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Grain Elevators of South Dakota and Associated Farm Supply Businesses: Some Factors Affecting Their Growth and Future Prospects

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Grain Elevators of South Dakota

and Associated Farm Supply Businesses

Some Factors Affecting
Their Growth and Future Prospects

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Grain Elevators of South Dakota

(and Associated Farm Supply Businesses)

Some Factors Affecting Their Growth and Future Prospects

By Arthur B. Sogn, Albert E. Raeder and Mark J. Powers*

INTRODUCTION

Larger, more mechanized elevator operations have been replacing smaller, less efficient elevator businesses in South Dakota and the trend is expected to continue.

The 1968 Directory of the South Dakota Grain Elevators indicates a loss of 83 elevators from 1960—the 1960 directory lists 533 elevator companies in 368 locations and by the end of 1968 there were only 450 companies in 345 locations.¹

Some elevators are keeping up with this rapidly changing industry, while others have failed to adopt and implement new ideas that would keep them competitive with profitable operations. Elevators with less than 100,000 bushels of storage capacity have experienced the greatest decline.

The purpose of this study is to explore some of the characteristics of the South Dakota grain elevator and farm supply industry and to identify factors affecting the growth or survival of an elevator. It is possible by utilizing known economies of volume through their marketing systems, South Dakota producers could realize a savings of at least \$19 million annually.

This publication uses the term "elevator" to signify all facilities and businesses that operate under one management either as a grain elevator company or as a combined grain elevator and farm supply business.

The sale of farm supplies has grown very rapidly in this country and a large number of grain elevators have found it profitable to handle farm supplies in addition to their grain business. Farm supply sales are where much of the business volume increases for South Dakota elevators have come in recent years. Cost of purchased U. S. farm production items, except labor, farm real estate and machinery, rose 36.8% in the 10-year period from 1958 to 1968.² During the same 10-year period, South Dakota farm production expenses rose 75.7%.³ These rapid increases reflect inflation in part, but they also involve the purchase of more services and increased use of production items.

For example, the sale of fertilizer materials which play an important part in the farm supply department of many elevators increased by 127% in this decade.⁴

One of the major adjustments which grain elevators in South Dakota face is the continued decline in the number of farms and farmers. At the same time, an increased demand is anticipated for farm supplies and services, especially for some of the newer goods and services, including automated record keeping, technical information and equipment in the fields of irrigation, chemical agriculture and soil treatment.

A second adjustment facing the elevator industry arises from the decline of Commodity Credit Corporation storage income in recent years, which has resulted in income reductions in the face of increasing operating costs. Some of these elevators experienced decreases in net income, while others managed to retain their previous net income level, despite the lack of volume growth.

A third adjustment facing the grain elevator industry is related to the threat of competition by one-stop farm service shopping centers. Entrepreneurs have considered plans to build a number of these centers across the Midwest. Should these service centers materialize, the grain elevator businesses undoubtedly will face intense competition. The older, less efficient, less convenient facilities would find it difficult to compete. Only the most efficient, most conveniently located elevator businesses would survive and, as a result, they probably would become very similar to the one-stop farm service centers.

*Respectively, research economist, graduate research assistant, associate professor of economics at South Dakota State University. Some of the information in this bulletin is derived from "Some Factors Affecting the Growth of Grain Elevators in South Dakota," unpublished manuscript thesis by Albert E. Raeder, SDSU, December 1969.

¹Farmers Elevator Association of South Dakota, *1960 Directory of the South Dakota Grain Elevators*, Aberdeen, S. D.

²U. S. Department of Agriculture, *Handbook of Agricultural Charts*, 1968, Agriculture Handbook No. 359, November 1968.

³South Dakota Crop and Livestock Reporting Service, *South Dakota Agriculture, 1958*, p. 50, and *South Dakota Agriculture, 1968*, p. 58, Sioux Falls, S. D.

⁴U. S. Department of Agriculture, loc. cit.

Table 1. Change in Storage Capacity of South Dakota Elevators from 1963 to 1968*

Bushels	Number in 1963	Number in 1968	Per Cent Change of the Number of Elevators
50,000 or under	89	60	-33%
51,000 to 100,000	131	123	-6%
101,000 to 150,000	93	95	+2%
151,000 to 200,000	69	70	+1%
201,000 to 300,000	58	60	+3%
301,000 to 400,000	24	35	+46%
401,000 to 500,000	12	7	-42%
over 500,000	14	16	+14%
Totals	490	466†	-5%

*South Dakota Elevators Licensed by the Public Utilities Commission to do Business in South Dakota for the Years 1963 and 1968.

†This number represents the bonafide grain elevators operating at the beginning of 1968. By the end of 1968, 16 of these elevators discontinued their operation. Therefore, throughout the remainder of this study the total number of operating grain elevators in South Dakota for 1968 will be indicated as 450.

STRUCTURAL CHARACTERISTICS OF GRAIN ELEVATORS

Number, Size and Location of Elevators

Approximately 150 million bushels of grain are marketed annually by farmers to South Dakota elevators. The 450 elevators in the state range in size from 10,000- to 1,246,750-bushel capacities (data in Table 1 shows the changes in the number of elevators in the different size categories from 1963 to 1968). More than half of all the elevators were below the 150,000-bushel capacity in both 1963 and 1968. The smallest elevators, those with 50,000 bushel capacities or less, showed the largest decline, a reduction from 89 to 60 during the five-year period. This decrease could have been due to the merging of small elevators with other elevators or other area elevators absorbing the business of discontinued elevators. At any rate, many of the existing elevators are larger.

The 42% decrease, shown by the group of elevators with 401,000- to 500,000-bushel capacities, represented the largest percentage decrease for the firms grouped by volume. However, this was a numerical reduction of only five elevators—in 1963 there were 12, while in 1968 the count was seven elevators with this volume. A sharp decrease in CCC storage payments, causing the abandonment of older, temporary structures could have accounted for the change.

The largest percentage increases—46%—was shown by the 301,000- to 400,000-bushel elevator grouping. Many of these elevators also may have seen growth during the survey period through merger or consolidation. The net result of all the business adjustments is a 5% decrease in the total number of elevators of all sizes.

Reduced income from the CCC is one of the basic reasons for readjustments in capacity and numbers of South Dakota grain elevators. Commodity loans made for all of the United States during the fiscal year 1963 totaled \$3.1 billion. In each of the following fiscal years, loans continued to be decreased to the point that by 1967 commodity loans totaled only \$1.4 billion.⁵ Storage and handling expenses paid by the CCC during this period decreased from \$380 million to \$150 million.⁶

Innovations in transportation are likely to continue and perhaps accelerate the trend toward even fewer and larger elevators. Some of the innovations used in some states include unit trains, multi-car shipments, use of sealed containers, barges, and guaranteed annual volume from a single shipping point. All of these require large volumes of grain to be shipped from one point. Also the Grain Standards Act of 1968 permits interstate transactions of grain without inspection. If the elevator operators choose, they also can sell direct to a buyer, merchandiser, or exporter, by-passing the services of a terminal elevator. The Grain Standards Act allows the grade of the grain to be determined more quickly because official inspectors can be located in the country elevators.⁷ Thus, if both the buyer and the seller agree, grain can be merchandised on sample or on mutual trust without inspection.

Ownership Patterns

Slightly less than half of the 450 operating elevators were organized as cooperatives, while the rest were independently owned. Table 2 indicates that about equal proportions of the elevators were locally owned and about twice as many were line independents as opposed to line cooperatives (a line independent is an independently owned elevator whose central office operates as a commission merchant buying and selling for other elevators as well as maintaining local ownership of elevators).

Concentration of Ownership

The 450 elevators operating at the end of 1968 were owned by 264 elevator companies, many of which had multiple locations for their elevators. Thirty-six (or 13.6%) of the elevator companies owned 186 (or 41.3%) of the elevators (See Table 3).

⁵U. S. Department of Agriculture, *Commodity Credit Corporation Charts*, Washington, D. C., March 1968, p. 12.

⁶*Ibid.*, p. 14.

⁷David M. Pettus, "The New Grain Standards Acts," *Consolidated Grain and Feed Journals*, (October, 1968), p. 13.

Location Patterns and Trade Areas

Figure 1 (showing the location of elevators which served South Dakota in 1968) indicates that the number of elevators in a county tends to vary directly with the amount of marketable grain produced in that county. For example, Brown County, which has the largest volume of grain available for marketing, also has the largest number of elevators. Five counties in South Dakota have no elevators, four of which are in the western part of the state. Four other counties in western South Dakota have only one elevator per county.

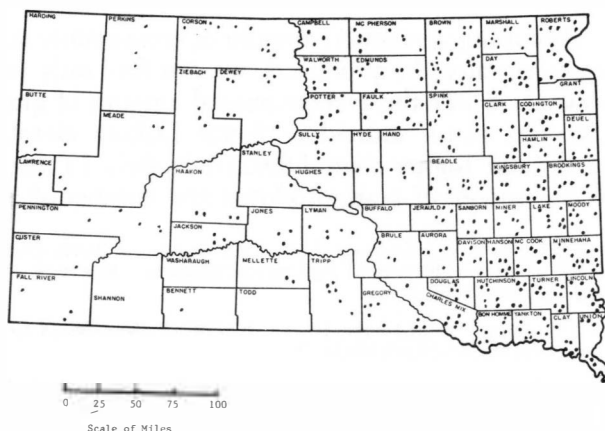
Table 2. Dispersion of Ownership among Elevators

Ownership Category	Per Cent
Local Cooperative	42.8%
Line Cooperative	4.9%
Local Independent	43.6%
Line Independent	8.7%
Total	100.0%

Table 3. South Dakota Elevator Companies with Multiple Locations, 1968

Number of Locations per Elevator Company	Number of Companies	Number of Elevator Sites
2	19	38
3	5	15
4	3	12
9	3	27
10	1	10
11	1	11
15	1	15
16	1	16
19	1	19
23	1	23
Total	36	186

Figure 1. Location of elevators in South Dakota, 1968.



GENERAL CHARACTERISTICS OF THE SAMPLE STUDIED

Two hundred and nineteen of the 476 elevators polled in South Dakota returned the questionnaire sent in 1968. Usefulness of their responses varies; therefore, the number of elevators in the following tables also varies. The sample was assumed to be representative because size and location characteristics of the elevators in the sample were proportionate and similar to the total population.

Trade Areas

Trade areas were determined from data obtained from elevator managers who made estimates of the radius of the area their firm served (Figure 2 shows much over-lapping for 204 elevators studied). Where the production is high, several elevators usually serve the same area, suggesting that perhaps some areas could be served by fewer elevators without increasing the producer commuting distance.

The most common trade area radius for elevators was from six to 10 miles; the smallest four miles; and the largest 150 miles (Table 4 shows trade area radii).

Table 4. Radius of Business for South Dakota Elevators Studied, 1968

Miles	Number of Elevators
1 to 5	7
6 to 10	59
11 to 15	42
16 to 20	33
21 to 50	51
51 to 100	11
over 100	1
Total	204

Figure 2. Trade areas for South Dakota elevators studied, 1968.

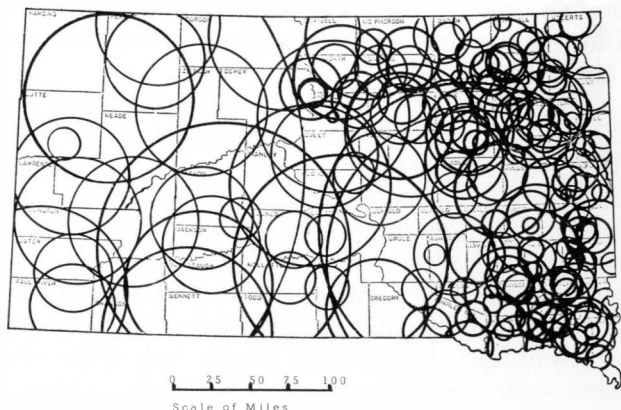
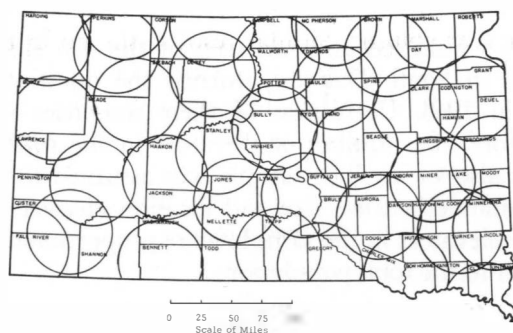


Figure 3. Location and trade areas of elevators needed to serve South Dakota, assuming 32.4-mile trade area radius.*



*All trade areas shown had operating grain elevators in 1968 except the area encircling Harding County.

Thirty per cent of the elevators in the sample had a radius greater than 20 miles. Often elevators in western South Dakota had a larger trade area radius than elevators in the eastern part of the state, because production density is usually less in the western counties.

The majority of the elevators responding did not experience a change in trade area radius during the five-year period (Table 5 shows the changes for 204 elevators from 1963 to 1968). None of the elevator managers reported a decrease in the radius of their business, but there were several increases, most of them from one to five miles. Seventeen of the elevators reported increases of over 10 miles in business radius. One reason for the increase is that better roads and larger trucks allowed farmers to haul grain greater distances. Another reason is that in a few cases fewer elevators served the area.

Should present trends continue, South Dakota probably will be served by fewer but larger elevators in the future. For the sake of experimentation, the average radius for the 18 largest respondent elevators in the state was determined (32.4 miles), then this average was extrapolated to show how many elevators might serve the state if they were all this size. Large elevators in this example were arbitrarily defined as those having a storage capacity of at least 300,000 bushels or more than a \$1 million volume per year (the volume includes both grain merchandised and farm supplies sold).

The result of the extrapolation is a conclusion that 34 existing elevators could possibly serve the state. This conclusion, however does not take into account other factors such as the transportation system or the capacity of the existing elevators; it was only concerned with radii (Figure 3 shows the number and current location of elevators needed to serve South Dakota if: (a) Overlapping of trade areas among elevators were minimized, and (b) If all elevators in the state had a trade area radius equal to the average radius of the large elevators).

Table 5. Increase in Radius of Business from 1963 to 1968 for South Dakota Elevators Studied

Miles	Number of Elevators
0	114
1 to 5	47
6 to 10	26
11 to 15	4
16 to 20	1
21 to 50	8
51 to 100	4
Over 100	0
Total	204

It is not anticipated that such a system, with so few elevators emerging in the near future, will occur, but the data does suggest that, indeed, far fewer elevators could serve the state.

Nevertheless, consolidation of many elevators might result in operational efficiencies. Storage and handling cost studies at North Dakota State University,⁸ as well as work done at Ohio State University⁹ and Montana State University¹⁰ indicate that a minimum annual volume of 1,000,000 bushels is needed before unit costs can be reduced to a level where charges for performing the functions of storage and merchandising will be attractive to farmers and still provide a profit for the elevators. These same data should be applicable to South Dakota.

Volume in Bushels

The North Dakota study indicated that operating costs would be reduced from almost 15 cents per bushel in an elevator handling 100,000 bushels per year down to about 4 cents per bushel in an elevator handling 750,000 bushels annually. Although the cost levels were slightly different in the Ohio study, the same relationships held. Furthermore, the Ohio study indicated that unit costs would continue to decrease as annual volume increased to 2,500,000 bushels. Only 11 elevators in South Dakota handled more than 1,000,000 bushels of grain in 1968; the largest handling 2,378,000 bushels (See Table 6).

Assuming a balanced amount of cross-county selling to elevators by producers, we can find only two instances where the average annual amount of grain available, to an individual South Dakota elevator would run higher than 1,000,000 bushels (Table 7 shows amount of grain produced and number of ele-

⁸Hemphill, P. V. and Anderson, F. G., "An Analysis of North Dakota Cooperative Grain Elevators," Agricultural Economics Report No. 50, August, 1966, Fargo, N. D.

⁹John W. Sharp, "Need Larger, Efficient Elevators," *Consolidated Grain and Feed Journals*, (March 1968), 18.

¹⁰Trock, Warren L. *Trends and Prospective Developments in Grain Elevator Operations*, Montana Agricultural Experiment Station, Bulletin 596, April 1965.

vators in each county and amount of grain available, while Table 8 shows production by county for eight major crops).

Table 6. Amount of Grain Handled by South Dakota Elevators, 1968

Bushels Handled	Number of Elevators
100,000 or under	22
101,000 to 200,000	29
201,000 to 300,000	33
301,000 to 400,000	34
401,000 to 500,000	17
501,000 to 1,000,000	59
over 1,000,000	11
Total	205

Table 7. Average Annual Amount of Grain Available to South Dakota Elevators, by Counties, 1964 to 1967*

County	Total Bushels of Corn, Wheat, Oats, Barley, Rye, Flax, Soybeans and Sorghum Available for Marketing	Number of Grain Elevators in County	Amount of Grain Available to Each Elevator in Bushels†
Brown	8,934,111	29	308,072
Spink	6,775,176	18	376,398
Day	4,883,217	14	348,801
Roberts	4,756,956	13	365,919
Minnehaha	4,738,202	16	296,137
Turner	4,120,911	12	343,409
Lincoln	4,101,747	9	455,749
Brookings	3,692,290	10	369,229
Union	3,655,094	6	609,182
Edmunds	3,616,460	10	361,640
Clark	3,487,444	9	387,493
Moody	3,368,004	9	481,143
Hutchinson	3,341,883	7	278,490
Tripp	3,307,644	6	551,274
Sully	3,254,860	5	650,972
Kingsbury	3,203,414	13	246,416
Marshall	3,155,613	10	315,561
Grant	3,109,365	5	621,873
Clay	3,103,993	5	620,798
Lyman	3,074,174	5	614,834
Codington	3,057,225	12	254,768
Faulk	3,014,667	14	215,333
Beadle	2,856,951	13	219,765
Yankton	2,849,416	9	316,601
Potter	2,801,072	7	400,153
Hamlin	2,791,469	7	398,781
Deuel	2,788,860	9	309,873
Perkins	2,696,886	3	898,962
Charles Mix	2,687,580	8	335,947
McPherson	2,652,187	9	294,687
Walworth	2,558,555	9	284,283
Bon Homme	2,514,088	8	314,261
Corson	2,500,446	9	277,827
Lake	2,475,340	8	309,417

*South Dakota Crop and Livestock Reporting Service, 1964, 1965, 1966, and 1967; Sioux Falls, S. D.

†The methods used in calculating the amount of grain available for marketing in each county was the same as that used by the U. S. Department of Commerce, Bureau of the Census in their calculations. The

There are 29 elevators in Brown County, but only nine elevators would be required if each elevator in Brown County reached the minimum 1,000,000 bushel per year volume. Similar results (shown in Figure 4) hold true for many other counties in South Dakota, perhaps indicating that there are too many elevators for the amount of grain available. On this assumption, perhaps significant efficiencies could be achieved by marketing grain through fewer but larger elevators.

Growth Rates

A growing and expanding elevator industry is important to customers, owners, managers and the community. People who do business with the elevator want continuous and improved service which can be assured only through continuous growth of the business. Owners and managers desire growth as a

County	Total Bushels of Corn, Wheat, Oats, Barley, Rye, Flax, Soybeans and Sorghum Available for Marketing	Number of Grain Elevators in County	Amount of Grain Available to Each Elevator in Bushels†
McCook	2,466,051	9	274,005
Hand	2,343,690	5	468,738
Campbell	2,197,061	3	732,353
Meade	1,698,947	4	424,736
Bennett	1,692,867	1	1,692,867
Hanson	1,509,529	7	215,647
Pennington	1,500,162	5	300,032
Gregory	1,499,268	8	187,408
Jones	1,485,750	3	495,250
Miner	1,446,681	6	241,113
Hughes	1,421,932	3	473,977
Haakon	1,416,987	4	354,246
Aurora	1,276,432	5	255,286
Davison	1,245,424	6	207,570
Dewey	1,266,213	8	158,276
Brule	1,113,722	3	371,240
Stanley	1,040,995	1	1,040,995
Douglas	987,727	5	197,545
Sanborn	890,417	5	178,083
Jerauld	819,927	4	204,981
Mellette	806,372	2	403,186
Shannon	754,135	0	0
Harding	723,146	0	0
Ziebach	678,058	3	226,019
Washabaugh	621,461	0	0
Fall River	559,497	2	279,748
Hyde	557,074	3	185,691
Butte	546,840	3	182,280
Jackson	455,246	4	113,811
Todd	429,657	0	0
Buffalo	272,185	0	0
Lawrence	146,070	1	146,070
Custer	88,911	1	88,911

total production of each type of grain was multiplied by the following percentages:

Corn	40%	Barley	58%	Soybeans ..	96%
Wheat	96%	Rye	95%	Sorghum ..	45%
Oats	35%	Flax	96%		

Table 8. Production by County for Eight Major Crops* (in thousands of bushels)

County	Total Production 4-year ave. (1964- 1967)	Rank	Corn	Wheat	Oats	Barley	Rye	Flax	Soybeans	Sorghum
District I										
Butte	1090	56	462	187	320	114	1			6
Corson	3487	38	99	1900	1187	177	26	96		2
Dewey	1854	50	99	954	703	75	12	10		1
Harding	966	57	7	582	264	101	6	5		1
Perkins	3411	39	62	2330	716	279	13	10		1
Ziebach	974	60	6	568	251	57	1	8		2
District II										
Brown	15,525	1	4037	3730	4842	1949	474	473		20
Campbell	3437	40	335	1453	1411	140	23	74		1
Edmunds	5709	24	407	1891	2528	230	526	122		5
Faulk	4933	28	743	1364	2003	182	608	17		16
McPherson	4397	31	268	1294	2150	276	183	224		2
Potter	4669	30	1133	1633	1599	184	89	29		2
Spink	10,599	3	2718	4069	2281	586	376	51		528
Walworth	3844	34	498	1716	1149	398	20	61		2
District III										
Clark	6357	16	1503	1165	2679	317	250	403		40
Codington	5802	23	639	625	3264	421	244	591	13	5
Day	8314	9	945	1758	3442	1223	269	670	2	5
Deuel	6109	19	1841	103	3260	141	73	565	121	5
Grant	6459	15	2030	345	3093	168	246	482	91	4
Hamlin	5955	21	1870	235	2981	139	82	600	37	11
Marshall	5367	27	1366	1183	1549	745	159	348	15	2
Roberts	8699	6	2376	994	3535	270	342	801	378	3
District IV										
Haakon	1885	52	78	1135	398	253	2			19
Jackson	594	64	5	374	132	74	2			7
Lawrence	242	66	22	86	102	30	1			1
Meade	2287	45	48	1391	648	183	8			9
Pennington	1859	49	43	1337	343	122	2	1		11
Stanley	1356	54	50	879	292	79	4	4		48
District V										
Aurora	2999	43	1074	149	1308	157	30	1		280
Beadle	5593	25	1304	1080	2494	182	151	11		371
Brule	2389	44	907	261	855	83	49	1		233
Buffalo	532	65	117	100	212	42	6	2		53
Hand	4186	32	1012	1121	1672	133	166	10		72
Hughes	2159	47	316	1012	687	28	52	15		49
Hyde	958	58	99	296	449	61	32	4		17
Jerauld	1658	53	506	273	646	85	25	1		122
Sully	4866	29	878	2368	1464	69	58	20		9
District VI										
Brookings	8565	7	3665	70	3922	201	40	447	203	17
Davison	3134	42	1130	36	1482	55	22		5	404
Hanson	3818	35	1615	19	1776	76	37	1	23	271
Kingsbury	6830	12	2518	441	2930	358	89	426	31	37
Lake	6175	18	2982	32	2790	162	6	13	152	38
McCook	6280	17	3275	10	2665	75	9	6	94	146
Miner	3573	36	1162	76	1949	144	32	20	17	173
Minnehaha	11,381	2	7621	2	3073	71	1	11	567	35
Moody	7712	11	4846	6	2129	42	8	181	485	15
Sanborn	2184	46	1023	45	890	35	35		4	152
District VII										
Bennett	1994	48	20	1558	293	78	42	1		2
Custer	164	67	40	39	66	12	4			3
Fall River	846	61	234	372	142	87	6			5
Shannon	908	59	16	671	140	59	21			1
Washabaugh	712	63	2	582	62	61	3			2
District VIII										
Gregory	3367	41	1204	332	1447	95	14			275
Jones	1771	52	19	1384	260	49	7	1		51
Lyman	4119	33	193	2454	680	92	65	5		630
Mellette	1100	55	55	640	257	76	7			65
Todd	729	62	128	231	262	65	16			27
Tripp	5430	26	794	2000	1626	187	45			777
District IX										
Bon Homme	5978	20	3558	40	1480	19	2		248	631
Charles Mix	5849	22	1637	476	1642	135	37		45	1875
Clay	6793	14	4762	38	917	12	1		696	367
Douglas	3563	37	1468	58	1468	45	9		9	506
Hutchinson	8324	8	4457	52	2904	46	19	1	131	714
Lincoln	9334	5	6513	3	1899	12	1	2	808	96
Turner	9709	4	6335	10	2538	21	2		611	192
Union	7945	10	6052	78	885	8	1		843	78
Yankton	6811	13	4457	18	1645	18	3		310	360

*South Dakota Crop and Livestock Reporting Service, 1964, 1965, 1966, and 1967; Sioux Falls, S. D.

means of assuring a continual return on investment. Local communities desire growth of an elevator because of the jobs provided and the value of the business activity in the community.

The growth rates of elevators in South Dakota for the five-year period showed much variation, ranging from a loss of -42% to a growth of 63%.¹¹ Thirty-four elevators showed a zero or negative rate of growth, while 30 elevators had a growth rate of over 90% from 1963 to 1968 (See Table 9).

The percentage change in gross volume for both the farm supply, service departments and grain merchandising departments of elevators was used as the indicator of growth. On this basis, the study employs three categories of growth rates: (1) Rapidly growing, (2) Slowly growing, and (3) Declining.

A rapidly growing elevator for the purpose of this study is regarded as one with a growth rate for the five-year period of over 30%; a slowly growing elevator had a growth rate from 1 to 30%; and a declining elevator had a growth rate of zero or less (Table 10 shows these growth rates by department for the elevators studied).

The study reveals that much of the growth in grain elevators during the five-year study period occurred in the farm supply and service departments. More than 50% of the farm supply and service departments evidenced rapid growth. Firms classified as slowly growing showed about equal growth rates for both the grain and farm supply and farm service departments. Decline occurred twice as often in grain merchandising departments as it did in farm supply-service departments.

The goods and services offered for sale by an elevator help to determine the volume of business. Some products may be in greater demand than others. Some elevators are quicker to adopt and offer new products and services to their customers. The growth rate for elevators was compared to types of goods and services offered by elevators to test validity of the assumption that types of products offered may influence growth. A chi-square statistical test was used. Twenty-three different goods and services were tested.

Results of these tests (Shown in Table 11) indicate a strong relationship between elevators with a high growth rate (30% or above from 1963 to 1968) and the sale of bulk fertilizer, liquid feed, and the services of fertilizer specialists and farm mapping. A somewhat weaker but still strong relationship was shown between high growth rates and such goods and services as seed cleaning, bagged fertilizer, anhydrous fertilizer, and record keeping for customers. Though no significant relationship was found between growth rate and the rest of the goods and services tested, it does not mean that these goods or services were unimportant to the total business.

Table 9. Growth Rate* for South Dakota Elevators from 1963 to 1968

Per Cent Growth	Number of Elevators
Less than -50%	0
-49% to -25%	9
-24% to 0%	25
1% to 15%	22
16% to 30%	15
31% to 45%	18
46% to 60%	26
61% to 75%	23
76% to 90%	8
91% to 105%	7
106% to 125%	3
126% to 150%	4
over 150%	16
Total	155

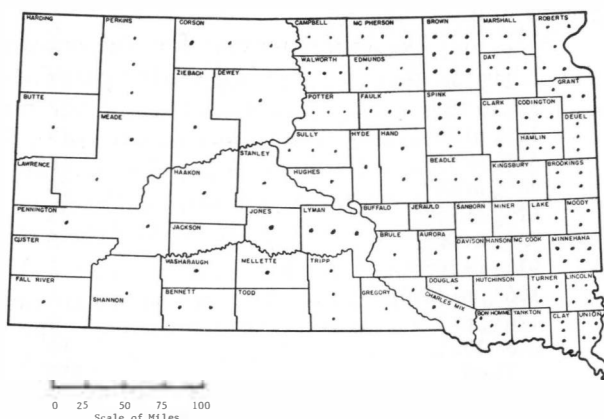
*Growth rate is the percentage change in gross volume of business in dollars based on 1958 dollars.

Table 10. Growth Rates of Farm Supply and Service Departments and Grain Merchandising Departments for South Dakota Elevators, 1962 to 1968

Growth Rates in Per Cent	Number of Farm Supply and Service Departments Rapidly Growing	Number of Grain Merchandising Departments Rapidly Growing
Over 700	3	0
601 to 700	1	0
501 to 600	0	0
401 to 500	1	0
351 to 400	6	0
301 to 350	2	0
251 to 300	1	0
201 to 250	3	1
176 to 200	5	3
151 to 175	4	1
126 to 150	2	4
101 to 125	4	3
91 to 100	4	2
81 to 90	1	5
71 to 80	4	1
61 to 70	2	3
51 to 60	6	6
41 to 50	10	9
31 to 40	8	6
Total	67	44
	Slowly Growing	Slowly Growing
26 to 30	10	7
21 to 25	13	3
16 to 20	7	10
11 to 15	10	10
6 to 10	4	6
1 to 5	4	9
Total	48	45
	Declining Growth	Declining Growth
-14 to 0	11	24
-24 to -15	6	10
-49 to -25	2	15
-99 to -50	6	2
Less than -100	0	0
Total	25	51

¹¹The growth rate was defined as the percentage change in gross dollar volume (deflated) from 1963 to 1968. Gross dollar volume is the sum of grain merchandised and farm supplies sold.

Figure 4. Location of elevators needed to serve South Dakota, assuming one million bushels of marketable grain available to each elevator.



The test results have important implications. First, goods and services most closely related to growth are of a technical nature and of recent vintage. For example, a decade ago very few elevators in the United States offered the services of a fertilizer specialist or handled bulk fertilizer. Only in the last few years has liquid feed been in demand by farmers. Generally, when a new product or service is offered for sale in an area, the price is set high enough to provide a relatively high profit margin on it. Often the product or service adds more per unit sold to total profit than do many other items. Therefore these products contribute more toward growth than do some old-line products. The elevators that offer newer, technical products build an image of progressiveness, thereby attracting more customers which aid in building volume and growth.

Second, the test results may imply that the progressiveness and ability of a manager may be measured by his willingness to adopt new products and innovations. Therefore a relevant criteria for selecting a good manager who can generate increased volume might be his willingness and ability to identify and sell those goods and services that represent significant new innovations.

EFFECT OF SOME OPERATING POLICIES ON GROWTH

The necessity of granting credit and keeping accurate records is more important today than ever before. When elevator managers were asked what their major problems were, the most frequent answer concerned credit. Elevator operators explained that it often was difficult to provide customers the large amount of credit they needed. Some elevators indicated difficulties in collecting accounts receivable.

Although the elevators were not extending credit for any longer period in 1968 than they did in 1963, there were some significant changes in the number of

businesses asking for an interest or service charge on accounts. Only six elevators asked a service or interest charge in 1963 on accounts of less than 30 days. By 1968, 13 elevators were doing so. Forty-four elevators charged interest or service charges on accounts of more than 30 days in 1963; by 1968, 137 elevators asked such a charge. There also was a great increase in long-term full-season financing and bank note financing; elevators that offered full season financing in 1963 numbered 27, and in 1968 this increased to 43. Similarly the number of elevators offering bank note financing increased from 22 to 60 (See Table 12).

Granting credit up to 90 days was the most popular length of time for the elevators studied. The proportion that granted no credit and that granted credit up to 30, 60, and 90 days did not change significantly between 1963 and 1968. It is important to note, however, that a small number of the elevators studied still do not grant any credit.

Part of the reason for the increase in the number of elevators charging an interest or service charge is due to increased demand for credit by farmers who are buying increasingly larger amounts of farm supplies. Elevator managers, finding that cost of borrowing money has increased as interest rates increased, have compensated for this business expense by adding service and interest charges. Elevator managers have added the full season and bank note financing primarily as a means of attracting and keeping customers.

Table 11. Relationship Between Growth and Product Mix of South Dakota Elevators, 1968

Goods or Services Tested	Relationship between Goods or Services Sold and Growth Rate
Seed cleaning.....	Moderate
Feed grinding.....	No relationship found
Bulk feed delivery.....	No relationship found
Grain and general trucking.....	No relationship found
Semi-trailer and long-distance hauling.....	No relationship found
Feed specialists.....	No relationship found
Fertilizer specialists.....	Strong
Farm mapping.....	Strong
On-the-farm costs for tires, batteries, and accessories.....	No relationship found
Employ full-time carpenters.....	No relationship found
Record keeping for customers.....	Weak
Radio dispatched trucks.....	No relationship found
Fertilizer-bagged.....	Moderate
Fertilizer-bulk.....	Strong
Fertilizer-liquid.....	No relationship found
Fertilizer-anhydrous.....	Moderate
Feed-bagged.....	No relationship found
Feed-liquid.....	Strong
Feed-bulk.....	No relationship found
Petroleum-bulk plant.....	No relationship found
Petroleum-retail station.....	No relationship found
Hardware goods, fencing, etc.....	No relationship found
Lumber.....	No relationship found

A good manager tries to determine those facets of his business that are growing and those that are not, along with the reasons for each. In recent years, more elevator managers have become better trained in business analysis. Some of them are now maintaining accounting records on a departmental basis. Elevators using departmental cost accounting in 1963 numbered only 30, but by 1968 the number had increased to 49, (a 63% increase—see Table 12).

Table 12. Summary of Some of the Operating Policies of 219 Elevators in South Dakota, 1963 and 1968

Operating Policy	Number of Elevators in 1963	Number of Elevators in 1968
No credit granted	13	9
Credit limit 30 days	24	35
Credit limit 60 days	51	57
Credit limit 90 days	70	75
Interest or service charge of accounts less than 30 days	6	13
Interest or service charge for accounts more than 30 days	44	137
Offer full season financing	27	43
Offer bank note financing	22	60
Departmental cost accounting	30	49

Cost accounting by departments provides the manager with an accurate appraisal of the contribution each department makes to total and net sales. This appraisal enables a manager to make more informed decisions on which areas of the business to expand or reduce. Cost accounting may also aid the manager in distributing available labor to receive maximum returns. In general, costs and time involved in setting up and maintaining an accounting system on a departmental basis are not great.

RELATIONSHIP BETWEEN SOME OF THE CREDIT POLICIES AND GROWTH

This study reveals that extension of credit beyond 30 days appears to deter growth by elevator companies. This relationship is quite strong in those companies extending credit beyond 60 days.

To determine the relationship between the credit policies followed by an elevator and the growth of the elevator, a chi-square statistical test was used (elevators were classified as rapidly growing, slowly growing, and declining—Table 13 shows the result of the test). The first three operating policies listed in the table concerns the length of time for which credit was granted. Only nine elevators from the sample granted no credit, thus most of the elevators are concerned with credit policies.

No significant relationship was found between granting credit for 30 days and the growth rate. However, there was a slight negative relationship between granting credit for 60 days and the growth rate, which might indicate that those elevators that granted cred-

it up to 60 days tend to be the ones that have a declining growth rate. There is a strong negative relationship between granting credit for 90 days and the growth rate.

There may be several reasons for this outcome. Those elevators that are extending credit up to 90 days may have a large portion of their assets in the form of accounts receivable. When their assets are in this form, they may not be able to make the investments which are important for their business. This may result in a slower growth rate, particularly if these alternative opportunities have high rates of return. Also, when credit is granted for a long period, it may mean that a large portion of the accounts receivable end up as uncollectable. This can be detrimental to any business and can reduce the growth rate. Large accounts receivable disturb the total cash position of a firm and circumscribe its ability to take advantages of cash discounts and other benefits of cash liquidity.

Table 13. Relationship Between Some Operating Policies and the Growth of South Dakota Elevators from 1963 to 1968

Operating Policy Tested	Relationship between Operating Policy and Growth Rate
Credit granted up to 30 days	No relationship found
Credit granted up to 60 days	Moderate negative relationship
Credit granted up to 90 days	Strong negative relationship
Interest or service charge for accounts of more than 30 days	No relationship found
Offer full-season financing	No relationship found
Offer bank note financing	Strong relationship
Departmental cost accounting	No relationship found

No relationship was found between charging an interest or a service charge for accounts of 30 days or more and the growth rate. Similarly, no relationship was found between offering full season financing and the growth of an elevator. However, a very strong relationship between bank note financing and the growth rate was found. There are several reasons for this result. When an elevator offers full season financing, it may have a large amount of its assets in the form of accounts receivable. The interest income the elevator is earning from the accounts receivable may not be competitive with the earnings that could be received by reinvesting the money in the elevator. On the other hand, bank note financing will allow an elevator to give a customer credit at a low cost to the elevator and it has the added advantage of freeing more funds for reinvestment in the business. This increase in investment may tend to cause an increase in the growth rate.

The use of departmental cost accounting was also compared to the growth rate. It was anticipated that if the elevator used departmental cost accounting, the manager would be able to make more accurate decisions and the result would be an increase in growth.

However, results of this test showed no significant relationship. It is assumed that cost accounting may have shown no significant relationship, because this type of accounting was employed in some instances to determine why their particular business was not growing as they thought it should.

TRANSPORTATION

The transportation system of South Dakota makes up an important part of the total effort to promote efficient and orderly grain marketing. Each year nearly 130 million bushels of grain are exported from this state. Nearly 85 million bushels of this grain are shipped by rail, and the remaining 45 million are shipped by truck. Transportation expenses are a significant part of total marketing expenses. As a large part of total marketing expenses, transportation costs offer one of the best sources of savings based on volume efficiencies.

When grain elevator managers were asked whether they preferred truck or rail transportation for shipment of their grain, assuming costs were the same, 124 said they preferred to ship by rail and 69 said they preferred to ship by truck (See Table 14).

No significant relationship was found between the type of transportation used and the growth rate of the elevator (See Table 15).

Table 14. Number of South Dakota Elevators that Prefer to Ship by Truck or Rail, 1968

Method of Shipment Preferred	Number of Elevators
Truck	69
Rail	124
Total	193

Table 15. Number of South Dakota Elevators that Ship Mostly by Truck or Mostly by Rail, 1968

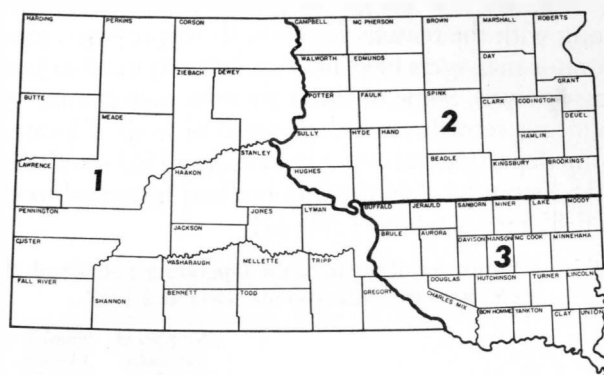
Growth Rate	Ship 80% or More by Truck	Ship 80% or More by Rail	Totals
Declining	7	12	19
Slowly Growing	6	8	14
Rapidly Growing	11	16	27
Totals	24	36	60

Table 16. Possible Savings for South Dakota Elevators from Multiple-Car Shipments, 1968

Location*	Bushels of Wheat Marketed	Average Transpor- tation Rate in Cents Per Bushel	Transportation Cost	Possible Savings
Western South Dakota	19,612,869	27.3	\$ 5,354,313.24	\$ 937,004.82
Southeastern South Dakota	1,710,680	19.2	\$ 328,450.56	\$ 57,478.85
Northeastern South Dakota	28,602,500	16.8	\$ 4,805,220.00	\$ 840,913.50
Totals	49,926,049		\$10,487,983.80	\$1,835,397.17

*See Figure 5 for a description of the areas studied.

Figure 5. Description of areas of South Dakota studied.



- 1 Western South Dakota
- 2 Northeast South Dakota
- 3 Southeast South Dakota

The Interstate Commerce Commission permitted the railroads to give reduced rates for shipment of grain in 1968, if there are economies of volume derived. This decision instigated several types of volume discounts for rail transportation such as, the rent-a-train, unit train, the hopper car, and five-car discounts as well as a discount for a certain guaranteed annual volume of shipments.

The five-car discount should be easily attainable for any part of South Dakota. The discount for a five-car unit shipment, offered by the Illinois Central Railroad, amounts to a savings of 17½%.¹² This discount was applied to the 1968 shipments of wheat from different areas of South Dakota to note possible savings (See Table 16).

ANTICIPATED GROWTH

The purpose of this part of the study was to determine the product mix of South Dakota elevators by the beginning of 1974. Elevators managers were asked on a questionnaire at the end of 1968 and beginning of 1969 which goods and services they then offered to their customers and the ones they planned on offering five years hence. Two hundred nineteen elevators were included in this sample (Results are presented in Table 17).

¹²John Ingram, *Proceedings of the Grain Marketing Sessions, Department of Agricultural Economics, University of Illinois, Urbana, January 31 and February 1, 1968.*

Table 17. Changes 219 South Dakota Elevator Managers Plan on Making by 1974

Good or Service	Number Currently Offering the Good or Service	Number Planning to Offer the Good or Serv- ice by 1974	Net Change
Seed cleaning (coarse grains).....	132	128	-4
Seed cleaning (fine seeds).....	41	40	-1
Seed treating (coarse grains).....	96	93	-3
Seed treating (fine seeds).....	24	31	+7
Soybeans inoculation.....	16	17	+1
Feed grinding.....	136	127	-9
Feed mixing.....	116	111	-5
Bulk feed delivery.....	115	116	+1
Mobile mills.....	39	38	-1
Grain and general trucking.....	46	43	-3
Livestock trucking.....	5	7	+2
Semi-trailer and long distance hauling.....	13	16	+3
Feed specialists.....	67	70	+3
Soil specialists.....	36	43	+7
Fertilizer specialists.....	62	66	+4
Chemical specialists.....	49	53	+4
Soil testing.....	96	93	-3
Farm mapping.....	15	24	+9
Custom crop spraying.....	29	39	+10
Custom livestock spraying.....	8	22	+14
Custom bin spraying.....	11	25	+14
Crop sprayers for rent.....	20	27	+7
On the farm service calls for TB&A.....	7	10	+3
Water system service.....	4	6	+2
Custom repair of any farm machinery.....	5	5	0
Employ full-time carpenters.....	7	9	+2
Custom painting service.....	3	9	+6
Record keeping for customers on all purchases and sales.....	79	75	-4
Performance record keeping for livestock and fertilizer.....	20	33	+13
Radio dispatched trucks.....	54	52	-2
Twine or rope.....	66	54	-12
Fertilizer-bagged.....	138	117	-21
Fertilizer-bulk.....	102	106	+4
Fertilizer-liquid.....	48	71	+23
Fertilizer-anhydrous.....	49	71	+22
Feed-bagged.....	180	167	-13
Feed-liquid.....	38	64	+26
Feed-bulk.....	146	142	-4
Ag chemicals (weed sprays).....	141	133	-8
Petroleum-bulk plant.....	22	23	+1
Petroleum-retail station.....	14	16	+2
Diesel fuel.....	19	20	+1
Propane gas.....	15	16	+1
Tires, batteries and accessories.....	23	24	+1
Hardware goods, fencing, etc.....	44	46	+2
Wagons.....	18	18	0
Grain drying systems.....	42	44	+2
Grain bins.....	47	48	+1
Water systems.....	11	13	+2
Water heaters.....	19	18	-1
Softener salt.....	149	136	-13
Self feeders or feed bunks.....	109	104	-5
Lumber.....	16	19	+3
Irrigation equipment.....	7	6	-1
Artificial insemination, semen or service.....	5	7	+2
Lawn and garden supplies.....	43	39	-4
Paint.....	31	31	0

Many of the older goods and services, such as seed cleaning and treating, feed grinding and mixing, twine or rope, and bagged fertilizer, probably will be sold by fewer grain elevators in the future. It appears that the demand for these goods and services is decreasing, because of many of the technological changes on farms and because other sources may be more convenient. An increasing number of farmers now have their own feed grinders and mixers and much of the fertilizer is handled in bulk.

Softener salt is one other item which probably will be sold by fewer elevators in the future. Thirteen elevators indicated they were going to discontinue this item and none of the elevators in the sample indicated that it planned to add it. One possible reason for discontinuation of softener salt is that other businesses are including softener salt in their product mix.

As might be expected, many of the technical or newer goods and services will be added to the product mix of grain elevators. Apparently many elevator managers realize they must continually improve their product mix if they intend to provide customers with top quality goods and services. Some of the newer goods and services that several elevator managers planned to add include liquid fertilizer, anhydrous fertilizer, liquid feed, and custom crop, livestock and bin spraying.

SUMMARY AND CONCLUSIONS

This study was undertaken to determine some of the characteristics which cause some elevators to grow and others to decline and to explore some of the changes occurring in South Dakota grain and farm supply businesses.

From an economic standpoint it is important that the grain and farm supply industry be made aware of these factors and stimulated to evaluate how to best utilize existing facilities and resources. This will allow firms to take maximum advantage of the savings.

(1) The number of grain elevators in South Dakota decreased from 533 to 450 between 1963 and 1968. This trend is expected to continue.

(2) As a group, the elevators with less than 100,000 bushels of storage capacity experienced the greatest decline in number. Many of these elevators may have consolidated with larger elevators.

(3) Much of the growth in the volume of business done by South Dakota elevators from 1963 to 1968 is attributable to increases in the farm supply business rather than to increases in the grain merchandising business.

(4) There is a direct relationship between the nature of the product mix and the growth of an elevator. Those elevators enjoying the greatest growth in volume of business were those that added recently developed goods and services of a technical nature.

(5) The extension of credit beyond 30 days appears to deter growth. This relationship is quite strong in those companies extending credit beyond 60 days.

(6) The innovations in transportation, currently in use in other states, could provide substantial savings to elevators in South Dakota.

(7) It appears that South Dakota has more elevators than is optimum from the standpoint of efficiency.

RECOMMENDATIONS

There appears to be three alternatives developed from this study of grain elevators:

1. The first alternative is to preserve as many of the present grain elevators as is possible by adding services to the existing businesses. This would be done, hoping the multi-business concept on a smaller scale will prove profitable. The preservation of smaller businesses in most cases would mean the producer would sell his produce for less and would pay more for his supplies. Perhaps there are instances where producers will accept comparative inefficiencies to preserve local service. Although the smaller business may survive, its competitive position in the domestic and world market will not improve, and in the long run both the farmer and the elevator will be at a competitive disadvantage.

2. The second alternative would be intensive research to look for yet unknown efficiencies in the present system. This is the normal process for managers and researchers to take in attacking short term problems; but this seems inadequate for the long term.

3. The third and most promising alternative appears to be the unification of present facilities into large complete farm marketing and farm supply businesses to take advantage of known efficiencies in this area. This unification needs to be done in such a way as to make the adjustments as smoothly as possible, in the least costly manner. However, it will take some time and probably will be accomplished most smoothly if the process goes through two phases.

Phase I might be the agreement of various businesses in an area to merge, unify, acquire or cooperate with each other to establish a larger, more economical business unit. Many of the facilities now in use could still be used in Phase I until such time as their economic value was nearly depleted. Towns could agree that

one would specialize in grain, another in feed, or in petroleum or fertilizer. It would be possible for companies to remain in Phase I for several years; even though this system would not offer maximum efficiency.

Phase II might develop gradually as old facilities wore out, or when new facilities were to be built they would be built at the most competitively advantageous site. Thus by utilizing efficiencies of volume, South Dakota could assume possible savings of at least \$19,600,000 per year (based on studies previously referred to from North Dakota, Ohio, and Montana).

This estimate is arrived at by assuming:

1. That volume efficiencies gained from larger size elevators would amount to at least two cents per bushel on 150,000,000 bushels.
($.02 \times 150,000,000 = \$3,000,000$)
2. A 17½% savings (about 2 cents per bushel) on transportation of the 130,000,000 bushels of grain shipped out of South Dakota annually.
($.02 \times 130,000,000 = \$2,600,000$)
3. A 2% savings from economies of size on \$700,000,000 annual cost of farm production expense in South Dakota.
($2\% \times 700,000,000 = \$14,000,000$)*

For a total annual savings of: **\$19,600,000**

Transportation is such an important part of future development of the grain and farm supply businesses that the plan outlined above and its advantages will not come to pass without some changes in the transportation system.

If the railroads are to offer the type of service the grain industry of South Dakota needs for the 1970's, some major changes must be made. Some of these changes are not wanted by many of the people of South Dakota, but there are few alternatives if we are to compete in the world markets with our products.

1. The railroad companies serving South Dakota must cooperate with each other so as to have a minimum of duplication in service to an area, and yet serve as much of every area of South Dakota as possible.
2. Branch line rail service that cannot generate enough business to pay the railroads for the service must be abandoned. If it is not self-supporting, it only adds to the cost of service elsewhere.

*In actual practice it should not be difficult for a large farm supply business to reap annual savings of at least 2% for purchasing in volume. Currently, they get a 20% savings on volume steel shipments and \$2-\$3 a ton on volume fertilizer purchases.

3. All rail lines serving South Dakota must be improved to have a rated carrying capacity of 263,000 pounds so as to accommodate the 200,000-pound load capacity hopper cars. Most new rail car construction is for hopper cars. If we do not have rails to accommodate them we would soon end up with the smaller, older cars which do not lend themselves to the efficiencies available in the transportation system and might result in the loss of some markets.
4. Railroads must offer the shippers some of the savings from loading a large volume of grain

from a desired point. These savings could be in the form of unit train discounts, five car shipments, large car savings or guaranteed annual volume discounts.

Certain changes must also be made to aid the trucking industry so that it can adequately serve the grain and farm supply industry. First, many of the advantages presently enjoyed by the rails must be available to the trucking industry. Secondly, changes in laws governing the weight and length of trucks must be made to accommodate larger vehicles; and third, there must be a system of all weather roads to all areas of the state.

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