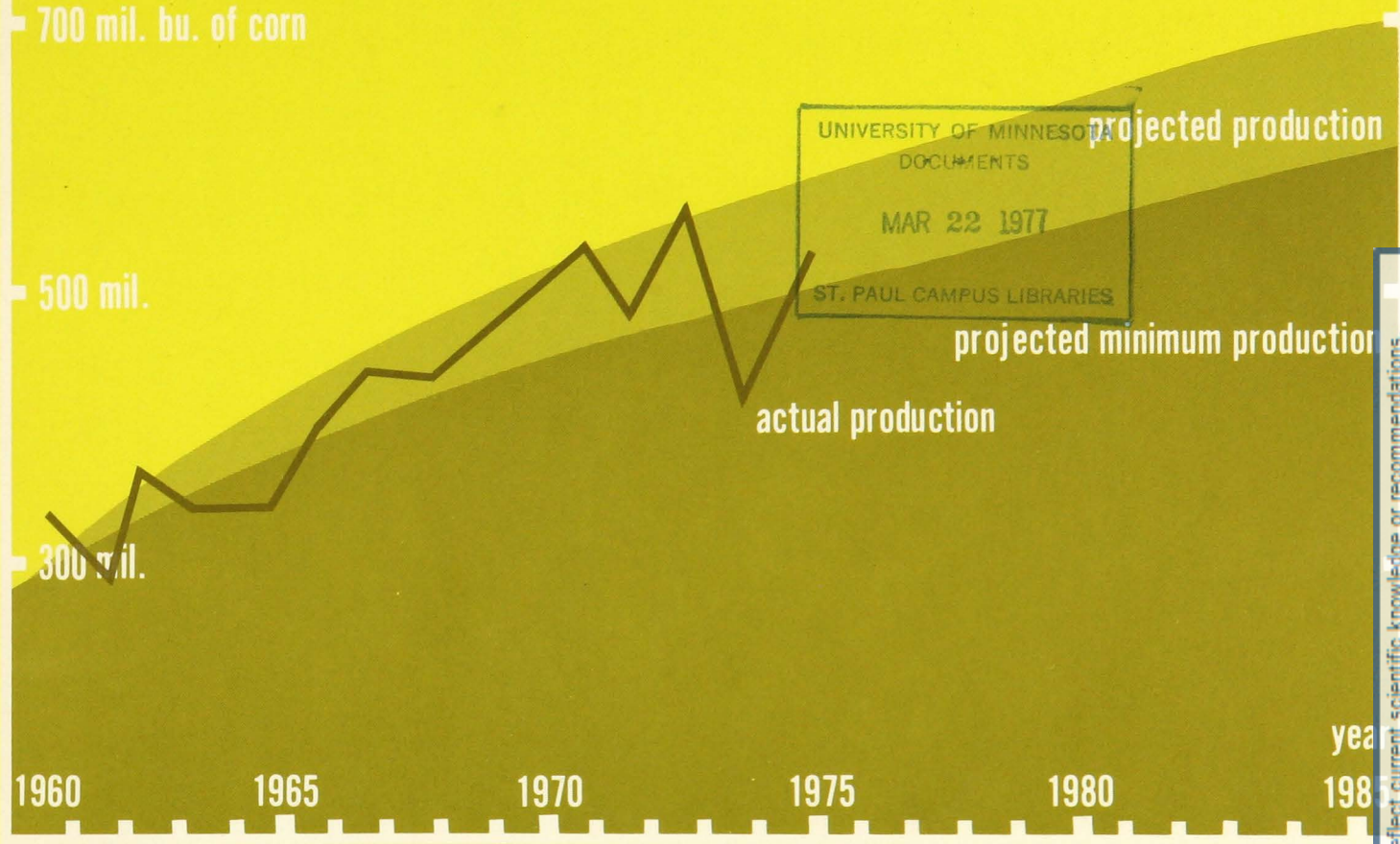


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Grain Production Projections

by County and District,
Minnesota, 1980 and 1985

Michael Martin Reynold Dahl

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INTRODUCTION

During the last 10 years grain production has expanded significantly in Minnesota. Increased production creates a need for adjustments in the marketing system which handles, stores, and transports grain. New marketing facilities and transportation services must be designed and built to handle larger volumes of grain. Planning for such facilities and services requires some approximation of future grain production which will move into marketing channels. Currently, there are no available projections of grain production by county or region for Minnesota. While the Minnesota Crop and Livestock Reporting Service provides good historic data and estimates current year production, it makes no long range projections.

This study projects to 1980 and 1985 production of corn, soybeans, oats, barley, and wheat for primary producing counties in Minnesota. These projections can be used as a basis for planning size and location of country elevator expansions and subterminal elevators. This can help reduce costly duplication in some elevator facilities and provide sufficient capacity in others. Marketing and transportation facilities involve long-term investments in which planning is extremely important.

Transportation needs are also clarified when production projections are available. Private suppliers of transportation services can more accurately make decisions regarding expansion, upgrading, contraction or abandonment of facilities and routes. Railroads, trucking firms, and water carriers have ongoing programs to appraise alternatives for future operations.

Government regulatory and coordinating agencies also need projections of future commodity production

and marketable surplus. Decisions regarding highway construction or improvements in rural areas are, to a large extent, dependent on anticipated traffic in agricultural output. Likewise, action on railroad branchline abandonments or river traffic development may be influenced by expected future grain volume.

Projections in this study are on a county-by-county basis and by crop reporting district so these projections can be used for local, regional, or statewide planning.

However, production projections are subject to error and should be used with caution. There are a number of unpredictables such as weather, grain price shifts, input price shifts, changes in technology or in related production areas and in federal agricultural policy. These projections are based primarily on a time trend analysis of yield and acreage. They represent achievable production if 1976 through 1985 is similar to 1960 through 1974.

METHODOLOGY

Production of each named crop in a Minnesota county was projected in a two-step process. First, expected future yield of a crop was estimated by county. It was necessary to make yield estimates on an individual county basis because history has demonstrated that large yield variations can exist in adjacent fields.

The yield projection is mainly based on time trend analysis from 1960 through 1975.¹ Continual technological innovation and application are assumed. Upper yield limits were included to prevent unrealistic extrapolations. Determination of upper yield limits were estimated with the aid of the Department of Agronomy, University of Minnesota.

ACKNOWLEDGMENTS

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Once county production projections were made, they were aggregated by crop reporting district and also to a state total. (Tables A, B, C, D, and E in the appendix contain county projections for corn, soybeans, wheat, oats, and barley.) Tables and maps 1-5 contain aggregate county projections for each district. Crop reporting districts 2, 3, and 6 are combined as Rest of State. This was done because these districts produce only a small percentage of the crops under consideration in this study.

Marketable surplus of corn for each district was determined by subtracting estimated in-district livestock use from projected production. In-district use was estimated by first projecting future production of major livestock types (tables F and G in appendix). These estimates were obtained by prorating Minnesota's historic share of projected national livestock production for 1980 and 1985.² The projected state production was then prorated to each district based on past production shares. Once district livestock projections were found, they were multiplied by annual feed ratios listed in table H of the appendix. The resulting estimated consumption of corn by livestock was then subtracted from production to obtain the estimated marketable corn surplus (table 6).

Second, expected acreage commitment to each crop in each county was estimated. To achieve such estimates, consideration was given the following: historic acreage commitments, regional shifts in grain type specialization, total land in farms, and the share of total land in farms planted to grain. Because federal programs for acreage diversion and set-asides were in effect through the 1960's, 1971 through 1975 were used as a basis for estimating acreages in 1980 and 1985.

Statistical analysis reveals that in the last 15 years a shift in regional grain specialization has taken place. Farmers in the southern third of the state seem to have shifted acreage from small grains to corn and soybeans while acreage planted to small grains in the northwestern region has increased.

Production projections were computed for each county by multiplying estimated yield times estimated acreage. Because of the relatively wide year-to-year yield variations in Minnesota for all crops, two sets of production projections were computed. The set in the tables headed Projected Production is made assuming that the years when yields were extremely low represent abnormal production years. These projections apply if one assumes good growing conditions for the years being projected.

The set of projections headed Projected Minimum Production is made assuming that those years when yields were extremely high represent abnormal conditions. Essentially, these projections apply if one foresees less than favorable growing conditions. The Projected Production estimates are most relevant for planning purposes since they represent realistic potential output. It is likely that Minnesota production will fall somewhere within the range bounded by the two sets of projections.

Figure 1 illustrates the general trend for each set of projections using Renville County corn production as an example.

INTERPRETATION AND CONCLUSION

An analysis of these projections suggests a number of general observations.

- Total combined production of the five grains studied is likely to increase substantially through 1985. Average annual production in 1971-74 totaled 782 million bushels. By 1980, production is estimated to increase 21 percent and reach 949 million bushels. Total grain production in 1985 is estimated at 1,042 million bushels or 33 percent higher than the average in 1971-74.

Two factors explain these increases. First, improved production technology should continue to increase yields as in the past. Even if the rate of technological innovation slows, further application of existing technologies should produce higher yields. Second, additional acreage has been coming into production since 1973 when government acreage controls were abandoned and world grain shortages resulted in increased prices. New acreage has come from farm land which was not used for grain crops during the 1960's and from some additional land added to farms. Price incentives have induced farmers to farm more intensively. If export demand remains strong, farmers will produce more grain in response to these market price incentives.

- Corn is Minnesota's most important grain and is estimated to increase at the fastest rate. Average annual corn production in 1971-74 was 451 million bushels. By 1980, production is estimated to increase 33 percent and reach 598 million bushels. Corn production in 1985 is estimated at 666 million bushels or 48 percent higher than the 1971-74 average.

¹ Equations are provided in the appendix on page 18.

² Livestock projections are based on USDA projections for national livestock production for 1980 and 1985.

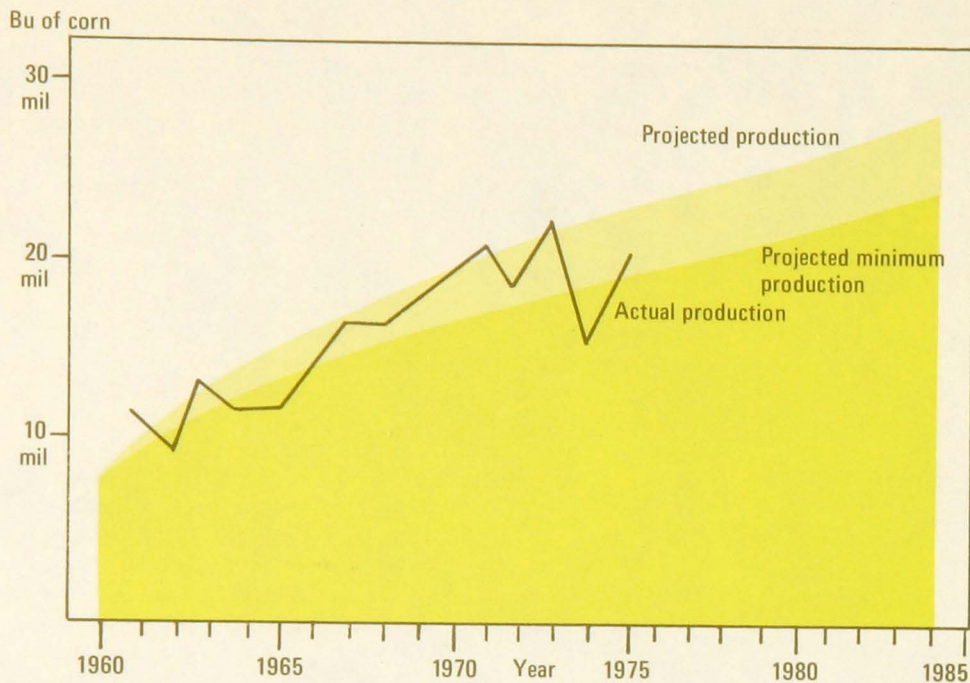


Figure 1. Projected corn production in Renville County for 1980 and 1985

Two factors explain the increase. First, yield-improving technology has been generated for corn at a very rapid rate over the last 10 or 15 years. Application of these new technologies is continuing. Second, specialization in corn and soybean production has occurred in a very fertile area of the state. Analysis indicates that farmers in the southern third of the state have moved more and more toward corn and soybean production exclusively.

The marketable surplus of corn should rise markedly. Minnesota's estimated annual marketable corn surplus averaged 153 million bushels in 1971-74. It is estimated to reach 236 million bushels in 1980 and 273 million in 1985. Livestock production in the state is estimated to grow at a slower rate than corn production. Hence, more corn will be available for marketing and export. However, if Minnesota's livestock production grows at a faster rate than expected, the marketable corn surplus will grow at a slower rate. Caution should be taken in interpreting the projections of marketable surplus. First, they apply only to corn. Due to lack of data no effort was made to project specific surpluses of other grains. Second, these assume corn production will increase substantially while livestock production remains quite constant or declines. This residual surplus of corn may vary widely with a relatively small change in either corn yield or livestock production.

- Soybean production should rise modestly over the projected period. Average annual soybean production for 1971-74 was 92 million bushels. The 1980 production is estimated at 105 million bushels or a 14 percent increase. Production in 1985 is estimated to rise to 111 million bushels or 20 percent above the 1971-74 average annual level. While acres planted to soybeans have increased and are expected to continue to increase, yields for soybeans have remained nearly constant.

- The lowest rate of production growth should occur in oats. Average annual production was 135 million in

1971-74. Production is estimated to decline to 124 million in 1980 and then return to 135 million bushels in 1985.

Acreage commitments to this crop have dropped continually in recent years. Once acreage plantings in oats stabilize at a new, lower level, normal yield increases should up production to a level roughly equal to the average in 1971-74.

- Wheat production in Minnesota is estimated to reach 80 million bushels in 1980 and 85 million in 1985. Average annual production in 1971-74 was 67 million. Acreage planted to wheat has risen substantially in the last three years as wheat prices rose relative to feed grain prices. It is questionable, however, whether wheat acreage will continue to increase this rapidly.

- Barley production is projected to increase from the 1971-74 average annual production of 36 million bushels to 42 million bushels in 1980; a 17 percent increase. By 1985, production is estimated at 46 million bushels or 28 percent above 1971-74 average annual production.

- The south central and southwestern areas of the state should show the greatest production growth rates when compared to 1971-74 average production. These projections reveal that District 7 should lead the state in production expansion. The rate of growth estimated relative to the 1971-74 period is projected at 33.5 percent by 1980 and 49.0 percent by 1985. These rates may overstate potential gains since the production in the comparison period (1971-74) was held below normal due to unfavorable weather conditions. District 5 should also show a high growth rate over the projected period. Total grain production should increase 27 percent between 1971-74 and 1980, and 40 percent by 1985.

- The projections made in this study indicate that the marketing system which handles, stores, and transports grain will be challenged to accommodate ever growing volumes. Not only will total output expand but so will the surpluses entering the marketing channels.

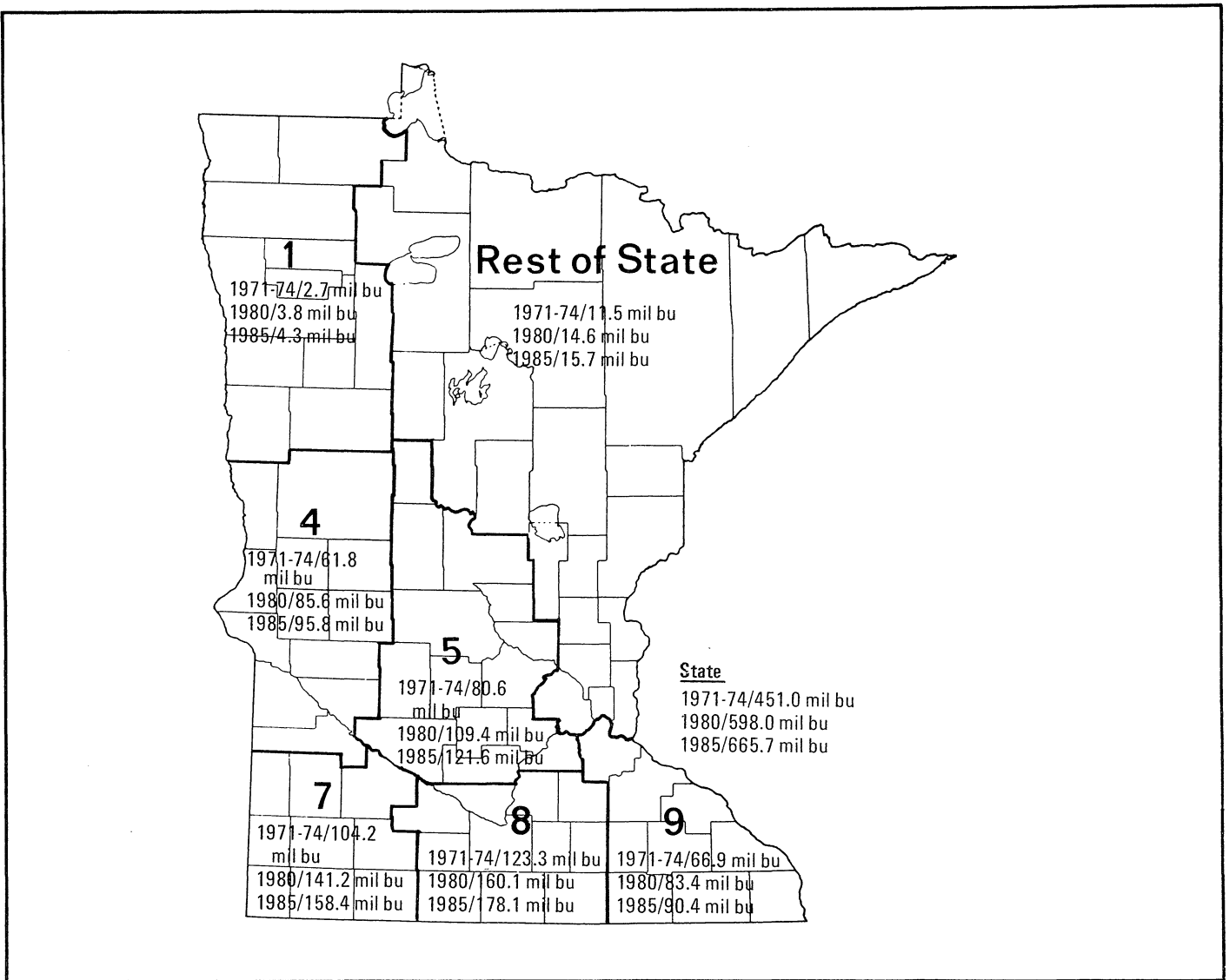


Table 1. Projected corn production and projected minimum production by district for 1980 and 1985 and percentage over 1971-74 average

District	Crop production forecast					
	Corn (bushels) Average production		Projected Production		Projected Minimum Production	
	1971-74	1980	1985	1980	1985	
1	2,695,900	3,787,000	4,269,000	2,858,000	3,084,000	
% change		40.5	58.3	6.0	14.4	
4	61,810,300	85,568,000	95,809,000	66,527,000	74,043,000	
% change		38.7	55.0	7.6	19.8	
5	80,581,750	109,381,000	121,563,000	94,604,000	103,801,000	
% change		35.7	50.9	17.4	28.8	
7	104,240,130	141,204,000	158,442,000	120,628,000	134,011,000	
% change		40.0	52.0	15.7	28.6	
8	123,278,230	160,071,000	178,088,000	143,808,000	157,515,000	
% change		37.0	44.5	16.7	27.8	
9	66,876,230	83,373,000	90,830,000	70,181,000	74,647,000	
% change		21.6	35.8	4.9	11.6	
Rest of state	11,492,230	14,608,000	15,682,000	12,799,000	13,452,000	
% change		27.1	36.8	11.4	17.1	
State total	450,974,770	597,992,000	665,683,000	511,405,000	560,553,000	
% change		32.6	47.6	13.4	24.3	

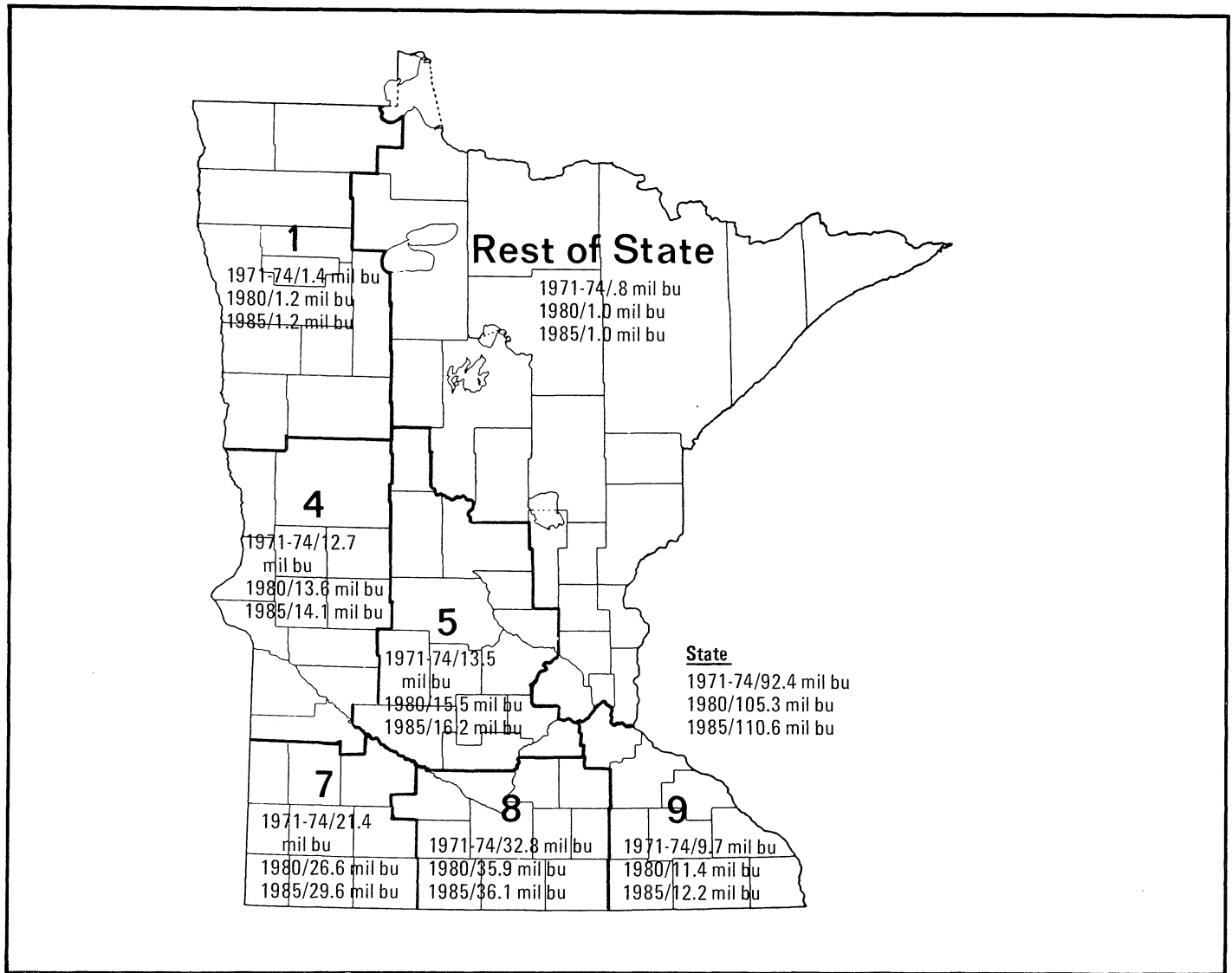


Table 2. Projected soybean production and projected minimum production by district for 1980 and 1985 and percentage over 1971-74 average.

District	Crop production forecast				
	Soybeans (bushels)		Projected production		
	Average production	Projected production		Projected minimum production	
	1971-74	1980	1985	1980	1985
1	1,424,300	1,231,000	1,239,000	787,000	787,000
% change		-13.6	-13.0	-44.0	-44.0
4	12,738,880	13,631,000	14,065,000	9,152,000	9,004,000
% change		7.0	10.4	-28.2	-28.2
5	13,504,100	15,482,000	16,282,000	11,249,000	11,249,000
% change		14.7	20.6	-16.7	-16.7
7	21,373,150	26,585,000	29,647,000	20,320,000	21,227,000
% change		24.4	38.7	-5.0	-.7
8	32,844,600	35,938,000	36,177,000	28,335,000	28,335,000
% change		9.4	10.2	-13.7	-13.7
9	9,693,050	11,421,000	12,168,000	8,122,000	8,122,000
% change		17.8	25.5	-14.8	-14.8
Rest of state	792,180	1,017,000	1,017,000	761,000	761,000
% change		28.4	28.4	-4.0	-4.0
State total	92,370,260	105,305,000	110,596,000	78,727,000	79,485,000
% change		14.0	19.7	-14.8	-14.0

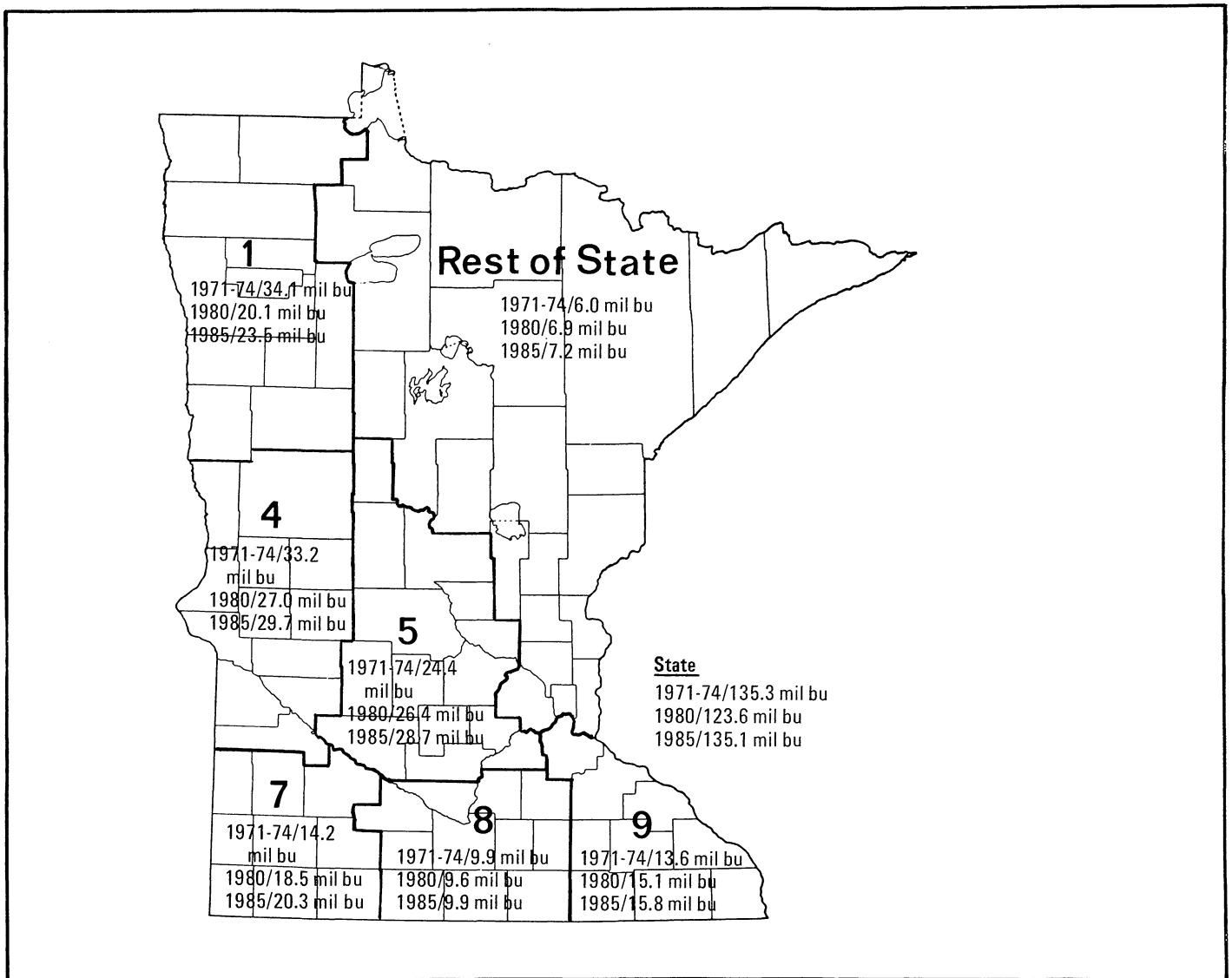


Table 3. Projected oats production and projected minimum production by district for 1980 and 1985 and percentage over 1971-74 average

District	Crop production forecast				
	Oats (bushels)	Projected production		Projected minimum production	
	Average production 1971-74	1980	1985	1980	1985
1	34,072,150	20,057,000	23,501,000	11,354,000	12,004,000
% change		-41.1	-31.0	-66.7	-64.8
4	33,193,630	27,013,000	29,684,000	17,683,000	19,929,000
% change		-18.6	-10.6	-46.7	-39.9
5	24,351,180	26,381,000	28,737,000	20,061,000	21,210,000
% change		8.3	18.0	-17.6	-12.9
7	14,234,850	18,517,000	20,326,000	13,616,000	15,089,000
% change		30.1	43.8	-4.4	6.0
8	9,887,780	9,598,000	9,896,000	7,054,000	7,272,000
% change		-2.9	0.1	-28.7	-26.5
9	13,567,030	15,063,000	15,797,000	10,518,000	11,462,000
% change		11.0	16.4	-22.5	-15.5
Rest of state	5,993,400	6,941,000	7,152,000	4,538,000	4,951,000
% change		15.8	19.3	-24.3	-17.4
State total	135,300,020	123,570,000	135,093,000	84,824,000	91,867,000
% change		-8.7	0.2	-37.3	-32.1

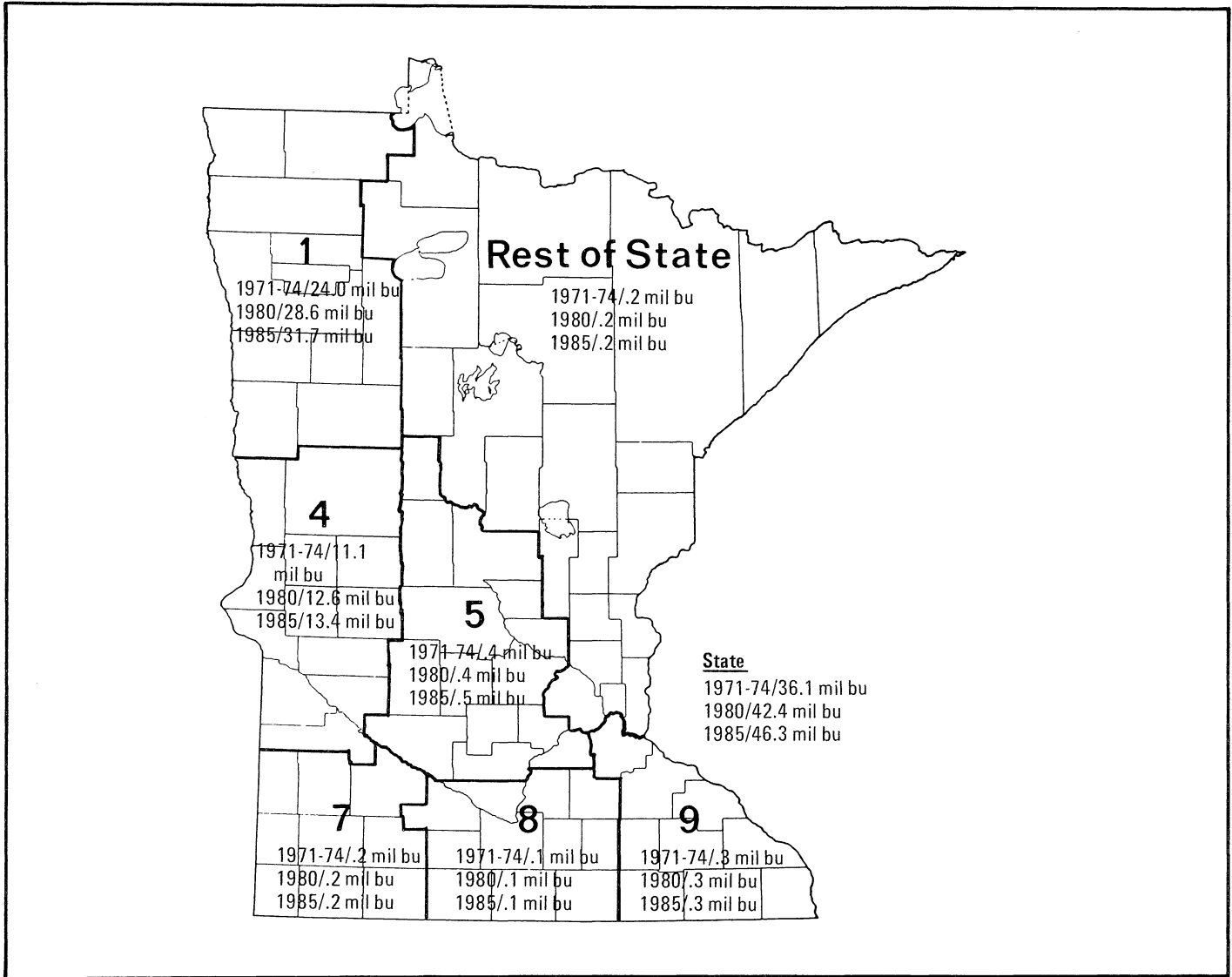


Table 4. Projected barley production and projected minimum production by district for 1980 and 1985 and percentage over 1971-74 average.

District	Crop production forecast				
	Barley (bushels)		Projected		
	Average production	Projected production		minimum production	
	1971-74	1980	1985	1980	1985
1	23,976,150	28,592,000	31,711,000	20,680,000	22,373,000
% change		19.3	32.3	-13.7	-6.7
4	11,073,630	12,652,000	13,336,000	8,655,000	8,515,000
% change		14.3	20.4	-21.8	-23.1
5	387,600	422,000	514,000	292,000	297,000
% change		8.9	32.6	-24.7	-23.4
7	193,030	213,000	227,000	95,000	82,000
% change		10.3	17.6	-50.8	-57.5
8	52,230	54,000	56,000	28,000	25,000
% change		3.4	7.2	-46.4	-52.1
9	267,950	272,000	282,000	204,000	199,000
% change		1.5	5.2	-23.9	-25.7
Rest of state	175,330	192,000	210,000	153,000	163,000
% change		9.5	19.8	-12.7	-7.0
State total	36,125,920	42,397,000	46,336,000	30,107,000	31,654,000
% change		17.4	28.3	-16.7	-12.4

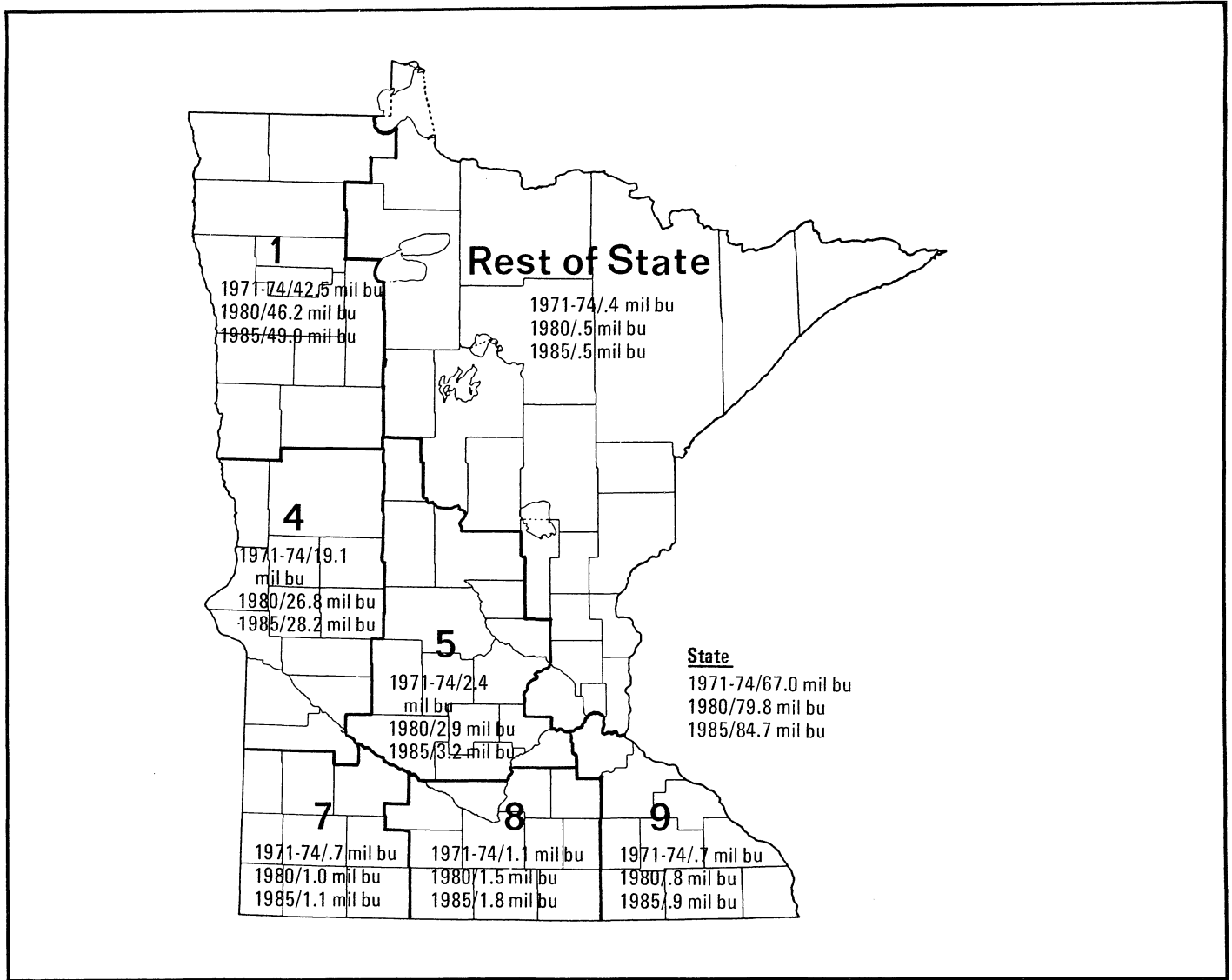


Table 5. Projected wheat production and projected minimum production by district for 1980 and 1985 and percentage over 1971-74 average

Crop production forecast					
District	Wheat (bushels)		Projected minimum production		
	Average production 1971-74	Projected production 1980 1985		1980	1985
1	42,514,400	46,190,000	48,962,000	35,522,000	35,522,000
% change		8.7	15.2	-16.5	-16.5
4	19,139,780	26,805,000	28,206,000	21,565,000	21,793,000
% change		40.1	47.4	12.7	13.9
5	2,397,050	2,901,000	3,218,000	2,039,000	2,620,000
% change		21.0	12.4	-14.9	9.3
7	710,680	984,000	1,098,000	842,000	929,000
% change		38.4	54.5	18.5	30.8
8	1,104,680	1,548,000	1,830,000	927,000	1,080,000
% change		40.1	65.7	-16.1	-2.2
9	674,650	814,000	914,000	606,000	660,000
% change		20.7	35.5	-10.3	-2.2
Rest of state	434,280	523,000	531,000	432,000	208,000
% change		20.4	22.0	-5	-52.1
State total	66,975,520	79,765,000	84,740,000	61,933,000	62,812,000
% change		19.1	26.5	-7.5	-6.2

Table 6. Marketable surplus of corn by crop reporting district, 1971-74 average, 1980, 1985

District	Average marketable surplus	Projected surplus		Projected minimum surplus	
	1971-74	1980	1985	1980	1985
1	-14,500,000	-17,600,000	-19,200,000	-18,600,000	-20,400,000
% change		-21.4	-32.4		
4	21,900,000	38,400,000	44,000,000	19,300,000	14,700,000
% change		75.3	100.9		
5	900,000	14,800,000	20,000,000		-7,000,000*
% change		1500.4	2100.2		
7	56,600,000	81,000,000	92,200,000	60,000,000	54,400,000
% change		43.1	62.9		
8	80,000,000	108,000,000	121,700,000	91,900,000	87,400,000
% change		35.0	52.1		
9	19,000,000	25,000,000	27,400,000	11,700,000	6,800,000
% change		31.6	44.2		
Rest of state	-10,700,000	-13,200,000	-13,400,000	-15,000,000	-16,300,000
% change		-23.4	-25.2		
State total	153,200,000	236,400,000	272,700,000	149,300,000	133,600,000
% change		54.6	78.0		

* Extreme variability is due to large poultry production and annual yields variations.

APPENDIX

Table A. Corn production in Minnesota, 1973-74 and projected production for 1980 and 1985 by county

County	Actual production (bushels)		Projected production (bushels)		Projected minimum production (bushels)	
	1973	1974	1980	1985	1980	1985
Becker	461,700	392,900	544,000	620,000	422,000	471,000
Clay	978,200	727,700	1,102,000	1,285,000	807,000	914,000
Clearwater	53,300	39,100	53,000	59,000	34,000	36,000
Kittson	27,000	20,800	22,000	26,000	11,000	11,000
Mahnomen	234,000	129,300	276,000	318,000	188,000	212,000
Marshall	48,000	53,500	55,000	61,000	26,000	26,000
Norman	882,000	616,400	818,000	895,000	645,000	690,000
Pennington	42,400	24,400	36,000	41,000	16,000	17,000
Polk	583,000	429,800	713,000	778,000	542,000	574,000
Red Lake	198,000	71,300	156,000	172,000	124,000	128,000
Roseau	16,800	8,300	12,000	14,000	43,000	5,000
District 1 total	3,524,400	2,513,500	3,787,000	4,269,000	2,858,000	3,084,000
Big Stone	3,830,400	1,729,900	4,045,000	4,562,000	3,069,000	3,397,000
Chippewa	11,104,200	7,688,900	12,806,000	14,512,000	10,358,000	11,604,000
Douglas	2,359,000	1,162,700	2,215,000	2,495,000	1,730,000	1,909,000
Grant	2,328,000	1,029,500	2,365,000	2,769,000	1,452,000	1,630,600
Lac Qui Parle	12,172,000	6,896,500	12,954,000	14,617,000	9,742,000	10,807,000
Otter Tail	5,166,000	3,073,600	5,237,000	5,947,000	4,350,000	4,886,000
Pope	5,504,000	2,944,300	5,301,000	5,855,000	4,274,000	4,629,000
Stevens	6,811,200	4,016,800	7,446,000	8,624,000	5,638,000	6,446,000
Swift	12,154,200	7,134,100	12,670,000	14,299,000	9,602,000	10,643,000
Traverse	2,307,500	1,113,800	2,770,000	3,176,000	2,036,000	2,280,000

Table A. (continued).

County	Actual production (bushels)		Projected production (bushels)		Projected minimum production (bushels)	
	1973	1974	1980	1985	1980	1985
Wilkin	749,700	406,900	744,000	845,000	426,000	445,000
Yellow Medicine	14,492,500	10,025,200	17,015,000	19,108,000	13,850,000	15,367,000
District 4 total	78,545,200	47,222,200	85,568,000	96,809,000	66,527,000	74,043,000
Benton	2,174,400	1,422,900	2,208,000	2,362,000	1,708,000	1,759,000
Carver	3,961,800	3,321,000	4,906,000	5,319,000	4,431,000	4,747,000
Kandiyohi	11,911,900	7,262,400	12,987,000	14,225,000	11,173,000	12,055,000
McLeod	7,756,800	5,624,800	9,256,000	10,096,000	8,290,000	8,928,000
Meeker	7,679,800	5,028,300	9,151,000	9,989,000	7,914,000	8,472,000
Morrison	3,389,200	2,003,000	3,064,000	3,514,000	1,763,000	1,922,000
Renville	21,512,700	13,522,900	26,336,000	30,004,000	23,910,000	27,076,000
Scott	3,848,100	2,401,900	4,281,000	4,743,000	3,585,000	3,917,000
Sherburne	2,058,000	1,301,500	1,857,000	2,009,000	1,528,000	1,616,000
Sibley	11,791,400	8,146,400	14,100,000	15,658,000	12,074,000	13,234,000
Stearns	9,727,600	5,520,400	9,473,000	10,655,000	8,383,000	9,360,000
Todd	3,825,000	1,827,700	3,468,000	3,819,000	2,817,000	3,048,000
Wadena	1,001,100	699,700	1,010,000	1,147,000	871,000	983,000
Wright	6,434,700	4,498,900	7,284,000	8,023,000	6,157,000	6,684,000
District 5 total	97,072,500	62,581,800	109,381,000	121,563,000	94,604,000	103,801,000
Cottonwood	13,198,700	9,869,100	17,962,000	20,360,000	15,295,000	17,173,000
Jackson	17,419,500	13,072,600	21,041,000	23,372,000	17,955,000	19,730,000
Lincoln	6,164,400	4,979,100	6,981,000	7,722,000	5,497,000	5,962,000
Lyon	12,901,200	9,483,300	17,820,000	20,328,000	14,761,000	16,699,000
Murray	13,371,300	9,358,700	16,449,000	18,373,000	14,087,000	15,574,000
Nobles	14,809,200	8,202,000	16,690,000	18,510,000	14,144,000	15,495,000
Pipestone	7,616,000	5,150,700	8,463,000	9,298,000	7,116,000	7,697,000
Redwood	18,300,100	12,799,900	23,026,000	26,188,000	20,861,000	23,622,000
Rock	11,601,000	4,912,300	12,772,000	14,291,000	10,912,000	12,059,000
District 7 total	115,381,400	77,827,700	141,204,000	158,442,000	120,628,000	134,011,000
Blue Earth	14,920,500	11,963,900	18,710,000	20,773,000	16,813,000	18,513,000
Brown	11,265,800	9,796,200	13,933,000	15,499,000	11,877,000	13,063,000
Faribault	16,758,000	13,971,300	21,068,000	23,474,000	19,334,000	21,412,000
Freeborn	15,492,400	13,273,600	18,169,000	20,250,000	16,353,000	18,102,000
Le Sueur	8,070,400	5,197,200	9,946,000	11,061,000	9,013,000	9,932,000
Martin	18,009,600	16,066,000	22,446,000	25,113,000	19,671,000	21,784,000
Nicollet	7,068,700	7,068,700	12,262,000	13,809,000	11,355,000	12,734,000
Rice	8,284,500	5,854,100	9,302,000	10,131,000	8,197,000	8,745,000
Steele	8,389,500	7,834,800	10,027,000	10,996,000	8,824,000	9,583,000
Waseca	9,593,700	8,096,800	10,856,000	11,919,000	9,859,000	10,740,000
Watonwan	9,525,600	9,147,400	13,332,000	15,063,000	11,525,000	12,907,000
District 8 total	130,155,100	108,270,000	160,071,000	178,088,000	143,808,000	157,515,000
Dakota	6,736,200	5,049,200	7,537,000	8,850,000	4,967,000	5,772,000
Dodge	7,425,600	5,858,500	8,758,000	9,579,000	7,588,000	8,191,000
Fillmore	13,366,600	9,282,900	14,503,000	15,602,000	12,228,000	12,716,000
Goodhue	10,563,000	7,247,300	10,877,000	11,352,000	9,608,000	9,654,000
Houston	5,140,500	4,008,900	5,850,000	6,456,000	5,293,000	5,786,000
Mower	12,352,200	8,991,200	14,984,000	16,682,000	12,362,000	13,575,000
Olmsted	8,473,900	6,086,300	9,521,000	10,209,000	8,318,000	8,744,000
Wabasha	5,449,600	2,991,900	5,386,000	5,713,000	4,609,000	4,737,000
Winona	5,564,000	4,159,100	5,957,000	6,387,000	5,208,000	5,472,000
District 9 total	75,071,600	53,675,300	83,373,000	90,830,000	70,181,000	74,647,000
Rest of state	13,609,800	7,809,500	14,608,000	15,682,000	12,799,000	13,452,000
State total	513,360,000	359,900,000	597,992,000	665,683,000	511,405,000	560,553,000

Table B. Soybean production in Minnesota, 1973-74 and projected production for 1980 and 1985 by county

County	Actual production (bushels)		Projected production (bushels)		Projected minimum production (bushels)	
	1973	1974	1980	1985	1980	1985
Becker	109,200	49,500	96,000	98,000	33,000	22,000
Clay	1,200,000	635,100	789,000	789,000	541,000	541,000
Clearwater	—	1,400	700	800	300	300
Kittson	—	5,400	1,100	1,000	—	—
Mahnomen	25,200	10,500	18,000	18,000	13,000	13,000
Marshall	20,800	10,800	17,000	18,000	12,000	13,000
Norman	418,600	162,900	254,000	254,000	157,000	157,000
Pennington	1,800	1,500	2,200	2,300	1,000	700
Polk	76,000	33,400	47,000	52,000	27,000	29,000
Red Lake	3,600	1,400	3,900	4,000	1,300	1,000
Roseau	1,700	1,300	2,300	2,500	1,300	1,200
District 1 total	1,856,900	913,200	1,231,200	1,239,600	786,900	778,200
Big Stone	562,800	356,500	370,000	370,000	270,000	270,000
Chippewa	3,683,000	2,110,100	2,690,000	2,822,000	1,856,000	1,752,000
Douglas	297,000	165,900	143,000	143,000	86,000	86,000
Grant	712,500	545,900	514,000	514,000	362,000	362,000
Lac Qui Parle	2,955,000	1,830,500	2,490,000	2,490,000	1,625,000	1,625,000
Otter Tail	273,700	177,700	182,000	186,000	54,000	34,000
Pope	600,000	329,100	332,000	332,000	231,000	231,000
Stevens	1,066,000	677,500	681,000	681,000	501,000	501,000
Swift	2,608,200	1,511,800	1,560,000	1,560,000	1,083,000	1,083,000
Traverse	1,020,000	567,800	608,000	608,000	378,000	378,000
Wilkin	1,012,000	742,500	750,000	764,000	181,000	87,000
Yellow Medicine	3,861,000	2,474,000	3,311,000	3,595,000	2,525,000	2,595,000
District 4 total	18,651,200	11,489,300	13,631,000	14,065,000	9,152,000	9,004,000
Benton	86,400	60,000	56,000	56,000	8,000	8,000
Carver	436,800	357,500	329,000	334,000	263,000	250,000
Kandiyohi	2,337,600	1,415,300	2,049,000	2,207,000	1,498,000	1,524,000
McLeod	2,047,400	1,191,300	1,563,000	1,640,000	1,038,000	962,000
Meeker	1,680,000	1,088,100	1,475,000	1,576,000	1,079,000	1,091,000
Morrison	74,800	41,200	41,000	41,000	32,000	32,000
Renville	6,450,000	4,546,000	4,978,000	5,197,000	3,861,000	3,832,000
Scott	852,500	519,100	615,000	656,000	393,000	376,000
Sherburne	325,600	295,100	215,000	215,000	95,000	95,000
Sibley	3,680,000	2,250,000	2,958,000	3,074,000	2,219,000	2,090,000
Stearns	397,500	210,000	240,000	240,000	141,000	141,000
Todd	66,700	52,300	52,000	57,000	8,500	4,400
Wadena	2,100	3,400	2,000	2,000	—	—
Wright	1,160,000	640,900	909,000	987,000	614,000	629,000
District 5 total	19,597,400	12,670,500	15,482,000	16,282,000	11,249,500	11,034,400
Cottonwood	3,888,000	2,919,700	4,228,000	4,785,000	3,164,000	3,346,000
Jackson	4,928,000	4,125,400	5,478,000	6,247,000	4,253,000	4,567,000
Lincoln	466,000	423,100	469,000	519,000	338,000	361,000
Lyon	2,109,600	1,847,500	2,260,000	2,577,000	1,819,000	2,016,000
Murray	2,775,000	2,298,600	2,730,000	3,047,000	2,015,000	2,056,000
Nobles	3,978,800	3,018,900	4,071,000	4,611,000	3,086,000	3,301,000
Pipestone	701,500	553,900	631,000	703,000	470,000	499,000
Redwood	5,916,000	4,661,700	5,428,000	5,738,000	4,291,000	4,170,000
Rock	1,554,000	1,110,700	1,290,000	1,420,000	884,000	911,000
District 7 total	26,316,900	20,959,500	26,585,000	29,647,000	20,320,000	21,227,000
Blue Earth	6,555,500	3,979,800	5,082,000	5,239,000	3,787,000	3,528,000
Brown	3,836,700	2,680,300	2,954,000	2,889,000	2,354,000	2,064,000
Faribault	7,951,300	4,970,500	6,121,000	6,232,000	5,010,000	4,751,000

Table B. (continued).

County	Actual production (bushels)		Projected production (bushels)		Projected minimum production (bushels)	
	1973	1974	1980	1985	1980	1985
Freeborn	4,677,000	3,363,100	3,633,000	3,680,000	2,739,000	2,417,000
Le Sueur	2,280,300	1,115,200	1,576,000	1,550,000	1,098,000	911,000
Martin	6,723,500	4,942,900	6,430,000	6,676,000	5,668,000	5,677,000
Nicollet	2,954,600	1,793,900	2,229,000	2,216,000	1,685,000	1,495,000
Rice	1,419,600	954,200	1,168,000	1,211,000	911,000	876,000
Steele	2,541,000	1,585,000	1,607,000	1,480,000	1,189,000	888,000
Waseca	3,455,800	1,823,800	2,202,000	2,052,000	1,722,000	1,393,000
Watonwan	3,791,000	2,683,600	2,906,000	2,952,000	2,172,000	1,950,000
District 8 total	46,186,300	29,901,300	35,938,000	36,177,000	28,335,000	25,950,000
Dakota	1,522,500	819,600	1,115,000	1,234,000	687,000	726,000
Dodge	2,082,600	1,369,100	1,596,000	1,607,000	1,218,000	1,109,000
Fillmore	1,512,000	920,400	1,450,000	1,616,000	1,104,000	1,166,000
Goodhue	1,887,000	1,094,700	1,500,000	1,600,000	1,046,000	1,024,000
Houston	146,200	112,000	123,000	139,000	96,000	104,000
Mower	4,350,000	2,735,400	3,852,000	4,015,000	2,690,000	2,398,000
Olmsted	1,145,000	688,000	1,029,000	1,119,000	711,000	725,000
Wabasha	516,200	330,800	487,000	540,000	392,000	416,000
Winona	333,500	176,900	269,000	298,000	178,000	187,000
District 9 total	13,495,000	8,246,900	11,421,000	12,168,000	8,122,000	7,855,000
Rest of state	1,204,000	659,300	761,000	761,000	500,000	500,000
State total	127,307,700	84,840,000	105,049,200	110,339,600	78,465,400	76,348,600

Table C. Oats production in Minnesota, 1973-74 and projected production for 1980 and 1985 by county

County	Actual production (bushels)		Projected production (bushels)		Projected minimum production (bushels)	
	1973	1974	1980	1985	1980	1985
Becker	2,953,800	1,245,100	2,487,000	2,650,000	1,406,000	1,380,000
Clay	2,656,800	1,507,800	1,154,000	1,200,000	960,000	910,000
Clearwater	722,200	513,300	970,000	1,390,000	668,000	630,000
Kittson	1,285,700	542,500	1,073,000	1,206,000	420,000	370,000
Mahnomen	2,024,000	870,500	1,530,000	1,643,000	1,100,000	1,060,000
Marshall	4,684,800	1,875,900	3,834,000	4,295,000	1,760,000	1,850,000
Norman	4,368,000	1,213,000	2,043,000	2,461,000	1,020,000	1,230,000
Pennington	2,796,200	1,210,100	1,708,000	1,886,000	965,000	976,000
Polk	4,967,900	1,847,300	2,936,000	3,554,000	1,630,000	1,860,000
Red Lake	2,295,400	669,800	711,000	774,000	545,000	568,000
Roseau	4,827,600	972,700	1,611,000	2,442,000	880,000	1,170,000
District 1 total	33,582,400	12,468,000	20,057,000	23,501,000	11,354,000	12,004,000
Big Stone	2,495,600	1,208,400	1,668,000	1,916,000	960,000	1,050,000
Chippewa	1,548,000	1,153,000	1,778,000	2,169,000	1,000,000	1,205,000
Douglas	3,120,000	1,962,100	2,770,000	2,807,000	1,742,000	1,760,000
Grant	2,278,800	1,319,200	1,410,000	1,777,000	920,000	1,100,000
Lac Qui Parle	2,403,400	1,818,400	2,712,000	3,017,000	2,219,000	2,430,000
Otter Tail	7,804,800	4,713,900	6,207,000	6,418,000	4,820,000	5,120,000
Pope	3,050,000	2,039,300	2,567,000	2,428,000	1,442,000	1,034,000
Stevens	3,594,500	1,991,800	1,688,000	1,933,000	1,150,000	1,310,000
Swift	2,359,800	1,586,900	2,080,000	2,277,000	1,340,000	1,550,000
Traverse	3,384,000	1,016,000	959,000	1,269,000	630,000	870,000
Wilkin	2,808,000	1,147,500	926,000	1,160,000	610,000	820,000

Table C. (continued).

County	Actual production (bushels)		Projected production (bushels)		Projected minimum production (bushels)	
	1973	1974	1980	1985	1980	1985
Yellow Medicine	1,943,500	1,583,000	2,248,000	2,513,000	1,390,000	1,680,000
District 4 total	36,790,400	21,539,500	27,013,000	29,684,000	17,683,000	19,929,000
Benton	1,065,900	929,100	1,466,000	1,680,000	1,099,000	1,223,000
Carver	1,117,800	1,054,000	900,000	920,000	722,000	728,000
Kandiyohi	2,133,000	1,587,300	1,943,000	2,002,000	1,410,000	1,500,000
McLeod	1,904,400	1,674,100	2,144,000	2,481,000	1,593,000	1,681,000
Meeker	1,870,300	1,458,100	1,757,000	1,914,000	1,559,000	1,648,000
Morrison	1,865,600	1,264,200	1,816,000	1,985,000	1,049,000	971,000
Renville	2,412,400	1,738,600	2,323,000	2,664,000	1,688,000	1,953,000
Scott	725,000	640,600	885,000	887,000	645,000	645,000
Sherburne	185,600	134,000	180,000	196,000	102,000	105,000
Sibley	1,902,800	1,411,100	2,143,000	2,677,000	1,760,000	2,090,000
Stearns	6,696,000	5,806,500	6,100,000	6,344,000	5,059,000	5,195,000
Todd	2,713,200	1,757,600	2,552,000	2,606,000	1,600,000	1,610,000
Wadena	604,000	323,100	514,000	572,000	331,000	351,000
Wright	1,630,200	1,703,500	1,658,000	1,809,000	1,444,000	1,510,000
District 5 total	26,827,000	21,481,800	26,381,000	28,737,000	20,061,000	21,210,000
Cottonwood	774,400	953,200	1,105,000	1,217,000	820,000	835,000
Jackson	777,200	652,500	840,000	900,000	620,000	664,000
Lincoln	2,304,000	2,272,200	2,848,000	3,057,000	1,992,000	2,330,000
Lyon	2,116,800	2,296,000	2,816,000	3,055,000	2,270,000	2,511,000
Murray	1,862,400	1,854,100	2,369,000	2,663,000	1,851,000	2,014,000
Nobles	1,701,800	1,422,000	1,884,000	2,095,000	1,392,000	1,645,000
Pipestone	2,803,200	1,574,600	2,543,000	2,916,235	1,774,000	2,030,000
Redwood	1,990,600	1,698,400	2,432,000	2,570,000	1,818,000	1,900,000
Rock	1,285,200	1,171,200	1,680,000	1,853,000	1,079,000	1,160,000
District 7 total	15,615,600	13,894,200	18,517,000	20,326,000	13,616,000	15,089,000
Blue Earth	823,900	652,900	611,000	649,000	470,000	490,000
Brown	1,502,800	1,128,300	1,500,000	1,660,000	1,249,000	1,390,000
Faribault	669,300	630,900	707,000	728,000	351,000	364,000
Freeborn	1,153,200	966,900	962,000	834,000	624,000	590,000
Le Sueur	736,000	591,800	653,000	675,000	409,000	421,000
Martin	967,000	726,200	730,000	740,000	600,000	606,000
Nicollet	1,076,400	981,200	1,138,000	1,281,000	963,000	1,006,000
Rice	1,248,000	1,157,100	1,135,000	1,172,000	821,000	830,000
Steele	1,050,000	1,011,100	1,109,000	1,126,000	761,000	770,000
Waseca	586,500	500,300	359,000	252,000	215,000	172,000
Watsonwan	693,000	589,200	694,000	779,000	591,000	630,000
District 8 total	8,929,500	8,935,900	9,598,000	9,896,000	7,054,000	7,272,000
Dakota	1,504,000	1,346,300	1,585,000	1,741,000	1,223,000	1,442,000
Dodge	1,067,000	1,176,200	1,162,000	1,199,000	588,000	597,000
Fillmore	1,823,200	2,076,000	2,394,000	2,470,000	1,771,000	1,843,000
Goodhue	2,189,900	2,018,200	2,179,800	2,318,000	1,739,000	1,821,000
Houston	780,000	850,200	1,040,000	1,055,000	640,000	643,000
Mower	1,333,800	1,925,200	1,841,000	1,934,000	1,113,000	1,220,000
Olmsted	1,446,900	1,678,700	1,705,000	1,764,000	1,311,000	1,330,000
Wabasha	1,578,900	1,318,700	1,531,000	1,610,000	922,000	1,225,000
Winona	1,240,000	1,316,200	1,626,000	1,706,000	1,211,000	1,341,000
District 9 total	12,964,900	13,705,700	15,063,000	15,797,000	10,518,000	11,462,000
Rest of state	6,513,400	4,934,900	6,941,000	7,152,000	4,538,000	4,951,000
State total	142,800,000	96,960,000	123,570,000	135,093,000	84,824,000	91,867,000

Table D. Barley production in Minnesota, 1973-74 and projected production for 1980 and 1985 by county

County	Actual production (bushels)		Projected production (bushels)		Projected minimum production (bushels)	
	1973	1974	1980	1985	1980	1985
Becker	1,646,800	1,070,100	1,556,000	1,642,000	1,100,000	1,076,000
Clay	3,728,900	2,255,600	3,932,000	4,258,000	2,788,000	2,913,000
Clearwater	108,000	49,000	105,000	112,000	63,000	63,000
Kittson	3,797,000	1,919,000	3,668,000	4,142,000	2,622,000	2,919,000
Mahnomen	1,095,100	426,700	995,000	1,047,000	732,000	736,000
Marshall	4,566,600	2,850,400	4,622,000	5,113,000	3,493,000	3,792,000
Norman	3,529,700	1,117,500	3,100,000	3,547,000	2,145,000	2,426,000
Pennington	780,000	494,900	740,000	789,000	530,000	537,000
Polk	7,249,200	5,929,000	8,871,000	9,971,000	6,495,000	7,166,000
Red Lake	568,000	403,700	518,000	552,000	334,000	333,000
Roseau	504,000	227,000	485,000	538,000	378,000	412,000
District 1 total	27,573,300	16,742,900	28,592,000	31,711,000	20,680,000	22,373,000
Big Stone	378,100	257,800	454,000	471,000	232,000	198,000
Chippewa	35,200	43,000	63,000	63,000	56,000	56,000
Douglas	534,100	754,400	617,000	654,000	465,000	465,000
Grant	1,665,600	1,780,200	2,013,000	2,188,000	1,355,000	1,414,000
Lac Qui Parle	21,500	15,500	51,000	56,000	19,000	18,000
Otter Tail	1,545,600	1,741,100	1,705,000	1,796,000	1,215,000	1,178,000
Pope	158,400	316,600	273,000	303,000	184,000	198,000
Stevens	787,200	855,400	840,000	840,000	575,000	575,000
Swift	105,600	147,600	231,000	254,000	67,000	57,000
Traverse	1,950,200	1,490,100	1,967,000	2,033,000	1,197,000	1,102,000
Wilkin	4,390,000	4,066,200	4,407,000	4,645,000	3,274,000	3,239,000
Yellow Medicine	20,500	21,900	31,000	33,000	16,000	15,000
District 4 total	11,601,000	11,489,800	12,652,000	13,336,000	8,655,000	8,515,000
Benton	7,200	7,900	6,800	7,300	5,300	5,500
Carver	4,500	4,800	4,800	5,200	3,300	3,400
Kandiyohi	33,600	48,900	43,000	43,000	—	—
McLeod	13,500	50,400	22,000	23,000	17,000	17,000
Meeker	22,000	26,400	22,000	24,000	16,000	17,000
Morrison	26,600	36,000	22,000	23,000	18,000	18,000
Renville	8,800	15,400	8,100	3,500	—	—
Scott	8,800	14,300	9,200	10,000	6,800	7,000
Sherburne	3,600	7,800	4,500	4,600	3,600	3,500
Sibley	8,600	15,100	10,000	10,000	6,000	6,000
Stearns	136,000	207,200	155,000	168,000	135,000	145,000
Todd	91,200	137,700	84,000	86,000	59,000	54,000
Wadena	23,800	30,600	19,000	20,000	14,000	13,000
Wright	10,800	18,000	12,000	13,000	8,000	8,000
District 5 total	399,000	620,500	422,400	513,500	292,000	297,400
Cottonwood	—	—	3,300	3,600	1,500	1,300
Jackson	—	—	—	—	—	—
Lincoln	75,600	84,500	122,000	129,000	71,000	69,000
Lyon	20,000	25,200	28,000	31,000	—	—
Murray	4,000	3,700	4,000	4,000	2,000	2,000
Nobles	7,600	11,400	10,000	11,000	3,000	3,000
Pipestone	24,000	18,500	21,000	21,000	10,000	10,000
Redwood	16,000	19,000	22,000	24,000	7,000	6,000
Rock	4,000	3,100	2,600	3,000	—	—
District 7 total	151,200	165,400	212,900	226,600	94,500	82,300
Blue Earth	8,600	4,000	5,500	5,600	2,400	1,700
Brown	4,000	7,600	5,600	6,000	1,000	—
Faribault	—	3,900	2,400	2,600	—	—

Table D. (continued).

County	Actual production (bushels)		Projected production (bushels)		Projected minimum production (bushels)	
	1973	1974	1980	1985	1980	1985
Freeborn	3,900	7,800	5,500	5,300	4,600	4,200
Le Sueur	4,000	7,800	4,900	4,900	2,200	1,600
Martin	3,900	4,600	4,000	4,000	2,900	2,600
Nicollet	—	4,400	4,000	4,000	—	—
Rice	9,000	13,200	9,300	9,600	7,900	8,000
Steele	4,300	9,200	6,500	6,600	3,800	3,500
Waseca	—	4,500	2,400	2,600	—	—
Watonwan	3,900	9,400	4,300	4,300	3,400	3,200
District 8 total	41,600	76,400	54,400	55,500	28,200	24,800
Dakota	35,000	49,700	39,000	42,000	33,000	34,000
Dodge	19,600	24,900	18,000	18,000	14,000	13,000
Fillmore	9,200	14,000	10,000	10,000	5,400	4,300
Goodhue	61,600	104,400	93,000	98,000	69,000	70,000
Houston	22,000	47,800	25,000	26,000	23,000	23,000
Mower	4,300	14,000	12,000	12,000	7,000	6,000
Olmsted	21,500	28,000	21,000	22,000	12,000	11,000
Wabasha	36,000	33,100	27,000	26,000	20,000	17,000
Winona	16,400	57,600	27,000	28,000	21,000	21,000
District 9 total	225,600	373,500	272,500	282,000	204,400	199,300
Rest of state	238,100	95,500	192,200	209,700	152,500	162,500
State total	40,229,800	29,564,000	42,397,900	46,334,300	30,116,600	31,654,300

Table E. Wheat production in Minnesota, 1973-74 and projected production for 1980 and 1985 by county

County	Actual production (bushels)		Projected production (bushels)		Projected minimum production (bushels)	
	1973	1974	1980	1985	1980	1985
Becker	1,581,000	1,251,300	1,341,000	1,491,000	900,000	937,000
Clay	7,028,300	5,688,100	5,628,000	6,033,000	3,862,000	3,595,000
Clearwater	194,800	138,000	165,000	177,000	117,000	120,000
Kittson	5,789,300	5,542,200	6,167,000	6,648,000	4,617,000	4,635,000
Mahnomen	1,263,000	807,300	877,000	924,000	568,000	538,000
Marshall	8,165,200	7,911,300	8,161,000	8,827,000	6,138,000	6,213,000
Norman	6,197,200	3,947,900	6,793,000	6,793,000	6,091,000	6,091,000
Pennington	1,832,500	1,397,500	1,388,000	1,477,000	993,000	977,000
Polk	12,749,800	12,890,800	12,665,000	13,500,000	10,184,000	10,173,000
Red Lake	1,889,700	1,276,800	1,407,000	1,477,000	887,000	807,000
Roseau	2,088,300	994,500	1,598,000	1,615,000	1,165,000	1,075,000
District 1 total	48,778,100	41,845,800	46,190,000	48,962,000	35,522,000	35,161,000
Big Stone	1,802,500	1,399,100	1,708,000	1,870,000	1,168,000	1,210,000
Chippewa	728,600	1,609,200	1,251,000	1,344,000	1,100,000	1,169,000
Douglas	898,700	1,055,800	971,000	1,011,000	770,000	770,000
Grant	3,578,900	3,249,500	3,471,000	3,594,000	2,752,000	2,680,000
Lac Qui Parle	1,445,500	2,078,600	1,853,000	1,987,000	1,606,000	1,696,000
Otter Tail	2,360,000	2,666,400	2,597,000	2,759,000	2,156,000	2,220,000
Pope	932,900	919,400	975,000	1,030,000	831,000	857,000
Stevens	1,918,500	2,832,100	2,399,000	2,461,000	2,148,000	2,162,000
Swift	1,506,500	3,068,900	2,333,000	2,408,000	2,131,000	2,169,000
Traverse	3,267,300	2,362,700	2,861,000	3,040,000	1,865,000	1,802,000
Wilkin	5,699,000	5,309,100	5,534,000	5,774,000	4,298,000	4,259,000

Table E. (continued).

County	Actual production		Projected production		Projected minimum production	
	(bushels)		(bushels)		(bushels)	
	1973	1974	1980	1985	1980	1985
Yellow Medicine	626,200	944,800	852,000	928,000	740,000	799,000
District 4 total	24,764,600	27,495,600	26,805,000	28,206,000	21,565,000	21,793,000
Benton	2,900	5,600	3,400	3,600	2,200	2,100
Carver	38,000	181,500	83,000	93,000	70,000	78,000
Kandiyohi	432,700	949,400	486,000	520,000	39,000	410,000
McLeod	70,700	553,100	220,000	245,000	179,000	197,000
Meeker	255,800	477,000	312,000	339,000	265,000	282,000
Morrison	18,400	28,200	17,000	18,000	12,000	13,000
Renville	760,000	1,832,900	1,006,000	1,122,000	864,000	956,000
Scott	40,800	111,200	59,000	65,000	50,000	54,000
Sherburne	35,000	75,700	35,000	37,000	28,000	29,000
Sibley	205,900	766,700	395,000	463,000	305,000	357,000
Stearns	98,200	174,300	101,000	107,000	85,000	88,000
Todd	72,100	84,600	63,000	67,000	48,000	49,000
Wadena	15,700	25,500	13,700	14,000	11,000	11,000
Wright	54,000	172,400	107,000	124,000	81,000	94,000
District 5 total	2,100,200	5,438,400	2,901,100	3,217,600	2,039,200	2,620,100
Cottonwood	36,500	53,800	43,000	49,000	32,000	35,000
Jackson	6,200	16,300	11,000	14,000	6,000	7,000
Lincoln	232,400	344,200	321,800	333,000	296,000	302,000
Lyon	122,400	290,600	168,000	189,000	142,000	158,000
Murray	6,200	14,700	12,900	15,000	8,000	10,000
Nobles	3,100	7,800	6,000	8,300	3,000	4,300
Pipestone	9,300	22,500	10,000	11,000	9,000	10,000
Redwood	310,400	619,700	411,000	479,000	346,000	403,000
Rock	—	2,800	—	—	—	—
District 7 total	726,500	1,372,400	983,700	1,098,300	842,000	929,300
Blue Earth	91,400	335,400	240,000	297,000	—	—
Brown	60,700	149,100	99,000	119,000	71,000	84,000
Faribault	24,400	117,600	57,000	60,000	—	—
Freeborn	31,500	126,400	74,000	85,000	35,000	37,000
Le Sueur	93,400	482,500	227,000	254,000	190,000	210,000
Martin	10,600	49,500	25,000	31,000	15,000	19,000
Nicollet	136,100	500,600	261,000	306,000	208,000	243,000
Rice	98,300	401,401	207,000	241,000	162,000	189,000
Steele	48,900	189,000	115,000	140,000	85,000	104,000
Waseca	96,800	404,100	228,000	277,000	153,000	184,000
Watsonwan	3,500	23,100	15,800	20,000	8,500	10,000
District 8 total	695,600	2,779,300	1,548,000	1,830,000	927,000	1,080,000
Dakota	255,100	446,400	279,000	301,000	225,000	237,000
Dodge	45,300	106,600	71,000	80,000	54,000	59,000
Fillmore	6,400	32,000	20,000	24,000	15,000	17,000
Goodhue	99,600	383,900	217,000	257,000	162,000	191,000
Houston	3,000	30,400	10,000	11,000	9,500	9,700
Mower	17,000	65,100	35,000	40,000	20,000	21,000
Olmsted	35,800	272,400	105,000	115,000	80,000	85,000
Wabasha	27,900	71,500	42,000	48,000	11,000	10,000
Winona	24,400	84,200	35,000	38,000	29,000	30,000
District 9 total	514,500	1,492,500	814,000	914,000	605,500	659,700
Rest of state	572,000	438,000	523,000	531,000	432,000	208,000
State total	78,151,500	80,862,000	79,764,800	84,740,700	61,932,700	62,451,100

Table F. Projected livestock production and in-district corn use for 1980

District	Beef Feeders	Cows	Dairy cows	All hogs	Sheep & lambs	Turkeys	Chickens	Estimated in-district corn use (bu.)
1	259,647	101,246	62,062	65,062	32,960	2,316,733	1,093,781	21,418,131
4	533,922	98,453	114,540	440,979	20,809	6,177,955	1,372,588	47,190,639
5	760,656	87,980	310,213	639,781	14,126	10,296,592	10,573,218	94,566,131
7	731,400	97,755	65,891	849,426	30,226	514,830	1,908,755	60,317,366
8	486,381	50,372	113,586	921,716	18,227	1,287,074	2,402,029	51,942,732
9	588,777	158,503	175,628	607,249	21,113	2,059,318	1,458,375	58,528,300
Rest of state	299,874	104,040	108,678	90,365	14,272	3,088,978	2,637,943	27,792,649
State total	3,660,657	698,929	953,598	3,614,578	151,733	25,741,480	21,446,689	361,755,948

Table G. Projected livestock production and in-district corn use for 1985

District	Beef Feeders	Cows	Dairy cows	All hogs	Sheep & lambs	Turkeys	Chickens	Estimated in-district corn use (bu.)
1	290,000	113,010	62,062	70,426	28,097	2,550,593	1,135,016	23,500,567
4	596,463	109,893	114,540	477,534	17,739	6,801,581	1,424,333	51,854,065
5	849,755	98,202	310,213	692,525	12,042	11,335,968	10,971,819	101,653,518
7	817,072	109,113	65,861	919,454	25,767	566,798	1,980,714	66,250,135
8	543,353	56,895	113,586	997,705	15,538	1,416,996	2,482,584	56,384,324
9	657,743	176,919	175,628	657,311	17,998	2,267,194	1,513,354	63,409,823
Rest of state	334,999	116,128	108,678	27,388	12,131	2,890,672	2,737,391	29,106,244
State total	4,089,445	780,160	953,598	3,842,343	129,312	27,829,802	22,245,211	392,158,676

Table H. Feeding ratios used to compute in-district consumption of corn

Type of livestock	Bushels consumed annually
Beef feeders	56.0 (assumes corn plus small grain feeding. corn only 76.45 bu.)
Beef cow	6.6 (assumes 50-50 mixed corn and small grains. Corn only 8.7 bu.)
Dairy cows	73.9—southern districts Nos. 5,7,8,9
	32.43—northern districts Nos. 1,2,3,4,6 (assumes small grain feed to 34.54 bu. corn equivalent)
All hogs	13.38
Sheep and lambs	4.5
Turkeys	0.9
Chicken	1.0

Equations

Yield

$$Y_{ij} = a + bT$$

Where Y_{ij} is yield in county i of grain j . T is year. A sample of years 1960 through 1975 were used for O.L.S. regression projections. Maximum future yields were imposed as a constraint preventing extreme extrapolations.

Two separate projections were run, one dropping two years when yields were extremely low, the other dropping two years when yields were extremely high.

Acres

$$A_{ij} = a + bT$$

Where A_{ij} is acres planted in county i of grain j . Acreage planting projections were constrained by:

$$\sum_{j=1}^n EA_{ij} \leq cLi$$

Where Li is the total land in farms in county i such that the sum of acres planted to all five grains in any

county cannot exceed a specified percentage (c) of land in farms for that county.

Grain projections were checked by adopting techniques used at Iowa State University for a similar study in Iowa. Minnesota's share of U.S. projected production was determined by using a nonlinear trend. Then county shares were determined for the projected state production in the same way. The results from using this method were nearly identical to the results obtained using time trend projections.

Livestock Production

Minnesota's share of U.S. livestock production was computed as:

$$Msh_{kt} = \frac{MP_{kt}}{US P_{kt}}$$

Then Minnesota's share was projected by a nonlinear trend to 1980 and 1985:

$$MSh_{kt} = tB$$

The projected share of livestock production for each district was determined in the same way for Minnesota's share of projected U.S. production.

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