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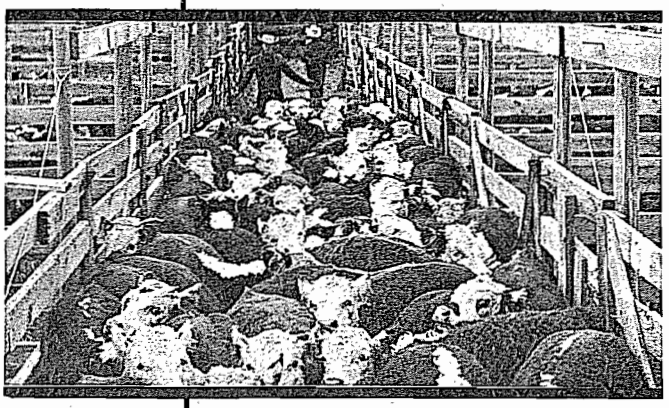

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Feasibility of Cooperatively Owned SLAUGHTERING PLANTS

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FARGO, NORTH DAKOTA

FEASIBILITY OF COOPERATIVELY OWNED SLAUGHTERING PLANTS

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In cooperation with
Farmer Cooperative Service, USDA
Washington, D.C.

January, 1965

FOREWORD

This technical assistance study was done in cooperation with the Farmer Cooperative Service, USDA, with contract funds from the Area Redevelopment Administration of the Department of Commerce. The results of this study are applicable on a statewide basis. Indian reservations were given consideration for the possible development of slaughter plants.

Initial interest in the feasibility of cooperatively owned slaughter plants was exhibited by grain and livestock producers and their organizations within the State. It has been a common practice for North Dakota farmers and ranchers to ship both feed and cattle out of the State. The development of additional feeding should provide more finished cattle for slaughterers in North Dakota. If feeding is economical, additional slaughter plants would increase the income of farmer feeders and provide additional employment.

Cooperative slaughter plants would be owned and operated by North Dakota producers and feeders and any margins accruing from the operations would be retained.

This publication deals only with slaughter plants. "Feasibility of Cooperatively Owned Feedlots," Agricultural Economics Report No. 36, was published in July, 1964.

TABLE OF CONTENTS

	Page
Purpose and Method of Study	3
Beef Consumption Requirements and Slaughter of Cattle in North Dakota	5
Feasibility of Additional Slaughtering Plants in North Dakota	11
Labor Requirements and Costs	14
Capital Requirements of Slaughtering Plants	18
Cost of Operation of Slaughtering Plants	22
Suggested Locations for Slaughtering Plants	25
Marketing of Beef	28
Cooperatively Owned Slaughtering Plants	30
Summary and Conclusions	34

LIST OF TABLES

Table		Page
1	Estimates of Population, by Areas, North Dakota, 1963 . . .	6
2	Consumption of Beef, by Areas, North Dakota, 1963	6
3	Consumption of Beef and Number of Cattle Adjusted for Farm Slaughter Required to Meet Consumption Needs, by Areas, North Dakota, 1963	7
4	Commercial Slaughter of Cattle, by Areas, North Dakota, 1963	8
5	Adjusted Commercial Slaughter of Cattle Available for Local Consumption, North Dakota, 1963	8
6	Comparison of Consumption Requirements and Slaughter Supplies Available for Local Consumption, by Areas, North Dakota, 1963	9
7	Projected Beef Consumption Requirements, by Areas, North Dakota, 1970	10
8	Comparison of Projected Consumption Requirements and Projected Slaughter Supplies Available for Local Consumption, by Areas, North Dakota, 1970	10
9	Labor Requirements and Costs: One-Bed Slaughter Plants With Capacities of 10 and 15 Cattle Per Hour, Respectively	16
10	Labor Requirements and Costs: Partly Automated On-the-rail Plants with Capacities of 20 and 30 Cattle Per Hour, Respectively	17
11	Capital Requirements of Beef Slaughtering Plants of Varying Capacities	19

Table		Page
12	Capital Requirements Per Head of Beef Slaughtering Plants of Varying Capacities	20
13	Capital Investment in Land, Buildings and Equipment, and Corral for Slaughtering Plants with Annual Capacities of 18,750 and 56,250 Head, Respectively	21
14	Operating Expenses Breakdown of Participating Companies, by Company Classification, 1963	23
15	Costs of Operation of Slaughtering Plants of Annual Capacities of 18,750 and 56,250 Head, Respectively	24
16	Earning Ratios of Food Processors, Chain Stores, and Meat Packing Companies, 1963	33

Appendix

1	Commercial Cattle and Calf Slaughter, North Dakota 1948-1963	38

LIST OF FIGURES

Figure		Page
1	Location of Slaughtering Plants in North Dakota	2
2	Area Designations for North Dakota Livestock Feedlot and Processing Study	4
3	Railroads in North Dakota	27

FEASIBILITY OF COOPERATIVELY OWNED SLAUGHTERING PLANTS[1]

Rex W. Cox and Fred R. Taylor[2]

This is the second of two reports which are primarily concerned with the production, marketing, and processing of fed cattle in North Dakota. The first report, entitled "Feasibility of Cooperatively Owned Feedlots," Agricultural Economics Report No. 36, July, 1964, had as its main objective the identification and evaluation of the factors which should be considered in the establishment of commercial feedlots in various areas of the state. This evaluation was considered essential to an adequate appraisal of the desirability of entering this type of business on a cooperative basis.

An analysis of the feed-livestock balance, contained in the first report, revealed that possibilities exist for a minimum expansion of 30 per cent in the number of beef cows and a doubling of the number of cattle fed to slaughter weights. Expansion possibilities prevail in all areas; however, they are more pronounced in some areas than in others.

Any study which indicates that conditions are such as to encourage an expansion in the feeding of cattle to slaughter weights, either on the farm or in commercial feedlots, intensifies the desire of the leaders in various communities to establish processing plants as market outlets for finished cattle. This desire is prompted primarily by the wishes of the leaders to enhance the economic well-being of the community and, specifically, to provide an outlet for the surplus labor.

At the present time 11 slaughtering plants are operating in North Dakota which kill and at least partially process the carcass (Figure 1). Only two of these plants operate under the supervision of the Federal Meat Inspection Division of the U. S. Department of Agriculture, enabling them to market their product in interstate commerce.

Only one of the eleven plants employs more than 50 persons, one has between 25 and 50 employees, and the remainder, less than 25.[3]

In addition to the above plants there are 60 or more custom slaughtering plants, many of which are frozen food locker plants. Some of these

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[1]Recognition is extended to Elmer C. Vangsness, Extension Resource Economist; B. Gene Crewdson, former Extension Economist in Marketing; Thor A. Hertsgaard, Assistant Professor of Agricultural Economics; James I. McDowell, Assistant Professor of Agricultural Economics, North Dakota State University; and C. J. Heltemes, State Statistician, North Dakota Crop and Livestock Reporting Service, Fargo, North Dakota, for their suggestions in the preparation of this report.

[2]Rex W. Cox is Professor, and Fred R. Taylor is Professor and Chairman, Department of Agricultural Economics, North Dakota State University.

[3]North Dakota Economic Development Commission, Directory of North Dakota Manufacturers, 1963.

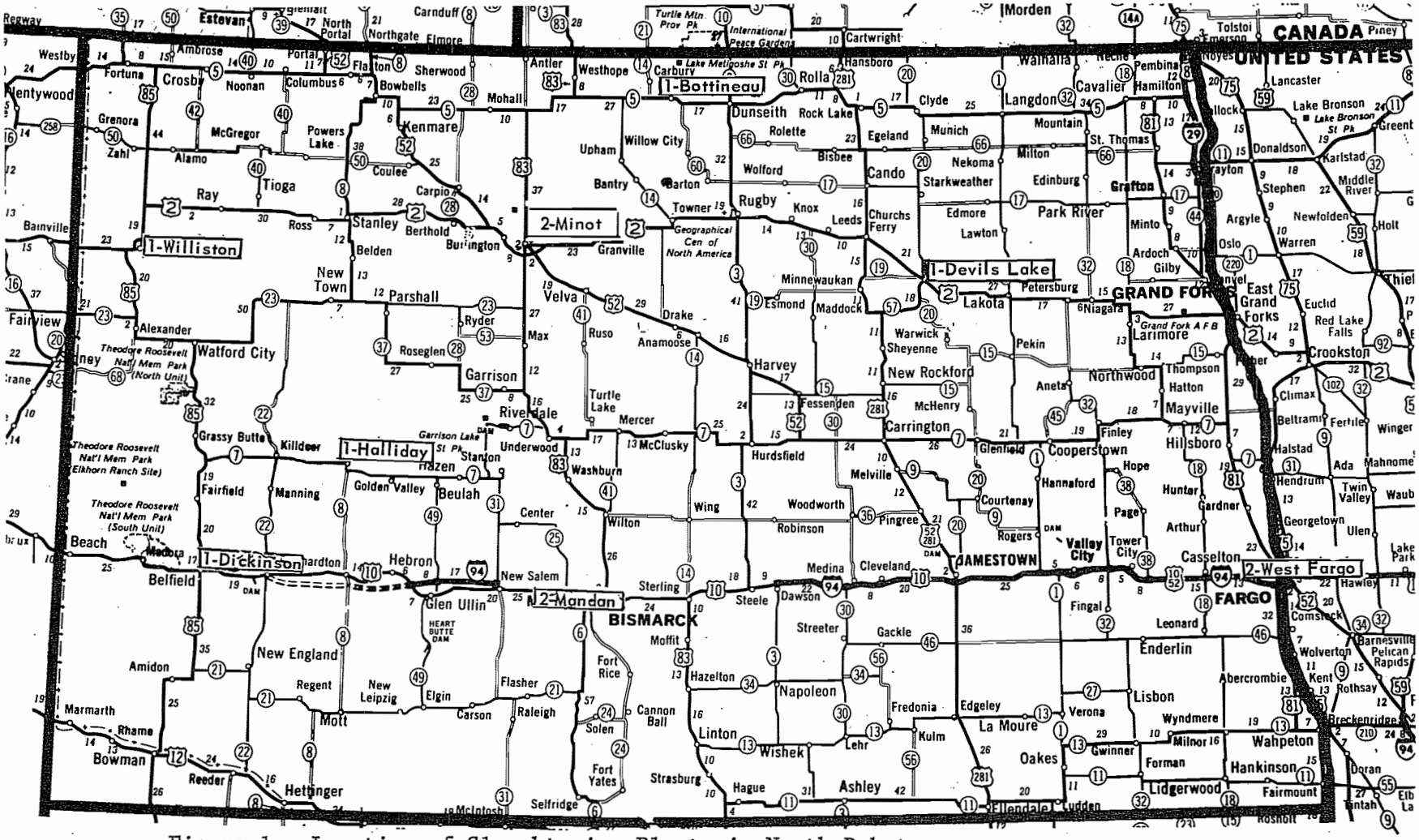

Figure 1. Location of Slaughtering Plants in North Dakota

There are eleven plants in North Dakota. Two of these operate under the supervision of the Federal Meat Inspection Division of the U. S. Department of Agriculture and are located at West Fargo and Williston.

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maintain a locker service for frozen foods, but this particular service has become less important because many of the farmers and other persons previously using these plants now have their own deep freeze units. These plants have slaughtered only a limited amount of livestock, little of which goes into the commercial trade channels.

Commercial slaughter in North Dakota in 1963 amounted to 123,800 cattle, with a live weight equivalent of 134,144,000 pounds (Appendix Table 1). During the past 15 years the peak of cattle slaughter was reached in 1956, when 154,900 cattle were killed, the live weight of which was 157,624,000 pounds. The lowest kill, 17,700 cattle, occurred in 1960, with a live weight of only 18,668,000 pounds.[4] This marked decline to such a low level was due to the cessation of operations by Armour and Company at West Fargo and Grand Forks. The closing of these plants was due in part to the high cost of operation arising from obsolescence of plant and equipment and lack of adequate volume. Siouxland Dressed Beef Company, division of Needham Packing Company, did not start operations until December, 1960.

Farm slaughter has remained fairly uniform during the past five years, averaging close to 22,500 head annually.

Purpose and Method of Study

The purpose of this study is to analyze the factors that should be considered by those who are advocating the establishment or expansion of slaughtering plants. The rapid decentralization of slaughtering during the past few years has involved the abandonment of some of the plants in the large terminal market centers.

The increased slaughter capacity in the United States has resulted from the growth of relatively smaller plants operating with a greater degree of efficiency in areas where the livestock is fed.

The mere fact that a supply of fed cattle is available, however, is not the only factor that should be considered in reaching a decision regarding the establishment of a plant in a particular area.

The first section of this report is concerned with the determination of (1) consumption requirements in the various areas of North Dakota which are shown in Figure 2, (2) the live weight and number of cattle slaughtered, (3) amount of dressed beef shipped out and amount shipped into the state, (4) projected consumption requirements and slaughter by 1970, and (5) the feasibility of expansion of existing slaughtering plants or the organization of new ones.

This will be followed by an analysis of labor and capital requirements and annual operating costs of slaughtering plants of varying capacities.

Markets for fed beef are available to feeders in almost any area of North Dakota. That is, the disposal of cattle fed to slaughter weights is

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[4]North Dakota Crop and Livestock Reporting Service.

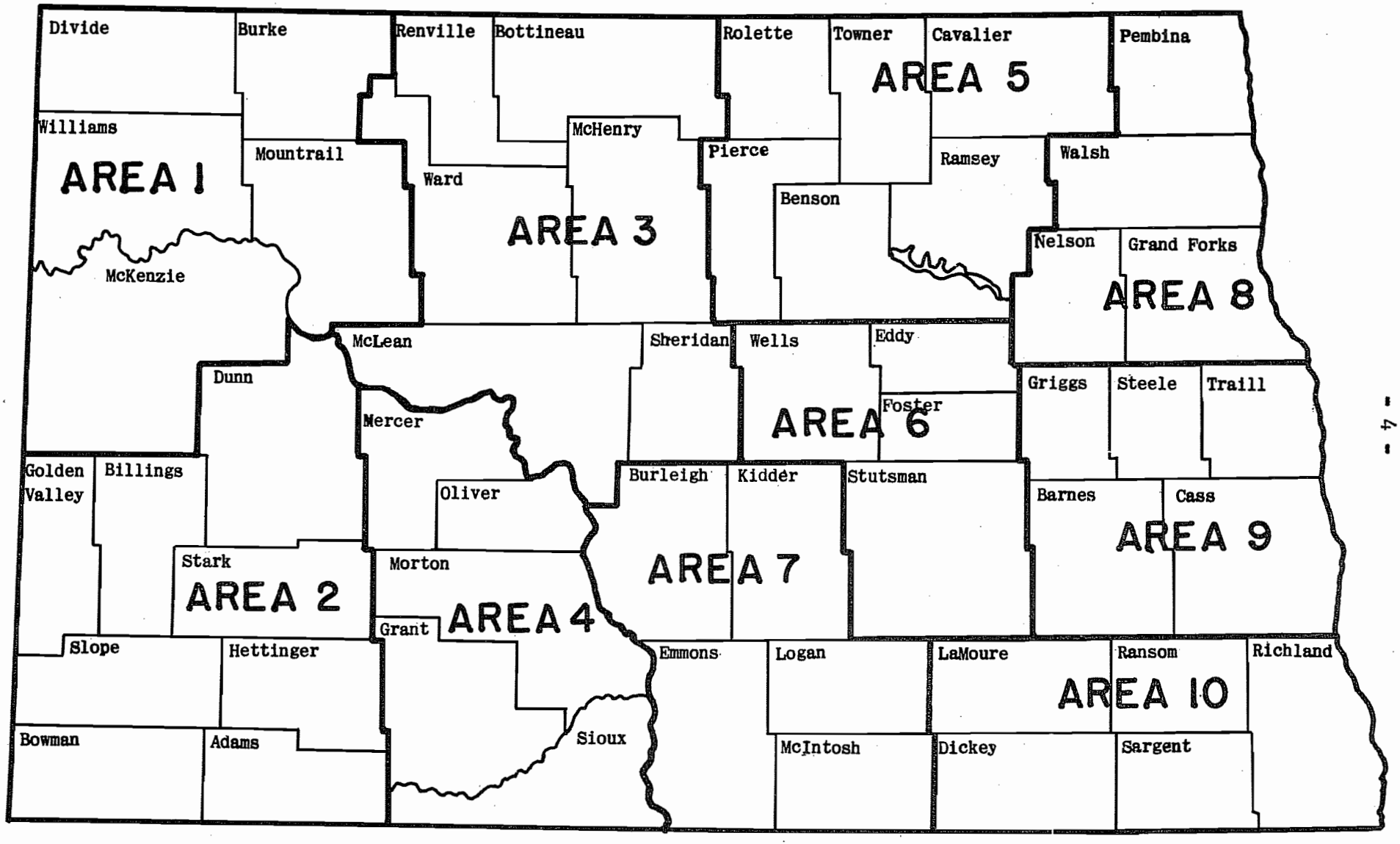

Figure 2. Area Designations for North Dakota Livestock Feedlot and Processing Study

These areas have been so selected as to be contiguous to a central city or cities and possessing somewhat similar livestock and crop enterprises. Consideration was given to the identification of the central cities as possible locations for commercial feeders and/or slaughtering plants.

not a problem except in isolated cases where competition is lacking. The disposal of beef carcasses, however, is more difficult because of competition not only within North Dakota, but also from outside of the state. The potentials for beef production in North Dakota far outweigh those of beef consumption. The ability of North Dakota packers to compete with other packers, for markets outside the state will depend in part on maintaining not only plant operations on an economical basis, but also on maintaining an aggressive and efficient sales organization. These points will receive additional emphasis in the latter part of this report.

Criteria which should govern the location of new slaughter establishments will be outlined. Alternative locations based on these criteria will be suggested.

Even though conditions warrant the establishment of a slaughtering plant in a locality, the question still remains as to whether it should be operated and controlled by farmers and feeders or by other business interests. The last section of this report deals with this question.

The data which appear in most of the tables are estimates and should be regarded as such.

Beef Consumption Requirements and Slaughter of Cattle in North Dakota

Consumption of Beef

It is estimated that the carcass weight of beef consumed in North Dakota in 1963 totaled 69,530,000 pounds, the yield from about 123,000 cattle. This amount was based on a per capita consumption of 107.3 pounds and a population of 648,000.[5]

The estimates of population, carcass weight of beef consumed, and the corresponding live weight of beef consumed, by areas are given in Tables 1 and 2.

The estimated total consumption of beef in terms of live weight equivalent totaled 115,907,000 pounds in 1963.

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[5]The estimate of per capita consumption was derived as follows: The per capita consumption of beef in the United States averaged 94.6 pounds in 1963 (see National Food Situations, No. 108, 1964, U. S. Department of Agriculture). The per capita consumption in the North Central Region is estimated at 113.5 per cent of the United States average (Thor A. Hertsgaard and Sylvester D. Phillippi, "Distribution Patterns for Beef," North Dakota Agricultural Experiment Station Bulletin No. 435, 1961). Multiplying the United States per capita consumption by this proportion gives 107.3 pounds. It is assumed that the per capita consumption of beef in North Dakota averages approximately the same as in the North Central Region.

TABLE 1. ESTIMATES OF POPULATION, BY AREAS, NORTH DAKOTA, 1963*

Area	Population
1	52,099
2	47,369
3	94,867
4	41,342
5	57,996
6	45,749
7	61,431
8	88,776
9	106,531
10	51,840
Total	648,000

*The reported population in 1962 was 644,000. It is assumed that the population increased 4,000 from July 1, 1962, to July 1, 1963.

TABLE 2. CONSUMPTION OF BEEF, BY AREAS, NORTH DAKOTA, 1963

Area	Estimated Consumption	
	Carcass Weight	Live Weight Equivalent*
	thousand pounds	
1	5,590	9,319
2	5,083	8,473
3	10,179	16,968
4	4,436	7,395
5	6,223	10,374
6	4,908	8,182
7	6,592	10,989
8	9,526	15,880
9	11,431	19,055
10	5,562	9,272
Total	69,530	115,907

*The live weight equivalent is obtained by multiplying carcass weight by 1.667.

In Table 3 the live weight of farm slaughter is subtracted from the total live weight. The remainder represents the consumption requirements in 1963 less those met by farm slaughter. The latter is then divided by 1,040, the assumed average live weight of cattle slaughtered for local consumption. The quotients which are given by areas provide an indication of the number of cattle that were required to meet the consumption needs in the various areas in 1963 after adjustments were made for farm slaughter.

TABLE 3. CONSUMPTION OF BEEF AND NUMBER OF CATTLE ADJUSTED FOR FARM SLAUGHTER REQUIRED TO MEET CONSUMPTION NEEDS, BY AREAS, NORTH DAKOTA, 1963

Area	Consumption	Farm Slaughter	Consumption Less Farm Slaughter	
	Live Weight	Live Weight	Live Weight	Number of Cattle
	thousand pounds	thousand pounds	thousand pounds	
1	9,319	1,651	7,668	7,373
2	8,473	2,011	6,462	6,213
3	16,968	2,973	13,995	13,457
4	7,395	1,844	5,551	5,337
5	10,374	2,170	8,204	7,888
6	8,182	1,515	6,667	6,411
7	10,989	1,781	9,208	8,854
8	15,880	1,722	14,158	13,613
9	19,055	1,870	17,185	16,525
10	9,272	1,574	7,698	7,402
Total	115,907	19,111	96,796	93,073

Commercial Slaughter

The number of cattle slaughtered commercially in North Dakota in 1963 amounted to 123,800. The live weight equivalent of this number was 134,144,000 pounds. The distribution of both the number and live weight among areas is given in Table 4.

A significant proportion of the beef produced from the cattle slaughtered in North Dakota is shipped out of the state; therefore, it is not available for local consumption. Williston Packing Company, Incorporated, at Williston in Area 1 and Siouxland Dressed Beef Company at West Fargo in Area 9, which operate under the supervision of the Federal Meat Inspection Service, are the only plants which are permitted to market their products in other states.

TABLE 4. COMMERCIAL SLAUGHTER OF CATTLE, BY AREAS, NORTH DAKOTA, 1963

Area	Live Weight	Number of Cattle
	thousand pounds	
1	14,419	14,205
2	2,095	2,017
3	3,315	3,200
4	4,480	4,300
5	1,019	1,000
6	219	221
7	297	300
8	408	400
9	107,650	97,913
10	242	244
Total	134,144	123,800

Although the live weight of beef slaughtered in North Dakota amounted to 134,144,000 pounds in 1963, it is estimated that about three-fourths of this was shipped out of the state leaving 34,375,000 pounds for local consumption (Table 5). The demand for high quality fed beef exists in North Dakota, but the firm which accounts for a large proportion of out-of-state shipments has not developed an extensive in-state market for this type of beef.

The merchandising program of this firm, however, could change quickly. If this occurred, a new firm would have to meet unexpected and increased competition for in-state markets.

TABLE 5. ADJUSTED COMMERCIAL SLAUGHTER OF CATTLE AVAILABLE FOR LOCAL CONSUMPTION, NORTH DAKOTA, 1963

	Live Weight	Number of Cattle
	thousand pounds	
Total Slaughter	134,144	123,800
Less amounts shipped out of state	99,769	90,962
Slaughter Available for Local Consumption	34,375	32,838

Comparison of Consumption Requirements and Slaughter

The excess of consumption requirements over slaughter supplies available for local consumption in 1963 is shown in Table 6.[6]

In 1963 consumption requirements of North Dakota less those supplied by farm slaughter were about three times the slaughter supplies available for local consumption. The requirements greatly exceed available supplies in all areas except Area 1.

The difference between requirements and slaughter supplies roughly represents the live weight and number of cattle equivalents of the dressed beef that was shipped into North Dakota.

TABLE 6. COMPARISON OF CONSUMPTION REQUIREMENTS AND SLAUGHTER SUPPLIES AVAILABLE FOR LOCAL CONSUMPTION, BY AREAS, NORTH DAKOTA, 1963

Area	Live Weight			Number of Cattle		
	Consumption Requirements	Slaughter Supplies	Excess or Deficit Supplies	Consumption Requirements	Slaughter Supplies	Excess or Deficit Supplies
	thousand pounds					
1	7,668	11,535	3,867*	7,373	11,365	3,992*
2	6,462	2,095	-4,367	6,213	2,017	-4,196
3	13,995	3,315	-10,680	13,457	3,200	-10,257
4	5,551	4,480	-1,071	5,337	4,300	-1,037
5	8,204	1,019	-7,185	7,888	1,000	-6,888
6	6,667	219	-6,448	6,411	221	-6,190
7	9,208	297	-8,911	8,854	300	-8,554
8	14,158	408	-13,750	13,613	400	-13,213
9	17,185	10,765	-6,420	16,525	9,791	-6,734
10	7,698	242	-7,456	7,402	244	-7,158
Total	96,796	34,375	-62,421	93,073	32,838	-60,235

*Slaughter supplies exceed consumption requirements.

Projected Consumption Requirements and Slaughter

It is estimated that consumption of beef by North Dakota residents will increase 10 per cent by 1970 from the 1963 levels. Most of this increase will result from an increase in per capita consumption. Only a slight change in the population of North Dakota is anticipated. Estimates of the consumption requirements in 1970 are given in Table 7.

[6]Slaughter supplies are expressed in terms of both live weight and number of cattle.

TABLE 7. PROJECTED BEEF CONSUMPTION REQUIREMENTS, BY AREAS, NORTH DAKOTA, 1970

Area	Live Weight	Number of Cattle
	thousand pounds	
1	8,435	8,110
2	7,108	6,834
3	15,394	14,803
4	6,106	5,871
5	9,024	8,677
6	7,334	7,052
7	10,129	9,739
8	15,574	14,974
9	18,904	18,178
10	8,468	8,142
Total	106,476	102,380

Estimates of slaughter supplies from firms now operating that will be available for local consumption in 1970 are given in Table 8. The changes between these estimates and those computed for 1963 are due to the increased slaughter in Area 1 and the increased proportion of the output of this area that is shipped out of state. The total commercial slaughter in Area 9 is likely to increase; however, little is expected to be available for in-state consumption.

The amount of slaughter in other areas is assumed to remain the same. An increase in the output of plants in these areas will depend mainly on an expansion of feeding operations in accessible territory.

The comparisons of the projected consumption requirements and projected slaughter available for local consumption in 1970 are presented in Table 8 also.

TABLE 8. COMPARISON OF PROJECTED CONSUMPTION REQUIREMENTS AND PROJECTED SLAUGHTER SUPPLIES AVAILABLE FOR LOCAL CONSUMPTION, BY AREAS, NORTH DAKOTA, 1970*

Area	Live Weight			Number of Cattle		
	Consumption Requirements	Slaughter Supplies	Excess or Deficit Supplies	Consumption Requirements	Slaughter Supplies	Excess or Deficit Supplies
	thousand pounds					
1	8,435	15,928	7,493**	8,110	15,600	7,490**
2	7,108	2,095	-5,013	6,834	2,017	-4,817
3	15,394	3,315	-12,079	14,803	3,200	-11,603
4	6,106	4,480	-1,636	5,871	4,300	-1,571
5	9,024	1,019	-8,005	8,677	1,000	-7,677
6	7,334	219	-7,115	7,052	221	-6,831
7	10,129	297	-9,832	9,739	300	-9,439
8	15,574	408	-15,166	14,974	400	-14,574
9	18,904	10,765	-8,139	18,178	9,791	-8,387
10	8,468	242	-8,216	8,142	244	-7,898
Total	106,476	38,768	-67,708	102,380	37,073	-65,307

*The slaughter supplies do not represent total commercial slaughter. They are determined by subtracting projected out-of-state shipments from total slaught

**Slaughter supplies exceed consumption requirements.

Feasibility of Additional Slaughtering Plants in North Dakota

According to the data in Table 8, the estimated excess of consumption requirements will exceed slaughter supplies available for local consumption by an equivalent of 65,307 cattle. This excess must be met by increased imports of dressed beef from other states unless new plants are erected.

It is unreasonable to expect that the output of new plants erected in North Dakota could completely supplant the dressed beef that is now shipped into the state. In fact, the most optimistic estimate of the proportion that could be supplanted probably would be close to 40 per cent.

The supermarkets, both chain and others, demand a uniform supply of a specified quality. The national packers are in a position to meet these demands. It is not an easy task for new packing plants to break into the trade of the established packers unless the retail outlets can be assured of the same type of product and services which they demand.

The discussion which follows is based mainly on the assumption that the amount of the shipped in dressed beef that will be supplanted by the output of new plants will not exceed an equivalent of 28,125 cattle.[7] This number is just about the output of one plant killing 15 head per hour, or 562 per week.

It hardly seems feasible to consider the establishment of a new plant which expects to market its product solely within North Dakota. It should be so designed as to meet the requirements of a federally inspected plant; it would then be permitted to market its products beyond the borders of the state.

Assuming that (1) the amount of dressed beef (equivalent to 28,125 cattle) now imported will be supplanted by sales of a new plant, and (2) 50 per cent of the total output of new plants can be sold in other states, a plant or plants with a total capacity of 56,250 head appears feasible. The factor which limits expansion beyond this capacity is the number of cattle of desired quality available for slaughter. If other states are used as sources of supply, the capacity might be increased.

The number of cattle on feed during the early part of 1963 was 186,666. Commercial slaughter amounted to 123,800, and farm slaughter 23,000, or a total of 146,800 cattle. Many cattle fed to slaughter weights in North Dakota and will continue to be sold to firms whose plants are located in South St. Paul, Minnesota, Sioux Falls, South Dakota, and other places.

If North Dakota packers, those now operating and others who may start operating, depend primarily on this state as a source of supply, the above suggested expansion could hardly be realized unless more cattle are fed to slaughter weights on the farm or in commercial feedlots.

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[7]The figure 28,125 is approximately 43 per cent of the projected 1970 excess of consumption requirements over slaughter supplies shown in Table 8.

It has been shown that the surplus of feed in North Dakota is sufficient for doubling the number of cattle on feed.[8] Assume the number fed to slaughter weights increased 35 per cent, or 65,334 head by 1970, and the number fed for farm slaughter remained the same at 23,000 cattle. The increased number fed to slaughter weights less projected farm slaughter equals 42,334 head. Consequently, the projected number of cattle available for commercial slaughter would total 229,000 (186,666 and 42,334). Subtracting the 1963 slaughter of 123,800 cattle from 229,000 leaves a remainder of 95,200 cattle. The latter figure is more than sufficient to cover the projected increase in slaughter by plants now operating and provide for an additional plant or plants with a capacity of 56,250 cattle, which has been suggested above.

This suggested increase in capacity may appear conservative in view of the estimated increase of 65,334 cattle fed to slaughter weights in North Dakota. The latter estimate is not conservative. The potential for greatly increased feeding operations exists; however, progress in this direction has been slow, although much has been said and written about the advantages accruing from feeding cattle. It is unlikely that any increase between the present and 1970 will be anything but moderate. If the opposite is true, the suggested capacity can be increased.

If the estimated increase in the number of cattle fed out were realized, there is doubt regarding the availability of a fairly uniform supply of desired quality each month in the year. At times the packers currently operating in North Dakota find it difficult to obtain the type of animal needed. This problem becomes all the more important where attempts are made to break into the business of the national packers either locally or outside of North Dakota.

Regular and continuing feeding operations in North Dakota are a prerequisite for efficient operation of slaughtering or packing facilities. To achieve real continuity in fed cattle production, additional large year around feeding operations will be necessary.[9]

The present one-shot-a-year marketing of fed cattle places a burden on slaughtering establishments during the peak season and results in much unused capacity at other times. While most packers experience unused capacity because of seasonality of marketings, the problem is less serious in some states than in others.

In North Dakota the effects of seasonality of marketings of fed beef may be partially overcome by an expansion of the production of boned beef from beef and dairy cows.

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[8]Cox, Rex W., and Fred R. Taylor, "Feasibility of Cooperatively Owned Feedlots," Agricultural Economics Report No. 36, July, 1964.

[9]Trock, Warren L., "Cattle Feeding in the Northern Great Plains," Technical Paper No. 11, Upper Midwest Economic Study, 1963.

There were about 584,000 beef cows and 287,000 dairy cows on North Dakota farms in 1963. The number of beef cows probably will increase significantly by 1970; however, the number of dairy cows will continue to decline.

It is estimated that approximately 20 per cent of both beef and dairy cows are slaughtered each year. A large proportion of beef cows reaches the slaughter plants in the fall and early winter when the marketings of fed cattle are at a relatively low level. The marketings of dairy cows not only come a few months earlier but also are more uniform through the year.

Increased slaughter of cows by plants in North Dakota will achieve and are achieving a greater and more uniform utilization of capacity.

To meet the quality specifications of meat packers, cattle feeders will have to give greater attention to the cattle they buy, the feeding and finishing process, and the cattle they sell. This is of prime importance when the fed cattle are to be sold to plants which market a significant proportion of dressed beef to chain stores outside of the state and to those which have government contracts.

Feeders who live relatively short distances from slaughtering operations are in a better position to acquire knowledge regarding packers' requirements than those who live much farther away because they have the opportunity of observing more closely the market demands.

If one plant with a capacity of 56,250 cattle or 30 head per hour were erected, the management would be able to maintain a highly qualified buying and selling staff, which is so important in that the cattle must be purchased under conditions of increased competition, and 50 per cent of the beef must be sold outside of North Dakota.

Another alternative consists of the erection of three smaller plants, each with an annual capacity of 18,750 head, or 10 per hour. With these plants located in different areas of the state, there would be certain economies in supplying local markets. Such plants might not be able to obtain the selling advantages which normally accrue to larger plants; however, under good management, a high degree of efficiency in plant operations can be achieved.

Packer Feedlot Integration

Owners of some slaughtering plants in the United States operate their own feedlots. This type of integration affords an opportunity to have a ready supply of the type of cattle the packer needs.[10] At the time he purchases feeder cattle, the packer begins exercising quality control over the livestock he will eventually slaughter.

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[10]Rust, C. H., and C. R. Harston, "The Survival and Growth Potential of Small Meat Packing Businesses in Montana," Bulletin 580, Montana Agricultural Experiment Station, 1963.

During the time the packer is feeding cattle, he has assumed the added risk of owning the livestock for a longer period of time. He must be willing and able to absorb the consequences of any additional fluctuations in prices, quality, and loss from disease and death.

The feedlot also affords the packer the opportunity to buy cattle that are in various stages of finish and place them in his own yard until they reach the condition that he prefers for slaughter. It also allows him to make any opportune purchase larger than necessary to fill particular requirements at that time, and the overflow may be placed in the feedlot.

Packers who own their own feedlots do not have to kill all the cattle in their own lots. They have the alternative of shipping to other markets if conditions so warrant.

Contractual arrangements between a packer and the operator of a commercial feedlot are becoming more common. The packer puts cattle in the feedlot, and the operator feeds them to the desired weight. This type of arrangement is another method the packer uses to maintain needed volume.

Labor Requirements and Costs

The various operations performed in slaughtering plants are summarized in the tables which follow. Cattle killing-floor work consists of dressing line and supporting operations.

Dressing line operations are the major work performed to prepare finished carcasses. They are performed in sequence; each operation can begin only when the preceding operation is completed. Thus, the operation requiring the greatest elapsed time sets the pace for all operations.[11]

Supporting operations consist of work performed on those parts of the carcass, such as heads and offal, that are removed in preparing the sides. Supporting operations are performed independently of one another and of dressing room operations except for the products that are obtained as a result of dressing time work.

Other operations which are performed in slaughter plants include cooler, dock maintenance, yard and clean-up work.

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[11]The data presented in Tables 1 and 2 are based on information obtained from the following publications:

Logan, S. H., and G. A. King, "Economies of Scale in Beef Slaughter Plants," Giannini Foundation Research Report No. 260, December, 1962.
"Cattle Killing-Floor Systems and Layouts," U. S. Department of Agriculture Marketing Research Report No. 657, May, 1964.

These reports include detailed information on the basic systems used in killing cattle, labor requirements and costs for the different systems, and varying capacities. The labor requirements and costs for operations other than killing-floor operations are also discussed.

In addition, the slaughter plant must maintain a certain number of office personnel, buyers of cattle, sellers of the products, and management.

The slaughtering industry usually has used one basic system to perform killing-floor operations--the one-, two-, or three-bed type system. The bed type system requires manual performance of most operations. In recent years the more automated on-the-rail dressing system has been adopted.

The two systems differ mainly in the dressing operations with other operations such as cooler and dock-loading tasks identical under both.

The number of workers required and the cost of labor for one-bed systems with hourly kills of ten and fifteen cattle and for the partly automated on-the-rail system with hourly kills of 20 and 30 cattle are presented in Tables 9 and 10, respectively.

A plant with a capacity of ten per hour requires a labor force of eight men to handle the killing-floor operations of a one-bed system. Adding the other labor requirements including the management brings the total to 20 men. The total annual labor cost is $139,922.[12] A plant with a capacity of 20 head per hour requires one additional man in dressing line and supporting operations and one additional seller of the meat products. These additions bring the total labor cost to $157,933.

A partly automated on-the-rail system with a capacity of 30 cattle killed per hour requires a total of 19 workers in dressing line and supporting operations. Total labor requirements add up to 41 individuals. Annual wages and salaries amount to $277,113.

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[12]The following average hourly wages and annual salaries paid would apply to most areas of North Dakota. It must be recognized that they are approximate.

Operations	Average Rate Per Hour
Dressing line and supporting operations	$2.89
Cooler	2.82
Dock	2.75
Maintenance	2.65
Yard work	2.65
Clean-up	2.65
Office	3.00
	annual salary
Buyers	12,500
Sellers	12,000
Manager	15,000

The work year on which compensation is based consists of 52 weeks of 40 hours each. The actual time spent in slaughter operations amounts to 37½ hours per week.

A plant with a capacity of 30 cattle per hour provides a fair sized market for available labor in a community. Some of the work on the cattle killing floor is highly specialized; other work requires little skill or at least that degree of skill that can be acquired in a short time.

The main requirement of office help, particularly in plants of the size under consideration here, is training in bookkeeping and allied duties. In some of the larger plants an office manager is essential; however, none has been included in the requirements listed in the tables.

The local communities in which plants of the sizes discussed here are likely to be located should be in a position to supply or develop at least most of the labor required to carry on the operations except buying, selling, and management. Efficient buyers of livestock, sellers of meat, and managers of slaughtering plants need to be men of experience.

TABLE 9. LABOR REQUIREMENTS AND COSTS: ONE-BED SLAUGHTER PLANTS WITH CAPACITIES OF 10 and 15 CATTLE PER HOUR, RESPECTIVELY

Capacity Per				
Hour	10		15	
Day	75		112	
Week	375		562	
Year	18,750*		28,125*	
Operation	Number of Workers	Annual Labor Costs	Number of Workers	Annual Labor Costs
Killing floor:				
Dressing line and supporting operations	8	$ 48,088	9	$ 54,099
Cooler	3	17,598	3	17,598
Dock	1	5,720	1	5,720
Maintenance	1	5,512	1	5,512
Yard work	1	5,512	1	5,512
Clean-up work	1	5,512	1	5,512
Office	2	12,480	2	12,480
Buyers	1	12,500	1	12,500
Sellers	1	12,000	2	24,000
Management	1	15,000	1	15,000
Total	20	$139,922	22	$157,933

*Weekly capacity times 50 (weeks).

TABLE 10. LABOR REQUIREMENTS AND COSTS: PARTLY AUTOMATED ON-THE-RAIL PLANTS WITH CAPACITIES OF 20 AND 30 CATTLE PER HOUR, RESPECTIVELY

Capacity Per				
Hour	20		30	
Day	150		225	
Week	750		1,125	
Year	37,500*		56,250*	
Operation	Number of Workers	Annual Labor Costs	Number of Workers	Annual Labor Costs
Killing floor: Dressing line and supporting operations	11	$ 66,121	19	$114,209
Cooler	4	23,464	4	23,464
Dock	1	5,720	3	17,160
Maintenance	2	11,024	2	11,024
Yard work	1	5,512	1	5,512
Clean-up work	1	5,512	2	11,024
Office	3	18,720	3	18,720
Buyers	2	25,000	2	25,000
Sellers	2	24,000	3	36,000
Management	1	15,000	1	15,000
Total	28	$200,073	40	$277,113

*Daily capacity times 50 (weeks).

Capital Requirements of Slaughtering Plants

The data in Table 11 provide useful information on the approximate costs of construction and equipment of beef slaughtering plants of varying capacities. In addition, the operating capital needed to carry on the normal operations of buying, processing, storing, and selling, including extension of credit, is shown.

The capital requirements which are included under the various categories should be considered minimums, particularly operating capital. The latter depends on many factors, not the least of which is the amount of accounts receivable outstanding and the age of the accounts. The operating capital needs given in the table are based on the collection of accounts within 12 days. If they are older, the amounts should be increased 25 to 35 per cent; If less than twelve days, they might be cut as much as 50 per cent.

If slaughtering only is to be conducted in a plant with an annual capacity of 18,750 head, costs of construction and equipment amount to $232,000. If primal cut breakdown is included as an addition to the production of the chilled carcass, the costs increase by $7,000. The addition of inedible processing facilities increases the costs by $56,000 bringing the total construction and equipment costs to $295,000.

Many plants today confine their operations primarily to slaughtering only or the production of the chilled carcass. The large outlets for beef, particularly chain stores, prefer to do their own primal cut breakdown.

Many of the smaller plants do not maintain provisions for inedible processing. Separate firms exist which provide rendering and similar services and obtain the inedible products from one or more slaughtering plants or nearby butchers.

The addition of the estimated needed operating capital of $190,000 gives a total capital requirement of $485,000. The corresponding capital requirements of a plant with a capacity of 56,250 head amount to $1,240,500.

The necessity for maintaining adequate operating capital cannot be overemphasized, especially for a new firm which has to become established. Large quantities of working capital are needed when cash must be paid for live animals and credit extended when selling the product.

Assuming a long-run average price of $23 per hundredweight for 1,050-pound live cattle, the average cost per animal would be $241. Cost at the plant, including the purchase price, transportation, and insurance, would approach $245 per head.

If a two-day killing inventory of live animals were maintained at all times (150 head) at a plant with a daily capacity of 75 head, cattle were purchased five days per week, and all customers took fourteen days' credit, the twelve days of purchases would require $220,500. A twelve-day extension

TABLE 11. CAPITAL REQUIREMENTS OF BEEF SLAUGHTERING PLANTS OF VARYING CAPACITIES*

Slaughter Capacity**				Capital Requirements					
				Construction and Equipment Costs					
number of head									
Hourly	Daily	Weekly	Annual	Slaughter Only	Primal Cut Breakdown	Inedible Processing	Total	Operating Capital	Total
2	15	75	3,750	$155,000	$ 5,000	$ ------	$160,000	$ 40,000	$ 200,000
5	37	187	9,375	155,000	5,000	40,000	200,000	96,000	296,000
10	75	375	18,750	232,000	7,000	56,000	295,000	190,000	485,000
15	112	562	28,125	320,000	7,500	65,000	392,500	284,000	676,500
20	150	750	37,500	390,000	9,000	75,000	474,000	375,000	849,000
25	187	937	46,875	485,000	11,500	90,000	586,500	468,750	1,055,250
30	225	1,125	56,250	565,000	13,000	100,000	678,000	562,500	1,240,500
35	262	1,312	65,625	635,000	14,400	100,000	749,400	656,250	1,405,650
40	300	1,500	75,000	700,000	147,000	100,000	814,700	750,000	1,564,700

*Data for the various capacities are based on information supplied by R. L. Fox, Chief, Livestock and Wool Branch, Farmers Cooperative Service, U. S. Department of Agriculture.

**The daily, weekly, and annual capacities are based on a 7.5-hour day, a 5-day week, and a 50-week year, respectively.

of credit would reduce the requirement to $183,750.[13]

To maintain a two-day inventory (300 cattle) at a plant with a daily capacity of 150 head where all customers take fourteen days' credit, the operating capital required for these two purposes would approximate $441,000. A twelve-day extension of credit would reduce this amount to $367,500.

The above amounts of operating capital do not include those needed for a rise in cattle prices, day-to-day expenses, or emergencies. Most plants, however, do not operate at capacity. A utilization figure of 70 or 75 per cent is more common. Consequently, the operating capital needed for all purposes should approximate the figures which are given in Table 11 for the various capacities.

On a per head basis the capital requirements for construction and equipment decline significantly until an annual capacity of about 37,500 head is reached (Table 12). For example, a plant with an annual capacity of 9,375 head which performs the functions included in the three categories--slaughter, primal cut breakdown, and inedible processing--requires a capital investment of $21.33 per head. The corresponding figure for a plant with a 37,500-head capacity is $12.60. Additional increases in the capacity result in only slight reductions in per head requirements.

TABLE 12. CAPITAL REQUIREMENTS PER HEAD OF BEEF SLAUGHTERING PLANTS OF VARYING CAPACITIES

Slaughter Capacity	Capital Requirements Per Head	
	Construction and Equipment Costs	
Number of Head Annual	Slaughter Only	Slaughter, Primal Cut Breakdown, and Inedible Processing
9,375	$16.53	$21.33
18,750	12.37	15.73
28,125	11.37	13.60
37,500	10.40	12.60
46,875	10.35	12.51
56,250	10.04	12.05
65,625	9.67	11.42
75,000	9.33	10.86

The above costs per head assume that the plant is operating at capacity, which is seldom the case. Many small plants have a higher rate of utilization than some of the larger plants, which accounts for their

[13]Some of the estimates suggested by B. Gene Crewdson, former Extension Economist in Marketing, North Dakota State University.

efficient operation not only in the use of plant and equipment, but also in the use of labor.

The amount of operating capital required varies more or less with capacity and rate of utilization of capacity.

To the capital costs in buildings and equipment which have been discussed above there must be added the investment in land and corral. The cost of land varies greatly from area to area and particularly in respect to its location relative to the center of the city or town within the area. Estimates of the cost of these two items have been made for slaughtering plants of annual capacities of 18,750 and 56,250 head, respectively. When these costs are included, the total investment in these plants conducting slaughtering only amounts to $265,000 and $612,000, respectively (Table 13).

TABLE 13. CAPITAL INVESTMENT IN LAND, BUILDINGS AND EQUIPMENT, AND CORRAL FOR SLAUGHTERING PLANTS WITH ANNUAL CAPACITIES OF 18,750 AND 56,250 HEAD, RESPECTIVELY

Capital Requirements	Annual Capacity	
	18,750	56,250
Land	$ 8,000	$ 12,000
Buildings and equipment (slaughter only)	232,000	565,000
Corral	25,000	35,000
Total	$265,000	$612,000

Cost of Operation of Slaughtering Plants

The information contained in Table 14 shows the relative importance of the various expense items in the operation of the slaughtering plants which participated in a survey conducted by the American Meat Institute in 1963 and reported in its publication, "Financial Facts About the Meat Packing Industry."

For example, wages and salaries accounted for close to 50 per cent of the total expenses of both regional and sectional meat packing plants.[14] If employer benefit programs are added, employee expenses amount to about 57 per cent of the total operating expenses. The other items of particular significance are supplies and containers.

Total selling and administrative expenses accounted for almost one fourth of total operating expenses of both regional and sectional packers. The point to be emphasized is that qualified sellers and administrators command fairly high salaries.

In as much as wages and salaries and supplementary benefits account for such a large proportion of total expenses, the efficient use of all labor employed becomes particularly significant.

Regarding the costs of operation of meat packing plants in the United States, it should be pointed out that many plants do not operate at capacity, that is, 35 to 40 hours per week. A more common figure is 65 to 75 per cent utilization. Costs in relation to annual output would be reduced greatly should a plant operate a full week, no matter what is the stated capacity. Consequently, an extensive analysis of supply of cattle, competition for them, and probable output should be made before construction is planned because a low utilization can greatly increase operating costs per head.

Estimates of operating costs of slaughtering plants with hourly capacities of 10 and 30 head or annual capacities of 18,750 and 56,250 head are presented in Table 15. The depreciation of and interest on investment in plant and equipment are for plants conducting slaughtering only.

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[14]Meat packing companies include those which may do both slaughtering and processing. They are classified into four divisions, the data for two of which are included in the table.

National packers include companies with annual sales exceeding $100 million and who have full-time production and national distribution of their products.

Regional packers are companies with annual sales between $15 million and $100 million. Product distribution is not as widespread as that of national packers.

Sectional packers are companies with annual sales between $3 million and $15 million. Product distribution extends to areas beyond the city where the plant is located.

Local packers have annual sales of less than $3 million. Product distribution is limited to immediate area of city where plant is located.

TABLE 14. OPERATING EXPENSES BREAKDOWN OF PARTICIPATING COMPANIES, BY COMPANY CLASSIFICATION, 1963*

Items	Meat Packing Companies**	
	Regional	Sectional
	per cent	per cent
Wages and salaries	49.3	50.9
Employee benefit programs:		
Retirement expense	1.2	1.1
Social Security taxes	1.9	2.1
Insurance programs	1.5	1.4
Vacation and holiday pay	2.6	2.2
Total employee benefits	7.2	6.8
Total employee expense	56.5	57.7
Supplies and containers	13.9	16.1
Depreciation	3.7	4.6
Rents	.8	.6
Taxes	1.0	1.3
Interest	.8	.7
Miscellaneous	23.3	19.0
Total	100.0	100.0

*"Financial Facts About the Meat Packing Industry, 1963," American Meat Industry, Table 18.

**The numbers of regional and sectional packers included in the survey were 24 and 36, respectively.

The total operating costs amount to $243,928 and $487,884. If these plants were operating at capacity, the cost per head handled would amount to $13.00 and $8.67, respectively. It is evident that a marked degree of efficiency is achieved by the larger plant relative to the plant with the smaller capacity. Reduction in costs per head in plants with capacities exceeding 60,000 head is small. The important point to emphasize is to obtain as high a utilization of capacity as possible regardless of size. For both size plants labor costs account for more than 50 per cent of the total costs.

This again emphasizes the importance of obtaining a high degree of efficiency in the use of labor. The two items which rank next in order of relative importance are depreciation of buildings and equipment and interest on operating capital.

A cost factor for which estimates have not been made is transportation involved in the procurement of cattle. This cost can amount to a significant sum for plants with a fairly large capacity. Any disadvantage along this line, however, is likely to be offset by the higher degree of efficiency in buying and selling by the larger plants.

TABLE 15. COSTS OF OPERATION OF SLAUGHTERING PLANTS OF ANNUAL CAPACITIES OF 18,750 AND 56,250 HEAD, RESPECTIVELY*

Cost Item	Annual Capacity	
	18,750	56,250
Labor	$139,922	$277,113
Depreciation:		
Buildings and equipment	15,900	33,880
Corral	1,000	1,400
Interest on investment:		
Land	400	600
Buildings and equipment	6,960	16,950
Corral	750	1,050
Operating capital	11,400	31,750
Insurance:		
Buildings and equipment	4,061	10,392
Corral	535	749
Other costs	63,000	114,000
Total costs	$243,928	$487,884

*Labor costs are based on data in Table 10.

Depreciation rates: buildings, 4 per cent; equipment, 10 per cent; corral, 4 per cent.

Interest rates applied to investment: land, 5 per cent; other items, 6 per cent.

Insurance rates were obtained from Fire Underwriters Inspection Bureau. The following rates were used and applied to 90 per cent of the estimated value:

	rate per $100
Building construction (concrete blocks with fireproof roof)	$1.69
Equipment	2.69
Corral	2.14

Suggested Locations for Slaughtering Plants

The selection of a location for a packing plant demands a careful study of the advantages and disadvantages which alternative locations may possess. When a plant has been established, it becomes difficult to relocate, or it may be costly to remodel for a change in operations. Consequently, it is essential to consider carefully every aspect that might have an effect on the over-all operation of the firm.[15]

The following comments will be of assistance in analyzing the more important requirements in relation to the selection of an appropriate location of a slaughtering plant:

1. Supply of cattle in desired numbers and quality. Will competing firms outbid for the available supply? Will the supply be sufficiently uniform throughout the year so that unused capacity will be at a minimum at all times?

2. Labor. Is there an adequate supply of labor with proper skills available at a satisfactory cost? Can an experienced manager be obtained who possesses the skills, experience, and other qualifications needed for successful operation?

3. Water. Are the quantity, quality, and cost of water required satisfactory?

4. Sewage disposal. Are present facilities adequate to properly dispose of wastes and sewage from the operation, or will additional sewage facilities have to be constructed?

5. Power. Is the electric power adequate at satisfactory rates?

6. Transportation. Are facilities adequate and rates reasonable to the plant from sources of supply of cattle and from the plant to the markets where dressed beef will be sold?

7. Industrial fuel. Are coal, oil, and/or gas available at competitive rates?

8. Construction costs. How do these compare with costs at alternative locations?

9. Plant site. Is the suggested site adequate in size for buildings, storage, and desired expansion at reasonable cost? Are drainage, groundwater level, and soil bearing capacity satisfactory? Are utilities and transportation facilities available?

10. Livestock markets. Are nearby markets available which provide for concentration of selling and buying activities?

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[15]Vangsness, Elmer C., and Fred R. Taylor, "Plant Location Guides for Your Community," North Dakota State University, Extension Service Circular RAD-1-62, 1962. The suggestions in this section are based mainly on the material and guide lines included in this publication.

11. Others. There are other factors related to the selection of an appropriate location of a slaughtering plant, such as technical services, repair services, fire protection, local taxes and laws, community characteristics, weather, and the like.

One of the factors mentioned above which should receive serious attention relates to the stability of the number and quality of cattle available for slaughter and the potential competition for the supply. Competition exists at the present time for the cattle that are ready for slaughter. Until feedlots, either farm or commercial, turn out more cattle fed to slaughter weights, this competition for cattle will increase significantly with additional slaughtering capacity.

For example, the suggested increase in capacity, 56,250 cattle, represents an increase of approximately 46 per cent over the actual number, 123,800, slaughtered in 1963. This increase is significant in view of unused capacity, which now prevails in most plants during certain times of the year. With continued educational efforts directed at the production of more fed cattle, competition for the available supply should become less.

If only one additional plant were erected in North Dakota, the logical location would be in the eastern section of the state, where potentials for the production of finished cattle are more favorable than in other areas of the state. West Fargo probably meets the qualifications for a satisfactory location as well as any town that might be suggested. One distinct advantage of this location is that it has a well-established cattle market. The transportation facilities to and from West Fargo are excellent (see Figures 1 and 3). Other places which meet most of the location prerequisites are in the vicinity of Bismarck-Mandan and Minot. The selection of a location should be made only after the advantages and disadvantages of alternative locations have been thoroughly analyzed, with particular attention given to the potential supply of slaughter cattle.

Slaughtering Plants on Indian Reservations

While the selection of a location of slaughtering plants should be based on physical and economic criteria, there are factors other than those which have been enumerated which deserve serious consideration.

For example, one of the problems in the area of economic development is closely related to the location of industry within or in close proximity to the Indian reservations in North Dakota. The question arises as to the advisability of locating a slaughtering plant on one or more of the reservations in this state. Even though such a location fails to meet the specified locational requirements, the sum total of advantages gained may outweigh the disadvantages.

Assume a plant with an annual capacity of 18,750 (or ten per hour) cattle were erected on one of the reservations. The killing-floor, cooler, dock, maintenance, hide-curing and clean-up operations plus the office work would require about 20 workers. A reduction to about one third of the above capacity would require a labor force of only seven workers.

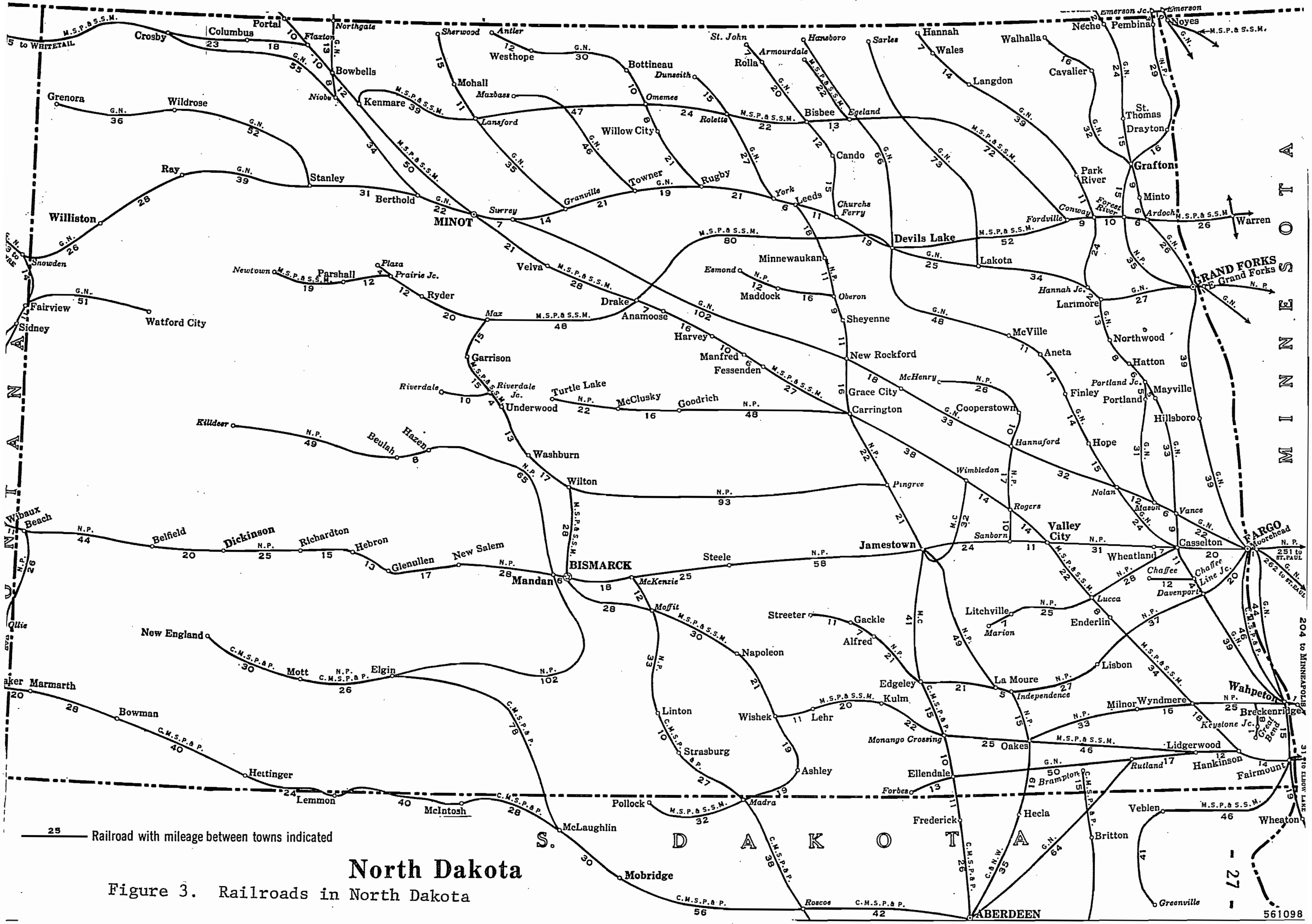

Figure 3. Railroads in North Dakota

There exist possibilities for the Indians on the reservations to engage in tanning operations which would offer an avenue of additional employment and income. A special program assigned to aid industry locating in reservation areas is an "on the job" program. Such a program could be of assistance to the Indians in acquiring the skills essential in some of the operations. Considering the dexterity of Indians, their adaptation to specific jobs should be relatively easy.[16]

Apparently, the costs of construction and equipment of a slaughtering plant on a reservation constitute no serious problem. Certain of the tribes have their own funds which may be invested, funds arising from grazing leases, settlement of claims, etc. In addition, they all gain access to funds through the Indian Revolving Credit Fund, as such moneys become available.

Some tribes, for example, the Standing Rock Sioux Tribe of North Dakota, have adopted a definite program for industrial and/or economic development which stipulates exactly what they might do in order to assist an industry locating on the reservation.

A plant on a reservation must compete with other plants in the acquisition of cattle and in the sale of beef carcasses. With specialized management it eventually should do as well economically as plants operating under similar conditions of a limited supply of slaughter cattle.

With full recognition of the favorable statements above, the establishment of slaughter facilities on or near the reservations at the present time does not appear feasible. It is doubtful that enough production could be generated by Indians and others in contiguous areas to support a plant, even one of a relatively small capacity.

Marketing of Beef

The supermarkets, particularly those within the chain organizations, have become the most important retail merchandisers of meat. These stores, and the same may be said of smaller stores, base their buying specifications on consumer demand. The consumer is becoming more and more quality conscious because of educational efforts directed in his direction.

A new packing plant erected in North Dakota must orient its selling efforts towards the demands of the large merchandisers, that is, the chain organizations. The specifications laid down by the chains are specific and rather rigid.

One of the main marketing problems confronting new packers as well as old is the establishment of contacts and obtaining favorable contracts with a chain organization. The bargaining power of the chains is enormous. This means that the packer must not only meet the quantity and quality buying

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[16]Some of the information contained in this section of this report was obtained from William Drake, Jr., Acting Area Resource and Industrial Development Officer, Bureau of Indian Affairs, Aberdeen, South Dakota.

specifications of the chains, but also maintain an aggressive sales organization of the highest quality.

It has been suggested that the annual capacity of any new plants erected in North Dakota during the next few years be limited to 56,250 cattle, Further, one half of the beef produced from this number would be consumed locally, replacing about 43 per cent of the beef presently imported from other states and one half shipped out of the state.

While the competition for the markets within the state is strong, it should not be too great a task to replace the above proportion now shipped into North Dakota. The savings in transportation provide a distinct advantage to the local packer; however, such replacement requires the production and aggressive selling of the kind of beef the market demands.

The additional amount of beef that would be shipped out of the state, equivalent to one half of 56,250 or 28.125 cattle, would be considered minor considering the potential increase in demand at the national level during the next few years. Nevertheless, the disposal of this additional amount in the midst of severe competitive conditions in the various markets necessitates an intensive study of market outlets, the character of the demand therein, and the development of an efficient merchandising program.

There is little evidence to confirm the belief that the West Coast constitutes a market for North Dakota dressed beef. The line which separates the supply sources of the western and eastern markets lies in Montana. It will continue in that position in the immediate future unless transportation rates change.

Federal Grading of Beef[17]

The provision for federal grading of beef is a distinct advantage to the packer who attempts to sell to chain or other large stores, particularly those who advertise and sell USDA grades of beef. This aids the independent packer in selling undifferentiated meats, which allows him to be at a higher competitive level with the nationally known packers.[18]

Federal grading also provides the basis for quality control in buying

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[17]Meat grading is sometimes confused with meat inspection. The latter service is for sanitation and freedom from disease. These inspections are conducted by the U. S. Department of Agriculture at no cost to the packer. Meat that has been federally graded and inspected carries two stamps. The circular inspection stamps which read "U. S. INS'D" have no relation to grade. The purple ribbon-like stamp with the grade name and the letters "USDA" denotes the grade and quality of the carcass. The cost of grading is borne by the packer. At the present time some federal graders are paid as high as $7.40 per hour.

[18]Rust, C. H., and C. R. Harston, "The Survival and Growth Potential of Small Meat Packing Businesses in Montana," Research Report, Montana Agricultural Experiment Station Bulletin 580, July, 1963.

and selling in that federal grades are used by the buyer in determining acceptability of the product.

It is recognized that the maintenance of federal grading is not always possible because of the cost involved. A small plant, unless it can obtain the services of a federal grader in cooperation with other plants, might find the cost prohibitive. The advantage arising from a better competitive position must be compared with the increased cost.

Cooperatively Owned Slaughtering Plants

Many farmers and farm groups are interested in handling livestock through cooperative meat packing plants. This desire to own and operate their own slaughtering, processing, and merchandising facilities is intensified during periods of low livestock prices and small feeding margins.

The increased emphasis on vertical integration in agriculture and especially in livestock production, marketing, and processing likewise encourages interest in cooperative meat packing. Development of cooperatively owned and operated feedlots also has made farmers consider anew the possibilities of owning their slaughtering and processing facilities.

The growth of mass retailing through chain stores and supermarkets, with its emphasis on specification buying, has raised this question: Can farms increase their bargaining power through their ownership and operation of packing plants?[19]

Cooperative ventures into meat packing business for the most part have been far from successful. All of the 17 plants which were organized between 1914 and 1920 failed or suspended operations for various reasons. Chief among these were lack of operating capital and member support, inadequate volume of livestock, inexperienced and unskilled management, keen competition, and unsatisfactory sales outlets. It is interesting to note that professional promoters were instrumental in bringing about the organization of eight of the thirteen cooperative enterprises.

From 1930 through 1963 14 cooperative meat packing plants began operations. Ten of these failed or ceased operations for one or more of the same reasons mentioned above. The remaining four are still doing business and can be classified as successful cooperative enterprises.

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[19]These comments and those which deal with the history of farmer cooperative packing plants and the prerequisites for successful organization and operation of such plants are based on the following references:

Fox, R. L., "Meat Packing Enterprises in the United States," General Report 29, Farmer Cooperative Service, U. S. Department of Agriculture, 1957.

"Recent Developments in Farmer Cooperative Meat Packing and Processing Plants," Information 18, Farmer Cooperative Service, U. S. Department of Agriculture, 1961.

These references should be read by any group of farmers who contemplate providing funds for a cooperative packing plant.

Feasibility of Cooperative Slaughtering Plants

Experiences of the early and more recently organized cooperative packing plants emphasize the need for prospective operators to do certain things if they hope to succeed. Included among these, the following are considered of prime importance:

1. Determine if there is a definite need for a new packing plant in the area. If so, can it be organized as a cooperative?

2. Obtain membership support. Farmers should expect to contribute both cattle and capital to make the cooperative a success.

3. Be sure there is an adequate supply of cattle to enable the plant to slaughter a uniform number per week.

4. Study the competition of other plants for the supply of cattle. There is little justification for farmers to build their own plant if the area is presently served by other plants that are slaughtering all available cattle and probably going outside of the area for additional cattle.

5. Determine the probable outlets for the beef--both local and regional or national. This is essential before the plant is built because the potential volume of sales will influence the decisions regarding size of facilities.

6. Analyze the labor supply. The needed skilled employees should be available locally. It is difficult to obtain foremen and supervisory employees from other areas.

7. Check the utilities. The availability of adequate water, sewage, and electricity at reasonable rates is essential.

8. Capital requirements and operating costs should be analyzed before plans are made to construct and operate a plant. Sources of finances and methods of financing should be determined.

9. Select the right location, one to and from which transportation poses no problem.

10. Obtain efficient management. This has probably been the most important factor in the success or failure of cooperative ventures.

Most of the suggestions which are listed above are not limited to cooperatives but apply to noncooperatives as well.

A careful programming of the above will help greatly in deciding whether a cooperative packing plant should be organized. Cooperatives in other lines have been eminently successful, particularly those which met a need and operated under efficient management. A cooperative slaughter plant can be successful if it operates as efficiently or more so than a noncooperative facility.

In addition to increased bargaining power accruing to producers as a group, a cooperative brings the group into more intimate contact with the market. The individual producer, therefore, is in a position to more clearly understand consumer market demands and the type of animal he should produce.

Ownership of the raw material, that is, the live animal, and cooperative ownership of the final product until it is sold avoids at least one transfer of ownership, thereby increasing to some degree the proportion of the consumer's dollar the producer receives.

It is doubtful, however, if attempts should be made at the present time to encourage the organization of cooperative packing plants in North Dakota. The number of cattle on feed or which will be fed out in the future is sufficient to provide for additional slaughtering; however, the number of high quality cattle is limited and keen competition exists for them. There is the additional difficulty of obtaining a uniform supply throughout the year. The latter situation can be the cause of unused capacity during certain periods of the year.

The maintenance of interest by farmers in their cooperative organization depends on a number of factors, not the least of which is the amount of patronage refunds available for distribution at the end of the fiscal year. The realization of earnings is often less than anticipated. Some idea of what may be expected financially may be obtained by observing the operation results of other packing plants in the United States.

For example, in 1963 the meat packing companies had earning ratios of .7 per cent to sales and 5.9 per cent to net worth. The comparable ratios of all manufacturing companies were 5.7 per cent and 11.5 per cent, respectively. Additional information on earning ratios is presented in Table 16.

The low ratios which have been determined for the meat packing companies do not necessarily mean that the meat packing companies on the average are in bad financial condition. They do mean that any promoters of a new company should analyze very carefully the conditions that make for financial success before any construction begins.

Many meat packers derive a significant proportion of their incomes from the manufacture and sale of by-products including pharmaceutical items as well as feed and fertilizer ingredients. It is from the sale of these products that many firms are enabled to maintain a favorable profit position. A cooperative packing plant of the size which might be contemplated for North Dakota probably would not be able to engage in the manufacture and sale of these products at least to the extent realized by larger firms.

It has been suggested that the annual capacity of any new plant erected in North Dakota in the near future be limited to 56,250 cattle. Such a plant would require an investment of $612,000 in land, plant and equipment, and corral if it conducted slaughtering only plus $562,500 in operating capital, or a total of $1,174,500.

If other operations are included such as primal cut breakdown and inedible processing, the total would amount to $1,287,500.

TABLE 16. EARNING RATIOS OF FOOD PROCESSORS, CHAIN STORES, AND MEAT PACKING COMPANIES, 1963*

Companies	Earning Ratios	
	To Sales	To Net Worth
	per cent	
16 Bakery products	3.0	11.0
11 Dairy products	2.7	10.8
17 Sugar products	4.3	10.4
92 Other food products	4.2	12.3
61 Food chain stores	1.2	11.5
21 Meat packing companies	.7	5.9
2280 Manufacturing corporations	5.7	11.5

*"Financial Facts About the Meat Packing Industry," American Meat Institute, 1963, Table 6 and Appendix Table VII, 1963.

If such a slaughtering plant were organized as a cooperative, the farmer clientele would be expected to furnish 50 per cent of the capital required or more than $600,000.

A plant with one third of the capacity considered above and conducting slaughtering only requires a capitalization of $455,000. Further, a plant of this size is not in as good a position in its bargaining on the selling side as the larger plant.

Sources of additional capital to finance cooperative slaughter plants are Bank for Cooperatives, local banking institutions, insurance conpanies serving the area, rural electric cooperatives to provide for loans for electric equipment, sale of preferred dividend bearing stock to nonproducer investors, and Area Redevelopment Administration or other government guaranteed programs which are designed to assist rural economy.

The cooperative packing plants which have been successful are the MFA Packing Company, Springfield, Missouri; Shen-Valley Meat Packers, Incorporated, Timberville, Virginia; and Farmbest, Incorporated, Denison, Iowa. The production of the MFA Packing Company is fairly evenly divided among beef, pork, and sausage products. This helps to utilize all meats produced as well as to make more effective use of the plant and equipment.[20]

Farmbest is a cooperative owned by local farmers and the Consumers Cooperative Association, Kansas City, Missouri. It started in 1959 as a hog slaughtering facility selling hog carcasses to the meat trade. It has added processing facilities which enable it to can, smoke, and cure all types of pork products.

[20]Fox, R. L., "Recent Developments in Farmer Cooperative Meat Packing and Processing Plants," Information 18, Farmer Cooperative Service, U. S. Department of Agriculture, 1961.

These plants have enjoyed good management, but MFA and Shen-Valley have had some problems in procurement of desirable livestock. The latter has been unable to build a beef business due to lack of uniform supply. A great deal of the output of these plants must go outside of their immediate territory where competition is great. Both Shen-Valley and Farmbest operate under Federal Meat Inspection, so they can ship across state lines.

These plants had their problems of building up their procurement systems and breaking into markets for their products. These are real problems which should be given full recognition by those considering the establishment of a slaughtering plant whether it is a cooperative or one owned by others. Any plant starting in a new area, if it is to be successful, will need to meet the competition which already exists in the market place.

Even though the organization of a cooperative slaughter plant is not advisable at present, it is not at all unlikely that such action will be appropriate in the future. How soon this will be depends largely on the supply of fed cattle of desired quality coming from both farm and commercial feedlots.

Summary and Conclusions

The inhabitants of North Dakota consumed 69,530,000 pounds of beef, carcass weight, in 1963. The live weight of cattle equivalent to this amount is estimated at 115,907,000 pounds. Subtracting farm slaughter from the latter figure leaves 96,796,000 pounds, or an equivalent of 93,073 cattle.

Commercial slaughter of cattle totaled 123,800 in 1963, with Area 9 in eastern North Dakota accounting for almost 80 per cent of the total.

Taking into consideration the amount of dressed beef shipped out of North Dakota in 1963, it is estimated that consumption requirements exceeded slaughter supplies available for local consumption by 62,431,000 pounds of live weight, or an equivalent of 60,235 cattle. These figures roughly represent the equivalents of dressed beef imported into North Dakota in 1963.

The projected number of cattle required to meet consumption requirements in North Dakota in 1970 is 102,380 head. With slaughter supplies available for local consumption projected at 37,073 cattle, which includes some additional slaughter by existing plants, the deficit of supplies would amount to 65,307 cattle.

Unless new plants are erected, this deficit must be met by imports of dressed beef from other states.

Assuming that about 43 per cent of projected imports could be supplanted by sales from new slaughtering plants and that one half of the total output would be exported, it is considered feasible to expand slaughter capacity by the erection of one or more new plants with a total capacity of 56,250 head. One plant of this size can achieve desired operating efficiency compared with plants of a smaller size.

An increase in capacity by this number will depend in part on an increase in the output of farm and commercial feedlots if the animals for slaughter are to be obtained from North Dakota sources. Competition now exists for the high quality product produced in North Dakota, and it will become more so with increased slaughter facilities.

A previous study has indicated that North Dakota could easily increase its output of fed cattle by 35 per cent by 1970, which would more than suffice for the suggested increase in slaughter of 56,250 cattle.

Efforts must not only be directed towards increasing the output of feedlots, but educational efforts must be made to emphasize the importance of uniform high quality and more uniform output during the year.

The important retail markets for dressed beef are the supermarkets, particularly those within a chain organization. These outlets are becoming more and more demanding in their quality specifications, and if North Dakota plants cannot meet these demands, plants in other states will do so.

It is true that consumer demand on which the retail outlet demand is based varies from locale to locale; nevertheless, the consumer is becoming more quality conscious. With increased income the consumer is in a position to pay a premium for the better quality of beef.

The ability of new plants as well as those now operating to compete with the national packers depends in large part on the quality of cattle from both the farm and commercial feedlots. The potential for producing what the market demands exists, that is, North Dakota can produce good quality beef.

The amount of labor needed in slaughtering establishments depends on a number of factors, the more important of which are size, degree of automation, and management. A one-bed plant with an annual capacity of 18,750 head requires only 20 employees, including the buyers, sellers, and management, as well as employees operating on the killing floor, cooler, dock, and in the office. A partly automated on-the-rail plant with three times the capacity, or 56,250 head, requires 40 employees.

A plant with an annual capacity of 18,750 head conducting slaughtering only requires an investment of $265,000 in physical facilities (land, plant and equipment, and corral) and $190,000 of operating capital, a total of $455,000. The addition of facilities for primal cut breakdown and inedible processing increases the total to $518,000.

A plant three times the above capacity, that is, 56,250 head, requires an investment of $612,000 in physical facilities and $562,500 of operating capital, or a total of $1,174,500. If provision is made for primal cut breakdown and inedible processing, the required investment increases to $1,287,500.

The annual operating costs of the smaller size plant are estimated at $243,928 and of the larger plant, $487,884.

The capital requirements and operating costs are approximations and should be regarded as conservative, because both are likely to increase

significantly during the next few years. They, as well as similar data for plants of other sizes, should at least serve as guide lines to those who are recommending the erection of slaughtering facilities.

The selection of a location for new slaughtering facilities should be based on an evaluation of the relative advantages and disadvantages of alternative locations. If only one plant is constructed, the vicinity of West Fargo meets the qualifications of an appropriate location probably better than alternative sites.

This location has a well established cattle market. In addition, the transportation facilities for the movement of cattle to West Fargo and the distribution of dressed beef from there to various destinations are excellent.

If three plants are erected, the vicinities of West Fargo, Bismarck-Mandan, and Minot are suggested.

The location of slaughtering plants on or near Indian reservations hardly seems feasible. The main justification for such a location lies in the employment of Indians for certain lines of work; however, considering the relatively small number of workers required by one of the smaller plants, the unemployment problem on the reservations would be eased only slightly. It is doubtful that the Indians and others in contiguous areas could generate sufficient production to justify a slaughtering plant on or in the vicinity of the reservations.

New packing plants erected in North Dakota should meet the requirements for Federal inspection because they must orient their selling efforts towards the demands of the large merchandisers. This means, as has been implied, that the packers must not only meet the quantity and quality buying specifications of chains and other buyers, but also maintain an aggressive sales organization. The sales organization operating in the midst of severe competition must make an intensive study of market outlets, the character of the demand therein, and the development of an efficient merchandising program. The use of federal grades facilitates this development.

The outlet for beef sales outside of North Dakota lies east and south of the state. There is little evidence to indicate that the West Coast will constitute an important outlet in the near future.

The increased emphasis on vertical integration in agriculture and especially in livestock production, marketing, and processing has encouraged increased interest in cooperatively owned slaughtering or meat packing plants.

Historically, cooperative endeavor along this line has not been an outstanding success. For various reasons failures have been numerous; however, there are some successful cooperatively owned plants now operating.

It is doubtful that attempts should be made to organize cooperative slaughtering plants in North Dakota at the present time. The financial requirements are heavy, and the risks are large. Even though such endeavor is not advisable, it is not at all unlikely that such action will be appropriate in the future. How soon will depend largely on the supply of fed cattle of desired quality coming from both farm and commercial feedlots.

A P P E N D I X

TABLE 1. COMMERCIAL CATTLE AND CALF SLAUGHTER, NORTH DAKOTA, 1948-1963

Year	Cattle		Calves	
	Number	Live Weight	Number	Live Weight
		thousand pounds		thousand pounds
1948	121,200	130,221	70,000	19,429
1949	113,700	116,704	52,200	14,790
1950	97,900	100,820	34,800	9,585
1951	92,800	97,603	28,600	7,805
1952	99,800	100,727	26,900	7,297
1953	118,800	116,259	26,200	6,912
1954	118,700	119,313	24,700	6,472
1955	133,000	133,820	29,600	7,672
1956	154,900	157,624	42,800	11,457
1957	147,000	150,985	35,000	8,732
1958	90,100	95,896	11,300	2,921
1959	47,100	51,055	500	191
1960	17,700	18,668	600	240
1961	96,100	105,093	300	161
1962	109,200	114,869	400	154
1963	123,800	134,144	300	100

Source: U. S. Department of Agriculture: Reports on Livestock Slaughter.