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Minnesota Agricultural Growth, 1880-1970: Appendix

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MINNESOTA AGRICULTURAL GROWTH, 1880-1970: APPENDIX

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THE GROWTH OF MINNESOTA AGRICULTURE, 1880-1970: APPENDIX

Joseph C. Fitzharris*

This appendix to Minnesota Agricultural Growth, 1880-1970[1/] consists of two parts. First, several estimation procedures are discussed. The second part contains supporting raw data and a bibliography of statistical sources. The raw data tables are referenced to the appropriate tables in Growth.

ESTIMATION PROCEDURES

Labor Force

The labor force in agriculture includes farmers and managers, hired workers, and unpaid family workers. The U.S. Bureau of the Census, in both the Census of Population, Occupations, and the Census of Agriculture, provides some labor force data. However, the series are not consistent over time. Additionally, they usually record the labor force for the week preceding enumeration.[2/] The result is to understate the actual man-years of labor on farms.

In Growth, an effort was made to determine the man-years of labor. Since the 1920s, the Department of Agricultural and Applied Economics, and its predecessors, have provided statistical services to three farm management associations.[3/] Earlier farm management surveys were conducted starting in 1902, by the Division of Agronomy and Farm Management. The result is a long series, for a small, well-managed group of farms. Considerable information

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*Mr. Fitzharris is Assistant Professor in the College of St. Thomas Department of History. This appendix is part of a study, "Technology, Institutions and Development: Minnesota Agriculture, 1880-1970," which is supported by a grant from the Rockefeller Foundation to the University of Minnesota Economic Development Center.

on labor time is included. This data is for the entire year. From this data assumptions about the man-years per farm can be made.

These man-years per farm figures were adjusted to the decennial census years, and to the intervening agricultural census years. For the period before 1920, the man-years of labor per farm was assumed to be at least equal to the 1920 figure for the farms in the Southeastern Farm Management Association (2.0 man-years). The man-years per farm data was then multiplied by the numbers of farms reported in the Census of Agriculture. The resulting labor force estimates behave in approximately the same fashion as the best series from the census data. However, the post-1940 decline in the labor force is much greater than the census-based series indicates.

Table A-1: The Agricultural Labor Force, 1880-1970

Year	Man-Years per Farm	Farms	Estimated Labor Force	Census-based Labor Force a/
1880	2.0	92,386	184,572	131,000
1890	2.0	116,851	233,702	160,000
1900	2.0	154,659	309,318	256,600
1910	2.0	156,137	312,274	273,600
1920	2.0	178,478	356,956	288,100
1925	2.0	188,231	376,462	
1930	2.3	185,255	426,018	301,600
1935	2.3	203,302	467,595	
1940	2.2	197,351	434,172	359,000
1945	1.9	188,952	359,009	
1950	1.8	179,101	322,382	277,000
1954	1.8	165,225	297,405	
1959	1.7	145,662	247,625	235,000
1964	1.7	131,163	222,977	
1969	1.7	110,747	188,270	187,000

a/ U.S. Bureau of the Census, Census of Population, Occupations, 1880-1970; and U.S. Bureau of the Census, Census of Agriculture, 1880-1970.

Overhead Capital

The basic work was done by Marvin W. Towne and Wayne D. Rasmussen[4/] for the United States in the nineteenth century. The building costs were derived from Hiram M. Drache.[5/] The change in farms over the decade, divided by ten, was used to determine the total amount per year spent on construction of buildings. Similarly, the change in "improved" acreage over the decade, divided again by ten, is used, times the average farm labor rate, assuming that 36 days were spent out of the year clearing land. The basic assumption is that one-tenth of the land clearing, fencing, and building construction in each decade, 1880-1930, occurred in each year of the decade. While a priori false, this facilitating assumption allows reasonable estimation with some ease. The risk of over-stating appears to be slight, that of understating is greater, and acceptable. (See Growth, pp. 6-8, and Table A-15 below).

Breeding Stocks

Breeding stocks of animals are an item of farm capital for which little direct historical data is available. Stock (breeding) sheep are reported since 1867. Data on breeding cattle is not available, and farrowing sows are not reported before 1924. Breeding poultry is too difficult to estimate, and brood mares are also difficult to determine. For convenience, only sheep, cattle, and swine were considered in breeding animal capital stock, thereby underestimating this capital component somewhat.

breeding cattle

Because of data limitations, the 1880-1920 stock had to be estimated.[6/] The 1924-1929 ratio of cattle to calves was used to estimate the numbers of live calves in 1920, assuming a seven percent calf death rate (implicit in the 1924-29 ratio). For 1880, the 1890 calves to cattle ratio was used, upward biased slightly, to allow for poorer health care, to determine the numbers of calves. The numbers of calves were reported for 1890-1910 in

the Census of Agriculture. To simplify, the assumption of one calf per cow was made, and this allows the use of calf numbers as a proxy for breeding cattle (table A-2).

Table A-2: Breeding Stock Estimation: Cattle

Year	All Cattle (000)	Ratio of Calves to Cattle	Calves (000)	Breeding Cattle
1870	337	.33	111	111
1880	803	.32	258	258
1890	1,487	.31	461	461
1900	1,873	.32	606	606
1910	2,224	.31	692	692
1920	3,021	.26	778	778
1930	3,030	---	1,479	1,479
1940	3,407	---	1,670	1,670
1950	3,242	---	1,513	1,513
1959	3,859	---	1,621	1,721
1969	3,958	---	1,578	1,578

farrowing sows

Again, the data necessitates estimation of farrowing sows (breeding stock) before 1924. For swine, the all hogs on farms on 1 January of the year is known. The ratio of pigs saved to stock on farms 1 January, for the 1924-29 period was assumed to be the minimum ratio, and the minimum litter size was assumed to be 5 pigs per litter.[7/] The stock was multiplied by the saved pigs ratio, and then divided by the average litter size. The resulting estimates are reasonable.

Table A-3: Breeding Stock Estimation: Swine

Year	Herd Size 1 January (000)	Pigs saved (000)	Farrowing Sows (000)
1870	305	473	95.0
1880	505	783	156.6
1890	750	1,162.5	232.5
1900	1,000	1,550	310
1910	1,250	1,937.5	387.5
1920	2,381	3,690.5	738.1
1930	3,494	--	972
1940	3,407	--	950
1950	3,242	--	1,030
1959	3,859	--	983
1969	3,958	--	726

stock sheep

Stock sheep were reported (Table A-4), so no manipulation was necessary. Valuing the three breeding stock animal series at their inventory values gives a measure of capital. Using one-tenth of the decadal change gives a single year value for entry in Table 2-9 of Growth.

Table A-4: Value of Yearly Change in Breeding Stocks, 1880-1970
(in millions of 1950 dollars)

Year	Cattle Number[a/] (000)	Value	Swine Number[a/] (000)	Value	Sheep Number[a/] (000)	Value
1880	258	$2.06	157	$0.20	285	$0.23
1890	461	2.84	233	0.25	350	0.11
1900	606	2.03	310	0.25	386	0.05
1910	692	1.30	388	0.25	480	0.16
1920	778	1.20	738	1.14	429	-0.09
1930	1,479	9.77	972	0.76	800	0.63
1940	1,670	2.67	950	-0.07	1,030	0.39
1950	1,513	-2.20	1,030	0.26	571	-0.78
1960	1,621	1.51	983	-0.15	749	0.31
1970	1,578	-0.62	726	-0.83	432	-0.54

a/ Cattle for 1870 are 337,000 head, a calf/cattle ratio of .33, and a value of $2.06; Farrowing sows in 1870: 305,000 stock, 1 January, pigs saved were 473,000, giving 95,000 farrowing sows at a value of $.02; Stock sheep were 147,000, valued at $.23. (Values in millions of 1950 dollars.)

The yearly change in breeding stock and in value of breeding stock presented in Growth (Table 2-10) represent the actual change from 1 January of the decadal year to 1 January of the next year (e.g. from 1 January 1880 to 1 January 1881). Consequently, these figures are not comparable to the valuation data in Table A-4 or Growth Table 2-9. However, these figures make possible a comparison between the estimation based on the change over the decade, distributed evenly across the ten years, and the actual change in the first year of each decade. The 1880-1881 figure, for example, is used to judge the change between 1880 and 1890, reported for 1890.

THE DATA

Listing of Tables

Table A-5: Five-year Average Acreage in Crops, 1880-1970[8/] (millions of acres)

	1880	1890	1900	1910	1920	1930	1940	1950	1960	1970
Oats	0.625	1.520	1.803	2.906	3.735	4.373	4.094	5.010	3.577	3.080
Barley	0.146	0.359	0.544	1.458	0.970	2.045	1.854	1.223	0.872	0.775
All Spring Wheat	2.751	3.187	5.348	4.248	2.848	1.232	1.472	1.091	0.833	1.079
Durum Wheat						0.165	0.078	0.064	0.067	0.057
Winter Wheat					0.082	0.167	0.182	0.080	0.028	0.025
Rye	0.014	0.059	0.074	0.223	0.661	0.393	0.377	0.178	0.067	0.113
Buckwheat	0.005	0.019	0.089	0.007	0.034	0.049	0.021	0.022	nr	nr
Flax	nr	nr	nr	0.393	0.314	0.706	1.252	1.355	0.521	0.305
Corn	0.502	0.786	1.141	2.025	3.373	4.581	4.500	5.373	6.172	5.504
Potatoes	0.054	0.107	0.153	0.250	0.380	0.361	0.220	0.874	1.021	0.936
Soybeans							0.090	1.003	2.388	3.073
Sugarbeets						0.033	0.035	0.050	0.086	0.140
Field Peas					0.001	0.014	0.026	0.051	0.046	0.065
Sweet Corn					0.010	0.043	0.060	0.074	0.092	0.114
Onions					0.001	0.002	0.004	0.004	0.002	0.001
Cabbage					0.003	0.003	0.003	0.002	0.002	0.001

nr: not reported.

Table A-6: Five Year Average Physical Volume of Crop Production, 1880-1970[a/] (millions of units)

	1880	1890	1900	1910	1920	1930	1940	1950	1960	1970	Units of Measure[a/]
Oats	22.4	46.4	59.8	85.7	122.9	148.6	150.1	197.6	172.0	171.5	bu.
Barley	3.9	7.7	14.4	33.6	24.3	50.0	51.6	32.3	27.1	34.9	bu.
All Spring Wheat	34.0	41.4	71.2	59.9	36.7	21.0	25.5	17.2	21.6	21.1	bu.
Durum Wheat						2.9	1.3	0.8	1.3	1.9	bu.
Winter Wheat					1.3	3.3	3.2	1.3	0.7	0.7	bu.
Rye	0.2	1.0	1.5	4.2	11.8	5.9	5.4	2.6	1.3	3.1	bu.
Buckwheat	0.1	0.2	0.1	0.1	0.5	0.5	0.3	0.3	nr	nr	bu.
Flax	nr	nr	nr	3.6	3.0	6.0	12.8	13.9	6.2	4.0	bu.
Corn	17.1	22.0	32.6	66.8	128.5	143.0	186.0	240.0	297.4	408.0	bu.
Potatoes	3.2	6.5	8.4	15.6	20.0	18.0	15.5	8.8	12.6	14.5	cwt.
Soybeans							1.2	17.5	46.7	76.4	bu.
Sugarbeets						0.3	0.3	0.5	1.0	1.9	ton
Field Peas					*	*	*	*	0.1	0.1	bu.
Sweet Corn					*	0.1	0.2	0.2	0.3	0.5	ton
Onions					0.3	0.4	0.8	0.9	0.4	0.2	cwt.
Cabbage					*	0.4	0.4	0.4	0.3	0.1	cwt.
Apples							0.2	0.2	0.3	0.5	bu.

a/ bu. = bushels; cwt. = hundred weight; tons of 2,000 pounds

* less than 50,000 units

Table A-7: Physical Volume of Livestock and Products, 1880-1970[10/] (in millions of units)

	1880	1890	1900	1910	1920	1930	1940	1950	1960	1970	Units of Measurement
All Cattle	0.8	1.5	1.6	2.2	3.0	3.0	3.5	3.3	4.0	4.0	head
Sheep [a/]	0.3	0.3	0.5	0.6	0.5	0.9	1.4	0.8	1.0	0.5	head
Swine	0.2	0.4	0.8	1.5	2.6	3.6	3.3	3.5	3.5	3.4	head
Poultry [b/]						31.8	38.2	34.1	20.4	13.6	head
Milk[c/]	44.9	157.4	261.5	409.2	388.2	825.4	866.6	na	na	na	pounds
Eggs	8.2	20.4	43.2	50.4	56.4	107.3	119.4	na	na	187.4	dozens
Wool[d/]	1.4	1.9	2.6	3.3	2.9	6.1	8.1	4.3	5.8	4.9	pounds
Honey[d/]	0.2	1.2	1.0	1.0	1.3	3.1	4.0	4.0	26.7	19.5	pounds
Beeswax[d/]	*	*	*	*	*	0.1	0.2	0.5	0.5	0.5	pounds

a/ Including Goats

b/ Chickens and Turkeys on farms

c/ 1880-1900 converted from gallons to pounds at 8.6 pounds per gallon, assuming 3% fat content.

d/ Same as physical volume of output since there is no data on production.

* less than 0.05 million units.

Table A-8: Five Year Average Current Value of Crop Production, 1880-1970 [11/] (millions of dollars)

	1880	1890	1900	1910	1920	1930	1940	1950	1960	1970
Oats	6.8	12.6	15.6	28.9	53.3	38.8	44.7	138.4	97.3	98.9
Barley	2.1	4.2	5.5	18.9	16.5	19.6	23.6	40.1	24.3	30.3
All Spring Wheat	29.0	30.9	41.6	53.5	64.1	14.3	20.2	36.0	42.6	53.7
Durum Wheat	--	--	--	--	--	1.6	1.0	1.8	1.2	2.7
Winter Wheat	--	--	--	--	2.0	1.8	2.6	2.7	1.2	1.0
Rye	0.1	0.5	0.6	2.6	11.3	3.2	2.2	3.7	1.2	2.8
Buckwheat	*	0.1	0.1	0.1	0.6	0.3	0.1	0.2	--	--
Flax	--	--	--	5.5	7.8	10.1	22.7	58.3	18.4	10.7
Corn	6.6	7.7	10.7	31.5	90.5	70.5	109.5	316.1	289.6	497.9
Potatoes	2.1	3.9	5.0	17.5	30.4	15.0	11.8	20.3	15.8	25.7
Soybeans	--	--	--	--	--	--	1.7	43.3	99.3	21.8
Sugarbeets	--	--	--	--	--	1.9	1.8	5.8	11.1	28.8
Field Peas	--	--	--	--	*	0.5	1.3	0.4	4.9	8.7
Sweet Corn	--	--	--	--	0.3	1.0	1.7	4.8	5.6	8.7
Onions	--	--	--	--	0.5	0.4	1.0	2.7	1.2	0.8
Cabbage	--	--	--	--	0.4	0.2	0.3	0.5	0.6	0.5
Apples	--	--	--	--	--	--	0.2	0.4	0.9	1.8

* less than 0.05 million.

Table A-9: Constant Dollar Value of Crop Production, 1880-1970 12/ (millions of 1950 dollars)

	1880	1890	1900	1910	1920	1930	1940	1950	1960	1970
Oats	15.7	32.5	41.9	60.0	86.1	104.1	105.2	138.4	120.4	120.1
Barley	4.9	9.6	17.9	41.7	30.2	62.1	64.1	40.1	33.6	43.3
All Spring Wheat	71.2	86.6	148.9	125.3	76.7	43.9	53.3	36.0	45.1	74.9
Durum Wheat	--	--	--	--	--	6.1	2.6	1.8	2.6	4.0
Winter Wheat	--	--	--	--	2.7	6.9	6.7	2.7	1.3	1.4
Rye	0.3	1.4	2.1	6.0	16.9	8.5	7.8	3.7	1.8	4.4
Buckwheat	0.1	0.2	1.2	0.1	0.6	0.4	0.2	0.2	--	--
Flax	--	--	--	15.1	12.6	25.4	53.7	58.3	26.2	16.9
Corn	22.6	28.9	43.0	88.0	169.3	188.4	245.1	316.1	392.0	537.2
Potatoes	7.4	15.1	19.3	36.0	45.3	41.5	26.5	20.3	29.0	33.5
Soybeans	--	--	--	--	--	--	3.1	43.3	115.5	188.7
Sugarbeets	--	--	--	--	--	3.4	4.0	5.8	11.8	22.4
Field Peas	--	--	--	--	*	0.1	0.2	0.4	0.5	0.7
Sweet Corn	--	--	--	--	0.5	2.0	3.8	4.8	5.0	10.7
Onions	--	--	--	--	0.7	1.2	2.4	2.7	1.2	0.7
Cabbage	--	--	--	--	0.3	0.5	0.5	0.5	0.4	0.2
Apples	--	--	--	--	--	--	0.4	0.4	0.6	0.9

* less than 0.05 million

Table A-10: Five Year Average Physical Volume of Crop Output, 1880-1970 [13/] (millions of units)

	1880	1890	1900	1910	1920	1930	1940	1950	1960	1970	Units of Measure [a/]
Oats	6.8	14.0	18.1	24.4	31.3	25.7	28.4	41.5	53.3	80.6	bu
Barley	2.0	3.8	7.3	16.8	9.3	12.9	18.8	24.3	19.5	28.6	bu
All SpringWheat	28.9	35.0	60.6	50.1	30.0	15.3	20.1	14.2	21.8	20.7	bu
Durum Wheat	--	--	--	--	--	2.1	1.0	0.7	1.2	1.9	bu
Winter Wheat	--	--	--	--	--	2.4	2.5	1.1	0.7	0.7	bu
Rye	0.2	0.7	1.1	2.9	8.5	3.4	2.9	2.2	1.1	2.8	bu
Buckwheat	*	0.2	0.1	0.1	0.3	0.2	0.1	0.1	--	--	bu
Flax	--	--	--	3.3	2.7	5.5	12.2	13.2	6.0	3.9	bu
Corn	3.8	4.6	7.6	12.7	24.0	25.9	40.0	92.9	92.2	220.1	bu
Potatoes	2.6	5.4	6.9	12.9	16.5	14.9	7.9	7.2	10.4	12.9	cwt
Soybeans	--	--	--	--	--	--	1.0	16.6	44.4	74.5	bu
Sugarbeets [b/]	--	--	--	--	--	0.3	0.3	0.5	1.0	1.9	tons
Field Peas [b/]	--	--	--	--	*	0.1	0.2	0.2	0.3	0.5	vu
Sweet Corn [b/]	--	--	--	--	*	*	*	*	0.1	0.1	tons
Onions [b/]	--	--	--	--	0.3	0.4	0.8	0.9	0.4	0.2	cwt
Cabbage [b/]	--	--	--	--	*	0.4	0.4	0.4	0.3	0.1	cwt
Apples [b/]	--	--	--	--	--	--	0.2	0.2	0.3	0.5	be

a/ bu = bushels, cwt = hundredweight.

b/ No adjustment for seed and feed usage, identical to entries in Table A-7.

Table A-11: Physical Volume of Livestock and Product Output, 1880-1970 (in millions of units)

	1880	1890	1900	1910	1920	1930	1940	1950	1960	1970	Units of Measure
All Cattle [a]	0.2	0.3	0.5	0.8	1.0	1.2	1.5	1.5	1.8	2.1	head
Swine [b]	0.1	0.3	1.1	1.8	2.6	4.6	5.6	5.2	6.0	5.5	head
Sheep [c]	*	0.1	0.1	0.2	0.3	0.6	1.0	0.7	0.8	0.5	head
Chickens [d]	0.7	1.6	2.8	3.7	5.0	12.0	12.2	16.3	17.4	10.9	head
Turkeys [e]	0.1	0.2	0.2	0.1	0.5	1.2	3.0	4.2	14.3	16.3	head
Milk [f]	12.9	452.7	892.4	457.4	6314.0	6614.0	7483.0	7435.0	9751.0	9473.0	pounds
Eggs [g]	6.2	15.3	32.4	40.4	82.4	103.9	144.2	295.9	281.8	183.3	dozens
Wool [h]	1.4	1.9	2.6	3.3	2.9	6.1	8.1	4.3	5.8	4.9	pounds
Honey [i]	0.2	1.2	1.0	1.0	1.3	3.1	4.0	4.0	26.7	19.5	pounds
Beeswax [j]	*	*	*	*	*	0.1	0.2	0.5	0.5	0.3	pounds

Notes to Table A-11

* less than 0.05 million units

a/ 1890 from U.S. Bureau of the Census, Census of Agriculture, 1890; 1920-1950 from Mesick, Livestock, pp. 8-9; 1960-1970 from Agricultural Statistics, 1961, 1971. 1880-1910 estimated as follows: 1890 ratio of sales to total livestock on farms 1 January times the 1880 stock on farms. From 1900 and 1910, linear intrapolation between 1890 and 1920 sales and slaughters data.

b/ 1890 from U.S. Census of Agriculture, 1890; 1920-1950 from Mesick, Livestock, p. 16; 1960-1970 from Agricultural Statistics, 1961, 1971. Estimation for 1880 and 1900-1910 are the same as for cattle (note a, above).

c/ 1890 from U.S. Census of Agriculture, 1890; 1920-1950 from Mesick, Livestock, p. 21; 1960-1970 from Agricultural Statistics, 1961-1971. Estimation for 1880 and 1900-1910 is the same as for cattle (note a, above).

d/ U.S. Census of Agriculture, 1880-1970; For 1880-1900, the chickens sold were estimated using the average sales as a percentage of total chickens on farms in 1910 times chickens on farms, 1880-1900.

e/ 1930-1950 from Mesick, Livestock, p. 38; 1910 from U.S. Census of Agriculture, 1910. 1960-1970 from Agricultural Statistics, 1961, 1971. 1880-1900 are estimated using sales and slaughters to total turkeys, applied to the ratio of turkeys (1890) to all poultry for 1880, and to total turkeys, 1890-1900. 1920 is a linear intrpolation between 1910 and 1930. The 1970 data is for Minnesota assuming that Minnesota produces 75% of all turkeys in the Minnesota-Wisconsin reporting area.

f/ 1924-1959 from Mesick, Livestock, p. 26; 1960-1970 from Agricultural Statistics, 1961-1971. 1880 and 1900-1910 from U.S. Census of Agriculture, 1880, 1900-1910. 1890 is estimated using linear intrapolation between 1880 and 1900. 1920 is estimated using the 1924-29 ratio of milk cows to all cattle to estimate the numbers of milk cows in 1920. The average of milk sold and consumed on the farm in the home for 1924-29 was used times the numbers of milk cows for 1920.

g/ 1930-1950 from Mesick, Livestock, p. 33; 1960-1970 from Agricultural Statistics, 1961, 1971. Estimation for 1880-1900 used the ratio of eggs sold to eggs produced in 1910 to adjust the eggs produced numbers for 1880-1900.

h/ 1880-1900 from U.S. Census of Agriculture; 1910-1950 from Mesick, Livestock, p. 22; 1960-1970 from Agricultural Statistics, 1961, 1971.

i/ U.S. Census of Agriculture, 1880-1970.

j/ U.S. Census of Agriculture, 1880-1920, 1940-1970; with 1930 a linear intrapolation between 1920 and 1940.

Table A-12: Constant Value of Crop Output, 1880-1970 [14/] (millions of 1950 dollars)

	1880	1890	1900	1910	1920	1930	1940	1950	1960	1970
Oats	4.8	9.8	12.6	17.1	21.9	18.0	19.9	29.1	37.3	56.4
Barley	2.5	4.8	9.0	20.8	11.5	16.0	23.3	30.1	24.2	35.5
All Spring Wheat	60.5	73.1	126.6	104.8	62.4	32.0	42.0	30.0	45.5	43.3
Durum Wheat	--	--	--	--	--	4.4	2.1	1.5	2.5	3.9
Winter Wheat	--	--	--	--	--	5.0	5.3	2.3	1.4	1.4
Rye	0.2	1.1	1.6	4.1	12.2	4.9	4.2	3.2	1.6	4.0
Buckwheat	*	0.1	0.1	0.1	0.2	0.2	0.1	0.1	--	--
Flax	--	--	--	13.8	11.4	23.2	51.2	55.6	25.1	16.2
Corn	5.1	6.1	10.0	16.8	31.7	34.1	52.8	122.6	121.7	290.6
Potatoes	6.1	12.5	16.0	29.9	38.0	34.5	18.2	16.7	24.1	29.7
Soybeans	--	--	--	--	--	--	2.5	41.0	109.7	184.0
Sugarbeets [a/]	--	--	--	--	--	3.5	4.0	5.7	11.8	22.4
Field Peas [a/]	--	--	--	--	*	0.1	0.2	0.4	0.5	0.7
Sweet Corn [a/]	--	--	--	--	0.5	2.0	3.8	4.8	5.0	10.2
Onions [a/]	--	--	--	--	0.7	1.2	2.4	2.7	1.2	0.7
Cabbage [a/]	--	--	--	--	0.3	0.5	0.5	0.5	0.4	0.2
Apples [a/]	--	--	--	--	--	--	0.4	0.4	0.6	0.9

a/ Identical to the values in Table A-9 since no adjustments for feed or seed usage were made.

Table A-13: Constant Value of Livestock and Products Output, 1880-1970[15/]
(in millions of 1950 dollars)

	1880	1890	1900	1910	1920	1930	1940	1950	1960	1970
All Cattle	25.9	53.2	87.8	122.3	157.2	190.8	241.2	242.9	292.3	340.6
Swine	4.8	10.9	43.7	76.5	109.6	190.0	226.5	214.6	248.1	228.0
Sheep	1.0	1.5	3.2	5.0	6.7	13.0	21.2	14.6	16.9	11.3
Chickens[a/]	0.6	1.3	2.2	2.9	4.0	9.4	9.6	12.8	13.7	8.6
Turkeys[a/]	0.6	0.9	1.2	0.9	3.0	7.3	18.7	25.9	88.7	100.5
Milk	0.3	12.7	25.0	12.8	176.8	185.2	209.5	208.2	273.0	265.2
Eggs	1.9	4.6	9.7	12.1	24.7	31.2	43.3	88.8	84.6	55.0
Wool	0.7	1.1	1.4	1.8	1.6	3.3	4.4	2.3	3.1	2.6
Honey	*	0.1	0.1	0.1	0.2	0.4	0.5	0.5	3.3	2.4
Beeswax	*	*	*	*	*	0.1	0.1	0.2	0.2	0.2

* less than 0.05 million dollars

a/ Chickens and turkeys on farms.

Table A-14: Constant Value of Output and Major Components, 1880-1970[16/]
(in millions of 1950 dollars)

Year	Value of Crops[a/]	Value of Animals and Poultry[b/]	Value of Products[c/]	Total Value of Output
1880	79.1	32.9	2.9	115.0
1890	107.4	61.8	18.5	187.7
1900	164.4	138.1	36.3	339.8
1910	207.3	207.7	26.9	441.8
1920	190.7	280.4	203.2	674.4
1930	179.9	410.5	220.1	810.5
1940	232.7	517.2	257.7	1007.8
1950	346.1	510.7	300.0	1156.8
1960	412.2	659.6	364.2	1369.9
1970	699.2	689.0	325.4	1713.6

a/ Includes crops and vegetables from Table A-13.
b/ Only animals and poultry sold on slaughtered on the farm, from Table A-14.
c/ Total of milk, eggs, wool, honey, and beeswax from Table A-14.

Table A-15: Estimation of Overhead Capital Output, 1880-1940[17/]

Year	Building Construction					Land Clearing and Fencing					Total Per Year Constant Value i/ (millions)
	Decadal Changes in Farms	Labor Cost of Construction a/	Decadal Current Value b/ (millions)	Decadal Constant Value c/ (millions)	Per Year Constant Value d/ (millions)	Decadal Change in Improved Acreage (000)	Labor Cost for Average Days Worked e/	Decadal Current Value f/ (millions)	Decadal Constant Value e/ (millions)	Per Year Constant Value h/ (millions)	
1870-1880	45.9	$125.00	5.74	32.05	3.20	4915	$36.00	176.94	988.49	98.85	102.05
1880-1890	24.5	125.00	3 06	17 08	1.78	3881	36.00	139.72	786.56	78.06	79.84
1890-1900	37.5	125.00	4 73	26 40	2.64	7315	36.00	263.34	1471.17	147.12	149.76
1900-1910	1.4	180.87	0.27	1.03	0.10	1201	52.20	62.69	242.05	24.20	24.30
1910-1920	22 4	330.31	7 38	16.22	1.62	1838	91.80	168.73	370.84	37.08	38.70
1920-1930	6.8	261.87	1.77	4.73	0.47	6257	75.60	473.03	1261.41	126.14	126.61
1930-1940	12 1	206.00	2 49	8 45	0.84	--	--	--	--	--	0.84

a/ Drache's 1880s figure ($125.00) adjusted for 1900/1910 - 1930/1940 changes in rural labor wage rates.

b/ Numbers of farms times the labor cost of construction.

c/ Current value adjusted by the labor wage index, 1950 = 100.

d/ 10% of the "Decadal Constant Value".

e/ Daily wage with board (Minnesota Agricultural Statistics, 1956, p.71) times 36 days.

f/ Labor cost times acreage.

g/ Current Value adjusted by the labor wage index, 1950 = 100.

h/ 10% of the "Decadal Constant Value".

i/ Total of the per-year building and land values, in constant 1950 dollars

Table A-16: Estimation of Tractor Horsepower, 1920-1970[18/]

	Numbers of Tractors[a/] (000)	Average Horsepower[b/]	Total Tractor Horsepower (000)
1920	15.0	26.5	398.7
1930	47.3	25.1	1187.6
1940	105.1	26.8	2816.0
1950	204.2	27.1	5533.8
1960	278.8	33.0	9201.3
1970	259.0	42.2	10929.8

a/ U.S. Bureau of the Census, Census of Agriculture, 1959, 1969.

b/ U.S.D.A. Changes in Farm Production and Efficiency, Statistical Bulletin 233, 1965, p. 27, 1972, p. 21.

Table A-17: Per Unit Output Prices, 1880-1970 [19/]

	1880	1890	1900	1910	1920	1930	1940	1950	1960	1970	Unit of Measure [a/]
Oats	.30	.27	.26	.34	.43	.26	.30	.70	.565	.58	bu.
Barley	.53	.55	.38	.56	.68	.39	.46	1.24	.90	.87	bu.
All Spring Wheat	.85	.75	.58	.89	1.75	.75	.80	2.09	1.97	1.50	bu.
Durum Wheat						.66	.77	2.08	2.28	1.42	bu.
Winter Wheat					1.54	.55	.82	2.07	1.84	1.40	bu.
Rye	.55	.49	.44	.62	.96	.55	.41	1.44	.96	.90	bu.
Buckwheat	.63	.51	.54	.71	1.24	.66	.55	.91	--	--	bu.
Flax				1.54	2.62	1.67	1.77	4.20	2.95	2.65	bu.
Corn	.38	.35	.33	.47	.70	.49	.59	1.32	.97	1.22	bu.
Potatoes	.66	.60	.60	1.12	1.53	.83	1.03	2.31	1.26	1.77	cwt.
Soybeans							1.36	2.47	2.13	2.85	tons
Sugarbeets						6.28	5.12	11.56	10.95	14.87	tons
Field Peas					42.13	49.10	50.57	95.56	86.62	115.04	tons
Sweet Corn					12.70	9.88	8.46	19.40	21.72	15.67	tons
Onions					1.92	1.06	1.28	2.94	3.12	3.19	cwt.
Cabbage					1.62	.57	.64	1.87	2.14	3.61	cwt.
Apples							..95	1.85	2.67	3.50	bu.
Hay	5.67	4.79	4.87	7.44	9.96	7.83	6.61	17.61	17.45	20.72	ton
All Cattle	3.46	3.30	4.07	4.00	7.70	7.50	7.20	22.60	22.20	24.50	cwt.
Swine	4.45	5.76	5.97	8.00	12.90	8.70	5.20	17.60	13.70	22.30	cwt.
Sheep	1.82	2.00	2.44	4.50	7.70	4.15	3.10	10.80	5.70	7.80	cwt.

a/ bu. = bushels, cwt. = hundred-weight.

Table A-18: Land Prices and Labor's Daily Wage (With Board), 1880-1970[20/]

	Land Price Per Acre[a/]	Labor's Daily Wage (including board)[b/]
1880	$14.00	$1.00
1890	18.00	1.00
1900	26.00	1.00
1910	41.00	1.45
1920	104.00	2.55
1930	60.00	2.10
1940	43.00	1.65
1950	85.00	5.60
1960	157.00	7.70
1970	223.00	11.30

a/ 1880-1910 from Thomas J. Pressly and William H. Scofield, eds., Farm Real Estate Values in the United States by Counties, 1850-1959, (Seattle: University of Washington Press, 1965), pp. 33-34; 1910-1970 from Maurice Mandale and Philip M. Raup, The Minnesota Rural Real Estate Market in 1973, Economic Report 74-1, University of Minnesota, Department of Agricultural and Applied Economics, (St. Paul: 1974), p. 42.

b/ 1880-1900 based on scattered reports (Growth, note 31), and on discussions with Rodney C. Loehr; 1910-1970 from Minnesota Agricultural Statistics, 1956, p. 71; 1965, p. 83; 1975, p. 90.

Table 2-19: Price Indices for Farm Machinery, Fertilizer, Land and Labor, 1880-1970[21/] (1950 = 100)

	1880	1890	1900	1910	1920	1930	1940	1950	1960	1970
Price Index:										
Farm Machinery[a/]	39.2	29.4	27.2	36.4	60.4	55.3	55.6	100	135.3	185.1
Fertilizer[a/]				68.1	125.7	87.5	68.1	100	105.6	98.6
Land[b/]	16.5	21.2	30.6	48.2	122.4	70.6	50.6	100	184.7	262.4
Labor[b/]	17.9	17.9	17.9	25.9	45.5	37.5	29.5	100	137.5	201.8

a/ U.S.D.A., Agricultural Statistics, 1974, p. 457; U.S. Bureau of the Census, Historical Statistics of the United States, Colonial Times to 1957 (Washington, D. C.: U.S. Government Printing Office, 1967); Series E7 and E20, pp. 115-17.

b/ Derived from Table A-18.

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Footnotes

1/ University of Minnesota Department of Agricultural and Applied Economics Staff Paper P76-4

2/ For specific details for each census, see the appropriate volumes where the series are discussed.

3/ The Southeastern Farm Management Association (1920s-date); the Southwestern Farm Management Association (1940-date); and the West Central Farm Management Association (1930s, and the 1950s-early 1960s).

4/ See Growth, pp. 6-8, and Table A-15 below).

5/ David O. Mesick, Minnesota Agriculture--Livestock, 1858-1959. (St. Paul: Minnesota Crop and Livestock Reporting Service, 1959), p. 19; and U.S. Bureau of the Census, Census of Agriculture, 1880-1920.

6/ Calves and cows, 1924-1958, are from Mesick, Livestock, pp. 4-5; Minnesota Agricultural Statistics, 1963, 1972; and U.S. Bureau of the Census, Census of Agriculture, 1880-1920.

7/ Mesick, Livestock, pp. 11-15; and Minnesota Agricultural Statistics, 1963, 1972.

8/ Richard J. Schrimper, Minnesota Agriculture--Crops, 1859-1958, Minnesota Agricultural Statistics, 1963-1972.

9/ Schrimper, Crops, - Minnesota Agricultural Statistics, 1963-1972.

10/ David O. Mesick, Minnesota Agriculture--Livestock, 1859-1959; Minnesota Agricultural Statistics, 1963, 1972.

11/ Schrimper, Crops: Minnesota Agricultural Statistics, 1963, 1972.

12/ Data in Table A-7 multiplied by the 1948-1952 average price for each crop. Prices are reported in Table A-17, below. See Table 2-1 in Growth.

13/ Schrimper, Crops: Minnesota Agricultural Statistics, 1963, 1972.

14/ The data from Table A-11 multiplied by the 1948-52 price for each crop from Table A-17. See Table 2-2 in Growth.

15/ Quantities from Table A-12 multiplied by the 1950 price for each commodity from Table A-17. See Table 2-2 of Growth.

16/ Differs slightly, in value of crops, from Table 2-2 of Growth, due to rounding errors.

17/ See Tables 2-2, Overhead Capital; and 2-4 in Growth.

18/ See Table 2-19 of Growth.

19/ Crop prices are five year centered averages, livestock prices are given year prices. From Mesick, Livestock, pp. 4-5, 11-15, 19; Schrimper, Crops, passim and Minnesota Agricultural Statistics, 1963, 1972. See Table 2-14, and figures 2-3 and 2-4 of Growth.

20/ See Table 2-15 and 2-16 in Growth.

21/ See Figures 2-4 and 2-5 of Growth.