

THE COMPETITIVE POSITION OF CATTLE FEEDING  
IN NORTHERN CORN BELT\*  
January, 1968



This study was prompted by the fact that expansion in cattle feeding has been much more rapid in the Southwestern United States than in the Northern corn belt. From 1956 to 1966 marketings of fed cattle increased by 113 per cent or 3,700,000 head in the states included in the Southwest grouping as opposed to a 38 per cent or 340,000 increase in the Northern corn belt.

The general questions to which this study was addressed were:

- 1) Is cattle feeding relatively more profitable in the Southwest?
- 2) If so, to what extent is the disadvantageous position of the Northern states due to factors which are amendable to change as opposed to factors which are of a longer run nature?
- 3) What are the feeding programs and practices required to maximize returns from cattle feeding in the Northern corn belt?

FINDINGS RELATIVE TO THE COMPETITIVE POSITION  
OF THE NORTHERN CORN BELT

All the evidence turned up in the course of this study indicates that cattle feeding is more profitable in the Southwest than it is in the Northern corn belt. The reasons for this are many but may be grouped according to source under three headings when comparing the farm feedlot of the North with the larger scale lots of the Southwest. These three groupings are:

1. Reasons related to geographic location.
2. Reasons related to differences in average size of feedlot between the two areas.
3. Reasons related to differences in management practices followed by the typical feeder in each area.

The Locational Disadvantage of the Northern Corn Belt

The major locational disadvantages of cattle feeding in the Northern corn belt are the higher nonfeed costs due to the bedding and housing requirements necessitated because of the higher precipitation and greater annual temperature variations in the Northern corn belt. Neither bedding or shelter are required in the drier high plains region located in the Southwestern part of the United States. These climate related differences in inputs result in increased non-feed costs for the Northern area. These were estimated to total about \$1.50 per hundredweight of beef produced. Limited research suggests that to do without these inputs results in lower feedlot performance.

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- \* A study completed in January, 1968 by Paul Hasbargen of The University of Minnesota. A Ph.D. Thesis submitted to Dept. of Agr. Econ., Michigan State University.
  - \* Exerpts of this 214 page study compiled by John E. Moore, Extension Farm Management, The Ohio State University.

In summary, the results of the various resource situations compared in this study indicated a locational disadvantage for the Northern corn belt of from \$1.00 to \$2.00 per hundredweight of beef produced. If capital investments are to be recovered in less than 20 years the locational disadvantage is even greater because investments per unit of capacity are at least twice as much in the North.

The findings relative to costs and returns in the two areas led to the conclusion that feedlot expansion in the Northern states will continue to be small relative to expansion in the Southwest.

#### The Size Disadvantages of the Northern Corn Belt

It was concluded that large scale feedlots operated independently of crop production appear unlikely to develop in the Northern corn belt since returns to such investment ventures would probably be quite low. On the other hand, large scale lots in Colorado can be developed without suffering any diseconomies of size. Because of lower labor requirements and lower wage rates in Colorado, labor cost per hundredweight is less in Southwest United States. Feed costs change very little as size increases since the production costs of silage are closer to the market value of silage in irrigated areas and little if any of the grain needs are home produced for any size of feedlot. Thus, the farm feeder in the Southwest who becomes proficient in the management of a feedlot has a strong profit incentive for increasing the size of his lot. And, as he expands he will find that the larger operation facilitates the attainment of financial advantages--lower interest rates, lower feeder and feed prices, and relatively higher product prices.

#### The Management Disadvantages of the Northern Corn Belt

This study found that the stronger competitive position of the specialized feedlots of the Southwest also appears to be associated with differences in a number of management practices. These differences give rise to relatively lower feed costs, lower nonfeed costs, and more favorable cattle price margins. To the extent that Northern cattle feeders allow these differences to persist, in the future they will continue to obtain lower return from cattle feeding than could be attained despite locational and size disadvantages.

In summary, there is no question but that specialized feedlots enjoy many economic advantages over the average farm feeder because of improved management practices. Many of these advantages are due to lack of knowledge on the part of the smaller feeder. However, some of them are due to economic forces which, although they result in apparent disadvantages in cattle feeding costs and returns, may actually bring higher returns to the overall crop-livestock business. Also, other advantages may net less additional income to the small feeder than he feels is the cost of acquiring the knowledge and/or taking the action necessary to obtain the advantage. But, if farmer feeders in the corn belt want to put their cattle feeding enterprise on a paying basis, they will have to devote more time to improving their feedlot management practices. Some suggestions for improvement are found in a later section.

### Future Growth Rate Differences

There are some trends now under way which should tend to improve the competitive position of corn belt cattle feeders. These are:

- 1) Shifts away from the production and feeding of hay (due to higher returns from corn and beans and labor shortages on larger farms).
- 2) A general shift in the industry from yearling to calf feeding (expected because improved breeding will produce heavier calves, forage supplies will not be adequate to carry calves an extra year, and more calves will be available throughout the year as the South expands beef cow herds and some calf production moves to drylot in the corn belt).
- 3) A relaxation of attitudes concerning credit use.
- 4) Research on housing and lot facilities that may lead to savings in production costs.

The findings of this study leave no doubt that feedlot expansion will continue to be very rapid in the Southwest relative to the Northern corn belt. This will be due to the long-term locational advantage held by that area with respect to climate and feeder cattle availability. These advantages give rise to profits which encourage size expansion of individual lots and the development of specialized feeding operations. The larger size in turn leads to decreases in per unit labor and facility costs whereas the specialization factor generates improved management practices as well as giving rise to pecuniary advantages. As for total feedlot capacity expansion, it is the more rapid growth in average lot size that is the prime factor affecting this, rather than increases in the number of feedlots.

What has changed to put the corn belt area in a weaker competitive position? The main reason is that the specialized beef feeding industry of today that furnishes about two-thirds of all beef eaten in the U. S. is of fairly recent origin. It was discovered that cattle performance was better in areas of high elevation where summer temperatures were lower and that costs of large scale units were lower in arid areas.

Some additional factors may tend to enhance the position of the Southwest relative to the corn belt are (1) the recent relative improvement in the feeding value of milo by the thin flaking process, (2) the more rapid beef demand growth expected in the South, Southwest, and West relative to the rest of the country, and (3) future research findings on ration improvements that are more likely to be adopted by large scale feedlots.

The relative importance of the different factors to the profitability of cattle feeding as indicated by this study suggest the following hypotheses concerning firm growth: Feedlots which exhibit growth over a period of years will, upon study, be found to possess one or more of the following advantages relative to other cattle feeders in the same location:

- 1) Better feed conversion efficiency.
- 2) Buying advantages on credit, cattle, and/or feed.

- 3) Selling advantages due to a higher quality product (cattle have higher retail value) and/or to superior knowledge.

FINDINGS AND RECOMMENDATIONS RELATIVE TO TECHNOLOGIES  
NECESSARY TO MAXIMIZE FEEDLOT RETURNS IN THE  
NORTHERN CORN BELT

The findings reviewed in the previous section have very significant implications for cattle feeding in the Northern corn belt. One important conclusion is that profit margins in cattle feedings will tend to narrow rather than widen in the future. This conclusion follows if one accepts the finding that large scale lots will continue to develop in the Southwest. As these lots account for more and more of the total beef production, they will also have more of an influence on the average cost curve of the industry--bringing it relatively lower. Therefore, farmer feeders who wish to maintain feedlots which are adding monetary returns to the farm business will have to sharpen their management practices.

The comparison of different technologies, practices, or programs with an eye toward determining "the best one" is a very complex matter. The problem inherent in depending on a single measure of superiority have been demonstrated several times in this study. Even the broad measures of feed costs, non-feed costs, and cattle price margins do not tell much about comparative profitability when examined alone. Even the term "profitability" is a vague one unless agreement can be reached as to which financial ratios are the most appropriate ones to use. (The investor is interested in net returns on investment; the small farmer feeder in labor returns per head; the farmer's wife in residual returns after debt repayment and taxes; the animal husbandryman in returns over feed cost per head; the economist in returns to all resources, etc.) Consequently, any broad recommendations found in this section will usually be couched in general terms and the more specific recommendations will be tied to specific planning situations or encumbered with qualifying statements.

I. Types of Cattle to Feed

One of the most advantageous management practices that has been followed by the sharper profit oriented cattle feeders in the past has been the feeding of lower priced feeder cattle. Lower quality feeders have quite consistently given higher feedlot returns because of their more favorable price margins and their satisfactory gainability. Five separate experiments at Iowa all showed higher returns over feed from lower priced feeders. Work at Michigan and Minnesota also indicated this same advantage. Therefore, more corn belt feeders should shift over to these lower grade cattle to take advantage of this price margin characteristic and help to bring the prices on these feeders more in line with their value.

Lightweight feeder cattle should continue to be the major weight category fed by Northern feeders because of the lower transportation costs on these feeders as well as the reduced level of direct competition from the large feedlots who are bidding more actively on heavier feeders. But, differences in average returns between calves and yearlings are so small that the change in slaughter price between the two different marketing dates is apt to be the factor which determines whether the yearling program or the calf program is more profitable in a given year.

Consequently, a more important consideration is how to spread the risk of both slaughter price and feeder price variability. One technique for doing this is to feed both calves and yearlings.

Another way to spread price risk is to feed some heifers since they finish out sooner than steers. However, since heifers are sold at lighter weights after smaller weight gains they are not as competitive in the Northeastern corn belt where high feeder transportation costs coupled with high slaughter cattle prices give the advantage of feeder cattle which can put on more gain and be sold at heavier weights.

Finally, the need for more complete information on the feedlot performance potential of feeders from different geographic areas as well as from different breeding is very acute. Thus, corn belt feeders should encourage the development of as many techniques as possible to obtain such information. For example, production testing by ranchers must be encouraged. Also, research aimed at determining performance differences related to locational source of cattle, breed background, and visual appearances could be stepped up.

## II. Types of Rations to Feed

High roughage rations were found to be one of the factors responsible for the poorer feedlot performance observed in the Northern corn belt. Excess hay or corn cobs in a ration cause slower gains, increase feed requirements, require feeding to heavier weights for similar finish, and reduce dressing per cent. These disadvantages began to accrue when daily hay intake is increased over 3 or 4 pounds per head. (In addition to decreasing feedlot returns, hay production over and above the amount dictated by soil management needs, usually decreases crop income on corn belt farms.)

Ground ear corn is another expensive feed when sufficient hay is raised on the farm to already provide the minimum roughage requirements for the cattle. When adequate hay is already available, the addition of cobs to the ration simply decreases average gains and may actually increase corn grain requirements since cobs will substitute for hay and the cobs in a full feed of ground ear corn can furnish the total roughage requirement of a finishing ration. Thus, one or the other--hay or cobs--might best be eliminated from a finishing ration.

Some combination of corn grain and corn silage is the most practical ration for the most large corn belt feeders. What proportion of these two ingredients to use depends upon the price of corn, the farm resource situation, the number of lots purchased in one year, and the relative profitability of the operation.

As the price of corn moves up it becomes more profitable to use higher silage rations. Thus, higher silage rations should be used in the Northeastern corn belt than in the Northwestern corn belt. Under the price projections of this study and efficient feed conversion, a daily concentrate feed equal to one per cent of the body weight of the cattle was the concentrate level that was most generally selected in the profit maximizing solutions in Michigan whereas a full feed (almost 2 per cent of body weight) concentrate level was always selected in Minnesota.

The farm resource situation which calls for heavier use of corn silage in the ration is when limited availability of operating capital prohibits purchase of added feed grains. This limitation could force the small farm operator to a 100 per cent corn silage ration in order to get maximum returns per acre. However, when credit is available to expand the feeding enterprise beyond the farm feed supply additional grain should be purchased and the farm feedlot used to capacity by buying more than one group of cattle each year.

When only one lot of cattle is fed each year, the corn silage portion of the ration can be increased up to a full ration unless otherwise dictated by crop labor needs. That is, if facilities and labor availability permits feeding all summer, a 100 per cent silage ration can be utilized if this permits marketing of finished cattle within 11-12 months. However, if spring labor requirements, mud problems or hot summer weather make it desirable to get the cattle to market finish earlier, a higher concentrate ration will be required. However, the most profitable organizations on the many farm situations programmed in this study usually used feedlots to near capacity levels--which entails buying feeder cattle more than once during the year.

Finally, if returns from feeding are low, higher silage rations will give greater returns to existing feedlot facilities than will the higher concentrate rations since feed costs tend to decrease as the proportion of silage is increased so long as corn costs more than \$1.10 per bushel. Nevertheless, more research is needed to determine the relative merits of different high concentrate rations for the large efficient corn belt feeder.

### III. Type of Feedlot Facilities to Invest In

A corn belt cattle feeder should carefully consider all alternatives before deciding on long-term investments in feedlot facilities. Special attention should be given to all questions relative to materials handling (bedding, manure, and feed.) Will there be a dependable supply of low cost bedding in the foreseeable future? How can manure be best handled? Will there be adequate labor for handling bedding and manure as desired? How will feed be stored, removed from storage, and be distributed to cattle? How might the organization and cost of all these tasks be changed if the feedlot is expanded more in the future?

The decision on what type of building to construct will hinge on how the questions relative to bedding and manure handling are answered. The decision on feedlot design will also depend on these answers but also on decisions relative to feed storage and handling, and on the capital position of the potential feeder.

The younger feeder with a smaller equity position who is just beginning a long period of expected business growth should search for other solutions even if bedding is scarce. One possibility is to design a feedlot without any shelter except perhaps a roof over the feed bunk. If topography and soil type are such that muddy lots can be avoided, the concrete area might also be limited to an apron along the fence-line bunk. If muddy lots cannot be avoided either large portions of the lots must be concreted, or the cattle might be moved into a building with a concrete floor designed in such a way as to facilitate manure removal without the use of any straw. Insufficient research evidence is available on these programs at this time to completely assess their impact on feedlot performance. Existing evidence suggests that daily gains would be 5 to 10 per cent less in the shelterless lots and feed requirements would be higher by about 5 per cent. (Almost \$1.00 per hundredweight).

The three different systems--confinement--slotted floor; conventional manure pack (indoor or outdoor feeding) and the no housing system--has disadvantages as well as advantages. To summarize these:

- 1) The slotted floor system has a high initial cost but saves on annual costs of labor, bedding, and probably manure nutrients.
- 2) The conventional manure pack requires much straw and labor to handle the straw and the manure. It has a lower investment cost than the slotted floor system. Although it has a higher investment cost than the no housing system it also results in better feedlot performance than that system.
- 3) The no housing system requires less initial investment than the slotted floor system, less bedding and initial cost than the conventional system but gives rise to higher feed and operating interest costs than the other two systems.

Feed storage facilities need not be as extensive as often found on corn belt farms. The findings of this study indicated that if a farm feedlot is expected to grow beyond a few hundred head capacity the horizontal silo should be used for storage of corn silage. This is especially true if a high silage ration is to be fed. Total farm business income is reduced if capital is tied up in expensive upright silos. However, if feedlot size is to be limited, an auger feeding system and upright silo may be the least cost system. Again though, younger feeders should keep in mind that a healthy farm business must continually expand if it is to stay competitive.

Finally, if the overhead costs for buildings, equipment, and labor are to be held down on a per unit of production basis some important management techniques are as follows:

- 1) If feedlot is to be mechanized, it should be expanded enough to fully utilize specialized equipment and available labor.
- 2) Use feedlot facilities to capacity the year round. This will require buying cattle more than once a year and probably will entail buying some yearlings as well as calves.
- 3) Obtain high daily rates of gain.

Also, once these lots have been mechanized it is simply too costly to leave them under-utilized for very much of the year. Thus, the extent of one's commitment to feeding should be decided before major investments are made in a specialized cattle feeding enterprise.

#### RECOMMENDATIONS

The major implications of the findings of this research study are contained in the following recommendations which are aimed at strengthening the competitive position of the Northern corn belt in cattle feeding.

### For Cattle Feeders

1. Must acquire more knowledge concerning the economics of cattle feeding, including the effects of differences in rations, feed processing methods, building and lot setups, and weight-production cost relationships.
2. Must better learn the arts of buying and selling or get commission firms to do a better job of buying on basis of gainability and selling on basis of retail value for them.
3. Encourage the market agencies in the North to more accurately reflect retail carcass values back to the producers.

### For Credit Agencies

1. Feedlot expansion should not be encouraged unless the operator has exhibited above average ability in cattle feeding.
2. Do not limit financing expansion only to the limit of home produced grain after feeder has established superior feeding ability.
3. Adequate intermediate and long-term credit must be provided in the Northern corn belt to assure that climatic disadvantages are overcome.

### For Potential Investors

1. Best climate for feedlot location is when summers are cool, winters are mild, and precipitation is low.
2. Best location from standpoint of feed and feeder supplies and product market is one which minimizes cost of inputs--transportation costs on beef are less important.
3. Strong financing arrangements for operating capital must be assured at prime interest rates.

### For Researchers

1. A greater proportion of research efforts must be aimed at solving problems relevant to larger scale feedlot in the corn belt.
2. Additional research is required on the economic efforts of:
  - a. Different building-lot arrangements
  - b. Different bedding and manure systems
  - c. Visual differences, breed differences, and locational differences in feeder cattle. This information might be used to develop new feeder cattle grades which describe feedlot potential of cattle.
  - d. Differences in the pricing efficiency of alternative marketing systems.

### For Extension Workers

1. More intensive educational work with the industry is required to teach knowledge already available.
2. A computer record keeping and planning service might be developed to aid farmer feeders in acquiring additional knowledge about the feeding business.