FINANCIAL ASPECTS OF FEEDLOT MANAGEMENT IN NEW ZEALAND

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SUMMARY

The economic viability of a beef cattle feedlot in New Zealand is influenced by several major variables. These are discussed under the titles of Capital, Feed Costs, Growth Rates, Cattle Values and Operating Costs. The variables not only possess considerable range, and in some cases a high degree of fluidity with time, but also can be assembled in many combinations, all of which produce different economic results. It is concluded that a greater awareness of the important influence of these variables, in respect to their possible different combinations, is required if the feedlot is to produce financial benefits.

INTRODUCTION

Recent interest in feedlotting has led to a number of feasibility studies proposing exploratory investment in feedlots, or an extension of established small enterprises.

Visitors to such pilot schemes or enterprises frequently grasp upon one factor of production to make an on-the-spot judgement of the economics of the enterprise. Such judgements must be a source of annoyance and frustration to the host because it is highly likely that the visitor's decision has been based upon one of the variables which, because of its particular relationship with other factors, does not, by itself, portray a realistic assessment of the total enterprise. Feed costs, though very important, have been misused in this manner.

Feedlotting is still new in New Zealand and up till the present showed insufficient profit to warrant large-scale establishment. McClatchy (1969) and Greig (1971) estimated returns to capital of only 2 to 3%. Therefore, only limited information is available relating to local establishment costs and the performance of cattle. However, it is apparent that because of the range of environments, the diversity of feed sources, and some specialization of markets, a very large range of choice exists for the planner who must spend time optimizing the integration of those variables pertinent to the niche where a

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feedlot is to be established. The discussion in this paper endeavours to aid selection and subsequent planning of the feedlot enterprise.

CAPITAL

The total capital required for feedlots is influenced by size of feedlot, feed supply concepts, lot design, and the type of cattle. The efficiency with which capital is used will depend upon management skill, annual turnover ratio of cattle, efficiency of facility utilization, feed costs, animal performance, market values, and operating costs.

Capital requirement is divided into two main categories:

(1) *Fixed Capital:*
   (a) Fixed assets—land and buildings, yards, races, silos, water supply, etc.;
   (b) Plant—vehicles, trucks, tractors, trailers, feeding-out equipment, feed mill, maintenance equipment, and scales.

(2) *Variable Capital:*
   (a) Stock;
   (b) Working capital.

FIXED CAPITAL

Fixed capital of various types of feedlot has been calculated by McClatchy (1969) and Greig (1971), and each of their estimates relates to a certain type of feedlot with a given capacity. The estimates calculated by these authors are shown in Table 1 where the values are expressed as a cost per head of capacity.

The range of $110.40 to $423.92 per head of capacity indicates the level of capital intensity invested in facilities which must ultimately be expressed as an annual interest charge per animal. More recent feasibility studies by commercial investors

TABLE 1: COMPARISON OF FIXED CAPITAL REQUIREMENTS RELATIVE TO CAPACITY OF FEEDLOT

Example	*Fixed Capital* $	*Capacity of Feedlot* (*No. cattle*)	*Fixed Capital per Head of Capacity* $
McClatchy	160 015	620	258.09
(1969)	110 400	1 000	110.40
Greig	254 350	600	423.92
(1971)	171 750	600	286.25

within New Zealand indicate the cost per head of capacity will probably range from $35 to $90 per beast, but this will depend upon size of unit, degree of plant automation, and inventiveness of the planner. This means that for a 5 000 beast capacity unit, an investment of $175 000 to $450 000 would be required.

For any given design there appears to be some economy in scale in fixed capital requirements. This effect is illustrated in United States data published by Dietrich (1969) and discussed by Dyer and O'Mary (1972). The results are given in Table 2.

TABLE 2: FIXED INVESTMENT ($US) PER HEAD OF CAPACITY[1] (Texas and Oklahoma Feedlots 1966-7)

Capacity	< 1 000	1 000-1 999	2 000-4 999	5 000-9 999	> 10 000	Total
Fixed Investment	$43.33	$49.72	$46.81	$31.65	$32.76	$35.29

[1] Source: Dietrich (1969).

The fixed capital per head of capacity can be modified by the number of groups of cattle passing through the feedlot, and the total number of days in the year in which the feedlot is fully utilized. These are termed annual turnover ratio and efficiency of facility utilization, respectively.

Annual Turnover Ratio

The effect of the annual turnover ratio on the relationship of fixed capital to the feedlot capacity is shown in Table 3. Here it is assumed that the feedlot capacity is 5 000 cattle and that sufficient animals are bought in each time to fill the unit. Of course, should the number of cattle taken in be less than the feedlot capacity, then the turnover ratio would be less than that given in Table 3. For example, if 8 000 cattle pass through the lot, the turnover ratio would be 1.6 (8 000/5 000).

It can also be seen from Table 3 that the current estimate of the likely range of fixed costs of commercial feedlots is used to indicate the influence of annual turnover ratio on fixed

TABLE 3: EFFECT OF ANNUAL TURNOVER RATIO ON FIXED CAPITAL AND DEBT SERVICING COSTS PER BEAST

No. Intakes per Year	*Annual Turnover Ratio*	*Range of Fixed Capital per Head*	*Range of Debt Servicing Costs (interest only)*
1	5 000/5 000 = 1	$35 —$90	$3.50—$9.00
2	10 000/5 000 = 2	$17.50—$45	$1.75—$4.50
3	15 000/5 000 = 3	$11.67—$30	$1.16—$3.00

capital and debt servicing per head. As turnover increases, fixed capital and debt servicing costs decrease (in the present paper debt servicing costs are taken as interest only, namely 10% of fixed capital).

The debt servicing figure may be contested by a feedlot owner who has developed facilities from cash resources. However, where investor or borrowed capital is involved, an annual service cost would be approximately 10%, and could be considerably higher if principal repayments are required.

Efficiency of Facility Utilization

A further modification to the fixed capital per head cost is made by the level of organization and the degree to which the facilities are fully utilized. It is possible that the annual turnover ratio could be less than 1 and as high as 3, but poor organization can result in feedlots being empty for several months of the year. A useful reference to the efficiency of facility utilization is reported by Dyer and O'Mary (1972). This measure can be obtained by multiplying the annual turnover rate by the average number of days each group spends in the lot, divided by 365 days. Examples are given in Table 4.

TABLE 4: EFFICIENCY OF FACILITY UTILIZATION

Turnover Ratio	*Av. No. Days per Group*	*EFU*[1] = *T/O Ratio* × *Av. No. Days/365*
1	150	41%
2	120	66%
3	110	90%

[1] EFU = efficiency of facility utilization.

VARIABLE CAPITAL

Stock

The size of the cattle and the price paid per kg of carcass will affect total capital and have some influence upon the interest cost per beast. To illustrate this principle the liveweight ranges specified by Jagusch and McIvor (1974) namely:

200 kg (*i.e.*, buy 150 kg and sell 250 kg)
300 kg (*i.e.*, buy 250 kg and sell 350 kg)
400 kg (*i.e.*, buy 350 kg and sell 450 kg)

have been used and the costings including interest charges are shown in Table 5. Here three purchase values based upon carcass weight are used and the capital requirement to stock a 5 000 head feedlot, together with the resultant interest costs, are outlined.

TABLE 5: COST OF CATTLE PER GROUP OF 5 000 AT THREE LIVEWEIGHTS AND AT THREE PURCHASE PRICES

Liveweight at Purchase (*kg*)	*Price Paid per kg of Carcass at 50% Kill-out Percentage*			*Interest at 3% per Annum*[1]		
	$55	$77	$99	$55	$77	$99
150	206,250	288,750	371,250	6,186	8,662	11,139
250	343,750	481,250	618,750	10,314	14,436	18,561
350	481,250	673,750	866,250	14,440	20,211	25,989

[1] Interest is assumed at 9% per annum and required for fourth months providing a net annual rate of 3%.

It is useful also to consider the interest cost per head for the weight groups and the range of prices listed above. This has been done in Table 6 which shows that interest charges increase with the size of beast and with increasing purchase price.

TABLE 6: THE EFFECT OF SIZE AND PURCHASE PRICE ON INTEREST COSTS PER HEAD[1]

Liveweight at Purchase (*kg*)	$55	$77	$99
150	1.23	1.71	2.23
250	2.06	2.89	3.71
350	2.89	4.02	5.20

[1] Interest rate assumed is 3% per annum as for Table 5.

Working Capital

The amount required for working capital will be considerable (Anon. 1970). This is capital needed to bridge the period of no income from purchase to sale of cattle and must cover running costs such as feed, labour, transport, animal health, etc. When several months of feed has to be bought in advance, this could conservatively run into $40 to $60 per beast or, say, $200 000 to $300 000 per 5 000 group.

Total Capital

In summary, the total capital required for a 5 000 beast unit could range as follows:

	Low		*High*
Land, buildings, plant	175 000	to	450 000
Stock	200 000	to	870 000
Working capital	200 000	to	300 000
Total capital required	$575 000	to	$1 620 000

FEED COSTS

A study of United States feedlot data from Oregon State University (Johnson, 1970) suggests that feed costs make up between 75 and 80% of total annual running costs. Estimates for New Zealand indicate that feed costs may be nearer 65 to 75%, but will remain the most significant direct cost.

Feeds are sold in a variety of forms and measures. Traditionally grains have been sold in bushels, hay in bales, and meal in tons. Considerable price variation has occurred in some feeds, not only from year to year, but also from month to month. One of the problems in costing feeds has been this variety of weights and measures, together with the variation in feed quality. It can be seen from Table 7 that considerable variation occurs in costs between different feeds as well as the range of prices for individual feedstuffs. This is even more

TABLE 7: RANGE OF FEED COSTS FOR GRAINS, HAY, SILAGE, AND ROOT CROPS

Values are expressed in $/bushel, bale or tonne, respectively.

	Feed Cost			
	Range	*Value Used*	*Range*	*Value Used*
	($)		(*cents/MJ ME*)	
Grains				
MJ per bushel				
327.21 wheat	1.40- 3.00	2.00	0.43-0.92	0.61
286.87 maize	1.00- 3.00	2.00	0.35-1.05	0.70
307.36 barley	0.80- 2.50	1.50	0.26-0.81	0.49
231.49 oats	0.80- 2.50	1.50	0.34-1.08	0.65
Hay				
MJ per bale				
226.60 lucerne (28 kg)	0.65- 2.00	1.00	0.29-0.88	0.44
208.33 meadow (28 kg)	0.50- 2.00	0.80	0.24-0.96	0.38
97.77 straw (16 kg)	0.15- 2.00	0.25	0.15-1.02	0.26
Grass Silage				
MJ per tonne DM				
10,032 maize silage	4.00- 15.00	8.00	0.04-0.15	0.08
10,032 lucerne haylage	8.00- 22.00	8.00	0.08-0.22	0.08
11,286 lucerne pellets	70.00-100.00	80.00	0.62-0.89	0.71
10,868 grass	4.00- 22.00	8.00	0.04-0.18	0.07
Root Crops				
MJ per tonne of green matter				
1254 turnips	4.00- 12.00	8.00	0.32-0.96	0.64
1504 swedes	4.00- 12.00	8.00	0.27-0.80	0.53
1881 fodder beet	8.00- 16.00	12.00	0.43-0.85	0.64

apparent when the cost is shown for a standard unit of feed such as the megajoule of metabolizable energy (MJ ME).

The adoption of a standard unit of feed such as the megajoule greatly facilitates the costing of feeds, feed programmes, and, in particular, combination of feeds into rations. This advantage is shown in Table 8 which relates the rations given in Table 3 of our previous paper (Jagusch and McIvor, 1974) to a cost per MJ and the average M/D (MJ ME/kg DM) of each ration. Both of these measures are important if the benefits of research into animal performance are to be taken advantage of in feed costing. The individual feed cost used for assessing ration costs are shown in Table 7. It can be

TABLE 8: SUMMARY OF VALUES OF RATIONS[1]

Rations	*Cost per MJ (cents)*	*Cost per kg/DM (cents)*	*Ration Quality (MJ ME/ kg DM)*	*Gross or Wet Weight per 10 kg/DM (kg)*
(1) Low grain				
a	0.47	4.87	10.37	11.5
b	0.48	5.12	10.62	11.4
c	0.46	4.62	10.03	11.6
d	0.45	4.47	9.99	11.5
(2) High grain				
a	0.49	5.69	11.62	11.5
b	0.61	7.04	11.45	12.0
c	0.52	5.94	11.37	11.5
d	0.54	6.08	11.37	12.0
e	0.59	7.10	12.08	11.4
f	0.69	8.25	12.00	11.4
(3) Grass rations				
a	0.17	1.72	10.41	78.9
b	0.30	3.14	10.62	33.5
c	0.40	3.70	9.24	55.1
(4) Maize silage				
a	0.45	4.87	10.78	23.7
b	0.56	6.53	11.58	20.0
(5) Lucerne-based rations				
a	0.68	7.73	11.29	11.2
b	0.18	1.74	9.49	30.7
c	0.35	3.26	9.36	21.7
(6) High root ration				
a	0.60	7.02	11.79	37.9
b	0.57	5.97	10.70	54.6

[1] Ration composition given in Table 3; Jagusch and McIvor (1974).

seen from Table 8 that the range of ration cost extends from 0.17c to 0.69c per MJ metabolizable energy, while ration quality varies from 9.24 to 12.08 MJ metabolizable energy/kg DM (M/D).

With the range of these two variables established, it is possible to apply ration costs directly into established U.K. Agricultural Research Council figures (A.R.C. 1965) to find the daily feed cost per animal at different performance levels. This is illustrated in Table 9 using 3 weight ranges (200 kg, 300 kg, 400 kg), 3 different qualities of ration (9.2, 10.9, 12.6 M/D), and 3 prices for each ration, (0.24c/MJ, 0.48c/MJ, 0.72c/MJ).

TABLE 9: COST IN CENTS PER DAY OF MJ ENERGY REQUIREMENT IN SIMPLIFIED PARAMETERS FOR 200, 300 AND 400 kg LIVEWEIGHT RANGES AT THREE FOOD VALUES AND THREE PRICE LEVELS

(Note: Price levels per ME correspond to 1, 2 and 3c per ME in Mcal)

		Cost per MJ ME	*Liveweight Gain (kg/day)*				
Liveweight	*M/D*	*(cents)*	*0*	*0.5*	*1.0*	*1.25*	*1.5*
200 kg	9.2	0.24	8.3	11.5	16.3	—	—
		0.48	16.6	23.0	32.6	—	—
		0.72	24.9	34.5	48.9	—	—
	10.9	0.24	8.0	10.6	14.3	17.0	19.7
		0.48	16.0	21.2	28.6	34.0	39.4
		0.72	24.0	31.8	42.9	51.0	59.1
	12.6	0.24	7.7	9.9	13.0	15.15	17.3
		0.48	15.4	19.8	26.0	30.30	34.6
		0.72	23.1	29.7	39.0	45.45	51.9
300 kg	9.2	0.24	10.2	13.9	19.5	—	—
		0.48	20.4	27.8	39.0	—	—
		0.72	30.6	41.7	58.5	—	—
	10.9	0.24	9.8	12.8	17.2	—	—
		0.48	19.6	25.6	34.4	—	—
		0.72	29.4	38.4	51.6	—	—
	12.6	0.24	9.4	12.1	15.6	18.3	21.0
		0.48	18.8	24.2	31.2	36.6	42.0
		0.72	28.2	36.3	46.8	54.9	63.0
400 kg	9.2	0.24	12.0	16.4	22.9	—	—
		0.48	24.0	32.8	45.8	—	—
		0.72	36.0	49.2	68.7	—	—
	10.9	0.24	11.5	15.0	20.2	—	—
		0.48	23.0	30.0	40.4	—	—
		0.72	34.5	45.0	60.6	—	—
	12.6	0.24	11.1	14.1	18.3	21.65	25.0
		0.48	22.2	28.2	36.6	43.3	50.0
		0.72	33.3	42.3	54.9	64.95	75.0

It can be seen that the daily feed cost is influenced by animal performance requirements, feed cost, and feed quality. However, to relate feed costs to income, it is necessary to show the relationship of feed costs to animal growth rate. This has been done in Table 10, which shows the cost of producing 100 kg of liveweight for the weight ranges and feed variables given in Table 9.

It can be seen that the total feed cost of 100 kg of liveweight gain decreases when the animal grows fast and the quality of the ration improves.

The combined effect of feed cost, feed quality, size of animal and requirements for growth shown in Table 10 are illustrated in Fig. 1. This provides a useful means of comparing the feed

TABLE 10: COST ($) OF 100 kg LIVEWEIGHT GAIN FOR 200, 300 AND 400 kg LIVEWEIGHT RANGES AT THREE M/D VALUES AND THREE PRICE LEVELS

			Rate of liveweight gain (kg/day)			
		Cost per MJ ME	*0.5 kg*	*1.0 kg*	*1.25 kg*	*1.6 kg*
			No. Days			
Liveweight	*M/D*	*(cents)*	*200*	*100*	*80*	*67*
200 kg	9.2	0.24	23.00	16.30		
		0.48	46.00	32.60		
		0.72	69.00	48.90		
	10.9	0.24	21.20	14.30	13.60	13.20
		0.48	42.40	28.60	27.20	26.40
		0.72	63.60	42.90	40.80	39.60
	12.6	0.24	19.80	13.00	12.12	11.59
		0.48	39.60	26.00	24.24	23.18
		0.72	59.40	39.00	36.36	34.77
300 kg	9.2	0.24	27.80	19.50		
		0.48	55.60	39.00		
		0.72	83.40	58.50		
	10.9	0.24	25.60	17.20		
		0.48	51.20	34.40		
		0.72	76.80	51.60		
	12.6	0.24	24.20	15.60	14.64	14.07
		0.48	48.40	31.20	29.28	28.14
		0.72	72.60	46.80	43.92	42.21
400 kg	9.2	0.24	32.80	22.90		
		0.48	65.60	45.80		
		0.72	98.40	68.70		
	10.9	0.24	30.00	20.20		
		0.48	60.00	40.40		
		0.72	90.00	60.60		
	12.6	0.24	28.20	18.30	17.32	16.75
		0.48	56.40	36.60	34.64	33.50
		0.72	84.60	54.90	51.96	50.25

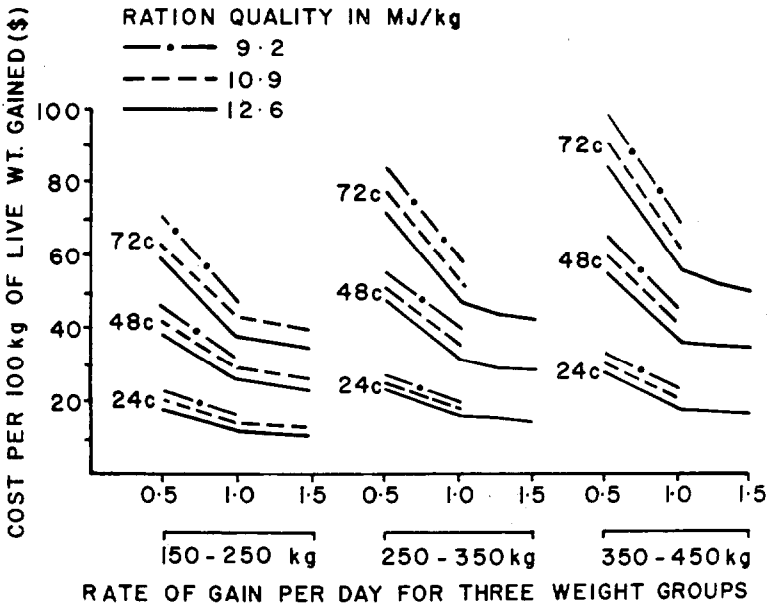

FIG. 1: *Cost per 100 kg of liveweight gain at different growth rates and feed costs.*

cost of producing 100 kg of liveweight gain with the value of such an increase in liveweight. It also enables prediction of feed costs at levels intermediate to those selected.

CATTLE VALUES

It is common to assume that the sale value per 100 kg of carcass weight of the total animal is a satisfactory criterion for determining the income derived from feedlot increase in liveweight. However, the important value is really the actual margin between purchase price and sale price, because this figure takes into account any discount or appreciation in sale price per kg of carcass over purchase price, together with the effect of changing killing out percentage.

INFLUENCE OF DISCOUNT OR APPRECIATION IN SALE VALUE

The bulk of New Zealand store cattle are purchased for fattening on grass which would cost in the vicinity of 1c per kg dry matter harvested. The competition between purchasers has developed a trend over recent years where fatteners tend to pay a premium of $5 to $22 per 100 kg of carcass weight

TABLE 11: EFFECT OF DISCOUNT OR APPRECIATION IN SALE VALUE RELATIVE TO PURCHASE PRICE
Liveweight 350 kg at purchase, 550 kg at sale

Sale Value per 100 kg		$55	$77	$99
	Gross Value per beast	$151.25	$211.75	$272.25
Buy-in Value Per 100 kg Carcass	*Gross Cost*	*Margin between Purchase and Sale*		
$55	$96.25	55.00	115.50	176.00
$77	$134.77	16.50	77.00	137.50
$99	$173.25	—22.00	38.50	99.00

over the export schedule. For some categories of animals this premium may be as high as 20 to 25% of the ruling export prices per 100 kg.

This means that a purchaser may pay $99 per 100 kg carcass weight of store cattle and sell for $77, thus accepting a discount upon the additional weight he has grown on the beast. On the other hand, by special market arrangements and fortuitous purchasing, he may buy at $77 and sell at $99 which will provide a very substantial appreciation upon the basic purchase value of the animal, as well as a higher value for the growth added.

The effect of appreciation and discount is given in Table 11. Here it should be noted that the killing-out percentage is held constant at 50%.

The effect of $1 change in sale value per 100 kg relative to purchase value is equal to a $6.05 change in margin per beast. This margin increases as the animal size increases at purchase.

Effect of Change in Killing-out Percentage

In New Zealand grass-fattening systems, the degree of change in killing-out percentage between initial purchase and slaughter has usually been small, seldom exceeding 4%. In

TABLE 12: INFLUENCE OF CHANGE IN KILLING-OUT PERCENTAGE

Killing-out (%)	*Carcass Weight*	*Increment over 50%*	*Value of Gain at $ per 100 kg* $55	$77	$99
50	275 kg	Nil			
52	286 kg	11 kg	6.05	8.47	10.89
54	297 kg	22 kg	12.10	16.94	27.78
56	308 kg	33 kg	18.15	25.41	32.67
58	319 kg	44 kg	24.20	33.88	43.56
60	330 kg	55 kg	30.25	43.35	54.45
Value of change per 1%		=	$3.025	$4.335	$5.445

feedlots, however, particularly when animals are fed on "hot" rations, there appears to be a marked improvement in killing-out percentage which may be as high as 8 to 10%. The effect of this is shown in Table 12 where increases in income of $3 to $5/100 kg may occur for every 1% change in killing-out percentage.

This example assumes a purchase liveweight of 350 kg killing-out at 50% providing a 175 kg carcass. Final liveweight at sale is 550 kg. The table also shows how increases in killing-out percentage over the initial purchased carcass weight can add substantially to the income with increases of $30 to $54 per beast where the killing-out percentage reaches 60%.

The fallacy of adopting a sale value per 100 kg of carcass as a criterion for assessing the economics of a feeding programme is readily apparent. Instead the assessor must allow for market appreciation or discount, together with any possible change in killing-out percentage. The degree of error which may occur in adopting sale value is illustrated by Fig. 2 which combines these two variables. Here killing-out percentage is taken as 50% at purchase improving to 58% at sale. For comparison the 200 kg of liveweight gain has been assessed to yield 58% of carcass or 116 kg and this is compared at the three market

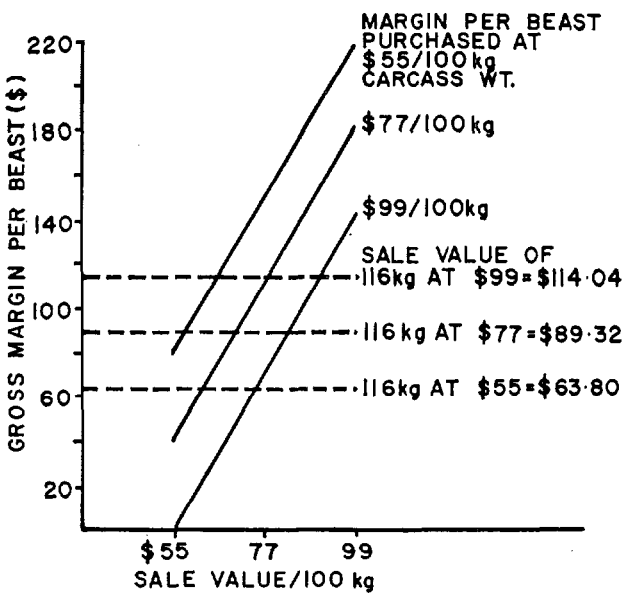

FIG. 2: *Margin per beast corrected for change in market value and killing-out percentage in contrast to market value at sale.*

values in Fig. 2. The range of possibilities portrayed by the margin per beast lines may be contrasted with the values given at 116 kg.

It is suggested, therefore, that income assessments intended to measure economic limits when planning feed programmes should encompass the two variables of market change and killing-out percentage. This has been attempted in Table 13 which outlines a margin between purchase price and sale price for the three weight groups previously discussed. It should be noted from the table that there is a size response to these variables, with an increasing response to age and size.

TABLE 13: MARGIN PER BEAST BETWEEN PURCHASE AND SALE AT THREE VALUES OF PRICE/100 kg CARCASS WEIGHT

		Purchase Price per 100 kg Carcass		
		$55	$77	$99
Buy 150 kg—sell 250 kg at 50%				
Sale value per 100 kg	$55	27.50	11.00	—5.50
	$77	55.00	38.50	22.00
	$99	82.00	66.00	49.50
250 kg—sell 350 kg at 52%				
Sale value	$55	31.35	3.85	—23.65
	$77	71.39	43.89	16.39
	$99	111.43	83.93	56.43
350 kg—sell 450 kg at 58%				
Sale value	$55	47.30	8.80	—29.70
	$77	104.72	66.22	27.72
	$99	162.14	123.64	85.14
350 kg—sell 550 kg at 58%				
Sale value	$55	79.20	40.70	2.20
	$77	149.38	110.88	72.38
	$99	219.56	181.06	142.56

To facilitate the comparison of feed costs per 100 kg of liveweight gain with income margin per beast, the data in Table 13 have been presented graphically (Fig. 3). The increased response to these variables with increased weight is apparent between the groups with the combined effect in the 350 to 450 kg group creating a margin ranging from —$29.70 to +$162.14.

The advantage of graphical presentation is that the range of discrete possibilities given in Table 13 enables an observer to quickly locate intermediate values. The manner in which this technique may be used is illustrated in Fig. 4 which compares the feed costs per 100 kg of liveweight gain with the margin per beast for the 250 to 350 kg weight group.

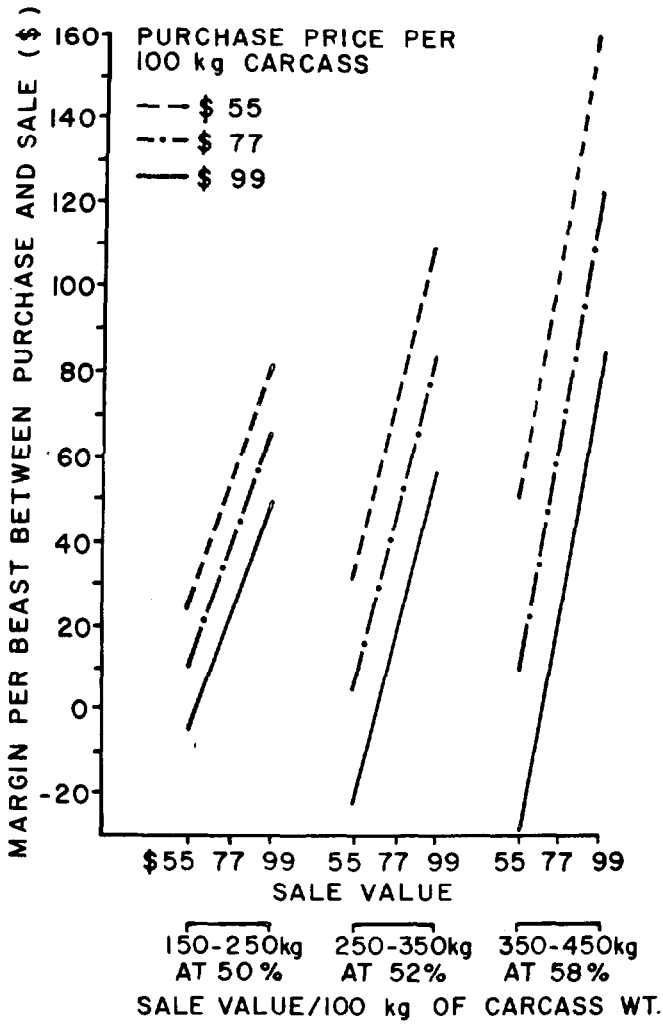

FIG. 3: *Margin per beast between purchase and sale for three liveweight groups and three prices (based on Table 13).*

The comparison of feed costs per 100 kg of liveweight gain can be made for three price levels and three M/D values. The range of costs given illustrates that 100 kg of liveweight may be attained at a cost varying from $19.50 to $83. This cost must be met from the margin between purchase price and sale value per beast as given to the right of feed costs in Fig. 4.

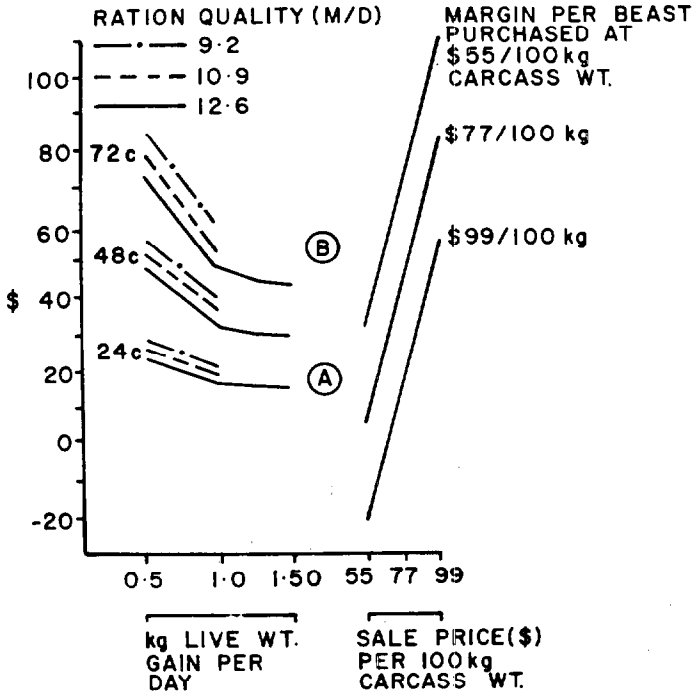

FIG. 4: *Comparison of feed costs per 100 kg of liveweight gain with margin per beast for 300 kg liveweight group (100 kg liveweight gain).*

At point A, also in Fig. 4, where feed costs are 0.24c per MJ, a comfortable surplus remains after extracting any of the rations at this cost from cattle bought at $55, but not for those bought at $77 and $99 where sale value is $55 and $77 per 100 kg, respectively. A further comparison may be made at point B, where feed costs are 0.72c MJ. In this instance a ration of 12.6 M/D would provide a surplus with cattle bought for $99 and sold at $99, whereas a ration of 9.2 M/D would provide no surplus.

OPERATING COSTS

The final group of costs are those related to the operation of the enterprise. Approximate costs are listed below:

	Costs per beast $
Labour—1 man per 1 000 at $5 000	5.00
Animal health	1.50
Transport	5.00
Electricity	0.20
Vehicles	0.40
Repairs and maintenance—buildings, yards, races	1.20
Plant	0.60
Effluent removal	1.00
Depreciation	0.60
Administration	0.10
Insurance and rates	0.10
Total operating costs per beast	16.00

It is useful to add operating costs to feed costs per beast when making comparisons of rations with margins between purchase and sale. This provides a more comprehensive indication of likely costs relative to income. However, it is not suggested that this measure can replace detailed costing, but it may provide a useful indicator as to the general lines of operation.

In Fig. 5 feed costs are compared at 0.48c per MJ metabolizable energy with the margin per beast (purchase to sale) for

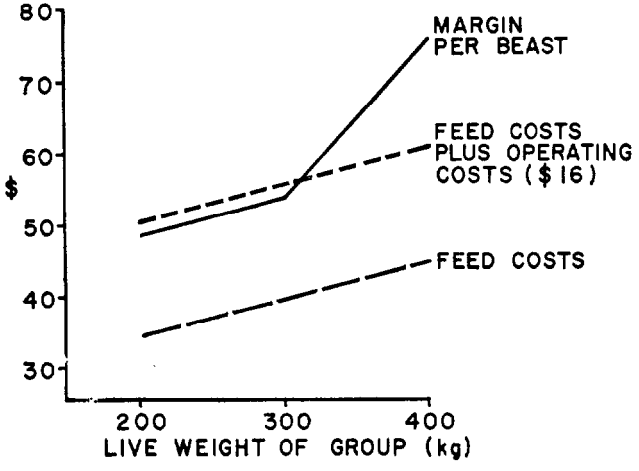

FIG. 5: *Margin per beast between purchase and sale shown in relation to feed cost and operating cost.* Purchase and sale price $77 per 100 kg carcass (Table 13); feed M/D 12.6, cost 0.48c MJ; growth rate 1.25 kg liveweight/day.

the three weight groups. This illustrates how operating costs may be added to provide an indicator of the likely profit margin per beast.

SUMMARY OF COSTS

The range of economic possibilities for a unit with a capacity of 5 000 head is contrasted very broadly for the 400 kg range buying at $77 and selling at $77 and $99 in Table 14.

TABLE 14: RANGE OF ECONOMIC POSSIBILITIES FOR FEEDLOT UNIT OF 5 000 HEAD CAPACITY
400 kg range; buying at $77; selling at $77 and $99

	Minimum		*Maximum*	
	Per Head	*Total*	*Per Head*	*Total*
	$	$	$	$
Fixed Capital	35.00	175,000	90.00	450,000
Variable capital	80.00	400,000	234.00	1,170,000
Total capital	115.00	575,000	324.00	1,620,000
Annual cost per head				
Interest on capital	1.17		9.00	
Interest on stock	4.02		5.20	
Interest on working capital	1.20		1.80	
Operating costs	16.00		16.00	
Deaths at 3%	4.02		5.20	
Feed costs (0.48c MJ)	40.40	(0.72 MJ)	60.60	
	66.81		97.80	
Margin per beast at $99	123.64	Margin at $77	66.22	
Net Margin	+$56.83		—$31.58	
Margin per group of 5,000				
= Profit	$284,150	Loss	$157,900	

Interest on fixed capital assumes an annual turnover of three for the minimum estimate, and one for the maximum. Interest on working capital is taken as 9% for 4 months or 3% per annum. Feed costs assume 1 kg liveweight gain per day at M/D value of 10.9 (see Table 10).

At this point it becomes clear that, because of the wide range of possibilities in capital planning, feed supply costs, types and markets of cattle, exercises in such a macroform as in Table 14 can indicate only the range of profitabilities that

could occur. On the other hand, plans taking only a narrow outlook could also mislead because of the degree of choice available in different environments throughout New Zealand.

CONCLUSIONS

The capital required to establish feedlots is extremely great, with stock costs, and working capital ranging up to $2\frac{1}{2}$ times establishment costs, and this could be conservative. There exists a wide range in capital requirements, but the most important factors appear to be costs of feed, the performance of cattle, and the margin between purchase and sale. All of these factors are variable, with feed costs and the market value of cattle being particularly fluid. It seems probable that profitable enterprises can be established, particularly when appreciation in value between purchase price and sale price can be attained, and feed costs held at near 0.5c MJ metabolizable energy though this may prove difficult with increased grain prices. Finally the planner will need to be very thorough in his choice of concept and fastidious in planning.

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