization than does the man with a small business, and can utilize more efficiently and to better advantage available labor, power, machinery and buildings. The size of the farm business may be increased by farming more land, by keeping more livestock, or by keeping livestock or growing crops of a more intensive type.

Table 8. Relation of Amount of Work Accomplished per Worker to Farm Earnings

Work units per worker Group	Average	No. of farms	Average operator's labor earnings
Below 180	148	22	$ 298
180-249	213	53	658
250 & above	299	23	1,124

More units of work accomplished per worker reduces the labor charge per unit of business. Higher labor accomplishment can be secured in several ways. In the first place, the business must be large enough so that there will be at least sufficient work available for the family labor. The farm should be so organized that the labor requirements are well distributed throughout the year. Handling pastures in such a way that as large a proportion as possible of the year's feed for livestock may be obtained from them helps to reduce labor requirements. Proper planning of the farm work and economical use of labor-saving machinery help to increase the work accomplished per worker.

Table 9. Relation of Power, Machinery, Equipment and Building Expense to Farm Earnings*

Expense per work unit Group	Average	No. of farms	Average operator's labor earnings
$2.30 & above	$2.88	22	$423
$1.30-2.29	1.76	53	730
Below $1.30	1.12	23	850

*Includes building, fencing, all crop machinery and livestock equipment, horse feed, and miscellaneous horse expense.

The expense factor does not show as high relationship with earnings when prices are high as when they are low. Some farms are under-equipped. On a few farms, excessive expenses constitute the main factor causing earnings to be very low.

Some of the cash expenses can be kept down by careful management. Oftentimes necessary repairs and improvements can be made by using the available farm labor rather than by hiring extra help. Repairs and overhauling should be done before spring work begins insofar as possible; or on rainy days or in other spare time during the summer. Reducing the number of horses to the minimum required for efficient operation of the farm helps reduce the power expense. In some cases, farmers can offset some or all of the power and machinery expense by using their equipment for outside work.

EFFECT OF WELL-BALANCED EFFICIENCY ON FARM PROFITS

It is quite evident from this report that few farmers have a monopoly on efficiency. Quite often farm operators show efficient management in one part of the farm business, which is offset by poor results in other phases. These farmers get medium returns while those who fall down all along the line get the lowest returns, and on the other hand those few who can manage to attain high efficiency in all parts of their organization receive returns well above the average. This is well illustrated in Table 10.

Table 10. Relation of Operator's Labor Earnings to the Number of Factors in which the Farmer is Above Average

No. of factors in which farm excels	No. of farms	Your farm	The length of the shaded lines are in proportion to the average operator's labor earnings	Average operator's labor earnings
None or one	14	_____	xxxxxxxxx	$ 393
Two or three	46	_____	xxxxxxxxx	423
Four or five	26	_____	xxxxxxxxxxxxxxxxxxx	883
Six or seven	12	_____	xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx	1,636

The array in Table 10 indicates that it will be worth-while for each cooperator to study carefully his ranking on pages 12 and 13, and learn his standing in respect to each of the above factors and the elements of strength and weakness in his farm business.

Measures of Farm Organization and Management Efficiency, 1940

Measures used in chart on page 13	Your farm	Average of 98 farms	20 most profitable farms	20 least profitable farms
Operator's labor earnings	$____	$689	$1,916	-$-188
(1) Crop yields*	____	100	112	83
(2) % of tillable land in high return crops**	____	34.9	37.5	34.2
(3) Gross returns from prod. livestock***	____	100	106	92
(4) Prod. livestock units per 100 acres****	____	9.6	9.1	8.5
(5) Size of business - work units	____	456	622	463
(6) Work units per worker	____	219	273	190
(7) Power, mach., equip. & bldg.exp. per work unit	$____	$1.86	$1.60	$2.15
Measures and items related to some of the above measures:				
(3) Index of gross returns from -				
Dairy cattle	____	100	108	83
Dual purpose cattle	____	100	113	99
Beef cattle - breeding herd	____	100	101	-
Beef cattle - feeders	____	100	-	-
Hogs	____	100	107	94
Sheep - farm flock	____	100	99	95
Turkeys	____	100	101	103
Chickens	____	100	111	92
(5) Work units on crops	____	182	278	205
Work units on productive livestock	____	245	292	240
Other work units	____	29	52	18
(6) Total number of workers	____	2.1	2.4	2.5
Number of family workers	____	1.6	1.6	2.0
Number of hired workers	____	.5	.8	.5
(7) Power expense per work unit	$____	$1.27	$1.07	$1.45
Crop machinery expense per work unit	____	.29	.28	.36
Livestock equip. expense per work unit	____	.06	.04	.05
Bldgs. and fencing exp. per work unit	____	.24	.21	.29

*Given as a percentage of the average.

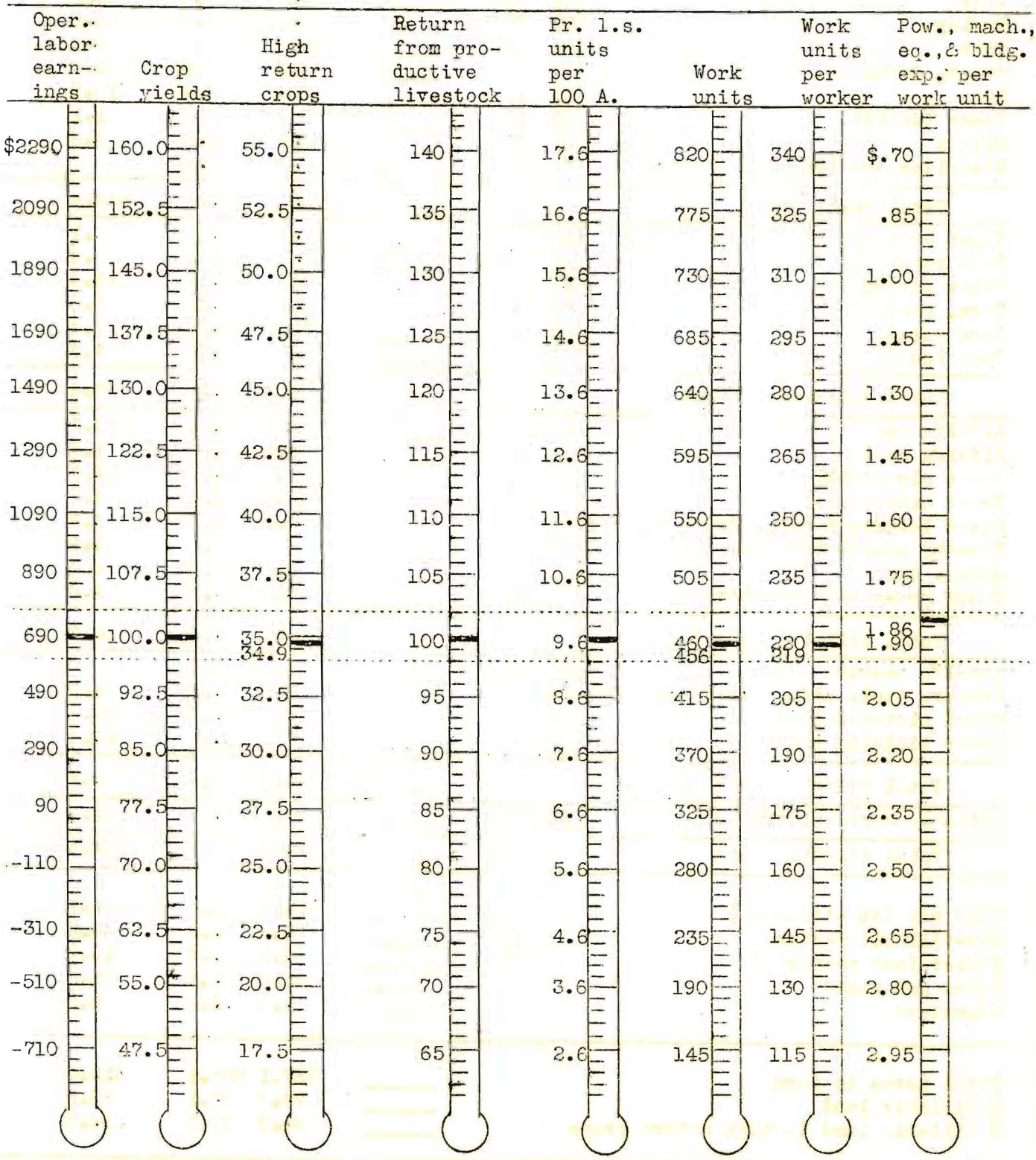
**Crops are marked on page 14 as (A), (B), (C) and (D). All of acres in (A) crops, one half of acres in (B) crops, and one fourth of acres in (C) crops are used in calculating per cent of tillable land in high return crops.

***An index weighted by the animal units of livestock.

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

Thermometer Chart

Using your figures from page 12 locate your standing with respect to the various measures of farm organization and management efficiency. The averages for the 98 farms included in this summary are located between the dotted lines across the center of this page.



Distribution of Acres in Farm, 1940

Crop: (A), (B), (C), and (D) refer to ranking used in calculating % of tillable land in High Return Crops (see page 12)		No. growing this crop	Your farm	Average of 98 farms	20 most profitable farms	20 least profitable farms
Wheat, hard spring	(A)	80		26.2	38.0	29.4
Flax	(B)	74		28.9	56.7	28.8
Barley	(B)	79		29.2	43.2	30.3
Oats	(C)	94		36.0	45.0	37.1
Wheat, durum	(C)	5		3.2	12.8	2.4
Rye	(D)	15		5.4	6.4	10.9
Emmer (spelt)	(D)	18		2.3	3.9	1.1
Millet	(D)	12		1.7	1.2	3.6
Miscellaneous (buckwheat, etc.)	(D)	3		.1	.2	0
Total Small Grain				133.0	207.4	143.6
Sugar beets and truck crops	(A)	6		.6	.1	.1
Seed potatoes	(A)	3		.7	2.8	.4
Other potatoes	(B)	38		5.1	5.5	11.4
Corn, grain	(C)	30		4.0	7.2	2.8
Corn silage	(D)	54		8.5	12.5	7.4
Corn fodder	(D)	50		6.3	4.1	7.3
Total cultivated crops				25.2	32.2	29.4
Alfalfa hay	(A)	68		16.1	23.1	14.7
Alfalfa seed	(B)	16		2.2	2.8	1.3
Sweet clover hay	(C)	38		11.2	14.0	12.7
Sweet clover seed	(C)	34		10.7	28.3	4.4
Mixed legumes & non-legumes for hay	(C)	18		4.6	4.2	3.7
Timothy and/or brome hay	(D)	15		6.1	6.0	11.6
Annual hay	(D)	43		8.2	9.0	8.0
Quack grass and junegrass hay	(D)	11		2.3	2.0	2.3
Total tillable land in hay				61.4	89.4	58.7
Alfalfa pasture	(A)	13		2.0	1.4	0
Mixture incl. alf., sw.clov., brome	(B)	14		3.0	5.6	4.2
Sweet clover pasture	(C)	58		16.7	19.6	23.0
Other tillable pasture	(D)	59		17.1	14.0	13.4
Total tillable land in pasture				38.8	40.6	40.6
Tillable land not cropped	(D)	76		29.0	45.4	34.3
Total tillable land				287.4	415.0	306.6
Wild hay (non-tillable)		33		14.2	29.5	16.8
Non-tillable pasture		70		36.2	32.6	46.8
Timber (not pastured)		30		8.9	9.6	14.2
Roads and waste				42.0	88.5	25.8
Farmstead				8.4	9.9	8.8
Total acres in farm				397.1	585.1	419.0
% tillable land				73.6	70.1	73.5
% tillable land in high return crops				34.9	37.5	34.2

Crop Yields per Acre, 1940

Crop	Your farm	Average of 98 farms	20 most profitable farms	20 least profitable farms
Wheat, hard spring, bu.	_____	15.0	18.3	12.3
Flax, bu.	_____	7.3	7.5	6.5
Barley, bu.	_____	20.0	22.3	15.3
Oats, bu.	_____	26.7	31.6	21.2
Wheat, durum, bu.	_____	13.6	17.5	7.5
Rye, bu.	_____	14.9	18.6	9.3
Emmer (spelt), bu.	_____	24.0	33.7	26.4
Millet, bu.	_____	19.0	25.0	15.9
Seed potatoes, bu.	_____	160.2	190.3	100.0
Other potatoes, bu.	_____	103.4	147.7	85.8
Corn, grain, bu.	_____	28.3	33.5	27.5
Corn silage, tons	_____	6.1	5.6	7.0
Corn fodder, tons	_____	2.6	3.1	2.5
Alfalfa hay, tons	_____	1.2	1.2	1.1
Alfalfa seed, lbs.	_____	100.2	90.2	88.8
Sweet clover hay, tons	_____	.7	.8	.5
Sweet clover seed, lbs.	_____	285.3	286.5	157.6
Mixed legume & non-legume hay, tons	_____	.7	1.0	.7
Timothy and/or brome hay, tons	_____	.7	.7	.4
Annual hay, tons	_____	.9	.8	1.1
Quack grass & junegrass hay, tons	_____	.7	.6	.8
Wild hay, tons	_____	.8	.5	.6

Power and Machinery Expense

Item	Your farm	Average of 98 farms	20 most profitable farms	20 least profitable farms
Crop acres per farm	_____	233.9	358.5	248.6
Tractor and horse exp. per crop acre	$_____	$1.73	$1.35	$1.98
Crop and gen. mach. exp. per crop acre	_____	.63	.55	.71
Number of farms with tractors		87	17	19
Number of farms without work horses		3	1	0
Number of farms with two work horses		20	4	4

Returns from Productive Livestock, 1940

Items	Your farm	Average of 98 farms	20 highest in livestock returns	20 lowest in livestock returns
DAIRY CATTLE--55 farms				
Gross returns per dairy cow	$_____	$68.90	$93.40	$49.73
Pounds of butterfat per cow	_____	220	296	165
No. of head of dairy cows	_____	11.9	12.2	10.4
Gross ret. per head other dairy cattle	$_____	$28.79	$34.97	$25.97
Gross ret.per ani.unit all dairy cattle	$_____	$59.83	$80.31	$45.92
No. of ani. units all dairy cattle	_____	18.7	17.9	16.2
DUAL PURPOSE CATTLE--39 farms				
Gross returns per dual purpose cow	$_____	$61.95	$79.13	$48.58
Pounds of butterfat per cow	_____	196	231	160
No. of head of dual purpose cows	_____	11.3	9.0	10.9
Gross ret.per head other du.pur.cattle	$_____	$26.88	$30.90	$22.12
Gross ret.per ani.unit all du.pur.cattle	$_____	$54.87	$69.69	$42.65
No. of animal units all dual pur.cattle	_____	19.0	14.9	18.3
Price rec'd. per lb.butterfat sold(cts.)	_____	30.4	30.9	30.1
BEEF-BREEDING HERD--13 farms				
Gross returns per animal unit	$_____	$58.04	$68.82	$38.10
No. beef cows and bulls per herd	_____	8.1	3.2	14.5
No. animal units per herd	_____	15.8	10.7	23.7
FEEDER CATTLE--2 farms				
Gross returns per cwt. produced	$_____	-	-	-
Lbs. feeder cattle produced	_____	-	-	-
Price rec'd. per cwt. sold	$_____	-	-	-
SHEEP - FARM FLOCK--53 farms				
Gross returns per head*	$_____	$5.93	$7.65	$4.19
No. of head of sheep	_____	69.7	55.9	56.0
No. of ewes kept for lambing	_____	49.7	39.0	36.8
% lamb crop	_____	103	135	92
% death loss	_____	7.3	9.6	9.6
Lbs. wool per sheep sheared	_____	7.8	8.1	7.2
Price rec'd. per lb. wool sold (cents)	_____	28.9	28.6	28.0
Price rec'd. per cwt. of lambs sold	$_____	$8.12	$8.29	$7.52
HOGS--80 farms				
Gross returns per cwt. produced	$_____	$5.81	$5.97	$5.36
Lbs. hogs produced	_____	4355	3521	3629
Total no. litters raised	_____	2.8	2.3	3.0
Pigs per litter	_____	7.2	6.8	6.3
Price rec'd. per cwt. sold	$_____	$5.32	$5.34	$5.10
CHICKENS--60 farms				
Gross returns per hen	$_____	$1.86	$2.14	$1.55
No. of hens	_____	89	79	89
Eggs laid per hen	_____	121	132	97
Price rec'd.per doz.eggs sold (cents)	_____	13.9	13.6	14.3
TURKEYS--28 farms**				
Gross returns per cwt. produced	$_____	$15.34	$17.57	$15.58
Lbs. turkeys produced	_____	3210	1363	2008
Price rec'd. per lb. sold (cents)	_____	15.6	17.7	15.4

*Two lambs under 6 mo. of age considered as one head.
**Includes 3 farms raising capons.

Farm Produce Used in House and House Rental, 1940

Items	Quantities: Your farm	Quantities: Average of 98 farms	Quantities: 20 most profitable farms	Quantities: 20 least profitable farms	Value: Your farm	Value: Average of 98 farms	Value: 20 most profitable farms	Value: 20 least profitable farms
Whole milk	_____	771 qts.	768	856	$ _____	$21.86	$26.57	$22.33
Skim milk	_____	814 qts.	852	1,204	_____	4.38	3.40	6.95
Cream	_____	479 pts.	540	581	_____	43.04	51.75	53.80
Farm made butter	_____	49 lbs.	37	68	_____	13.61	9.36	19.77
Eggs	_____	98 doz.	131	113	_____	14.23	19.28	16.21
Cattle	_____	306 lbs.	280	461	_____	22.10	18.65	34.16
Hogs	_____	536 lbs.	655	595	_____	30.92	40.15	32.52
Sheep	_____	15 lbs.	25	19	_____	.81	1.24	1.20
Poultry	_____	80 lbs.	89	116	_____	9.80	11.05	13.83
Potatoes	_____	29 bu.	33	39	_____	11.09	14.31	11.46
Vegetables & fruits					_____	32.60	40.50	29.31
Farm fuel	_____	8 cds.	9	9	_____	15.43	17.44	13.10
Rental val. of house					_____	146.32	142.93	178.05
Total					_____	$366.19	$396.63	$432.69

Household and Personal Expenses for Those Farms Which Kept Complete Accounts of These Expenses, 1940

Items	Your farm	Average of 30 farms	10 most profitable farms	10 least profitable farms
Number of persons - family	_____	4.9	4.7	6.3
Number of persons, (Family adult equivalent (Family	_____	3.8	3.5	5.0
(Other*	_____	.6	.8	.4
Food and meals bought	$_____	$247	$299	$278
Operating and supplies	_____	78	103	99
Clothing and clothing materials	_____	113	134	109
Personal care, personal spending	_____	48	70	42
Furnishings and equipment	_____	37	57	20
Education, recreation and development	_____	50	64	59
Medical care and health insurance	_____	58	82	51
Church, welfare, and gifts	_____	40	53	37
Personal share of auto expense	_____	69	79	71
Household share of elect. & gas eng. exp.	_____	8	17	4
H.H.& pers.shr. of new auto, gas eng. & motor bot	_____	62	85	8
Life insurance and other investments	_____	404	757	20
Total household and personal cash expenses	_____	$1214	$1800	$ 798
Food furnished by the farm	_____	224	217	252
Fuel furnished by the farm	_____	17	8	20
House rental	_____	133	125	139
Total household and personal expenses	_____	1588	2150	1209

*Hired help or others boarded.

Summary of Farm Earnings and Farm Inventories--Averaged by Counties, 1940

Item	W. Kittson W. Marshall W. Polk*	Mahnomen	East Marshall	Norman	Pennington Red Lake	E. Polk	Roseau E. Kittson
Number of farms	14	9	10	15	19	13	18
FARM EXPENSES							
Horses bought	$28	$7	$ 0	$18	$30	$34	$ 9
Dairy and dual purpose cows bought	21	7	11	104	12	3	34
Other dairy & dual purpose cattle bought	29	29	20	91	32	51	29
Beef cattle bought (including feeders)	0	7	0	36	0	21	0
Hogs bought	5	15	3	9	13	18	9
Sheep bought	11	4	20	19	4	1	126
Poultry bought (including turkeys)	23	6	85	11	24	31	7
Misc. crop expenses	199	153	121	188	145	112	123
Feed bought	123	93	206	176	128	125	124
Power mach. (farm share) (new)	289	225	126	399	210	131	175
Power mach. (farm share) (upkeep)	506	187	292	381	311	178	372
Custom work hired	124	61	50	65	66	69	73
Crop and general mach. (new)	313	71	218	376	147	65	146
Crop and general mach. (upkeep)	92	32	56	44	46	36	45
Livestock equipment (new)	24	21	5	37	46	17	33
Livestock equipment (upkeep)	13	3	4	6	5	5	2
Misc. livestock expense	13	13	21	7	14	15	12
Buildings and fencing (new)	45	51	128	500	127	61	110
Buildings and fencing (upkeep)	109	29	38	80	104	114	52
Hired labor	374	109	163	327	144	127	194
Taxes	284	116	156	211	187	149	202
Insurance	7	2	7	11	3	6	3
General farm	25	26	29	26	21	24	23
(1) Total farm purchases	2657	1267	1759	3122	1819	1393	1903
(2) Decrease in farm capital	6	-	-	-	-	8	-
(3) Board furnished hired labor	144	56	89	170	71	69	102
(4) Interest on farm capital	1054	431	490	834	627	604	663
(5) Unpaid family labor	297	307	185	193	333	195	465
(6) Total farm expenses (Sum of (1) to (5)	4158	2061	2523	4319	2850	2269	3133

*Farms in the Red River Valley

Summary by Counties (continued)

FARM RECEIPTS

Horses	$20	$8	$32	$20	$62	$17	$30
Dairy and dual purpose cows	97	60	79	260	114	133	83
Dairy products	535	670	438	588	703	562	691
Other dairy and dual purpose cattle	200	137	137	220	218	219	232
Beef cattle (including feeders)	6	62	78	248	45	120	0
Hogs	278	132	25	190	202	221	75
Sheep and wool	113	189	293	70	132	239	491
Poultry (including turkeys)	119	40	619	129	167	244	25
Eggs	63	62	49	72	72	70	60
Potatoes	366	26	33	201	79	60	41
Small grain	1651	138	393	555	317	244	506
Other crops	128	39	286	101	50	32	233
Power machinery sold	84	23	81	135	106	53	73
Crop and gen. mach. sold	56	20	33	90	13	3	12
Misc.	80	35	102	369	86	96	122
Income from work off the farm	67	122	118	122	117	146	125
Agricultural adjustment payments	452	136	176	303	225	206	216
(7) Total farm sales	4315	1899	2972	3673	2708	2665	3015
(8) Increase in farm capital	-	446	62	660	622	-	526
(9) Farm prod. used in house plus house rent	391	400	314	364	342	348	399
(10)Total farm receipts (7) + (8) + (9)	4706	2745	3348	4697	3672	3013	3940
(6) Total farm expenses	4158	2061	2523	4319	2850	2269	3133
(11)Operator's labor earnings (10) - (6)	548	684	825	378	822	744	807

FARM INVENTORIES (Beginning of year)

Horses	$255	$423	$255	$401	$413	$292	$298
Productive livestock	1341	1284	1340	1640	1475	1448	1555
Crop, seeds and feed	1840	350	463	1084	759	681	677
Machinery and equipment	3273	1404	2119	2135	1833	1640	2336
Buildings, fences, etc.	4741	2253	2642	4554	3331	3924	3091
Land	9637	2692	2942	6524	4417	4089	5034
Total farm capital	21087	8406	9761	16338	12228	12074	12991

Miscellaneous Information - Averaged by Counties, 1940

	W. Kittson W. Marshall W. Polk	Mahnomen	East Marshall	Norman	Pennington Red Lake	East Polk	Roseau E. Kittson
Meas. of farm org. & management efficiency							
Index of crop yields	95	102	105	113	102	108	82
% tillable land in high return crops	44.4	28.1	30.7	35.7	30.7	33.7	37.7
Index of returns from livestock	96	108	90	107	91	100	105
Prod. livestock units per 100 acres	7.0	10.5	10.0	8.5	10.1	12.6	9.3
Size of business - work units	493	394	421	469	470	394	494
Work units per worker	213	219	230	221	229	224	201
Power, mach., eq., bldg. exp. per w. unit	$2.41	$1.51	$1.98	$2.07	$1.60	$1.90	$1.64
Amount of livestock							
No. of work horses	3.3	4.7	2.9	4.8	4.4	4.1	3.6
No. of colts	.5	1.3	.3	.7	1.0	.7	.7
No. of dairy and dual purpose cows	10.7	11.2	9.3	9.1	13.3	10.1	12.7
Head other dairy and dual purpose cattle	12.9	10.8	10.3	11.6	18.3	12.2	12.8
Head in beef-breeding herd	1.9	2.9	4.6	10.8	1.5	.9	.3
Litters of pigs raised	3.6	1.7	.6	2.9	2.4	3.0	1.3
Pounds of hogs produced	5991	3052	851	3989	4110	4860	1694
Head of sheep	20.2	36.1	38.4	11.9	29.7	49.6	79.1
No. of hens	55	69	36	64	68	60	59
Total no. of prod. livestock units	24.8	26.0	27.1	26.6	31.6	28.6	32.6
% of total prod. livestock units that are:							
Dairy and dual purpose cows	46.7	46.4	39.8	37.2	44.4	36.9	42.5
Other dairy and dual purpose cattle	30.6	23.8	22.9	23.9	31.1	23.2	22.3
Beef cattle (including feeders)	1.9	6.1	7.2	23.3	1.5	5.5	.8
Sheep (farm flock)	8.6	15.5	20.2	4.6	12.3	21.6	29.9
Hogs	7.8	5.0	1.8	6.0	5.7	7.0	2.7
Turkeys	1.6	.1	6.7	2.3	2.6	3.0	.2
Chickens	2.8	3.1	1.4	2.7	2.4	2.8	1.6

Miscellaneous Information (continued)

Distribution of acres in farms							
Wheat - hard spring	82.2	13.6	5.2	27.3	21.0	13.2	14.8
Flax	19.8	7.9	67.6	23.9	21.0	7.5	52.6
Barley	71.9	19.7	12.3	46.1	26.2	11.3	11.9
Oats	38.7	28.0	29.1	54.0	42.0	28.7	25.5
Wheat - durum	15.0	0	0	0	3.0	3.6	0
Miscellaneous	5.8	6.1	5.1	14.2	7.7	9.6	14.7
Total acres in small grain	233.4	75.3	119.3	165.5	120.9	73.9	119.5
Sugar beets, seed potatoes and gardens	6.1	0	.9	.1	1.2	.1	.1
Other potatoes	8.9	2.2	1.1	14.2	1.2	3.8	3.5
Corn (grain, silage and fodder)	16.7	23.0	10.0	25.8	24.9	18.2	11.6
Total cultivated crops	31.7	25.2	12.0	40.1	27.3	22.1	15.2
Alfalfa hay	12.5	6.1	11.9	13.0	13.3	13.8	33.3
Alfalfa seed	1.0	0	0	1.0	.6	2.8	7.6
Sweet clover hay	5.9	1.2	10.8	5.4	11.9	16.2	21.2
Sweet clover seed	.9	.1	33.5	.6	5.6	3.3	30.0
Mixed legumes and non-legume hay	.5	1.9	21.8	2.0	3.3	4.3	3.3
Timothy and brome hay	.9	0	.8	0	7.5	17.6	11.5
Misc. hay crops	18.6	15.1	9.6	8.6	7.7	6.2	10.4
Total tillable land in hay	40.3	24.4	88.4	30.6	49.9	64.2	117.3
Alfalfa pasture and mixtures incl. sweet clover and brome	6.3	4.2	3.4	2.1	1.1	10.7	7.4
Sweet clover pasture	26.4	2.2	10.0	18.4	18.4	19.7	14.7
Other tillable pasture	8.4	14.2	26.2	11.7	23.7	11.7	21.9
Total tillable land in pasture	41.1	20.6	39.6	32.2	43.2	42.1	44.0
Tillable land not cropped	73.7	17.0	16.3	36.7	21.8	8.5	23.4
Total tillable land	420.2	162.5	275.6	305.1	263.1	210.8	319.4
Wild hay	4.7	49.0	10.7	9.7	19.9	1.9	12.9
Non-tillable pasture	9.4	41.9	37.4	25.9	43.1	32.1	57.8
Timber, roads, waste and farmstead	35.1	53.2	60.6	36.6	65.2	55.4	96.0
Total land in farms	469.4	306.6	384.3	377.3	391.3	300.2	486.1
% tillable land	89.3	57.0	71.2	82.1	72.6	71.8	66.3

Miscellaneous Information (continued)

	W. Kittson W. Marshall W. Polk	Mahnomen	East Marshall	Norman	Pennington Red Lake	East Polk	Roseau E. Kittson
Crop yields per acre							
Wheat, hard spring, bu.	14.0	12.6	14.1	16.2	13.3	17.1	17.2
Flax, bu.	7.6	5.1	8.2	6.4	7.2	8.7	7.6
Barley, bu.	15.5	19.6	24.0	24.3	19.3	22.7	16.4
Oats, bu.	23.2	30.4	29.5	30.4	27.1	26.6	22.3
Potatoes (excluding certified seed), bu.	136.0	95.9	87.2	102.9	95.0	83.9	142.8
Corn, grain, bu.	28.8	25.0	32.5	28.1	27.1	32.0	-
Corn silage, tons	7.0	5.2	8.5	6.0	5.2	6.5	6.0
Corn fodder, tons	2.9	2.6	2.9	2.9	2.1	2.5	2.3
Alfalfa hay, tons	1.2	1.3	1.3	1.4	1.4	1.3	.8
Sweet clover hay, tons	.8	1.3	.7	1.1	.8	.7	.5
Sweet clover seed, lbs.	192.3	180.0	281.5	250.0	359.2	369.9	225.6
Wild hay, tons	.8	.8	1.3	.8	.7	.9	.6