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FEASIBILITY OF COOPERATIVELY OWNED FEEDLOTS

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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 state-wide basis; however, a few areas in North Dakota have been designated eligible for assistance under the Area Redevelopment Act. Indian reservations were given consideration for the possible development of feedlots.

Initial interest in the feasibility of cooperatively owned feedlots was exhibited by grain and livestock producers and their organizations within the State. These people realized that at the present there are normally surpluses of grain and feeder cattle which are shipped out of North Dakota. Their desire is to establish a local industry that will more fully utilize their production efforts within the State and thereby increase their income.

The number of cattle feedlots in North Dakota is small, with only one cooperative in operation. Those furnishing custom feeding services are extremely limited.

This publication deals only with feedlots. The feasibility of slaughtering plants is now being studied. When this is finished, the technical assistance project in North Dakota will be completed.

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FEASIBILITY OF COOPERATIVELY OWNED FEEDLOTS[1]

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

A great deal of interest is being expressed by farmers, businessmen, and others regarding the potentials for livestock expansion in North Dakota, particularly in the production of finished or fattened livestock. Most of the interest which has been manifested in livestock expansion is in relation to cattle feeding. This interest has been prompted by the availability of feeder livestock, surplus feed and labor, and it has become greatly intensified in more recent years because of adjustments that are occurring in agriculture.

Supply and demand forces have necessitated the search for alternative enterprises that may be substituted for those which have been forced to reduce production. The reduction of wheat acreage in North Dakota has resulted in the substitution of feed grains for wheat. For example, barley is now second to wheat in acreage devoted to field crops. Production of barley in 1962 amounted to 99 million bushels, three-fourths of which was sold from farms.[3]

Even though a significant proportion of the sales was malting barley, it is likely that the feed barley which was sold could have been utilized more advantageously in the feeding of livestock. The producer considering cattle feeding as a new undertaking can choose one of several alternatives to achieve his objective. Among the alternatives are:

He may operate independently, that is, confine his operation to his own farm. The supply of feeder cattle may come from his own farm or from purchases made in his own or more distant areas. The better utilization of labor which is in surplus on many farms provides a motive for an individual farmer to either increase his cow-calf operation or to undertake the production of slaughter livestock or both.

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[1]Recognition is extended to Elmer C. Vangsness, Extension Resource Economist, B. Gene Crewdson, Extension Economist in Marketing, and James I. McDowell, Assistant Professor, Agricultural Economics, North Dakota State University, for their assistance in the preparation of this report.

[2]Dr. Cox is Professor and Dr. Taylor is Professor and Chairman, Department of Agricultural Economics, North Dakota State University.

[3]Agricultural Statistics No. 10, North Dakota Crop and Livestock Reporting Service.

The producer not having facilities or capital for equipment for finishing cattle but wishing to carry his stock to slaughter weights may arrange to have his cattle fattened in a commercial feedlot on a custom basis. The commercial feedlot may be privately or cooperatively owned. The amount of capital an individual farmer must contribute towards the construction and operation of a cooperatively owned feedlot would be much less than that needed to construct and maintain feeding facilities on his own farm.

At present, the number of commercial feedlots which do custom feeding in North Dakota is very limited. Consequently, comparatively few farmers have the opportunity to arrange for custom feeding. There is only one cooperatively owned feedlot in North Dakota.

Purpose and Method of Study

The purpose of this study is to identify and evaluate the various factors which should be considered in determining the feasibility of cooperative feedlots in various areas of North Dakota. The information which is presented in this report should be of assistance in appraising the desirability of entering feedlot operations on a cooperative basis.

Estimates are presented of the capital and labor requirements and costs of feedlots of 2,000 and 5,000 head capacity. Attention is also directed to the necessity of obtaining a high degree of utilization of the feedlot if economies of operation are to be obtained.

One of the latter sections of this report is devoted to an analysis of information obtained from farmers regarding their present type of cattle operations, their future plans, and their attitude towards the establishment of cooperatively owned feedlots.

The final part of this study is concerned with the factors basic to successful cooperative endeavor, the financing of cooperatively owned feedlots, and the financing of the farmer who patronizes a commercial feedlot.

Finishing cattle in a commercial feedlot has some distinct advantages. It enables the individual producer to put his cattle through to slaughter weights without interrupting the regular program of farm work. In addition, the owner of the cattle gains from the specialized management of a commercial feedlot that has training in nutritional aspects of cattle feeding. In years when the margin of profit in feeding is low, a knowledge of the new developments in nutrition may mean the difference between profit and loss.

Commercial feedlots are also credited with an advantage in selling the fed animals because of market knowledge. An additional factor is

that large-scale feeders offer livestock that is reasonably uniform in quality, is available regularly, and is available in large volume. Packer-buyers can inspect such livestock on a regular schedule and negotiate for the purchase of a large number of cattle in a single transaction--perhaps more than they could buy in a week of traveling among small feedlots. These buyers, thus, incur a smaller buying expense and may accomplish further savings because of the handling of animals in truck lots and carload lots rather than in small odd-size lots.

While this report is concerned with the feasibility of cooperatively owned feedlots, the methods of operation are similar to those of a privately owned and operated commercial feedlot as are the prerequisites for successful management and operations. These prerequisites are related to the appropriate location, essential volume, efficient management, capital and labor requirements, costs of operation, and the like. Consequently a large part of the analysis which follows is devoted to cattle feeding in general. If it appears that a feedlot is advisable for a particular area of the state, the decision can then be made regarding the feasibility of a cooperatively owned establishment.

It is estimated that consumption of beef in the United States will increase by at least 25 percent by 1975 without any increase in the per capita consumption. Are North Dakota farmers in a position to take advantage of this favorable outlook for the cattle industry? The next section of this report is intended to supply at least a partial answer to this question. It will be devoted in the main to an analysis of the livestock-feed balance of each county in ten areas into which North Dakota has been divided (Figure 1).[4] The analysis will aid in determining where conditions appear favorable for an expansion of cattle industry either in the production of feeder cattle or the feeding of cattle to slaughter weights or both. In addition, selected locations within the district will be designated which seem to be logical locations for an establishment of a cooperative feedlot.

Production and Utilization of Feed by Livestock and Livestock Expansion

Any marked expansion in the production and feeding of livestock in any county or area in North Dakota is dependent in part on the excess of feed supplies over those now being consumed by livestock. Other factors of significant influence include the desire of the individual farmer to

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[4]The ten areas were so selected as to be contiguous to a central city or cities and possessing somewhat similar livestock and crop enterprises. The central cities or the main trading centers generally meet the criteria which may be used in the selection of an appropriate location for a commercial feedlot. These criteria and the identity of the cities are found in pages 9-13.

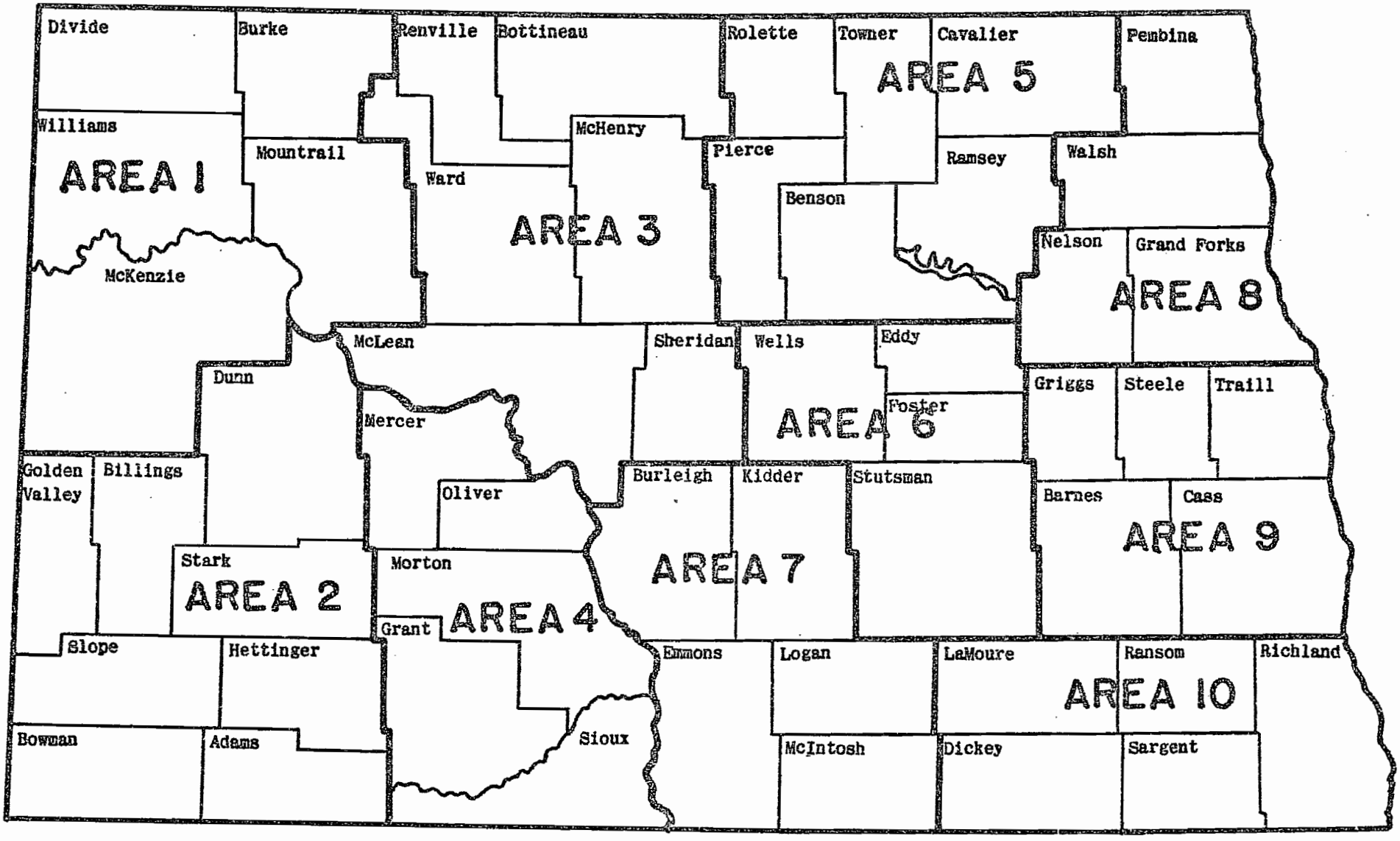

Figure 1. Area Designations for North Dakota Livestock Feedlot and Processing Study

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.

obtain a more complete use of farm labor, the roughage feed supply, and the range pasture land, and the pressure for increased income which may be obtained from adding to or expanding the livestock enterprise.

As with any pattern of agricultural production, alternative costs and returns over the long run will determine the more or less permanent combination of enterprises in an area. Long established practices followed by farmers tend to persist. This persistence or resistance to change, even though such may be economically feasible, is one of the reasons why various recommended adjustments are not put into practice.

The preceding factors and others are of much importance in determining the type of farm organization. It is unlikely, however, that farmers will raise or feed much more livestock unless there is a fairly adequate supply of feed from year to year. The same conclusion also applies in part to the establishment of a commercial feedlot.

There are a number of feedlots in deficit grain areas which feed out thousands of cattle each year. Some of these, as in Arizona, lie between the source of feed supplies and the ultimate markets; others are in areas such as Colorado where roughages and water are in plentiful supply. Feedlots in North Dakota are more likely to be located where minimum amounts of feed have to be shipped into the area.

In order to determine the amount of excess feed, if any, in the various counties, data have been assembled on:[5]

1. Available grain supplies expressed in terms of bushels of barley equivalent.

2. Roughage supplies expressed in terms of tons of hay equivalent.

3. Available pasture expressed as animal unit months.

4. Amounts of these respective feed categories consumed by the current inventories of livestock.

These county data plus estimates of the excess feed supplies are summarized in Appendix Table 4. This table is of particular use to a person who is primarily interested in the livestock-feed balance and the potentials for expansion in a certain county.

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[5]The procedures used in determining the bushels of barley equivalent, tons of hay equivalent, animal unit months, and amounts of feed consumed by livestock are given in Appendix, pages 37-38. These conversion coefficients have been suggested by Elmer C. Vangsness, Extension Resource Economist, North Dakota State University.

In order to obtain a somewhat broader view of the situation, the county data have been summarized by areas in North Dakota and are presented in Table 1. This table gives the current number of beef cows and cattle on feed and the potentials for expansion in terms of the limitations imposed by the feed supplies of the three categories of feed. For example, in Area 1, located in the northwestern section of North Dakota, the roughage supplies limit the degree of expansion in the number of beef cows. These supplies are sufficient to provide for an additional 13,289 beef cows, an increase of about 18 percent over the current number, assuming full usage is made of the roughage supplies. In the same area, the maximum expansion in the number of cattle on feed is 33,224, or more than three times the current number.

The data in Table 1 indicate that the grain supplies are so limited in Area 4 as to prohibit an increase in the number of beef cows or cattle on feed. In view of the plentiful available roughage supplies and the possibility of shipping some grain into the area, it is likely that some expansion in the number of beef cows can occur. It is doubtful, however, that conditions warrant an expectation of an increase in finishing cattle for slaughter.

The totals for North Dakota indicate that the number of beef cattle could be expanded by almost 61 percent. Pasture appears to be the limiting factor. If recommended practices for pasture improvement, such as fertilization and periodic seeding and so forth were used, the change would be much greater.

Grain supplies constitute the limiting factor to expansion of the number of cattle on feed; however, there are sufficient grain supplies to permit almost tripling the present number.

A more detailed analysis of the amount of expansion in the number of beef cows and cattle on feed in the various areas is provided by the organization of the data in Table 2. The maximum expansion in the number of beef cows corresponds to that listed in Table 1. The maximum expansion in the number of cattle on feed is also based on the data in this table; however, the numbers have been adjusted to take into account the feed that would be utilized by the increase in number of beef cows.

In order to be realistic, the estimated expansion in the number of beef cows and cattle on feed is limited to 25 percent and 40 percent of the maximum, respectively. Workers in this field may consider these proportions either too low or too high for some areas. If so, the proportions may be changed and adjustments made in the estimated expansion with little difficulty. Any increase would represent a big increase. Therefore it is logical to assume that the increase would be less than enough to utilize all surplus grain.

The potential maximum expansion in the number of beef cows is

TABLE 1. POTENTIAL EXPANSION OF THE NUMBER OF BEEF COWS AND CATTLE ON FEED BY AREAS IN NORTH DAKOTA*

	Number of beef cows				Number of cattle on feed		
		Potential expansion in terms of excess				Potential expansion in terms of excess	
Area	Current	Grain	Roughage	Pasture	Current	Grain	Roughage
1	70,990	863,400	13,289	65,339	10,000	71,950	33,224
2	123,650	424,354	76,648	103,258	16,500	35,363	191,619
3	70,500	1,464,305	79,772	124,341	18,000	122,025	199,431
4	103,000	---------	33,728	61,994	15,500	--------	84,320
5	34,342	1,074,393	23,978	--------	11,500	89,533	59,947
6	52,275	451,935	78,706	9,835	17,000	37,661	196,765
7	95,620	278,911	96,468	33,145	11,000	23,243	241,171
8	21,700	785,126	34,093	1,530	17,666	65,427	137,258
9	34,000	842,461	77,602	7,096	40,000	70,205	175,615
10	70,600	557,397	133,042	--------	29,500	44,296	332,605
State	676,677	6,737,282	667,326	406,538	186,666	559,703	1,651,955

*In the western areas of North Dakota the maximum expansion of the number of beef cattle, that is, the number of head that could be added using available feed supplies, is limited by the supply of roughage over that which is currently used by livestock. In the other areas the amount of available pasture is the limiting factor. In all areas the supply of grains places a limit on the maximum expansion of number of cattle on feed.

estimated at 13,209 in Area 1. If farmers did expand the number of beef cows by 25 percent of this maximum, the number would be increased by 3,322, or 4.7 percent above the present number. This figure added to the present number of beef cows of 70,990 gives 74,312.

The number of calves raised is assumed at 85 percent of the number of beef cows. Applying this proportion to the number of beef cows after expansion, or 74,312, gives 63,166 calves.

The potential maximum number of cattle on feed in Area 1 was given as 33,224 in Table 1; however, this number is reduced to 24,219 because of the feed consumed by the expansion of 3,322 beef cows. Forty percent of this potential maximum is 9,960. The latter figure added to the current number of cattle on feed, 10,000, gives a total of 19,960.

The difference between the number of calves raised, 63,166, and the number that could be fed out to slaughter weights, 19,968, is 43,198, which is an estimate of the number of feeder calves available for shipping out of the area.

The number of cattle on feed after expansion in Area 8 is estimated at 43,824, but the number of calves raised in this area totals only 18,770. Consequently, it would be necessary to import from other areas in North Dakota or other states 25,054 feeder calves to more fully utilize all feed resources.

Under the assumptions stated above, the total expansion in number of beef cows in North Dakota is estimated at about 10 percent over the current number. The estimated number of cattle on feed after expansion would be about double the present number.

The data which have been shown in the tables must be considered as approximations of the potentials for livestock expansion in the ten areas of North Dakota. They do suggest, however, the direction in which expansion may take and the areas which seem to offer the greater possibilities of expansion.

It is evident, however, that the excess feed supplies in many areas of North Dakota are sufficient to provide for a marked increase in the number of beef cows and in the number of cattle finished to slaughter weights. The estimates of the increases listed in Table 2 are conservative if one considers the increasing yields of grain and hay which occur year by year and the great opportunities that exist for the improvement of pastures and ranges.

In some areas of the state, particularly those in the Red River Valley, the size of beef cow herds is limited because of the small amount of pasture per farm unit. This, in turn, limits the number of locally produced feeders that later would go to the feedlot. The net returns

TABLE 2. ESTIMATES OF EXPANSION OF THE NUMBERS OF BEEF CATTLE AND CATTLE ON FEED BY AREAS IN NORTH DAKOTA*

	Areas										State
	1	2	3	4	5	6	7	8	9	10	
Beef cows											
Current number	70,990	123,650	70,500	103,000	34,342	52,275	95,620	21,700	34,000	70,600	676,677
Expansion in number											
Potential maximum	13,289(R)	76,648(R)	79,772(R)	33,728(R)	——(P)	9,835(P)	33,145(R)	1,530(R)	7,096(P)	——(P)	255,043
Estimated:											
Per cent of maximum	25	25	25	25	———	25	25	25	25	25	25
Number	3,322	19,162	19,943	8,432	———	2,459	8,286	382	1,774	———	63,760
Number after expansion	74,312	142,812	90,443	111,432	34,342	54,734	103,906	22,082	35,774	70,600	740,437
Calves raised											
Current number	60,342	105,109	59,925	87,550	29,191	44,434	81,277	18,445	28,900	60,010	575,177
Additional number	2,824	16,288	16,952	7,167	———	2,090	7,043	325	1,508	———	54,197
Total	63,166	121,391	76,877	94,717	29,191	46,524	88,320	18,770	30,408	60,010	629,374
Cattle on feed											
Current number	10,000	16,500	18,000	15,500	11,500	17,000	11,000	17,666	40,000	29,500	186,666
Expansion in number											
Potential maximum	24,919(R)	33,766(G)	120,363(G)	——(G)	59,947(R)	37,456(G)	22,552(G)	65,395(G)	70,057(G)	44,296(G)	478,751
Estimated:											
Per cent of maximum	40	40	40	———	40	40	40	40	40	40	40
Number	9,968	13,506	48,145	———	23,979	14,982	9,021	26,158	28,023	17,718	191,500
Per cent increase	100	82	267	———	208	88	82	147	70	61	102
Total number after expansion	19,968	30,006	66,145	15,500	35,479	31,982	20,021	43,824	68,023	47,218	378,166
Source of feeder calves											
Same area	19,968	30,006	66,145	15,500	29,191	31,982	20,021	18,770	30,408	47,218	309,209
Other areas	———	———	———	———	6,288	———	———	25,054	37,615	———	68,957
Feeder calves shipped out of area	43,198	91,385	10,732	79,217	———	14,542	68,299	———	———	12,792	———

*The letters G, R, and P enclosed in () at the side of the figures representing the maximum expansion simply indicate which of the feed items; namely, grain (G), roughage (R), or pasture (P) limits expansion.

from investment in fertilizer, weed spraying, and other crop management practices are likely greater than those which could be achieved by increasing the pasture acreage and investing similar sums in livestock.

The existence of ample feed supplies, however, is not a clear indication of success, because factors other than feed may be of much significance in limiting the expansion. Farmers who enter the livestock business on an extensive scale for the first time not only should have an inclination towards this type of farming but also need to possess the "know how" of livestock management if they expect to meet with success. Management ability needed in the production and marketing of grain is much different from that involved in livestock.

Furthermore, success in the production and marketing of livestock depends on staying in the business over a period of time. While some contraction or expansion may be advisable from one year to the next, the cattle business is not one adapted to the "in and out" procedure.

Suggested Locations of Commercial Feedlots

The feeding of cattle to slaughter weights may be carried out on the farm or in commercial feedlots. The location of commercial feedlots in an area demands a careful study of the advantages and disadvantages which alternative locations may possess. Some of the criteria which may be used in deciding upon an appropriate location are:

1. Supply of cattle
2. Nearness to feed grain source
3. Nearness to a trading center
4. Nearness to feed processing plants if a feed mill is not to be included in the organization
5. Nearness to slaughtering facilities
6. Proximity of marketing agencies, auctions, and other livestock marketing channels
7. Adequate transportation facilities and/or a satisfactory network of highways
8. Adequate community contributions related to financing and servicing feedlot operations, the labor force, and technical services including: veterinarian, repairs, fire protection, power, water, sewage, and others which are essential to successful feedlot operation

Possible location of commercial feedlots in various areas of North Dakota are as follows. These locations, which are shown in Figure 2, do not eliminate the consideration of other locations; however, it appears that they meet at least in part the previously mentioned criteria. In the actual selection of a location from a list of two or more alternatives, a detailed investigation of the advantages and disadvantages of each location should be made.

Area 1. The vicinity of Williston probably should be given first consideration as a location for the establishment of a commercial feedlot. Williston is an important trading center, and at the present time a livestock auction and slaughtering plant are located there.

Because of the variability of weather conditions which influences both the stability of the production of feed and of feeder cattle, it is likely that one additional commercial feedlot in the area would be sufficient to take care of the potential demand for custom feeding in the near future. A feedlot may be able to draw on the eastern part of Montana for feeder stock. This possibility, however, should not be given too much emphasis because of the competition of existing and proposed feedlots located in Montana.

Area 2. At the present time, the most important commercial feedlot in this area is located at Beach. It appears that if another one is established, the appropriate location would be in the vicinity of Dickinson where there are two livestock auctions, a slaughtering plant, and a feed processing plant.

Area 3. This area includes Minot, where there are two auctions and two slaughtering plants. North Dakota's only cooperative feedlot is located at Sawyer, a short distance from Minot. The establishment of this feedlot was based on a careful study of alternative locations. Over time, the organization and operation of this feedlot will serve as a guide to the initiators of other cooperative feedlots in North Dakota. This feedlot has room for expansion; therefore no additional lots are needed.

Area 4. It is suggested that this area confine its attentions to the cow-calf type of operation because of the apparent scarcity of feed. Any expansion in finishing cattle to slaughter weights should be done on the individual farm; however, any marked expansion along this line is quite doubtful. See comments on Area 7 relating to the Bismarck-Mandan vicinity.

Area 5. There are two possible locations for commercial feedlots in the area: in the vicinity of Rugby, where there is an auction, and near Devils Lake, where there is an auction and also a slaughtering plant.

Area 6. There are three alternative locations in this area which should be considered in the establishment of a commercial feedlot: Jamestown, Harvey, and Carrington. However, a good sized commercial feedlot is located at Carrington at the present time. The degree of competition for cattle, feed, and market outlets which would be offered by existing commercial feedlots is also a factor in selecting alternative locations within an area.

Area 7. The auctions and packing plants at Bismarck-Mandan offer inducements for the establishment of feedlots in the vicinity of these cities.

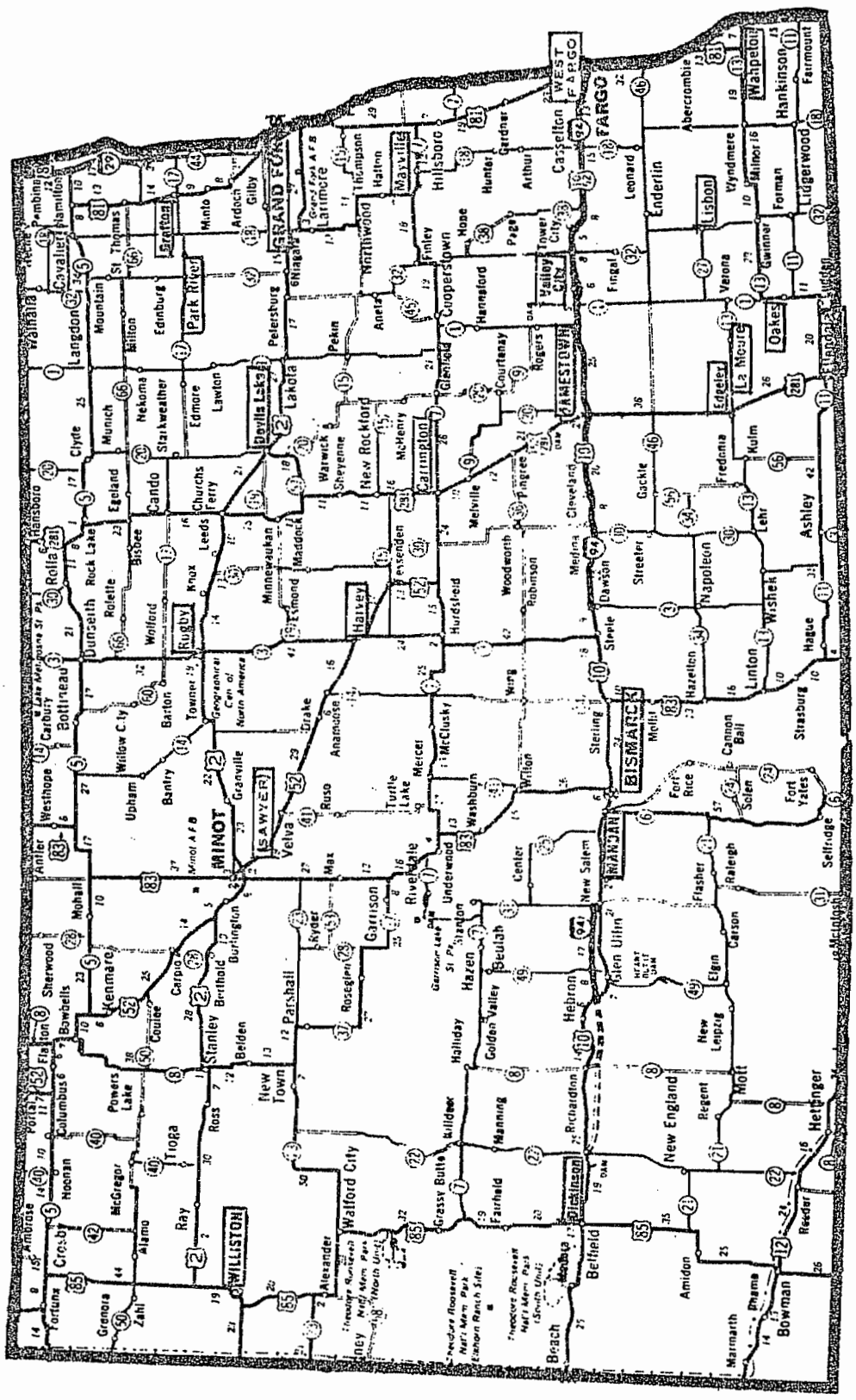

Figure 2. Suggested Alternative Locations of Commercial Feedlots in North Dakota

Area 8. Considering the stability of feed supplies and the cattle industry in general, this area, along with Areas 9 and 10, seems to offer greater possibilities of finishing cattle to slaughter weights than do other areas, either on the farms or in commercial feedlots. The one auction in this area is located at Park River. The latter town or Grafton, a few miles to the east, is a suitable location for a feedlot. Alternative locations are in the vicinity of Cavalier and Grand Forks.

Area 9. There are more farm feedlots and commercial feedlots located in this area than in any other. This may be due not only to the available auctions at different places and the packing plant at West Fargo, but also to the accessibility to North Dakota's only public terminal market at the latter place. In addition, this area is one of fairly stable feed supplies. Suggested alternative locations for additional commercial feedlots include the areas near West Fargo, Valley City, and Mayville.

Area 10. A number of locations should be considered as possible locations for commercial feedlots in this area. They are Lisbon, Wahpeton, LaMoure, Edgeley, Oakes, and Ellendale. The latter three towns have auctions.

The alternative locations which have been suggested for cooperative feedlots are not the only ones where a feedlot could probably be operated with success, but considering all factors, they do possess some distinct advantages which other locations may not possess.

It has been suggested that Indian farmers on the various reservations might profit if they had the opportunity of placing cattle in a nearby feedlot for fattening, thereby enjoying the same benefits that accrue to other farmers who follow this practice.

The only reservation in North Dakota where there is a significant number of Indian farmers raising livestock is Fort Berthold, which occupies parts of Dunn, McKenzie, McLean, and Mercer counties. There is no location central to this reservation which appears to meet the criteria which should be considered in the establishment of a commercial feedlot.

The only location which holds any possibilities is in the vicinity of New Town. A commercial feedlot located here would need the patronage of both Indian and White farmers if it were to be operated with a reasonable degree of efficiency.

Probably the best way for Indian farmers to obtain those advantages accruing to farmers who fatten cattle to slaughter weights is to send them to Sawyer, where a cooperative feedlot is located. It is recommended that the Bureau of Indian Affairs make the necessary arrangements with the management of this feedlot. The location of Sawyer relative to the reservation is such that the transportation of the young stock would not pose a serious problem.

The utilization of the facilities at Sawyer would be attended by much less risk than that connected with the establishment of a new feedlot considering the capital costs and the uncertainty of volume. This plan is at least worth trying even on a pilot basis.

It has been shown that feed supplies in excess of those now being utilized by livestock over a period of years are sufficient to permit an expansion in the cow-calf operation or in the number of cattle fed for the slaughter market or both in many areas of North Dakota. It must be emphasized, however, that recurring drouth years in some areas have a definite effect on the cattle industry, causing much instability both in the size of the breeding herd and the supply of cattle that might be put in a commercial feedlot. Economical operation of a commercial feedlot with its relatively high capital requirements requires a constant use from year to year as well as during the year at near capacity.

Figures 3 and 4 have been prepared to show the degree of variability of crop yields in each county of North Dakota during the period 1940-1962. In the space occupied by each county in Figure 2 there are recorded the following data in the order named: range in barley yields per planted acre, average yield, and index of variability of yield. Similar data are recorded for oats in Figure 3.[6]

Examination of the data shows that the range in yields for both crops was wider, the average yields were lower, and the index of variability was much higher in the western than in the eastern counties. The highest index of variability for barley yields was 50 in Billings and Sioux counties, and the lowest, 17 in Traill County.

The index of variability of the yield of oats was highest in Billings, amounting to 60. The lowest index of 19 prevailed in each of the three counties, Grand Forks, Traill, and Cass.

It is probable that an index of yields of roughages and one of pasture conditions would correspond closely to those of yields of barley and oats.

This instability of the supply of stockers and feeders along with that of locally grown feed affects all parts of North Dakota but particularly the western two-thirds of the state. Transportation of feed from surplus to deficit areas becomes very costly if the feed has to be shipped

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[6]The index of variability of yield per planted acre is more generally known as the coefficient of variability. This is found by dividing the standard deviation by the average yield and multiplying the result by 100. The index of variability for barley yields is 48 in Burleigh County. This means that the chances are two out of three that the yield in this county in any one year will not vary more than 48 percent from the average yield of 18.5 bushels.

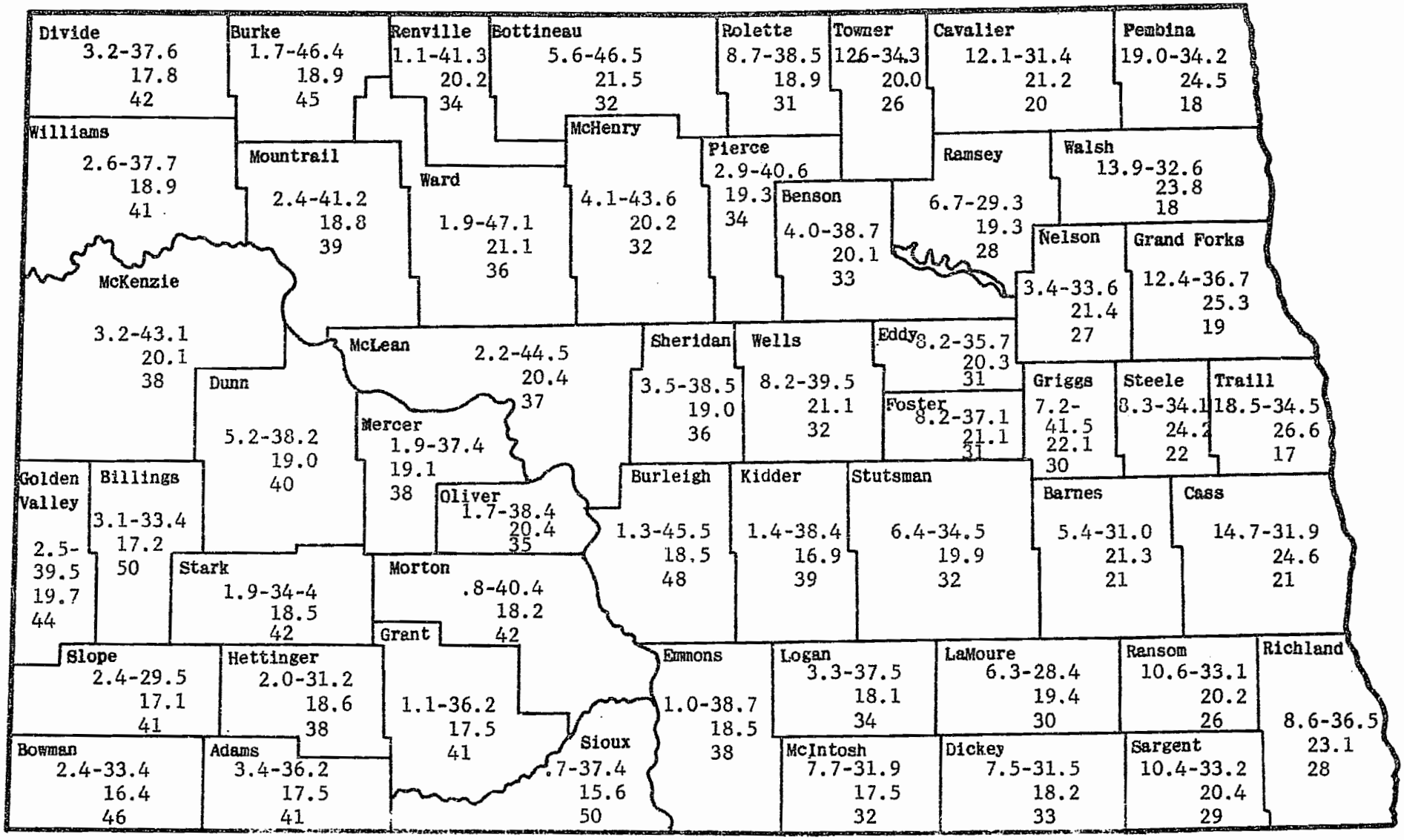

Figure 3. Barley: Range of Yield Per Planted Acre, Average Yield, and Index of Variability, by Counties in North Dakota, 1940-1962.

The top figures in each column represent the range in yield per planted acre during the 23-year period; the middle figure is the average yield; and the bottom figure is the index of variability of yield.

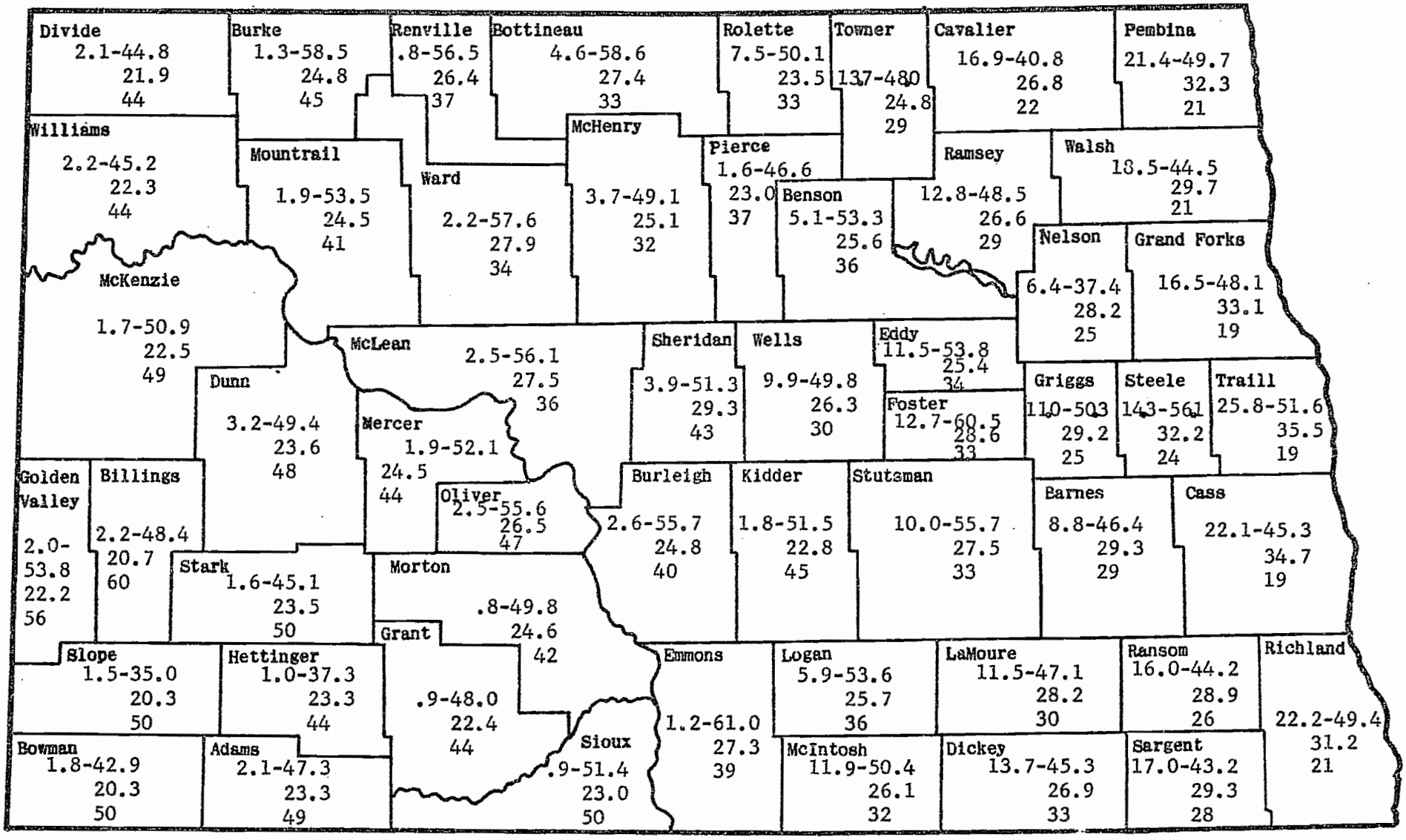

Figure 4. Oats: Range of Yield Per Planted Acre, Average Yield, and Index of Variability, by Counties in North Dakota, 1940-1962.

The top figures in each column represent the range in yield per planted acre during the 23-year period; the middle figure is the average yield; and the bottom figure is the index of variability of yield.

long distances in order to reach the feedlots, thereby adding to the operating costs. It is essential that livestock producers, businessmen, and others who are interested in the establishment of a commercial feedlot realize some of the inherent risks involved because of the variation in supply of feeder cattle and feed.

Another factor affecting the potential use of a commercial feedlot in many areas is the pattern of production and marketing ranchers have been following for years. For the most part, they have been cow-calf operators producing primarily for the stocker-feeder market. A comparatively few have fed cattle out to slaughter weights; consequently, they are not orientated towards cattle feeding. Furthermore, most are not fully aware of the advantages gained through marketing grain through cattle. To encourage more cattle feeding in an area, either on the farm or in a privately owned or cooperatively owned feedlot, a well planned and executed educational program is essential. Ranchers must become acquainted with both the advantages and the risks involved in finishing cattle to slaughter weights. Even in areas such as the eastern counties of the state where many cattle are now fed, an expanded educational program is advisable.

Size and Capacity Utilization of Feedlots

Commercial feedlots vary in size ranging from a few hundred to many thousand. Investigations regarding the effects of scale and utilization in the feedlot industry indicate that nonfeed cost savings per pound of gain accompany an increase in the size of the feedlot and the rate of utilization.

When feedlots are used continuously throughout the year, approximately three-fourths of the cost savings per pound of gain associated with scale are reached with a 2,000 head feedlot with practically none achieved in feedlots exceeding 5,000 head capacity.[7]

There are advantages, however, which accrue to feedlots of a larger capacity. For example, more market outlets are available to feedlots where the turnout is larger and fairly uniform over the year. Further, a large feedlot is in a position to employ high quality management, which is essential to the efficient operation of any size feedlot.

The rate of utilization is more important than is the difference in size. That is, at any particular utilization rate less than 100 percent the cost savings per pound of gain obtained by using larger feedlots are less than those associated with increasing the utilization of a feedlot of a given size.

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[7]McDowell, James I., Scale Economies and Returns in Commercial Feedlots, unpublished Ph.D. thesis, Oklahoma State University, 1963.

If a feedlot can operate at an average rate of 75-80 percent utilization, the nonfeed costs can at least be covered. In North Dakota the seasonality of cattle feeding necessitates almost 100 percent utilization during part of the year if an average rate of 75-80 percent is to be attained.

The more uniform the utilization is throughout the year, the more efficient and economical the operation is likely to be. Much emphasis will have to be placed on an educational program to get farmers to supply cattle to the feedlot on a year-round basis rather than seasonally.

In order to take advantage of the economies of size, probably the minimum size of a commercial feedlot which should be considered is 2,000 head capacity. It is unlikely that a commercial lot exceeding 5,000 head capacity will be planned in any area of North Dakota in the immediate future. In consequence, the following analysis of costs is confined to feedlots of 2,000 and 5,000 head capacity.

Capital Requirements and Costs

Estimates have been made of the capital requirements of a 2,000 head and a 5,000 head capacity feedlot. These estimates, which are listed in Table 3, are subject to change from time to time and place to place; however, they should provide a starting point in the consideration of capital requirements for commercial feedlots.

The total requirements for the 2,000 head and 5,000 head feedlot approach $154,200 and $247,800, respectively. The items included under improvements account for about 74 percent of the total requirements for the 2,000 head lot and 81 percent for the 5,000 head lot.

The cost of the feed mill and storage is included in the total requirements. In many locations prepared feeds may be obtained from existing nearby facilities, thus eliminating the feed mill from the capital structure and reducing the capital requirements to $79,200 and $97,800, respectively.

The decision to establish a commercial feedlot not only involves consideration of capital requirements but also of the annual capital costs, estimates of which are given in Table 4. For both size feedlots, the combined interest and depreciation costs account for about 80 percent of the total annual capital costs of $16,119 and $25,467, respectively. Again, if the feed mill and storage were dropped, the annual capital costs would be reduced by about 45 percent.

If a feedlot is to be operated on an economical basis, the number of cattle handled during the year should be about 37 percent greater than the rated capacity. That is, the number handled by the lots of 2,000 and

TABLE 3. CAPITAL REQUIREMENTS OF 2,000 AND 5,000 HEAD CAPACITY FEEDLOTS*

	CAPACITY					
	2,000 Head			5,000 Head		
Working capital			$ 20,000			$ 34,000
Land, 40 acres @ $100 per acre			4,000			4,000
Improvements						
Feed mill and storage		$75,000			$125,000	
Water system and well		8,000			10,000	
Trench silo		700			1,000	
Other improvements						
Concrete	$8,000			$16,000		
Pen construction	8,000			17,000		
Feed bunks, wood and angle iron in concrete	3,500			7,000		
Infirmary loading and holding pens	2,000			3,600		
Cattle scales	3,000			3,000		
Other buildings	5,000	29,500		5,000	51,600	
Total improvements			113,200			187,600
Total working capital, land, and improvements			$137,200			$225,600
Equipment						
Manure handling						
Used cat and scoop	$2,500			$ 3,000		
Used dump truck	1,500	$ 4,000		1,500	$ 4,500	
Feeding equipment						
Trucks (used)	$2,000			$ 4,000		
Feeding boxes	2,500			5,000		
Silage cutter and tractor	2,000			2,000		
Hay chopper and system	2,000	8,500		2,000	13,000	

(continued)

TABLE 3. CAPITAL REQUIREMENTS OF 2,000 AND 5,000 HEAD CAPACITY FEEDLOTS* (continued)

	CAPACITY					
	2,000 Head			5,000 Head		
Miscellaneous equipment						
Tractor and wagon	$2,000			$ 2,000		
Pick-up truck	1,500			1,500		
Cattle handling equipment	1,000	$ 4,500		1,200	$ 4,700	
Total equipment			$ 17,000			$ 22,200
Total investment			$154,200			$247,800

*These data are based in part on information obtained from the following publications:

South Dakota Agricultural Experiment Station Bulletin 494, "Economic and Organizational Aspects of Cooperative Feedlots," G. E. Marousek and H. J. Dirks.

North Dakota Farmers Union, Livestock Study Committee, "A Progress Report," and other reports.

Montana State College, A Thesis, "The Feasibility of Beef Feeding Cooperatives in Montana," R. L. Tinnermuir.

Oklahoma State University, An unpublished Ph.D. thesis, "Scale Economies and Returns in Commercial Feedlots, James I. McDowell.

Economic Research Division, Consumers Cooperative Association, "Commercial Cattle Feed Yards, Operating Policies, Facilities, and Cooperative Organization Guides."

5,000 head capacity should be close to 3,750 and 9,375 head, respectively. This assumes a turnover of two and one-half times and a capacity utilization averaging 75 percent.

Yearlings put in the lot weighing 650-750 pounds, fed for almost 150 days, and marketed at 1,000-1,100 pounds would result in a turnover of 2.5 times if the feedlot were in continuous operation. If calves, rather than yearlings, were put in the lot and partially grown there, the turnover and the number handled would be less. The most important factor is the maintenance of a high rate of utilization if costs are to be kept at a minimum.

The data in Tables 5 and 6 show how the increased use of capacity results in reduced capital requirements and annual capital costs per head.

For a 2,000 head feedlot, the capital requirements per head are estimated at $77.10 when only 2,000 head are handled, but drop to $30.84 when the number increases to 5,000, a turnover of 2.5 times. For the 5,000 head feedlot, the requirements per head amount to $49.56 when 5,000 are put through the lot. An increase in the number to 12,500 reduces the requirements to $19.82 per head. Without the inclusion of a feed mill and storage, the capital requirements decline about 50 percent.

An increase in the volume of cattle handled during the year results in a significant reduction in the annual capital costs per head. For example, when a 5,000 head lot feeds out 5,000 cattle, the annual capital costs per head (excluding those associated with the feed mill and storage) are $2.72. An increase in the number handled to 12,500, which represents a maximum utilization of the capacity, reduces the annual capital costs to $1.09 per head.

Labor Requirements and Costs

The labor needed to perform the normal operations of a feedlot other than those of a managerial nature are first presented on a per head basis (Table 7). Most operators of feedlots compute their costs on this basis.[8]

Furthermore, the requirements and cost figures per head are based on the total annual volume the feedlot would be expected to handle. Thus, a feedlot with a capacity of 2,000 head would handle 3,750 cattle annually assuming a turnover of two and one-half times and a capacity utilization averaging 75 percent. A feedlot of 5,000 capacity would handle 9,375 cattle under the same assumptions.

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[8]Part of the analysis of labor requirements and costs is based on Improved Methods and Facilities for Commercial Cattle Feedlots, J. F. Webb, Marketing Research Report No. 517, United States Department of Agriculture.

TABLE 4. CAPITAL COSTS OF 2,000 AND 5,000 HEAD CAPACITY FEEDLOTS

	Interest	Deprec.	Taxes*	Insurance	Repairs	Other	Total
			Capacity 2,000 Head				
Working capital	$1,200						$ 1,200
Land	220		$ 80				300
Trench silo						$140	140
Improvements							
Feed mill and storage	2,062	$ 3,750	750	$ 562			7,124
Water system	240	800	80				1,120
Other improvements	885	1,475	295		$ 250		2,905
Equipment	510	1,700	170	250	700		3,330
Total capital costs	$5,117	$ 7,725	$1,375	$ 812	$ 950	$140	$16,119
			Capacity 5,000 Head				
Working capital	$2,040						$ 2,040
Land	220		$ 80				300
Trench silo						$200	200
Improvements							
Feed mill and storage	3,437	$ 6,250	1,250	$ 938			11,875
Water system	300	1,000	100				1,400
Other improvements	1,548	2,580	516		$ 500		5,144
Equipment	666	2,220	222	400	1,000		4,508
Total capital costs	$8,211	$12,050	$2,168	$1,338	$1,500	$200	$25,467

Cost Rates

Interest rate:
- Working capital: 6%
- Land: 5½%
- Feed mill and storage: 5½% on one-half of value
- Water system: 6% on one-half of value
- Other improvements: 6% on one-half of value
- Equipment: 6% on one-half of value

Depreciation rates:
- Feed mill and storage: 5%
- Water system: 10%
- Other improvements: 5%
- Equipment: 10%

Taxes:
- Land: $2 per acre
- Feed mill, water system and other improve. & equip.: 1% of value

Insurance rates
- Feed mill: 50% of value times $1.50
- Equipment: estimated

Repairs: estimated

Other costs: trench silo: 20% of cost

*A question may be raised regarding the taxes on the improvements. Such are not normally taxable on the

TABLE 5. CAPITAL REQUIREMENTS PER HEAD*

Number of head fed annually	CAPACITY			
	2,000 Head		5,000 Head	
	With feed mill and storage	Without feed mill and storage	With feed mill and storage	Without feed mill and storage
1,500	$102.80	$52.80		
2,000	77.10	39.60	$123.90	$61.40
2,500	61.68	31.68	99.12	49.12
3,000	51.40	26.41	82.60	40.93
3,500	44.07	22.63	70.80	35.08
4,000	38.55	19.80	61.95	30.70
4,500	34.26	17.60	55.06	27.28
5,000	30.84	15.84	49.56	24.56
5,500			45.05	22.32
6,000			41.30	20.46
6,500			38.12	18.89
7,000			35.40	17.54
7,500			33.04	16.37
8,000			30.97	15.35
8,500			29.15	14.44
9,000			27.53	13.64
9,500			26.08	12.92
10,000			24.78	12.28
10,500			23.60	11.70
11,000			22.53	11.16
11,500			21.54	10.68
12,000			20.65	10.23
12,500			19.82	9.82

*The data on this table are based on those in Table 3.

TABLE 6. ANNUAL CAPITAL COSTS PER HEAD*

Number of head fed annually	CAPACITY			
	2,000 Head		5,000 Head	
	With feed mill and storage	Without feed mill and storage	With feed mill and storage	Without feed mill and storage
1,500	$10.75	$6.00		
2,000	8.06	4.50	$12.73	$6.79
2,500	6.45	3.60	10.18	5.46
3,000	5.37	3.00	8.49	4.53
3,500	4.60	2.57	7.28	3.88
4,000	4.03	2.25	6.37	3.40
4,500	3.58	2.00	5.66	3.02
5,000	3.22	1.80	5.09	2.72
5,500			4.63	2.47
6,000			4.24	2.27
6,500			3.92	2.09
7,000			3.64	1.94
7,500			3.40	1.82
8,000			3.18	1.70
8,500			3.00	1.60
9,000			2.83	1.51
9,500			2.68	1.43
10,000			2.54	1.36
10,500			2.43	1.30
11,000			2.32	1.24
11,500			2.21	1.18
12,000			2.12	1.13
12,500			2.03	1.09

*The data in this table are based on those in Table 4.

It is also assumed the work year consists of 50 weeks and the work week, 44 hours or a total of 2,200 man-hours. The yard labor is estimated at $2.20 per hour; however, the annual salary of a full-time yard worker is based on 52 weeks of employment or $5,034.

The data included in the table below are based on improved physical layouts for both sizes of feedlots which are discussed in this report. The layout for the larger feedlot, that is, the one with a capacity of 5,000 head includes a feed mill.

TABLE 7. LABOR REQUIREMENTS AND COSTS FOR PERFORMING THE YARD WORK IN OPERATION OF FEEDLOT

Capacity:	Requirements			Costs
	Man-hours		Man-equivalents**	
Number of Head	Per Head	Annual Total*	Annual Total	Annual Total
	Number	Number	Number	Dollars
2,000	1.04	3,900	1.77	8,910
5,000	.85	7,969	3.62	18,223

*The total man-hours required are obtained by multiplying the requirements per head by 3,750 and 9,375, respectively.

**Man-equivalents are derived by dividing the total man-hours required by the work year of 2,200 hours.

The required yard labor in terms of man-equivalents amounts to 1.77 and 3.62 for the respective capacities. The cost figures, however, do not take into account the yard work that normally is performed by the manager. The adjusted costs which are shown in Table 8 are based on the following assumptions:

The yard work performed by the manager in the smaller feedlot amounts to .77 man-equivalents and in the larger feedlot, .62 man-equivalents.

The annual salaries of the managers are estimated at $7,500 and $8,500, respectively.

The cost of bookkeeping is the final labor cost that must be added to the yard and management costs of $12,534 and $23,602, respectively, to obtain the total labor costs involved in the operations of feedlots with capacities of 2,000 and 5,000 head. This cost is estimated at $1,800 for the smaller feedlot and $2,600 for the larger feedlot on the assumption that the bookkeepers would be employed on a part-time basis.

TABLE 8. LABOR REQUIREMENTS AND ADJUSTED COSTS FOR PERFORMING YARD AND MANAGERIAL WORK IN OPERATION OF FEEDLOTS

Capacity: Number of Head	Requirements: Man-hours Annual Total		Requirements: Man-equivalents Annual Total	Costs: Annual Total
	Number		Number	Dollars
2,000	3,900	Yard Work		
		Manager	.77	5,775
		Other Labor	1.00	5,034
		Total	1.77	10,809
		Management	.23	1,725
		Total	2.00	12,534
5,000	7,969	Yard Work		
		Manager	.62	5,270
		Other Labor	3.00	15,102
		Total	3.62	20,372
		Management	.38	3,230
		Total	4.00	23,602

TABLE 9. ANNUAL CAPITAL AND LABOR COSTS INVOLVED IN OPERATION OF FEEDLOTS

Capacity and Type of Cost	Capital and Labor Costs: Annual Total	Per Head
	Dollars	
2,000 Head		
Capital	8,995	2.40
Labor		
Yard	10,809	2.88
Management	1,725	.46
Bookkeeping	1,800	.48
Total	23,329	6.22
5,000 Head*		
Capital	25,467	2.72
Labor		
Yard	20,372	2.17
Management	3,230	.34
Bookkeeping	2,600	.28
Total	51,669	5.51

*The layout for a feedlot with a capacity of 5,000 head includes a feed mill. If such were excluded, the capital costs would be reduced to $13,592. Specific advantages accrue to feedlots with capacities of 5,000 head or more which have their own feedmill and storage.

Total Capital and Labor Costs

Table 9 gives the sum of the capital costs and all labor costs for each size feedlot and the cost per head assuming that the smaller feedlot handles 3,750 head annually and the larger feedlot, 9,375 head. These costs total $23,329 and $51,669, respectively. On a per head basis the costs are $6.22 for the smaller feedlot and $5.51 for the larger.

There are other costs involved in the operations of a feedlot, such as gasoline or other fuel for operation of machinery, electricity, etc; however, the capital and labor costs probably account for at least 90 percent or more of the annual operating costs.

Results of a Survey of North Dakota Farmers[8]

A recent inquiry was directed at North Dakota farmers by the Agricultural Extension Service, North Dakota State University, for the purpose of obtaining information regarding the pattern of livestock production and marketing in North Dakota. This inquiry also included accessibility of commercial feedlots to livestock producers; the plans of producers regarding livestock expansion in the next few years; and their interest in and probable participation in the organization of cooperatively owned feedlots.

Replies to the inquiry were received from 771, or 32 percent, of the 2,381 farmers who were contacted by mail. Of the number who replied, 443 kept beef cows or heifers two years old or over, 30 had dairy cattle, and the remainder had no cattle. The discussion which follows and the tabulations included in Appendix, pages 40-41, are based mainly on the replies of these 443 farmers who are maintaining a beef herd. There were 118 farmers, or 27 percent of this group, who fed cattle to slaughter weights, the proportions ranging from 20 percent or less in Area 1 through 4 to 40 percent or more in Areas 8, 9, and 10.

Only 50 of the 118 farmers were operating their feedlot to capacity. The reasons given by many for a less than full utilization included: "shortage of water," "difficulty of obtaining efficient help," and "lack of feed." Some indicated the lack of capital was a factor limiting the number of feeder stock purchased.

The terminal market appears to be the most important market outlet for slaughter cattle marketed from areas in the eastern part of North Dakota. This is probably due to the proximity of the terminal market at West Fargo. In most of the other areas farmers market most of their slaughter cattle through the auction.

Only 95 farmers, or 21 percent of those keeping beef cows, reported

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[8]The nature of the inquiry is found in the Appendix, page 39.

that there was a commercial feedlot in their area. Almost one-half of these were located in Area 3, where the cooperatively owned feedlot at Sawyer is located. With the exception of Area 3, less than one-half of the producers who said there was a commercial feedlot in the area knew little about its operation. For example, most of them did not know whether or not the management provides for custom feeding of cattle.

Only 11, or less than 3 percent, of the 443 farmers said they sent cattle to a commercial feedlot for custom feeding. This low number is probably another indication of the very limited number of custom feedlots to which farmers can send cattle for custom feeding. The small number of such feedlots, however, may be due to the lack of demand on the part of livestock producers for the various services which commercial feedlots of this type are able to render. This lack of interest and demand is likely due to inadequate knowledge on the part of producers regarding the objectives and methods of operation of these feedlots and the cost savings and other advantages which they can offer to the producer. Also, it may be due to the fact that a change to custom feeding involves a departure from long established patterns of livestock production and marketing.

Seventy-seven, or 17 percent, replied in the affirmative to the question: "If your area does not have a commercial feedlot that does custom feeding, should one be organized?" The highest proportions of the farmers replying were 38 percent and 37 percent in Areas 1 and 4, respectively. More than one-third, or 160 out of the 443 farmers with beef cattle, said that if a new feedlot were organized, it should be set up as a cooperative; however, many of these did not intend to patronize the feedlot.

The number of farmers who indicated that they would buy at least one or two shares of stock in a 2,000 head capacity feedlot totaled 61, and 38 said they would buy at least this many in a 5,000 head capacity feedlot.

According to the replies, farmers expect to expand their livestock operations during the next few years. The most important phase of this expansion will be an increase in the size of the beef herd; 58 percent of the farmers said they expected to enlarge the herd, the proportions ranging from 39 percent in Area 8 to 67 percent in Area 2. More than one-fourth (27 percent) expected to feed more cattle to slaughter weights on their own farms. The lowest proportion, 15 percent, was in Area 6 and the highest, 41 percent, in Area 9. Only 11 percent expected to make greater use of commercial feedlots.

The particular phase of the cattle cycle which exists at the present time undoubtedly influences the intentions of livestock producers. If the inquiry had been made at a time when returns from fattening cattle were more favorable than at present, it is likely that a larger proportion of farmers would have indicated that they intended to expand their cattle feeding operations.

The replies to the inquiry confirm the previously held opinion that

a comparatively few farmers have access to a commercial feedlot which has arrangements for custom feeding of cattle. Unless producers live in a vicinity where there is a feedlot that provides for custom feeding, it is unlikely that they are aware of the advantages of this type of operation. Before a feedlot of this type is organized, either on a cooperative or other basis, it is essential that an educational program be put into effect in order to analyze the pros and cons of sending cattle to a commercial feedlot for fattening to slaughter weights.

Cooperatively Owned Feedlots

If a group of farmers and businessmen in a community decide that a feedlot should be organized which will provide for custom feeding, the question arises as to whether it should be organized on a cooperative basis.

North Dakota farmers, whose activities have been concerned mainly with the production and marketing of grain and/or dairy products, have long been associated with cooperative elevators and cooperative creameries. Further, they are well aware of the requisites to successful cooperative enterprise as well as the distinct benefits to be derived therefrom.

Since the decline of livestock shipping associations, North Dakota livestock producers have had less direct contact with cooperatives. This is probably one of the reasons why producers who were included in the survey of North Dakota farmers indicated a genuine interest in the organization of cooperatively owned feedlots.

The organizers of a cooperative feedlot need to understand the features of a cooperative organization and the benefits to be derived from this type of operation. In general, a cooperative feedlot would have the following features:

1. Ownership, control, and benefits would be retained by the livestock producer who uses its services.
2. The services to be provided by a cooperative feedlot to its members would include:
   a. Providing of short-term credit to members for financing of cattle or assisting members to obtain credit from other sources.
   b. Order buying of calves or cattle for members to place in the feeding program or accept calves produced by farmer members.
   c. Contracting out calves or cattle to farmer members for a warm-up period, assuming that the financial position of the cooperation is such that it can buy young stock. (This will allow the member the opportunity to

market otherwise nonmarketable feeds and at the same time receive a return on a part of his labor that may not be readily marketable in other forms.)

d. Feeding out of cattle and calves previously contracted out to farmer members and feeding out of heavier cattle produced or purchased by members for direct placement in the feedlot.

e. Providing marketing services either direct by the feedlot or through existing cooperative marketing agencies or slaughtering plants.

The cooperative feedlot could benefit its members as a concentrated operation as opposed to small individual operations in the following ways:

1. Provide expert feeding and marketing management, which they as individuals could not otherwise obtain.

2. Obtain many of the buying and selling advantages now enjoyed by privately owned commercial feedlots.

3. Provide for reduction of risks by pooling arrangements.

4. Provide a means by which many small farmers can expand the size of their operations and increase their income beyond that which would be possible for them acting as individuals.

The achievement of the above benefits depends in large part on the quality of the management and the recognition of the importance of efficient management by the members. A cooperative is a business organization, and its success depends in large part on maintaining sound business practices.

Financing Cooperatively Owned Feedlots

The decision to establish a cooperatively owned feedlot rests primarily with the producers in the area. The data in Table 3 indicate that the capital requirements of a 2,000 head and a 5,000 head capacity feedlot are approximately $154,200 and $247,800, respectively. The amount of operating capital is estimated at $20,000 and $34,000, respectively.

One of the main points that would need to be emphasized by the initiators of a cooperatively owned feedlot is that at least 50 percent of the capital requirements should be furnished by the prospective patron members. Consequently, the minimum contributions by the latter towards the purchase of shares of stock amount to $77,100 for a 2,000 head capacity and $124,400 for a 5,000 head capacity. These requirements could be reduced by approximately one-half if feed is secured from other processors.

In order to keep the feedlot operating at a minimum of 75 percent capacity on an average, it would be required that the number of cattle put in a 2,000 head feedlot during the year should be at least 3,750 and, for a 5,000 head feedlot, 9,375. If each member supplied an average of fifteen head of cattle to the feedlot, the number of members would approximate 250 and 625, respectively.

With the members financing 50 percent of the capital requirements, it would be necessary for the 250 members of the 2,000 head capacity to purchase a minimum of $308 of capital stock. This assumes that the minimum amount of operating capital required is $20,000. This amount is essential considering the instability of the production of feeder cattle and feed.

For the 5,000 head feedlot, the contribution of almost $200 would be required per member if the operating capital were to be maintained at a minimum of $34,000.

The management of a cooperatively owned feedlot may bill the patrons monthly for the feed and yardage expense or wait until the cattle are sold from the lot. If the latter procedure were followed, the amount of working capital needed would increase in proportion to the amount of credit extended.

It is essential that fairly accurate estimates be made of the capital structure before plans are presented to a group of farmers who are interested in patronizing this type of organization. Also, it is necessary to survey the area in order to determine the probable sources of feeder stock and the number of farmers who would provide animals for custom feeding.

Cooperatives have access to a number of sources of funds which are required in addition to the patron members' contributions. One of the main sources which should be investigated is the Bank for Cooperatives. The Bank for Cooperatives was organized for the benefit of producer cooperatives, and this organization is in a position to extend positive suggestions for sound financial management.

Another source is the rural electric cooperative. The cooperatively owned feedlot at Sawyer, North Dakota, was financed in part by this organization. Normally, the amount of money this organization can loan is determined by the value of the electrical equipment and its use.

Area Redevelopment Administration funds may be available to help finance facilities in designated areas.

Another source of capital is from the sale on preferred stock, non voting, to non producers.

Local banks also are available to service cooperatives; however, the large amount of capital required may prohibit the local banks from participating in financing the feedlot.

The proprietors of a non-cooperatively owned feedlot with adequate financing can buy feeder stock on its own account if the amount of custom feeding is not sufficient to provide for adequate utilization of the feedlot facilities. Most of the existing feedlots in North Dakota confine their operations to buying and selling on their own account. It is doubtful if a cooperative should engage in this type of operation because of the amount of capital required and the risk involved; however, such operations may be necessary at times to keep operating expenses in line.

Financing the Producer

A rancher who has followed the pattern of raising and selling young stock receives his money at the time of sale. If he puts his cattle in a feedlot, he must wait from four to six months before his cattle are ready for sale. This waiting period tends to be an obstacle to a rancher who may be thinking about changing from a cow-calf operation to finishing cattle for the slaughter market.

Likewise, the farmer who is classified as a grain farmer hesitates to change over to even a partial livestock operation because of the waiting period before he can make his cash sales. This is true even though many cash grain farmers could improve their financial status and obtain a better utilization of their resources, particularly labor, if they added livestock to their operations.

It is doubtful if cooperatively owned feedlots will ever become important in North Dakota unless the producer can be financed from the time he puts cattle in the feedlot until they are ready for the market. This should not be too difficult a task because the young stock put in the feedlot could be used as collateral for the loan, the amount of the loan depending on the current value of the collateral.

Feed and yardage costs which are usually paid monthly depend on the weight of cattle when they are put in the feedlot and on the price of feed. Assume that this charge amounts to 45 cents per head per day for yearlings weighing 650 pounds. If they are kept on feed for 150 days, the cost would be $67.50 per head. For cattle weighing 450 pounds the cost per head per day would approximate 35 cents.

In the more prominent feeding areas of the United States, particularly in the cornbelt region, local banks and other credit agencies, such as the production credit association and Farmers' Home Administration, loan funds to farmers who are carrying their stock through extended feeding periods.

In the areas where feeding to slaughter weights is not common, local credit sources are not fully acquainted with the procedures followed in other areas. Consequently, the success of a cooperative program not only depends on promoting an educational campaign among ranchers but also among banks and other lending agencies.

If the cooperative feedlot is to be the source of funds, then it is necessary for the organization to make arrangements for operating capital.

Summary and Conclusions

Available feed supplies on the average in North Dakota are such as to permit a 10 percent expansion in the number of beef cows and a doubling of the number of cattle fed to slaughter weights. Expansion possibilities prevail in practically all areas; however, they are more pronounced in some areas than in others.

It is recognized, however, that a number of other factors will influence the degree of expansion that may be expected in the future. Prominent among these is the resistance to changing the mode of farming, that is, a reluctance to change the combination of enterprises. This reluctance often is a recognition of the particular management skills prerequisite to successful livestock operations, skills that are not common to those required in grain farming.

In addition, and this is important, some farmers choose to maintain the status quo as a matter of preference, even though the changeover to some phase of cattle feeding operations would prove profitable. Probably, the factor which will ultimately dominate in bringing about a change involving an increase in cattle production and feeding will be the economic pressure on the individual to increase his income.

Feeding cattle in commercial feedlots has distinct advantages over feeding on the farm. It enables the producer to put his cattle through to slaughter weights without interrupting the regular program of farm work. Of particular importance to the smaller farmer or one with only a moderate degree of experience with livestock is the opportunity to obtain the services of the specialized management of the feedlot in particular as it relates to the nutritional aspects of cattle feeding.

The determination of the location of a feedlot in an area demands careful scrutiny of alternative locations. The ultimate selection should be based on how close these locations meet specified criteria. The particular locations mentioned are not all inclusive but are at least suggestive.

The capital requirements and annual capital costs have been determined for commercial feedlots of 2,000 and 5,000 head capacity. It is estimated that when feedlots are used continuously throughout the year, about three-fourths of the cost savings associated with scale of operations are reached with a 2,000 head feedlot, with practically none achieved in feedlots exceeding 5,000 head capacity. In fact, the rate of utilization is of particular importance.

In addition to efficiencies of size and higher rates of utilization,

a number of price and marketing advantages accrue to feedlots having these efficiencies. It is doubtful if either a 2,000 head or a 5,000 head capacity feedlot can be operated economically unless the number being fattened in the lot averages around 75 or 80 percent. This means that at certain times in the year the lot must be filled to capacity. To insure an economic operation, it is likely that the number of cattle put in the 2,000 head capacity during the year should be 3,750 or more. For the 5,000 head capacity the number should be about 9,375.[9]

This is a point which should be emphasized when an individual or group of individuals is considering the establishment of a commercial feedlot.

The capital requirements and the capital cost figures which have been presented are approximations and will serve as a starting point in analyzing the capital structure of a contemplated feedlot.

The labor required to operate a 2,000 head feedlot which feeds out 3,750 cattle annually includes a manager who devotes one-fourth of his time to management and one other worker. The operation of a 5,000 head feedlot which handles a total of 9,375 cattle during the year requires four men including the manager. The latter spends almost three-fifths of his time on managerial duties.

It is evident that commercial feedlots of the size considered in this study require a comparatively small amount of labor. Consequently, they cannot be considered an important market for surplus labor in the community.

The analysis of the replies to a survey by the Extension Service of 2,386 farmers shows rather definitely that comparatively few farmers have access to a commercial feedlot that does custom feeding. This indicates the need for additional feedlots in North Dakota which do custom feeding. At the present time, unless the young stock can be fattened on the home farm, it is necessary to send them to market. The farmer does not have the opportunity to have them fattened in a commercial feedlot and at the same time retain ownership of the cattle. In North Dakota, farmers have a minimum acquaintance with the operations of commercial feedlots.

The establishment and operation of a commercial feedlot is attended by a certain amount of risk. If the feedlot is privately owned, the operator assumes full responsibility for its operation, its success or failure.

Before a cooperatively owned feedlot is organized, the interested parties should acquaint the prospective members and patrons with all phases of its operation, obligations of the members, and the benefits to be derived from this type of business organization. It is apparent that

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[9]These figures assume a turnover of 2.5 times, and an average capacity utilization of 75 percent.

much ground work of an educational nature is essential. A minimum knowledge on the part of the members is not enough; full acquaintance with all phases of the cooperative enterprise is essential. Contracts to assure patronage from the members of the cooperative organization are necessary if the desired utilization is to be attained.

It is doubtful if intensive interest and participation in a cooperatively owned feedlot will prevail unless the farmer can be financed from the time he puts cattle in the feedlot until they are ready for market. This means that the initiators of this type of feedlot must make arrangements with the various financial agencies for the financing of farmer cooperators. In some cases the cooperative itself may have sufficient operating capital so it can provide short-term credit to members.

Because cooperatively owned feedlots are new in North Dakota, lenders who have loanable funds will require complete details of the objectives and methods of operation. A certain amount of educational work among these groups is essential.

A P P E N D I X

METHODS USED IN THE DETERMINATION OF MAXIMUM EXPANSION OF LIVESTOCK PRODUCTION ON BASIS OF EXCESS FEED SUPPLIES

1. Five-year averages of the production of grains and roughages were obtained. These averages were converted to bushels of barley equivalent and tons of hay equivalent, respectively, by use of the following conversion factors:

Grains	
Barley	1.00
Corn	1.25
Oats	.63
Millet	1.25

Roughages	
All hay	1.000
Corn silage	.333
Sorghum silage	.333
Sorghum forage	1.000
Corn forage	1.000

2. The acreages of cropland pasture, woodland pasture, and other (open) pasture, as reported in the 1959 U.S. Census of Agriculture, were converted to animal unit months by multiplying the respective acreages by the following factors:

	Areas of North Dakota		
	West	Central	Red River Valley
Cropland pasture	1.250	1.667	2.500
Open pasture	.667	.833	1.250
Woodland pasture	.417	.522	.833

3. The number of the various kinds of livestock was multiplied by the following feed requirements per unit in order to obtain estimates of the utilization of grains, roughages, and pasture by livestock.

	Source of data	Requirements per unit		
		Bushels of barley equivalent	Tons of hay equivalent	Animal unit months
Beef cows	Estimates by county agents, Jan. 1, 1963	5.0	2.0	7.0
Cattle on feed	Estimates by county agents, Jan. 1, 1963	60.0	.8	---
Dairy cows	North Dakota Crop and Livestock Statistics, Jan. 1, 1962	40.0	6.5	7.0
Stock sheep	North Dakota Crop and Livestock Statistics, Jan. 1, 1962	4.0	.4	1.2

(continued)

	Source of data	Requirements per unit (continued) Bushels of barley equivalent	Tons of hay equivalent	Animal unit months
Laying hens	North Dakota Crop and Livestock Statistics, Jan. 1, 1963	1.55	---	---
Litters of hogs	1959 Census of Agriculture	140	---	---
Turkeys raised	1959 Census of Agriculture	1.0	---	---
Horses	1959 Census of Agriculture	10.0	2.0	6.0

4. The differences between the amounts of the respective feeds produced and the utilization by the inventories of livestock provide estimates of excess feeds which may be used for expansion of livestock production.

5. The excess feeds divided by the per unit requirements of beef cows and cattle on feed gives an estimate of the maximum expansion of these classes of livestock.

BEEF CATTLE: SURVEY OF NORTH DAKOTA FARMERS
BY EXTENSION SERVICE, NORTH DAKOTA STATE UNIVERSITY

Mailing address _____ Size of farm _____acres

1. How many cattle do you have on your farm? Total cattle _____, Beef cows and heifers two years old and over _____, Steers _____, Calves _____, Others _____
2. Do you feed cattle to slaughter weights on your farm? Yes _____ No _____
   a. How many do you usually feed? _____
   b. What percent of the number fed are raised on your farm? _____
   c. Are you operating your feedlot to capacity? Yes ____ No ____
   d. Would you feed more cattle to slaughter weights if the size of the feedlot permitted? Yes _____ No _____
   e. What other factors limit the number of cattle that you feed to slaughter weights? _____
3. Do you usually purchase calves? Yes ____ No ____ Yearlings? Yes ____ No ____
   a. What is the usual weight at time of purchase? Calves _____ Yearlings _____
4. Where do you usually sell your cattle?
   a. Slaughter cattle: Terminal market __, To a direct buyer __, At an auction__
   b. Feeder cattle: Terminal market __, To a direct buyer __, At an auction ____
5. Is there a commercial feedlot in your area? Yes ____ No ____
   a. Location (near what town) _____
   b. Miles from your farm _____
   c. How many cattle can it handle at one time? _____
6. Does this commercial feedlot accept cattle for feeding on a custom basis? Yes ____ No ____
7. Does this feedlot buy cattle directly, that is, take title and finish them for slaughter? Yes ____ No ____
8. Do you send cattle to this or any other commercial feedlot for custom feeding? Yes ____ No ____
   a. What is the usual number? _____
   b. The cattle are put into the commercial feedlot at what weight? _____
   c. What percent of the cattle which you purchase are put in a commercial feedlot for finishing on a custom basis? _____
      None ___, 1-24% ___, 25-49% ___, 50-74% ___, 75-99% ___, All ___
9. If your area does not have a commercial feedlot that does custom feeding:
   a. Should one be organized? Yes ____ No ____
   b. How many cattle would you usually send to the lot for custom feeding? ____
10. If a new feedlot were organized, should it be set up on a cooperative basis? Yes ____ No ____
    a. Producers should furnish at least 50 percent of the capital requirements of a cooperatively owned feedlot. The minimum capital requirements of a 2,000 head capacity lot are about $70,000 and of a 5,000 head lot, $125,000.* What would be the maximum number of shares of stock that you would purchase if each share sold for $100?
       2,000 head capacity - Number of shares _____
       5,000 head capacity - Number of shares _____
11. Do you expect to expand your beef cattle operation during the next few years? If so, will the expansion involve:
    a. An increase in number of beef cows? Yes ____ No ____
    b. Increase in number of cattle fed to slaughter weights on your own farm? Yes ____ No ____
    c. Greater use of commercial feedlots? Yes ____ No ____

*These figures represent 50 percent of total requirements or the proportion of total that should be supplied by the farmers.

BEEF CATTLE: RESULTS OF SURVEY OF NORTH DAKOTA FARMERS BY EXTENSION SERVICE, NORTH DAKOTA STATE UNIVERSITY

	Area 1		Area 2		Area 3		Area 4		Area 5		Area 6		Area 7		Area 8		Area 9		Area 10		Total	
	No. of Farmers	%	No. of Farmers	%	No. of Farmers	%	No. of Farmers	%	No. of Farmers	%	No. of Farmers	%	No. of Farmers	%	No. of Farmers	%	No. of Farmers	%	No. of Farmers	%	No. of Farmers	%
Farmers surveyed	182	100	214	100	365	100	145	100	278	100	164	100	206	100	282	100	285	100	265	100	2,386	100
Replies received	53	29	74	34	129	35	37	26	80	29	57	35	48	23	108	38	106	37	79	30	771	32
Farmers reporting																						
Beef cows and heifers on farm*	34	100	49	100	69	100	30	100	43	100	39	100	38	100	44	100	54	100	43	100	443	100
Cattle fed to slaughter weights on farm	4	12	8	16	14	20	4	13	11	26	7	18	7	18	22	50	25	46	16	39	118	27
Feedlot operated at full capacity	2	50	2	25	12	86	4	100	1	10	2	29	3	33	8	36	10	40	6	38	50	42
Use of specified market outlet																						
Slaughter cattle																						
Terminal market	0		0		2		0		7		6		5		18		22		13		73	
Direct buyer	2		2		3		1		3		0		1		2		2		1		17	
Auction	3		6		7		2		2		0		3		3		1		0		27	
Feeder cattle																						
Terminal market	4		5		11		3		14		14		1		15		20		18		105	
Direct buyer	9		8		12		4		5		5		6		3		4		6		62	
Auction	14		27		30		15		8		5		17		6		5		6		133	
Commercial feedlot in area with arrangements for custom feeding	5	15	3	6	47	68	3	10	4	9	12	31	2	5	5	11	8	15	6	14	95	21
Cattle sent to commercial feedlot	0	0	0	0	3	4	5	17	1	2	0	0	0	0	0	0	0	0	2	5	11	3
In favor of organization of a commercial feedlot	12	38	8	16	7	10	11	37	4	10	4	10	9	24	7	16	5	10	10	23	77	17
In favor of organization of a cooperatively owned commercial feedlot	19	56	16	32	25	36	14	47	12	28	8	20	9	24	18	40	16	30	23	53	160	36

(continued)

BEEF CATTLE: RESULTS OF SURVEY OF NORTH DAKOTA FARMERS BY EXTENSION SERVICE, NORTH DAKOTA STATE UNIVERSITY (continued)

	Area 1		Area 2		Area 3		Area 4		Area 5		Area 6		Area 7		Area 8		Area 9		Area 10		Total	
	No. of Farmers	%	No. of Farmers	%	No. of Farmers	%	No. of Farmers	%	No. of Farmers	%	No. of Farmers	%	No. of Farmers	%	No. of Farmers	%	No. of Farmers	%	No. of Farmers	%	No. of Farmers	%
Intentions to purchase specified number of $100 shares of stock in a cooperatively owned feedlot**																						
2,000 head capacity																						
1-2 shares	2		0	1	4		2		1		0		2		3		1		3		18	
3-4 shares	0		1		1		2		2		0		0		1		0		0		7	
5-6 shares	5		0		4		2		1		0		0		2		4		1		19	
7-8 shares	0		0		0		0		0		0		0		0		0		0		0	
Over 8 shares	1		3		0		2		0		3		3		0		1		4		17	
5,000 head capacity																						
1-2 shares	2		0		3		0		1		0		0		1		0		2		9	
3-4 shares	0		0		1		0		0		0		0		1		0		0		2	
5-6 shares	2		1		3		3		1		0		1		0		2		1		14	
7-8 shares	0		0		0		0		0		0		0		0		0		0		0	
Over 8 shares	1		2		1		1		0		2		1		2		1		2		13	
Intentions to expand livestock operations																						
Increase in number of beef cows	19	56	33	67	44	60	26	70	23	53	19	50	20	25	17	39	26	49	28	60	255	54
Increase in number of cattle fed to slaughter weights	5	15	17	35	15	22	8	27	10	23	6	15	14	37	11	25	22	41	12	28	120	27
Increase in use of commercial feedlots	6	16	2	4	10	14	6	20	5	12	1	3	4	10	5	11	1	2	7	17	47	11

*The tabulations which follow refer only to the farmers reporting beef cows and heifers two years old and over kept on the farm. It is assumed that these are the farmers who maintain a beef herd.

**Even though some farmers did not favor the organization of a cooperatively owned feedlot, they indicated that they would purchase shares of stock in such an organization if one were organized.

TABLE 1. CATTLE AND CALVES: INVENTORY NUMBERS, CALF CROP, AND DISPOSITION, NORTH DAKOTA, 1958-1963*

Item	1958	1959	1960	1961	1962	1963
	- - - - - - - thousand head - - - - - - - - - -					
Number on hand beginning of year, January 1						
All cattle and calves	1,831	1,794	1,758	1,881	1,862	2,048
All cows, 2 years and older	954	952	953	963	983	1,044
Calves born						
Number	849	866	848	886	904	950
Percent of cows 2 years and older**	89	91	89	92	92	91
Inshipments	20	21	19	56	92	76
Marketings***						
Cattle	532	517	431	583	506	586
Calves	276	298	203	268	195	192
Farm Slaughter						
Cattle	22	25	26	24	22	23
Calves	8	6	6	6	6	5
Deaths						
Cattle	26	30	30	32	34	32
Calves	42	47	48	48	47	48
All cattle and calves on hand December 31	1,794	1,758	1,881	1,862	2,048	2,232

*U.S. Department of Agriculture, Statistical Bulletin No. 333, Livestock and Meat Statistics, 1962.

U.S. Department of Agriculture and North Dakota State University, Agricultural Statistics Nos. 8 and 12, North Dakota Crop and Livestock Statistics.

**Figure represents calves born expressed as percentage of January 1 inventory of cows and heifers 2 years and over.

***Excludes interfarm sales.

TABLE 2. DIRECT SHIPMENT OF NORTH DAKOTA STOCKERS AND FEEDER CATTLE AND CALVES BY STATE OF DESTINATION, 1958-1963*

State	1958	1959	1960***	1961**	1962**	1963
			thousand head			
Minnesota				124	95	84
Iowa				115	70	48
South Dakota				32	22	21
Illinois				14	6	7
Nebraska				23	10	3
Wisconsin				6	5	3
Colorado				6	5	3
Montana				6	9	9
Other States				14	4	7
All States	292	283	243	340	226	185

*U.S. Department of Agriculture and North Dakota State University, Statistical Bulletins Nos. 6, 10, and 12, Crop and Livestock Statistics, North Dakota, 1960, 1962, and 1963.

**Shipments to individuals and feedlots not consigned to public stockyards and not intended for immediate slaughter.

***Excludes Wisconsin. Data for individual states are not available.

TABLE 3. NUMBER OF FED CATTLE AND CALVES MARKETED AND NUMBERS PLACED ON FEED BY QUARTERLY DATES, NORTH DAKOTA, 1958-1963*

Year and Quarter	Total Fed Cattle Marketed	Cattle and Calves Placed on Feed**
	thousand head	
1958		
October 1 - December 31	32	101
1959		
January 1 - March 31	54	31
April 1 - June 30	40	17
July 1 - September 30	36	26
October 1 - December 31	36	103
1960		
January 1 - March 31	55	60
April 1 - June 30	50	18
July 1 - September 30	33	29
October 1 - December 31	40	151
1961		
January 1 - March 31	64	39
April 1- June 30	66	21
July 1 - September 30	67	32
October 1 - December 31	41	95
1962**		
January 1 - March 31	50	31
April 1 - June 30	41	16
July 1 - September 30	52	28
October 1 - December 31	27	132
1963		
January 1 - March 31	40	27
April 1 - June 30	48	16
July 1 - September 30	43	29
October 1 - December 31	50	122

*U.S. Department of Agriculture and North Dakota State University, Agricultural Statistics No. 7, North Dakota Livestock County Estimates, U.S. Department of Agriculture, Cattle on Feed Reports, 1925-1961.

U.S. Department of Agriculture, Statistical Bulletin No. 333, Livestock and Meat Statistics, 1962.

**Includes cattle placed on feed after beginning of quarter and marketed by end of period.

TABLE 4. FEED: AVAILABILITY AND UTILIZATION BY LIVESTOCK BY COUNTIES AND AREAS IN NORTH DAKOTA

Area and County	Grain: Bushels of Barley Equivalent			Roughage: Tons of Hay Equivalent			Pasture: Number of A.U.M. Equivalent		
	Available	Utilization	Excess	Available	Utilization	Excess	Available	Utilization	Excess
	thousands of units								
Area 1	6,536	2,219	4,317	298	270	28	1,137	680	457
Burke	1,210	237	973	38	25	13	94	53	41
Divide	1,153	253	901	32	28	4	100	55	45
Mountrail	1,566	525	1,041	67	63	4	243	146	97
McKenzie	892	673	219	97	102	-5	397	310	87
Williams	1,715	532	1,183	64	52	12	303	116	187
Area 2	6,837	4,715	2,122	633	480	153	1,833	985	848
Adams	689	460	229	81	46	35	160	118	42
Billings	383	253	130	42	41	1	191	117	74
Bowman	695	462	233	65	47	18	257	126	131
Dunn	1,163	909	254	149	111	38	467	85	382
Golden Valley	553	420	133	43	35	8	190	94	96
Hettinger	1,273	749	524	80	58	22	128	129	-1
Slope	627	342	285	52	43	9	198	121	77
Stark	1,454	1,120	334	121	99	22	242	195	47
Area 3	11,955	4,633	7,322	615	456	159	1,014	871	123
Bottineau	2,108	532	1,576	69	53	16	96	105	-9
McHenry	1,745	1,013	732	185	111	74	246	230	16
McLean	2,729	1,178	1,551	144	104	40	282	203	79
Renville	1,293	320	973	29	27	2	48	50	-2
Sheridan	953	697	256	81	73	8	135	131	4
Ward	3,127	893	2,234	107	88	19	207	152	55

(continued)

TABLE 4. FEED: AVAILABILITY AND UTILIZATION BY LIVESTOCK BY COUNTIES AND AREAS IN NORTH DAKOTA (Continued)

Area and County	Grain: Bushels of Barley Equivalent			Roughage: Tons of Hay Equivalent			Pasture: Number of A.U.M. Equivalent		
	Available	Utilization	Excess	Available	Utilization	Excess	Available	Utilization	Excess
	thousands of units								
Area 4	4,524	5,092	-568	533	466	67	1,477	1,043	434
Grant	1,142	1,325	-183	145	116	29	377	261	116
Mercer	907	1,039	-132	107	89	18	235	197	38
Morton	1,475	1,668	-325	142	152	-10	444	314	130
Oliver	687	667	20	81	53	28	139	115	24
Sioux	313	393	-80	58	56	2	282	156	126
Area 5	8,828	3,456	5,372	363	316	48	533	564	-11
Benson	1,496	787	709	88	74	14	136	138	-2
Cavalier	2,451	665	1,786	56	54	2	85	94	-9
Pierce	1,109	620	489	74	67	7	110	118	-8
Ramsey	1,553	550	1,003	55	46	9	82	84	-2
Rolette	821	454	367	52	44	8	90	72	18
Towner	1,398	380	1,018	38	31	7	50	58	-8
Area 6	6,155	3,896	2,259	479	322	157	730	661	69
Eddy	717	530	187	75	49	26	127	108	20
Foster	1,025	528	497	67	44	23	88	101	-13
Stutsman	2,590	1,818	772	232	150	82	372	306	66
Wells	1,823	1,020	803	105	79	26	143	146	-4
Area 7	6,726	5,330	1,396	721	528	193	1,329	1,093	236
Burleigh	1,520	1,154	365	183	110	73	380	264	116
Emmons	1,443	1,501	-58	158	128	30	297	243	54
Kidder	924	959	-35	162	108	54	300	254	46
Logan	1,911	782	1,129	111	91	20	199	169	30
McIntosh	928	934	-6	107	91	16	153	163	-10

(continued)

TABLE 4. FEED: AVAILABILITY AND UTILIZATION BY LIVESTOCK BY COUNTIES AND AREAS IN NORTH DAKOTA

Area and County	Grain: Bushels of Barley Equivalent			Roughage: Tons of Hay Equivalent			Pasture: Number of A.U.M. Equivalent		
	Available	Utilization	Excess	Available	Utilization	Excess	Available	Utilization	Excess
	thousands of units								
Area 8	7,241	3,315	3,926	307	197	110	358	345	13
Grand Forks	2,173	1,136	1,037	102	60	42	107	107	0
Nelson	1,576	734	842	72	56	16	109	104	5
Pembina	1,813	621	1,192	58	30	28	54	50	4
Walsh	1,679	824	855	75	51	24	88	84	4
Area 9	11,533	7,321	4,212	476	320	156	593	543	50
Barnes	2,857	1,451	1,406	138	89	49	186	161	25
Cass	4,166	3,485	681	154	101	53	169	159	10
Griggs	1,224	595	629	64	46	18	110	92	18
Steele	1,512	618	894	48	36	12	64	66	2
Traill	1,774	1,172	602	72	48	24	64	65	-1
Area 10	11,643	8,985	2,658	703	437	266	862	877	-15
Dickey	2,222	1,605	617	145	84	61	185	197	-12
LaMoure	2,026	1,491	535	148	92	56	182	179	3
Ransom	1,834	1,455	379	123	80	43	150	169	-19
Richland	3,350	2,981	369	171	115	56	201	209	-8
Sargent	2,211	1,453	758	116	66	50	144	123	21
State Total	81,978	48,962	33,016	5,128	3,792	1,337	9,886	7,662	2,204