Beef Cattle Feedlots in Oregon

. . . a Feasibility Study

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FOREWORD

This technical assistance study was done in cooperation with Farmer Cooperative Service, USDA, with funds from the Area Redevelopment Administration of the Department of Commerce. Initial interest in a beef feeding feasibility study was shown by farmers and business interests in Sherman and Wasco Counties, which is an eligible area under the ARA program. These citizens were interested in investing in a new beef feeding enterprise and certain associated facilities as a means of expanding employment in the area if it could be determined whether such an enterprise would be economically feasible and on what scale of operation its performance would be most efficient. These people made contact with the regional coordinator for ARA, who in turn brought the proposal to the attention of the United States Department of Agriculture and Oregon State University. Meetings with OSU personnel led to a request for funds to do the work and the development of a cooperative agreement with Farmer Cooperative Service.

Interest in this study goes beyond Wasco and Sherman Counties. Beef cattle feeding has been increasing rapidly in the northeastern part of Oregon and moderately in central, eastern, and southern parts of the state. The results of this study are generally applicable to all potential cattle feeding areas in the state of Oregon.

SUMMARY AND CONCLUSIONS

The purpose of this study is to show costs and returns that might have prevailed from 1956 through 1963 for commercial beef cattle fattening operations in Wasco and Sherman Counties in particular and in Oregon in general. This information is designed to show probable net returns and how they varied from month to month and year to year. Feasibility of this industry is thus determined.

In this study, most of the emphasis has been on showing in detail a plan for a beef cattle feedlot with 2,000 head capacity. The plan shows all the expenses involved which include cost of feeders, feed, feedlot expense, and feed processing expense. Also an allowance is made for shrinkage and a marketing expense is included. The plan shows the feeding period to be an average of 150 days with the cattle gaining 2.75 pounds per day and a feed conversion ratio of 8.5. This means 8.5 pounds of feed are required on the average for each pound of gain.

The plan shows only high quality steers are fed, although most Oregon feeders have both steers and heifers in the feedlot. It is recognized that there may be times when feeding other market classes and grades may be more (or less) profitable than steers. It should be kept in mind that while the feedlot plan in this study is shown in detail, it is only illustrative of whether or not feeding cattle in Oregon is feasible. No one would likely follow this plan in all of its details.

A feed processing plant is shown in connection with the feedlot even though it is not operated at capacity unless mixed feed is sold. Mixed feed could be purchased in most parts of the state thus reducing capital investment by more than $60,000 but the cost per ton will be greater. Feed processing cost at the feedlot site should not exceed $3.00 a ton. Furthermore, reliability of supply and quality is assured, and labor can be used interchangeably between the feedlot and the processing plant.

The study shows sketches of feedlot and feed processing plant design and layout that should be useful to those contemplating cattle feeding on a commercial scale. These designs were developed after interviewing commercial feeders in Oregon and Washington and obtaining data and information from them concerning their operations.

Capital investment in land, feedlot, feed processing plant, trucks, and other equipment is estimated at $143,000 for a 2,000 head capacity feedlot. In addition, another $400,000 will be invested in cattle ownership and working capital to buy feed assuming 90 percent of capacity or 1,800 head. Of course, if all cattle were on custom feed, only about $58,000 in working capital would be required.

It is believed this study can be of considerable use to the cattle feeding industry because returns to management and profit (or loss) are shown by months and for several years. Profit per head varied from a high of nearly $27 in 1958 to a loss of almost $12 for 1963. If 4,320 head were fattened in 1958 when the profit per head was nearly $27, the total net return would have been $115,000. This figure is based on a feedlot of 2,000 head capacity which has an average of 1,800 head in the lot at all times with an annual turnover of 2.4 times. As slaughter cattle are sold, new feeders are purchased and placed on feed. The feedlot plan provides for a continuous-type feeding operation.

In 1961, the profit per head amounted to less than $.50, resulting in a total of less than $2,000 for the entire year. The early part of 1963 was a "bad" feeding year (for the classes considered in this study) because slaughter cattle prices declined more than $4.00 per hundredweight between the fall of 1962 and May 1963, while feeder steer prices did not decline at all during the same period. However, the largest loss in one month occurred in December 1963 ($3.88 per hundredweight) because slaughter steer prices in Portland declined nearly $2.00 per hundredweight between November and December.

This study clearly shows how changing price relationships between slaughter and feeder cattle may affect the profit position. Another important variable is that of the price of feed per ton. A drop in the price of barley of $5.00 a ton will reduce the cost of gain per hundredweight by $1.17, other costs remaining the same. A drop of $5.00 a ton in the price of alfalfa will reduce the cost of gain per hundredweight by $0.42. Even though the feedlot operator is efficient there may be times when losses will occur because of changing cost-price relationships.

This study also shows feedlot designs for capacities of 500 and 5,000 head. Furthermore, the nonfeed costs of these two sizes are compared with the 2,000 head capacity layout. The nonfeed cost per hundredweight of gain in the 500 head size was $1.25 more than in the 2,000 head lot. On the other hand, the nonfeed cost per hundredweight was $.81 less in the 5,000 head size than in the 2,000 head plant. These results indicate that costs can be reduced as size of feedlot increases.

Operating a feedlot of given size at capacity thus fully utilizing capital investment and other input factors can have a greater impact on cost per hundredweight of gain than the size of feedlot. For example, in the 2,000 head feedlot, the nonfeed cost per hundredweight was $2.23 less at 100 percent of capacity than at 62.5 percent of capacity. In the 5,000 head feedlot, the difference between the same percentages of capacity was not quite as great, but still amounted to $1.83. It is important that feedlot operators construct facilities that can be used fully throughout the year regardless of what size they might be.

If even half of the feeder cattle produced annually in the state were fed to slaughter weights in Oregon, this would amount to 250,000 head. Only about 140,000 head were fed in 1963. An increase of 110,000 head would require thousands of tons of feed and if a net income of $10 a head is realized, it would add over $1,000,000 to net income of feeders. As a deficit producer of slaughter beef, most of these cattle would be processed in the state. This increase in slaughter and feeding activity would provide at least 300 new jobs.

This study shows that beef cattle feeding operations in the Wasco-Sherman County area and in Oregon generally are feasible. There may be feeding periods when losses rather than profits result, but over a number of years, if past price-cost relations generally prevail, commercial beef cattle feeding in Oregon should be encouraged.

BEEF CATTLE FEEDLOTS IN OREGON ---A FEASIBILITY STUDY

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INTRODUCTION

The purpose of this study is to determine whether or not commercial beef cattle feedlots in Oregon are feasible. Costs of building and operating feedlots are shown in detail. Costs and returns are summarized to show the net returns to management on the basis of hundredweight, per head, and for each year.

Oregon has the ingredients for an expanded beef cattle feeding industry. Figure 1 shows that 55,000 head were on feed in Oregon on October 1, 1963, and a record total of about 140,000 head were fattened during the year. Feed grain is available to produce at least twice the meat tonnage if wheat becomes available at feed grain prices. 1/ An estimated 350,000 feeder cattle and calves produced in Oregon move into Washington, California and elsewhere for fattening each year. It is estimated that the equivalent of 70,000 one thousand pound fat cattle and carcasses move into Oregon each year to satisfy the demand for beef. If it is feasible to fatten more cattle in Oregon, savings in resource use may result and economic activity generated which is in the interest of the general welfare of the state.

Attention in this study will be focused on feedlots of 2,000 head capacity located in either, or both, Wasco and Sherman Counties. The model plan 2/ outlined in detail will be a continuous operation; that is, as slaughter cattle are sold, new feeders are bought and placed in the feedlot. The plan will show in sketch form the feedlot and mill design together with the estimated cost of each. All costs including feeder and feed costs will be included so it will be possible to show the estimated net profit per head. Good but not necessarily superior management will be assumed.

1/ Grain Feeding Opportunities and Problems in Oregon. Oregon Agricultural Experiment Station Special Report 146, April 1963.

2/ The purpose of a model is to capture the essence of a given situation in a set of explicit relationships. The model feedlot plan developed in this study shows detailed expenses and receipts together with net returns to management and profit or loss per hundredweight.

Area	No. of head
Total area 1	5,000
Total area 2	28,200
Total area 3	10,200
Total area 4	4,500
Total area 5	7,100
Total for State	55,000

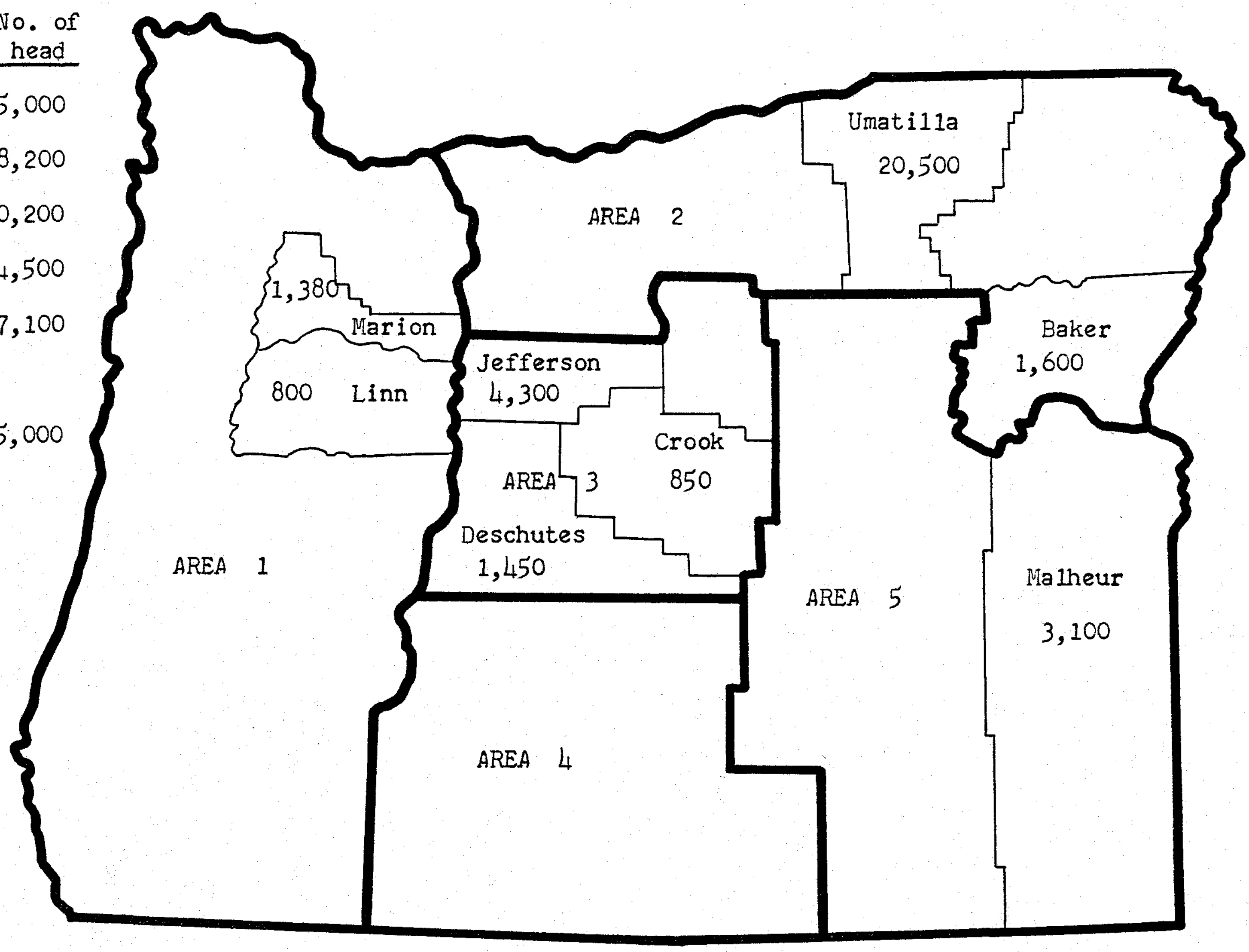


Figure 1. Cattle and Calves on Feed for Market (by Counties with Greatest Number in Each Area), Oct. 1, 1963

Source: Oregon Crop and Livestock Reporting Service, Portland, Oregon

Two other model plans will be considered in this study. One will be a feedlot with a capacity of 500 head and the other will have a capacity of 5,000 head. These model plans will not be in the detail of the 2,000 head, but will deal primarily with economies of scale. In other words, how much, if any, will costs per hundredweight be reduced in a large lot compared to a small one?

It is important to keep in mind that numerous but what the authors feel are realistic assumptions underlie the model feedlot plan. For example, if the gain per day per head is lower or the feed conversion ratio is actually greater than in the plan, the profit per head will decline or perhaps disappear. As the price spread between feeders and slaughter cattle changes, again profit will be affected. If more is spent for the feedlot, mill, or for labor, again the profit position is changed. This does not mean that good management can always expect the results estimated in the model plan. Changing cost-price relationships beyond the control of management may adversely affect net profit. Cost of feed and prices of feeders and slaughter cattle do not remain fixed.

Although this study was generally tailored to the Wasco-Sherman County area, the results are directly applicable to other potential feeding areas in central and eastern Oregon as well as southeast Washington. When the model plan in this study shows a profit, it is likely a profit can be earned elsewhere. Feeders, feed, and personnel to operate feedlots are available throughout the state at fairly uniform prices. Of course, feeders and feed are usually lower in price in more distant areas from Portland due to transportation costs but the cost of moving the slaughter cattle to market may offset this advantage. In locating a feedlot, consideration should be given to availability of rail and truck transportation, adequate water supply and, of course, other site characteristics which are referred to later. Climate is not a problem in developing beef cattle feedlots especially in central and eastern Oregon.

OPERATING POLICY, CATTLE PRICES, FEED AND OTHER COSTS

The cost structure of each feedlot depends on numerous variables such as types of feed available and the cost of each ingredient, capital and labor requirements with alternative methods of operation, flexibility desired in feedlot operation, tax differences, land cost (as determined by alternative use value) and cost of developing a water supply and distribution system. In addition, consideration must be given to market changes in the value of the finished product and the availability and market value of different kinds of feed and feeder animals.

In order to make the data assembled generally more useful, most input cost categories are introduced separately. To the extent that anyone interested in initiating a feeding operation feels that any cost can be reduced (or should be increased), it will be possible to substitute an alternate value into the plan to determine the effect of the change. All costs of feedlot operation are assembled to determine the profitability (or loss) of the model feedlot.

General Feeding Policy. The feed supply in the Sherman-Wasco area is likely to be one of the most influential factors determining the type of ration used in the feeding operation. This area produces abundant supplies of barley and wheat. Roughage supplies (of types currently popular for cattle feeding) are less abundant. A summary of important types of feed available and agricultural production in the area is shown in Appendix Table 1.

The feed ration for the model plan has the following constituents:

Barley	55%
Alfalfa hay	20%
Beet pulp	15%
Molasses	5%
Supplement	5% 1/

It is recognized that the costs of different kinds of feeds change from time to time, as will the overall feed cost-livestock price ratio and that this will result in a variation in the feed ration components. In order to maximize the use of the cheapest inputs, the components of the feed ration should be altered and balanced with new feeds and in different proportions. Also, the feed ration would be different for early stages of feeding than in later stages. The above ration is considered to be an average of the feeds used since a continuous feeding operation is assumed and there will be animals in all stages of fattening.

This study is aimed at determining the feasibility of feeding high quality steers which is the most important class of cattle in Oregon feedlots. It is recognized, of course, that there may be times when market classes and grades other than good and choice steers may be more or less profitable to feed.

Feeder Animal Costs. It is assumed that feeder steers would be purchased with an average weight of 650 pounds 2/ when placed in the feedlot and would be fed to a slaughter weight averaging 1,062.5 pounds before allowing for a marketing shrink. Good and choice, 500 to 700 pound feeder steer prices at the Ontario, Oregon market were obtained for the period 1956 through 1963 (Appendix Table 2) as the basis for feeder animal prices since this market is influential in determining the prices of Oregonfeeder cattle. 3/

1/ Includes salt and serves as a carrier of additives such as Vitamin A.

2/ There undoubtedly will be times when steers weighing more or less than an average of 650 pounds will be purchased because of price and availability.

3/ It is recognized that many feeder cattle may actually be purchased in Sherman and Wasco Counties or from adjacent areas. Also, if a large feedlot was initiated in this area, it would likely influence the prices of feeder cattle at least in the vicinity of the feedlot. For these reasons and because feeder cattle are likely to come from a wide area, it is difficult to determine any source that will exactly represent feeder cattle prices. However, the Ontario market is influential in determining feeder cattle prices over the general area, and therefore is used as a basis for estimating the cost of feeder cattle.

Slaughter Cattle Prices. The Portland Market was used as the basis for determining the value of slaughter cattle and simple monthly average prices were obtained for the period 1956 to 1963. It is assumed that slaughter animals will grade approximately 60 percent choice with most of the remainder falling in the high-good category. Therefore, prices for good and choice grade, 900 to 1,100 pound slaughter steers were determined (Table 1). 1/ Although slaughter animals might be sold either direct to a slaughterer or shipped to an organized market, the prices at Portland were used as the basis for estimating the value.

Estimated Rates of Performance. An average daily gain of 2.75 pounds per day (net after death loss) is assumed throughout the feeding period. Although the rate of gain will vary during the different stages of the feeding process, between animals, and because of other factors, this represents a reasonable average according to the results being achieved in actual feeding operations in Oregon. With an average daily rate of gain of 2.75 pounds, it will take 150 days to feed a 650 pound feeder steer to a slaughter weight of 1,062.5 pounds.

The ration previously outlined can be expected to result in a feed conversion ratio of 8.5. With this conversion ratio approximately 23.4 pounds of feed would be consumed daily by each animal (on the average) in order to achieve a daily gain of 2.75 pounds.

Feed Costs. Feed costs were also determined for the period 1956 through 1963. Barley prices were based on the price of No. 2, Western barley at Portland less $4.00 per ton transportation charge from the Sherman-Wasco area to Portland. This $4.00 per ton transportation charge represents an average for various areas in Sherman and Wasco Counties.

Beet pulp prices were obtained from the Utah-Idaho Sugar Co. (Moses Lake, Washington) for beet pulp at its plant at Toppenish, Washington, for the 1956 through 1963 time period. An average transportation charge of $6.00 per ton was added to these prices to obtain the cost of beet pulp in the study area. The same method (with a $6.00 per ton transportation charge) was used to derive the cost of molasses.

1/ It is assumed that 60 percent of the animals will reach the choice grade when marketed and most of the remainder will fall in the high-good category. It is difficult to determine the market prices for exactly these grades. Available market data are presented either in the form of a price range or a simple average of some range that does not account for the number of animals selling at each price in the range. However, the break between the bottom prices for animals grading choice and the top of those grading good, represents a group of animals grading approximately 50 percent good and 50 percent choice. These are the prices used (Table 1) even though it is expected that animals will average about 60 percent choice at time of slaughter.

Table 1. Good and Choice Slaughter Steer Prices at Portland[1/]

(900-1100 pounds, simple monthly average)

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sept	Oct	Nov	Dec	Average
1956	18.55	18.25	19.05	19.44	19.45	20.56	22.35	24.12	23.69	23.00	21.50	20.12	20.84
1957	20.38	20.40	21.75	23.25	23.12	23.06	24.45	24.12	23.38	22.30	23.12	24.35	22.81
1958	25.50	25.56	27.25	27.75	28.25	28.25	27.12	26.06	26.10	26.50	27.00	27.00	26.86
1959	27.94	27.06	27.70	28.69	29.12	28.80	28.81	28.35	27.94	27.19	26.50	26.42	27.88
1960	26.50	26.19	27.20	27.25	27.30	26.81	26.56	26.20	25.12	24.20	24.38	25.32	26.09
1961	25.40	24.62	24.38	23.50	23.60	23.25	23.25	24.38	24.56	24.60	25.12	25.44	24.34
1962	25.45	25.00	26.56	27.20	26.69	26.31	26.55	27.25	27.38	27.12	27.56	27.75	26.74
1963	26.56	24.50	23.94	24.20	23.19	23.25	25.95	25.13	24.70	23.63	23.06	21.25	24.11

1/ Represents animals grading 50% good and 50% choice (taken from simple weekly averages with the date on which Monday falls of each week determining the month in which the weekly average was used). Initial data from market news reports provided by U.S.D.A., Agricultural Marketing Service, Livestock Market News, North Portland, Oregon

A price of $100.00 per ton (delivered) was used for the supplement that constitutes 5 percent of the feed ration. The type of supplement used (and the proportion of the total ration) will vary between feedlots, resulting in considerable variation in cost. Thus, a cost of $100.00 per ton is used to represent a reasonable average. An average price was also used for alfalfa hay. Alfalfa hay might be grown in the area or shipped in from other localities, or other types of roughage such as corn silage might be substituted for hay in the ration. Thirty dollars per ton is the value used to represent the average cost for this input in the Sherman-Wasco area.

The average monthly cost per ton of using the feed ration suggested (barley 55 percent, alfalfa hay 20 percent, beet pulp 15 percent, molasses 5 percent, and supplement 5 percent) is tabulated in Appendix Table 3. However, this cost represents only the cost of obtaining the feed and does not represent the cost of processing and distributing the feed. 1/ These latter costs will be considered in detail in the section on nonfeed costs. The monthly cost per ton of feed is a weighted average according to the proportions of the various components of the feed ration and their corresponding prices. This average monthly cost per ton of feed can be reduced to the feed cost (without processing) per pound of gain based on an expected conversion ratio of 8.5 (Appendix Table 4).

A more representative cost of feed per pound of gain may be obtained by averaging the monthly feed costs over the five month feeding period. Feed might not be purchased every month depending on storage available, price changes, and similar factors, but by averaging the feed cost per pound of gain over the five month span of the feeding period, the results will tend to reflect the changes in feed prices. This is a simple average,with the feed cost during each of the five months weighted equally. These data are summarized in Appendix Table 5.

Appendix Table 6 shows the composite average cost per hundred of slaughter weight when the cost of slaughter animal that was purchased in the form of feeder is combined with the cost of weight gained in the feedlot. In the plan under consideration, cost of feed is weighted 412.5/1062.5 and cost of feeder animal is weighted 650/1062.5. By subtracting the costs in Appendix Table 6 from the monthly average price per pound of slaughter steers in Table 1, it is possible to obtain the residual amounts available to cover all other costs (other than feed and feeder animal) plus a return to management and profit (if any exists). These residual amounts are shown by months in Appendix Table 7.

1/ Processed feed could be obtained in most parts of Oregon, but a feed mill located on the feedlot assures operator of reliable supply, uniform quality, and makes possible a better use of the labor force needed to operate the feedlot. Furthermore, the cost of processing should be no more than $3.00 per ton whereas commercial feed mills charge $4.00 to $5.00 a ton.

Transportation Costs and Shrinkage. Two other factors, transportation costs and shrinkage, are closely related to the cost per pound of feeder and the value per pound of slaughter animal. Prices of good and choice, 500 to 700 pound feeder steers at the Ontario market have been used as the basis of the cost of feeder animals. However, it is not known if feeder animals will be supplied from within the Sherman-Wasco area, from adjacent areas, or from markets such as Ontario or even from out-of-state markets. Thus, the supply of feeder animals may have an additional transportation (and consequently also shrinkage) costs.

Feeder animals would likely be supplied from several sources with the transportation cost ranging from near zero in the immediate area to $1.00 or more per hundredweight from distant areas. In order to allow for this situation, an average transportation cost of $.50 per hundredweight was added to Ontario feeder cattle prices and the effect on cost per hundredweight of slaughter weight sold (650/1,062.5 x $.50) was determined to be $.31.

It is assumed in the model feedlot plan that if the feeder animals were purchased direct, they weighed an amount above 650 pounds to about equal the shrinkage allowance and if purchased on an organized market, that shrink is compensated for in the purchase price. Thus, feeder animal prices are based on the Ontario market plus $.50 per hundredweight additional for transportation cost.

Shrinkage of slaughter cattle, regardless of method used in marketing, is a direct cost to the feedlot operator. If the finished animals are sold direct, it is likely that a shrinkage of some type may be granted to the purchaser. If the animals are sold on an organized market, shrinkage will be incurred when transporting the animals to the market, and fill-back is likely to be reduced due to change from a high concentrate ration in the feedlot to the all roughage ration at the market.

In this study a 4 percent shrink allowance is used as a direct reduction in the value of cattle sold and not as a reduction in feedlot gain.

NONFEED COSTS --- THE FEEDLOT

Nonfeed costs of the feedlot operation include investment costs, labor and management costs, clerical and office expense, and miscellaneous items such as veterinary expense, death loss, and taxes. These nonfeed costs will vary for each feedlot, but in general, the greatest proportion of nonfeed expense for a mechanized feedlot will be in the investment cost category. It is in this category that most economies of scale are likely to occur.

Feedlot Layout and Design. Factors that must be considered include the planned feedlot capacity and potential for future expansion, land value, type of feed processing plant, feeding equipment, and feed rations. In most cases, it may be possible to supplement planning decisions with research and past experience, but many decisions will likely depend upon individual preferences.

The facilities necessary for feedlot operation can be classified into several general categories of necessary components regardless of the specific type of construction used in each case. A general classification that indicates the facilities that should be considered in the feedlot layout and design follows:

A. Pens
   a. feed pens
   b. hospital pens
   c. sorting and handling pens

B. Alleys
   a. feed alleys
   b. drive alleys
   c. sorting and working alleys

C. Supplemental Facilities
   a. scale
   b. loading dock
   c. squeeze chute
   d. watering facilities
   e. sheds (hospital area and cattle working area)

D. Feed Processing
   a. milling
   b. storage (grain and hay or other roughage)
   c. equipment to deliver to feed bunks

E. Management and Miscellaneous
   a. office
   b. fence enclosing entire lot (optional)
   c. windbreaks (in some areas)
   d. equipment housing area

<u>The Feedlot Site</u>. It is generally agreed that a wet, sloppy feedlot detracts significantly from gains, but it may be necessary only to keep a portion of the pen dry. This can be accomplished by mounding with manure, wood chips, straw, soil, gravel or similar materials. Thus, while all possible drainage is promoted away from the pen and away from the entire lot, it is likely to be cheaper to mound in one section of each pen rather than depending upon drainage entirely. A southern slope with 3% to 5% rise is recommended for most feedlots. With small feedlots, or with lots located on steep slopes, it may be adequate to depend upon the slope (surface drainage) to remove much of the excess moisture. On the other hand, it is difficult in larger feedlots to promote drainage from one pen without channeling this run-off into an adjacent pen or alley. In some cases, the drive alleys are utilized to carry the liquid away from the feedlot pens and, as far as possible, away from the entire lot.

Under certain types of management, soil type and profile may be such that drainage into the subsoil will be adequate to keep the lot dry. With most types of management, however, cattle will probably be confined in such close quarters that the manure will tend to "seal" the soil surface and retard underground drainage. Thus, it will usually be necessary to depend on surface drainage to a large extent, and usually specific arrangements will be necessary to provide dry lots during wet seasons. This is usually accomplished by mounding some type of material in one section of the pen.

Pen Arrangement. The pen arrangement will be determined by the feeding method used, the loafing space and bunk space per animal, livestock handling facilities, and land cost. A suggested feedlot layout for the 2,000 head plan is shown in Figure 2. This particular pen arrangement assumes that a bunk space of 15 inches per animal will be used, and a loafing area of 225 square feet will be provided. Pens are designed for 50 head, 100 head, and 200 head. However, in this particular layout, it is possible to have any number of animals up to 500 head in each pen without affecting either the feed bunk space or the loafing space per animal. The net result of increasing the number of animals in each pen will be to change the shape and size of the pens. This has been demonstrated by using broken lines between certain pen areas. For example, pens B-1, B-2, B-3, etc. are designed for 100 head, but could be changed to 50-head pens by the construction of fences where the dotted lines are shown. In the same way, pens D-1, C-1, and C-3 could be changed from 200-head pens to 100-head pens or to 50-head pens. For the purpose of determining costs, it is assumed pens will be built as shown by the solid lines resulting in 10 pens of 50 head each, 9 pens with 100 head, and 3 pens with 200 head each.

Some operators might prefer to arrange their feed alleys closer together and their drive alleys at the extremes and the center. This could be done by using alleys EE, DD, and BB for drive alleys and alleys AA and CC for feed alleys. However, this latter arrangement would require more fence since the optional fence around the entire lot has not been used.

Loafing Space Per Head. If a portion of the feedlot is hard-surfaced (i.e., concrete aprons at feed bunks, and water tanks), it is generally recommended that each animal be provided 180 to 225 square feet of loafing space. The usual recommendation for hard-surfaced lots runs from 50 to 100 square feet per animal.

There is no one minimum space recommendation that will be best under all conditions. However, unless land values are high, it may be advisable to provide extra space regardless of the required minimum. The two principal factors determining the cost of loafing space per animal are the cost of land and the cost of pen construction.

There is little intrinsic soil value in feedlot construction (except for drainage) and therefore, little value to locating a feedlot on high-priced land. An exception to this might occur when it is desirable to locate the feedlot near a city or near existing facilities. When land value is relatively low, the most important factor affecting loafing space

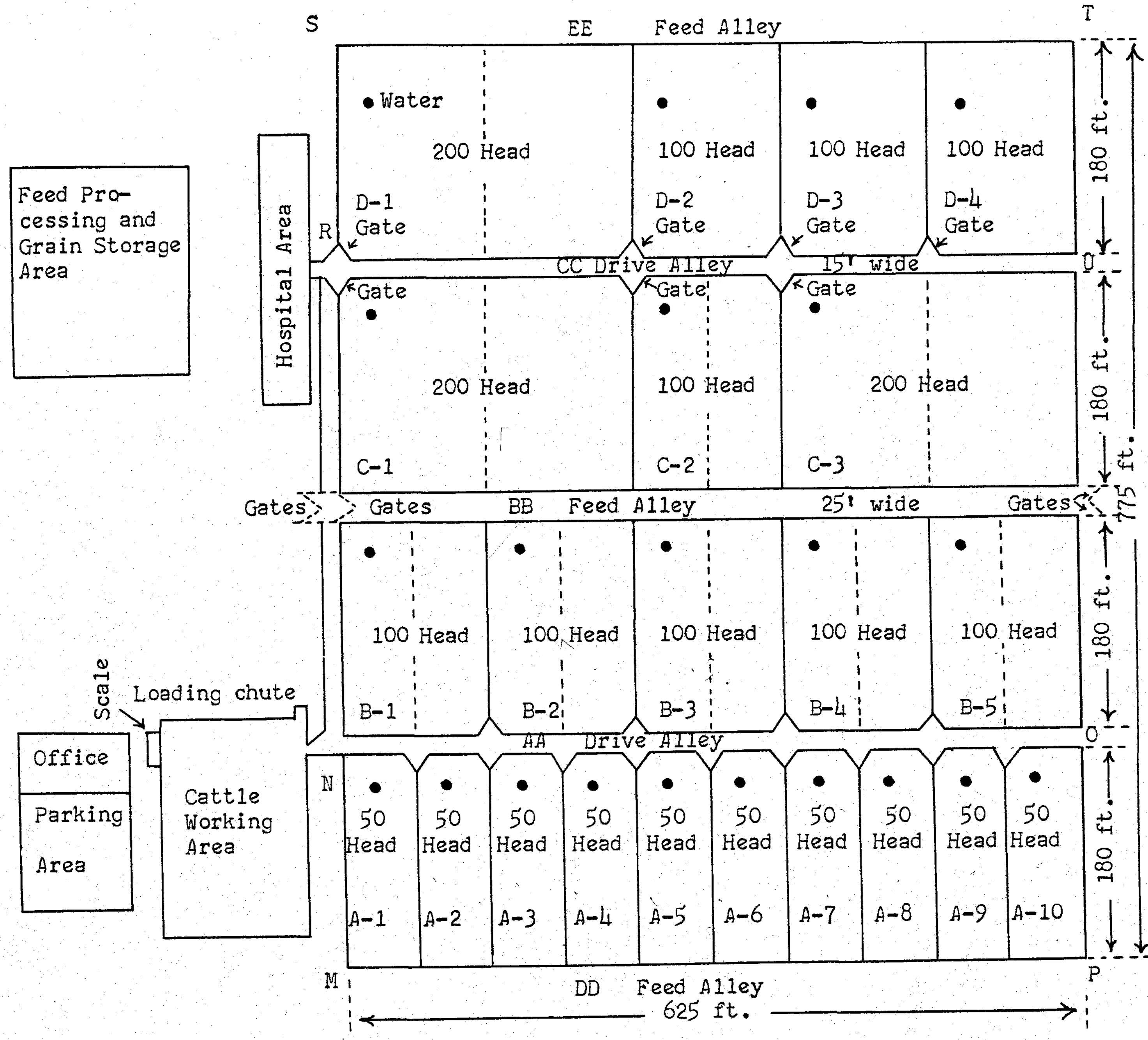


Figure 2. Layout for Two-thousand-head Feedlot (Requires Approximately 15 Acres of Land)

per animal may be the amount of bunk space that is provided. One dimension of the pen is determined by the bunk space, and this side constitutes by far the greatest cost of building the pen. This sometimes results in a preference for long, narrow, rectangular-shaped pens when this is possible. In other words, since the feed bunk constitutes the most expensive portion of the pen, there may be little economy gained by minimizing loafing space unless land value is high, although the cost of fencing the three remaining sides of the pen will also influence the decision.

Feed Bunk (Manger) Space Per Head. In this study, it was decided to use a feed bunk space of 15 inches per animal for the 2,000-head feedlot being considered. It will probably be necessary to feed more than once per day, and in actual practice, the size of feed bunk space per animal might likely be varied in different sections of the feedlot. Some operators like to start animals in the pens in uniform lots and keep them together. In this case, it may be decided to have more roughage in the ration and a greater bunk space in the area where animals are started and a reduction of roughage and bunk space as animals are moved to other areas of the feedlot as they near marketing weight.

Feedlot Construction Costs. The materials listed in this plan, along with their estimated costs, are only suggested examples of construction that is compatible with the assumptions of the plan and the conditions existing in the study area.

Fence line, other than the feedbunk side, is commonly built with either wood or cable construction and posts may be wood, metal, or concrete. Wood posts are used in most Oregon feedlots, but either wood or cable fence construction is satisfactory with only minor differences in the results obtained. Cable construction allows better air flow through the feedlot (which may be a disadvantage in cold weather), and visibility from the alleys is improved when cable fence line is used. Although cable construction may have a higher initial cost (depending on the grade of lumber used for comparison and other factors), it also normally will have a longer life span, lower maintenance cost, and a salvage value. Lumber is relatively inexpensive in the Sherman-Wasco area and may cost less initially, but the initial cost is increased if preservation treatment is used. Fence line costs will also vary with the fence height, space between fence rails and posts, and size of posts.

If 3/8" cable costs 7¢ per foot, 100 feet of six cable fence line would cost $42 exclusive of posts, labor, and miscellaneous items. While smaller posts might be used for cable construction than for wood, they may also need to be closer together depending upon the type of fence (i.e. how well constructed). Labor costs of feedlot construction also may vary. However, it is assumed that labor and post costs are approximately equal for either wood or cable construction. If lumber is used at a cost of $70 per thousand, five 2 x 6 boards for 100 feet of fence would cost $35. Of course, cheaper grade lumber could be used or only four rails or both (or some combination such as four 2 x 8's). The average cost for posts is estimated at $2 each (for 8' treated post with 5" top and using larger posts on corners), and with posts spaced eight feet apart, the cost of posts required for 100 feet of fence would be approximately $25. There would also be some minor costs for bolts, springs, and other hardware, plus additional expense for fence corners and gate posts. Using these costs as a guide, the estimated cost for labor and material for feedlot fence is $1 per foot.

There is approximately 6,750 feet of this fence without the inclusion of a fence enclosing the entire feedlot. An additional 3,100 feet of fence would be required to construct a fence surrounding the entire feedlot, but this latter facility is omitted from the plan. The cost involved is, therefore, $6,750 at a cost of $1 per foot. Approximately forty gates are also required for the feedlot area, and the cost of these will also depend on their construction and the type of material used. It is assumed that metal gates of some type will be used with an estimated cost of $30 each to build (or buy). Thus the total cost of fence used in the feeding area, other than the feedbunk is estimated at $7,950. At this cost, it is assumed that construction will be either of cable or well-treated and good quality lumber and the useful life expected (with a reasonable amount of maintenance) is 12 years.

Feedbunks comprise one side of all feeding pens, and in the proposed plan, 2,500 feet of feedbunks will be required. Feedbunks are commonly constructed of either wood or concrete, with wood generally costing less initially, but usually requiring more maintenance and with a higher rate of depreciation (again depending on lumber quality and preservation treatment). Concrete feedbunks are used in this plan plus a 10 foot concrete apron on which the feedbunk is placed. The estimated cost of feedbunk and apron is $6 per foot, with 2,500 feet costing a total of $15,000. The expected useful life of these feedbunks is at least 12 years.

Corrals will be needed in which animals can be worked and sorted. Pen arrangements should include one pen large enough to hold the largest lot of cattle in the feedlot (in this case 200 head), plus at least three sorting pens. Facilities will also be required for loading, unloading, brand checking, and weighing. The working corrals will almost always be built with wood construction, although some components such as the loading chute may be made of concrete. Corral fences will normally be higher and more sturdily built than other areas of the feedlot, and consequently will cost more to construct. More gates will be required plus additional alleys for sorting and handling. The estimated cost of labor and material for the construction of sorting and working corral (180 feet by 100 feet) is $4,000, with an expected useful life of 12 years.

In some feedlots the scale is situated so that one scale can be used to weigh both livestock and feed trucks. It is expected that this arrangement will be used for the 2,000 head plan. The cost of scale is estimated at $4,000.

A hospital area is required and a portion of this should be covered. Pens will be needed in which the animals can be isolated, and larger pens for exercise. The estimated cost for construction of these facilities is $2,000. The hospital area proposed is 60 feet by 100 feet The expected useful life is 12 years.

The above estimates for the working corrals and hospital area also include the costs of alleys and gates necessary to move animals from the main feedlot areas to the auxiliary facilities. In both cases, cost estimates include labor and material costs.

The estimated cost of land is $200 per acre, although the required investment in land will vary with feedlot location. Twenty acres of land are included which leaves a small allowance for future expansion. It may be desirable to have more than twenty acres of land since approximately 15 acres will be required for the facilities. Also, the layout requires a parcel of land approximately 800 feet by 775 feet and it may be necessary to buy additional land in order to include both of these dimensions. Although $4,000 is the estimated cost of land in the plan, this may be for 20 acres of $200 per acre land or for 40 acres of $100 per acre land or some other combination.

Obviously, if the feedlot site has a high alternative value, the cost of using a particular site will be high. Some feedlot sites have a locational value due to proximity to a city, water supply, commercial feed processing facilities, or existing buildings. This locational value may justify using high-priced land if this reduces other costs or lowers total capital requirements.

The cost of developing a water supply will also vary with location. The estimated cost for this facility is $5,600 (350 foot well at $16 per foot). The pumping and water distribution system is estimated to cost in the neighborhood of $8,000 resulting in a total cost for water supply and distribution of $13,600. This cost includes water tanks and a concrete apron surrounding the water tank. In some cases, this apron is short so animals must step up with front feet when drinking. This encourages animals to move away when not drinking.

Miscellaneous facilities and improvements will be needed. Gravel for feeding alleys, leveling and grading the feedlot into desired slope during construction, and a small office are included at an estimated cost of $5000.

NONFEED COSTS --- THE FEED PROCESSING PLANT

Feeds must be processed and combined in order to increase feed efficiency. Usually this is done in a feed processing plant, although in smaller feeding operations mixing may take place in a self-mixing, self-unloading truck or trailer with the feed processed on the premises or by commercial facilities located elsewhere. The 2,000 head feedlot would almost certainly require some type of processing plant, but at the same time may not be of sufficient size to utilize processing facilities to the maximum advantage. Facilities are necessary for feed processing, and storage for about two months supply of concentrates. If custom feeding is included in the feedlot operation, the ability to vary each ingredient in the feed ration individually may be desirable. Factors such as this must be taken into account to determine what feed processing facilities are needed to achieve the desired results.

The "continuous or percentage" type of feed processing plant combines ingredients in a continuous process according to the proportion each ingredient constitutes of the total ration. Ingredients are usually processed simultaneously in the continuous system, although this may be limited to concentrates only with roughages fed separately or combined with concentrates in self-mixing, self-unloading units during distribution to the feed bunks. In the "batch" system, the ingredients are usually all processed separately and then mixed. This system enables each ingredient to be varied individually. Mixing may take place in a self-unloading (or self-mixing, self-unloading) unit during distribution or in a mixing unit in the processing plant. The degree of automation and accuracy in mixing determines the cost of this type of feed processing in most cases since the "batch" system varies from shovel mixing to fully automated systems using punch card controls. The simplest system is the self-mixing truck or trailer that requires hand labor to obtain uniform layering of the ingredients. Some self-unloading units are also equipped for mixing which eliminates this hand leveling. At the other extreme is the fully automated feed processing plant that processes and mixes completely and delivers the mixed feed into a self-unloading unit.

A sketch of a hypothetical feed processing plant is shown in Figure 3. Concentrates are delivered to the processing plant at the facility labeled "A". These concentrates may be unprocessed or some (i.e. beet pulp) may be in the desired form for feeding. Feed is mechanically moved to a lift (B) that elevates the feed and distributes it to holding bins ($C_1C_2C_3$). There may be many of these or only a few holding bins depending on the number of ingredients necessary for the feed rations. The feed bins are intended to hold only a working supply for the processing plant in most cases. Additional storage should also be included and engineered into the system in order to utilize the unloading facilities of the processing plant.

The feed is moved from the holding bins by gravity and/or mechanical augers ($D_1D_2D_3$) that may be controlled by timing devices to automate the system or the proportion of each ingredient used may be controlled manually by timing or weighing. In some cases it may be desirable to have roller mills or grinders available to process one particular feed and return it to a holding bin, or feed may be processed (k) as it is moved to the mixing area (l). The procedures used will vary with the type of processing facilities, and feed rations.

Ingredients used in very small quantities (i.e., minerals) may be added to the ration (E) if mixing takes place in the mill or some other procedure may be used, such as mixing with one ingredient before adding this sub-mix to the ration. A component may be available in the feed processing plant to process and add roughage to the ration (F), or this may be processed separately (i.e. silage) and added to the ration during distribution or fed separately. Some feed processing plants will have facilities for steam rolling, or this may be done commercially, or omitted entirely and dry-rolled or

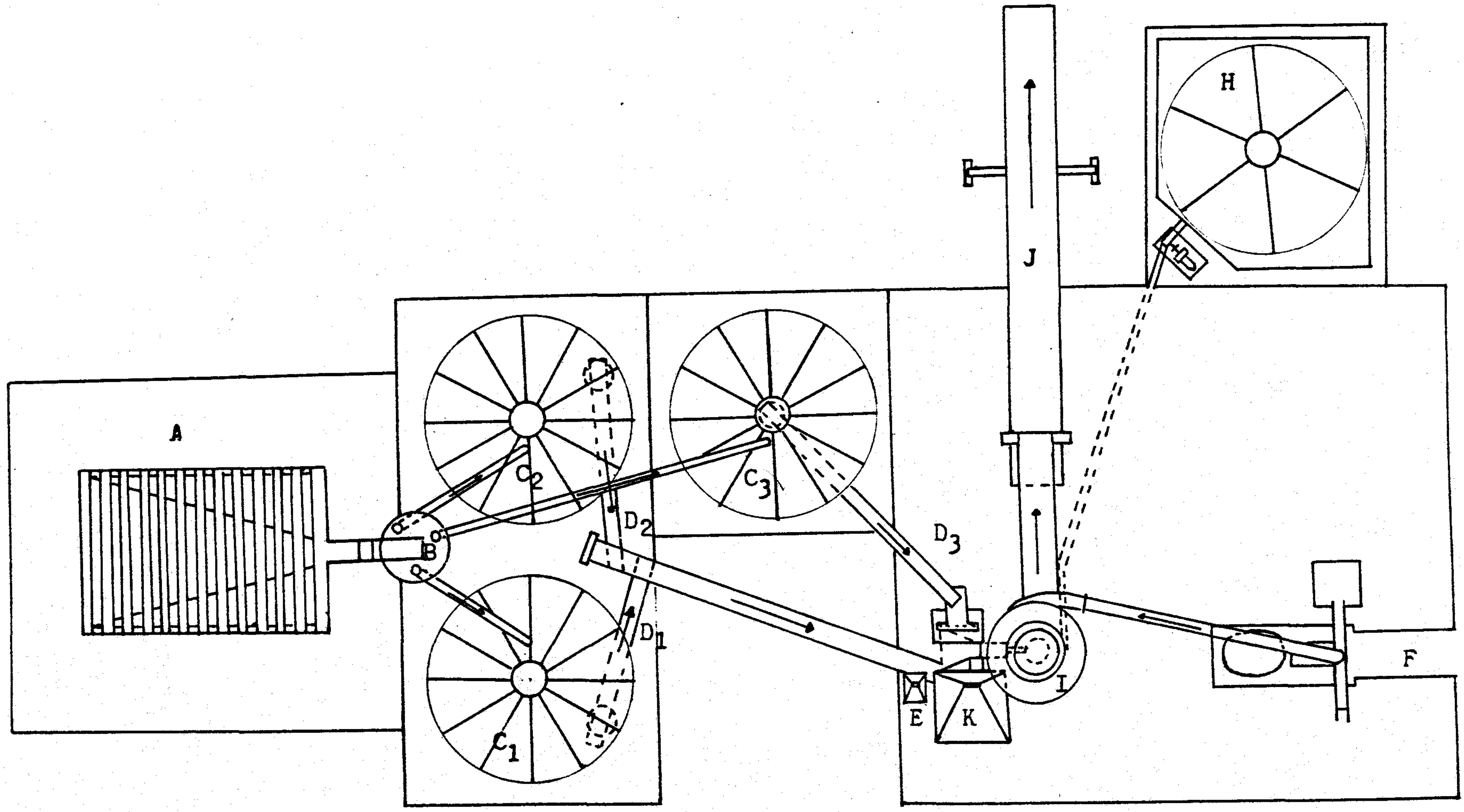


Figure 3. Sketch of Feed Processing Plant

ground feed used. Molasses may also be added (H) to the feed ration. The mixed ration is then delivered to a self-unloading unit (J) for addition to other ingredients or distribution. Other feed processing components may also be necessary if special feeds are included in the ration, but the facilities shown will handle the ingredients of the ration used in this plan.

The feed processing plant sketch is intended only to indicate the type of components that may be used. Each individual processing plant must be planned (or engineered) to work as a unit, and the components used must be in balance with the overall feedlot operation and planning (although some feed processing facilities are sold as units that may be expanded).

The estimated cost for the feed processing plant, like other values in the model, is intended to represent only a "reasonable" and not necessarily an optimum amount. Feed processing plant cost estimates are based on data obtained through contacts with feed mill engineering and sales outlets and by a survey of existing feedlot operations in Oregon.

The overall feed processing plant plus storage is estimated to cost $62,000. This includes storage for 30,000 bushels of feed concentrates at an estimated cost of 35 cents per bushel. It is possible to spend a great deal more than this and very likely may be desirable to do so under some operating conditions (e.g. custom feeding, feeding other classes of livestock in addition to cattle, such as hogs or sheep). It is believed that this amount will purchase feed processing facilities capable of an efficient output of about five tons per hour of the ration. The expected useful life of the feed processing plant is 12 years.

Under conditions assumed in the study, an average of 23.4 pounds (2.75 average daily gain x 8.5 feed conversion ratio) of feed per day will be consumed by each animal. If the feedlot were filled to capacity at all times (2,000 head), feed processing facilities would need to be capable of processing and/or combining 23.4 tons of feed per day. This includes 25,712 pounds of barley, 9,350 pounds of alfalfa hay, 7,012 pounds of beet pulp, and 2,337.5 pounds each of molasses and supplement.

It is not likely, however, that the feedlot would always be filled to capacity. It is assumed that on the average 1,800 head will be on feed at all times. Based on this number, the feed processing plant would be required to handle approximately 21 tons of feed per day on the average (assuming all ingredients were combined at the processing plant). The feed mill would need to be operated from four to five hours a day under these conditions. The excess feed mill capacity allows for considerable expansion at relatively little cost if feedlot size is increased.

OWNERSHIP AND OPERATING COSTS

Investment Requirements. The total investment plus annual ownership and operating costs for the type of feedlot and feed processing facilities outlined in the foregoing discussion are summarized in Appendix Table 8. The estimated total investment of $143,150 also includes capital expenditures for trucks, one tractor, squeeze chute, and related equipment.

The total annual cost of using these facilities is $26,170.96 using 6% interest cost for capital and a depreciation factor as shown in Appendix Table 8.

Summary of Annual Costs. The first cost listed in Table 2 is annual investment (ownership) costs of feedlot facilities plus fuel and electricty. In addition to these expenses, other classes of nonfeed costs of feedlot operation are labor, office and clerical expenses, veterinary and medicine, investment in cattle, and working capital, and miscellaneous expenses. Cattle ownership costs are a special category of investment costs. This cost will not be incurred for custom feeding operations.

Livestock death loss is considered to be a direct reduction in feedlot gain. In other words, the average daily gain of 2.75 pounds per day used in the plan is the average gain after death loss and reduction in gain from illness are taken into account. Experience of feedlot operators indicate death loss runs from .5 to 1.0 percent.

Cost of management also is omitted from the model plan. Profit will be considered as the return to management where the owner is also the manager. If hired management is used, this will be a direct reduction of profit (or an additional loss if this is the case). For example, in a cooperative type feedlot this will be a direct reduction of profit and net return.

Table 2. Ownership and Operating Costs for Feedlot and Feed Processing Plant

Feedlot ownership costs (Appendix Table 8) 1/	$26,170.96	
Labor	14,400.00	
Office and clerical	5,000.00	
Veterinary and medicine	1,500.00	
Miscellaneous	1,500.00	
Total annual ownership and operating costs for feedlot and processing plant		$48,570.96
Interest expense of cattle ownership ($342,000 at 6%)	20,520.00	
Interest expense of working capital ($58,000 at 6%)	3,480.00	
Allowance for taxes on livestock	1,000.00 2/	
Cost for cattle ownership and working capital		25,000.00
Total annual ownership and operating cost of 2,000 head feedlot		$73,570.96

1/ Includes fuel and electricity.

2/ Assuming all cattle are destined for slaughter when leaving feedlot and 80% of those on hand January 1 will be sold by May 1.

Labor costs are estimated at $14,400 per year for other than office and clerical requirements. This cost is for three full-time employees in the feedlot, although it may be possible to use less labor than this with the automated feedlot presented in the model. An allowance is also made for office and clerical expenses of $5,000.

Veterninary and medicine expenses are estimated at $1,500 per year under operating conditions assumed in the plan and by utilizing good management practices in the care and prevention of disease. An allowance of $1,500 is also made for miscellaneous expense items that are not included in other categories.

Since this feedlot plan is not a custom feeding operation, considerable capital will be required to purchase livestock. Money invested in cattle is assumed to cost 6 percent interest. An interest charge needs to be included as an expense even though the owner has part or all of his own capital. The average investment required for 1,800 cattle will be about $342,000, the exact amount depending on the age and market prices of livestock in the feedlot. Working capital in the amount of about $58,000 will be required to maintain adequate feed supplies and cover operating expenses.

Annual ownership and operating costs of using the facilities and equipment outlined for the 2,000 head feedlot total $73,570,96.

SUMMARY OF ALL FEEDLOT COSTS

Since an average of 1,800 cattle will be on feed at all times and the feeding period is 150 days, a total of 4,320 cattle per year can be fattened (1800 x 360/150). This results in an average annual turnover of 2.4 based on 1,800 head.

Since each animal is expected to gain 412.5 pounds while in the feedlot (with shrink considered as a marketing cost), a total of 1,782,000 pounds will be gained in the feedlot annually (412.5 x 4,320). By dividing the annual operating costs by the annual feedlot gain ($73,570.96/1,782,000 pounds) an average nonfeed cost per pound of gain is determined. This nonfeed cost is $.0413 per pound or $4.13 per hundredweight of feedlot gain under the conditions assumed in the plan.

By adding the nonfeed cost per hundredweight ($4.13) to the feed cost per hundredweight of gain the total cost of gain in the feedlot is determined. These feedlot costs per hundredweight of gain are tabulated by months beginning in June, 1956 as shown in Appendix Table 9.

When the nonfeed costs are spread over the average slaughter weight of 1,062.5 pounds ($4.13 x 412.5/1,062.5) the cost is $1.60 per hundred pounds. This amount ($1.60) must be added to all other costs incurred in the feeding operation in order to determine the average monthly costs of producing slaughter animals. Table 3 shows all feedlot costs including transportation and an allowance for marketing shrink.

Table 3. All Feedlot Costs 1/ (in dollars per hundredweight or cents per pound)

Cost attributable to:	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Simple Annual Average
1956													
Feeder animal 2/						9.97	9.98	10.65	10.77	10.75	11.17	10.41	10.53
Feed 3/						7.36	7.40	7.42	7.38	7.35	7.34	7.36	7.35
Transportation 4/						.31	.31	.31	.31	.31	.31	.31	.31
Market expense 5/						.82	.89	.96	.95	.92	.86	.80	.87
Nonfeed costs 6/						1.60	1.60	1.60	1.60	1.60	1.60	1.60	1.60
Total costs (1956) 7/						20.06	20.18	20.94	21.00	20.93	21.28	20.48	20.09
1957													
Feeder animal 2/	10.59	10.24	9.87	10.17	10.16	10.77	10.72	11.87	12.62	12.60	12.27	12.44	11.98
Feed 3/	7.43	7.50	7.54	7.53	7.48	7.34	7.20	7.08	6.98	6.94	6.98	7.07	7.26
Transportation 4/	.31	.31	.31	.31	.31	.31	.31	.31	.31	.31	.31	.31	.31
Market expense 5/	.82	.82	.87	.93	.92	.92	.98	.96	.94	.89	.92	.97	.91
Nonfeed costs 6/	1.60	1.60	1.60	1.60	1.60	1.60	1.60	1.60	1.60	1.60	1.60	1.60	1.60
Total costs (1957) 7/	20.74	20.46	20.19	20.54	20.47	20.94	20.80	21.82	22.44	22.34	22.08	22.39	21.27
1958													
Feeder animal 2/	12.16	12.02	12.39	12.98	13.86	12.49	14.33	16.19	16.41	17.22	16.39	15.99	14.37
Feed 3/	7.11	7.10	7.11	7.08	7.02	7.00	6.95	6.92	6.89	6.89	6.93	7.07	7.01
Transportation 4/	.31	.31	.31	.31	.31	.31	.31	.31	.31	.31	.31	.31	.31
Market expense 5/	1.02	1.02	1.09	1.11	1.13	1.13	1.08	1.04	1.04	1.01	1.08	1.08	1.07
Nonfeed costs 6/	1.60	1.60	1.60	1.60	1.60	1.60	1.60	1.60	1.60	1.60	1.60	1.60	1.60
Total costs (1958) 7/	22.20	22.05	22.50	23.08	23.92	22.53	24.27	26.06	26.25	27.08	26.31	26.05	24.36
1959													
Feeder animal 2/	16.21	15.80	16.74	16.57	16.47	17.62	17.25	17.90	18.33	16.21	17.58	17.13	16.98
Feed 3/	7.16	7.26	7.32	7.31	7.26	7.23	7.13	6.99	6.98	6.83	6.80	6.81	7.08
Transportation 4/	.31	.31	.31	.31	.31	.31	.31	.31	.31	.31	.31	.31	.31
Market expense 5/	1.12	1.08	1.11	1.15	1.16	1.15	1.15	1.13	1.12	1.09	1.96	1.06	1.12
Nonfeed costs 6/	1.60	1.60	1.60	1.60	1.60	1.60	1.60	1.60	1.60	1.60	1.60	1.60	1.60
Total costs (1959) 7/	26.39	26.05	27.07	26.93	26.80	27.91	27.44	27.93	28.24	26.03	27.35	26.90	27.08

Table 3. All Feedlot Costs 1/ (in dollars per hundredweight or cents per pound) continued

Cost attributable to:	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Simple Annual Average
						1960							
Feeder animal 2/	15.39	16.36	15.40	14.68	15.25	15.60	15.43	16.38	16.08	16.32	15.37	14.17	15.54
Feed 3/	6.97	7.02	7.00	6.95	6.91	6.76	6.68	6.62	6.60	6.59	6.60	6.67	6.78
Transportation 4/	.31	.31	.31	.31	.31	.31	.31	.31	.31	.31	.31	.31	.31
Market expense 5/	1.06	1.05	1.09	1.09	1.09	1.07	1.06	1.05	1.00	.97	.98	1.01	1.04
Nonfeed costs 6/	1.60	1.60	1.60	1.60	1.60	1.60	1.60	1.60	1.60	1.60	1.60	1.60	1.60
Total costs (1960) 7/	25.33	26.33	25.39	24.63	25.16	25.36	25.08	25.95	25.59	25.78	24.85	23.76	25.27
						1961							
Feeder animal 2/	13.83	13.59	13.49	14.36	14.91	15.27	14.91	15.50	15.11	15.32	14.66	13.87	14.57
Feed 3/	6.73	6.77	6.81	6.83	6.82	6.83	6.83	6.82	6.85	6.91	6.98	7.05	6.85
Transportation 4/	.31	.31	.31	.31	.31	.31	.31	.31	.31	.31	.31	.31	.31
Market expense 5/	1.02	.98	.98	.94	.94	.93	.93	.98	.98	.98	1.00	1.02	.97
Nonfeed costs 6/	1.60	1.60	1.60	1.60	1.60	1.60	1.60	1.60	1.60	1.60	1.60	1.60	1.60
Total costs (1961) 7/	23.48	23.25	23.18	24.04	24.58	24.94	24.58	25.20	24.85	25.12	24.55	23.84	24.30
						1962							
Feeder animal 2/	14.43	14.00	14.55	14.95	15.12	14.99	15.53	15.97	15.44	15.71	15.59	14.78	15.09
Feed 3/	7.17	7.29	7.40	7.47	7.54	7.58	7.52	7.44	7.32	7.18	7.04	6.98	7.33
Transportation 4/	.31	.31	.31	.31	.31	.31	.31	.31	.31	.31	.31	.31	.31
Market expense 5/	1.02	1.00	1.06	1.09	1.07	1.05	1.06	1.09	1.10	1.08	1.10	1.11	1.07
Nonfeed costs 6/	1.60	1.60	1.60	1.60	1.60	1.60	1.60	1.60	1.60	1.60	1.60	1.60	1.60
Total costs (1962) 7/	24.52	24.20	24.92	25.42	25.63	25.53	26.02	26.41	25.76	25.88	25.64	24.78	25.39
						1963							
Feeder animal 2/	15.45	15.36	15.28	15.66	15.95	15.96	15.34	15.05	15.59	15.44	15.20	15.51	15.48
Feed 3/	6.95	6.97	6.96	6.94	6.93	6.89	6.81	6.74	6.69	6.66	6.71	6.79	6.84
Transportation 4/	.31	.31	.31	.31	.31	.31	.31	.31	.31	.31	.31	.31	.31
Market expense 5/	1.06	.98	.96	.97	.93	.94	1.04	1.01	.99	.95	.92	.92	.97
Nonfeed costs 6/	1.60	1.60	1.60	1.60	1.60	1.60	1.60	1.60	1.60	1.60	1.60	1.60	1.60
Total costs (1963) 7/	25.37	25.22	25.10	25.47	25.71	25.70	25.10	24.71	25.18	24.96	24.74	25.13	25.20

Table 3. All Feedlot Costs 1/ (in dollars per hundredweight or cents per pound) continued

1/ Weighted average with each category weighted according to the proportion it constitutes of total costs.

2/ Data from Appendix Table 2 weighted 650/1062.5 (data lagged 5 months).

3/ Data from Appendix Table 5 weighted 412.5/1062.5.

4/ Transportation allowance for feeder animals 50¢ per cwt. weighted 650/1062.5 (actual amount $.3058).

5/ Expense due to shrink allowance assumed to be 4% of selling price (4% of Table 1).

6/ Nonfeed costs $4.13 per cwt. of feedlot gain weighted 412.5/1062.5 equals $1.60.

7/ Columns may not total due to rounding.

RETURNS TO MANAGEMENT AND PROFIT

By subtracting the values in Table 3 (total costs) from the average monthly prices received for slaughter steers as shown in Table 1, the net average monthly and annual average returns to management and profit per hundred pounds are determined. These values are shown in Appendix Table 10. By multiplying these values per hundredweight times the volume handled in the feedlot, the total returns to management and profit can be derived and are shown in Table 4. Every year (except 1963) would have resulted in a profit 1/ for the feedlot plan outlined in detail in this study. The net returns per head shown in the model plan resembles those obtained by successful feeders in Oregon and Washington.

It should be emphasized that the profit situation shown is based on the conditions assumed in the model plan and as conditions change so will profit per hundredweight and net income. 2/ Because of these limitations, the effect of varying the costs of some production inputs is considered in the next section.

Table 4. Returns to Management and Profit per Hundredweight, Per Head, and for the Year, 2,000-Head Capacity

Year	Per Hundredweight	Per Head	For the Year
1956	$1.50	$15.94	$ 68,861
1957	1.54	16.36	70,675
1958	2.51	26.67	115,214
1959	.79	8.39	36,245
1960	.82	8.71	37,627
1961	.04	.42	1,814
1962	1.34	14.24	61,517
1963	-1.09	-11.58	-50,026

1/ The term "profit" includes returns to management whenever used in this study.

2/ For example, it has been assumed that no net profit of any consequence will be realized from the sale of manure. An allowance has been made for machinery to clean feeding pens but no other costs for manure removal are included. It is recognized that there may be times when manure removal from the feedlot site involves some expense.

EFFECT OF VARIATION IN SELECTED COSTS

Reliability of the estimated returns to management and profit situation for the model plan depends on how accurately the prices selected are representative of the conditions existing in the study area. Even if the basic data selected are reliably representative of the conditions in the study area, all categories of costs will vary from time to time. It is not possible to accurately predict future price changes nor future price relationships. However, it is possible to appraise some of the effects of using different prices.

Variation in Feed Costs. It is a well known fact that feed grain prices in Oregon are considerably higher than in midwestern states of the Cornbelt. If barley prices were reduced $1.00 per ton, the net effect would be a reduction in feed cost of approximately $0.23 per hundredweight of feedlot gain. If barley prices (or an equivalent feed such as wheat) dropped $5.00 per ton, the feed costs would decline about $1.17 per hundredweight.

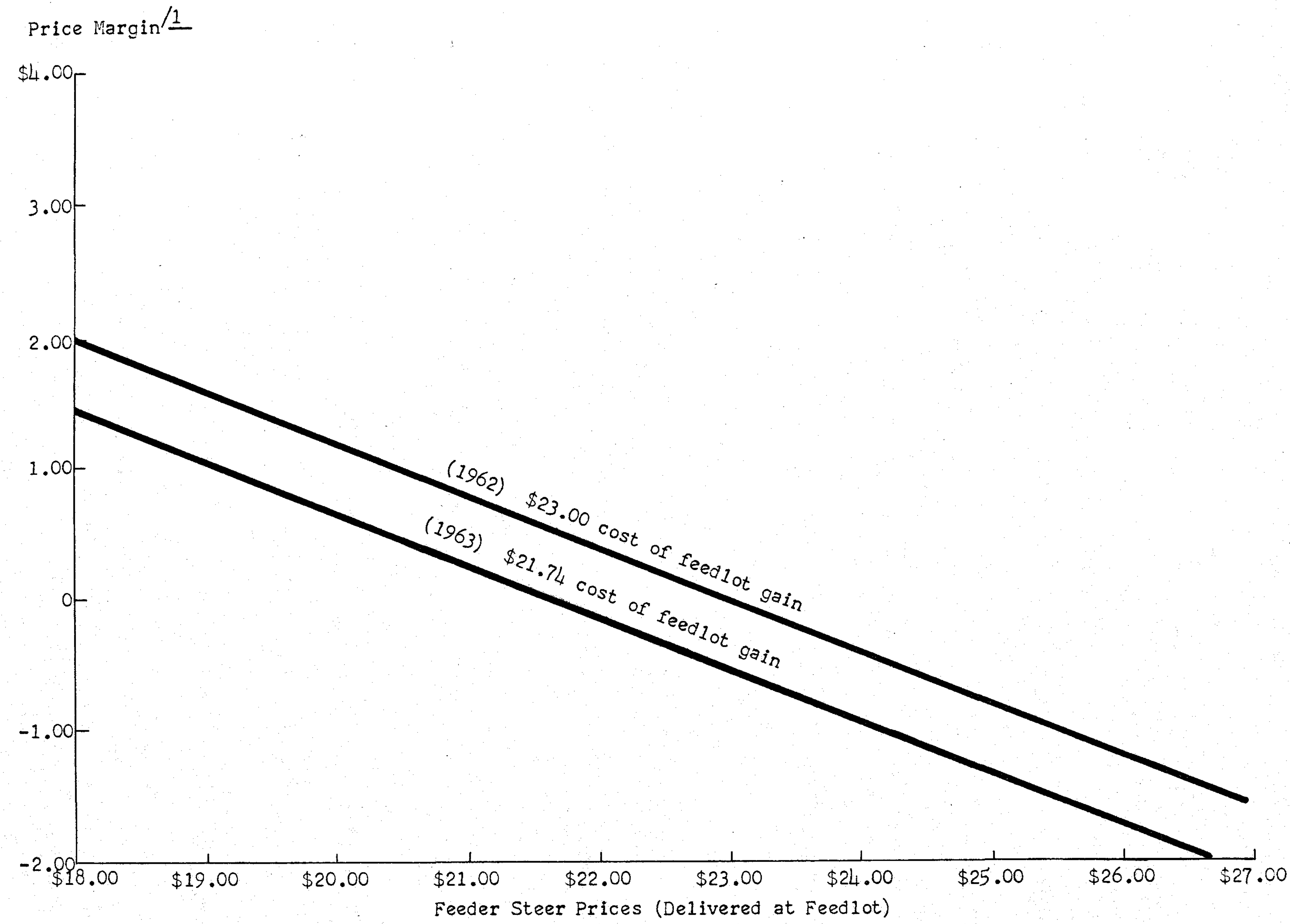
The results of price changes for other feeds used in the ration can also be calculated. For example, $30.00 per ton was used as the price of alfalfa hay. A $1.00 per ton drop in the price of alfalfa hay would reduce feed costs 20¢ per ton (since alfalfa hay constitutes 20 percent of the ration) and consequently results in a reduction of the cost per hundredweight of feedlot gain of $0.085.

Impact of Changing Feeder Cattle Prices on Profit. It is important to keep in mind that the relationship between feeder cattle and slaughter cattle prices has much to do with determining profitability during a particular year or feeding period. When feedlot operators find it necessary to pay a higher price for feeders they naturally hope slaughter cattle prices will be higher when the cattle are ready for market. From Figure 4 it is possible to determine break-even points based on the feedlot cost of gain per hundredweight for 1962 and 1963.

By selecting any expected price paid for feeder animals on the horizontal axes, the corresponding price that must be received for slaughter animals in order to break even can be determined on the vertical axes. The price needed for slaughter animals will be a price five months later at the end of the feeding period.

It can be seen that Figure 4 is a simplified example using only average annual values from two years and assumes that market price can be accurately estimated. Nonetheless, this chart demonstrates how variations in the prices of feeder and slaughter animals may affect the profit position.

For example, if feeder steers weighing 650 pounds cost $25.20 per hundred pounds in 1962, a feeding operation could break even if slaughter steers sold for about $0.85 less than the cost of feeder steers or a selling price of $24.35 per hundredweight when no allowance is made for shrinkage and marketing expense. To prove this, 412.5 pounds of feedlot gain at



/1 Difference between net slaughter steer price (minus marketing costs) and total feeder steer costs

Figure 4. Break-even Margins for Feeding -- Assuming 650-pound Feeder Steer and 1,062.5-pound Slaughter Steer

$23.00 per hundredweight cost $94.87 and 650 pounds purchased as feeder animal cost $163.80, thus the cost of obtaining the finished slaughter steer is $258.67. If this latter value is divided by the weight of the slaughter animal (1,062.5) the selling price necessary to break even turns out to be $24.34 per hundredweight. When an allowance of four percent is made for shrinkage and marketing expense ($1.01) the selling price included would need to be $25.35 to break even.

From these examples it is apparent that the values used in the model plan can vary with little difficulty. The prices of different ingredients in the feed ration, the price of feeder animals or the selling price of slaughter animals can change and this will affect the profit position.

Other inputs can and very likely will vary from time to time. For example, muddy pens, excessive illness, animal age, inherited characteristics or severe climatic conditions may change the feed conversion ratio thus making feeding more costly.

OTHER FEEDLOT SIZES

The determination of current economies of scale, if any, are limited in this study to feedlots of three sizes; 500, 2,000, and 5,000 head.

500 and 5,000 Head Feedlots. The suggested pen arrangement for the 500-head feedlot (Figure 5) is the same as section MNOP in Figure 2. Each of the basic 500-head feeding sections of Figure 2 can be expanded to increase the capacity of the feedlot and only a minimum variation in materials used or construction costs need occur. Therefore, the costs of some feedlot components will be nearly proportional as size is varied and others may exhibit only minor economies.

By expanding this basic 500-head unit to a composite of 10 such units, the pen arrangement for the 5,000-head feedlot is depicted in Figure 6. However, a 5,000-head feedlot that is not a custom feeding operation may have very few pens designed for only 50 head of livestock. The 5,000-head feedlot will have 10 basic sections each of which may vary from 10 pens of 50 head each to one pen holding 500 head or any combination between these extremes. The loafing space, bunk space, and feed and drive alleys will not be changed regardless of the pen arrangement used in the 5,000-head feedlot. Only the size of the pens will be changed and possibly the number of water tanks, gates, and similar facilities will be reduced. The pen size and arrangement, however, is extremely flexible.

A small feedlot (500 head or less) may have relatively high feed costs per ton. More feed may need to be purchased that has been at least partially processed and reduced freshness may result due to storage. Feed processing done at the feedlot site may not be as thorough when low-cost inadequate processing facilities are used. This may result in a lower average daily gain and higher feed conversion ratios that will result in increased feed costs. The total result of this situation is not evident in a consideration of only nonfeed economies of scale.

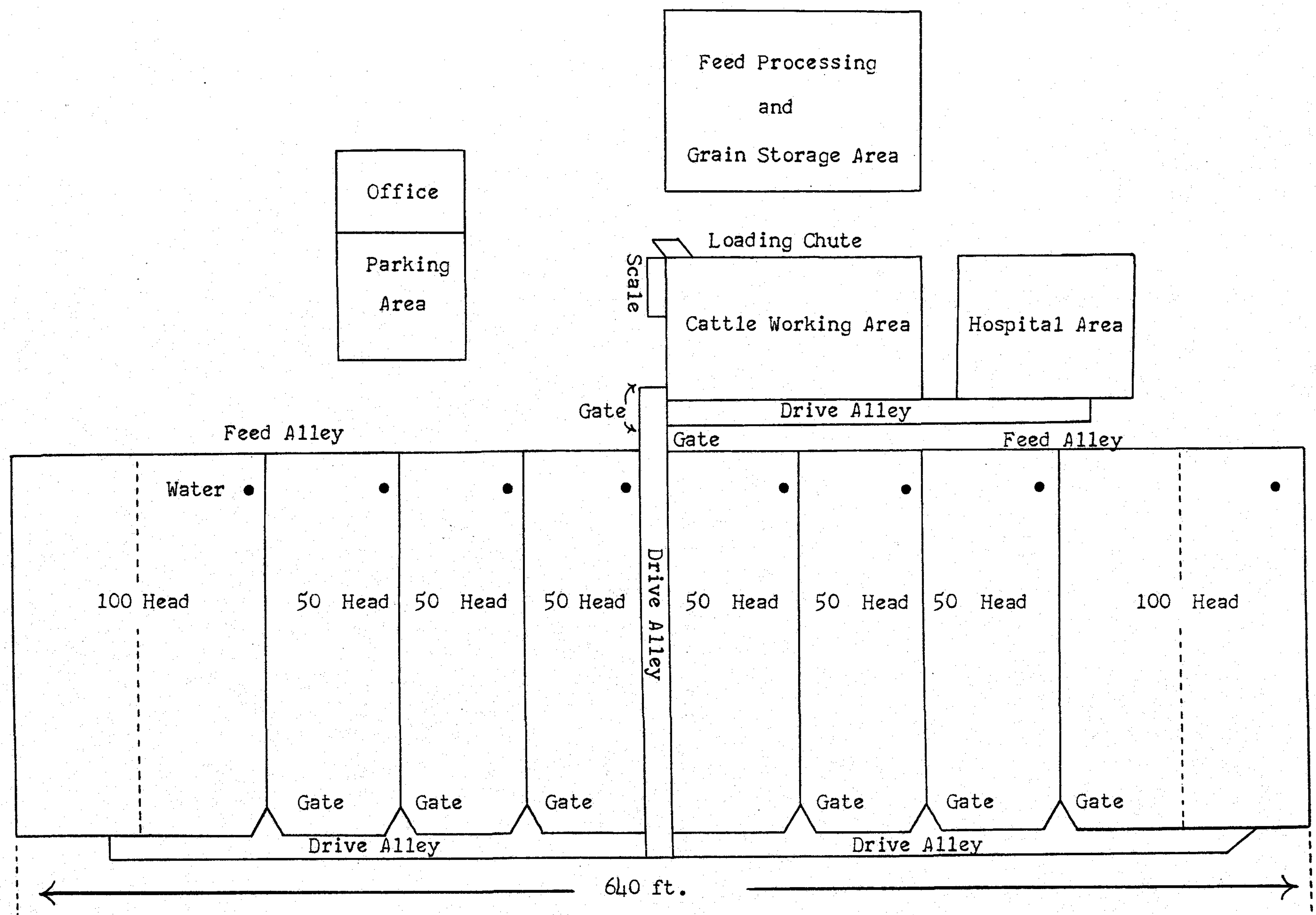


Figure 5. Layout for Five-hundred-head Feedlot

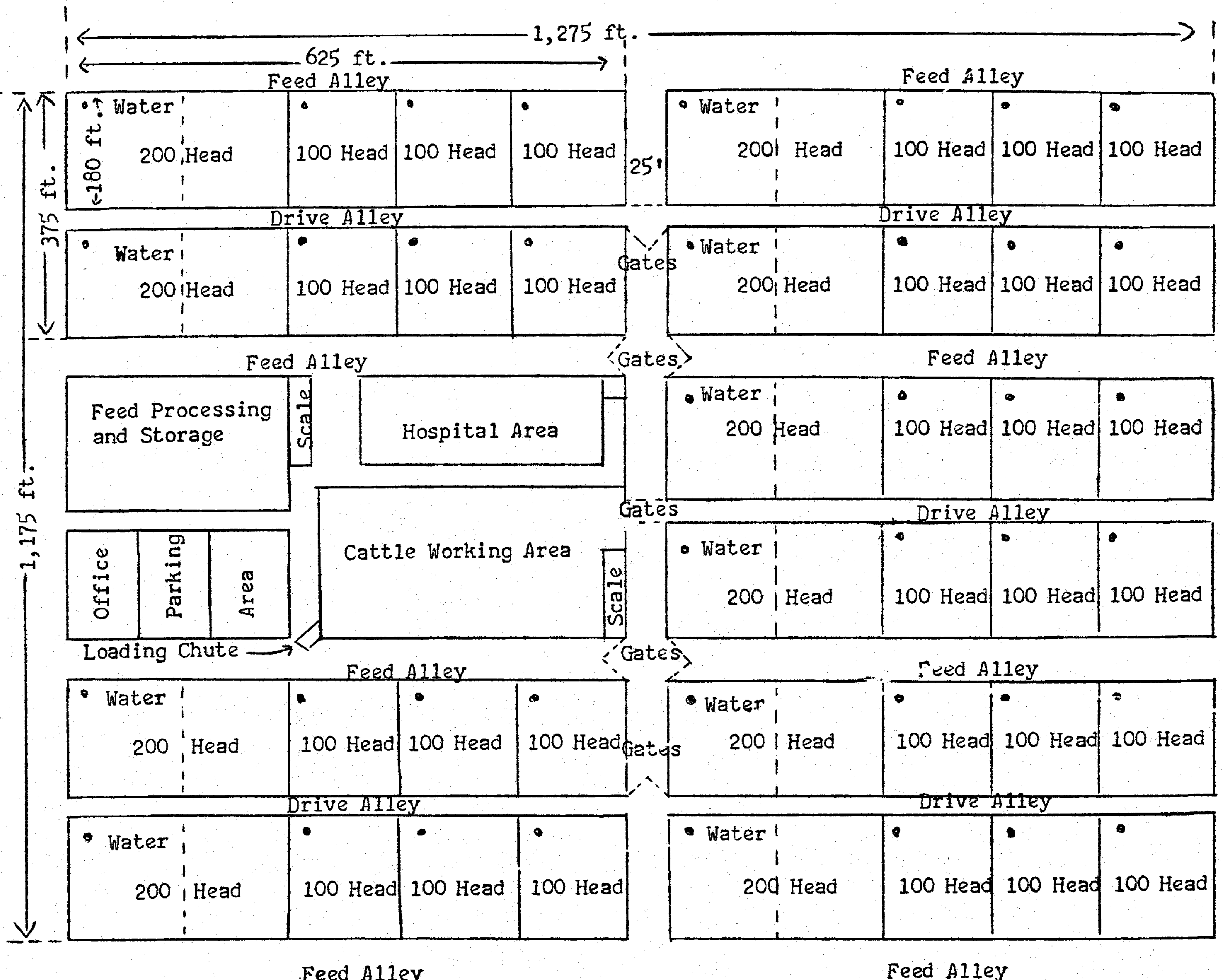


Figure 6. Layout for Five-thousand-head Feedlot

Comparison of Capital Requirements for Three Feedlot Sizes. The estimated capital requirements for each feedlot components plus the amount needed for cattle ownership and working capital for feedlots of the three sizes being considered are shown in Table 5. Capital requirements per head of feedlot capacity are also listed. Based on intended capacity, the 500-head feedlot would require $95.28 per head to build the feedlot, supply at least a partial feed processing system plus some storage, and furnish the needed equipment. It is likely that feed storage will be proportionately greater in this smaller feedlot due to need to purchase some feeds partially processed which may require storage facilities for both processed and unprocessed feeds in some cases. Only $71.58 is required for these same facilities for the 2,000-head feedlot. It is expected that the feed processing plant will be capable of doing a more satisfactory job even though the proportionate cost is lower. This means that feed costs for the 2,000-head feedlot might also be lower, although no estimate of the extent of this will be made. The cost for equivalent facilities is reduced still further for the 5,000-head feedlot to $52.22 per head of capacity. Feed processing may be even more efficient and satisfactory in this larger feedlot as more expensive but more efficient facilities are available.

Some minor economies will exist in other components of the feedlot such as in the cattle working and sorting areas, use of scales, feed distribution and manure handling equipment.

Unit Costs Per Hundredweight by Size of Feedlot. Comparison of each feedlot cost per hundredweight of gain for the three feedlot sizes demonstrates the economies of scale that are likely to occur in each category (see Table 6). For example, using the assumptions made previously (one firm considering three feedlot sizes), no economy of scale is demonstrated in the cost of cattle ownership, although in reality, large firms may tend to have capacity to obtain capital at lower cost than small firms. On the other hand, an economy is anticipated in the amount of working capital even though the interest cost of money is the same. It is expected that a greater amount of working capital per head of capacity will be needed as the feedlot size is reduced. Additional capital is likely to be required since capital and profit are likely to be returned in a somewhat "lumpy" stream. For example, if feeder cattle are purchased in groups averaging 50 head each, a new lot would enter the 5,000-head feedlot on the average of once every day and one-half. If the same conditions hold for the 500-head feedlot, a new lot of cattle would go on feed only every 15 days, and it is possible that the majority of the animals in the entire feedlot might be in one stage of finishing at certain times of the year. It can be seen that nonfeed costs per hundred pounds of gain are about $2.00 less in the 5,000-head feedlot than in the 500-head size.

It is important to note that this analysis is based on feedlot operations where the livestock are owned by management. If the feedlot operator is interested primarily in custom feeding, a different arrangement of components may be likely and capital requirements would be greatly reduced (see Table 7).

Table 5. Estimated Capital Requirements of 500, 2,000, and 5,000 Head Capacity Feedlots

Item	500 Head		2,000 Head		5,000 Head	
	Total capital	Per head of capacity	Total capital	Per head of capacity	Total capital	Per head of capacity
Land	$ 2,000.00		$ 4,000.00		$ 10,000.00	
Water system	7,600.00		13,600.00		25,600.00	
Feedlot fence	1,987.50		7,950.00		19,775.00	
Feedbunks & other concrete	3,750.00		15,000.00		37,500.00	
Working corrals	1,500.00		4,000.00		6,000.00	
Hospital area	800.00		2,000.00		3,500.00	
Scales	3,000.00		4,000.00		8,000.00	
Miscellaneous facilities	3,000.00		5,000.00		10,000.00	
TOTAL INVESTMENT OTHER THAN FEED MILL AND STORAGE	23,637.50	$ 47.28	55,550.00	$ 27.78	120,375.00	$ 24.08
Feed processing and storage facilities	15,000.00		62,000.00		100,000.00	
TOTAL FEEDLOT AND FEED MILL INVESTMENT	38,637.50	77.28	117,550.00	58.78	220,375.00	44.08
Feeding equipment	4,000.00		9,600.00		19,200.00	
Tractor and loader	3,000.00		7,000.00		7,000.00	
Manure hauling equipment	1,000.00		4,000.00		4,000.00	
Pickup truck	1,000.00		2,500.00		2,500.00	
Other buildings (equipment, storage, etc.)					3,000.00	
Miscellaneous equipment			2,500.00		5,000.00	
TOTAL FEEDLOT REQUIREMENT	47,637.50	95.28	143,150.00	71.58	261,075.00	52.22
Cattle ownership	85,500.00		342,000.00		874,000.00	
Working capital	25,000.00		58,000.00		120,000.00	
TOTAL CAPITAL REQUIREMENTS	158,137.50	316.28	543,150.00	271.75	1,255,075.00	251.01

Table 6. Estimated Nonfeed Costs for 500, 2,000, and 5,000-Head Feedlots 1/

Item	500 Head		2,000 Head		5,000 Head	
	Total annual cost	Cost per cwt of gain 3/	Total annual cost	Cost per cwt of gain 3/	Total annual cost	Cost per cwt of gain 3/
Feedlot ownership	$6,730.05	$1.51	$19,625.96	$1.10	$ 35,602.72	$ .78
Electricity, fuel, etc.	1,250.00	.28	2,120.00	.12	4,250.00	.09
Feedlot maintenance	760.00	.17	1,425.00	.08	2,775.00	.06
Labor	4,800.00	1.08	14,400.00	.81	24,000.00	.53
Office and clerical	1,800.00	.40	5,000.00	.28	8,000.00	.18
Veterinary and medicine	400.00	.09	1,500.00	.09	3,750.00	.08
All taxes and insurance	1,250.00	.28	4,000.00	.22	9,500.00	.21
Miscellaneous	500.00	.11	1,500.00	.09	3,500.00	.08
Cattle ownership 2/	5,130.00	1.15	20,520.00	1.15	52,440.00	1.15
Working capital 2/	1,386.00	.31	3,480.00	.19	7,200.00	.16
TOTALS	24,006.05	5.38	73,570.96	4.13	151,017.72	3.32

1/ Some feedlot expenses can be considered in more than one category of costs. Feed storage beyond a 30-day working supply may be either a feed or nonfeed cost. In this table feed storage is considered to be a nonfeed cost, not because this method is more correct, but because it is consistent with including capital investment for feed storage with other capital investments. Death loss may be considered as a direct reduction of feedlot gain or as a nonfeed cost. In this study, death loss was a direct reduction in feedlot gain. Transportation charge for feeder animals may be an increase in the cost of livestock or a nonfeed cost, but is considered in this study as an increase in the cost of feeder animals. Shrink also affects nonfeed cost if it is deducted from feedlot gain but here marketing shrink has been considered a cost of marketing and feeder animal shrink as accounted for in feeder animal prices.

2/ All capital is assumed to have an interest cost of 6%.

3/ The following assumptions are made concerning number of livestock fed: in 500-head feedlot, an average of 450 head on feed at all times (90% of capacity), in the 2,000-head feedlot an average of 1,800 (90% of capacity and in the 5,000-head feedlot, an average of 4,600 (92% of capacity).

Table 7. Proportion That Each Component Constitutes of Total Capital Required, by Size of Feedlot

Feedlot Size	Total Capital Required 1/	Component				
		Feedlot	Processing Plant	Equip-ment	Working Capital	Cattle Ownership
		- - - - - - - Percent - - - - - - - - - -				
500 Head	$ 158,137.50	14.9	9.5	5.7	15.8	54.1
2,000 Head	543,150.00	10.2	11.4	4.7	10.7	63.0
5,000 Head	1,255,075.00	9.6	8.0	3.2	9.6	69.6

1/ Table 5.

Need for Full Use of Feedlot Capacity. Although nonfeed costs are reduced as feedlot size increases, it is also important to construct a feedlot of a size that can be operated at or near capacity most of the time. Annual nonfeed costs are held constant for two feedlot sizes while the numbers of animals fed per year are varied, (see Table 8). The table shows that if 5,000 head are fed annually in the 2,000-head feedlot (104.2% of capacity) the nonfeed cost per hundredweight of feedlot gain is $3.57. However, if only 5,000 head are fed per year using the feedlot with intended capacity of 5,000 head (41.6% of annual capacity), the cost per hundredweight of gain is $7.33. These comparisons demonstrate the effect of unused feedlot capacity and the extent it is offset by efficiency due to economy of scale for the 2,000-head and 5,000-head feedlots.

Of course, it is not likely that decreasing per unit costs would continue if extensive overstocking was practiced and may not occur at all beyond the intended capacity. However, only part of the physical facilities would be used excessively. Loafing space per animal would diminish with overstocking, but at certain seasons of the year this might not be a problem. Feed bunk space would be less, but feeding more often or in larger amounts might offset this or the feed ration might be changed.

The feedlot sizes selected for study do not fully solve the problem of determining optimum feedlot size. Individuals considering the construction of a 2,000-head feedlot would be likely to concern themselves with the advantages of successive sizes such as 2,500, 3,000, 4,000 and 5,000 as alternatives rather than comparing only the two alternatives of 2,000 head and 5,000 head.

This study has aimed at emphasizing feasibility of any size feedlot, rather than attempting to appraise the most profitable size for the study area. Feedlot size depends to a large measure on the ability, desires, and available capital of management, although under some conditions it may be desirable to alter the type of feeding operation to take advantage of economies of scale due to increased size, (i.e., custom feeding to increase feedlot capacity).

Table 8. Nonfeed Costs per Hundredweight of Gain when Feeding at Different Levels of Feedlot Capacity 1/

2,000 head capacity			5,000 head capacity		
Number of head fed annually 2/	% of capacity	Nonfeed cost per cwt. of gain	Number of head fed annually 3/	% of capacity	Nonfeed cost per cwt. of gain
			5,000	41.6	$7.33
3,000	62.5	$5.95	7,500	62.5	4.88
3,200	66.7	5.57	8,000	66.7	4.57
3,400	70.8	5.25	8,500	70.8	4.31
3,600	75.0	4.95	9,000	75.0	4.07
3,800	79.2	4.69	9,500	79.2	3.85
4,000	83.3	4.46	10,000	83.3	3.66
4,200	87.5	4.25	10,500	87.5	3.49
4,320	90.0	4.13	11,000	91.7	3.33
4,400	91.7	4.05	11,040	92.0	3.32
4,600	95.8	3.88	11,500	95.8	3.18
4,800	100.0	3.72	12,000	100.0	3.05
5,000	104.2	3.57	12,500	104.2	2.93

1/ Based on total annual costs of operation of $73,570.96 for the 2,000-head feedlot and $151,017.72 for the 5,000-head feedlot. It is assumed that all costs of feedlot operation remain constant for at least one year as the number of head fed in the feedlot varies (although it is likely that some costs such as cattle ownership expense may vary).

2/ Feeding period of 150 days resulting in 4,800 head as maximum intended capacity (2,000 x 360/150).

3/ Feeding period of 150 days resulting in 12,000 head as maximum intended capacity (5,000 x 360/150).

APPENDIX

Table 1. Grain and Hay Acreage and Production, Wasco and Sherman Counties

WASCO COUNTY

	1954[1/]	1959[1/]
Total cropland (in acres)	117,997	110,587
Total irrigated acres	15,190	16,840
Average size of farms (in acres)	1,314.8	2,048.6
Proportion of farms with irrigation	41.1%	45.4%

Crops Harvested[2/]

	1955-59 average	1960	1961	1962[p/]
Barley				
Acres in barley	24,460	21,000	21,000	17,000
Barley production (thousand bushels)	736	766	738	684
Wheat				
Acres in wheat	59,720	59,600	60,000	52,000
Wheat production (thousand bushels)	1,869.6	1,989	1,606	2,043
All hay crops				
Acres in hay	19,692	16,390	16,250	17,650

	1940	1950	1961	1962[p/]
Livestock				
Beef cows on farms, 2 yrs. old or older Jan. 1	4,400	6,700	14,000	14,500
Brood sows on farms, over 6 months old Jan. 1	1,800	1,000	800	650

SHERMAN COUNTY

	1954[1/]	1959[1/]
Total cropland (in acres)	140,634	141,165
Total irrigated acres	602	1,505
Average size farms (in acres)	1,868.8	2,112.1
Proportion of farms with irrigation	7.9%	13.4%

Table 1. Grain and Hay Acreage and Production, Wasco and Sherman Counties (continued)

SHERMAN COUNTY (continued)

Crops harvested[2/]	1955-59 average	1960	1961	1962[P/]
Barley				
Acres in barley	43,040	40,400	42,000	36,000
Barley production (thousand bushels)	1,144	1,515	1,327	1,273
Wheat				
Acres in wheat	89,800	95,400	96,000	87,500
Wheat production (thousand bushels)	3,067.4	3,233	2,347	3,266
All hay crops				
Acres in hay	6,002	5,870	5,320	5,800

	1940	1950	1961	1962[P/]
Livestock				
Beef cows on farm, 2 yrs. old or older, Jan. 1	2,400	6,000	5,500	6,000
Brood sows on farm, over 6 months old, Jan. 1	600	300	200	200

1/ United States Census of Agriculture, Vol. 1, Part 47, 1959, U.S. Dept. of Commerce, Bureau of the Census.

2/ Cooperative Extension Service, Oregon State University, Corvallis, and the Oregon Crop and Livestock Reporting Service, USDA, Portland, cooperating.

P/ Preliminary.

Table 2.[1] Good and Choice Feeder Steer Prices at Ontario
(500 to 700 pounds, simple monthly average)

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Yearly Ave.
1956	16.29	16.31	17.41	17.61	17.57	18.26	17.02	17.31	16.74	16.13	16.63	16.61	16.99
	(16.79)[2]	(16.81)	(17.91)	(18.11)	(18.07)	(18.76)	(18.52)	(17.81)	(17.24)	(16.63)	(17.13)	(17.11)	(17.57)
1957	17.61	17.52	19.41	20.63	20.59	20.06	20.34	19.88	19.64	20.25	21.21	22.66	19.98
	(18.11)	(18.02)	(19.91)	(21.13)	(21.09)	(20.56)	(20.84)	(20.38)	(20.14)	(20.75)	(21.71)	(23.16)	(20.48)
1958	20.42	23.43	26.46	26.83	28.14	26.79	26.13	26.50	25.82	27.36	27.08	26.93	25.99
	(20.92)	(23.93)	(26.96)	(27.33)	(28.64)	(27.29)	(26.63)	(27.00)	(26.32)	(27.86)	(27.58)	(27.43)	(26.49)
1959	28.81	28.20	29.26	29.96	26.50	28.73	28.00	25.15	26.75	25.18	24.00	24.92	27.12
	(29.31)	(28.70)	(29.76)	(30.46)	(27.00)	(29.23)	(28.50)	(25.65)	(27.25)	(25.68)	(24.50)	(25.42)	(27.62)
1960	25.54	25.23	26.77	26.28	26.68	25.13	23.17	22.60	22.21	22.05	23.48	24.37	24.46
	(26.04)	(25.73)	(27.27)	(26.78)	(27.18)	(25.63)	(23.67)	(23.10)	(22.71)	(22.55)	(23.98)	(24.87)	(24.96)
1961	24.96	24.37	25.33	24.70	25.05	23.97	22.68	23.58	22.89	23.78	24.43	24.71	24.20
	(25.46)	(24.87)	(25.83)	(25.20)	(25.55)	(24.47)	(23.18)	(24.08)	(23.39)	(24.28)	(24.93)	(25.21)	(24.70)
1962	24.50	25.38	26.10	25.24	25.68	25.49	24.16	25.25	25.11	24.98	25.60	26.08	25.30
	(25.00)	(25.88)	(26.60)	(25.74)	(26.18)	(25.99)	(24.66)	(25.75)	(25.61)	(25.48)	(26.10)	(26.58)	(25.80)
1963	26.09	25.08	24.60	25.49	25.24	24.85	25.36	24.41	23.10	22.64	21.48	20.98	24.11
	(26.59)	(25.58)	(25.10)	(25.99)	(25.74)	(25.35)	(25.86)	(24.91)	(23.60)	(23.14)	(21.98)	(21.48)	(24.61)

1/ Extension Service, Oregon State University and USDA cooperating, Corvallis, Oregon.
2/ Figures in parentheses are the Ontario prices plus $.50 for transportation.

Table 3. Feed Ration Cost per Ton[1/]

(Does not include cost of feed processing)

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual Average
1956	$43.62	$44.08	$44.76	$45.45	$45.00	$45.10	$44.41	$43.82	$44.28	$44.84	$45.75	$46.44	$44.80
1957	45.84	45.68	45.00	43.62	42.32	41.64	41.99	41.99	42.35	43.40	44.40	43.20	43.45
1958	41.84	42.53	42.53	42.71	42.48	40.21	41.82	41.58	42.66	43.57	44.72	44.39	42.59
1959	44.53	44.48	43.29	43.34	43.29	41.73	40.13	40.36	41.50	42.42	42.08	44.94	42.67
1960	41.71	41.02	40.67	40.89	40.44	39.29	39.29	39.98	40.67	40.77	41.27	41.22	40.60
1961	41.29	41.75	41.29	41.06	41.48	41.52	41.29	42.16	42.90	43.59	43.81	44.96	42.26
1962	45.80	46.03	45.57	46.26	46.03	43.86	43.64	42.04	42.04	41.80	41.80	42.82	43.97
1963	42.67	41.98	41.06	41.52	41.52	40.38	39.69	39.46	40.84	42.90	42.90	43.70	41.55

1/ Based on weighted average per month of following ration:
55% barley -- Portland price less $4.00 per ton transportation charge.
20% alfalfa hay -- $30.00 per ton average price.
15% beet pulp -- Toppenish, Washington, prices plus $6.00 per ton average transportation charge.
5% molasses -- Toppenish, Washington, prices plus $6.00 per ton average transportation charge.
5% supplement -- $100.00 per ton average price.

Table 4. Feed Cost per Hundredweight of Gain -- 8.5 Feed Conversion Ratio (in dollars per cwt. or cents per pound)

(Does not include cost of feed processing)

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual average
1956	18.54	18.73	19.02	19.32	19.13	19.17	18.87	18.62	18.82	19.06	19.44	19.74	19.04
1957	19.48	19.41	19.13	18.54	17.99	17.70	17.85	17.85	18.00	18.45	18.87	18.36	18.47
1958	17.78	18.08	18.08	18.15	18.05	17.09	17.77	17.67	18.13	18.52	19.01	18.87	18.10
1959	18.93	18.90	18.40	18.42	18.40	17.74	17.06	17.15	17.64	18.03	17.88	19.10	18.14
1960	17.73	17.43	17.29	17.38	17.19	16.70	16.70	16.99	17.29	17.33	17.54	17.52	17.26
1961	17.55	17.74	17.55	17.45	17.63	17.65	17.55	17.92	18.23	18.53	18.62	19.11	17.96
1962	19.47	19.56	19.37	19.66	19.56	18.64	18.55	17.87	17.87	17.77	17.77	18.20	18.69
1963	18.14	17.84	17.45	17.65	17.65	17.16	16.87	16.77	17.36	18.23	18.23	18.57	17.66

Table 5. Feed Ration Cost per Hundredweight of Gain[1/] - Simple Average of Five Month Feeding Period, 8.5 Feed Conversion Ratio (in dollars per cwt. or cents per pound)

(Does not include cost of feed processing)

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual average
1956						18.95	19.07	19.10	19.02	18.92	18.91	18.96	18.99
1957	19.14	19.31	19.43	19.44	19.26	18.91	18.55	18.24	17.99	17.88	17.97	18.20	18.69
1958	18.31	18.29	18.31	18.23	18.09	18.03	17.89	17.83	17.75	17.74	17.84	18.22	18.04
1959	18.44	18.69	18.85	18.82	18.70	18.61	18.37	18.00	17.75	17.60	17.52	17.55	18.24
1960	17.96	18.08	18.03	17.89	17.79	17.40	17.20	17.05	16.99	16.97	17.00	17.17	17.46
1961	17.33	17.45	17.54	17.58	17.56	17.58	17.60	17.57	17.64	17.80	17.98	18.17	17.65
1962	18.48	18.79	19.06	19.23	19.43	19.52	19.36	19.16	18.86	18.50	18.14	17.97	18.88
1963	17.90	17.95	17.94	17.88	17.86	17.75	17.55	17.36	17.22	17.16	17.28	17.49	17.61

1/ Simple average of feed costs (from Appendix Table 4) for five months preceding the month in which the animal is marketed.

Table 6.[1/] Composite Cost per Hundredweight of Slaughter Animal (in dollars per cwt. or cents per pound)

(Excluding nonfeed costs and transportation to feedlot)

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual average
1956						17.32	17.38	18.07	18.16	18.09	18.51	17.77	17.90
1957	18.02	17.74	17.41	17.72	17.64	18.11	17.92	18.96	19.61	19.54	19.25	19.51	18.45
1958	19.27	19.12	19.50	20.05	20.89	19.49	21.28	23.11	23.30	24.10	23.32	23.06	21.37
1959	23.37	23.05	24.06	23.87	23.73	24.85	24.38	24.89	25.22	23.04	24.38	23.94	24.06
1960	22.36	23.38	22.40	21.63	22.15	22.38	22.11	23.00	22.67	22.91	21.97	20.84	22.32
1961	20.55	20.36	20.30	21.19	21.73	22.09	21.74	22.32	21.96	22.24	21.64	20.93	21.42
1962	21.60	21.30	21.95	22.41	22.66	22.57	23.04	23.41	22.76	22.89	22.64	21.76	22.42
1963	22.40	22.33	22.86	22.60	22.89	22.85	22.16	21.79	22.28	22.10	21.91	22.30	22.37

1/ Weighted average with weighting according to proportion that feed (412.5/1062.5) and feeder animal (650/1062.5) constitute the selling weight of slaughter steer. Feed cost averaged over five month feeding period preceding (but not including) the month in which the animal is marketed.

Table 7.[1] Amount of Slaughter Animal Value Available to Cover all Costs of Feedlot Operations (except cost of feed and feeder animal)

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
				(in dollars per cwt. or cents per pound)								
1956						3.24	4.97	6.05	5.53	4.91	2.99	2.35
1957	2.36	2.66	4.34	5.53	5.48	4.95	6.53	5.16	3.77	2.76	3.87	4.84
1958	6.23	6.44	7.75	7.70	7.36	8.76	5.84	2.95	2.80	2.40	3.68	3.94
1959	4.57	4.01	3.64	4.82	5.39	3.95	4.43	3.46	2.72	4.15	2.12	2.48
1960	4.14	2.81	4.80	5.62	5.15	4.43	4.45	3.20	2.45	1.29	2.41	4.48
1961	4.85	4.26	4.08	2.31	1.87	1.16	1.51	2.06	2.60	2.36	3.48	4.51
1962	3.85	3.70	4.61	4.79	4.03	3.74	3.51	3.84	4.62	4.23	4.92	5.99
1963	4.16	2.17	1.08	1.60	.30	.31	3.79	3.34	2.42	1.53	1.15	-1.05

1/ Table 1 minus Appendix Table 6.

Table 8. Investment and Ownership and Operating Costs for 2,000 Head Feedlot

Item	Estimated cost	Amortization factor (6% interest) 1/	Annual interest and depreciation	Operating Costs: Electricty, fuel, etc.	Operating Costs: maintenance	Total ownership and operating costs
Land	$ 4,000.00	-	$ 240.00	$	$	$ 240.00
Water system	13,600.00	.1193a/	1,622.48	100.00	75.00	1,797.48
Feedlot fence	7,950.00	.1193a/	948.44		150.00	1,098.44
Feedbunks and other concrete	15,000.00	.1193a/	1,789.50			1,789.50
Working corrals	4,000.00	.1193a/	477.20		100.00	577.20
Hospital area	2,000.00	.1193a/	238.60		50.00	288.60
Scale	4,000.00	.1193a/	477.20		25.00	502.20
Miscellaneous facilities	5,000.00	.1193a/	596.50		75.00	671.50
TOTAL INVESTMENT AND COST OTHER THAN FEED MILL	55,550.00		6,389.92	100.00	475.00	6,964.92
Feed processing plant	62,000.00	.1193a/	7,396.60	1,000.00	400.00	8,796.60
TOTAL FEEDLOT AND FEED MILL INVESTMENT AND COST	117,550.00		13,786.52	1,100.00	875.00	15,761.52
Feed trucks (two)	9,600.00	.2374c/	2,279.04	600.00	200.00	3,079.04
Tractor (one)	7,000.00	.2034b/	1,423.80	150.00	125.00	1,698.80
Dump truck	4,000.00	.2374c/	949.60	50.00	75.00	1,074.60
Pickup truck	2,500.00	.2374c/	593.50	200.00	100.00	893.50
Miscellaneous equipment	2,500.00	.2374c/	593.50	20.00	50.00	663.50
TOTAL	143,150.00		19,625.96	2,120.00	1,425.00	23,170.96
Allowance for taxes and insurance						3,000.00
TOTAL COSTS						26,170.96

1/ Depreciation costs plus 6% interest expense is accounted for in such a way that equal annual expense accrues.
a/ 12 years estimated life.
b/ 6 years estimated life.
c/ 5 years estimated life.

Table 9. [1/] Cost of Feedlot Gain, 8.5 Feed Conversion Ratio (in dollars per cwt. or cents per pound)

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual average
1956						23.08	23.20	23.23	23.15	23.05	23.04	23.09	23.12
1957	23.27	23.44	23.56	23.57	23.39	23.04	22.68	22.37	22.12	22.01	22.10	22.33	22.82
1958	22.44	22.42	22.44	22.36	22.22	22.16	22.02	21.96	21.88	21.87	21.97	22.35	22.17
1959	22.57	22.82	22.98	22.95	22.83	22.74	22.50	22.13	21.88	21.73	21.65	21.68	22.37
1960	22.09	22.21	22.16	22.02	21.92	21.53	21.33	21.18	21.12	21.10	21.13	21.30	21.59
1961	21.46	21.58	21.67	21.71	21.69	21.71	21.73	21.70	21.77	21.93	22.11	22.30	21.78
1962	22.61	22.92	23.19	23.36	23.56	23.65	23.49	23.29	22.99	22.63	22.27	22.10	23.00
1963	22.03	22.08	22.07	22.01	21.99	21.88	21.68	21.49	21.35	21.29	21.41	21.62	21.74

1/ Appendix Table 5 (Feed Ration Cost Per Cwt. of Gain) plus $4.13 (Nonfeed costs assuming 4,320 head fed annually). Does not include costs associated with purchasing feeder animals or marketing slaughter animals and does not allow for a return to management.

Table 10. Returns to Management and Profit from Feedlot Operations 1/ Using 8.5 Feed Conversion Ratio

(in dollars per hundredweight or cents per pound)

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual average
1956						.50	2.17	3.18	2.69	2.07	.22	-.36	1.50
1957	-.36	-.06	1.56	2.71	2.65	2.12	3.65	2.30	.94	-.04	1.04	1.96	1.54
1958	3.30	3.51	4.75	4.67	4.33	5.72	2.85	.00	-.15	-.58	.69	.95	2.51
1959	1.55	1.01	.63	1.76	2.32	.89	1.37	.42	-.30	1.16	-.85	-.48	.79
1960	1.17	-.14	1.81	2.62	2.14	1.45	1.48	.25	-.47	-1.58	-.47	1.56	.82
1961	1.92	1.37	1.20	-.54	-.98	-1.69	-1.33	-.82	-.29	-.52	.57	1.60	.04
1962	.93	.80	1.64	1.79	1.06	.78	.53	.84	1.62	1.24	1.92	2.97	1.34
1963	1.19	-.72	-1.16	-1.27	-2.52	-2.45	.85	.42	-.48	-1.33	-1.68	-3.88	-1.09

1/ Table 1 (Slaughter Steer Prices) minus Table 3 (total costs).