ECONOMIC POSSIBILITIES OF BACKWARD VERTICAL INTEGRATION BY A KANSAS COMMERCIAL FEEDLOT COMPANY

by

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INTRODUCTION

With the rapid expansion in both size and number of commercial cattle feedlot operations in Kansas from 1960 to the early 1970's one of the feedlot's major managerial difficulties was the problem of securing a dependable supply of feeder cattle capable of rapid and inexpensive gains and attaining the choice grade for slaughter animals. As this supply became restricted, the feedlots had to start feeding an increasing percentage of cattle which did not possess the inherent characteristics needed to make profitable gains. This began to require the use of more expensive feeds and longer feeding periods which began to decrease the returns of the feedlot company.

This study analyzed the possibility of backward vertical integration by the feedlot company to own and manage backgrounding and cowherd enterprises to relieve the supply situation. Alternative systems of integrated production were compared to non-integrated systems in order to assess any gains or losses in net returns resulting from the integration process. As used in this paper vertical integration is the single ownership of two or more stages of production where a saleable product exists at each stage.

OBJECTIVE

The objective of this study was to analyze the effect on income of a Kansas commercial feedlot which has vertically integrated backward to own and manage backgrounding and cowherd enterprises, as compared to the income of the same feedlot when it purchases 100 percent of its cattle to be fed from independent producers.

CHAPTER I

METHODOLOGY

THE MODEL

Linear Programming[1] was used to analyze alternative methods of integration and cattle purchasing for a representative cattle feedlot company. Linear programming was chosen for the ease with which it handles a large number of alternatives.

The type of program chosen was one that will maximize income for the feedlot company while choosing a specific system of management for the backgrounding and cowherd systems involved.

Linear programming does not account for risk and uncertainty. All alternatives were considered to be equally free of risk and uncertainty in this problem; therefore actual operations of the types specified might give different results.

PROCEDURE

The first step in developing the linear program was to develop a set of budgets specifying variable and fixed costs for each of the alternatives. A base period of 1969-1974 was used to average out price cycles. Both prices paid and prices received were averaged and used in the budgets. In keeping with the backward vertical integration analysis the first enterprise budgeted

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[1]Raymond R. Beneke and Ronald Winterboer, Linear Programming Applications to Agriculture (Ames: Iowa State University Press, 1973).

was the feedlot.

Feedlot

The feedlot chosen was a 20,000 head one-time capacity operation. All cattle were fattened from 650 pounds to 1091 pounds and sold with a 4 percent pencil shrink at 1047 pounds. Fed cattle were assumed to be sold grading choice and the sale price used was a weekly average of the Dodge City Area feedlot direct sales prices for 900-1100 pound choice slaughter steers.[2] The weekly average price was derived from the weekly quotations for the five year period 1969-1974. The feeding period was 147 days or 21 weeks, with a daily rate of gain of 3.0 pounds on the unshrunk weight. The ration mix was changed as the animal grew and his nutrient requirements changed. Over the total feeding period the feed requirements of each animal, on an as-fed basis, were 2646.7 pounds of grain sorghum, 153.3 pounds of soybean oil meal, 996.1 pounds of corn silage and 276.5 pounds of alfalfa hay.[3]

This feedlot was programmed to conform in general to an average feedlot operation in Southwestern Kansas, the arbitrarily chosen location of the feedlot for this study. The feedlot was assumed to be operated at 75 percent of capacity, i.e. 15,000 head. This allowed some empty pens for cleaning, and individual pens not full to capacity, all conditions which an actual feedlot would face.[4] Costs for the feedlot phase was kept constant per head

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[2]Correspondence with Gary Mills, U.S.D.A. Market News Office, Dodge City, Kansas, 10 July 1974.

[3]Donald A. Johnson, "The Use of Live Steer Futures Contracts and Their Effect on Cattle Feeding Profits." (M.S. Thesis, Kansas State University, 1970).

[4]Interview with Dr. Keith Zoellner, Associate Professor, Extension Animal Science, Kansas State University, January 1974.

regardless of whether the animal was purchased or produced by the company, except a commission buyer's fee was budgeted against purchased steers.

Through integration the feedlot furnished a supply of cattle sufficient to fill the lot to 15,000 head one time in each "individual" option and twice in each "combined" option.[5] However, the feeding period budgeted requires three groups of cattle in each "individual" option and six groups in each "combined" option; thus making necessary the purchase of additional steers to complete the cycle in the integrated options. All purchased steers entered the feedlot directly following purchase at 650 pounds and all company owned integrated cattle entered the feedlot following a company operated backgrounding phase.

Backgrounding

Backgrounding in this study was considered to cover the period from time of weaning until entrance into the feedlot for all animals intended for fattening. To comply with variable methods in current use by backgrounders, two methods were independently budgeted for each cowherd: (1) a grazing backgrounding system and (2) a drylot confinement backgrounding system. As will be explained later two cowherd units were evaluated--one in the Flinthills area and the other in Western Kansas.

The grazing backgrounding consisted of the use of leased native grass, wheat pasture, or irrigated improved grass as the main means of meeting

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[5]Integrated cattle backgrounded and fed in the feedlot are a mixture of steers and the heifers remaining after replacement heifers are selected and daily rates of gain are averages for this mix. All feeders purchased whether for the integrated options or the 100 percent purchased options are assumed to be steers.

nutrient requirements. Due to uncertainty of the availability of wheat pasture it was assumed that one-third of the cattle would be put directly into a drylot backgrounding system in this grazing backgrounding option. Wheat in Kansas provides sufficient growth to be pastured only two out of three years. Therefore the method of wheat pasturing only two-thirds of the cattle in each herd each year was used to meet to some degree this restriction.[6]

In the options using wheat pasture and native grass in Western Kansas it was necessary to finish the backgrounding phase by placing the cattle into a company owned drylot confinement backgrounding system to bring the calves to the correct feedlot "in" weight. Thus the grazing backgrounding system was actually a combination of grazing and limited usage of drylot confinement.

The drylot confinement backgrounding option consists of placing all "company" feeders in pens located adjacent to the feedlot in Southwest Kansas and feeding them a growing ration of milo and alfalfa hay.[7] The calves were placed in the drylot immediately following weaning and grown to 657 pounds in order to enter the feedlot at 650 pounds following a one percent shrink in body weight to compensate for moving and sorting. These calves made no use of pasture of any kind after weaning. Daily rate of grain in the drylot was assumed to be 1.75 pounds so the length of time in the drylot was variable depending upon weaning weight and amount of shrink prior to start of backgrounding. The ration and the daily rates of gain were the major differences

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[6]Correspondence with Eugene Harris, County Extension Director, Meade, Kansas, June 1974.

[7]Charles H. Greene, William N. Capener, and James D. Caviness, Economic Potential of Backgrounding Feeder Calves in North Central New Mexico, Research report 204 (Las Cruces, New Mexico: New Mexico, Agriculture Experiment Station, March 1971), p. 33.

in operation between the feedlot phase and drylot confinement backgrounding. Hereafter in the study drylot confinement backgrounding will be referred to as drylot backgrounding or the drylot.

Calves from the Flinthill cowherds were assumed to be transported 300 miles to the drylot and cattle from the Western Kansas cowherds were assumed to be shipped 150 miles. In 300 miles Flinthills calves were shrunk five per cent of body weight and in 150 miles Western Kansas cattle were shrunk three and one-half per cent of body weight.[8]

Cowherd

Cowherd in this study was used to mean a group of mother cows used for the purpose of producing weaner calves. All cowherds in this study were assumed to be range herds by the fact they were pastured year around on native grass.

The analysis provides the option of using any of four different systems of cowherd management. Budgets were developed for Flinthills spring calving, Flinthills fall calving, Western Kansas spring calving, and Western Kansas fall calving cowherds.

The cowherds regardless of option were considered to be utilizing pasture owned by the "company" and were managed by full time employees of the company. For the purpose of management the herds were split into groups of 1000 cows, 160 replacement heifers and 40 bulls; and each group was the responsibility of one man.[9]

For the purpose of the budgets it was assumed the company pays itself

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[8]Neff Tippets, et al., In Transit Shrinkage of Cattle, Mimeo. Circular 78 (Laramie, Wyoming: Wyoming Agriculture Experiment Station, 1957).

[9]Zoellner, January 1974.

a (per acre) rental rate for the pasture. This rental rate was based upon average rental fees paid for the period 1969-1974.[10] The rental fee represents opportunity costs of the land used by the cowherds or the equivalent of what they would pay if the company rented pasture.

Suggested management practices for profitable cowherds were followed in budgeting the variable costs. The calving interval was kept short, allowing 60 days, so calves would not be too variable in size and weight, and could enter the feedlot within a relatively short period of time. This also allowed for a shorter, more compact rebreeding period so bulls would not be with the cows "year-round." All cows were in contact with the bulls for rebreeding for two months after calving, if not culled and sold, so as to keep the same calving time each year.

A 240 day, or eight month, weaning time was used to allow the cows two and one-half to three months time to develop body condition for the next calving period. The weaning period follows the same 60 day interval as calving to allow each calf equal time with its dam to develop.

Cows, bulls, and replacement heifers were supplemented on free choice grass diets for 181 days, or six months, during the off-pasture season using milo and soybean oil meal to meet nutrient requirements for growth, breeding, body maintenance, and calf development.

Bulls were provided with each cowherd at the rate of one bull to 25 cows or 40 bulls per 1000 cows to achieve good "bull-power" and keep the rebreeding of cows within the 60 day periods indicated. This rate permits a

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[10]Kansas Department of Agriculture, Statistical Division, Kansas Crop and Livestock Reporting Service, Bluestem Pasture Report (Topeka, Kansas: Raymond R. Hancock, State Statistician, April 1974).

bull to remain vigorous and helps insure that the calf crop per cent will remain high.

Strict culling of cows and bulls was practiced in order to keep the calving per cent high and to provide a high quality grade of calves. Sixteen per cent of the cows were replaced each year giving the average cow a six year herd life plus a two year heifer life or eight years in the program.[11] Twenty-five per cent of the bulls were replaced each year giving the average bull a four year herd life. All bulls were purchased ready for service, none were produced by the "company." All replacement heifers for the cowherds were produced within the cowherd. These heifers are bred to calve as two year olds.

All feeder calves produced by the cowherds were kept by the company and were put through the integrated system into the backgrounding phase and into the feedlot. All of these animals were assumed to have been of a quality capable of attaining "choice" grade when fed to slaughter weight. After weaning the calves were put into backgrounding. Each herd was programmed separately for both grazing or drylot backgrounding. The type of backgrounding system the feeders entered had no effect on the cowherd costs; they remained constant for each of the herds. Cowherd costs were also the same for each of the two cowherds in a region; the only difference in costs was between the two regions.

Following weaning of the calves, the replacement heifers were separated from the stocker calves before backgrounding. For the grazing backgrounding

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[11] U.S., Department of Agriculture, Economic Research Service, Cattle Raising in the United States, by Roy N. Van Arsdall and Melvin D. Stold, Economic Report No. 35 (Washington, D.C., Government Printing Office, January 1973), p. 84.

system those calves which were put on pasture remained in the same area for backgrounding. Only when it was necessary to place them in a drylot to meet either the wheat pasture restriction or complete backgrounding to feedlot weight after pasture seasons end, were the stockers transported prior to being shipped to the feedlot. For the "drylot" backgrounding system all stockers were transported to the "company" drylot facility in Southwestern Kansas immediately after being weaned.

Purchased Steers

In the study "purchased steers" was the term used to designate all feeder cattle placed in the feedlot that were not produced by the company owned integrated enterprises of backgrounding and cowherd. Purchased steers were used in integrated options to provide the additional number of cattle needed for the length of feeding period budgeted over the number provided by a company owned cowherd. Purchased steers were also used in the 100 per cent purchased steer options which were programmed and compared to the integrated options. The 100 per cent purchased steer options and their relationship to the integrated options will be described later. Prices paid for the 650 pound steers purchased and fed in the various options were a weekly average price for 600-700 pound choice grade feeder steers from the Dodge City, Kansas markets. This price was derived from the weekly quotations for the five year period 1969-1974.[12]

Options

In the study ten options using integrated production were budgeted to

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[12]Correspondence with Gary Mills, U.S.D.A. Market News Office, Dodge City, Kansas, 10 July 1974.

provide coverage of the many systems possible in Kansas. In order to clarify how these ten options were derived from the one feedlot, two backgrounding, and four cowherd systems previously mentioned a brief description of each follows.

Integrated Options.

1) Option one combined a spring calving cowherd of 21,490 cows located in the Flinthills with a grazing backgrounding system and furnished the feedlot 14,998 head of feeders for one feed period per year.
2) Option two combined a fall calving cowherd of 21,490 cows located in the Flinthills with a grazing backgrounding system, and furnished the feedlot 14,998 head of feeders for one feed period per year.
3) Option three combined a spring calving cowherd of 21,490 cows located in Western Kansas with a grazing backgrounding system, and furnished the feedlot 14,998 head of feeders for one feed period per year.
4) Option four combined a fall calving cowherd of 21,490 cows located in Western Kansas with a grazing backgrounding system and furnished the feedlot 14,998 head of feeders for one feed period per year.
5) Option five combined a fall calving cowherd of 10,500 cows located in both Western Kansas and the Flinthills and a spring calving cowherd of 10,500 cows located in both Western Kansas and the Flinthills for a total of 43,000 cows with a grazing backgrounding system and furnished 15,000 cattle to the feedlot

in two feeding periods.

6) Option six combined a spring calving cowherd of 21,490 cows located in the Flinthills with a drylot backgrounding system and furnished the feedlot 14,998 head of feeders for one feed period per year.

7) Option seven combined a fall calving cowherd of 21,490 cows located in the Flinthills with a drylot backgrounding system and furnished the feedlot 14,998 head of feeders for one feed period per year.

8) Option eight combined a spring calving cowherd of 21,490 cows located in Western Kansas with a drylot backgrounding system and furnished the feedlot 14,998 head of feeders for one feed period per year.

9) Option nine combined a fall calving cowherd of 21,490 cows located in Western Kansas with a drylot backgrounding system and furnished the feedlot 14,998 head of feeders for one feed period per year.

10) Option ten combined a fall calving cowherd of 10,500 cows located in both the Flinthills and Western Kansas and a spring calving cowherd of 10,500 cows located in both the Flinthills and Western Kansas for a total of 43,000 cows with a drylot backgrounding system and furnished the feedlot 15,000 head of feeders for two feed periods per year.

100 Per Cent Purchased Steer Options. These options were developed using steers purchased by the feedlot at 650 pounds to go directly into the feedlot and use the same feedlot enterprise as the integrated options. 100

per cent purchased options compare exactly with the respective integrated option using the same name in that the cattle are placed into the feedlot and sold out of the feedlot on exactly the same time schedule and they involved the exact same number of head of cattle. These options were used to compare any gains or losses in returns to the feedlot company from integration.

11) Option eleven used 100 per cent purchased steers on the same time schedule as a spring calving cowherd of 21,490 cows located in the Flinthills combined with a grazing backgrounding system.

12) Option twelve used 100 per cent purchased steers on the same time schedule as a fall calving cowherd of 21,490 cows located in the Flinthills combined with a grazing backgrounding system.

13) Option thirteen used 100 per cent purchased steers on the same time schedule as a spring calving cowherd of 21,490 cows located in Western Kansas combined with a grazing backgrounding system.

14) Option fourteen used 100 per cent purchased steers on the same time schedule as a fall calving cowherd of 21,490 cows located in Western Kansas combined with a grazing backgrounding system.

15) Option fifteen used 100 per cent purchased steers on the same time schedule as the combination of the four cowherds combined with a grazing backgrounding system.

16) Option sixteen used 100 per cent purchased steers on the same time schedule as a spring calving cowherd of 12,490 cows located in the Flinthills combined with a drylot backgrounding system.

17) Option seventeen used 100 per cent purchased steers on the same time schedule as a fall calving cowherd of 21,490 cows located in the Flinthills combined with a drylot backgrounding system.

18) Option eighteen used 100 per cent purchased steers on the same time schedule as a spring calving cowherd of 21,490 cows located in Western Kansas combined with a drylot backgrounding system.

19) Option nineteen used 100 per cent purchased steers on the same time schedule as a fall calving cowherd of 21,490 cows located in Western Kansas combined with a drylot backgrounding system.

20) Option twenty used 100 per cent purchased steers on the same time schedule as the combination of the four cowherds combined with a grazing backgrounding system.

For this study the Linear Program was restricted to selecting only one of the twenty options as the optimum and at the same time was not allowed to mix the options and select a combination of options.

SOURCES OF DATA

Coefficients used in the linear program were taken from budgets for each individual option. Linear programming uses only the variable costs. These costs will be discussed first.

Variable Costs

Labor. Labor for the feedlot and backgrounding phases was determined in hours per head per month and totaled for the number of months in each enterprise. Labor coefficients for the grazing and drylot phases were derived from material by McReynolds and Figurski, KSU Area Extension Economists.[13]

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[13]Kenneth L. McReynolds and Leo Figurski, Programs for Managing Steers, Farm Management Guide MF-296 (Manhattan, Kansas: Kansas Cooperative Extension Service, November 1972), pp. 1, 5.

Drylot steers required .25 hours per head per month and grazed steers required .40 hours per head per month. The labor cost of $2.50 an hour was also derived from that bulletin. This rate was used for both part and full time hired labor.

Cowherd labor in this analysis was assumed to be provided by full time year around herd managers. Although in normal cowherd operation the amount of labor needed per month will vary the manager was budgeted at a set salary of $8400 per year per 1000 head cowherd unit. This figure was derived from KSU Farm Management data.

Feed. Feeds considered in this study were grain sorghum, 44 per cent soybean meal, alfalfa hay, corn, and corn silage.

For all but corn silage, the price was a statwide average of prices received by Kansas farmers for the period January 1, 1969 to March 30, 1974.[14] Prices were quoted per hundredweight for grain sorghum and soybean meal, in bushels for corn and in tons for hay. In the period used the quotation was actually "all hays" not just alfalfa. Price for corn silage was figured on a corn equivalent basis using a formula provided by KSU Animal Scientists.[15]

Prices used for the analysis were grain sorghum $2.21 per hundredweight, 44 per cent soybean meal $7.36 per hundredweight, hay $25.10 per ton, corn $1.45 per bushel, corn silage $10 per ton. These prices were then multiplied by the total pounds of each needed in the enterprises that used supplemental feed.

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[14]Kansas Department of Agriculture, Statistical Division, Kansas Crop and Livestock Reporting Service, Agricultural Prices (Topeka, Kansas: Raymond R. Hancock, State Statistician).

[15]Zoellner, January 1974.

Salt and Minerals. Mineralized salt was priced at the Manhattan Farmers Co-op elevator and the average price of $60 per ton for the five year period was quoted.

Salt requirements per steer varied with enterprise and length of time. For grazing enterprises each steer was supplied 2.5 pounds per month. For drylot backgrounding each steer was provided .06 pounds of salt per day.

Salt needs for grazing backgrounding were derived from McReynolds' and Figurski's budget for wintering and grazing steers.[16]

Salt requirements for drylot backgrounding were derived from data presented in a New Mexico feeder calf study.[17]

Salt requirements for the beef cows were set at 2.5 pounds per month per cow. Feedlot salt requirements were set at .06 pounds per head per day.

Veterinary, Drugs, Insecticides. The per head expense for Veterinary, Drugs, and Insecticides will vary according to size of calf, length of shipment, season, and amount of exposure to severe climatic conditions. For these reasons the amount of expense per calf varies considerably within herds as well as between herds. Data used were derived from budgets prepared by KSU Extension economists.

Fuel and Oil. Many factors can cause variation in fuel and oil costs on a per head basis. Fuel use varies with distance traveled to cattle, number of times fed, doctored, or checked per day over the time period in each phase.

For drylot backgrounding where cattle are in a relatively small area

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[16]McReynolds and Figurski, Managing Steers, p. 8.

[17]Greene, Capener, and Caviness, Backgrounding Feeder Steers, p. 33.

costs of .09 cents per head per month were estimated. Feeding and feed hauling would be the major uses of fuel and oil. Grazing background fuel and oil costs budgeted were .06 cents per head per month.

Feedlot fuel and oil costs were estimated to be larger due to an increased amount of machinery and equipment used. Costs budgeted were .47 cents per head per month. Cowherd fuel and oil costs were low due to estimation that most of the labor performed would not require machinery. A total of .45 cents per year was budgeted per cow.

Repairs on Permanent Improvements and Machinery. An annual repair cost of two per cent of original investment was suggested by KSU Extension Economists.[18] The amount of investment per head will vary by type of system. Investments for grazing systems would be lower due to the smaller amount of equipment and machinery required. Drylot backgrounding systems will have more repairs than grazing because more equipment and machinery would be required. Lists of capital investments for each enterprise can be found in Appendix A.

Insurance. Legal liability and workmen's compensation insurance was provided in each of the options. These insurance costs were included in variable costs as they were based on the amount of salary paid.

Legal liability coverage was provided under two major divisions: (1) bodily injury at $50,000 for each person, plus $10,000 for each accident, and (2) property damage at $25,000 for each accident. The rate for legal

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[18]Interview with Wilton Thomas, Extension Economist, Kansas State University, February 7, 1974.

liability was $0.48 per $100 salary paid.[19]

Workmen's compensation covered the statutory limits set by the State Compensation Bureau. The rate used was $1.70 per $100 of salary paid.

These two insurance costs were added together for a total of $2.18 per $100 of salary paid.

Taxes on Cattle. Since the cattle were considered personal property the same levy was used to figure taxes on cattle as was used to obtain fixed tax costs. The tax levy used was $6.19 per $100 taxable value. This figure was the average of statewide rural levy rates for Kansas for the years 1969-1973 and was obtained from the Division of Property Valuation, Department of Revenue, State of Kansas.

The valuation of the feeder steers was obtained from information from the 1972 Kansas Personal Property Assessment Manual approved by the State Division of Property Valuation and published in the December 1971 issue of The Kansas Stockman.[20] For taxation all feeders were considered to be steers one to two years old on full feed to give a per head valuation of $50. This gave a per head tax of $3.10.

In the analysis taxes on company produced feeders was budgeted and paid in the backgrounding phase as all feeders were in backgrounding at the time they became one year of age and eligible for taxation. Taxes for purchased steers were budgeted and paid in the feedlot phase. Taxes on purchased steers was also $3.10.

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[19]Interview with Paul Gross, Gross Insurance Agency, Manhattan, Kansas, July 11, 1974.

[20]"1972 Livestock Assessing-Schedule of Evaluations," The Kansas Stockman, December 1971, p. 23.

Taxes on cows in this analysis were used as a fixed cost and did not enter the linear program.

Pasture Fees. Native grass pasture rental fees for Flinthills grazing backgrounding steers and for Flinthills cowherds were obtained by averaging costs for the years 1969-1974 obtained from the Bluestem Pasture Report.[21]

Flinthills cowherds were guaranteed ten acres of grass per head year around at a fee of $7.38 per acre. This also provides some winter forage. The pasture was assumed to be owned by the feedlot company but a cost was budgeted to represent an opportunity cost.

Flinthills grazing backgrounding steers were budgeted $29.18 for the normal grazing season May 1 - October 30 on an acreage guarantee of 3.9 acres per head.

Native grass pasture rental fees for Western Kansas were derived from KSU Extension Economists and KSU Cooperative Extension Service county personnel.[22]

Western Kansas cowherds were guaranteed 20 acres of grass year around per head at a charge of $4.00 per acre. This also was considered to be an opportunity cost on company owned grassland.

Western Kansas grazing backgrounded steers on native grass pastures were guaranteed six acres per head at $4.00 per acre.

All native grass grazed by backgrounded cattle in this study is assumed to be leased. The feedlot company provides its own labor for the

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[21]Kansas Board of Agriculture, Bluestem.

[22]Kansas State University, Manhattan, Kansas, Interviews with selected personnel of Kansas Cooperative Extension Service, May 1974.

backgrounding phase but the land owner was responsible for repair costs on fences, pens, and water systems.

Included in the pasture charges for the company cowherds were payments for land taxes, depreciation of facilities and equipment, and repairs. Also included would be a return to investment but no attempt was made to separate this amount.

Wheat pasture for steers was assumed to be rented from area farmers. The calves were guaranteed 3.0 acres per head for the November 15 - March 15 season.

The rental fee per calf was determined using the formula of $1.00 per average hundred weight per head per month plus $1.00 per head per month for labor. The weight used to figure rental costs was the average of the weight at time of starting on wheat pasture and the weight at the time of leaving wheat pasture. This was one standard method in use in Kansas and was supported by KSU Extension Economists.[23]

Rental feeds for irrigated improved grass in Western Kansas were budgeted at $39.95 per steer. This practice was in limited use, therefore Extension Economists recommended using a charge sufficient to cover expected annual costs plus a return on investment.

Interest. Interest on operating capital in this study was included in the variable costs. Interest charges under actual conditions budgeted here would vary greatly depending upon capital available from the feedlot company and the amount borrowed. Interest was figured using the simple

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[23]Kansas State University, Manhattan, Kansas, Interviews with selected personnel of Kansas Cooperative Extension Service, May 1974.

interest formula and the total variable cost expenditure for each herd with an average interest rate of 8.18 per cent.[24] Interest charges were prorated on a monthly basis. For each phase the expenditure was divided by the number of months the cattle averaged in that phase to get an average monthly expense. For example the feedlot period was five months, backgrounding varied from 4.75 to 5.25 months and the cowherd period with each calf crop was 12.5 months. To arrive at a total interest cost the average monthly interest cost was multiplied by the number of months spent in the particular phase.

Cattle Hauling. Feeder cattle were assumed to be transported by custom livestock haulers and were either transported at the end of the grazing background to the feedlot or at weaning to the company drylot depending on the option. Cattle from the Flinthills were assumed to be transported 300 miles and Western Kansas Cattle were assumed to be transported 150 miles. Rates used were $.60 per hundred weight for 300 miles and $.33 per hundred weight for 150 miles. These rates were then multiplied by the number of hundred weight in the herd being transported.[25]

Other Hauling. This expense was budgeted in the feedlot phase only, and is primarily feed transportation. This expense was derived from McCoy and Hausman and was updated using the Index of prices paid of April 6, 1974.[26]

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[24]U.S. Department of Agriculture, Economic Research Service, Agricultural Finance Statistics, AFS-2 (Washington, D.C., Government Printing Office, 1974), p. 39.

[25]Orlo Sorenson and Richard L. Gillaspie, Cattle Trucking Rates for Kansas Carriers, Research Paper 9 (Manhattan, Kansas: Kansas Agriculture Experiment Station, July 1972).

[26]John H. McCoy and Calvin C. Hausman, Economies of Scale in Commercial Cattle Feedlots of Kansas - An Analysis of Non-Feed Costs, Technical Bulletin 151 (Manhattan, Kansas: Kansas Agriculture Experiment Station, April 1967).

Dues, Fees, and Subscriptions. An expense for membership dues and fees to professional societies and services and subscription to professional journals and information services was budgeted in for the operation at the feedlot level. This expense was derived from McCoy and Hausman.[27]

Non-Cost Data

Rates of Gain. Daily rate of gain remains a highly variable factor in cattle feeding. It will vary daily for the same steer, and would be highly variable for the same ration fed to different steers. It is affected by age, size, weight, health, climatic conditions, and soil factors such as nutrients and moisture where the feed was grown.

For this study conservative average daily rates of gain were determined in consultation with KSU Extension Agronomists and KSU Extension Animal Scientists.[28] Presented below in Table I-1 are the rates of gain used in

Table I-1. Daily Rates of Gain.

Feeding System	Area	Average Daily Rate of Gain (pounds)
Native grass	Western Kansas	1.0
Irrigated Improved Grass	Western Kansas	1.6
Wheat Pasture	Western Kansas	1.4
Wheat Pasture	Flinthills	1.4
Native grass	Flinthills	1.6
Feedlot (a)	Western Kansas	3.00
Drylot	All	1.75

(a) The feedlot ration is hotter to produce more rapid gains on a heavier animal than the drylot ration which was cooler and used to grow younger, lighter animals.

[27] Ibid.

[28] Interview with Keith Zoellner, Extension Animal Scientist and Verlin Peterson, Extension Agronomist, Manhattan, Kansas, January 1974.

this analysis showing type of pasture or ration, and location by state area.

The daily rate of gain was multiplied by number of days on each type of feed to obtain total weight gain per head.

Season of Grazing. In order to preserve the vegetation without lessening the stand of beneficial plants or to avoid lessening grain yield in the case of wheat pasture it was necessary to observe seasons of grazing.

Information on grazing seasons was received from KSU Agronomists and KSU Area Extension Specialists Crops and Soils and represent averages of dates to turn on and remove steers from pasture.[29] In excessively dry or wet years the season will vary.

Table I-2 shows grazing dates, locations and pasture types used in the analysis.

Table I-2. Grazing Dates, Locations, and Crops for Kansas Pastures.[a]

Crop	Location	Day in	Day out
Native grass	Western Kansas	May 1	Oct. 30
Irrigated Improved grass	Western Kansas	May 1	Oct. 15
Wheat pasture	Western Kansas	Nov. 15	March 15
Wheat pasture	Flinthills	Nov. 15	March 15
Native grass	Flinthills	May 1	Oct. 30

[a] This information is combined with average daily rate of gain to determine total weight gain in pounds per head of the grazing systems used in the analysis.

Stocking Rates. The stocking rate, i.e. the number of acres per head in grazing systems would be variable each year depending upon rainfall and plant growth. The data listed in Table I-3 are averages and were obtained

[29] Interview with Dr. Clenton Owensby, KSU Agronomist and correspondence with Dale H. Edelblute, Extension Specialist Crops and Soils, Manhattan, Kansas, June 1974.

from Dr. Clenton Owensby, KSU Agronomist.[30] Under actual conditions stocking rates will vary considerably, but these were presented as guidelines considered "safe" in a typical year.

Table I-3. Average Stocking Rates for Kansas Pastures.

Crop	Location	Animal	Acres per Animal
Native grass	Western Kansas	steer	6.0
Irrigated Improved grass	Western Kansas	steer	.53
Wheat pasture	Western Kansas	steer	3.0
Wheat pasture	Flinthills	steer	3.0
Native grass	Flinthills	steer	3.9
Native grass	Flinthills	cow	10.0[a]
Native grass	Western Kansas	cow	20.0[a]

[a]Pasture year around May 1 - April 30.

In the analysis these data were used with pasture rental rates to determine pasture expense.

Calving Percentage. Calving percentage has been used as a statistic used to show efficiency in the cowherd and could be measured by several methods. In this study calving percentage was the ratio of the number of cows that calved to the number of cows bred. Information on calving percentage using good cowherd management practices was obtained from Dr. Keith Zoellner, KSU Extension Animal Scientist.[31] The calving percentage used in this analysis was 90 per cent meaning ninety per cent of the cows bred calved in the appropriate season.

Distribution of Calf Births. The distribution of calf births during

[30]Interview with Dr. Clenton Owensby, Extension Agronomist, Manhattan, Kansas, June 1974.

[31]Zoellner, January 1974.

the normal calving season remains of economic importance. It would benefit the owner to have his calves born in as short a time period as possible. Distributions of calf births in a herd cannot be predicted exactly but using the 60 day calving season research shows that calving will follow a normal distribution.[32] For fitting to a normal distribution mu or the target date was set at the 30th day and sigma or standard deviation was set at intervals of ten days, to get the six needed segments or time periods.[33] Results are shown in Table I-4.

Table I-4. Distribution of Calf Births.

Range of Days	Number of Calves born[a]
0-10	21.0
11-20	122.0
21-30	307.0
31-40	307.0
41-50	122.0
51-60	21.0
	900.0

[a]The results have been rounded to the nearest whole number to total the number of calves born per 1000 cows.

Weaning-Backgrounding Groups. The results of the birth distribution were the basis of dividing the calves from each 100 cows into weaning and backgrounding groups.

The six birth units were combined into four weaning-backgrounding groups by adding the 21 head in group one to the 122 in group two for 143

[32]Interview with Dr. Keith Zoellner, Extension Animal Scientist, Manhattan, Kansas, April 1974.

[33]Interview with Dr. Ray Waller, Assistant Professor Statistics, KSU, Manhattan, Kansas, April 1974.

head and the same combination for groups five and six. Thus weaning-backgrounding group one had 143 head, group two had 307 head, group three had 307 head, group four had 143 head.

These groups were weaned at the 240th day after the birth of the last calf in each group or the 20th, 30th, 40th, and 60th days of the 60 day weaning period and were managed and backgrounded as individual groups through all phases until sold from the feedlot.

Death Loss. Death loss in all cattle would be affected by management, climatic conditions, quality of animals, and ration so it might vary in actual practice from those used in this study. Death loss in the cow herd was set at two per cent.[34] Death loss of calves following birth but before weaning was also set at two per cent. The death loss was subtracted from each of the four weaning-backgrounding groups individually. Death loss in the backgrounding phase was set at two per cent and again was subtracted from each individual wean-background group. Feedlot death loss was set at one-half of one per cent for each weaning-backgrounding group and also for the groups of purchased cattle. Death loss for the individual phases was subtracted on day one of each phase and no budget was carried forward for those lost as it was assumed they never actually entered the next phase.

Replacement Heifers. The feedlot company was assumed to raise and furnish its own replacement heifers at an annual rate of 160 per 1000 cows. Forty replacement heifers are taken from each weaning-backgrounding group. These heifers were chosen after calf death loss was subtracted so death loss

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[34]Zoellner, January 1974.

was accounted for among heifers also. These 160 heifers were then raised along with the cowherd unit as one management unit and were bred to calve as two year olds.

Size of Cowherds. Due to the backward direction of the vertical integration process in this study the last enterprise to be considered was the cowherd. It was necessary to decide on feedlot size, percentage of capacity to be filled with company cattle and from this by taking into account death loss and calving per cent to arrive at the size of cowherd necessary to provide the required number of cattle for the feedlot.

As described before, under integration the "company" has the choice of a cowherd enterprise with only one of the following four conditions: Flinthills Spring calving, Flinthills Fall calving, Western Kansas Spring calving, Western Kansas Fall calving, combined with either grazing or drylot backgrounding. In the remainder of the study this will be referred to in general as an "Individual" cowherd. The "company" also has an option of having all four of the cowherds listed above with either grazing or drylot backgrounding. In the remainder of the study this was referred to as a "Combined" cowherds option.

After taking into account the above mentioned factors affecting cowherd size it was necessary for each "individual" cowherd to consist of 21,490 cows and the "combined" cowherd to total 43,000 cows, 10,500 cows in each of the four herds involved. Owning this many cows under the integrated options allowed the company to provide the required 15,000 head of feeders to the feedlot at least once a year.

Cow Replacement, Culling, and Death Loss. Cowherd management

included the culling and selling of cows. Cows were culled, or replaced, for various reasons, e.g. age, injury, health, failure to calve, and poor quality calves. All cows culled in this study were assumed to be culled during the 60 day calving season. Culling during this period makes it easy to determine non-calving cows which are to be replaced. Sixteen per cent of the cows in each herd were assumed to be replaced each year: 14 per cent were sold as cull cows, 2 per cent were assumed to be lost through death. Cull cows were sold during the 60 day calving season and an eight week average price for that period was used to determine sales receipts. Sale price for spring calving cows was the average of February and March prices; sale price for fall calving cows was the average of September-October prices for the period 1969-1974.[35]

Division of Months into Weeks. For the purpose of joining cattle flows smoothly with cattle and feed price reports it was necessary to divide months of unequal lengths into units of uniform length. All months regardless of the number of days were divided into four weeks by the following pattern: week number one included days 1 to 7, week two included days 8 to 15, week three included days 16 to 23, and week four included days 24 on. Cattle movements, and cattle and feed prices then were placed in the corresponding week.

Feedlot Cattle Flows. Steers were moved into and sold out of the feedlot in the same uniform weaning-backgrounding groups they were placed in at weaning. These movements occurred weekly during periods of sales and

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[35]Correspondence with Gary Mills, U.S.D.A. Market News Office, Dodge City, Kansas, 10 July 1974.

placements so as not to present the idea that entire feedlot capacity had been placed on feed or sold at the same time. Cattle flows were not of the same size each week nor was there cattle flows in each and every week. Each set of cattle that was sold during a week was replaced that same week by a set of either company produced cattle or purchased steers of the same size.

Drylot and Feedlot Space Requirements. In both the feedlot and drylot background enterprises the steers were allowed 250 square feet of pen space and 18 linear inches of space at the feedbunks. Pens were then designed for a capacity of 250 head per pen and this specification was used to compute pen size in order to ascertain fencing costs, bunk costs, and number of pens required.[36]

Capital Investments

All capital investment items were priced using an original purchase price and all investment items were assumed to be new. The purchase of used investment items would lessen capital required.

Machinery and Equipment. Lists of machinery and equipment investments were presented in Appendix A for the feedlot and each of the drylot systems used in the backgrounding options. The amount of machinery and equipment increased as the number of cattle in the drylot or feedlot increased.

All backgrounding drylots and the feedlot were equipped with one or more pickup trucks, one or more self-unloading feed trucks and one or more regular trucks. The larger backgrounding drylots and the feedlot were

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[36]Interview with Leo Wendling, Extension Engineer, KSU, Manhattan, Kansas, January 1974.

equipped with one diesel and trailer grain truck and one diesel and trailer hay truck to transport feed in large quantities. The regular truck refers to a two to four ton multi-purpose truck equipped with a bed and hoist. Major uses were to haul hay and/or silage within the drylot or feedlot itself and to haul manure. All drylots were equipped with a standard farm tractor in the 70 to 80 horsepower class equipped with a front scoop loader and a rear blade used to clean lots and drives. The large backgrounding drylots and the feedlot were equipped with the same type of standard tractor plus a track type tractor with a dozer blade. Both were used in feedpen and feed yard cleaning, loading of feed if necessary, and packing of silage.

Machinery and equipment assessed values were derived from the 1974 Kansas Assessment Manual. Machinery and equipment were assessed at 30 per cent of value and this was used as the basis from which a 100 per cent purchasing price was derived.[37]

Feed Yards. Investments in the feed yards themselves include land, fences, feed bunks, feed aprons, waterers and water system, chutes, oilers, infirmary equipment, pollution control systems and sick pens, whether for backgrounding drylot or feedlot.

Land utilized for feedyards was assumed to possess adequate slope and soil characteristics to provide drainage from the pens. Materials used for fences were metal pipes set in concrete for posts and a metal top pipe with welded steel wire panels. The bunks and the feed apron were both of

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[37]State of Kansas, Department of Revenue, Division of Property Valuation, 1974 Kansas Assessment Manual (Topeka, Kansas: State Printing Office, November 1973).

concrete construction with the bunks being fence line types that support the front fence. Chutes and oilers were provided for all drylots and for the feedlot as well as for sick pens. Equipment and pens were provided for treating sick çalves. The waterers are automatic, designed to provide a continuous supply of fresh water to each pen. The water system provides for wells, reservoirs, and distribution pipes to distribute water to each pen or building. In compliance with environmental quality laws for livestock feeders, a diversion terrace-lagoon system was provided for all drylots and the feedlot. Kansas State University Extension Engineers provided building cost guidelines for the fences, bunks, feed apron and pollution control investments as follows:

Bunks	- $10 per linear foot	Feed Apron	- $.50 per sq. foot
Fences	- $1 per linear foot	Pollution Control	- $.50 per head cap.[38]

Investment costs for waterers, water system, chutes, sick pens, infirmary equipment, and oilers were derived from data in McCoy and Hausman.[39]

Feed Storage and Processing. For drylot background systems the only feed storage provided was metal grain bins sufficient to store one-third of the grain sorghum fed during the various feeding periods of each option, and augers to move the grain from bin to feed truck.

The feedlot is provided with flat bulk storage for one month's supply of concentrates and protein. All grain storage was budgeted at a cost of $.50 per bushel capacity. Silage storage for the feedlot was provided by a trench silo of sufficient size to hold one year's supply of corn silage. Silo costs

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[38]Interview with Leo Wendling, Extension Engineer, KSU, January 1974.

[39]McCoy and Hausman, Commercial Cattle Feedlots.

were budgeted at $.75 per ton capacity. All feed storage costs were given as guidelines by Kansas State University Extension Engineers.[40] Only the feedlot was budgeted with a feed mill. The feed mill has a capacity of 30 tons per hour and is assumed to operate 10 hours per day. Investment costs for the feed mill were derived from data for the "sample" mill from McCoy and Hausman.[41]

Office, Shop, and Scales. The feedlot was budgeted to provide a separate building to house management personnel. The office was provided with desks, file cabinets, telephones, lighting, heat, and other standard office needs. This was the only office space budgeted in the study and was assumed to also provide space for management of backgrounding and cowherd operation in the integrated option.

A repair shop was included to provide repair service for machinery, equipment, and feed yard facilities of the feedlot. Repair service was provided by this facility for the feedlot phase and Western Kansas Backgrounding Drylot owned by the feedlot company. Repairs on equipment used in other phases and locations were assumed to be purchased on a custom basis.

Large platform scales for weighing incoming and outgoing cattle and feed were provided in the feedlot along with a smaller platform scale for the weighing of single or small groups of cattle. Costs of these investments were derived from McCoy and Hausman.[42]

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[40]Wendling, January 1974.

[41]McCoy and Hausman.

[42]Ibid.

Brood Cows and Bulls. A major investment item for the backward vertical integrating feedlot company in this study was the purchase of cows and bulls for the cowherd operation. These purchases were budgeted at $300 per cow and $800 per bull regardless of the number needed per herd or the location of that herd.[43]

Tables of capital investments for each option are located in Appendix A.

Fixed Costs

The fixed costs described in this section were, in general, associated with the capital investments described in the prior section. The fixed costs in this study were depreciation, interest on investments, taxes on personal and real property, insurance, and office expenses. Total fixed costs did not change as the number of livestock handled changed; however, fixed costs per head decreased as they were spread over more head.

Depreciation. Depreciation is not a cash cost but an allowance for deterioration in value of investments over time due to wear and tear, accidents, obsolescence, and inadequacy. The straight-line-method of depreciation, allowing an equal deduction for each year of useful life was used in this study. The length of useful life and any salvage value for each investment was determined through consultation with KSU Extension Engineers.[44] Depending then upon the useful life span a rate of five or ten per cent depreciation per year was applied to each investment, excepting cattle.

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[43] Zoellner, January 1974.

[44] Wendling, January 1974.

Tables showing the yearly depreciation, useful life, salvage value and depreciation per head are presented in Appendix A.

Taxes. Taxes considered as fixed costs in this study were personal and real property taxes, including taxes on beef cows and bulls.

The amount of personal and real property tax per year was determined by applying the tax rate of $6.19 per $100 taxable value to each item.[45] Current taxable value of all personal and real property, except land and cattle, was assumed to be 50 per cent of purchase value to give an average valuation over time. Land was taxed at 100 per cent of value, and beef cows were valued at $40.00 for taxation.[46]

The amount of taxes per option are presented in tables in Appendix A and C.

Insurance. No general cost for insurance could be obtained as each facility must be analyzed individually by an insurance agent and factors such as location, age, and type of construction would affect the rate. An average cost was obtained from consultations with independent insurance agencies. Fixed insurance costs exclude cattle insurance and legal liability.

Management and Office. All office space and overall management was located at the feedlot location in Western Kansas and was budgeted at the feedlot level. Costs for this item were derived from McCoy and Hausman.[47]

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[45] Correspondence of July 1, 1974 with L. W. Clark, Administrative officer with Department of Property Valuation indicated this figure as the statewide average rural levy for the years 1969-1974.

[46] "1972 Livestock Assessing," The Kansas Stockman, December 1971, p. 23.

[47] McCoy and Hausman.

Interest. Interest on investment is a cost whether or not the investment capital is borrowed. If capital is not borrowed then an opportunity cost is used to show return from a comparable investment. The interest rate used was 7.9 per cent and was applied to one-half of the initial cost of all items except land.[48] These items were charged at only 50 per cent of value because over time their value decreases from 100 per cent to zero due to depreciation; therefore the investment average value would be 50 per cent. Fixed cost data per option is presented in Appendix C.

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[48]U.S., Department of Agriculture, Agricultural Finance Statistics, 1974, p. 39.

CHAPTER II

OPERATING OPTIONS AND COMPARISON TO OPTIMUM

Options considered in the analysis involve the use of various combinations of pasture and drylotting for the grazing background systems with varying lengths of time spent in the different phases. The drylot backgrounding system also involves different lengths of time in the drylot for each herd.

Following is a series of tables showing the management of each different option. These tables show the number of cattle per herd or group in each option, differences in grazing systems, shrinkage weight losses, calving and weaning dates, weaning weights, and length of time on each backgrounding system.

These tables show the number of cows in the cowherd for each option--21,490 for the individual herd options, 10,500 in each herd for the combined herd options--and are broken down into the four weaning-backgrounding groups to show any differences in treatment among the groups.

The purpose of these tables is to present the options in a form to aid in understanding differences which might have an effect on the selection of the optimum solution to the linear program.

Table II-1. Option 1 - Flinthills Spring Calving Cowherd - Grazing Backgrounding - Individual Herd Option - 21,490 Cows.

Operation	Weaning-Backgrounding Group 1	2	3	4
Calving dates	Feb.1-20	Feb.21-Mar.1	Mar.2-10	Mar.11-30
No. head per group	3073	6597	6597	3073
Weaning date	Oct.20	Oct.30	Nov.10	Nov.30
Weaning wt/lb	450	450	450	450
No. head weaned	3008	6447	6447	3008
No. replacement heifers	859	859	859	859
Wean death loss/No. hd.	65	150	150	65
Background Drylot in Eastern Kansas				
Date in	Oct.21			
Weight in/lb	427(a)			
Date out	Nov.15			
Weight ou/lb	470			
No. head	2106			
Background death loss	43			
Grazing Systems				
Crop	Wheat Pasture		Wheat Pasture	Wheat Pasture
Date in	Nov.15		Nov.10	Dec.1
Weight in/lb	465		427(a)	427(a)
Date out	Mar.15		Mar.15	Mar.15
Weight out/lb	633		600	572
No. head	2106		5458	2106
Background death loss			130	43
Background Drylot in Western Kansas				
Date in	Mar.16	Nov.1	Mar.16	Mar.16
Weight in/lb	601(b)	405(c)	570(b)	543(b)
Date out	Apr.17	Mar.25	May 5	May 20
Weight out/lb	657	657	657	657
No. head	2106	5458	5458	2106
Death loss	-	130	-	-
Feedlot in Western Kansas				
Date in	Apr.18	Mar.26	May 6	May 21
Weight in/lb	650(d)	650(d)	650(d)	650(d)
Date out	Sept.11	Aug.19	Sept.29	Oct.14
Weight out/lb	1091	1091	1091	1091
Sell wt/lb	1047(e)	1047(e)	1047(e)	1047(e)
Feedlot death loss	22	43	43	22
No. head	2084	5415	5415	2084

(a) Subtracted 5% weaning shrinkage
(b) Subtracted 5% transit shrinkage
(c) Subtracted 5% wean and 5% transit shrinkage
(d) Subtracted 1% handling shrinkage
(e) Subtracted 4% pencil shrinkage

Table II-2. Option 2 - Flinthills Fall Calving Cowherd - Grazing Backgrounding - Individual Herd Option - 21,490 Cows.

Operation	Weaning-Backgrounding Group 1	2	3	4
Calving dates	Oct.1-20	Oct.21-30	Nov.1-10	Nov.11-30
No. head/group	3073	6597	6597	3073
Weaning date	May 20	May 31	June 10	June 30
Weaning wt/lb	500	500	500	500
No. weaned	3008	6447	6447	3008
No. replacement heifers	859	859	859	859
Wean death loss/No. hd.	65	150	150	65
Grazing				
Crop	Native Grass	Native Grass	Native Grass	Native Grass
Date in	May 21	June 1	June 11	July 1
Weight in/lb	475(a)	475(a)	475(a)	475(a)
Date out	Sept.29	Oct.10	Oct.20	Nov.9
Weight out/lb	685	685	685	685
Background death loss	43	130	130	43
No. head	2106	5458	5458	2106
Feedlot				
Date in	Sept.30	Oct.11	Oct.21	Nov.10
Weight in/lb	650(b)	650(b)	650(b)	650(b)
Date out	Feb.24	Mar.7	Mar.17	Apr.6
Weight out/lb	1091	1091	1091	1091
Sell wt/lb	1047(c)	1047(c)	1047(c)	1047(c)
Death loss	22	43	43	22
No. head	2084	5415	5415	2084

(a) Subtracted 5% weaning shrinkage
(b) Subtracted 5% transit shrinkage
(c) Subtracted 4% pencil shrinkage

Table II-3. Option 3 - Western Kansas Spring Calving Cowherd - Grazing Backgrounding - Individual Herd Option - 21,490 Cows.

Operation	Weaning-Backgrounding Group 1	2	3	4
Calving dates	Feb.1-20	Feb.21-Mar.1	Mar.2-10	Mar.11-30
No. head per group	3073	6597	6597	3073
Weaning date	Oct.20	Oct.30	Nov.10	Nov.30
Weaning wt/lb	450	450	450	450
No. head weaned	3008	6447	6447	3008
No. replacement heifers	859	859	859	859
Wean death loss/no. hd.	65	150	150	65
Farm Drylot Western Kansas				
Date in	Oct.21			
Weight in/lb	427(a)			
Date out	Nov.15			
Weight out/lb	470			
No. head	2106			
Background death loss	43			
Grazing				
Crop	Wheat Pasture		Wheat	Wheat
Date in	Nov.15		Nov.11	Dec.1
Weight in/lb	465(b)		427(a)	427(a)
Date out	Mar.15		Mar.15	Mar.15
Weight out/lb	633		593	574
No. head	2106		5458	2106
Background death loss	-		130	43
Drylot Western Kansas				
Date in	Mar.16	Nov.1	Mar.16	Mar.16
Weight in/lb	626(c)	411(c)	572(d)	553(d)
Date out	Apr.11	Mar.21	May 3	May 15
Weight out	657	657	657	657
No. head	2106	5458	5458	2106
Death loss	-	130	-	-
Feedlot				
Date in	Apr.12	Mar.22	May 4	May 16
Weight in/lb	650(b)	650(b)	650(b)	650(b)
Date out	Sept.6	Aug.15	Sept.27	Oct.10
Weight out/lb	1091	1091	1091	1091
Sell weight	1047(e)	1047(e)	1047(e)	1047(e)
Feedlot death loss	22	43	43	22
No. head	2084	5415	5415	2084

(a) Subtracted 5% weaning shrinkage
(b) Subtracted 1% handling shrinkage
(c) Subtracted 5% weaning and 3 1/2% transit shrinkage
(d) Subtracted 3 1/2% transit shrinkage
(e) Subtracted 4% pencil shrinkage

Table II-4. Option 4 - Western Kansas Fall Calving Cowherd - Grazing Backgrounding - Individual Herd Option - 21,490 Cows.

Operation	Weaning-Backgrounding Group 1	2	3	4
Calving dates	Oct.1-20	Oct.21-30	Nov.1-10	Nov.11-30
No. head per group	3073	6597	6597	3073
Weaning date	May 20	May 31	June 10	June 30
Weaning wt/lb	400	400	400	400
No. head weaned	3008	6447	6447	3008
No. replacement heifers	859	859	859	859
Wean death loss/No. hd.	65	150	150	65
Grazing				
Crop	Irr.Imp.Gr(a)	Irr.Imp.Gr(a)	Nat. Grass	Nat. Grass
Date in	May 21	June 1	June 11	July 1
Weight in/lb	380(b)	380(b)	380(b)	380(b)
Date out	Oct.15	Oct.15	Oct.30	Oct.30
Weight out/lb	615	599	522	502
No. head	2106	5458	5458	2106
Background death loss	43	130	130	43
Drylot in Western Kansas				
Date in	Oct.16	Oct.16	Nov.1	Nov.1
Weight in/lb	593(c)	578(c)	503(c)	484(c)
Date out	Nov.22	Nov.30	Jan.27	Feb.7
Weight out/lb	657	657	657	657
No. head	2106	2106	2106	2106
Feedlot				
Date in	Nov.23	Dec.1	Jan.28	Feb.8
Weight in/lb	650(d)	650(d)	650(d)	650(d)
Date out	Apr.18	Apr.26	June 23	July 4
Weight out/lb	1091	1091	1091	1091
Sell weight/lb	1047(e)	1047(e)	1047(e)	1047(e)
Feedlot death loss	22	43	43	22
No. head	2084	5415	5415	2084

(a) Irrigated Improved Grass
(b) Subtracted 5% weaning shrinkage
(c) Subtracted 3.5% transit shrinkage
(d) Subtracted 1% handling shrinkage
(e) Subtracted 4% pencil shrinkage

Table II-5a. Option 5 - Flinthills Spring Calving Cowherd - Grazing Backgrounding - Combined Herds Option - 10,500 Cows.

Operation	Weaning-Backgrounding Group 1	2	3	4
Calving dates	Feb.1-20	Feb.21-Mar.1	Mar.2-10	Mar.11-30
No. head/group	1537	3300	3300	1537
Weaning date	Oct.20	Oct.30	Nov.10	Nov.30
Weaning wt/lb	450	450	450	450
No. head weaned	1505	3225	3225	1505
No. replacement heifers	430	430	430	430
Wean death loss/No. hd.	32	75	75	32
Drylot in Eastern Kansas				
Date in	Oct.21			
Weight in/lb	427(a)			
Date out	Nov.15			
Weight out/lb	470			
Head drylotted	1053			
Background death loss	22			
Grazing				
Crop	Wheat		Wheat	Wheat
Date in	Nov.15		Nov.10	Dec.1
Weight in/lb	465(b)		427(a)	427(a)
Date out	Mar.15		Mar.15	Mar.15
Weight out/lb	633		600	572
No. head grazed	1053		2730	1053
Background death loss	-		65	22
Drylot in Western Kansas				
Date in	Mar.16	Nov.1	Mar.16	Mar.16
Weight in/lb	601(d)	405(c)	570(d)	543(d)
Date out	Apr.17	Mar.25	May 5	May 20
Weight out/lb	657	657	657	657
No. head drylotted	1053	2730	2730	1053
Death loss	-	65	-	-
Feedlot				
Date in	Apr. 18	Mar.26	May 6	May 21
Weight in/lb	650(b)	650(b)	650(b)	650(b)
Date out	Sept.11	Aug.19	Sept.29	Oct.14
Weight out/lb	1091	1091	1091	1091
Sell weight/lb	1047	1047	1047	1047
Feedlot death loss	11	21	21	11
No. head	1042	2709	2709	1042

(a) Subtracted 5% weaning shrinkage
(b) Subtracted 1% handling shrinkage
(c) Subtracted 5% weaning and 5% transit shrinkage
(d) Subtracted 5% transit shrinkage

Table II-5b. Option 5 - Flinthill Fall Calving Cowherd - Grazing Backgrounding - Combined Herds Option - 10,500 Cows.

Operation	Weaning-Backgrounding Group 1	2	3	4
Calving dates	Oct.1-20	Oct.21-30	Nov.1-10	Nov.11-30
No. head per group	1537	3300	3300	1537
Weaning date	May 20	May 31	June 10	June 30
Weaning wt/lb	500	500	500	500
No. head weaned	1505	3225	3225	1505
No. replacement heifers	430	430	430	430
Wean death loss/No. hd.	32	75	75	32
Grazing				
Crop	Native Grass	Native Grass	Native Grass	Native Grass
Date in	May 21	June 1	June 11	July 1
Weight in/lb	475(a)	475(a)	475(a)	475(a)
Date out	Sept.29	Oct.10	Oct.20	Nov.9
Weight out/lb	685	685	685	685
Background death loss	22	65	65	22
No. head grazed	1053	2730	2730	1053
Feedlot				
Date in	Sept.30	Oct.11	Oct.21	Nov.10
Weight in/lb	650(b)	650(b)	650(b)	650(b)
Date out	Feb.24	Mar.7	Mar.17	Apr.6
Weight out/lb	1091	1091	1091	1091
Sell weight/lb	1047(c)	1047(c)	1047(c)	1047(c)
Death loss/hd	11	21	21	11
No. head	1042	2709	2709	1042

(a) Subtracted 5% weaning shrinkage
(b) Subtracted 5% transit shrinkage
(c) Subtracted 4% pencil shrinkage

Table II-5c. Option 5 - Western Kansas Spring Calving Cowherd - Grazing Backgrounding - Combined Herds Option - 10,500 Cows.

Operation	Weaning-Backgrounding Group 1	2	3	4
Calving date	Feb.1-20	Feb.21-Mar.1	Mar.2-10	Mar.11-30
No. head per group	1537	3300	3300	1537
Weaning date	Oct.20	Oct.30	Nov.10	Nov.30
Weaning wt/lb	450	450	450	450
No. head weaned	1505	3225	3225	1505
No. replacement heifers	430	430	430	430
Wean death loss/No. hd.	32	75	75	32
Farm Drylot Western Kansas				
Date in	Oct.21			
Weight in/lb	427(a)			
Date out	Nov.15			
Weight out/lb	470			
No. head drylotted	1053			
Background death loss	22			
Grazing				
Crop	Wheat		Wheat	Wheat
Date in	Nov.15		Nov.11	Dec.1
Weight in/lb	465(b)		427(a)	427(a)
Date out	Mar.15		Mar.15	Mar.15
Weight out/lb	633		593	574
No. head grazed	1053		2730	1053
Background death loss	-		65	22
Drylot in Western Kansas				
Date in	Mar.16	Nov.1	Mar.16	Mar.16
Weight in/lb	626(d)	411(c)	572(d)	553(d)
Date out	Apr.11	Mar.21	May 3	May 15
Weight out/lb	657	657	657	657
No. head in lot	1053	2730	2730	1053
Background death loss	-	65	-	-
Feedlot				
Date in	Apr.12	Mar.22	May 4	May 16
Weight in/lb	650(b)	650(b)	650(b)	650(b)
Date out	Sept.6	Aug.15	Sept.27	Oct.10
Weight out/lb	1091	1091	1091	1091
Sell weight/lb	1047(e)	1047(e)	1047(e)	1047(e)
Feedlot death loss	11	21	21	11
No. head	1042	2709	2709	1042

(a) Subtracted 5% weaning shrinkage
(b) Subtracted 1% handling shrinkage
(c) Subtracted 5% weaning and 3.5% transit shrinkage
(d) Subtracted 3.5% transit shrinkage
(e) Subtracted 4% pencil shrinkage

Table II-5d. Option 5 - Western Kansas Fall Calving Cowherd - Grazing Backgrounding - Combined Herds Option - 10,500 Cows.

Operation	Weaning-Backgrounding Group 1	2	3	4
Calving dates	Oct.1-20	Oct.21-30	Nov.1-10	Nov.11-30
No. head per group	1537	3300	3300	1537
Weaning date	May 20	May 31	June 10	June 30
Weaning wt/lb	400	400	400	400
No. weaned	1505	3225	3225	1505
No. replacement heifers	430	430	430	430
Wean death loss/No. hd.	32	75	75	32
Grazing				
Crop	Irr.Imp.Gr(a)	Irr.Imp.Gr(a)	Native Grass	Native Grass
Date in	May 21	June 1	June 11	July 1
Weight in/lb	380(b)	380(b)	380(b)	380(b)
Date out	Oct.15	Oct.15	Oct.30	Oct.30
Weight out/lb	615	599	522	502
Background death loss	22	65	65	22
No. head grazed	1053	2730	2730	1053
Drylot in Western Kansas				
Date in	Oct.16	Oct.16	Nov.1	Nov.1
Weight in/lb	593(c)	578(c)	503(c)	484(c)
Date out	Nov.22	Nov.30	Jan.27	Feb.7
Weight out/lb	657	657	657	657
No. head in lot	1053	2730	2730	1053
Feedlot				
Date in	Nov.23	Dec.1	Jan.28	Feb.8
Weight in/lb	650(d)	650(d)	650(d)	650(d)
Date out	Apr.18	Apr.26	June 23	July 4
Weight out/lb	1091	1091	1091	1091
Sell weight/lb	1047(e)	1047(e)	1047(e)	1047(e)
Feedlot death loss	11	21	21	11
No. head	1042	2709	2709	1042

(a) Irrigated Improved Grass
(b) Subtracted 5% weaning shrinkage
(c) Subtracted 3.5% transit shrinkage
(d) Subtracted 1% handling shrinkage
(e) Subtracted 4% pencil shrinkage

Table II-6. Option 6 - Flinthills Spring Calving Cowherd - Drylot Backgrounding - Individual Herd Option - 21,490 Cows.

Operation	Weaning-Backgrounding Group 1	2	3	4
Calving dates	Feb.1-20	Feb.21-Mar.1	Mar.2-10	Mar.11-30
No. head per group	3073	6597	6597	3073
Weaning date	Oct.20	Oct.31	Nov.10	Nov.30
Weaning wt/lb	450	450	450	450
No. weaned	3008	6447	6447	3008
No. replacement heifers	859	859	859	859
Weaning death loss/No. hd.	65	150	150	65
Drylot in Western Kansas				
Date in	Oct.21	Nov.1	Nov.11	Dec.1
Weight in/lb	405(a)	405(a)	405(a)	405(a)
Date out	Mar.14	Mar.25	April 4	April 24
Weight out/lb	657	657	657	657
Background death loss	43	130	130	43
No. head drylotted	2106	5458	5458	2106
Feedlot				
Date in	Mar.15	Mar.26	April 5	April 25
Weight in/lb	650(b)	650(b)	650(b)	650(b)
Date out	Aug.8	Aug.19	Aug.29	Sept.18
Weight out/lb	1091	1091	1091	1091
Sell wt/lb	1047(c)	1047(c)	1047(c)	1047(c)
Feedlot death loss	22	43	43	22
No. head	2084	5415	5415	2084

(a) Subtracted 5% weaning and 5% transit shrinkage
(b) Subtracted 1% handling shrinkage
(c) Subtracted 4% pencil shrinkage

Table II-7. Option 7 - Flinthills Fall Calving Cowherd - Drylot Backgrounding - Individual Herd Option - 21,490 Cows.

Operation	Weaning-Backgrounding Group 1	2	3	4
Calving dates	Oct.1-20	Oct.21-31	Nov.1-10	Nov.11-30
No. head per group	3073	6597	6597	3073
Weaning date	May 20	May 31	June 10	June 30
Weaning wt/lb	500	500	500	500
No. head weaned	3008	6447	6447	3008
No. replacement heifers	859	859	859	859
Wean death loss/No. hd.	65	150	150	65
Drylot in Western Kansas				
Date in	May 21	June 1	June 11	July 1
Weight in/lb	450(a)	450(a)	450(a)	450(a)
Date out	Sept.16	Sept.27	Oct.7	Oct.27
Weight out/lb	657	657	657	657
Background death loss	43	130	130	43
No. head drylotted	2106	5458	5458	2106
Feedlot				
Date in	Sept.17	Sept.28	Oct.8	Oct.28
Weight in/lb	650(b)	650(b)	650(b)	650(b)
Date out	Feb.10	Feb.21	Mar.3	Mar.23
Weight out/lb	1091	1091	1091	1091
Sell weight/lb	1047(c)	1047(c)	1047(c)	1047(c)
Feedlot death loss	22	43	43	22
No. head	2084	5415	5415	2084

(a) Subtracted 5% weaning and 5% transit shrinkage
(b) Subtracted 1% handling shrinkage
(c) Subtracted 4% pencil shrinkage

Table II-8. Option 8 - Western Kansas Spring Calving Cowherd - Drylot Backgrounding - Individual Herd Option - 21,490 Cows.

Operation	Weaning-Backgrounding Group 1	2	3	4
Calving dates	Feb.1-20	Feb.20-Mar.1	Mar.2-10	Mar.11-30
No. head per group	3073	6597	6597	3073
Weaning date	Oct.20	Oct.30	Nov.10	Nov.30
Weaning wt/lb	450	450	450	450
No. weaned	3008	6447	6447	3008
No. replacement heifer	859	859	859	859
Wean death loss/No. hd.	65	150	150	65
Drylot in Western Kansas				
Date in	Oct.21	Nov.1	Nov.11	Dec.1
Weight in/lb	412(a)	412(a)	412(a)	412(a)
Date out	Mar.9	Mar.20	Mar.30	Apr.19
Weight out/lb	657	657	657	657
Background death loss	43	130	130	43
No. head drylotted	2106	5458	5458	2106
Feedlot				
Date in	Mar.10	Mar.21	Mar.31	Apr.20
Weight in/lb	650(b)	650(b)	650(b)	650(b)
Date out	Aug.3	Aug.14	Aug.24	Sept.13
Weight out/lb	1091	1091	1091	1091
Sell weight/lb	1047(c)	1047(c)	1047(c)	1047(c)
Feedlot death loss	22	43	43	22
No. head	2084	5415	5415	2084

(a) Subtracted 3.5% transit and 5% weaning shrinkage
(b) Subtracted 1% handling shrinkage
(c) Subtracted 4% pencil shrinkage

Table II-9. Option 9 - Western Kansas Fall Calving Cowherd - Drylot Backgrounding - Individual Herd Option - 21,490 Cows.

Operation	Weaning-Backgrounding Group 1	2	3	4
Calving dates	Oct.1-20	Oct.21-30	Nov.1-10	Nov.10-30
No. head per group	3073	6597	6597	3073
Weaning date	May 20	May 31	June 10	June 30
Weaning wt/lb	400	400	400	400
No. weaned	3008	6447	6447	3008
No. replacement heifers	859	859	859	859
Wean death loss/No. hd.	65	150	150	65
Drylot in Western Kansas				
Date in	May 21	June 1	June 11	July 1
Weight in/lb	366(a)	366(a)	366(a)	366(a)
Date out	Nov.2	Nov.13	Nov.23	Dec.13
Weight out/lb	657	657	657	657
Background death loss	43	130	130	43
No. head drylotted	2106	5458	5458	2106
Feedlot				
Date in	Nov.3	Nov.14	Nov.24	Dec.14
Weight in/lb	650(b)	650(b)	650(b)	650(b)
Date out	Mar.29	Apr.9	Apr.19	May 9
Weight out/lb	1091	1091	1091	1091
Sell weight/lb	1047(c)	1047(c)	1047(c)	1047(c)
Feedlot death loss	22	43	43	22
No. head	2084	5415	5415	2084

(a) Subtracted 5% weaning and 3.5% shrinkage
(b) Subtracted 1% transit shrinkage
(c) Subtracted 4% pencil shrinkage

Table II-10a. Option 10 - Flinthills Spring Calving Cowherd - Drylot Backgrounding - Combined Herds Option - 10,500 Cows.

Operation	Weaning-Backgrounding Group 1	2	3	4
Calving dates	Feb.1-20	Feb.21-Mar.1	Mar.2-10	Mar.11-30
No. head per group	1537	3300	3300	1537
Weaning date	Oct.20	Oct.31	Nov.10	Nov.30
Weaning wt/lb	450	450	450	450
No. weaned	1505	3225	3225	1505
No. replacement heifers	430	430	430	430
Weaning death loss/No. hd.	32	75	75	32
Drylot in Western Kansas				
Date in	Oct.21	Nov.1	Nov.11	Dec.1
Weight in/lb	405(a)	405(a)	405(a)	405(a)
Date out	Mar.14	Mar.25	Apr.4	Apr.24
Weight out/lb	657	657	657	657
Background death loss	22	65	65	22
No. head drylotted	1053	2730	2730	1053
Feedlot				
Date in	Mar.15	Mar.26	Apr.5	Apr.25
Weight in/lb	650(b)	650(b)	650(b)	650(b)
Date out	Aug.8	Aug.19	Aug.29	Sept.18
Weight out/lb	1091	1091	1091	1091
Sell weight/lb	1047(c)	1047(c)	1047(c)	1047(c)
Feedlot death loss	11	21	21	11
No. head	1042	2709	2709	1042

(a) Subtracted 5% weaning and 5% transit shrinkage
(b) Subtracted 1% handling shrinkage
(c) Subtracted 4% pencil shrinkage

Table II-10b. Option 10 - Flinthills Fall Calving Cowherd - Drylot Backgrounding - Combined Herds Option - 10,500 Cows.

Operation	Weaning-Backgrounding Group 1	2	3	4
Calving dates	Oct.1-20	Oct.21-31	Nov.1-10	Nov.11-30
No. head per group	1537	3300	3300	1537
Weaning date	May 20	May 31	June 10	June 30
Weaning weight/lb	500	500	500	500
No. head weaned	1505	3225	3225	1505
No. replacement heifers	430	430	430	430
Wean death loss/No. hd.	32	75	75	32
Drylot in Western Kansas				
Date in	May 21	June 1	June 11	July 1
Weight in/lb	450(a)	450(a)	450(a)	450(a)
Date out	Sept.16	Sept.27	Oct.7	Oct.27
Weight out/lb	657	657	657	657
Background death loss	22	65	65	22
No. head drylotted	1053	2730	2730	1053
Feedlot				
Date in	Sept.17	Sept.28	Oct.8	Oct.28
Weight in/lb	650(b)	650(b)	650(b)	650(b)
Date out	Feb.10	Feb.21	Mar.3	Mar.23
Weight out/lb	1091	1091	1091	1091
Sell weight/lb	1047(c)	1047(c)	1047(c)	1047(c)
Feedlot death loss	11	21	21	11
No. head	1042	2709	2709	1042

(a) Subtracted 5% weaning and 5% transit shrinkage
(b) Subtracted 1% handling shrinkage
(c) Subtracted 4% weaning shrinkage

Table II-10c. Option 10 - Western Kansas Spring Calving Cowherd - Drylot Backgrounding - Combined Herds Option - 10,500 Cows.

Operation	Weaning-Backgrounding Group 1	2	3	4
Calving dates	Feb.1-20	Feb.21-Mar.1	Mar.2-10	Mar.11-30
No. head per group	1537	3300	3300	1537
Weaning date	Oct.20	Oct.30	Nov.10	Nov.30
Weaning wt/lb	450	450	450	450
No. weaned	1505	3225	3225	1505
No. replacement heifers	430	430	430	430
Wean death loss/No. hd.	32	75	75	32
Drylot in Western Kansas				
Date in	Oct.21	Nov.1	Nov.11	Dec.1
Weight in/lb	412(a)	412(a)	412(a)	412(a)
Date out	Mar.9	Mar.20	Mar.30	Apr.19
Weight out/lb	657	657	657	657
Background death loss	22	65	65	22
No. head drylotted	1053	2730	2730	1053
Feedlot				
Date in	Mar.10	Mar.21	Mar.31	Apr.20
Weight in/lb	650(b)	650(b)	650(b)	650(b)
Date out	Aug.3	Aug.14	Aug.24	Sept.13
Weight out/lb	1091	1091	1091	1091
Sell weight/lb	1047(c)	1047(c)	1047(c)	1047(c)
Feedlot death loss	11	21	21	11
No. head	1042	2709	2709	1042

(a) Subtracted 5% weaning and 3.5% transit shrinkage
(b) Subtracted 1% handling shrinkage
(c) Subtracted 4% pencil shrinkage

Table II-10d. Option 10 - Western Kansas Fall Calving Cowherd - Drylot Backgrounding - Combined Herds Options - 10,500 Cows.

Operation	Weaning-Backgrounding Group 1	2	3	4
Calving dates	Oct.1-20	Oct.21-30	Nov.1-10	Nov.10-30
No. head per group	1537	3300	3300	1537
Weaning date	May 20	May 31	June 10	June 30
Weaning wt/lb	400	400	400	400
No. weaned	1505	3225	3225	1505
No. replacement heifers	430	430	430	430
Wean death loss/No. hd.	32	75	75	32
Drylot in Western Kansas				
Date in	May 21	June 1	June 11	July 1
Weight in/lb	366(a)	366(a)	366(a)	366(a)
Date out	Nov.2	Nov.13	Nov.23	Dec.13
Weight out/lb	657	657	657	657
Background death loss	22	65	65	22
No. head drylotted	1053	2730	2730	1053
Feedlot				
Date in	Nov.3	Nov.14	Nov.24	Dec.14
Weight in/lb	650(b)	650(b)	650(b)	650(b)
Date out	Mar.29	Apr.9	Apr.19	May 9
Weight out/lb	1091	1091	1091	1091
Sell weight/lb	1047(c)	1047(c)	1047(c)	1047(c)
Feedlot death loss	11	21	21	11
No. head	1042	2709	2709	1042

(a) Subtracted 5% weaning and 3.5% transit shrinkage
(b) Subtracted 1% handling shrinkage
(c) Subtracted 4% pencil shrinkage

COMPARISON TO OPTIMUM OPTION

The basis used to select the optimum option in this study was maximization of net income. Net income is income resulting from gross receipts of fed steers minus variable operating expenses. This was used for all options, i.e. integrated or purchased steers. By comparing reduced costs of the non-optimum options to the income for the optimum option the amount by which the income of the optimum option exceeds the income of respective non-optimum options was shown.

THE OPTIMUM OPTION

The optimum option selected through the linear program was the individual herd option of the Flinthills Spring calving cowherd with 12,490 cows using the drylot type backgrounding system. This was one of the options where the feedlot company vertically integrated backward to furnish a portion of its own feeders by owning the cowherd producing the calves.

This option generates a greater income over variable costs than any of the others considered in the study.

Net income over variable costs of this option was $1,973,201. This was a return to all capital invested in the feedlot, backgrounding, and cowherd phases. A comparison of this optimum net income to the reduced costs and net incomes of the other options follows in Table II-11.

Negative income in Table II-11 indicates that those options would operate with a loss (or negative income).

The optimum option feeds a total of 44,994 head of cattle and the $1,973,201.00 net income gives a return per head of $43.85. This is an

Table II-11. Comparison of Reduced Cost and Net Income with the Optimum.

Herd Option	Reduced Income	Income
Company Integrated Options	$	$
Flinthills Spring Cowherd with Drylot Background	0	1,973,201.00
Flinthills Spring Cowherd with Grazing Background	-293,371.00	1,679,830.00
Western Kansas Spring Cowherd with Grazing Background	-507,238.00	1,465,963.00
Flinthills Fall Cowherd with Grazing Background	-416,513.00	1,556,688.00
Flinthills Fall Cowherd with Drylot Background	-257,068.00	1,716,133.00
Western Kansas Spring Cowherd with Drylot Background	-109,176.00	1,864,025.00
Western Kansas Fall Cowherd with Grazing Background	-1,033,156.00	940,045.00
Western Kansas Fall Cowherd with Drylot Background	-992,582.00	980,619.00
Combined Herds Option with Drylot Background	-15,123,280.00	-17,096,490.00
Combined Herds Option with Grazing Background	-15,265,670.00	-17,238,880.00
Purchased Steer Options[a]		
Flinthill Spring Graze	-1,517,496.00	455,705.00
Flinthill Spring Drylot	-1,161,069.00	812,132.00
Flinthill Fall Graze	-1,684,876.00	288,325.00
Flinthill Fall Drylot	-1,597,936.00	375,265.00
Western Kansas Spring Graze	-1,590,283.00	382,918.00
Western Kansas Spring Drylot	-795,318.00	1,177,883.00
Western Kansas Fall Graze	-1,852,606.00	120,595.00

Table II-11 (Cont'd)

Herd Option	Reduced Income	Income
	$	$
Western Kansas Fall Drylot	-1,975,468.00	-2,267.00
Combined Herds Graze	-27,396,204.00	-25,423,003.00
Combined Herds Drylot	-27,596,441.00	-25,623,240.00

(a) The purchased steer options use the same name, as all purchases and sales of steers are made at the same time as the integrated option of the same title.

average return for the integrated and purchased steers alike. The most profitable 100 per cent purchased steer option, the Western Kansas Spring Drylot, gives a net income of $1,177,883.00 for a per head return of $26.18. This amounts to a $17.67 gain in per head return for the integrated option.

If the purchased steers in the optimum option were assumed to also have a per head return of $26.18 per head this would indicate a return per head for the integrated steers in the optimum option of $79.20.

For further comparison Tables II-12 to II-15 show total operating expense for all of the options by phase and a total expenditure for each option.

Table II-12. Integrated Individual Herd Option - Total Operating Expenditures by Phase - For Drylot Background Option.

Herd	Cowherd	Grazing Backgrounding	Feedlot	Total
	$	$	$	$
Flinthills Fall	2,778,533	509,251	1,475,269(a) 3,085,269(b)	7,848,322
Flinthills Spring	2,778,533	685,906	1,475,269(a) 3,085,269(b)	8,024,977
Western Kansas Fall	2,928,769	750,876	1,475,269(a) 3,085,269(b)	8,240,183
Western Kansas Spring	2,928,769	651,532	1,475,269(a) 3,085,269(b)	8,140,839

(a) Total feedlot operating expense for integrated steers
(b) Total feedlot operating expense for purchased steers

Table II-13. Integrated Individual Herds Option - Total Operating Expenditures by Phase - for Grazing Background.

Herd	Cowherd	Grazing Backgrounding	Feedlot	Total
	$	$	$	$
Flinthills Fall	2,778,533	661,967	1,475,269(a) 3,085,269(b)	8,001,038
Flinthills Spring	2,778,533	815,327	1,475,269(a) 3,085,269(b)	8,154,398
Western Kansas Fall	2,928,769	962,247	1,475,269(a) 3,085,269(b)	8,451,554
Western Kansas Spring	2,928,769	791,425	1,475,269(a) 3,085,269(b)	8,280,732

(a) Feedlot operating expense for integrated steers
(b) Feedlot operating expense for purchased steers

Table II-14. Integrated Combined Herd Options - Total Operating Expenditure by Phase - for Grazing Backgrounding Option.

Herd	Cowherd	Grazing Backgrounding	Feedlot	Total
	$	$	$	$
Flinthills Fall	1,389,914	331,134	2,951,715(a) 6,172,996(b)	10,845,759
Flinthills Spring	1,389.914	407,642	2,951,715(a) 6,172,996(b)	10,922,267
Western Kansas Fall	1,465,074	479,308	2,951,715(a) 6,172,996(b)	11,069,093
Western Kansas Spring	1,465,074	354,804	2,951,715(a) 6,172,996(b)	10,944,589
Totals	5,709,976	1,572,888	36,498,844	43,871,709

(a) Feedlot operating expense for integrated steers
(b) Feedlot operating expense for purchased steers

Table II-15. Integrated Combined Herds Option - Total Operating Expenditure by Phase - Drylot Backgrounding Option.

Herd	Cowherd	Drylot Backgrounding	Feedlot	Total
	$	$	$	$
Flinthills Fall	1,389,914	291,574	2,951,715(a) 6,172,996(b)	10,806,099
Flinthills Spring	1,389,914	340,205	2,951,715(a) 6,172,996(b)	10,854,830
Western Kansas Spring	1,465,074	323,006	2,951,715(a) 6,172,996(b)	10,912,791
Western Kansas Fall	1,465,074	372,624	2,951,715(a) 6,172,996(b)	10,962,409
Totals	5,709,976	1,327,409	36,498,844	43,536,229

(a) Total feedlot operating expense for integrated steers
(b) Total feedlot operating expense for purchased steers

Presented in Tables II-16 to II-19 are feedlot income, steer purchasing expenditure, and income after steer purchasing expenditures for each of the 20 options in the study. For further clarification of the steer purchasing expense and feedlot income, Appendix D contains tables showing the weeks of sale and purchase, and corresponding prices and number of head involved.

Table II-16. Total Feedlot Income, Expense for Purchasing Steers, Profit - Integrated Options with Grazing Backgrounding System.

Cowherd Season and Location	Background System	Gross Feedlot Income[a]	Steer Purchasing Expense[b]	Feedlot Income[a][c]
		$	$	$
Western Kansas Fall	Grazing	16,994,148(b)	7,602,549	9,391,599
Western Kansas Spring	Grazing	17,376,703	7,630,008	9,746,695
Flinthills Fall	Grazing	17,242,948	7,685,282	9,557,666
Flinthills Spring	Grazing	17,467,151	7,632,914	9,834,237
Combined Herds Option	Grazing	34,554,742	15,294,778	19,259,964

(a) Includes income from sale of cull cows - $824,553 for fall options, $845,068 for spring options.
(b) Includes a death loss cost of 1/2 of 1% of purchasing expense.
(c) Income does not include subtraction of feedlot operating expense of $4,560,538 for each individual herd and $9,124,711 for each of the four combined herds. Net income is in Table II-11.

Table II-17. Total Feedlot Income, Expense for Purchasing Steers, and Profit - Integrated Options with Drylot Backgrounding System.

Cowherd Season and Location	Background System	Gross Feedlot Income[a]	Steer Purchasing Expense[b]	Feedlot Income[c]
		$	$	$
Flinthills Spring	Drylot	17,708,269	7,710,091	9,998,178
Flinthills Fall	Drylot	17,239,936	7,675,481	9,564,455
Western Kansas Spring	Drylot	17,725,267	7,720,403	10,004,864
Western Kansas Fall	Drylot	16,732,019	7,511,217	9,220,802
Combined Herd Option	Drylot	34,717,077	15,314,723	19,402,354

(a) Includes income from sales of cull cows - $824,553 for fall options, $845,068 for spring options
(b) Includes a death loss cost of 1/2 of 1% of purchasing expense
(c) Income does not include subtraction of feedlot operating expense of $4,560,538 for each individual herd and $9,124,711 for each of the four combined herds. Net income is in Table II-11.

Table II-18. Total Feedlot Income, Expense for Purchasing Steers, and Profit - 100% Purchased Steer Options.

Comparison to Cowherd Season and Location	Comparison to Background System	Gross Feedlot Income[a]	Steer Purchasing Expense[a]	Feedlot Income[b]
		$	$	$
Western Kansas Fall	Graze	16,169,595	11,423,347	4,746,248
Flinthills Spring	Graze	16,622,083	11,540,725	5,081,358
Flinthills Fall	Graze	16,385,448	11,471,470	4,913,978
Western Kansas Spring	Graze	16,531,635	11,523,064	5,008,571
Combined Herds	Graze	32,884,017	22,968,914	9,915,103

(a) Includes a death loss cost of 1/2 of 1% of purchasing expense
(b) Income does not include subtraction of feedlot operating expense of $4,625,653 for individual options or $9,259,494 for each of the four combined herds. Net income is in Table II-11.

Table II-19. Total Feedlot Income, Expense for Purchasing Steers, and Profit - 100% Purchased Steer Options.

Comparison to Cowherd Season and Location	Comparison to Background System	Gross Feedlot Income	Steer Purchasing[(a)] Expense	Feedlot[(b)] Income
		$	$	$
Flinthills Fall	Drylot	16,415,383	11,414,465	5,000,918
Flinthills Spring	Drylot	16,863,201	11,540,244	5,322,957
Western Kansas Fall	Drylot	15,907,466	11,284,080	4,623,386
Western Kansas Spring	Drylot	16,880,199	11,076,663	5,803,536
Combined Herds	Drylot	33,046,347	22,931,007	10,115,340

(a) Includes a death loss cost of 1/2 of 1% of purchasing expense
(b) Income does not include subtraction of feedlot operating expense of $4,625,653 for individual options and $9,259,494 for combined herds options. Net income is in Table II-11.

The selection of an integration option as the optimum is an indication that the price paid for purchased cattle represent prices higher than needed to pay production costs. The difference would represent seller's profit and the commission or buying charge. The feedlot company could capture these two items by backward vertical integration to include backgrounding and cowherd enterprises.

The income of $1,973,201 indicated for the Flinthills Spring Calving Cowherd with drylot backgrounding, which was determined to be the optimum, was the net income after payment of variable costs only. Fixed costs for this option when totaling feedlot, backgrounding, and cowherd phases amount to $598,743.00. This leaves a final net return of $1,374,458 to the operation. On a per head basis for both integrated and purchased steers alike this would amount to a return of $30.54 per head. The most profitable 100 per cent purchased steer option after payment of fixed costs provides a per

head return of $22.20 which is $8.34 per head less than the optimum integrated option.

The identically timed comparison option for 100 per cent purchased steers called the Flinthills Spring drylot had net returns over variable costs of $812,132 for the purchase, feeding, and marketing of 44,994 head. This gave a per head return of $18.05 before fixed costs were paid. Compared to the same return for the company integrated option this provides a $25.80 greater per head advantage for integration. After paying fixed costs the 100 per cent purchased steer option had a final per head return of $14.07. The optimum option had a final per head return of $30.54 for an advantage in returns of $16.47 to the integrated option.

The selection of a drylot backgrounding system over a grazing backgrounding system when the cowherd and feedlot costs for either were identical, implies that the faster rate of gain in the drylot system which also was combined with less shrinkage loss due to less handling of the steers was a cheaper method of backgrounding than grazing. One other factor that could easily influence this choice would be the relation of the average price of grain fed to the average grazing costs. Since both prices used the same period of years as their base it would tend to indicate that grain was priced lower when compared to an amount of grazing capable of providing the same amount of animal growth. In this sense the type of backgrounding which was most economical would seem to depend on the relationship of grain to pasturage prices at the time of consideration.

An additional factor in this study which could influence choice of backgrounding systems in an actual operation is the amount of investment and operating capital available. In this study the feedlot company was assumed

to be able to generate all capital needed whether through company funds or borrowing or some combination. In actual operation the capital availability situation facing a feedlot company may dictate a different system of integration than is indicated in this study.

CHAPTER III

SUMMARY AND CONCLUSIONS

Using maximization of net income as the criteria for selection, twenty varying management systems for a Kansas commercial feedlot company were budgeted and developed into a Linear Program. The management systems were: 10 various methods of backward vertical integration by the feedlot and 10 methods which assumed the steers were purchased on the same time schedule as the feeder cattle produced under the respective integrated option.

The option selected as optimum in the Linear Program by the reason it produces the maximum income was for the feedlot company to vertically integrate backward to own a drylot backgrounding facility which would handle the calves produced by an integrated Spring calving cowherd located in the Flinthills of Kansas. When compared to the option where 100 per cent of the steers were purchased but assumed to be produced on the same time schedule as the respective integrated option returns an additional $16.47 per head after all costs were paid, and when comparing the optimum option to the most profitable 100 per cent purchased steer option, the additional return per head above all costs was $8.43 for integration.

The results of this study, however, should not be interpreted as indicating final definite proof that backward vertical integration would always be a method by which a Kansas commercial feedlot could increase its net income. Actual operations face risks and uncertainties not accounted for in this study such as weather, gain, sickness, and accident, and also they can be more flexible in rates of gain and length of production period

in order to be able to take advantage of the price cycles for feeder steers and fed steers. The results do support the conclusion that backward vertical integration would be a management system deserving close consideration and investigation by a Kansas commercial feedlot company.

Backward vertical integration could be a system of management which would provide several advantages to a feedlot. Backward vertical integration would be a method of securing a more dependable supply of feeders with known performance characteristics desired in the cattle feeding industry. Diversification of production and investments and a possible enhancement of the marketing share of the feedlot in the competitive market structure would also be important possible advantages to backward vertical integration.

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Table A-1. Capital Investments and Depreciation - Farm Drylot in Eastern Kansas - Individual Flinthills Spring Calving Cowherd - Grazing Background - 21,490 Cows.

Item		Investment		Depreciation
		$		$
Pens	(9)	7965		398
Tractor	1	11633		1047
Feed trucks	1	12200		1098
Trucks	2	16466		1482
Grain Bin		867		43
Auger	1	384		35
Pickup	1	4100		369
Chutes		4000		200
Sick pen		1000		50
Gates	18	684		34
Waterers		1700		170
Water System		9000		900
Pollution control		10530		1053
Oilers		900		90
Infirmary Equip.		350		35
Bunks		16875		844
Feed Apron		16875		844
Sub-total		115529	Total	8692
Land-15A		2850		
Total		118379		4.13
Repairs		2310		
(2% of sub-total)		hd = 1.09		
Depreciation		8692	total	
		4.13	per head	
Taxes		53	land	
		2145	other	
		2198	total	
		1.04	per head	
Interest		225	land	
		4563	other	
		4788	total	
		2.27	per head	

Table A-2. Capital Investments and Depreciation - Individual Flinthill Spring Calving Cowherd - Grazing Background - 21,490 Cows.

Item		Investment		Depreciation
		$		$
Pens		54012		2700
Feed Bunks		114375		5719
Feed Apron		114375		5719
Grain Bins		22272		1114
Pollution Control		75640		7564
Waterers		7179		718
Water System		52543		5253
Sick Pen		2642		132
Chutes		9909		495
Infirmary Equip.		1651		165
Tractor	(1)	11633		1047
Track tractor	(1)	14933		1344
Oilers		6936		694
Grain truck	(1)	25633		2307
Pickup	(1)	4100		369
Standard trucks	(3)	24699		2223
Feed trucks	(3)	36600		3294
Auger	(3)	1152		104
Sub-total		583691		41132
Land		16150		2.71/hd
Total		599841		
Repairs (2% of sub-total)		11674		
		.77/hd		
Depreciation		41132	total	
		2.71	per head	
Taxes		300	land	
		5420	other	
		5720	total	
		.38	per head	
Interest		1276	land	
		23056	other	
		24332	total	
		1.61	per head	
Insurance		1049	total	
		.50	per head	

Table A-3. Capital Investments and Depreciation - Farm Drylot in Western Kansas - Individual Western Kansas Spring Calving Cowherd - Grazing Background - 21,490 Cows.

Item		Investment		Depreciation
		$		$
Pens	9	7965		398
Tractor	1	11633		1047
Feed truck	1	12200		1098
Trucks	2	16466		1482
Grain Bin		1039		52
Auger	1	384		35
Pickup	1	4100		369
Chutes		4000		200
Sick pen		1000		50
Gates		684		34
Waterers		1700		170
Water System		9000		900
Pollution Control		10530		1053
Oilers		900		90
Infirmary Equipment		350		35
Bunks		16875		844
Feed Apron		16875		844
Sub-total		115701	Total	8701
Land 15-A		2850		
Total		118551		
Repairs (2% of sub-total)		2314		
		1.09/hd		
Depreciation		8701	total	
		4.13	per head	
Interest		225	land	
		4570	other	
		4795	total	
		2.28	per head	
Taxes		53	land	
		2149	other	
		2202	total	
		1.05	per head	

Table A-4. Capital Investments and Depreciation - Drylot in Western Kansas - Individual Western Kansas Spring Calving Cowherd - Grazing Background - 21,490 Cows.

Item		Investment		Depreciation
		$		$
Pens		54012		2700
Feed bunks		114375		5719
Feed apron		114375		5719
Grain bins		22021		1101
Augers	(3)	1152		104
Pollution Control		75640		7564
Waterers		7179		718
Water System		52534		5253
Sick Pen		2642		132
Chutes		9909		495
Infirmary Equip.		1651		165
Tractor	(1)	11633		1047
Track tractor	(1)	14933		1344
Oilers		6936		694
Grain truck	(1)	25633		2307
Pickup	(1)	4100		369
Standard trucks	(3)	24699		2223
Feed trucks	(3)	36600		3294
Sub-total		583440		41119
Land		16130		2.71/hd
Total		599590		
Repairs (2% of sub-total)		11669		
		.77/hd		
Depreciation		41119	total	
		2.71	per head	
Taxes		300	land	
		5417	other	
		5717	total	
		.37	per head	
Interest		1276	land	
		23046	other	
		24322	total	
		1.61	per head	
Insurance		1094	total	
		.07	per head	

Table A-5. Capital Investments and Depreciation - Drylot in Western Kansas-Individual Western Kansas Fall Calving Cowherd - Grazing Background - 21,490 Cows.

Item		Investment		Depreciation
		$		$
Pens		54012		2700
Feed bunks		114375		5719
Feed apron		114375		5719
Grain bins		17757		888
Pollution Control		75640		7564
Waterers		7179		718
Water System		52534		5253
Sick Pen		2642		132
Chutes		9909		495
Infirmary Equip.		1651		165
Tractor	(1)	11633		1047
Track tractor	(1)	14933		1344
Oilers		6936		694
Grain truck	(1)	25633		2307
Pickup	(1)	4100		369
Standard trucks	(3)	24699		2223
Feed trucks	(3)	36600		3294
Auger	(2)	768		39
Sub-total		578792		40871
Land-85A		16150		2.70/hd
Total		594942		
Repairs (2% of sub-total)		11576		
		.76/hd		
Taxes		300	land	
		5374	other	
		5674	total	
		.38	per head	
Interest		1276	land	
		22862	other	
		24138	total	
		1.60	per head	
Depreciation		40871	total	
		2.70	per head	
Insurance		1049	total	
		.07	per head	

Table A-6. Capital Investments and Depreciation - Drylot in Western Kansas - Combined Herds Option - Grazing Background - 43,500 Cows.

Item		Investment		Depreciation
		$		$
Pens		54012		2700
Feed bunks		114375		5719
Feed apron		114375		5719
Grain bins		22157		1108
Augers	3	1152		104
Pollution Control		75680		7568
Waterers		7179		718
Water System		52534		5253
Sick Pen		2642		132
Chutes		9909		495
Infirmary Equip.		1651		165
Tractor	(1)	11633		1047
Track tractor	(1)	14933		1344
Oilers		6936		694
Grain truck	(1)	25633		2307
Pickup	(1)	4100		379
Standard trucks	(3)	24699		2223
Feed trucks	(3)	36600		3294
Sub-total		583616		41130
Land		16150		1.81/hd
Total		599766		
Repairs (2% of sub-total)		11672		
		.51/hd		
Depreciation		41130	total	
		1.81	per head	
Taxes		300	land	
		5419	other	
		5719	total	
		.25	per head	
Interest		1276	land	
		23053	other	
		24329	total	
		1.07	per head	
Insurance		1803	total	
		.08	per head	

Table A-7. Capital Investments and Depreciation - Drylot in Western Kansas - Individual Flinthills Spring Calving Cowherd - Drylot Background - 21,490 Cows.

Item		Investment		Depreciation
		$		$
Pens		54012		2700
Feed Bunks		114375		5719
Feed Apron		114375		5719
Grain Bins		35911		1796
Augers	3	1152		104
Chutes		9909		495
Sick Pens		2642		132
Infirmary Equip.		1651		165
Gates		3416		171
Oilers		6936		694
Waterers		7179		718
Water System		52534		5253
Pollution Control		75640		7568
Feed Trucks	5	61000		5490
Trucks	3	24699		2223
Hay truck	1	24633		2217
Grain truck	1	25633		2307
Pickups	2	8200		738
Tractor	1	11633		1047
Track tractor	1	14933		1344
Sub-total		650503	Total	46570
Land		16150		3.09/hd
Total		666653		
Repairs (2% of sub-total)		13010		
		.86/hd		
Taxes		300	land	
		6040	other	
		6340	total	
		.42	per head	
Interest		1276	land	
		25695	other	
		26971	total	
		1.78	per head	
Insurance		2119	total	
		.14	per head	

Table A-8. Capital Investments and Depreciation - Drylot in Western Kansas - Individual Flinthills Fall Calving Cowherd - Drylot Background - 21,490 Cows.

Item		Investment		Depreciation
		$		$
Pens		54012		2700
Feed bunks		114375		5719
Feed apron		114375		5719
Grain Bins		29426		1471
Augers	3	1152		104
Chutes		9909		495
Sick Pens		2642		132
Infirmary Equip.		1651		165
Gates	122	3416		171
Oilers		6936		694
Waterers		7179		718
Water System		52534		5253
Pollution Control		75640		7568
Feed trucks	5	61000		5490
Trucks	3	24699		2223
Hay truck	1	24633		2217
Grain truck	1	25633		2307
Pickups	2	8200		738
Tractor	1	11633		1047
Track tractor	1	14933		1344
Sub-total		643978		46275
Land-85A	$190A	16150		3.06/hd
Total		660128		
Repairs (2% of sub-total)		12880		
		.85/hd		
Taxes		330	land	
		5979	other	
		6279	total	
		.42	per head	
Interest		1276	land	
		25437	other	
		26713	total	
		1.77	per head	
Insurance		1526	total	
		.10	per head	

Table A-9. Capital Investments and Depreciation - Drylot in Western Kansas - Individual Western Kansas Spring Calving Cowherd - Drylot Background - 21,490 Cows.

Item		Investment		Depreciation
		$		$
Pens		54012		2700
Feed Bunks		114375		5719
Feed Apron		114375		5719
Grain Bins		34916		1746
Augers	3	1152		104
Chutes		9909		495
Sick Pens		2642		132
Infirmary Equip.		1651		165
Gates		3416		171
Oilers		6936		694
Waterers		7179		718
Water System		52534		5253
Pollution Control		75640		7568
Feed trucks	5	61000		5490
Trucks	3	24699		2223
Hay truck	1	24633		2217
Grain truck	1	25633		2307
Pickups	2	8200		738
Tractor		11633		1047
Track tractor		14933		1344
Sub-total		649508		46550
Land		16150		3.08/hd
Total		665658		
Repairs (2% of sub-total)		12990		
		.86/hd		
Taxes		300	land	
		6031	other	
		6331	total	
		.42	per head	
Interest		1276	land	
		25656	other	
		26932	total	
		1.78	per head	
Insurance		2085	total	
		.14	per head	

Table A-10. Capital Investments and Depreciation - Drylot in Western Kansas - Western Kansas Fall Calving Cowherd - Drylot Background - 21,490 Cows.

Item		Investment		Depreciation
		$		$
Pens		54012		2700
Feed bunks		114375		5719
Feed apron		114375		5719
Grain bins		41399		2070
Augers	3	1152		104
Chutes		9909		495
Sick pens		2642		132
Infirmary Equip.		1651		165
Gates		3416		171
Oilers		6936		694
Waterers		7179		718
Water System		52534		5253
Pollution Control		75640		7568
Feed trucks	5	61000		5490
Trucks	3	24699		2223
Hay truck	1	24633		2217
Grain truck	1	25633		2307
Pickups	2	8200		738
Tractor	1	11633		1047
Track tractor	1	14933		1344
Sub-total		655991		46874
Land		16150		3.10/hd
Total		672141		
Repairs (2% of sub-total)		13120		
		.87/hd		
Depreciation		46874	total	
		3.10	per head	
Taxes		300	land	
		6091	other	
		6391	total	
		.42	per head	
Interest		1276	land	
		25912	other	
		27188	total	
		1.80	per head	
Insurance		2311	total	
		.15	per head	

Table A-11. Capital Investments and Depreciation - Drylot in Western Kansas - Combined Herds Option - Drylot Background - 43,500 Cows.

Item		Investment		Depreciation
		$		$
Pens	61	54012		2700
Feed Bunks		114375		5719
Feed Apron		114375		5719
Grain Bins		106285		5314
Grain Auger	3	1152		104
Chutes		9909		495
Sick Pens		2642		132
Infirmary Equip.		1651		165
Gates	122	3416		171
Oilers		6936		694
Waterers		7179		718
Water System		52534		5253
Pollution Control		75680		7568
Feed Trucks	5	61000		5490
Trucks	3	24699		2223
Hay truck	1	24633		2217
Grain truck	1	25633		2307
Pickup	2	8200		738
Tractor	1	11633		1047
Track tractor		14933		1344
Sub-total		720877		50118
Land-85A	$190	16150		1.66/hd
Total		737027		
Repairs (2% of sub-total)		14417	total	
		3604	herd	
		.48	herd	
Taxes		300	land	
		6693	other	
		6993	total	
		.23	per head	
Interest		1276	land	
		28475	other	
		29751	total	
		.98	per head	
Insurance		4565	total	
		.15	per head	

Table A-12. Drylot Equipment Useful Life for Depreciation - All Options.

Item	Life	Salvage Value	% Depreciation per year
Pens	20	0	5
Feed bunks	20	0	5
Feed aprons	20	0	5
Grain bins	20	0	5
Tractor	10	10	10
Truck tractor	10	10	10
Augers	10	10	10
Trucks	10	10	10
Hay truck	10	10	10
Grain truck	10	10	10
Feed trucks	10	10	10
Chutes	20	0	5
Sick pens	20	0	5
Gates	20	0	5
Oilers	10	0	10
Waterers	10	0	10
Water System	10	0	10
Pollution Control	10	0	10
Pickups	10	10	10
Infirm	10	0	10

Table A-13. Feedlot Capital Investment Expenditures - All Options

	Item	#	Each		Total
1	Feed mill	1	300000		300000
2	1/2 Ton Pickup	2	4100		8200
3	Auger.	3	384		1152
4	Tractor	1	11633		11633
5	Track-tractor	1	14933		14933
6	Diesel truck	2	20533		41066
7	Hay trailer	1	4100		4100
8	Grain trailer	1	5100		5100
9	2-4T truck	4	6600		26400
10	18' Box w/Hoist	4	1633		6532
11	Feed truck	6	6600		39600
12	Feedbox 344 bu	6	5600		33600
13	Front loader	1	666		666
14	Blade		300		300
15	Waterers		7179		7179
16	Water System		52534		52534
17	Pollution Control		100000		100000
18	Oilers		6936		6936
19	Gates		28		4536
20	Infirmary Equip.		1651		1651
21	Sick Pens		2642		2642
22	Chutes		9909		9909
23	Land-113A		190		21470
24	Shop tools		7006		7006
25	Grain bins		124122		124122
26	Hayshed		7823		7823
27	Office		8883		8883
28	Cattle Scale		13281		13281
29	Truck Scale		27815		27815
30	Repair Shop		20861		20861
31	Pens		889		72016
32	Bunks		1882		152500
33	Feed Apron		1882		152500
34	Trench silo		27000		
					1213946
	Repairs 2%				24,279
					.54/hd
	Tax		399	land	
			11522	other	
			11921	total	
			.32	per head	
	Interest		1696	land	
			49017	other	
			50713	total	
			1.37	per head	
	Insurance		4000	total	
			.11	per head	

Table A-14. Feedlot Depreciation - All Options

Item	Amount
1. Feed Mill	15000
2. Pickups	738
3. Auger	104
4. Tractor	1047
5. Track tractor	1344
6. Hay truck	2217
8. Grain truck	2307
9. Standard trucks	2964
10. Feed trucks	6588
11. Blade	30
12. Front loader	67
13. Waterers	718
14. Water System	5253
15. Pollution Control	10000
16. Oilers	694
17. Gates	227
18. Infirmary Equip.	165
19. Sick Pens	132
22. Chutes	495
23. Shop tools	701
25. Grain Bins	6206
26. Hay Shed	391
27. Office	444
28. Cattle Scale	664
29. Truck Scale	1391
30. Repair Shop	1043
31. Pens	3601
32. Feed Bunks	7625
33. Feed Apron	7625
34. Silo	1350
Total	81131
Per Hd - 37050hd	2.19

Table A-15. Feedlot Equipment - Useful Life for Depreciation.

Item	Life	Salvage-Value	% Depreciation per year
Pens	20	0	5
Bunks	20	0	5
Feed Aprons	20	0	5
Grain Bins	20	0	5
Chutes	20	0	5
Sick Pens	20	0	5
Gates	20	0	5
Repair Shop	20	0	5
Cattle Scale	20	0	5
Truck Scale	20	0	5
Office	20	0	5
Shop Tools	10	0	10
Tractor	10	10	10
Track-tractor	10	10	10
Augers	10	10	10
Trucks	10	10	10
Hay Truck	10	10	10
Grain Truck	10	10	10
Feed Trucks	10	10	10
Oilers	10	0	10
Waterers	10	0	10
Water System	10	0	10
Pollution Control	10	0	10
Pickups	10	10	10
Infirmary Equip.	10	0	10
Front Loader	10	10	10
Blade	10	10	10
18' Box & Hoist	10	10	10
Feed Boxes	10	10	10
Hay Trailer	10	10	10
Grain Trailer	10	10	10
Hay Shed	20	0	5
Feed Mill	20	0	5
Trench Silo	20	0	5

APPENDIX B

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Table B-1. 5 Year Average Prices 1969-74 by Week for Choice 600-700 Pound Feeder Calves - Dodge City Prices.

Month	Week	Average Price
January	1	38.15
	2	39.27
	3	39.5
	4	39.27
February	1	39.27
	2	39.67
	3	39.58
	4	39.41
March	1	39.40
	2	39.95
	3	39.87
	4	39.44
April	1	38.48
	2	38.58
	3	38.79
	4	38.93
May	1	40.48
	2	38.09
	3	38.52
	4	38.22
June	1	37.92
	2	37.74
	3	37.99
	4	38.43
July	1	38.36
	2	38.75
	3	38.85
	4	39.35
August	1	40.87
	2	41.11
	3	40.95
	4	39.29
September	1	38.87
	2	39.00
	3	38.32
	4	37.70
October	1	38.32
	2	38.87
	3	38.75
	4	38.80
November	1	38.52
	2	38.32
	3	38.60
	4	38.83
December	1	38.05
	2	38.75
	3	39.22
	4	39.55

Table B-2. 5 Year Average 1969-74 by Week Dodge City Prices for 900-1100 Pound Choice Slaughter Steers Feedlot Direct Sales.

Month	Week	Average Price
January	1	33.80
	2	34.83
	3	35.56
	4	35.63
February	1	36.03
	2	36.07
	3	35.88
	4	35.76
March	1	35.48
	2	35.50
	3	35.81
	4	35.99
April	1	35.39
	2	35.78
	3	35.90
	4	36.09
May	1	35.91
	2	35.94
	3	36.26
	4	36.56
June	1	36.39
	2	36.11
	3	36.13
	4	36.39
July	1	36.10
	2	35.96
	3	35.75
	4	35.55
August	1	36.19
	2	37.00
	3	36.80
	4	35.53
September	1	34.63
	2	34.29
	3	33.33
	4	32.38
October	1	32.74
	2	32.78
	3	32.67
	4	32.70
November	1	32.45
	2	32.20
	3	32.19
	4	32.57
December	1	32.41
	2	33.07
	3	33.81
	4	34.36

Table B-3. Price, Income, Number and Season Sold, Weight for Cull Cows Sold.

Herd	No. Sold	Aver. Price/wt[(a)]	Receipts
Individual Herd Options		$	$
Western Kansas Fall	3008	24.92	824,553
Flinthills Fall	3008	24.92	824,553
Western Kansas Spring	3008	25.54	845,068
Flinthills Spring	3008	25.54	845,068
Combined Herds Options			
Flinthills and Western Kansas Fall	3010	24.92	825,101
Flinthills and Western Kansas Spring	3010	25.54	845,629
Total	6020		1,670,730

(a) Fall cows are sold using the average of Sept.-Oct. cow prices, spring cows are sold using the average of Feb.-March cow prices. All cows sold weighing 1100 lbs.

APPENDIX C

Cost Budgets for Cowherds, Background Options, and Feedlot - For all Options

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Table C-1. Cost Data for Western Kansas Fall Calving Cowherd with Grazing Backgrounding - Individual Herd Option - 21,490 Cows - Background Phase.

Variable Costs	$
Labor	80,535.00
Hay	106,111.00
Concentrates	131,853.00
Protein	0.00
Salt, Minerals	7,222.00
Vet., Drugs	52,951.00
Fuel, Oil for Equipment	5,283.00
All Repairs	11,498.00
Insurance	1,755.00
Taxes	46,821.00
Pasture	483,749.00
Interest	6,496.00
Transport to Drylot	27,974.00
Total	962,247.00
Fixed Costs	
Insurance	1,049.00
Depreciation	40,871.00
Taxes	5,674.00
Interest	24,138.00
Total	71,732.00

Table C-2. Cost Data for Western Kansas Spring Calving Cowherd with Grazing Backgrounding - Individual Herd Option - 21,490 Cows - Background Phase.

Variable Costs	$
Labor	29,253.00
Hay	167,729.00
Concentrates	184,063.00
Protein	30,481.00
Salt, Minerals	5,502.00
Vet., Drugs, Insecticide	46,246.00
Fuel, Oil for Equipment	3,957.00
All Repairs	13,964.00
Insurance	639.00
Taxes - Livestock	46,821.00
Pasture Rents	230,948.00
Interest	5,348.00
Transport to Drylot	26,473.00
Total	791,425.00
Fixed Costs	
Insurance	1,094.00
Depreciation	49,820.00
Taxes	7,919.00
Interest	29,117.00
Total	87,950.00

Table C-3. Cost Data for Flinthills Fall Calving Cowherd with Grazing Backgrounding - Individual Herd Option - 21,490 Cows - Background Phase.

Variable Costs	$
Labor	66,716.00
Concentrates	1,396.00
Salt, Minerals	5,238.00
Vet., Drugs	30,258.00
Fuel, Oil for Equipment	1,968.00
Insurance	1,456.00
Taxes	46,821.00
Pasture	441,463.00
Interest	4,471.00
Transport to Feedlot	62,180.00
Total	661,967.00
Fixed Costs[(a)]	
Insurance	0.00
Depreciation	0.00
Taxes	0.00
Interest	0.00
Total	0.00

(a) No fixed costs determined for this option as no property owned for insurance depreciation or taxes and no capital investments for interest. All land used in backgrounding is leased and landlord makes fixed cost payments.

Table C-4. Cost Data for Flinthills Spring Calving Cowherd with Grazing Backgrounding - Individual Herd Option - 21,490 Cows - Background Phase.

Variable Costs	$
Labor	32,651.00
Hay	166,461.00
Concentrates	184,638.00
Protein	31,255.00
Salt, Minerals	5,480.00
Vet., Drugs	44,140.00
Fuel, Oil for Equipment	3,999.00
All Repairs	13,960.00
Insurance	713.00
Taxes	46,821.00
Pasture	231,561.00
Interest	5,507.00
Transport to Drylot	48,141.00
Total	815,327.00
Fixed Costs	
Insurance	1,049.00
Depreciation	49,824.00
Taxes	7,918.00
Interest	29,120.00
Total	87,911.00

Table C-5. Cost Data for Combined Cowherds Option with Grazing Backgrounding - 10,500 Cows per Herd - Background Phase.

	Flinthills Spring	Flinthills Fall	West.Kan. Fall	West.Kan. Spring
Variable Costs				
Labor	16,333.00	33,373.00	40,151.00	14,633.00
Hay	83,269.00	0.00	53,080.00	83,903.00
Concentrates	92,395.00	698.00	65,957.00	92,075.00
Protein	15,634.00	0.00	0.00	15,247.00
Salt, Minerals	2,741.00	2,620.00	3,613.00	2,752.00
Vet., Drugs	22,081.00	15,136.00	26,488.00	23,134.00
Fuel, Oil for Equip.	2,001.00	984.00	2,642.00	1,980.00
All Repairs	6,170.00	0.00	3,860.00	6,174.00
Insurance	357.00	724.00	876.00	318.00
Taxes	23,423.00	23,423.00	23,423.00	23,423.00
Pasture	116,403.00	220,834.00	241,987.00	115,528.00
Interest	2,753.00	2,237.00	3,238.00	2,394.00
Transport	24,082.00	31,105.00	13,993.00	13,243.00
Total	407,642.00	331,134.00	479,308.00	354,804.00
Fixed Costs				
Insurance	2,852.00			
Depreciation	49,831.00			
Taxes	7,921.00			
Interest	29,124.00			
Total	89,728.00			

Table C-6. Cost Data for Western Kansas Fall Calving Cowherd with Drylot Backgrounding - Individual Herd Option - 21,490 Cows - Background Phase.

Variable Costs	$
Labor	54,897.00
Hay	261,847.00
Concentrates	307,395.00
Protein	0
Salt, Minerals	4,520.00
Vet., Drug	30,258.00
Fuel, Oil for Equipment	7,564.00
All Repairs	13,152.00
Insurance	1,197.00
Taxes	46,821.00
Pasture	0
Interest	5,070.00
Transport to Drylot	18,155.00
Total	750,876.00
Fixed Costs	
Interest	27,188.00
Insurance	2,311.00
Taxes	6,391.00
Depreciation	46,874.00
Total	82,764.00

Table C-7. Cost Data for Western Kansas Spring Calving Cowherd with Drylot Backgrounding - Individual Herd Option - 21,490 Cows - Background Phase.

Variable Costs	$
Labor	45,387.00
Hay	220,836.00
Concentrates	259,255.00
Protein	0.00
Salt, Minerals	3,812.00
Vet., Drugs	30,258.00
Fuel, Oil for Equipment	6,360.00
All Repairs	12,990.00
Insurance	990.00
Taxes	46,821.00
Pasture	0.00
Interest	4,399.00
Transport to Drylot	20,424.00
Total	651,532.00
Fixed Costs	
Depreciation	46,550.00
Taxes	6,331.00
Interest	26,932.00
Insurance	2,085.00
Total	81,898.00

Table C-8. Cost Data for Flinthills Fall Calving Cowherd with Drylot Backgrounding - Individual Herd Option - 21,490 Cows - Background Phase.

Variable Costs	$
Labor	39,799.00
Hay	186,128.00
Concentrates	139,708.00
Protein	0.00
Salt, Minerals	3,213.00
Vet., Drugs	30,258.00
Fuel, Oil for Equipment	5,288.00
All Repairs	12,880.00
Insurance	868.00
Taxes	46,821.00
Pasture	0.00
Interest	3,440.00
Transport to Drylot	40,848.00
Total	509,251.00
Fixed Costs	
Depreciation	46,275.00
Taxes	6,279.00
Interest	26,713.00
Insurance	1,526.00
Total	80,793.00

Table C-9. Cost Data for Flinthills Spring Calving Cowherd with Drylot Backgrounding - Individual Herd - 21,490 Cows - Background Phase.

Variable Costs	$
Labor	49,169.00
Hay	227,134.00
Concentrates	266,654.00
Protein	0.00
Salt, Minerals	3,922.00
Vet., Drugs	30,258.00
Fuel, Oil for Equipment	6,490.00
All Repairs	12,990.00
Insurance	1,073.00
Taxes	46,821.00
Pasture	0
Interest	4,631.00
Transport to Drylot	36,764.00
Total	685,906.00
Fixed Costs	
Taxes	6,340.00
Interest	26,971.00
Insurance	2,119.00
Depreciation	46,570.00
Total	82,000.00

Table C-10. Cost Data for Combined Cowherds Option with Drylot Backgrounding - 10,500 Cows Per Herd, 43,500 Total - Background Phase.

	Flinthills Fall	Flinthills Spring	West.Kan. Fall	West.Kan. Spring
Variable Costs				
	$	$	$	$
Labor	19,909.00	24,596.00	27,461.00	22,704.00
Hay	93,107.00	113,623.00	130,985.00	110,469.00
Concentrates	109,304.00	133,389.00	153,769.00	129,688.00
Protein	0.00	0.00	0.00	0.00
Salt, Minerals	1,607.00	1,962.00	2,261.00	1,907.00
Vet., Drugs	15,136.00	15,136.00	15,136.00	15,136.00
Fuel, Oil for Equipment	2,646.00	3,248.00	3,784.00	3,182.00
All Repairs	3,604.00	3,604.00	3,604.00	3,604.00
Insurance	434.00	536.00	600.00	495.00
Taxes	23,423.00	23,423.00	23,423.00	23,423.00
Pasture	0.00	0.00	0.00	0.00
Interest	1,970.00	2,298.00	2,519.00	2,181.00
Transport to Drylot	20,434.00	18,390.00	9,082.00	10,217.00
Total	291,574.00	340,205.00	372,624.00	323,006.00
Fixed Costs				
Depreciation	50,118.00			
Taxes	6,993.00			
Interest	29,751.00			
Insurance	4,565.00			
Total	91,427.00			

Table C-11. Cost Data for Western Kansas Fall Calving Cowherd - Individual Herd Option - 21,490 Cows - All Background Options - Cowherd.

Variable Costs				$
Labor				202,178.00
Concentrates				96,275.00
Protein				323,210.00
Salt, Minerals				21,662.00
Vet., Drugs				54,155.00
Fuel, Oil for Equipment				10,881.00
Insurance				4,405.00
Pasture*				1,925,504.00
Interest				19,775.00
Misc. Supplies				78,224.00
Bull Cost				192,550.00
Total				2,928,769.00
Fixed Costs	**$**			
Insurance*	336.00			
Taxes	53,209.00	cows	2.51 per head	
	2,927.00	bulls		
	56,136.00	total		
Interest	254,657.00	cows	12.61 per head	
	27,176.00	bulls		
	281,833.00	total		
Tax-land*	Paid in pasture* rent charge along with depreciation.			
Insurance*	Cows and bulls not insured.			
Total	338,305.00			

Table C-12. Cost Data for Western Kansas Spring Calving Cowherd - Individual Herd Option - 21,490 Cows - All Background Option - Cowherd.

Variable Costs	$
Labor	202,178.00
Concentrates	96,275.00
Protein	323,210.00
Salt, Minerals	21,662.00
Vet., drugs	54,155.00
Fuel, Oil for Equipment	10,831.00
Insurance	4,405.00
Pasture*	1,925,504.00
Interest	19,775.00
Misc. Supplies	78,224.00
Bull Cost	192,550.00
Total	2,928,769.00

Fixed Costs	$		
Insurance[b]	336.00		
Taxes	53,209.00	cows	2.51 per head
	2,927.00	bulls	
	56,136.00	total	
Interest	254,647.00	cows	12.61 per head
	27,176.00	bulls	
	281,833.00	total	
Tax-land*	Paid in pasture rent charge along with depreciation.		
Insurance[b]	Cows and bulls not insured.		
Total	338,305.00		

Table C-13. Cost Data for Flinthills Fall Calving Cowherd - Individual Herd Option - 21,490 Cows - All Background Option - Cowherd.

Variable Costs	$
Labor	202,178.00
Concentrates	96,275.00
Protein	323,210.00
Salt, Minerals	21,662.00
Vet., Drugs	54,155.00
Fuel, Oil for Equipment	10,831.00
Insurance	4,405.00
Pasture*	1,776,277.00
Interest	18,766.00
Misc. Supplies	78,224.00
Bull Cost	192,550.00
Total	2,778,533.00

Fixed Costs	$		
Insurance[b]	336.00		
Taxes	53,209.00	cows	2.51 per head
	2,927.00	bulls	
	56,136.00	total	
Interest	254,657.00	cows	12.61 per head
	27,176.00	bulls	
	281,833.00	total	
Tax-land*	Paid for in pasture charge* along with depreciation.		
Insurance[b]	Cows and bulls not insured.		
Total	338,305.00		

Table C-14. Cost Data for Flinthills Spring Calving Cowherd - Individual Herd Option - 21,490 Cows - All Background Options - Cowherd.

Variable Costs				$
Labor				202,178.00
Concentrates				96,275.00
Protein				323,210.00
Salt, Minerals				21,662.00
Vet., Drugs				54,155.00
Fuel, Oil for Equipment				10,831.00
Insurance				4,405.00
Pasture				1,776,277.00
Interest				18,776.00
Misc. Supplies				78,224.00
Bull Cost				192,550.00
Total				2,778,533.00
Fixed Costs	**$**			
Insurance	336.00			
Taxes	53,209.00	cows	2.51 per head	
	2,927.00	bulls		
	56,136.00	total		
Interest	254,657.00	cows	12.61 per head	
	27,176.00	bulls		
	281,833.00	total		
Tax-land	Paid for in pasture rent along with depreciation.			
Insurance	Cows and bulls not insured.			
Total	338,305.00			

Table C-15. Cost Data for Combined Cowherds - All Options - 43,500 Cows Total, 10,500 Each Herd - Cowherd.

	West.Kan. Spring	West.Kan. Fall	Flinthills Spring	Flinthills Fall
Variable Costs				
	$	$	$	$
Labor	101,136.00	101,136.00	101,136.00	101,136.00
Concentrates	48,160.00	48,160.00	48,160.00	48,160.00
Protein	161,680.00	161,680.00	161,680.00	161,680.00
Salt, Minerals	10,836.00	10,836.00	10,836.00	10,836.00
Vet., Drugs	27,090.00	27,090.00	27,090.00	27,090.00
Fuel, Oil for Equip.	5,418.00	5,418.00	5,418.00	5,418.00
Insurance	2,204.00	2,204.00	2,204.00	2,204.00
Pasture*	963,200.00	963,200.00	888,552.00	888,552.00
Interest	9,900.00	9,900.00	9,388.00	9,388.00
Misc. Supplies	39,130.00	39,130.00	39,130.00	39,130.00
Bull Cost	96,320.00	96,320.00	96,320.00	96,320.00
Total	1,465,074.00	1465,074.00	1,389,914.00	1,389,914.00

Fixed Costs	$		$
	Per Herd		Total Four Herds
Taxes	25,998.00	cows	103,992
	1,464.00	bulls	5,856
	27,452.00	total	109,848
Interest	124,425.00	cows	497,700
	13,588.00	bulls	53,432
	138,013.00	total	552,052
Insurance*	168.00		672.00
Total	165,643.00		662,572.00

Tax-land* - Paid in pasture charge along with depreciation.
Insurance - Cows and bulls not insured.

Table C-16. Cost Data for All Integrated Options Feedlot Options, for Company Produced Steers. Feedlot

	Individual Herd Options 14,998 head	Combined Herds Options 30,008 head
Variable Costs	$	$
Silage	74,690.00	149,440.00
Hay	51,893.00	103,828.00
Concentrates	1,024,063.00	2,048,946.00
Protein	169,177.00	338,490.00
Salt, Minerals	3,899.00	7,802.00
Vet., Drugs	17,698.00	35,409.00
Fuel, Oil for Equipment	34,495.00	69,018.00
All Repairs	7,799.00	15,604.00
Insurance	1,200.00	2,401.00
Dues, fees	900.00	1,800.00
Interest	9,965.00	19,935.00
Labor	56,243.00	112,530.00
Trucking (not cattle)	23,247.00	46,512.00
Total	1,475,269.00	2,951,715.00
Fixed Costs - Annual Totals		
Taxes	11,921.00	11,921.00
Interest	50,713.00	50,713.00
Depreciation	81,113.00	81,113.00
Insurance	4,000.00	4,000.00
Total	147,747.00	147,747.00

Table C-17. Cost Data for Feedlot for Purchased Steers for Integration Options - All Herd Options - Feedlot

	Individual Herd Options 29,996 head	Combined Herd Options 60,016 head
Variable Costs	$	$
Silage	149,380.00	298,880.00
Hay	103,786.00	207,655.00
Concentrates	2,048,127.00	4,097,892.00
Protein	338,355.00	676,980.00
Salt, Minerals	7,799.00	15,604.00
Vet., Drugs	35,395.00	70,819.00
Fuel, Oil for Equipment	68,991.00	138,037.00
All Repairs	15,598.00	31,208.00
Insurance	2,400.00	4,801.00
Taxes	44,994.00	90,024.00
Dues, Fees	1,800.00	3,601.00
Interest[a]	72,170.00	144,390.00
Labor	112,485.00	225,060.00
Trucking (not cattle)	46,494.00	93,025.00
Commission	37,495.00	75,020.00
Total	3,085,269.00	6,172,996.00
Fixed Costs - Annual Total[a]		
Taxes	11,921.00[b]	11,921.00
Interest	50,713.00	50,713.00
Depreciation	81,113.00	81,113.00
Insurance	4,000.00	4,000.00
Total	147,747.00	147,747.00

(a) Includes cattle purchase

(b) For individual options total fixed costs are 1.21 times as much and for combined options they are 2.42 times to cover total length of feed period.

Table C-18. Cost Data for Feedlot for Purchased Cattle for All 100% Purchased Cattle Options - Feedlot

	Individual Herd Options 44,994 head	Combined Herd Options 90,024 head
Variable Costs	$	$
Silage	224,070.00	448,230.00
Hay	155,679.00	311,483.00
Concentrates	3,072,190.00	6,146,839.00
Protein	507,532.00	1,015,471.00
Salt, Minerals	11,698.00	23,406.00
Vet., Drugs	53,093.00	106,228.00
Fuel, Oil for Equipment	103,486.00	207,055.00
All Repairs	23,397.00	46,812.00
Insurance	3,600.00	7,201.00
Taxes	66,741.00	135,036.00
Dues, Fees	2,700.00	5,401.00
Interest[a]	107,380.00	216,585.00
Labor	168,728.00	337,590.00
Trucking (not cattle)	69,741.00	139,537.00
Commission	55,618.00	112,530.00
Total	4,625,653.00	9,259,494.00
Fixed Costs - Annual Total		
Taxes	11,921.00	11,921.00
Interest	50,713.00	50,713.00
Depreciation	81,113.00	81,113.00
Insurance	4,000.00	4,000.00
Total	147,747.00	147,747.00

[a] Includes cattle purchase.

Appendix D

Week In, Week Out of Feedlot, Number Sold or Bought, Prices Paid and Received, Total Receipts or Expenditures for All Options.

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Table D-1. Individual Integrated Option Flinthills Spring Calving Cowherd with Drylot Backgrounding.

Month	Week	No. Sold or Purchased	Wt. per head	Aver. price	Gross income or Expenditure
(1) Original Purchase			lb.	$	$
October	1	2084	650	38.32	519,083
October	3	5415	650	38.75	1,363,903
October	4	5415	650	38.80	1,365,663
November	3	2084	650	38.60	522,876
					3,771,525
(2) Sell (1) Above					
March	2	2084	1047	35.50	774,592
March	4	5415	1047	35.99	2,040,455
April	1	5415	1047	35.39	2,006,438
April	4	2084	1047	36.09	787,465
					5,608,950
(3) Put "company" cattle in Feedlot					
March	2	2084		--	
March	4	5415		--	
April	1	5415		--	
April	4	2084		--	
(4) Sell "company" cattle					
August	2	2084	1047	37.00	807,321
August	3	5415	1047	36.80	2,086,378
August	4	5415	1047	35.53	2,014,375
September	3	2084	1047	33.33	727,243
					5,635,317
(5) Purchase to replace (4) above					
August	2	2084	650	41.11	556,876
August	3	5415	650	40.95	1,441,338
August	4	5415	650	39.29	1,382,910
September	3	2084	650	38.32	519,083
					3,900,207
(6) Sell (5) above					
January	3	2084	1047	35.56	775,901
January	4	5415	1047	35.63	2,020,045
February	1	5415	1047	36.03	2,042,723
February	4	2084	1047	35.76	780,265
					5,618,934

Table D-2. Individual Integrated Option Flinthills Fall Calving Cowherd with Drylot Backgrounding.

Month	Week	No. Sold or Purchased	Wt. per head	Aver. Price Paid or Rec'd	Gross income or Expenditure
			lb.	$	$
(1) Original Purchase					
April	2	2084	650	38.58	522,605
April	3	5415	650	38.79	1,365,311
April	4	5415	650	38.93	1,370,239
May	3	2084	650	38.52	521,792
					3,779,947
(2) Sell (1) above					
September	3	2084	1047	33.33	727,243
September	4	5415	1047	32.38	1,835,786
October	1	5415	1047	32.74	1,856,196
October	4	2084	1047	32.70	713,497
					5,132,722
(3) Put "company" cattle in feedlot					
September	3	2084		--	
September	4	5415		--	
October	1	5415		--	
October	4	2084		--	
(4) Sell "company" cattle					
February	2	2084	1047	36.07	787,029
February	3	5415	1047	35.88	2,034,218
March	1	5415	1047	35.48	2,011,540
March	3	2084	1047	35.81	781,356
					5,614,143
(5) Purchase to replace (4) above					
February	2	2084	650	39.67	537,370
February	3	5415	650	39.58	1,393,117
March	1	5415	650	39.40	1,386,782
March	3	2084	650	39.87	540,079
					3,857,348
(6) Sell (5) above					
July	3	2084	1047	35.75	780,046
July	4	5415	1047	35.55	2,015,509
August	2	5415	1047	37.00	2,097,717
August	4	2084	1047	35.53	775,246
					5,668,518

Table D-3. Individual Integrated Option Western Kansas Spring Calving Cowherd with Drylot Backgrounding.

Month	Week	No. Sold or Purchased	Wt. per head	Aver. Price Paid or Rec'd	Gross income or Expenditure
			lb.	$	$
(1) Original Purchase					
October	1	2084	650	38.32	519,083
October	2	5415	650	38.87	1,368,127
October	3	5415	650	38.75	1,363,903
November	2	2084	650	38.32	519,083
					3,770,196
(2) Sell (1) above					
March	2	2084	1047	35.50	774,592
March	3	5415	1047	35.81	2,030,250
March	4	5415	1047	35.99	2,040,455
April	3	2084	1047	35.90	783,319
					5,628,616
(3) Put "company" cattle in feedlot					
March	2	2084		--	
March	3	5415		--	
March	4	5415		--	
April	3	2084		--	
(4) Sell "company" cattle					
August	1	2084	1047	36.19	789,647
August	2	5415	1047	37.00	2,097,717
August	4	5415	1047	35.53	2,014,375
September	2	2084	1047	34.29	748,190
					5,649,929
(5) Purchase to replace (4) above					
August	1	2084	650	40.87	553,625
August	2	5415	650	41.11	1,446,969
August	4	5415	650	39.29	1,382,909
September	2	2084	650	39.00	528,294
					3,911,797
(6) Sell (5) above					
January	2	2084	1047	34.83	759,972
January	3	5415	1047	35.56	2,016,076
February	1	5415	1047	36.03	2,042,723
February	3	2084	1047	35.88	782,883
					5,601,654

Table D-4. Individual Integrated Option Western Kansas Fall Calving Cowherd with Drylot Backgrounding.

Month	Week	No. Sold or Purchased	Wt. per head	Aver. Price Paid or Rec'd	Gross income or Expenditure
			lb.	$	$
(1) Original Purchase					
May	4	2084	650	38.22	517,728
June	1	5415	650	37.92	1,334,689
June	2	5415	650	37.74	1,328,354
July	1	2084	650	38.36	519,625
					3,700,396
(2) Sell (1) above					
November	1	2084	1047	32.45	708,042
November	2	5415	1047	32.20	1,825,581
November	3	5415	1047	32.19	1,825,014
December	2	2084	1047	33.07	721,570
					5,080,207
(3) Put "company" cattle in feedlot					
November	1	2084			
November	2	5415			
November	3	5415			
December	2	2084			
(4) Sell "company" cattle					
March	4	2084	1047	35.99	785,283
April	2	5415	1047	35.78	2,028,549
April	3	5415	1047	35.90	2,035,352
May	2	2084	1047	35.94	784,192
					5,633,376
(5) Purchase to replace (4) above					
March	4	2084	650	39.44	534,254
April	2	5415	650	38.58	1,357,920
April	3	5415	650	38.79	1,365,311
May	2	2084	650	38.09	515,967
					3,773,452
(6) Sell (5) above					
September	1	2084	1047	34.63	755,609
September	3	5415	1047	33.33	1,889,646
September	4	5415	1047	32.38	1,835,786
October	3	2084	1047	32.67	712,824
					5,193,883

Table D-5. Combined Cowherds Integrated Option with Drylot Backgrounding.

Month	Week	No. Sold or Purchased	Wt. per head	Aver. Price	Gross income or Expenditure
			lb.	$	$
(1) Original Purchase					-
October	1	1042	650	38.32	259,541
October	2	2709	650	38.87	684,442
October	3	2709	650	38.75	682,329
November	2	1042	650	38.32	259,541
October	1	1042	650	38.32	259,541
October	3	2709	650	38.75	682,329
October	4	2709	650	38.80	683,210
November	3	1042	650	38.60	261,438
May	4	1042	650	38.22	258,864
June	1	2709	650	37.92	667,714
June	2	2709	650	37.74	664,545
July	1	1042	650	38.36	259,812
April	2	1042	650	38.58	261,302
April	3	2709	650	38.79	683,034
April	4	2709	650	38.93	685,499
May	3	1042	650	38.52	260,896
		30008			7,514,037
(2) Sale of Original Purchase in (1)					+
March	2	1042	1047	35.50	387,296
March	3	2709	1047	35.81	1,015,687
March	4	2709	1047	35.99	1,020,793
April	3	1042	1047	35.90	391,660
March	2	1042	1047	35.50	387,296
March	4	2709	1047	35.99	1,020,793
April	1	2709	1047	35.39	1,003,775
April	4	1042	1047	36.09	393,733
November	1	1042	1047	32.45	354,021
November	2	2709	1047	32.20	913,296
November	3	2709	1047	32.19	913,012
December	2	1042	1047	33.07	360,785
September	3	1042	1047	33.33	363,622
September	4	2709	1047	32.38	918,401
October	1	2709	1047	32.74	928,612
October	4	1042	1047	32.70	356,748
		30008			10,729,530
(3) Put "company" cattle in feedlot					
March	2				
March	3				
March	4				
April	3				
March	2				
March	4				
April	1				
April	4				
November	1				
November	2				

Table D-5. (Cont'd)

Month	Week	No. Sold or Purchased	Wt. per head	Aver. Price	Gross income or Expenditure
			lb.	$	$
(3) Put "company" cattle in feedlot					
November	3				
December	2				
September	3				
September	4				
October	1				
October	4				
(4) Sell "company" cattle from (3)					
August	1	1042	1047	36.19	394,823
August	2	2709	1047	37.00	1,049,440
August	4	2709	1047	35.53	1,007,746
September	2	1042	1047	34.29	374,095
August	2	1042	1047	37.00	403,660
August	3	2709	1047	36.80	1,043,767
August	4	2709	1047	35.53	1,007,746
September	3	1042	1047	33.33	363,622
March	4	1042	1047	35.99	392,642
April	2	2709	1047	35.78	1,014,836
April	3	2709	1047	35.90	1,018,240
May	2	1042	1047	35.94	392,096
February	2	1042	1047	36.07	393,514
February	3	2709	1047	35.88	1,017,673
March	1	2709	1047	35.48	1,006,327
March	3	1042	1047	35.81	390,678
		30008			11,270,905
(5) Purchase to replace "company" cattle sold					
August	1	1042	650	40.87	276,813
August	2	2709	650	41.11	723,885
August	4	2709	650	39.29	691,838
September	2	1042	650	39.00	264,147
August	2	1042	650	41.11	278,438
August	3	2709	650	40.95	721,068
August	4	2709	650	39.29	691,838
September	3	1042	650	38.32	259,541
March	4	1042	650	39.44	267,127
April	2	2709	650	38.58	679,336
April	3	2709	650	38.79	683,034
May	2	1042	650	38.09	257,984
February	2	1042	650	39.67	268,685
February	3	2709	650	39.58	696,944
March	1	2709	650	39.40	693,775
March	3	1042	650	39.87	270,040
		30008			7,724,493

Table D-5. (Cont'd)

Month	Week	No. Sold or Purchased	Wt. per head	Aver. Price	Gross income or Expenditure
			lb.	$	$
(6) Sell Cattle Purchased in (5)					
January	2	1042	1047	34.83	379,986
January	3	2709	1047	35.56	1,008,596
February	1	2709	1047	36.03	1,021,927
February	3	1042	1047	35.88	391,441
January	3	1042	1047	35.56	387,950
January	4	2709	1047	35.63	1,010,582
February	1	2709	1047	36.03	1,021,927
February	4	1042	1047	35.76	390,132
September	1	1042	1047	34.63	377,804
September	3	2709	1047	33.33	945,346
September	4	2709	1047	32.38	918,401
October	3	1042	1047	32.67	356,421
July	3	1042	1047	35.75	390,023
July	4	2709	1047	35.55	1,008,313
August	2	2709	1047	37.00	1,049,440
August	4	1042	1047	35.53	387,623
		30008			11,045,912

Table D-6. Individual Integrated Option Western Kansas Fall Calving Cowherd with Grazing Background.

Month	Week	No. Sold or Purchased	Wt. per head	Aver. Price	Gross income or Expenditure
			lb.	$	$
(1) Original Purchase					-
June	2	2084	650	37.73	511,226
June	3	5415	650	37.99	1,337,153
August	3	5415	650	40.95	1,441,338
August	4	2084	650	39.29	532,222
					3,821,939
(2) Sell (1) above					+
November	3	2084	1047	34.19	702,369
November	4	5415	1047	32.57	1,846,558
January	4	5415	1047	35.63	2,020,045
February	1	2084	1047	36.03	786,156
					5,355,128
(3) Put "company" steers in feedlot					-
November	3	2084			
November	4	5415			
January	4	5415			
February	1	2084			
(4) Sell "company" steers					+
April	2	2084	1047	35.78	780,701
April	4	5415	1047	36.09	2,046,124
June	3	5415	1047	36.13	2,048,392
July	1	2084	1047	36.10	787,683
					5,662,900
(5) Purchase to replace (4) above					-
April	2	2084	650	38.58	519,132
April	4	5415	650	38.93	1,370,329
June	3	5415	650	37.99	1,337,153
July	1	2084	650	38.36	516,172
					3,742,786
(6) Sell (5) above					+
September	3	2084	1047	33.33	727,243
October	1	5415	1047	32.74	1,856,196
November	4	5415	1047	32.57	1,846,558
December	2	2084	1047	33.07	721,570
					5,151,567

Table D-7. Individual Integrated Option Western Kansas Spring Calving Cowherd with Grazing Backgrounding.

Month	Week	No. Sold or Purchased	Wt. per head	Aver. Price	Gross income or Expenditure
			lb.	$	$
(1) Original Purchase					-
October	2	5415	650	38.87	1,368,127
November	1	2084	650	38.52	521,792
November	4	5415	650	38.83	1,366,719
December	1	2084	650	38.05	515,425
					3,772,063
(2) Sell (1) above					+
March	3	5415	1047	35.81	2,030,250
April	2	2084	1047	35.78	780,701
May	1	5415	1047	35.91	2,035,919
May	2	2084	1047	35.94	784,192
					5,631,062
(3) Put "company" steers in feedlot					-
March	3	5415			
April	2	2084		--	0
May	1	5415			
May	2	2084			
(4) Sell "company" steers					+
August	2	5415	1047	37.00	2,097,717
September	1	2084	1047	34.63	755,609
September	4	5415	1047	32.38	1,835,786
October	2	2084	1047	32.78	715,243
					5,404,355
(5) Purchase to replace (4) above					-
August	2	5415	650	41.11	1,446,969
September	1	2084	650	38.87	523,035
September	4	5415	650	37.70	1,326,946
October	2	2084	650	38.87	523,035
					3,819,985
(6) Sell (5) above					+
January	1	5415	1047	33.80	1,916,293
February	2	2084	1047	36.07	787,029
March	1	5415	1047	35.48	2,011,540
March	3	2084	1047	35.81	781,356
					5,496,218

Table D-8. Individual Integrated Option Flinthills Fall Calving Cowherd with Grazing Backgrounding.

Month	Week	No. Sold or Purchased	Wt. per head	Aver. Price	Gross income or Expenditure
			lb.	$	$
(1) Original Purchase					-
April	3	2084	650	38.79	525,449
May	1	5415	650	40.48	1,424,795
May	2	5415	650	38.09	1,340,673
June	1	2084	650	37.92	513,664
					3,804,581
(2) Sell (1) above					+
September	4	2084	1047	32.38	706,515
October	2	5415	1047	32.78	1,858,464
October	3	5415	1047	32.67	1,852,227
November	2	2084	1047	32.20	702,587
					5,119,793
(3) Put "company" steers in feedlot					-
September	4	2084			
October	2	5415			0
October	3	5415			
November	2	2084			
(4) Sell "company" steers					+
February	4	2084	1047	35.76	780,265
March	1	5415	1047	35.48	2,011,540
March	2	5415	1047	35.50	2,012,674
April	1	2084	1047	35.39	772,191
					5,576,670
(5) Purchase to replace (4) above					-
February	4	2084	650	39.41	528,294
March	1	5415	650	39.40	1,386,782
March	2	5415	650	39.95	1,406,140
April	1	2084	650	38.48	521,250
					3,842,466
(6) Sell (5) above					+
August	1	2084	1047	36.19	789,647
August	2	5415	1047	37.00	2,097,717
August	3	5415	1047	36.80	2,086,378
September	2	2084	1047	34.29	748,190
					5,721,932

Table D-9. Individual Integrated Option Flinthills Spring Calving Cowherd with Grazing Backgrounding.

Month	Week	No. Sold or Purchased	Wt. per head	Aver. Price	Gross income or Expenditure
			lb.	$	$
(1) Original Purchase					-
October	2	5415	650	38.87	1,368,127
November	2	2084	650	38.32	519,083
November	4	5415	650	38.83	1,366,719
December	2	2084	650	38.75	524,908
					3,778,837
(2) Sell (1) above					+
March	3	5415	1047	35.81	2,030,250
April	3	2084	1047	35.90	783,319
May	1	5415	1047	35.91	2,035,919
May	3	2084	1047	36.26	791,174
					5,640,662
(3) Put "company" steers in feedlot					-
March	3	5415			
April	3	2084		--	--
May	1	5415			
May	3	2084			
(4) Sell "company" steers					+
August	3	5415	1047	36.80	2,086,378
September	2	2084	1047	34.29	748,190
September	4	5415	1047	32.38	1,835,786
October	2	2084	1047	32.78	715,243
					5,385,397
(5) Purchase to replace (4) above					-
August	3	5415	650	40.95	1,441,338
September	2	2084	650	39.00	524,784
September	4	5415	650	37.70	1,326,946
October	2	2084	650	38.87	523,035
					3,816,103
(6) Sell (5) above					+
January	4	5415	1047	35.63	2,020,045
February	3	2084	1047	35.88	782,883
March	1	5415	1047	35.48	2,011,540
March	3	2084	1047	35.81	781,356
					5,595,824

Table D-10. Combined Cowherds Integrated Option with Grazing Backgrounding.

Month	Week	No. Sold or Purchased	Wt. per head	Aver. Price	Gross income or Expenditure
			lb.	$	$
(1) Original Purchase					-
October	2	2709	650	38.87	684,442
November	2	1042	650	38.32	259,541
November	4	2709	650	38.83	683,738
December	2	1042	650	38.75	262,454
April	3	1042	650	38.79	262,725
May	1	2709	650	40.48	712,792
May	2	2709	650	38.09	670,708
June	1	1042	650	37.92	256,832
June	2	1042	650	37.74	255,613
June	3	2709	650	37.99	668,947
August	3	2709	650	40.95	721,068
August	4	1042	650	39.29	266,111
October	2	2709	650	38.87	684,442
November	1	1042	650	38.52	260,896
November	4	2709	650	38.83	683,738
December	1	1042	650	38.05	257,713
					7,591,760
(2) Sell Cattle (1) above					+
March	3	2709	1047	35.81	1,015,687
April	3	1042	1047	35.90	391,660
May	1	2709	1047	35.91	1,018,524
May	3	1042	1047	36.26	395,587
September	4	1042	1047	32.38	353,257
October	2	2709	1047	32.78	929,747
October	3	2709	1047	32.67	926,627
November	2	1042	1047	32.20	351,294
November	3	1042	1047	32.19	351,185
November	4	2709	1047	32.57	923,790
January	4	2709	1047	35.63	1,010,582
February	1	1042	1047	36.03	393,078
March	3	2709	1047	35.81	1,015,687
April	2	1042	1047	35.78	390,350
May	1	2709	1047	35.91	1,018,524
May	2	1042	1047	35.94	392,096
					10,877,675
(3) Put "company" cattle in feedlot					
March	3	2709			0
April	3	1042			
May	1	2709			
May	3	1042			
September	4	1042			
October	2	2709			
October	3	2709			
November	2	1042			
November	3	1042			
November	4	2709			

Table D-10. (Cont'd)

Month	Week	No. Sold or Purchased	Wt. per head	Aver. Price	Gross income or Expenditure
			lb.	$	$
January	4	2709			
February	1	1042			
March	3	2709			
April	2	1042			
May	1	2709			
May	2	1042			
(4) Sell "company" steers					+
August	3	2709	1047	36.80	1,043,767
September	2	1042	1047	34.29	374,095
September	4	2709	1047	32.38	918,401
October	2	1042	1047	32.78	357,621
February	4	1042	1047	35.76	390,132
March	1	2709	1047	35.48	1,006,327
March	2	2709	1047	35.50	1,006,895
April	1	1042	1047	35.39	386,096
April	2	1042	1047	35.78	390,350
April	4	2709	1047	36.09	1,023,629
June	3	2709	1047	36.13	1,024,763
July	1	1042	1047	36.10	393,842
August	2	2709	1047	37.00	1,049,440
September	1	1042	1047	34.63	377,804
September	4	2709	1047	32.38	918,401
October	2	1042	1047	32.78	357,621
					11,019,179
(5) Purchase to replace (4) above					-
August	3	2709	650	40.95	721,068
September	2	1042	650	39.00	264,147
September	4	2709	650	37.70	663,840
October	2	1042	650	38.87	263,267
February	4	1042	650	39.41	266,924
March	1	2709	650	39.40	693,775
March	2	2709	650	39.95	703,460
April	1	1042	650	38.48	260,625
April	2	1042	650	38.58	261,302
April	4	2709	650	38.93	685,499
June	3	2709	650	37.99	668,947
July	1	1042	650	38.36	259,812
August	2	2709	650	41.11	723,885
September	1	1042	650	38.87	263,267
September	4	2709	650	37.70	663,840
October	2	1042	650	38.87	263,267
					7,626,925

Table D-10. (Cont'd)

Month	Week	No. Sold or Purchased	Wt. per head	Aver. Price	Gross income or Expenditure
			lb.	$	$
(6) Sell (5) above					
January	1	2709	1047	33.80	958,677
February	2	1042	1047	36.07	393,514
March	1	2709	1047	35.48	1,006,327
March	3	1042	1047	35.81	390,678
September	3	1042	1047	33.33	363,622
October	1	2709	1047	32.74	928,612
November	4	2709	1047	32.57	923,790
December	2	1042	1047	33.07	360,785
August	1	1042	1047	36.19	394,823
August	2	2709	1047	37.00	1,049,440
August	3	2709	1047	36.80	1,043,767
September	2	1042	1047	34.29	374,095
January	4	2709	1047	35.63	1,010,582
February	3	1042	1047	35.88	391,441
March	1	2709	1047	35.48	1,006,327
March	3	1042	1047	35.81	390,678
					10,987,158

Table D-11. 100% Purchased Option Flinthills Fall Calving Cowherd with Drylot Backgrounding.

Month	Week	No. Sold or Purchased	Wt. per head	Aver. Price	Gross income or Expenditure
			lb.	$	$
(1) Original Purchase					-
April	2	2084	650	38.58	533,605
April	3	5415	650	38.79	1,365,311
April	4	5415	650	38.93	1,370,239
May	3	2084	650	38.52	521,792
					3,779,947
(2) Sell (1) above					+
September	3	2084	1047	33.33	727,243
September	4	5415	1047	32.38	1,835,786
October	1	5415	1047	32.74	1,856,196
October	4	2084	1047	32.70	713,497
					5,132,722
(3) Purchase in lieu of "company" cattle					-
September	3	2084	650	38.32	519,083
September	4	5415	650	37.70	1,326,946
October	1	5415	650	38.32	1,348,768
October	4	2084	650	38.80	525,585
					3,720,382
(4) Sell (3) above					+
February	2	2084	1047	36.07	787,029
February	3	5415	1047	35.88	2,034,218
March	1	5415	1047	35.48	2,011,540
March	3	2084	1047	35.81	781,356
					5,614,143
(5) Purchase to replace (4) above					-
February	2	2084	650	39.67	537,370
February	3	5415	650	39.58	1,393,117
March	1	5415	650	39.40	1,386,782
March	3	2084	650	39.87	540,079
					3,857,348
(6) Sell (5) above					+
July	3	2084	1047	35.75	780,046
July	4	5415	1047	35.55	2,015,509
August	2	5415	1047	37.00	2,097,717
August	4	2084	1047	35.53	775,246
					5,668,518

Table D-12. 100% Purchased Option Flinthills Spring Calving Cowherd with Drylot Backgrounding.

Month	Week	No. Sold or Purchased	Wt. per head	Aver. Price	Gross income or Expenditure
			lb.	$	$
(1) Original Purchase					-
October	1	2084	650	38.32	519,083
October	3	5415	650	38.75	1,363,903
October	4	5415	650	38.80	1,365,663
November	3	2084	650	38.60	522,876
					3,771,525
(2) Sell (1) above					+
March	2	2084	1047	35.50	774,592
March	4	5415	1047	35.99	2,040,455
April	1	5415	1047	35.39	2,006,438
April	4	2084	1047	36.09	787,465
					5,608,950
(3) Purchase in lieu of "company" cattle					-
March	2	2084	650	39.95	541,163
March	4	5415	650	39.44	1,388,189
April	1	5415	650	38.48	1,354,400
April	4	2084	650	38.93	527,346
					3,811,098
(4) Sell (3) above					+
August	2	2084	1047	37.00	807,321
August	3	5415	1047	36.80	2,086,378
August	4	5415	1047	35.53	2,014,375
September	3	2084	1047	33.33	727,243
					5,635,317
(5) Purchase to replace (4) above					-
August	2	2084	650	41.11	556,876
August	3	5415	650	40.95	1,441,338
August	4	5415	650	39.29	1,382,910
September	3	2084	650	38.32	519,083
					3,900,207
(6) Sell (5) above					+
January	3	2084	1047	35.56	775,901
January	4	5415	1047	35.63	2,020,045
February	1	5415	1047	36.03	2,042,723
February	4	2084	1047	35.76	780,265
					5,618,934

Table D-13. 100% Purchased Option Western Kansas Fall Calving Cowherd with Drylot Backgrounding.

Month	Week	No. Sold or Purchased	Wt. per head	Aver. Price	Gross income or Expenditure
			lb.	$	$
(1) Original Purchase					-
May	4	2084	650	38.22	517,728
June	1	5415	650	37.92	1,334,689
June	2	5415	650	37.74	1,328,354
July	1	2084	650	38.36	519,625
					3,700,396
(2) Sell (1) above					+
November	1	2084	1047	32.45	708,042
November	2	5415	1047	32.20	1,825,581
November	3	5415	1047	32.19	1,825,014
December	2	2084	1047	33.07	721,570
					5,080,207
(3) Purchase in lieu of "company" cattle					-
November	1	2084	650	38.52	521,792
November	2	5415	650	38.32	1,348,768
November	3	5415	650	38.60	1,358,624
December	2	2084	650	38.75	524,908
					3,754,092
(4) Sell (3) above					+
March	4	2084	1047	35.99	785,283
April	2	5415	1047	35.78	2,028,549
April	3	5415	1047	35.90	2,035,352
May	2	2084	1047	35.94	784,192
					5,633,376
(5) Purchase to replace (4) above					-
March	4	2084	650	39.44	534,254
April	2	5415	650	38.58	1,357,920
April	3	5415	650	38.79	1,365,311
May	2	2084	650	38.09	515,967
					3,773,452
(6) Sell (5) above					+
September	1	2084	1047	34.63	755,609
September	3	5415	1047	33.33	1,889,646
September	4	5415	1047	32.38	1,835,786
October	3	2084	1047	32.67	712,842
					5,193,883

Table D-14. 100% Purchased Option Western Kansas Spring Calving Cowherd with Drylot Backgrounding.

Month	Week	No. Sold or Purchased	Wt. per head	Aver. Price	Gross income or Expenditure
			lb.	$	$
(1) Original Purchase					-
October	1	2084	650	38.32	519,083
October	2	5415	650	38.87	1,368,127
October	3	5415	650	38.75	1,363,903
November	2	2084	650	38.32	519,083
					3,251,633
(2) Sell (1) above					+
March	2	2084	1047	35.50	774,592
March	3	5415	1047	35.81	2,030,250
March	4	5415	1047	35.99	2,040,455
April	3	2084	1047	35.90	783,319
					5,628,616
(3) Purchase in lieu of "company" cattle					-
March	2	2084	650	39.95	541,163
March	3	5415	650	39.87	1,403,324
March	4	5415	650	39.44	1,388,189
April	3	2084	650	38.79	525,449
					3,858,125
(4) Sell (3) above					+
August	1	2084	1047	36.19	789,647
August	2	5415	1047	37.00	2,097,717
August	4	5415	1047	35.53	2,014,375
September	2	2084	1047	34.29	748,190
					5,649,929
(5) Purchase to replace (4) above					-
August	1	2084	650	40.87	553,625
August	2	5415	650	41.11	1,446,969
August	4	5415	650	39.29	1,382,909
September	2	2084	650	39.00	528,294
					3,911,797
(6) Sell (5) above					+
January	2	2084	1047	34.83	759,972
January	3	5415	1047	35.56	2,016,076
February	1	5415	1047	36.03	2,042,723
February	3	2084	1047	35.88	782,883
					5,601,654

Table D-15. 100% Purchased Option Combined Cowherds with Drylot Backgrounding.

Month	Week	No. Sold or Purchased	Wt. per head	Aver. Price	Gross income or Expenditure
			lb.	$	$
(1) Original Purchase					-
October	1	1042	650	38.32	259,541
October	2	2709	650	38.87	684,442
October	3	2709	650	38.75	682,329
November	2	1042	650	38.32	259,541
October	1	1042	650	38.32	259,541
October	3	2709	650	38.75	682,329
October	4	2709	650	38.80	683,210
November	3	1042	650	38.60	261,438
May	4	1042	650	38.22	258,864
June	1	2709	650	37.92	667,714
June	2	2709	650	37.74	664,545
July	1	1042	650	38.36	259,812
April	2	1042	650	38.58	261,302
April	3	2709	650	38.79	683,034
April	4	2709	650	38.93	685,499
May	3	1042	650	38.52	260,896
					7,514,037
(2) Sell cattle bought (1) above					+
March	2	1042	1047	35.50	387,296
March	3	2709	1047	35.81	1,015,687
March	4	2709	1047	35.99	1,020,793
April	3	1042	1047	35.90	391,660
March	2	1042	1047	35.50	387,296
March	4	2709	1047	35.99	1,020,793
April	1	2709	1047	35.39	1,003,775
April	4	1042	1047	36.09	393,733
November	1	1042	1047	32.45	354,021
November	2	2709	1047	32.20	913,296
November	3	2709	1047	32.19	913,012
December	2	1042	1047	33.07	360,785
September	3	1042	1047	33.33	363,622
September	4	2709	1047	32.38	918,401
October	1	2709	1047	32.74	928,612
October	4	1042	1047	32.70	356,748
					10,729,530
(3) Purchase in lieu of "company" cattle					
March	2	1042	650	39.95	270,581
March	3	2709	650	39.87	702,051
March	4	2709	650	39.44	694,479
April	3	1042	650	38.79	262,725
March	2	1042	650	39.95	270,581
March	4	2709	650	39.44	694,479
April	1	2709	650	38.48	677,575
April	4	1042	650	38.93	263,673

Table D-15. (Cont'd)

Month	Week	No. Sold or Purchased	Wt. per head	Aver. Price	Gross income or Expenditure
			lb.	$	$
November	1	1042	650	38.52	678,279
November	2	2709	650	38.32	260,896
November	3	2709	650	38.60	679,688
December	2	1042	650	38.75	262,454
September	3	1042	650	38.32	259,541
September	4	2709	650	37.70	663,840
October	1	2709	650	38.32	674,758
October	4	1042	650	38.80	262,792
					7,578,392
(4) Sell cattle purchased in (3)					
August	1	1042	1047	36.19	394,823
August	2	2709	1047	37.00	1,049,440
August	4	2709	1047	35.53	1,007,746
September	2	1042	1047	34.29	374,095
August	2	1042	1047	37.00	403,660
August	3	2709	1047	36.80	1,043,767
August	4	2709	1047	35.53	1,007,746
September	3	1042	1047	33.33	363,622
March	4	1042	1047	35.99	392,642
April	2	2709	1047	35.78	1,014,836
April	3	2709	1047	35.90	1,018,240
May	2	1042	1047	35.94	392,096
February	2	1042	1047	36.07	393,514
February	3	2709	1047	35.88	1,017,673
March	1	2709	1047	35.48	1,006,327
March	3	1042	1047	35.81	390,678
					11,270,905
(5) Purchase to replace cattle sold in (4)					
August	1	1042	650	40.87	276,813
August	2	2709	650	41.11	723,885
August	4	2709	650	39.29	691,838
September	2	1042	650	39.00	264,147
August	2	1042	650	41.11	278,438
August	3	2709	650	40.95	721,068
August	4	2709	650	39.29	691,838
September	3	1042	650	38.32	259,541
March	4	1042	650	39.44	267,127
April	2	2709	650	38.58	679,336
April	3	2709	650	38.79	683,034
May	2	1042	650	38.09	257,984
February	2	1042	650	39.67	268,685
February	3	2709	650	39.58	696,944
March	1	2709	650	39.40	693,775
March	3	1042	650	39.87	270,040
					7,724,493

Table D-15. (Cont'd)

Month	Week	No. Sold or Purchased	Wt. per head	Aver. Price	Gross income or Expenditure
			lb.	$	$
(6) Sell cattle purchased in (5)					
January	2	1042	1047	34.83	379,986
January	3	2709	1047	35.56	1,008,596
February	1	2709	1047	36.03	1,021,927
February	3	1042	1047	35.88	391,441
January	3	1042	1047	35.56	387,950
January	4	2709	1047	35.63	1,010,582
February	1	2709	1047	36.03	1,021,927
February	4	1042	1047	35.76	390,132
September	1	1042	1047	34.63	377,804
September	3	2709	1047	33.33	945,346
September	4	2709	1047	32.38	918,401
October	3	1042	1047	32.67	356,421
July	3	1042	1047	35.75	390,023
July	4	2709	1047	35.55	1,008,313
August	2	2709	1047	37.00	1,049,440
August	4	1042	1047	35.53	387,623
					11,045,912

Table D-16. 100% Purchased Option Western Kansas Fall Calving Cowherd with Grazing Backgrounding.

Month	Week	No. Sold or Purchased	Wt. per head	Aver. Price	Gross income or Expenditure
			lb.	$	$
(1) Original Purchase					
June	2	2084	650	37.74	511,226
June	3	5415	650	37.99	1,328,354
August	3	5415	650	40.95	1,441,338
August	4	2084	650	39.29	532,222
					3,813,140
(2) Sell (1) above					
November	3	2084	1047	32.19	702,369
November	4	5415	1047	32.57	1,846,558
January	4	5415	1047	35.63	2,020,045
February	1	2084	1047	36.03	786,156
					5,355,128
(3) Purchase in lieu of "company" cattle					
November	3	2084	650	38.60	522,876
November	4	5415	650	38.83	1,366,719
January	4	5415	650	39.27	1,382,206
February	1	2084	650	39.27	531,951
					3,803,752
(4) Sell (3) above					
April	2	2084	1047	35.78	780,701
April	4	5415	1047	36.09	2,046,124
June	3	5415	1047	36.13	2,048,392
July	1	2084	1047	36.10	787,683
					5,662,900
(5) Purchase to replace (4) above					
April	2	2084	650	38.58	522,605
April	4	5415	650	38.93	1,370,239
June	3	5415	650	37.99	1,337,153
July	1	2084	650	38.36	519,625
					3,749,622
(6) Sell (5) above					
September	3	2084	1047	33.33	727,243
October	1	5415	1047	32.74	1,856,196
November	4	5415	1047	32.57	1,846,558
December	2	2084	1047	33.07	721,570
					5,151,567

Table D-17. 100% Purchased Option Flinthills Spring Calving Cowherd with Grazing Backgrounding.

Month	Week	No. Sold or Purchased	Wt. per head	Aver. Price	Gross income or Expenditure
			lb.	$	$
(1) Original Purchase					
October	2	5415	650	38.87	1,368,127
November	2	2084	650	38.32	519,083
November	4	5415	650	38.83	1,366,719
December	2	2084	650	38.75	524,908
					3,778,837
(2) Sell (1) above					
March	3	5415	1047	35.81	2,030,250
April	3	2084	1047	35.90	783,319
May	1	5415	1047	35.91	2,035,919
May	3	2084	1047	36.26	791,174
					5,640,662
(3) Purchase in lieu of "company" cattle					
March	3	5415	650	39.87	1,403,324
April	3	2084	650	38.79	525,449
May	1	5415	650	40.48	1,424,795
May	3	2084	650	38.52	527,792
					3,881,360
(4) Sell (3) above					
August	3	5415	1047	36.80	2,086,378
September	2	2084	1047	34.29	748,190
September	4	5415	1047	32.38	1,835,786
October	2	2084	1047	32.78	715,243
					5,385,597
(5) Purchase to replace (4) above					
August	3	5415	650	40.95	1,441,338
September	2	2084	650	39.00	528,294
September	4	5415	650	37.70	1,326,946
October	2	2084	650	38.87	526,533
					3,823,111
(6) Sell (5) above					
January	4	5415	1047	35.63	2,020,045
February	3	2084	1047	35.88	782,883
March	1	5415	1047	35.48	2,011,540
March	3	2084	1047	35.81	781,356
					5,595,824

Table D-18. 100% Purchased Option Flinthills Fall Calving Cowherd with Grazing Backgrounding.

Month	Week	No. Sold or Purchased	Wt. per head	Aver. Price	Gross income or Expenditure
			lb.	$	$
(1) Original Purchase					
April	3	2084	650	38.79	525,449
May	1	5415	650	40.48	1,424,795
May	2	5415	650	38.09	1,340,673
June	1	2084	650	37.92	513,664
					3,804,581
(2) Sell (1) above					
September	4	2084	1047	32.38	706,515
October	2	5415	1047	32.78	1,858,464
October	3	5415	1047	32.67	1,852,227
November	2	2084	1047	32.20	702,587
					5,119,793
(3) Purchase in lieu of "company" cattle					
September	4	2084	650	37.70	510,684
October	2	5415	650	38.87	1,368,127
October	3	5415	650	38.75	1,363,903
November	2	2084	650	38.32	519,083
					3,761,797
(4) Sell (3) above					
February	4	2084	1047	35.76	780,265
March	1	5415	1047	35.48	2,011,540
March	2	5415	1047	35.50	2,012,674
April	1	2084	1047	35.39	772,191
					5,576,670
(5) Purchase to replace (4) above					
February	4	2084	650	39.41	533,848
March	1	5415	650	39.40	1,386,782
March	2	5415	650	39.95	1,406,140
April	1	2084	650	38.48	521,250
					3,848,020
(6) Sell (5) above					
August	1	2084	1047	36.19	789,647
August	2	5415	1047	37.00	2,097,717
August	3	5415	1047	36.80	2,086,378
September	2	2084	1047	34.29	715,243
					5,688,985

Table D-19. 100% Purchased Option Western Kansas Spring Calving Cowherd with Grazing Backgrounding.

Month	Week	No. Sold or Purchased	Wt. per head	Aver. Price	Gross income or Expenditure
			lb.	$	$
(1) Original Purchase					
October	2	5415	650	38.87	1,368,127
November	1	2084	650	38.52	521,792
November	4	5415	650	38.83	1,366,719
December	1	2084	650	38.05	515,425
					3,772,063
(2) Sell (1) above					
March	3	5415	1047	35.81	2,030,250
April	2	2084	1047	35.78	780,701
May	1	5415	1047	35.91	2,035,919
May	2	2084	1047	35.94	784,192
					5,631,062
(3) Purchase in lieu of "company" cattle					
March	3	5415	650	39.87	1,403,324
April	2	2084	650	38.58	522,605
May	1	5415	650	40.48	1,424,795
May	2	2084	650	38.09	515,967
					3,866,691
(4) Sell (3) above					
August	2	5415	1047	37.00	2,097,717
September	1	2084	1047	34.63	755,609
September	4	5415	1047	32.38	1,835,786
October	2	2084	1047	32.78	715,243
					5,404,355
(5) Purchase to replace (4) above					
August	2	5415	650	41.11	1,446,969
September	1	2084	650	38.87	526,533
September	4	5415	650	37.70	1,326,946
October	2	2084	650	38.87	526,533
					3,826,981
(6) Sell (5) above					
January	1	5415	1047	33.80	1,916,293
February	2	2084	1047	36.07	787,029
March	1	5415	1047	35.48	2,011,540
March	3	2084	1047	35.81	781,356
					5,496,218

Table D-20. 100% Purchased Option Combined Cowherds with Grazing Backgrounding.

Month	Week	No. Sold or Purchased	Wt. per head	Aver. Price	Gross income or Expenditure
			lb.	$	$
(1) Original Purchase					-
October	2	2709	650	38.87	684,442
November	1	1042	650	38.52	260,896
November	4	2709	650	38.83	683,738
December	1	1042	650	38.05	257,713
October	2	2709	650	38.87	684,442
November	2	1042	650	38.32	259,541
November	4	2709	650	38.83	683,738
December	2	1042	650	38.75	262,454
June	2	1042	650	37.74	255,613
June	3	2709	650	37.99	668,947
August	3	2709	650	40.95	721,068
August	4	1042	650	39.29	266,111
April	3	1042	650	38.79	262,725
May	1	2709	650	40.48	712,792
May	2	2709	650	38.09	670,708
June	1	1042	650	37.92	256,832
					7,591,760
(2) Sale of Original Purchase					+
March	3	2709	1047	35.81	1,015,687
April	2	1042	1047	35.78	390,350
May	1	2709	1047	35.91	1,018,524
May	2	1042	1047	35.94	392,096
March	3	2709	1047	35.81	1,015,687
April	3	1042	1047	35.90	391,660
May	1	2709	1047	35.91	1,018,524
May	3	1042	1047	36.26	395,587
November	3	1042	1047	32.19	351,185
November	4	2709	1047	32.57	923,790
January	4	2709	1047	35.63	1,010,582
February	1	1042	1047	36.03	393,078
September	4	1042	1047	32.38	353,257
October	2	2709	1047	32.78	929,747
October	3	2709	1047	32.67	926,627
November	2	1042	1047	32.20	351,294
					10,877,675
(3) Purchase in lieu of "company" cattle					
March	3	2709	650	39.87	702,051
April	2	1042	650	38.58	261,302
May	1	2709	650	40.48	712,792
May	2	1042	650	38.09	257,984
March	3	2709	650	39.87	702,051
April	3	1042	650	38.79	262,725
May	1	2709	650	40.48	712,792
May	3	1042	650	38.52	260,896

Table D-20. (Cont'd)

Month	Week	No. Sold or Purchased	Wt. per head	Aver. Price	Gross income or Expenditure
			lb.	$	$
November	3	1042	650	38.60	261,438
November	4	2709	650	38.83	683,738
January	4	2709	650	39.27	691,486
February	1	1042	650	39.27	265,976
September	4	1042	650	37.70	255.342
October	2	2709	650	38.87	684,442
October	3	2709	650	38.75	682,329
November	2	1042	650	38.32	259,541
					7,656,885
(4) Sale of cattle in (3)					
August	2	2709	1047	37.00	1,049,440
September	1	1042	1047	34.63	377,804
September	4	2709	1047	32.38	918,401
October	2	1042	1047	32.78	357,621
August	3	2709	1047	36.80	1,043,767
September	2	1042	1047	34.29	374,095
September	4	2709	1047	32.38	918,401
October	2	1042	1047	32.78	357,621
April	2	1042	1047	35.78	390,350
April	4	2709	1047	36.09	1,023,629
June	3	2709	1047	36.13	1,024,763
July	1	1042	1047	36.10	393,842
February	4	1042	1047	35.76	390,132
March	1	2709	1047	35.48	1,006,327
March	2	2709	1047	35.50	1,006,895
April	1	1042	1047	35.39	386,096
					11,019,184
(5) Purchase to replace cattle sold in (4)					
August	2	2709	650	41.11	723,885
September	1	1042	650	38.87	263,267
September	4	2709	650	37.70	663,840
October	2	1042	650	38.87	263,267
August	3	2709	650	40.95	721,068
September	2	1042	650	39.00	264,147
September	4	2709	650	37.70	663,840
October	2	1042	650	38.87	263,267
April	2	1042	650	38.58	261,302
April	4	2709	650	38.93	685,499
June	3	2709	650	37.99	668,947
July	1	1042	650	38.36	259,812
February	4	1042	650	39.41	266,924
March	1	2709	650	39.40	693,775
March	2	2709	650	39.95	703,460
April	1	1042	650	35.39	239,696
					7,605,996

Table D-20. (Cont'd)

Month	Week	No. Sold or Purchased	Wt. per week	Aver. Price	Gross income or Expenditure
			lb.	$	$
(6) Sell of cattle purchased in (5)					
January	1	2709	1047	33.80	958,677
February	2	1042	1047	36.07	393,514
March	1	2709	1047	35.48	1,006,327
March	3	1042	1047	35.81	390,678
January	4	2709	1047	35.63	1,010,582
February	3	1042	1047	35.88	391,441
March	1	2709	1047	35.48	1,006,327
March	3	1042	1047	35.81	390,678
September	3	1042	1047	33.33	363,622
October	1	2709	1047	32.74	928,612
November	4	2709	1047	32.57	923,790
December	2	1042	1047	33.07	360,785
August	1	1042	1047	36.19	394,823
August	2	2709	1047	37.00	1,049,440
August	3	2709	1047	36.80	1,043,767
September	2	1042	1047	34.29	374,095
					10,987,158

ECONOMIC POSSIBILITIES OF BACKWARD VERTICAL INTEGRATION BY A KANSAS COMMERCIAL FEEDLOT COMPANY

by

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The object of this study was to determine economic gains accruing to a Kansas commercial feedlot company through backward vertical integration. Integrated management systems in which the feedlot controlled the backgrounding and cowherds to provide a portion of the cattle fed yearly by the feedlot were compared to systems using the same production time schedules in which 100 percent of the steers were purchased at feedlot placement weight.

Enterprise budgets and Linear Programming were used to compare alternative options and select as the optimum option that system which maximized net returns. Twenty options were developed, ten involving integration, and ten which did not involve integration. The integrated options consisted of both spring and fall calving cowherds located in both the Flinthils and Western Kansas to give four cowherd options (referred to as individual options) and a fifth one where it is possible to simultaneously own one each of the four cowherd arrangements (referred to as the combined option). Two backgrounding systems were considered, i.e. grazing and drylot. Grazing involved the use of wheat pasture, native grass, or irrigated improved grass when in season. The two backgrounding systems were programmed with each of the five cowherd options to provide the ten integrated options. In no case was the integrated option set up to produce the entire annual feeder cattle requirements. That would have necessitated a staggered calving schedule which was considered impractical from an animal science standpoint. The number of cows programmed in integrated options was such as to fill the feedlot at one particular time of the year. At other times some company produced feeder cattle would be available and some feeder cattle would be purchased. The ten non-integrated options were developed using the same

production time schedules as the integrated options.

The feedlot was assumed to be located in Western Kansas and was a 20,000 head one time capacity commercial lot operating at 75 percent capacity. The feeding period was 147 days allowing a turnover rate of 2.47. Each integrated individual option was programmed to provide 14,998 cattle for one feeding period per year (with the remainder purchased), and the combined options for two feeding periods each year (with the remainder purchased).

Indicated as the optimum option by the Linear Programming was the integrated individual herd of a Flinthills spring calving cowherd combined with drylot backgrounding. Returns to the optimum option were $16.46 per head greater than the option in which steers were all purchased on the same time schedule as those produced under the optimum option.

In addition to the possibility of increasing profits, backward vertical integration provides the possibility of supplying a feedlot with cattle of known performance characteristics.

The results of this study, however, should not be interpreted as indicating final definite proof that backwards vertical integration would always be a method by which a Kansas commercial feedlot could increase its net income. Actual operations face risks and uncertainties not accounted for in this study, such as weather, gain, sickness, and accident, and also they can be more flexible in rates of gain and length of production period in order to be able to take advantage of the price cycles for feeder steers and fed steers. The results do support the conclusion that backward vertical integration would be a management system deserving close consideration and investigation by a Kansas commercial feedlot company.