

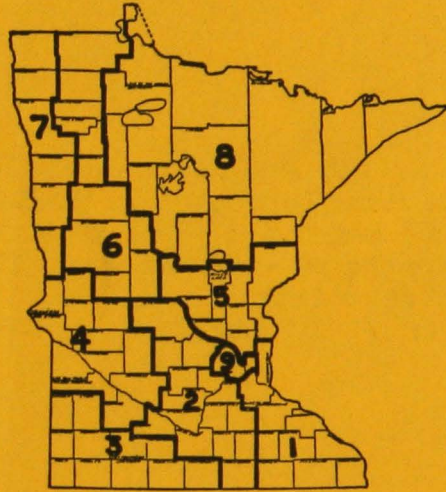
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Looking Ahead

1951

PLANNING MINNESOTA FARM PRODUCTION



TYPE-OF-FARMING AREAS IN MINNESOTA,
OUTLINED BY COUNTY BOUNDARIES

- Area 1—Southeast dairy and livestock
- Area 2—South-central dairy and livestock
- Area 3—Southwest livestock and cash grain
- Area 4—West-central livestock and cash grain
- Area 5—East-central dairy and potatoes
- Area 6—Northwestern dairy and livestock
- Area 7—Red River Valley small grain, potatoes, and livestock
- Area 8—Northern cutover dairy, potatoes, and clover seed
- Area 9—Twin City suburban truck, dairy, and fruit

*Handbook for Agricultural Extension Workers
and Other Leaders in Agriculture*

UNIVERSITY OF MINNESOTA (1)
Agricultural Extension Service (2)
U. S. DEPARTMENT OF AGRICULTURE

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Planning Minnesota Farm Production in 1951
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Looking Backward

For those things that are within the control of farmers, the safest prediction that anyone can make about this year's agriculture is that it will be much like last year's. This is true for any two successive years. Major changes take time to evolve and minor changes are relatively unimportant. Nevertheless sound future planning depends on a good understanding of the changes that are taking place in agriculture. Farmers make judgments on the basis of experience in the past and this experience must be modified by a knowledge of the changes that have accompanied it. This is why it seems desirable first to look backward on Minnesota agriculture and observe and briefly explain the changes. This will furnish a better background for the look ahead.

Trends in Crop Acreages

The total acreage devoted to all crops changes very slowly. Year-to-year variations arise from weather conditions which may make planting impossible or abandonment necessary, but the longer time total can be added to only by clearing, drainage or similar means. However, the acreages of particular crops may be changed considerably by shifting acres from one crop to another.

Table 1 shows the acres devoted to different crops in Minnesota since 1920. It gives 5-year averages up to 1945 and the annual acreages thereafter. The cultivated crops such as corn and soybeans have increased considerably during the period. Corn acreage has increased by more than a million and a half acres since the early twenties, while soybeans have changed from an emergency hay crop of insignificant acreage to a cash grain crop of about three quarters of a million acres.

Two big changes involving corn production have brought about this increased emphasis on corn acreage. The first has been mechanization. Tractors, tractor cultivators and corn pickers have so reduced the hours of labor that many more acres can be handled per man. Likewise, they have permitted the speeding up of operations so that time and weather are no longer as great hazards as they once were. The second change has been the development of adapted varieties of hybrid seed. By adding greatly to the yield, hybrid seed have stimulated the acreage of corn.

Looking toward the future, it would seem that much of the effects of these changes have already been realized. Mechanization is so widely adopted that only further major improvements are likely to bring much change in the future. Likewise, with hybrid seed the adoption in present forms is so nearly universal that only substantial improvements are likely to show any further stimulating effect.

Soybeans have demonstrated that they can compete on many farms with hay, small grains, flax and even corn for acreage planted to them. Many farmers like to grow them, not only because they have proven to be a profitable cash crop but because they are easy to handle and thrive well under varied weather conditions.

The increased emphasis on cultivated crops is disturbing to those who are interested in the conservation of our soil resources. There is little doubt but that the danger of serious erosion problems is increased and the maintenance of soil productivity made more difficult.

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Table 1 TRENDS IN CROP ACREAGES IN MINNESOTA BY TYPES OF FARMING AREAS

(Source: Crop and Livestock Statistics)

Period	Type of Farming Area									State
	1	2	3	4	5	6	7	8	9	
	(1000 acres)									
	Corn									
1921-24	524	916	1178	964	157	214	143	41	36	4173
1925-29	480	924	1229	1011	156	204	124	35	36	4199
1930-34	544	1061	1292	1164	222	269	147	56	41	2796
1935-39	539	1009	1275	1045	216	259	151	57	40	4591
1940-44	594	1090	1259	1082	268	318	212	61	41	4925
45	704	1299	1475	1455	292	360	228	63	50	5926
46	651	1224	1399	1309	245	321	210	50	43	5452
47	634	1205	1314	1236	248	330	181	44	42	5234
48	637	1151	1325	1256	243	310	174	46	40	5182
49	668	1265	1472	1377	264	328	178	56	40	5648
	Soybeans									
1945	117	84	150	67	26	1	6	---	1	452
46	120	121	211	114	34	1	8	---	1	610
47	146	201	324	213	22	1	12	---	1	920
48	130	212	254	220	16	1	10	---	1	844
49	102	184	191	197	18	1	15	---	1	709
	Oats									
1921-24	541	628	1057	922	174	345	468	91	23	4249
1925-29	550	713	1003	924	210	404	475	109	25	4413
1930-34	555	773	855	833	210	442	472	116	24	4280
1935-39	543	788	846	848	203	430	421	95	24	4198
1940-44	545	849	826	846	209	461	431	89	27	4283
45	646	1067	1001	1169	249	578	539	110	33	5392
46	647	1058	1012	1137	243	559	545	105	32	5338
47	556	916	789	895	246	539	451	117	28	4537
48	599	1008	866	962	263	554	460	112	31	4855
49	627	1036	880	953	273	577	449	125	32	4952
	Barley									
1921-24	176	111	79	211	19	132	189	11	4	932
1925-29	255	201	211	353	43	173	344	27	6	1613
1930-34	279	265	325	362	48	182	330	29	6	1826
1935-39	295	350	428	416	40	173	366	23	9	2100
1940-44	129	226	203	326	23	160	354	17	5	1443
45	9	30	15	64	5	68	247	8	1	447
46	21	63	56	146	6	96	333	11	1	733
47	40	78	94	200	8	129	410	15	1	975
48	62	112	134	269	8	150	468	14	2	1219
49	61	106	113	256	7	127	372	18	1	1061

* Less than 0.5

Table 1 continued TRENDS IN CROP ACREAGES IN MINNESOTA BY TYPES OF FARMING AREAS
(Source: Crop and Livestock Statistics)

Period	Type of Farming Area									State
	1	2	3	4	5	6	7	8	9	
(1000 acres)										
Durum and Other Spring Wheat										
1921-24	67	376	47	536	29	207	592	7	10	1871
1925-29	66	326	37	490	42	183	452	11	8	1615
1930-34	47	176	32	358	26	127	473	9	5	1253
1935-39	59	222	64	482	30	193	632	11	5	1798
1940-44	27	91	35	340	8	140	507	9	1	1158
45	24	57	22	249	6	136	486	10	1	991
46	36	88	35	299	9	155	665	15	1	1303
47	34	55	22	169	7	144	621	15	1	1068
48	31	47	22	163	8	123	567	13	1	975
49	31	50	16	145	8	153	776	20	1	1200
Winter Wheat										
1921-24	17	64	5	5	2	5	7	2	1	108
1925-29	33	90	14	11	2	2	2	1	2	157
1930-34	36	86	10	7	2	2	1	2	2	148
1935-39	47	115	8	3	10	5	1	4	6	199
1940-44	33	80	2	1	13	7	3	4	5	148
45	32	54	2	4	5	3	4	2	3	109
46	23	44	2	4	6	4	2	2	1	88
47	21	46	3	10	6	8	3	3	1	101
48	12	35	2	20	3	6	1	1	1	81
49	9	25	2	28	2	10	2	2	1	81
Flax										
1921-24	54	38	70	147	2	51	98	6	*	466
1925-29	79	54	147	219	3	63	142	5	*	712
1930-34	61	65	146	199	2	80	158	8	*	719
1935-39	27	51	153	218	1	92	154	9	*	705
1940-44	59	125	399	492	3	117	195	21	*	1411
45	26	76	250	374	3	118	192	28	*	1067
46	20	59	218	288	1	115	160	25	*	886
47	46	116	318	402	3	193	257	37	1	1373
48	44	119	355	493	4	239	348	59	*	1661
49	40	112	340	509	5	243	318	61	*	1628
Rye										
1921-24	91	173	45	106	84	139	170	23	6	837
1925-29	51	75	33	64	70	51	60	11	3	418
1930-34	36	50	38	46	81	57	41	12	3	364
1935-39	38	61	42	81	127	71	56	14	5	495
1940-44	15	28	11	26	66	33	29	6	2	216
45	6	15	9	16	39	11	7	2	2	107
46	5	13	12	14	42	14	15	2	1	118
47	8	18	19	25	46	22	22	3	2	165
48	12	25	30	51	56	28	30	5	2	239
49	11	18	10	26	60	19	20	4	2	170

* Less than 0.5

Table 1 continued TRENDS IN CROP ACREAGES IN MINNESOTA BY TYPES OF FARMING AREAS
(Source: Crop and Livestock Statistics)

Period	Type of Farming Area									State
	1	2	3	4	5	6	7	8	9	
	(1000 acres)									
	Potatoes									
1921-24	23	23	15	10	83	71	138	35	16	414
1925-29	20	25	10	9	69	43	92	30	16	314
1930-34	20	35	12	11	74	46	99	35	18	350
1935-39	16	28	10	9	48	31	83	28	11	264
1940-44	11	24	9	8	25	22	84	25	7	215
45	6	20	6	6	15	16	82	18	5	174
46	6	18	6	5	11	12	71	17	5	151
47	4	14	4	4	8	9	62	13	3	121
48	3	13	3	3	7	8	56	12	3	108
49	2	12	2	2	7	6	55	11	3	100
	All Hay									
1921-24	497	853	476	603	357	522	420	324	60	4112
1925-29	536	824	429	569	338	594	486	383	57	4216
1930-34	450	855	395	526	370	649	534	462	57	4298
1935-39	514	782	398	560	364	677	526	468	55	4344
1940-44	548	766	379	535	388	698	492	507	49	4362
45	488	693	299	444	408	690	489	540	46	4097
46	513	710	299	438	396	671	451	508	46	4032
47	520	704	307	421	402	652	428	531	44	4009
48	492	679	292	385	381	607	383	490	42	3751
49	469	650	272	378	368	603	367	477	41	3625
	Tame Hay									
1921-24	456	295	242	192	172	233	202	239	32	2063
1925-29	504	322	236	229	157	310	271	304	33	2366
1930-34	421	416	239	232	190	367	294	372	36	2567
1935-39	486	423	289	307	193	409	306	375	38	2826
1940-44	430	476	294	328	238	436	279	429	38	3048
45	473	412	206	248	261	431	262	473	36	2812
	Wild Hay									
1921-24	41	558	234	411	185	289	218	85	28	2049
1925-29	32	502	193	340	181	284	215	79	24	1850
1930-34	29	439	156	294	180	282	240	90	21	1731
1935-39	28	359	109	253	171	268	220	93	17	1518
1940-44	18	290	85	207	150	262	213	78	11	1314
45	15	281	83	196	147	259	227	67	10	1285

The total acreage of oats, barley and rye have decreased considerably since the pre-war period. The highest total figure for these three small grain crops since the close of World War II was 6,313,000 acres in 1948. This compares with 6,793,000 acres average for 1935-39 and 6,470,000 for the period 1930-1934. However, reference to Table 1 will show that practically all of the reduction took place in barley. The oats acreage has been higher in post-war than in pre-war years, and the rye acreage, while down, is relatively insignificant. Barley acreage suffered greatly as a result of low yields in 1943 and 1944. These low yields for barley were coupled with high yields for other grain crops and farmers shifted rapidly out of barley. The experience of the last three years would indicate that barley is gradually coming back into favor and we may reasonably expect some further increase. Account should also be taken of the fact that barley is less important as a feed crop in Minnesota. It has been shifting more and more to a cash crop and the growing of malting barley varieties has become very common.

Minnesota appears to be continuing to go out of wheat production. Only the Red River Valley (Area 7) has maintained its acreage reasonably well. It seems likely that this is a permanent change in Minnesota agriculture.

The need for oil crops during the recent war was met by a very favorable price guaranty policy for flax seed. The result was a sharp increase in flax acreage after 1940. The acreage has remained high even without the high floor on prices due to the large demand for the products of flax. The building boom of the post-war period has required large quantities of paint, while a booming livestock industry has been able to absorb large quantities of meal at favorable prices.

Potatoes - From an acreage point of view, potatoes are a minor crop in Minnesota. The acreage has been dropping steadily over the years though at a decreasing rate. Production of potatoes has not declined as rapidly as acreage because of sharply increased yields per acre. In common with much of the remainder of the country the potato enterprise in Minnesota has been the recipient of large government subsidies during the last few years. It seems likely that the acreage will be even smaller if these subsidies are permanently removed.

All Hay - One of the unfortunate consequences of the economic turn of events during the past ten years has been the reduction in hay acreage in the state. No doubt many factors have been partially responsible. The particular set of requirements for war time demands did not lay emphasis on hay production. The increase in mechanization has given other crops more advantage than to hay. The result has been a decreasing acreage. Unfortunately, this trend is contrary to our long time requirements for soil conservation and may prove expensive in the long run to farmers in some areas.

Trends in Crop Yields

Table 2 shows the average yield of each of our important crops by 10 year periods since 1870 and annually from 1940. It is interesting to observe that in all crops except barley and rye the period 1940-49 had higher average yields than any other 10 year period. Whether the high yields of the past ten years have been due to unusually favorable weather, to improved tillage resulting from mechanization, to improved varieties, to increased use of fertilizers, to soil conservation measures or to some other reason may be debatable. While the evidence is not clear cut, it seems probable that the plant scientists and the engineers have been able to more than hold their own in maintaining crop yields in spite of any tendency toward soil depletion and the ravages of weeds and plant diseases.

Trends in Livestock Numbers

As shown in Table 3 the only forms of livestock that show strong trends for the period 1923-50 are horses and hens. The strong downward trend in horse numbers has been consistent throughout the period and is likely to continue. In poultry the upward trend in numbers came about early in World War II. Since the close of the war,

Table 2. Trends in Yields of Principal Crops in Minnesota, State Average Yield

Year	Corn	Soybeans	Oats	Barley	Wheat			Flax	Rye	Potatoes	Hay			
					Durum	Other Spring	All Spring				Tame	Wild	All	
1870-79	32.5	-	34.0	26.1	-	-	14.3	-	18.6	97.7	1.43	-	-	
1880-89	29.9	-	33.4	24.2	-	-	12.6	-	14.9	94.3	1.31	-	-	
1890-99	28.1	-	31.0	26.2	-	-	14.4	-	17.4	87.2	1.45	-	-	
1900-09	29.3	-	31.6	25.5	-	-	13.1	-	18.8	88.4	1.65	-	-	
1910-19	34.2	-	33.4	24.3	-	-	14.1	-	9.1	100.5	1.55	-	-	
1920-29	34.4	-	34.8	27.1	-	-	-	18.2	9.6	99.1	1.64	1.20	-	
1930-39	30.9	-	31.2	22.0	13.2	12.6	-	18.0	8.3	76.1	1.34	.90	-	
1940-49	42.5	-	37.8	26.1	17.2	17.2	-	19.3	10.2	113.2	-	-	-	
1940	39.5	-	42.5	30.0	16.0	19.5	-	24.0	10.5	17.0	95.0	1.52	1.05	-
1941	44.0	15.0	27.0	27.0	15.5	13.5	-	14.0	10.5	11.5	78.0	1.70	1.10	-
1942	43.5	13.0	43.5	29.5	21.5	20.5	-	22.5	10.0	15.0	95.0	1.84	1.15	-
1943	41.5	13.5	33.0	18.5	18.0	12.5	-	18.5	9.5	12.5	97.0	1.82	1.15	-
1944	43.0	16.5	35.0	19.5	17.0	17.0	-	16.0	7.7	11.0	82.0	1.55	1.15	-
1945	36.5	14.5	45.0	29.0	17.5	19.0	-	22.5	11.0	16.0	11.0	-	-	1.52
1946	44.0	17.5	37.0	29.0	19.5	19.5	-	19.0	10.5	13.0	115.0	-	-	1.46
1947	36.5	15.0	36.0	26.5	17.0	17.5	-	19.5	11.0	15.0	140.0	-	-	1.42
1948	52.5	18.5	42.5	28.0	15.0	17.5	-	19.0	11.5	15.0	160.0	-	-	1.37
1949	44.0	17.5	35.0	24.0	15.5	15.5	-	18.0	10.0	15.0	160.0	-	-	1.39

Table 3 TRENDS IN NUMBER OF LIVESTOCK IN MINNESOTA ON JANUARY 1, BY TYPES OF FARMING AREAS
(thousand of head)

Period	Type of Farming Area									State
	1	2	3	4	5	6	7	8	9	
Horses, Mules and Colts										
1923-24	116	173	140	145	61	89	87	51	17	879
1925-29	111	170	136	138	55	85	80	42	11	828
1930-34	101	166	129	132	55	84	74	40	10	791
1935-39	94	157	108	110	53	81	61	42	10	716
1940-44	82	137	84	86	49	73	44	39	9	603
45	68	115	67	69	42	62	35	34	7	499
46	61	106	57	60	40	57	31	31	7	450
47	54	90	49	50	35	48	27	28	6	387
48	48	83	40	43	32	45	23	27	6	347
49	42	73	34	38	28	40	21	24	5	305
50	36	62	27	32	26	38	18	22	4	265
All Cattle and Calves										
1923-24	475	658	450	395	254	314	184	152	49	2931
1925-29	443	624	413	378	238	298	177	166	43	2780
1930-34	511	712	483	432	285	357	214	233	49	3276
1935-39	496	713	508	406	273	340	219	232	43	3230
1940-44	551	792	537	480	322	418	250	257	52	3659
45	585	791	542	458	324	423	253	252	52	3680
46	598	790	507	465	323	418	237	248	50	3636
47	582	764	483	451	317	412	231	241	46	3527
48	550	727	437	397	295	381	195	217	45	3244
49	550	727	455	396	294	382	188	208	44	3244
50	556	729	470	403	293	384	187	210	44	3276
Cows and Heifers Two Years and Over Kept for Milk										
1925-29	222	381	188	192	147	173	94	96	30	1523
1930-34	262	420	195	198	171	201	113	133	33	1726
1935-39	261	418	189	191	169	197	114	134	31	1704
1940-44	273	445	187	201	186	220	111	149	34	1806
45	288	453	171	190	193	222	103	152	35	1807
46	285	450	167	180	190	216	97	135	31	1751
47	277	446	154	171	190	206	96	129	29	1698
48	263	415	144	155	173	199	83	118	29	1579
49	254	396	138	148	167	193	78	115	27	1516
50	251	388	136	143	164	189	75	114	26	1486
Swine including pigs										
1923-24	626	927	998	742	127	173	98	63	46	3800
1925-29	533	844	994	724	112	175	102	50	29	3563
1930-34	574	986	1021	686	79	127	67	30	22	3572
1935-39	397	686	653	336	70	93	47	28	22	2332
1940-44	677	1250	1097	790	168	222	101	61	38	4404
45	584	1040	945	751	97	195	90	32	26	3760
46	601	1086	1098	817	118	198	92	34	38	4082
47	492	955	889	684	79	140	63	22	23	3347
48	476	863	801	626	89	140	58	30	30	3113
49	525	978	792	610	110	176	68	36	36	3331
50	561	1037	793	637	120	194	76	41	39	3498

numbers have dropped from their war time peak but are still much higher than in pre-war years. Better chicks and better feeding and care have resulted in greatly increasing the number of eggs laid per hen which in turn has made poultry production more profitable and has led farmers to increase the size of their flocks.

All cattle and calves moved upward during the war but following the close of the war numbers were reduced so that in 1950 they numbered the same as during the 5 year period 1930-34.

The number of milk cows as shown by cows and heifers two years old and over show about the same pattern as all cattle and calves except that the drop in numbers has been somewhat greater. In 1950 Minnesota farmers had fewer cows than during the period 1925-29 or any 5 year period following that time. War time conditions caused a number of changes which were important to Minnesota dairymen. One of these was a big shift to the sale of whole milk rather than butterfat alone. The overwhelming demand for food necessitated the use of all of the milk for human consumption. Emphasis shifted away from butter production to cheese, evaporated milk and to direct fluid milk consumption. Consumers curtailed their use of butter and, while expanding their use of alternatives for butter, used less of both than for the period before the war. Protected milk sheds around large cities became more firmly established and harder to compete with. Prices of crops and prices of meat animals became increasingly favorable to these products. Labor shortages made the problem of maintaining the dairy herd more difficult, while the growing value of dairy cows for slaughter rapidly increased the prices that farmers had to pay for replacements and increased the temptation to cull more severely. Following the war some of these changes became even more pronounced and have brought with them some shifting away from dairying. This shift has been more pronounced in the cash crop areas like West Central and Red River Valley areas. A definite reversal of present conditions as just described will be necessary before dairying regains its former dominance as a source of livestock income in Minnesota.

Hog production tends to follow fairly closely the supply of available feed. The data on numbers fail to show any particular underlying trends either upward or downward.

Sheep and lamb numbers have followed an up and down movement during the period since 1923. Numbers in 1950 were lower than the 1925-29 average.

Our Growing Mechanization

The very rapidly growing dependence of Minnesota farmers on mechanical power is brought out in the growth of tractor numbers, (Table 4). From less than 15,000 in 1920 the number has grown to more than 213,000 in 1950. On the average a tractor would need to supplant only three horses to furnish the same horse equivalent for drawbar power as we had in 1920. The numbers of trucks and automobiles has also greatly increased. Following 1930 the numbers of farms equipped with electric power has grown rapidly. This has not only furnished a new and convenient source of farm power but has enabled the farm family to enjoy many new comforts of life.

Table 5 shows the changes in the extent of use of tractor power for specific jobs on Minnesota farms. Plowing, disking and harvesting are now almost completely powered by mechanical means. However, other operations are increasing rapidly in making use of tractor power.

Production per Milk Cow and per Hen

Table 6 shows the milk produced per cow and number of eggs per hen for 5 year periods from 1925 and annually beginning with 1945. Increases in both items have been substantial. As previously indicated, milk cow numbers declined following 1945 and the

Table 4. Power and Machinery on Minnesota Farms
1920-1950

	Tractors Number	Trucks Number	Auto- mobiles Number	Electricity Number Farms Reporting	Implements & Machinery Per Acre Dollars
1920	14,588	**	**	13,539	\$5.99
1925	24,160	11,677	**	**	4.59
1930	48,457	**	185,717	23,342	5.88
1940	105,075	38,617	208,693	59,838	5.93
1945	152,555	47,413	**	95,342	9.13
1950	213,578	76,338	260,936	121,207*	**

* 1949

** Information not available

Table 5. Extent of Use of Tractor Power for Specific Operations
on Minnesota Farms, 1939 and 1946 ^{1/}

Operation	1939	1946
Plowing	71%	95%
Disking	64	94
Harrowing	48	88
Seeding small grain	31	73
Harvesting small grain	67	92
Planting corn	7	35
Cultivating corn	43	85

^{1/} Brodell, A. P., & Ewing, J. A. Use of Tractor Power, Animal Power and Hand Power in Crop Production. F. M. 69 B.A.E., U.S.D.A. July 1948.

Table 6. Production per Dairy Cow and Per Hen in Minnesota
1925-1949

Years	Milk per Cow	Eggs per Hen	Years	Milk Per Cow	Eggs per Hen
	pounds	number		pounds	number
1925-29	4854	112	1945	5180	165
1930-34	4740	114	1946	5420	170
1935-39	4870	125	1947	5500	171
1940-44	5120	149	1948	5599	175
1945-49	5532	172	1949	5960	179

Table 7. Size of Farm and Proportion of Tenant Operation in Minnesota,
1920-1949

Years	Acres per Farm	% Tenant Operated
1920-24	166.0	26.2
1925-29	165.8	28.5
1930-34	165.2	32.5
1935-39	168.5	33.3
1940-44	175.2	29.3
1944-49	185.6	23.9
1949	189.2	22.1

heavy culling may have been of some assistance in increasing the average production per cow since it is likely that the low producers were the cows sold. However, this is by no means the complete answer. Better feeding and management and perhaps better breeding must also be given credit. The reasons for the increase in rate of lay of hens have already been discussed.

Size of Farms and Proportion of Tenant Operators

Table 7 shows the changes in the average size of farms in Minnesota and the proportions of the farms that were operated by tenant operators. The average size of farms, being a composite of what is happening on all farms, is a figure that is subjected to stresses from many directions. On the one hand, there are a number of forces at work which tend to break farms into smaller units (measured in acres). Among these are (1) inheritance where a number of children are involved (2) subdivisions around cities into part-time and subsistence units (3) development of highly intensive enterprises such as truck gardening on relatively few acres (4) settlement of unfavorable farming areas such as our cut-over areas where clearing or draining are necessary. Many times the units are necessarily small. (5) A long period of adverse economic conditions may tend to break up larger units into smaller areas. On the other hand, there are forces which tend to consolidate existing units into larger ones and make the size of farms larger but the number of farms smaller. Among these forces are (1) large scale mechanized equipment such as big tractors, self propelled combines etc. which are most economically utilized on large acreages. Farmers seek to obtain control of more acres in order to utilize them more fully. (2) Favorable economic conditions which permit savings among farmers often lead farmers to invest in more land since this is the investing media with which they are most familiar. (3) Farms as a source of investment by city people often lead to consolidation of several units into one. Table 7 indicates that the resultant of all of the forces has been a gradual increase in the average size of farms since the 1930's.

The percentage of farms that are tenant operated is a figure that is also subjected to many cross currents of forces, some of which are the same as those operating on size. Table 7 shows how the aftermath and adjustments following World War I resulted in increasing tenancy while the World War II period and situation following has reversed the trend and tenancy has been dropping.

Changing Uses for Minnesota Milk

Table 8 shows the production of milk and of different manufactured products made from milk in Minnesota. It brings out the decline in butter production and use of dry skim milk for animal feed production and the increases in production of cheese, condensed milk, non-fat milk solids for human food and ice cream. The picture is not a clear cut one of changes in consumption demands since government programs have greatly altered the picture. Dry non-fat milk solids and butter have been the largest recipients of government aid.

Table 9 shows the proportion of milk sold to dairy plants as cream and as whole milk. It brings out the very large shift from sale of cream to the sale of whole milk. The biggest change that has resulted on the farm from this shift has been the loss of the skim milk as feed for livestock and of course the offsetting advantage of the added income from the direct sale of the milk.

Our Changing Economic Situation

The cash receipts that farmers obtain from the sale of their products has varied greatly over the period since 1920 (Table 10). The effects of adverse weather and general depression conditions of the 1930's is in sharp contrast with World War II and succeeding years of general economic prosperity. It should be borne in mind, however, that rising prices per unit of product have added more to the totals than increasing

Table 8. Production of Milk and of Manufactured Dairy Products in Minnesota, 1935-1949

	Milk Production	Total Products Manufactured from Milk					Ice Cream
		Butter	Cheese	Condensed Milk (unsweetened)	Dry Skim Milk (animal feed)	Non-fat Dry Milk Solids (human food)	
	million lbs.	1000 lbs.	1000 lbs.	1000 lbs.	1000 lbs.	1000 lbs.	1000 gal.
1935-39	7822	287,567	13,557	13,541	7341	9,670	6,687
1940-44	8685	299,628	28,477	28,422	3268	63,624	9,112
1945	8625	233,436	46,316	48,282	1668	167,594	10,022
1946	8651	175,891	47,852	41,939	2758	197,337	17,961
1947	8418	243,874	58,949	53,435	2537	164,827	16,389
1948	7987	222,657	54,061	51,368	2434	162,997	14,763
1949	8320	252,621	56,457	*	2381	180,990	14,019

* Not available

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Table 9. Proportion of Milk Sold to Dairy Plants
as whole milk, 1935-1949

	Milk sold to dairy plants			% sold as whole milk
	as cream*	as whole milk	total to dairy plants	
	Million pounds			
1935-1939	5759	945	6704	14.1%
1940-1944	5690	2009	7699	21.1
1945-1949	3423	4123	7546	54.6
1945	3600	4100	7700	53.3
1946	3240	4610	7850	58.7
1947	3403	4150	7553	54.9
1948	3374	3775	7149	52.8
1949	3500	3980	7480	53.2

*Milk equivalent basis

Table 10. Gross Cash Receipts From Crops, Livestock and Livestock
Products in Minnesota, 5-Year Ave. 1920-1944 Annually 1945-1949

	All Crops	Livestock	Livestock Products	Total
	Million dollars			
1920-1924	111.6	102.2	112.3	326.1
1925-1929	110.3	156.9	156.9	424.1
1930-1934	54.1	88.6	103.3	246.0
1935-1939	79.0	125.8	124.4	329.2
1940-1944	134.8	269.7	237.6	642.1
1945	190.9	310.6	357.7	859.2
1946	243.6	389.6	421.7	1054.9
1947	391.2	527.2	425.7	1344.1
1948	418.7	473.3	440.3	1332.3
1949	352.4	458.5	380.2	1191.2

numbers of units sold. To the extent that rising prices have also affected things bought by farmers there has been no actual purchasing power added.

Table 11 shows the cash receipts for each of the more important crops in the state. Examination of the figures will show variations that are almost unbelievably large. For example, gross receipts for corn in the period 1930-34 was less than 7 million dollars. In the year 1949 it was about 109 million dollars.

Table 12 shows the cash receipts from each of the more important kinds of livestock. The variations in cash receipts from livestock have also been very great. Wool and sheep and lambs have not shown the great increases common to the other items but it has already been pointed out that production of sheep has declined sharply during most of the later years.

Cash expenses have also fluctuated greatly during the period since 1920. The changes for various groups of expenses are shown in Table 13. The only declining item has been the interest paid on non-real estate debt and even this item has been rising sharply since 1947. By way of contrast, the expenditures for feed were 7 times as high in 1949 as in the low years of 1930-34. The other items show increases that are roughly as great.

Table 14 shows the prices received by farmers for each of the more important crop and livestock items over the period since 1930, and Table 15 shows the data by groups of products in the form of index numbers.

The over-all effects of changing prices, changing volume of production, changing efficiencies and changing technology can be observed in the balance sheet of Minnesota agriculture (Table 16). Among the assets, real estate has about doubled in value between 1910-14 and 1950. The larger value reflects increasing prices of farm lands more than it does any changing supply of either land or buildings. Assets other than real estate have increased in value by more than four times during the same period. This increase reflects both price increases and quantity increases. Of special interest is machinery and motor vehicle values which have increased from 63 millions in the 1910-14 period to 550 millions in 1950. This clearly points up the growing mechanization of Minnesota agriculture. The financial status of all Minnesota farmers taken as a group shows tremendous improvement. Back in 1910-14 and for every period up to the close of World War II the liquid assets of farmers fell far short of equalling the total liabilities. In 1950, however, Minnesota farmers (taken as a group) could pay off all liabilities using only their cash and bank accounts alone and still have money left over.

Looking Ahead

Perhaps it is fortunate that none of us is given the power to see future events in their entirety. At any event a part of the screen must remain dark until future time shall light it up for us. However, it requires no crystal ball to observe the unsolved problems which are now about us and which are likely to require some sort of solution in the years to come. Some of the problems are already of long standing but are only dimly realized because other events have tended to cover them and thus make them seem less important for the time being.

One of these problems is that of conserving our soil resources. War time demands left little place for consideration of the maintenance of soil resources. We needed everything that could be raised. Post-war economic conditions have been such as not to encourage greatly the adoption of conservation measures. The emphasis has still been largely on high immediate production. As viewed at the beginning of 1951, the situation still appears to favor high production regardless of cost to our soil resources. But sometime and perhaps soon we may need to look squarely at this problem.

Table 11. Gross Cash Receipts From Selected Crops in Minnesota. 5 Year Ave. 1920-1944 Annually 1945-1949

Crop	1920-24	1925-29	1930-34	1935-39	1940-44	1945	1946	1947	1948	1949
	(million dollars)									
Corn	12.7	10.9	6.8	11.1	26.3	38.38	42.61	76.13	81.64	108.97
Soybeans		no quotations			2.8	12.10	22.17	40.95	40.52	27.36
Oats	14.8	12.2	4.4	6.1	11.6	25.88	34.52	39.76	39.28	26.05
Barley	4.9	7.2	3.8	9.9	11.7	8.32	18.99	35.71	33.22	25.48
Wheat	28.8	25.2	8.3	16.4	17.7	24.14	31.89	44.37	35.58	34.55
Flax	9.5	14.1	7.4	9.2	30.6	32.13	34.29	86.34	108.68	58.64
Rye	10.1	4.5	1.2	2.7	1.2	2.26	2.97	4.91	4.42	3.06
Potatoes	15.3	15.7	6.8	5.7	9.4	10.76	15.57	11.66	18.62	16.57
All Hay	3.9	3.6	1.7	1.9	2.5	3.97	3.48	6.73	6.95	7.26

Table 12. Gross Income from Selected Livestock and Livestock Products in Minnesota
5 Year Ave. 1920-44 Annually 1945-49

	1920-24	1925-29	1930-34	1935-39	1940-44	1945	1946	1947	1948	1949
	(million dollars)									
Hogs	66.0	99.2	52.3	65.5	161.2	168.20	230.61	315.67	263.06	236.10
Cattle and Calves	35.1	58.3	36.2	52.9	96.6	129.87	144.02	194.97	196.17	209.00
Lambs and Sheep	2.0	3.8	4.0	7.2	10.9	12.54	14.95	16.57	13.73	13.44
Chickens	7.4	13.2	9.8	10.1	22.1	40.04	36.80	30.55	26.99	24.30
Eggs	19.5	24.1	14.0	19.0	57.7	100.74	104.29	118.86	120.06	115.57
Butterfat	61.3	112.0	71.6	86.1	139.2	67.26	76.46	242.06	260.09	208.72
Milk	18.1					110.70	157.32			
Wool	.8	1.4	1.0	1.7	3.4	3.06	2.64	2.23	1.99	1.87

Table 13. Current Non-labor Cash Expenses of Minnesota Agriculture 5 Year Ave. 1920-1944, Annually 1945-1949

	1920-24	1925-29	1930-34	1935-39	1940-44	1945	1946	1947	1948	1949
Feed	15.5	19.1	12.7	21.0	66.9	89.1	103.0	105.9	110.8	88.3
Livestock Purchase	6.5	15.3	7.1	16.1	26.8	31.5	34.1	34.2	39.7	36.7
Automotive Expense	11.9	18.4	16.4	23.6	35.9	51.2	55.4	64.1	73.9	82.0
Bldg. & Mach. Repairs	9.9	8.5	6.5	7.4	14.0	20.4	18.2	20.9	25.5	29.4
Int. pd. on non-real estate debt	13.4	9.8	5.0	3.9	5.3	4.2	4.0	4.4	5.8	8.2
Other items	17.8	20.7	19.1	20.3	32.1	44.5	53.1	57.0	59.5	62.1
Total	75.0	91.8	66.8	92.3	181.0	240.9	267.8	286.5	315.2	306.7

1948-1949 are estimates based on national figures

Table 14. Prices Received By Farmers for Selected Crops, Livestock and Livestock Products
in Minnesota. 5 Year Ave. 1920-44, Annually 1945-49

Item	1920-24	1925-29	1930-34	1935-39	1940-44	1945	1946	1947	1948	1949
Corn, bu.	.67	.70	.43	.57	.73	.91	1.14	1.63	1.78	1.06
Soybeans, bu.		no quotations			1.55	2.08	2.59	3.25	3.10	2.15
Oats, bu.	.38	.37	.25	.25	.44	.58	.72	.92	.89	.59
Barley, bu.	.57	.57	.40	.48	.66	1.03	1.37	1.95	1.73	1.13
Wheat, bu.	1.32	1.24	.56	.48	1.09	1.49	1.86	2.38	2.25	2.02
Flax, bu.	2.10	2.24	1.45	1.64	2.20	2.91	3.69	6.06	5.88	4.30
Rye, bu.	.90	.85	.43	.48	.68	1.33	1.92	2.45	1.82	1.21
Potatoes	.78	.84	.54	.52	.82	1.24	1.24	1.26	1.50	1.38
Hogs, cwt.	8.40	9.82	4.94	8.25	10.79	14.04	17.47	24.00	22.89	18.00
Cattle, cwt.	5.53	7.55	4.79	6.66	9.53	11.70	14.61	17.23	21.40	19.60
Calves, cwt.	8.04	10.57	6.14	7.99	11.36	12.77	14.36	21.18	25.55	24.90
Lambs and Sheep, cwt.	9.20	11.35	5.56	7.69	10.44	11.48	14.23	19.14	21.48	21.46
Chickens, lbs.	.14	.17	.10	.12	.16	.22	.25	.21	.23	.21
Butterfat, lbs.	.44	.46	.26	.31	.43	.53	.68	.77	.86	.67
Milk, cwt.	2.83	2.79	1.87	2.02	2.35	2.78	3.48	3.51	3.95	3.00
Eggs, doz.	.27	.26	.15	.18	.28	.34	.33	.39	.41	.40
Wool, lb.	.29	.32	.15	.23	.39	.45	.46	.43	.44	.44

Table 15. Minnesota Farm, Crop, Livestock and Livestock Product Indexes
5 Year Ave. 1920-44, Annually 1945-49

Index	1920-24	1925-29	1930-34	1935-39	1940-44	1945	1946	1947	1948	1949
All farm	121.9	132.4	76.0	100.0	136.7	175.0	212.1	268.7	279.8	228.0
Crops	not available		80.1	99.8	127.2	183.7	221.3	306.6	285.4	211.3
Livestock			66.4	103.4	139.0	169.8	207.5	285.6	298.0	253.0
Livestock prod.			84.02	99.9	138.0	174.0	211.3	231.2	257.4	207.0

Table 16. The Balance Sheet of Minnesota Agriculture ^{1/}
 (As of January 1 in millions of dollars)

	1910-14	1915-19	1920-24	1925-29	1930-34	1935-39	1940-44	1945-49	1950
Assets									
Real Estate	1370	2036	2951	2260	1652	1434	1564	2252	2707
Other physical assets									
Crops	90	148	142	150	91.0	102	193	392	470
Livestock	197	287	248	281	204	232	383	585	578
Machinery and Motor vehicles	<u>63</u>	<u>108</u>	<u>161</u>	<u>153</u>	<u>155</u>	<u>160</u>	<u>246</u>	<u>408</u>	<u>550</u>
Total non-real estate	350	543	551	584	450	494	822	1385	1598
Total physical assets	1720	2579	3502	2844	2102	1928.0	2386	3637	4305
Financial									
Currency and deposits	70	103	156	151	123	134	204	447	510
U. S. Bonds	-	10	36	31	16	3	45	217	315
Equity in cooperatives	<u>10</u>	<u>16</u>	<u>19</u>	<u>27</u>	<u>23</u>	<u>27</u>	<u>54</u>	<u>100</u>	<u>120</u>
Total	80	129	211	209	162	164	303	794	945
Total assets	1800	2708	3713	3053	2264	2092	2689	4431	5250
Liabilities									
Real estate mortgages	198	373	576	516	427	388	361	264	245
Non-real estate debt	<u>70</u>	<u>144</u>	<u>199</u>	<u>129</u>	<u>88</u>	<u>59</u>	<u>97</u>	<u>85</u>	<u>121</u>
Total liabilities	268	517	775	645	515	447	458	349	366
Proprietor's equity	1532	2191	2938	2408	1749	1645	2231	4082	4884
Land Owner's equity in real estate	1172	1663	2375	1744	1225	1046	1203	1988	2462
Operator's equity in non-real estate	360	528	563	664	524	599	1028	2094	2422

^{1/} Unpublished data, Division of Agricultural Economics

It is doubtful that we can continue to increase the acreage and production of soil depleting crops at the expense of conserving activities without eventually paying the price.

Another unsolved problem that has been partially covered by recent prosperity is that of becoming established in farming under modern high investment requirements. It is becoming an old saying that the only way to get a farm now is either to inherit one or marry one. But obviously this is far from being a full solution even though you grant that it is a desirable one. Methods of financing the beginning farmer are still to be fully worked out.

A third type of problem and one that bothered us a good deal during the depression years has never been solved. It has not disappeared but rather it is hibernating waiting for the right environment to come to active life again. This is the problem of making a living in disadvantaged farming areas during periods of economic stress. This is coupled with the public problem of providing high cost facilities such as schools and roads to isolated settlers who are farming under very disadvantaging circumstances. The beginnings of a program to relieve the situation were made during the depression through zoning and through resettlement programs but little has been done to follow through during our years of prosperity.

What About 1951?

In general the setting for 1951 looks somewhat more favorable than for 1950. Our growing defense effort will be likely to provide jobs for everyone who wishes to work. Material shortages are likely to curtail the supplies of many consumer goods that compete with food for the wage earner's dollars. Unless conditions get worse there is little likelihood of general food rationing in 1951. The demand for farm products should be at a high level.

Conditions appear to justify a high level of production of practically all of the important crops grown in Minnesota. Farmers should plant all of the corn and other feed crops that conditions permit. Cash crops also look like good prospects with the possible exception of potatoes on those farms that have been depending heavily on government subsidies. Choices between crops may make a difference in income but at the time that this is being written (January 1951) there are no outstanding favorites.

Farmers will be hampered by shortages of many necessary items, in their efforts to increase production. Labor will become increasingly hard to find as more men go into the armed forces and as defense production draws more heavily on available supplies. New machinery will be less plentiful for those farmers who are not adequately equipped. Fertilizers and spray materials may be reasonably adequate in total supply but distribution difficulties may cause local shortages. Transportation, both rail and truck will have to meet greater burdens and may provide difficult problems for farmers.

The outlook for prices on livestock and livestock products is sufficiently favorable to justify efforts to increase production. The feed now on hand is adequate for livestock now on farms and to provide a substantial carryover to the following year (See Table 17). This is true for Minnesota and for the entire United States. Corn production in Minnesota in 1950 was less than in recent years. As a result, current feed production will not fill all current needs; some of the feed reserves must be used. Fortunately, the corn carryover from previous years was very high.

Grain consuming livestock numbers are relatively large at the present time. The corn, oats, and barley needed for feed is almost equal to the production of those crops. Grain consumption this year will be slightly higher than normal due to the

Table 17. Estimates of Feeds Available for Feeding and Other Purposes - Minnesota

Item	For year starting October 1						Prob- able 1950
	5 yr.av. 1936-40	5 yr.av. 1941-45	1946	1947	1948	1949	
	Thousands of tons						
Production minus seed							
Corn (for grain)	3529	5137	5623	4525	6736	6166	4579 <u>1/</u>
Oats	2111	2468	2888	2417	3105	2551	2845 <u>1/</u>
Barley	1081	632	451	549	748	548	782 <u>1/</u>
Total feed grains available	6721	8237	8962	7491	10551	9463	8206
Needed for livestock	5024	7178	6747	5779	6357	6959	7584
Available for other uses	1697	1059	2215	1712	4194	2504	622
Sales off farm ^{2/}	1517	1307	2309	1712	2461	2604	?
Changes in feed reserves	+180	-248	- 94	----	+1839	-100	?
	Millions of bushels						
Carryover at harvest time one year later							
Corn	35	20	1	6	57	59	25 <u>3/</u>
Oats	28	31	35	24	41	30	30 <u>3/</u>
Barley	11	7	3	2	5	2	2 <u>3/</u>

1/ November 1 U.S.D.A. estimate.

2/ For shipment out of state, for non-farm use in the state, and for conversion into commercial feeds,

3/ Estimate of quantity which may remain on farms at harvest time in 1950 if sales off farm are equal to the average of the last fourteen years.

lower feeding value of soft corn. Even after making allowance for this, consumption of these grains added to normal sales for non-feed uses and for shipment out of the state would be approximately equal to the average production for the last three years. If demand for grain producing livestock is such as to require increased output over a period of years, the production of corn, oats, and barley will have to be increased.

Hay production has continued in reasonably close balance with livestock. Shortages have occurred in some localities, with surpluses in others. Additional hay will be needed if cattle numbers are increased. If the acreage of hay is increased without increases in cattle numbers, some additional hay can be used by changes in feeding practices.

When studying problems of feed utilization it is necessary to consider the distribution of feed among the different classes of livestock. The probable consumption of concentrates (corn, small grains, and commercial feeds) and roughages (hay and silage) during the coming year are:

	<u>Concentrates</u> <u>(1000 tons)</u>	<u>Roughages</u> <u>(1000 tons)</u>
Horses	160	480
Cattle	1885	6670
Sheep	15	180
Hogs	4435	-
Chickens	1625	-
Turkeys	275	-
	<u>8395</u>	<u>7330</u>

Hogs are the big consumers of concentrate feeds. They use almost half of the grains and commercial feeds used in the state. Cattle, especially dairy cattle, use most of the roughages. Horses, sheep, and turkeys are minor outlets for feed.

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