1973

Effects of Confinement Feeding Systems on Beef Cattle Production

R.D. Goodrich
University of Minnesota

J.C. Meiske
University of Minnesota

R.E. Smith
University of Minnesota

H.E. Henke
University of Minnesota

Effects of Confinement Feeding Systems on Beef Cattle Production

R. D. Goodrich, J. C. Meiske, R. E. Smith, H. E. Hanke and L. K. Lindor
University of Minnesota, St. Paul

Introduction

Several factors have stimulated interest in housing systems for feedlot cattle. Some of these factors are (1) the desire to eliminate problems associated with the use of bedding, (2) the desire to decrease the labor required for feeding, bedding and manure handling, (3) the need to develop effective pollution control measures and (4) the desire to know the effects that housing systems may have on the performance and carcass characteristics of feedlot cattle. The objectives of the trials reported herein were (1) to study the influence of housing systems on the performance of finishing steer calves and (2) to study the effect of animal density on feedlot performance. The housing systems studied are described below:

Conventional open shed. Cattle in this facility are fed from an outside fence-line bunk. The entire outside lot is paved with concrete. There is no concrete in the building, but the area under roof is bedded and a manure pack is allowed to develop. When used at 30, 20 and 17 sq. ft. of shed (bedded area) per head, space availabilities in the outside lot are 50, 33 and 28 sq. ft. per head. Thus at these densities, the total areas available are 80, 53 and 45 sq. ft. per head. Runoff from the lot is collected in a detention pond. Investment costs per head for this facility are approximately $105, $70 and $60 when used at 30, 20 and 17 sq. ft. of shed area per head.

Manure scrape unit. Cattle in this system are confined under roof in an open pole shed. The feed bunk is located along the open south side, under the roof overhang. The entire floor is concrete. It slopes away from the feed bunk at 1 in. per ft. for 6 ft. 8 in. in a flat 10 ft. center alley. The floor then slopes upward at 1/4 in. per ft. for 23 ft. to the north wall. The area to the north of the alley is bedded and a manure pack is allowed to develop. The center alley is scraped every 1 to 2 weeks, and all manure is handled as solid waste. When the cattle are housed at 30, 20 and 17 sq. ft. of bedded area per head, areas available in the center alley and feeding area are 24, 16 and 14 sq. ft. per head. Thus, total areas available are 54, 36 and 31 sq. ft. per head when the cattle are housed at 30, 20 and 17 sq. ft. of bedded area per head. Investment costs per head of capacity are approximately $120, $80 and $68 when used at 30, 20 and 17 sq. ft. of bedded area per head.

Cold slat unit. The open, slatted floor confinement shed is 40 ft. deep and has a 16 ft. wide feeding alley that runs the full length of the building next to the back (north) wall. A cable fence along the open south side confines the cattle to the slatted floor area which runs the length of the building and extends inward to the feed bunk for about 23 feet. The slats are 5½ in. wide with 1½ in. between slats. The liquid manure pit is 8 ft. deep. The cattle are

---

Presented at the Seventeenth Annual Cattle Feeders Day, November 2, 1973.

fed from a feed bunk which is located along the inner edge of the slatted floor area. Investment costs per head of capacity are approximately $173, $115 and $97 when used at 25, 17 and 14 sq. ft. of slatted area per head.

Warm slat unit. The enclosed, insulated, slatted floor confinement building has a 48 ft. wide slatted floor area, which is divided into two equal sized lots by a mechanical feeding system and feed bunk down the center of the floor area. The slatted floor consists of slats that are 5½ in. wide at the top, with 1½ in. between slats. The manure pit under the slatted floor is 8 ft. deep and extends 4 ft. outside the walls along both sides of the building. Exhaust fans which remove air from the pit are located outside the building. The building is insulated with 4 in. of fiberglass in the walls and 6 in. in the ceiling. There are 7 ft. 3 in. by 5 ft. 6 in. swing-up insulated panels in the outside walls which are opened in the summer to allow air movement in addition to that provided by exhaust fans in the walls.

Fresh air is admitted into the building through an insulated plenum chamber in the attic. This triangular chamber is 8 ft. wide and 7 ft. high. Fresh air is drawn into the housing area when air is expelled by the exhaust fans in the walls and manure pit. Outside air enters the chamber through louvers located at each end of the chamber. A heating unit is located at one end of the chamber. When the heating unit is in operation, all incoming air is drawn through it. Investment costs per head of capacity are approximately $255, $170 and $143 when used at 25, 17 and 14 sq. ft. of slatted area per head.

Open lot. The open lot unit has a dirt mound that is 5 ft. 6 in. high and 32 ft. wide at the top. The mound is located near the middle of the lot. A windbreak fence runs along the center of the top of the mound. The mound and fence are at right angles to prevailing winds (it lays NE to SW). The cattle have access to the mound and either side of the windbreak fence. The fence is 10 ft. high and constructed using 6 in. posts spaced 7 ft. 6 in., center to center. Four 2 by 6 in. purlins are used to support 1 by 10 in. vertical boards. The boards are spaced to provide a fence that is about 15% open. The cattle are fed from a fence-line bunk. There is an 8 ft. wide concrete strip next to the feed bunk and a 12 ft. wide asphalt strip between the concrete and the base of the mound. The cattle have no shelter other than that provided by the fence. Investment cost per head of capacity is approximately $25 when used at 250 sq. ft. of lot area per head.

Procedure

Hereford steer calves were obtained from the same herd in each of 3 years. With the exception of the open lot, each system was divided to provide two areas of equal size. Densities studied in these areas and other information concerning the three trials are shown below:

	Year		
	1970	1971	1972
Number of calves	324	340	340
Initial weight, lb.	435	431	424.5
Length of feeding period, days	256	234	241
Bunk space/head, inches	10.7	9.0	9.0
Densities, sq. ft./head			
Slatted floor facilities	25,17	25,14	25,14
Bedding facilities	30,20	30,17	30,17
Open lot	250	250	250

The square footages shown for the bedded units (conventional and manure scrape) represent the bedded area only. Bunk space was equalized at 10.7 or 9.0 inches per head by blocking off part of the feed bunk where necessary.

A ration composed of corn silage, high moisture shelled corn and supplement was fed to all lots in amounts that resulted in some feed being available at all times. The feeding program was as follows:

Up to about 700 lb.: High moisture shelled corn and corn silage full-fed at a ratio of 40 parts corn to 60 parts corn silage (wet basis) plus 1 lb. of supplement per head daily. All cattle were changed to the higher energy ration at the same time.

700 lb. to market: High moisture shelled corn and corn silage full-fed at a ratio of 80 parts corn to 20 parts corn silage (wet basis) plus 1 lb. of supplement per head daily.

The compositions of the supplements used in the 3 years are shown in table 1. When the cattle weighed 750 lb., they were provided with 20 mg. of stilbestrol daily. This was accomplished by substituting 10 lb. of stilbestrol premix (2 grams per lb.) for 10 lb. ground shelled corn in the formulation shown in table 1. The high moisture shelled corn fed in 1970, 1971 and 1972 had dry matter contents of 75.8, 71.3 and 73.7%, respectively. The corn silage had dry matter contents of 40.0, 42.9 and 42.6%, respectively.

Results

Feedlot performance data are presented in table 3 and carcass characteristics of the steers from the various housing systems in table 4.

1. Differences appear to exist among systems and among densities within systems relative to animals not completing the trials (died or removed, table 3). Close consideration fails to reveal any cause for these circumstances.

2. Average daily gains were highest for cattle housed at 25 or 17 sq. ft. per head in the warm slat unit (2.56 and 2.52 lb., respectively), followed closely by the cattle housed at 17 sq. ft. in the manure scrape unit (2.49 lb.). Cattle

housed at 14 sq. ft. per head in the warm slat unit averaged 2.36 lb. per day gain. A decrease in average daily gain was observed for cattle in the cold slat unit as density increased from 25 to 17 to 14 sq. ft. per head (2.43, 2.36 and 2.30 lb.).

Cattle housed at 20 or 17 sq. ft. of bedded area per head in the manure scrape unit gained faster (2.44 and 2.49 lb., respectively) than cattle housed at 30 sq. ft. per head (2.36 lb. per day). Average daily gains were 2.36, 2.26 and 2.30 lb. for cattle housed at 30, 20 and 17 sq. ft. of bedded area per head in the conventional facility. Cattle in the open lot had the slowest average daily gains (2.21 lb.).

3. Daily feed intakes tended to be greatest for cattle housed in the manure scrape, cold slat and warm slat units.

4. Amounts of feed per 100 lb. of gain (table 3) appeared to be influenced more by density in the slatted facilities (cold slat and warm slat) than in the bedded facilities (manure scrape and conventional). Amounts of feed (dry matter) required for 100 lb. of gain averaged 577 lb. for cattle housed in the warm slat unit, 581 lb. for cattle in the manure scrape unit, 603 lb. for cattle in the cold slat unit, 605 lb. for cattle in the conventional unit and 635 lb. for cattle in the open lot.

5. Carcass data presented in table 4 indicated that cattle housed in the manure scrape, cold slat and warm slat units were fatter than cattle housed in the conventional unit or open lot.

6. Economic calculations are presented in table 5 for feeders that keep their lots filled to capacity. The calculations are based on the densities used in these trials. Costs and returns were projected for units of equal size (to contain 200 head each at the lowest density studied). Housing costs are representative of a producer's cost to construct facilities for housing 200 head of cattle at the lower densities. Thus, high density units were assigned the same total housing cost as for low density units. An annual charge equal to 12% of the initial cost of each building was used to cover depreciation, repair, taxes and insurance. The number of days of feeding in each system to obtain 575 lb. of gain divided into 365 days per year gives the turnover rate per year. Lot capacity multiplied by the turnover rate indicates the number of cattle that could be fed per lot at 100% efficiency (each lot with the stated number of cattle all days of the year). While it is recognized that 100% efficiency would be difficult to attain, a producer should set his goal as close to 100% as possible to maximize returns. This is particularly true for those units having a high fixed cost per head.

Operational charges on a per head basis are shown in tables 5 and 6. These include bedding charges for conventional, manure scrape and open lot systems and heat and additional electricity for operating the warm confinement unit. Differences in labor charges per head are related to bedding and the periodic scraping of the facility (conventional, manure scrape and open lot).

In all instances, returns to labor and management favored the highest densities studied. Thus, even though performance was depressed in some units at the higher densities, returns continued to increase with each increase in density. Of course, there will be a density at which performance is decreased to such an extent that returns are reduced.

Projected returns to labor and management at the highest densities studied were:

Feedlot filled to capacity at all times		One lot per year	
Unit	$	Unit	$
Manure scrape	20,825	Manure scrape	11,755
Cold slat	17,308	Conventional	10,442
Conventional	16,902	Cold slat	10,210
Warm slat	15,863	Open lot	10,032
Open lot	14,869	Warm slat	8,168

Projected returns to management at the highest densities studied were:

Feedlot filled to capacity at all times		One lot per year	
Unit	$	Unit	$
Manure scrape	13,459	Manure scrape	7,000
Cold slat	12,306	Cold slat	6,783
Warm slat	11,583	Conventional	6,206
Conventional	10,722	Open lot	5,796
Open lot	10,127	Warm slat	5,312

When evaluating these data, a feedlot operator should consider if he is dependent on hired labor or if the feedlot is operated largely with family labor. If a majority of the labor is hired, the rankings under return to management apply. If a majority of the labor is supplied by the family, rankings under return to labor and management apply. Also, differences in returns among systems of $1000 or less should not be considered economically significant, since small variations in bedding costs, depreciation rates or other items may cause returns to vary by this amount.

Summary and Conclusions

Monetary charges have been identified herein that are related to the housing systems studied. These charges must be considered in evaluating the systems, but, because many of the charges vary from farm to farm and from year to year, producers are urged to apply their own cost estimates. The costs and returns used in these studies do not necessarily reflect current prices but are based on the economic conditions that existed at the time the studies were conducted. These costs and returns provide valid comparisons of the various housing systems; they are not intended to show the profitability of cattle feeding.

Three trials were conducted with Hereford calves fed in five housing systems. The systems studied were (1) conventional open shed with an outside concrete lot, (2) manure pack confinement with scrape alley, (3) cold slat confinement, (4) warm slat confinement and (5) open lot with a dirt mound and windbreak fence. With the exception of the open lot, all systems were divided to provide two animal densities. All cattle were started on trial in November and fed a ration composed of high moisture shelled corn, corn silage and supplement.

More animals died or were removed for poor health in the manure scrape facility than any other system. Close observation failed to reveal any reason for this circumstance. Average daily gains were reduced in the cold slat and warm slat systems as density was increased. In the cold slat system average daily gains were 2.43, 2.36 and 2.30 lb. for cattle housed at 25, 17 and 14 sq. ft., respectively. In the warm slat system average daily gains were 2.56, 2.52 and 2.36 lb. for cattle housed at 25, 17 and 14 sq. ft., respectively. Small differences in average daily gains were observed as density increased in the conventional facility (2.36, 2.26 and 2.30 lb. per day for cattle housed at 30, 20 and 17 sq. ft. of bedded area per head, respectively). Average daily gains increased as density increased in the manure scrape unit (2.36, 2.44 and 2.49 lb. per day for cattle housed at 30, 20 and 17 sq. ft. of bedded area per head, respectively).

Feed efficiency data reflected the rates of gain of cattle in the various systems--slow gaining cattle required more feed per 100 lb. of gain than cattle which gained at a more rapid rate. Feed costs per 100 lb. gain were $12.88, $12.98, $13.45, $13.55 and $14.17 for cattle housed in the warm slat, manure scrape, cold slat, conventional and open lot, respectively. The ranking of the systems with regard to feed cost per 100 lb. gain was consistent during the 3 years that this study was conducted. Carcass data suggested that those animals housed in the manure scrape, cold slat and warm slat units were fatter than those in the conventional and open lot systems.

Economic calculations showed that, when the lots were used at 100% of capacity, returns favored the high density conditions in all instances. Under the high density conditions (14 sq. ft. of slatted area per head in cold and warm slat units and 17 sq. ft. of bedded area per head in conventional and manure scrape units) returns per year to labor and management favored cattle housed in the manure scrape unit followed by those in the cold slat, conventional, warm slat and open lot units. With medium density conditions (17 sq. ft. slatted area per head in the warm slat and cold slat units and 20 sq. ft. bedded area per head in the conventional and manure scrape units) returns per year to labor and management favored cattle housed in the manure scrape unit followed in order by the cold slat, warm slat and conventional units (open lot considered only as high density unit). With the low density conditions (25 sq. ft. slatted area per head in warm slat and cold slat units and 30 sq. ft. bedded area per head in conventional and manure scrape units) returns per year to labor and management favored cattle housed in the cold slat unit followed in order by conventional, manure scrape and warm slat units.

When only one lot is fed per year economic calculations showed that returns to labor and management at high density were highest for the manure scrape unit followed in order by conventional, cold slat, open lot and warm slat units. At

medium density, returns to labor and management again favored the manure scrape unit followed in order by cold slat, conventional and warm slat units. At low density and one lot per year they ranked conventional, manure scrape, cold slat and warm slat.

Based on these data, it appears that there is little justification for incurring the expense of a high-cost unit such as the warm slat facility, especially for the one-lot-per-year feeder. If a higher depreciation rate than the one used herein was used, the warm slat unit may not have an advantage over any of the units, in spite of the advantage in cattle performance that it has permitted.

Table 1. Supplement Composition

Ingredient	1970	1971 and 1972
	%	%
Ground shelled corn	42.05	40.6
Urea	25.00	24.7
Ground limestone	19.00	13.5
Dicalcium phosphate	2.50	9.5
Vitamin A premix (13,600,000 IU/lb.)	0.18	0.22
Stilbestrol premix (2 g/lb.)[a]	0.50	0.50
Elemental sulfur	0.45	0.45
Trace mineralized salt	10.00	10.0
Vitamin D premix (750,000 IU/lb.)	0.32	0.40
Antibiotic premix (50 g/lb.)[b]	--	0.14

[a]To provide 10 mg. of stilbestrol per pound of supplement.

[b]To provide 70 mg. of chlortetracycline per pound of supplement.

Table 2. Analyses of Feeds

Feed	Dry matter, %			Crude protein, % of dry matter		
	1970	1971	1972	1970	1971	1972
Corn silage	40.0	42.9	42.6	7.7	7.4	7.0
High moisture corn grain	75.8	71.3	73.7	10.5	10.7	10.2
Supplement	96.2	92.1	92.7	70.2	73.5	80.4

Table 3. Least Squares Means Showing the Effects of Housing System and Density on Feedlot Performance

Item	Type of housing	Conventional			Manure scrape			Cold slat			Warm slat			Open lot
	Density, sq. ft./head	30	20	17	30	20	17	25	17	14	25	17	14	250
No. of steers		86	44	90	61	30	62	71	34	71	108	51	127	136
Initial weight, lb.		433	436	428	433	434	428	433	435	436	433	422	434	431
Final weight, lb.[a,b]		1006	985	988	1007	1030	1033	1024	1009	994	1055	1034	1009	969
Avg. daily gain, lb.		2.36	2.26	2.30	2.36	2.44	2.49	2.43	2.36	2.30	2.56	2.52	2.36	2.21
% of conventional		100	96	97	100	103	106	103	100	97	108	107	100	94
Avg. daily feed, lb. of dry matter														
Corn grain		9.59	9.49	9.58	9.46	9.59	9.77	9.76	9.68	9.64	9.96	9.93	9.51	9.48
Corn silage		3.44	3.40	3.45	3.46	3.54	3.54	3.64	3.57	3.62	3.61	3.58	3.48	3.57
Supplement		0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Total		13.96	13.82	13.96	13.85	14.06	14.24	14.33	14.18	14.19	14.50	14.44	13.92	13.98
Feed/100 lb of gain, lb. of dry matter														
Corn grain		408	426	415	404	388	399	400	416	418	393	390	404	431
Corn silage		145	151	149	147	143	144	148	153	156	142	141	147	161
Supplement		40	42	40	41	38	38	39	40	40	37	36	40	43
Total		593	619	604	592	569	581	587	609	614	572	567	591	635
% of conventional		100	104	102	100	96	98	99	103	104	96	96	100	107
Number of animals not completing the trials														
Died		1	0	0	4	2	3	0	1	2	1	2	3	2
Removed		3	1	0	2	1	1	1	1	0	0	0	1	5
Total		4	1	0	6	3	4	1	2	2	1	2	4	7
% died and removed		4.4	2.2	0	9.0	9.1	6.1	1.4	5.6	2.7	0.9	3.9	3.1	4.9
Bedding/head/day, lb.		2.09	2.05	2.02	2.37	2.28	2.19	–	–	–	–	–	–	2.81[c]
														0.08

[a] Fed for an average of 243 days.

[b] Adjusted to a dressing percentage of 63.4 so as to remove differences in final weights due to fill and dirt on the hide.

[c] Pounds of corn cobs per steer per day. All other values are pounds of baled straw per steer per day.

Table 4. Least Squares Means Showing the Effects of Housing System and Density on Carcass Characteristics

Item	Type of housing	Conventional			Manure scrape			Cold slat			Warm slat			Open lot
	Density, sq.ft./head	30	20	17	30	20	17	25	17	14	25	17	14	250
No. of carcasses		86	44	90	61	30	62	71	34	71	108	51	127	136
Marbling score[a,b]		5.08	4.94	4.98	5.08	5.01	5.01	4.95	5.01	4.81	4.77	4.54	4.78	5.14
Conformation score[c]		13.77	13.68	13.86	13.64	13.64	13.94	13.97	13.87	14.04	13.86	14.01	14.03	13.85
KHP, %[d]		2.94	2.91	2.92	2.98	2.98	2.92	2.96	3.30	3.00	3.06	3.16	3.00	2.86
Rib eye area, sq. in.		11.32	11.78	11.62	11.36	11.44	11.44	11.46	11.63	11.70	11.39	11.46	11.68	11.32
Fat depth, in.		0.62	0.58	0.59	0.67	0.70	0.70	0.66	0.68	0.70	0.74	0.76	0.64	0.59
Quality grade[c]		11.67	11.56	11.48	11.77	11.64	11.69	11.46	11.55	11.35	11.21	10.86	11.26	11.87
Yield grade[e]		3.44	3.19	3.27	3.56	3.61	3.59	3.51	3.56	3.52	3.75	3.80	3.38	3.34
Carcass Value/100 lb., $		52.17	52.06	51.98	52.27	52.14	52.19	51.96	52.05	51.85	51.71	51.36	51.76	52.37

[a] All carcass data adjusted to a carcass weight of 638.4 pounds.

[b] Marbling score: traces, 3: slight, 4: small, 5: modest, 6.

[c] Conformation score and quality grade: high Good, 11; low Choice, 12; average Choice, 13; high Choice, 14.

[d] Kidney, heart and pelvic fat expressed as a percentage of carcass weight.

[e] Yield grades range from 1 to 5. Low values indicate a high percentage of retail cuts.

Table 5 Economic Calculations for Feeders that Keep Their Lots Filled to Capacity

Type of housing	Conventional			Manure scrape			Cold slot			Warm slot			Open lot
Space allowed, sq ft/head	30	20	17	30	20	17	25	17	14	25	17	14	250
Cost of housing unit, $[d]	21,000[a]	21,000[a]	21,000[a]	24,000[a]	24,000[a]	24,000[a]	34,500[b]	34,500[b]	34,500[b]	51,000[b]	51,000[b]	51,000[b]	8,825[c]
Machinery and equipment costs, $	9,600	11,200	11,200	9,600	11,200	11,200	9,600	11,200	11,200	9,600	11,200	11,200	11,200
Housing cost/head, $	105	70	60	120	80	68	173	115	97	255	170	143	25
Avg daily gain, lb	2.36	2.26	2.30	2.36	2.44	2.49	2.43	2.36	2.30	2.56	2.52	2.36	2.21
Feed/100 lb gain, lb	593	619	604	592	569	581	587	609	614	572	567	591	635
Carcass grade	11.7	11.6	11.5	11.8	11.6	11.7	11.5	11.6	11.4	11.2	10.9	11.3	11.9
Animal costs and returns, $/head													
Carcass value	333.05	332.35	331.84	333.69	332.86	333.18	331.71	332.29	331.01	330.12	327.88	330.44	334.33
Purchase of feeders (432 lb x 42.05/100 lb)[e]	181.66	181.66	181.66	181.66	181.66	181.66	181.66	181.66	181.66	181.66	181.66	181.66	181.66
Gross margin	151.39	150.69	150.18	152.03	151.20	151.52	150.05	150.63	149.35	148.46	146.22	148.78	152.67
Manure credit	3.78	3.78	3.78	3.41	3.41	3.41	5.01	5.01	5.01	5.01	5.01	5.01	1.70
Gross return	155.17	154.47	153.96	155.44	154.61	154.93	155.06	155.64	154.36	153.47	151.23	153.79	154.37
Expenses, $/head													
Housing charge[f]	8.40	5.83	4.89	9.60	6.19	5.16	13.44	9.20	7.95	18.89	12.75	11.44	2.14
Equipment[g]	5.76	4.67	3.91	5.76	4.33	3.61	5.61	4.48	3.87	5.33	4.20	3.77	4.08
Feed for 575 lb gain[h]	76.36	79.75	77.62	76.19	73.02	74.63	75.32	78.14	78.60	73.43	72.74	75.96	81.48
Pretrial feed and bedding	4.67	4.67	4.67	4.67	4.67	4.67	4.67	4.67	4.67	4.67	4.67	4.67	4.67
Bedding[i]	3.83	3.55	4.00	4.33	3.81	4.20	-	-	-	-	-	-	5.47
Interest on animal[j]	10.08	10.45	10.30	10.08	9.78	9.59	9.82	10.08	10.30	9.37	9.52	10.08	10.68
Materials handling	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Veterinary and medicines	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50
Insurance and utilities	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	5.09	4.13	3.47	1.00
Death loss	4.25	4.25	4.25	4.25	4.25	4.25	4.25	4.25	4.25	4.25	4.25	4.25	4.25
Trucking to market	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00
Total	124.85	124.67	121.14	126.38	117.55	117.61	124.61	122.32	121.14	131.53	122.76	124.14	124.27
Return to labor and management, $/head	30.32	29.80	32.82	29.06	37.06	37.32	30.45	33.32	33.22	21.94	28.47	29.65	30.10
Labor charge, $/head	12.00	12.00	12.00	13.20	13.20	13.20	9.60	9.60	9.60	8.00	8.00	8.00	9.60
Return/head, $	18.32	17.80	20.82	15.86	23.86	24.12	20.85	23.72	23.62	13.94	20.47	21.65	20.50
No. of head (lot capacity)[k]	200	300	353	200	300	353	200	300	357	200	300	357	353
No. days feeding for 575 lb gain	244	254	250	244	236	231	237	244	250	225	228	244	260
Rate of turnover[l]	1.50	1.44	1.46	1.50	1.55	1.58	1.54	1.50	1.46	1.62	1.60	1.50	1.40
No. head fed/year	300	432	515	300	465	558	308	450	521	324	480	535	494
Return/lot, $	5496	7690	10722	4758	11095	13459	6422	10674	12306	4517	9826	11583	10127
Return to labor and management, $/lot[m]	9096	12874	16902	8718	17233	20825	9379	14994	17308	7109	13666	15863	14869

Footnotes on page 58.

Table 6. Economic Calculations for Feeders that Feed One Lot Per Year

Type of housing	Conventional			Manure scrape			Cold slot			Warm slot			Open lot
Space allowed, sq ft/head	30	20	17	30	20	17	25	17	14	25	17	14	250
Cost of housing unit, $	21,000[a]	21,000[a]	21,000[a]	24,000[a]	24,000[a]	24,000[a]	34,500[b]	34,500[b]	34,500[b]	51,000[b]	51,000[b]	51,000[b]	8,825[c]
Machinery and equipment cost, $[d]	8,000	9,600	9,600	8,000	9,600	9,600	8,000	9,600	9,600	8,000	9,600	9,600	9,600
Housing cost/head, $	105	70	60	120	80	68	173	115	97	255	170	143	25
Avg daily gain, lb	2.36	2.26	2.30	2.36	2.44	2.49	2.43	2.36	2.30	2.56	2.52	2.36	2.21
Feed/100 lb gain, lb	593	619	604	592	569	581	587	609	614	572	567	591	635
Carcass grade	11.7	11.6	11.5	11.8	11.6	11.7	11.5	11.6	11.4	11.2	10.9	11.3	11.9
Animal costs and returns, $/head													
Carcass value	333.05	332.35	331.84	333.69	332.86	333.18	331.71	332.29	331.01	330.12	327.88	330.44	334.33
Purchase of feeders (432.0 lb x 42.05/100 lb)[e]	181.66	181.66	181.66	181.66	181.66	181.66	181.66	181.66	181.66	181.66	181.66	181.66	181.66
Gross margin	151.39	150.69	150.18	152.03	151.20	151.52	150.05	150.63	149.35	148.46	146.22	148.78	152.67
Manure credit	3.78	3.78	3.78	3.41	3.41	3.41	5.01	5.01	5.01	5.01	5.01	5.01	1.70
Gross return	155.17	154.47	153.96	155.44	154.61	154.93	155.06	155.64	154.36	153.47	151.23	153.79	154.37
Expenses, $/head													
Housing charge[f]	12.60	8.40	7.14	14.40	9.60	8.16	20.70	13.80	11.60	30.60	20.40	17.14	3.00
Equipment[g]	7.20	5.76	4.90	7.20	5.76	4.90	7.20	5.76	4.84	7.20	5.76	4.84	4.90
Feed for 575 lb gain[h]	76.36	79.75	77.62	76.19	73.02	74.63	75.32	78.14	78.60	73.43	72.74	75.96	81.48
Pretrial feed and bedding	4.67	4.67	4.67	4.67	4.67	4.67	4.67	4.67	4.67	4.67	4.67	4.67	4.67
Bedding[i]	3.83	3.55	4.00	4.33	3.81	4.20	-	-	-	-	-	-	5.47
Interest on animal[j]	10.08	10.45	10.30	10.08	9.78	9.59	9.82	10.08	10.30	9.37	9.52	10.08	10.68
Materials handling	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Veterinary and medicines	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50	3.50
Insurance and utilities	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	5.09	4.13	3.47	1.00
Death loss	4.25	4.25	4.25	4.25	4.25	4.25	4.25	4.25	4.25	4.25	4.25	4.25	4.25
Trucking to market	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00
Total	130.49	128.33	124.38	132.62	122.39	121.90	133.46	128.20	125.76	145.11	131.97	130.91	125.95
Return to labor and management, $/head	24.68	26.14	29.58	22.82	32.22	33.03	21.60	27.44	28.60	8.36	19.26	22.88	28.42
Labor charge, $/head	12.00	12.00	12.00	13.20	13.20	13.20	9.60	9.60	9.60	8.00	8.00	8.00	12.00
Return/head, $	12.68	14.14	17.58	9.62	19.02	19.83	12.00	17.84	19.00	0.36	11.26	14.88	16.42
No. of head (lot capacity)	200	300	353	200	300	353	200	300	357	200	300	357	353
No. days feeding for 575 lb gain[k]	244	254	250	244	236	231	237	244	250	225	228	244	260
Return/lot, $	2536	4242	6206	1924	5706	7000	2400	5352	6783	72	3378	5312	5796
Return to labor and management, $/lot[l]	4936	7842	10442	4564	9666	11755	4320	8232	10210	1672	5778	8168	10032

Footnotes on page 58.

Footnotes to tables 5 and 6

[a] Cost of a building to hold 200 head at 30 sq. ft./head or 300 head at 20 sq. ft./head or 353 head at 17 sq. ft./head.

[b] Cost of a building to hold 200 head at 25 sq. ft./head or 300 head at 17 sq. ft./head or 357 head at 14 sq. ft./head.

[c] Cost to build an open lot to hold 353 head at 250 sq. ft./head.

[d] Machinery and equipment investment calculated at $8,000 for 200 head, $9,600 for 300 head, or $11,200 for 500 head.

[e] Ranch pay weight plus trucking ($176.76 + $4.90).

[f] 12% of initial cost of housing unit (depreciation, repair, taxes and insurance) divided by number of head marketed.

[g] 18% of machinery and equipment investment divided by number of head marketed.

[h] Feed prices: Corn grain, $2.36/100 lb. dry matter; corn silage, $1.43/100 lb. of dry matter; supplement, $3.95/100 lb. of dry matter (cost of ingredients plus $7/ton for mixing).

[i] Straw and corn cobs charged at $15/ton.

[j] Interest calculated at 7½% of initial cost for total days (26-day pretrial + an average 243-day feedlot period).

[k] Days of feeding to produce 575 lb. gain.

[l] (table 5) Number of groups that could be fed in 365 days.

[l] (table 6) Return to labor and management/head times the potential number of cattle marketed/year.

[m] (table 5) Return to labor and management/head times the potential number of cattle marketed/year.