



AgEcon SEARCH
RESEARCH IN AGRICULTURAL & APPLIED ECONOMICS

The World's Largest Open Access Agricultural & Applied Economics Digital Library

This document is discoverable and free to researchers across the globe due to the work of AgEcon Search.

Help ensure our sustainability.

Give to AgEcon Search

AgEcon Search
<http://ageconsearch.umn.edu>
aesearch@umn.edu

*Papers downloaded from **AgEcon Search** may be used for non-commercial purposes and personal study only. No other use, including posting to another Internet site, is permitted without permission from the copyright owner (not AgEcon Search), or as allowed under the provisions of Fair Use, U.S. Copyright Act, Title 17 U.S.C.*

Dairy

UNIVERSITY OF
SUTTON BONINGTON
DEPARTMENT OF
AGRICULTURAL ECONOMICS
LIBRARY

UNIVERSITY OF NOTTINGHAM
SCHOOL OF AGRICULTURE



DAIRY FARM MANAGEMENT

by

R. BENNETT JONES. M.Sc.

DEPARTMENT OF AGRICULTURAL ECONOMICS
SUTTON BONINGTON
LOUGHBOROUGH

Paper delivered at the Conference of N.A.A.S., N.F.U., N.U.A.W.,
and C.L.A. on Dairy Farm Management held at the Y.M.C.A. Hall,
Shakespeare Street, Nottingham, on February 1952.

DAIRY FARM MANAGEMENT

Department of Agricultural Economics
University of Nottingham School of Agriculture
Sutton Bonington, Loughborough.

AUGUST, 1952.

DAIRY FARM MANAGEMENT

Many dairy farmers have been dissatisfied with the award given at the February 1951 review of farm prices. It was admitted by the Government that the award represented only a partial recoupment of the agreed cost increases and farmers' representatives warned the Government that a serious decline in milk production was likely to result. (There is evidence that some reduction has already occurred). Costs have continued to rise over the past year and there can be no doubt that the position is more difficult now than it was a year ago. The Special Price Review held in November 1951 did little or nothing to ease matters and there is some evidence in the December 1951 agricultural returns of a move away from milk towards other lines of agricultural production.

Some farmers will move out of milk production because they feel that they will be able to make a better living by using their capital, land and labour in some other way. Such opportunities doubtless exist for some farmers at least. There are some farms where a better living would be made by feeding the crops grown to some class of livestock other than the dairy cow or by selling these crops straight off the farm. But that may be true only for this year and next year. What about the next 10 years? Farming, especially dairy farming, is a long term business and for many purposes 10 years is not too long to look and plan ahead.

The bulk of the country's milk is probably produced on farms, where, year in year out, dairying provides the best returns for the resources used. It will be assumed that the farmer has already decided to devote the bulk, (i.e. 80 to 90 per cent) of his resources to the production of milk.

The theme of this paper will be simply that profits from dairy farming vary not only from year to year but also among farms each year and that much of this variation is due to factors which are within the control of the farmer himself. The objective will be to illustrate some of the variations in profitability and efficiency which occur and to point to some of the causes which underlie these variations.

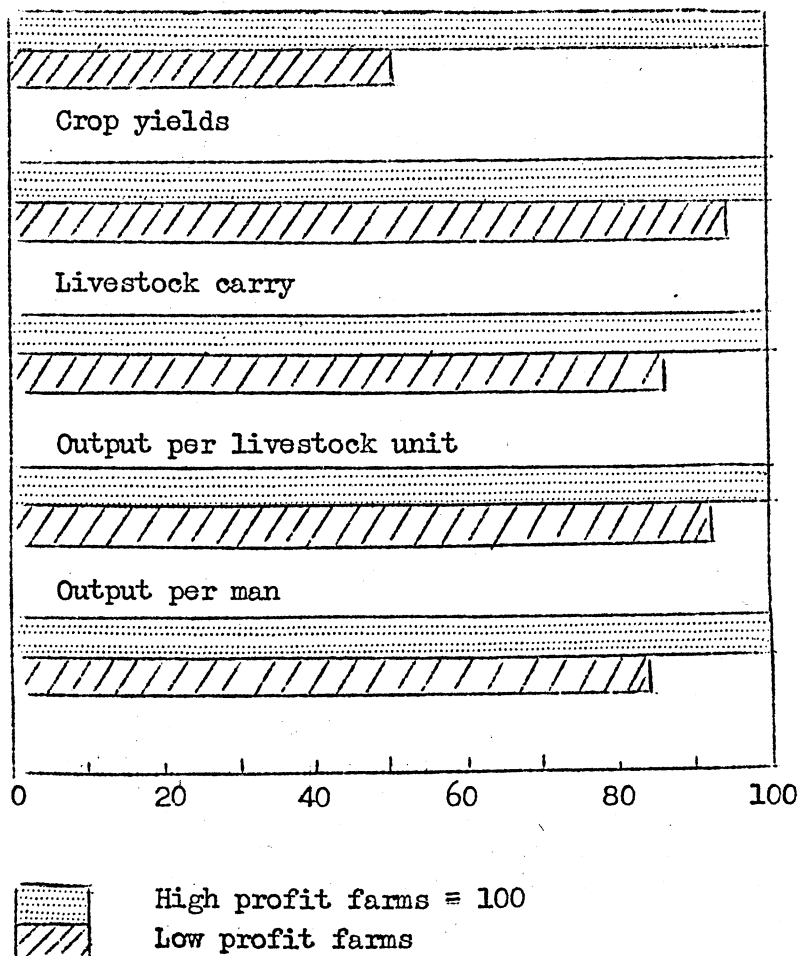
The farm approach

Let us look first at the results of 30 dairy farms situated mainly in Derbyshire and Leicestershire. In the year ending April 1951 the net returns on these 30 farms varied from a profit of £99 to £2,590. The farms however, varied in size from 21 acres to 322 acres and in rental value from £55 to £849. If these farms are divided into a low income and a high income group, in a manner which eliminates size differences some very significant facts emerge. (See Chart 1).

CHART 1

HIGH v LOW PROFIT FARMS (SIZE CONSTANT)
(EAST MIDLANDS 1950-51)

Profit



Each group consisted of 15 farms and the average size of a farm in both groups was 131 acres. Farm rents were very similar and so was their location. But the average farm in the high income group made a profit of £1,092 and in the low income group a profit of only £551. The reasons for this difference can best be stated under the following heads.

(1) Cropping: The high income farms had less land under cash crops and better crop yields. In other words, the crops grown were better suited to the livestock carried.

(2) Stocking: The high income farms carried 15 per cent more stock. This included stock of every type except horses and sheep. Judging by the value placed on it, it was also of better quality.

(3) Operating efficiency: The high income farms employed the same number of men as the low income farms but the value of output produced by each man on the high income farms was about £160 greater than that on the low income farms. Output per livestock unit on the high income farms was higher, mainly because of greater milk sales per cow.

(4) Volume of business: More stock of better quality gave the high income farms a larger volume of business. Total output of crops and livestock was greater than on the low income farms by nearly £600 per 100 acres.

(5) Earnings: The net result was that the high income farms had twice the profit of the other group from the same amount of land.

What lessons do these figures teach? They suggest that the more efficient dairy farmer is a specialist. He does not attempt to get income from both crops and cows. He strives for good yields of fodder, hay and roots to enable him to keep the maximum head of stock. Lastly, and possibly most important of all, he sees to it that he has good yielding cows.

These are the main points which emerge from a study of farm figures. To get to closer grips with the problem of what constitutes good management it is necessary to examine some dairy herd figures.

The Department of Agricultural Economics of the University of Nottingham obtain each year information on costs and returns of dairy herds from farms situated in all parts of the Province. Figures for the year ending 30th September last show that the average surplus or profit per cow on 50 of these dairy herds was £33. Incidentally, this compares with an average of £32 per cow in the preceding year. This is after making an allowance for the manual labour of the farmer and his wife and after charging home grown foods at their estimated cost of production.⁽¹⁾

Although the average profit per cow in these herds in 1950-51 was £33 the range was from a loss of £37 to a profit of £75. The amount of profit derived from a herd of cows depends on a long list of factors, many of them

(1)

Had the home grown foods with a market price been charged in the costs at those prices the surplus per cow last year would have been about £26.

interdependent. The ability of the farmer, the size of herd, the quality of the cows, the grade of milk, the seasonality of milk production, the type of buildings, the quality of labour and the efficiency of feeding are some that spring to mind. Some of these factors will be considered next and it will be shown how, in fact, they do affect the profitability of milk production.

Yield per cow.

There is no doubt that the level of yield per cow is the factor with the greatest influence on costs per gallon and profit per cow. It is true that at high yield levels costs per cow are high but as a rule costs per gallon fall as yield rises. The following national figures for 1949-50 illustrate this point:-

THE INFLUENCE OF YIELD PER COW ON COSTS AND RETURNS 1949-50
(NATIONAL FIGURES)

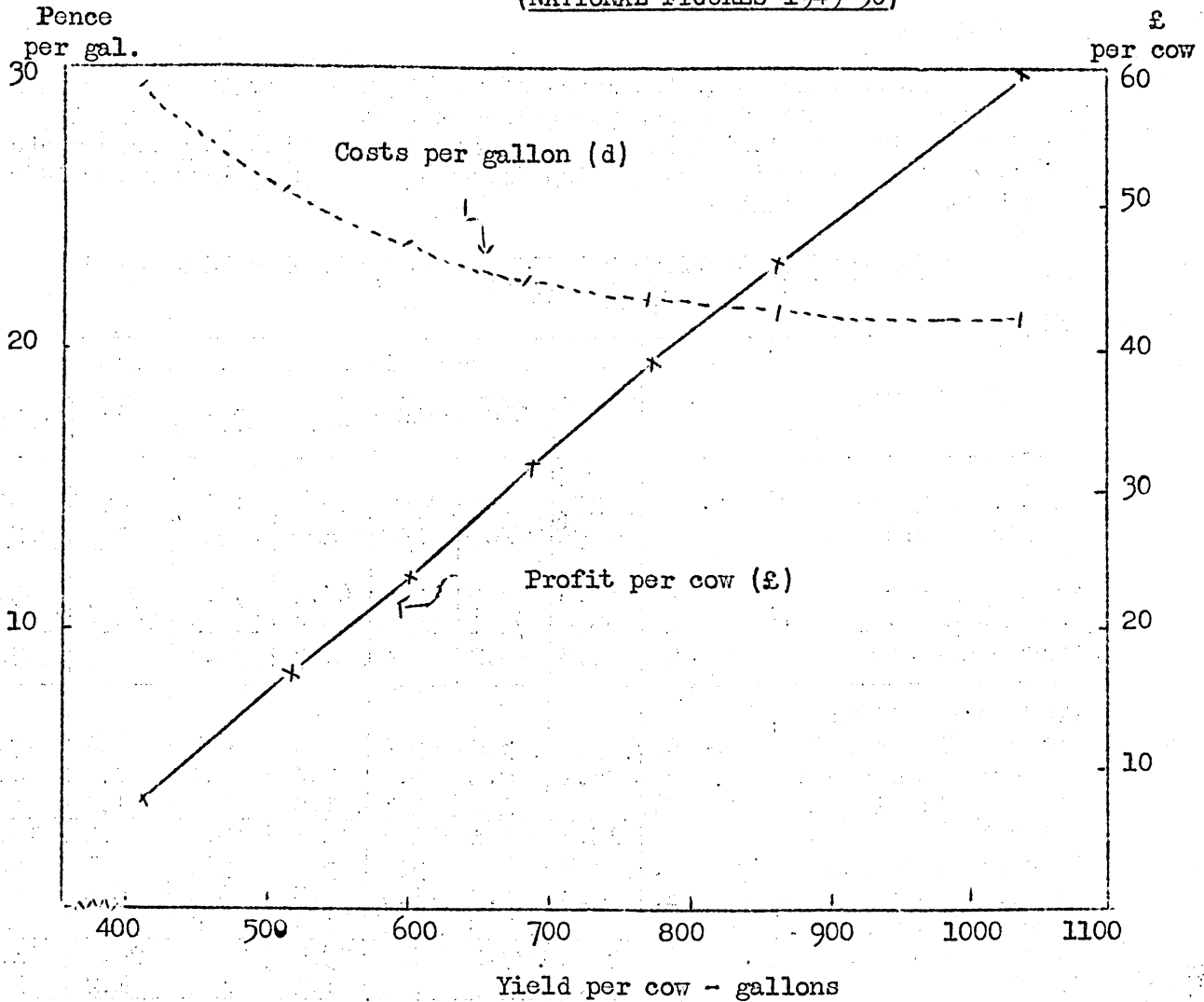
TABLE 1

ITEM	Average yield per cow - gallons						
	407	514	600	687	771	861	1,035
Number of herds	23	63	130	157	158	82	55
Cows per herd	19	26	24	32	32	28	25
Costs per cow	£ 48.3	54.9	58.9	64.3	70.4	76.7	89.2
Returns per cow	£ 55.6	71.1	82.3	95.8	109.2	122.4	148.4
Margin per cow	£ 7.3	16.2	23.4	31.5	38.8	45.7	59.2
Costs per gallon:							
Foods: Purchased	d. 5.2	5.8	5.9	6.0	6.6	6.7	7.9
Home grown	d. 8.1	6.3	5.6	5.4	5.1	4.9	4.2
Grazing	d. 2.3	2.0	2.1	1.9	1.7	1.7	1.3
Total	d. 15.6	14.1	13.6	13.3	13.4	13.3	13.4
Labour: Paid and unpaid	d. 8.8	6.6	5.9	5.4	5.3	5.1	4.8
Miscellaneous	d. 4.4	4.2	3.5	3.5	3.5	3.4	3.0
Herd replacement	d. 1.4	2.3	1.8	1.4	1.0	0.7	0.5
Gross farm costs	d. 30.2	27.2	24.8	23.6	23.2	22.5	21.7
Credits	d. 1.7	1.5	1.3	1.2	1.3	1.2	1.0
Net farm cost per gallon	d. 28.5	25.7	23.5	22.4	21.9	21.3	20.7
Return per gallon	d. 32.7	33.2	32.9	33.4	34.0	34.1	34.4
Margin per gallon	d. 4.2	7.5	9.4	11.0	12.1	12.8	13.7

Note that the high yield herds made more than eight times as much profit per cow as the low yield herds. In other words, each 100 gallons increase in yield gave an added margin of about £8 per cow. The effect of yield per cow on costs per gallon and profit per cow is shown graphically on Chart 2.

CHART 2

YIELD - INFLUENCE ON COSTS AND PROFITS
(NATIONAL FIGURES 1949-50)



What was the effect of increasing yield on the individual items of cost? The most significant saving was in labour cost per gallon. This amounted to as much as 4d. per gallon between the highest and the lowest yielding herds. But it should be noted also that the savings in feed,

miscellaneous and herd replacement costs were also important. The saving in cost was greatest at the lower yield levels. Raising yield from 400 to 700 gallons reduced costs per gallon by 6d. but the movement from 700 to 1,000 gallons brought a saving of only 2d. per gallon. Despite this, the steady upward trend of the profit per cow line in the chart shows that yields can be pushed to a high level before diminishing returns per cow are encountered.

There are farms and conditions where it would be folly to attempt to attain high yield levels, but on the basis of 660 herds studied, higher yields paid well. There are some circumstances where it would pay a farmer better to keep more cows than to attempt to raise the average level of yield, but as a rule, the farmer has more opportunity to raise yields than cow numbers. Every farmer must decide for himself what is the most suitable objective, bearing in mind his own ability as a dairyman, the size and quality of his farm and the place of milk production in the farm business as a whole.

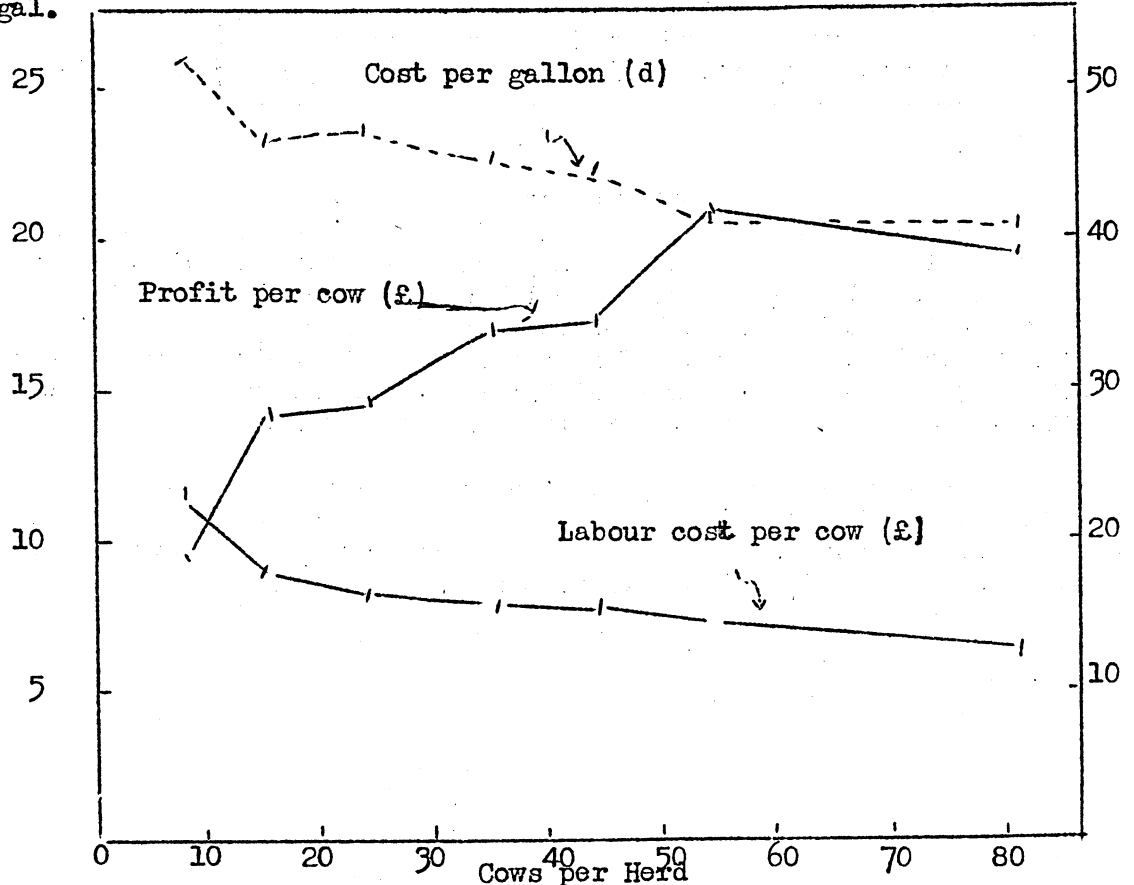
Size of herd

As Chart 3 shows, herd size does have its influence on the level of cost and returns. It is mentioned at this point because of the effect of the size of herd on the volume of production.

CHART 3
Pence
per gal.

SIZE OF HERD - INFLUENCE ON COSTS AND PROFITS
(NATIONAL FIGURES 1949-50)

£ per
cow



The farm figures already discussed showed that the high profit farms had more cows with a higher average yield. Every successful dairy farmer must aim at producing the maximum quantity of milk that his resources will allow. The circumstances of the farm and the farmer's own skill will indicate whether the main emphasis ought to be on the number of cows or on yield or on both.

THE INFLUENCE OF HERD SIZE ON COSTS AND RETURNS 1949-50
(NATIONAL FIGURES)

TABLE 2

	Number of cows in herd							
	5.0 to 9.9	10.0 to 19.9	20.0 to 29.9	30.0 to 39.9	40.0 to 49.9	50.0 to 59.9	60 to 134	Average of 660 herds
Cows per herd	8	15	24	35	44	54	81	-
Costs per cow:								
Labour	£ 23.2	18.1	16.8	16.4	16.1	15.0	13.6	16.4
Net farm costs	£ 76.0	68.5	68.7	68.1	67.5	65.5	61.4	67.1
Returns per cow	£ 95.4	97.3	98.2	102.8	102.3	107.7	101.1	101.0
Margin per cow	£ 19.4	28.8	29.5	34.7	34.8	42.2	39.7	33.9
Costs per gallon	d. 26.0	23.3	23.5	22.7	22.3	20.6	20.6	22.4
Returns per gallon	d. 32.7	33.1	33.6	34.2	33.8	33.9	33.9	33.7
Margin per gallon	d. 6.7	9.8	10.1	11.5	11.5	13.3	13.3	11.3
Yield per cow - gallons	701	705	702	722	726	764	717	720

Labour is the only item of costs which varies significantly with the size of herd. On average a farmer with 45 cows uses about 30 hours of labour per cow less than the man with 15 cows. But as herd sizes increase other factors come into play and there is no certainty that a saving in labour costs will not be offset by an increase in the cost of some other item. The indications are that a farmer who raises his yields from 600 to 700 gallons per cow will improve his profit per cow more certainly than the man who increases his herd size in the same proportion.

But even at a given level of herd size or milk yield there are very striking differences in profits per cow from one farm to another. The 50 herds in our sample have been put into a high and a low profit group in a way that eliminates differences in milk yields.

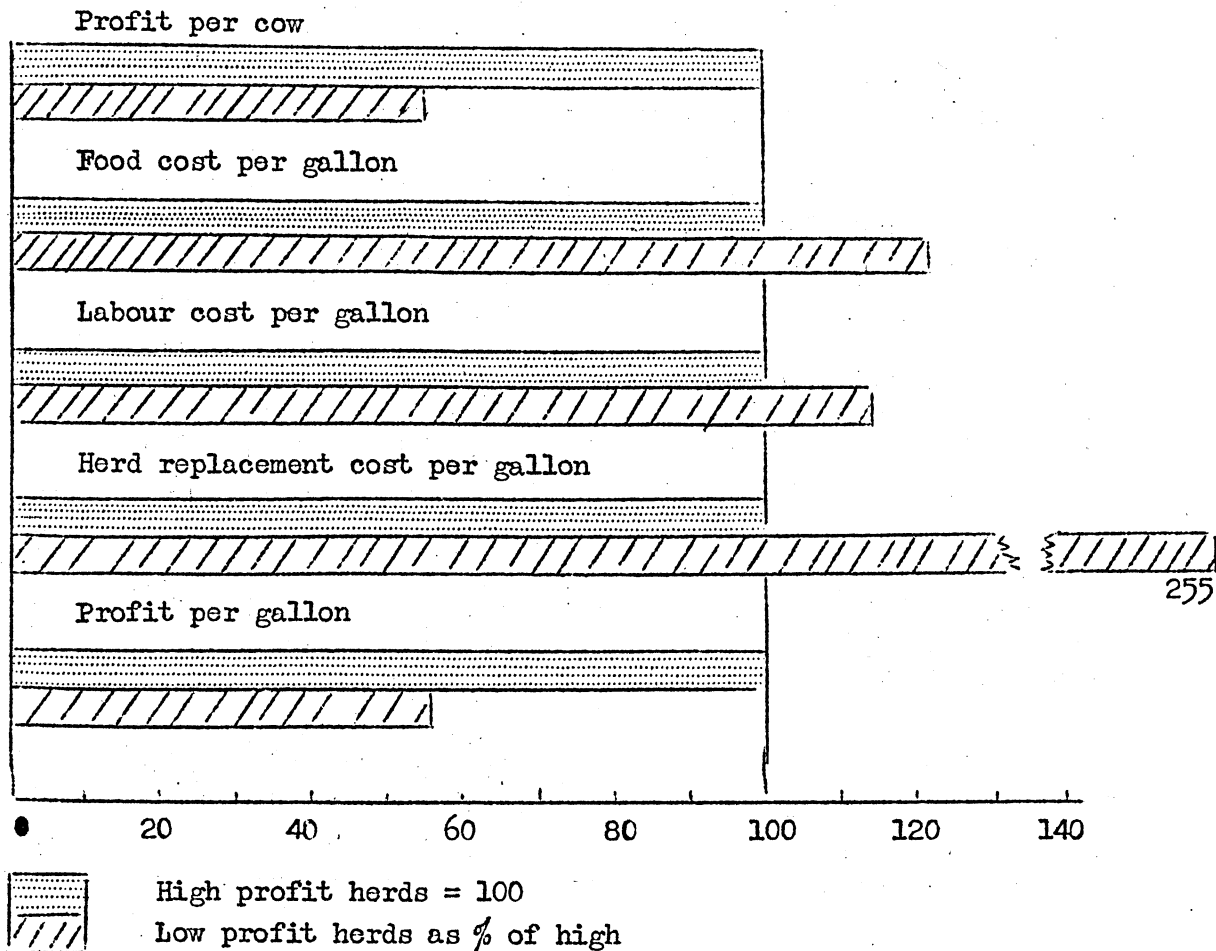
FACTORS AFFECTING PROFIT PER COW. YIELD PER COW CONSTANT
(EAST MIDLANDS 1950-51)

TABLE 3

Item	High Profit		Low Profit	
	Per cow £	Per gallon d.	Per cow £	Per gallon d.
No. of herds	25		25	
No. of cows per herd	35.6		22.0	
Yield per cow - gallons	705		699	
Food	40.6	13.85	49.2	16.88
Labour	15.0	5.10	16.9	5.80
Herd replacement	2.4	0.80	5.9	2.04
Net farm costs	65.6	22.37	78.5	26.93
Returns	105.1	35.82	100.4	34.44
Margin	39.5	13.45	21.9	7.51

These differences are further illustrated by Chart 4.

CHART 4 HIGH v LOW PROFIT HERDS (YIELD CONSTANT)
(EAST MIDLANDS 1950-51)



The high profit farmers made greater net returns principally because they were efficient feeders. They spent about 3d. a gallon less on food. This saving was spread over purchased foods, home grown foods and grazing. About $\frac{3}{4}$ d. per gallon or about twice as much as the difference in herd size would lead one to expect was saved on labour. The saving of $1\frac{1}{4}$ d. per gallon on herd replacement costs shows one of the benefits which may accrue from having T.T. or attested stock. Another benefit is to be observed in the better returns received per gallon. The higher profit group made a return from the dairy herd of about £1,400. The herd profit in the low profit group was only about £480. Had the farmers in this group made the same profit as those in the high profit group they would have earned nearly £400 more. The more profitable farmers, therefore, had (1) larger herds, (2) spent less on food, labour and herd replacement and (3) earned more by selling graded milk.

Although these two groups had virtually the same average yield, the high profit group had more cows than the other. Let us now divide our 50 herds once more into a high and low profit group but this time holding herd size constant.

FACTORS AFFECTING PROFIT PER COW - HERD SIZE CONSTANT
(EAST MIDLANDS 1950-51).

TABLE 4

Item	High Profit		Low Profit	
No. of herds	25		25	
No. of cows per herd	29.2		28.4	
Yield per cow - gallons	756		648	
Per cent of milk sold Oct. - March	49.9		48.4	
	Per cow £	Per gallon d.	Per cow £	Per gallon d.
Purchased foods	23.8	7.54	23.0	8.51
Home grown foods	16.4	5.21	17.3	6.41
Grazing	3.8	1.22	3.6	1.32
Total foods	44.0	13.97	43.9	16.24
Labour	15.8	5.01	15.6	5.79
Miscellaneous	11.7	3.74	9.6	3.56
Herd replacement	2.2	0.70	5.3	1.96
Gross farm costs	73.7	23.42	74.4	27.55
Credits	3.6	1.16	3.4	1.25
Net farm costs	70.1	22.26	71.0	26.30
Farm returns	113.7	36.12	92.6	34.31
Margin	43.6	13.86	21.6	8.01

Here we have two groups of 25 herds, each with virtually the same number of cows and neither with any marked advantage of locality. But one group made twice as much profit as the other. The high profit group made £22 more per cow or an extra £638 from the whole herd. The main reason for this was that the high profit group produced an extra 108 gallons per cow at a slightly smaller cost per cow. Their costs per gallon were 4d. less. Since more of them were T.T. and 'level' or winter producers, the milk was worth 2d. more per gallon.

Feed is the most important item of direct costs and the importance of efficient feeding has already been mentioned. It is now time to examine this problem in more detail. Of the 50 farms in our costs sample the 10 herds with lowest per gallon feed costs made three times as much profit per gallon and four times as much profit per cow as the 10 with the highest per gallon feed cost. Each of their cows produced about 150 gallons more milk at a lower feed cost both per gallon and per cow. Doubtless some of the bigger profit margin in the low feed cost group can be ascribed to the larger size of herd and to the higher milk yield, but the difference of 10d. in cost per gallon was largely (almost entirely) due to the lower cost of food per gallon. (1)

THE EFFECT OF FEED COSTS PER GALLON ON COSTS AND RETURNS

TABLE 5

Item	10 herds with highest food cost per gallon		10 herds with lowest food cost per gallon	
	£. per cow	d. per gallon	£. per cow	d. per gallon
Feed costs	50.9	21.20	32.8	10.93
Total net farm costs	72.2	30.07	60.4	20.12
Returns	84.4	35.15	106.3	35.40
Margins	12.2	5.08	45.9	15.28
Size of herd	24.5		38.5	
Yield per cow-gallons	576		720	

Chart 5 illustrates the effect of feeding efficiency on costs and profits in milk production.

(1)

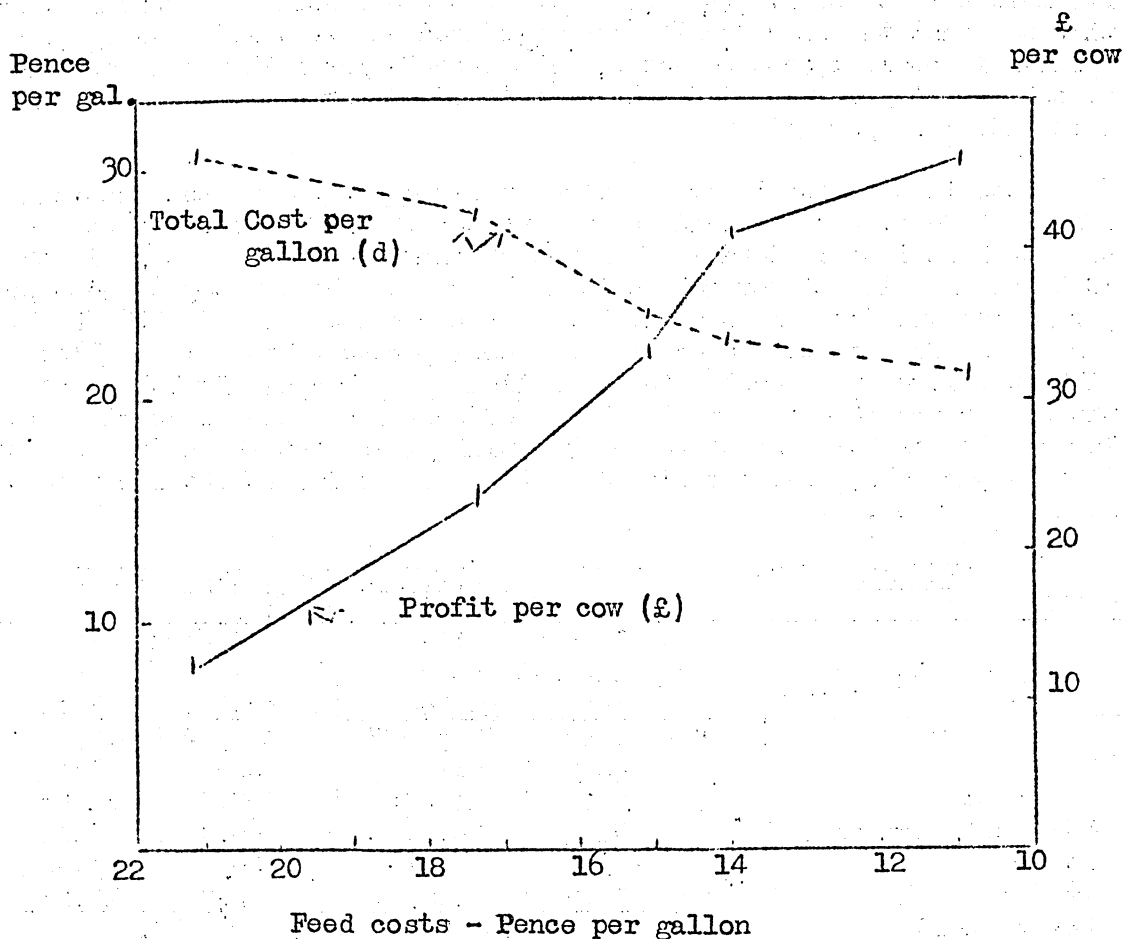
Quantities fed and Units Costs

The following table showing the quantity actually fed and the unit costs makes this point abundantly clear.

Average yield - gallons	10 high feed cost per gallon herds 576		10 low feed cost per gallon herds 720	
	cwt. per cow	£ per ton	cwt. per cow	£. per ton
Purchased concentrates	13.8	29.2	11.7	26.2
Home grown concentrates	8.4	12.1	7.9	10.7
Total concentrates	22.2	-	19.6	-
Hay - straw	31.7	5.6	16.4	4.4
Silage	13.0	2.6	17.9	2.6
Roots	81.6	2.6	39.8	2.2
Total bulk	126.3	-	74.1	-

CHART 5

FEEDING EFFICIENCY - INFLUENCE ON COSTS AND PROFITS
(EAST MIDLANDS 1950-51)

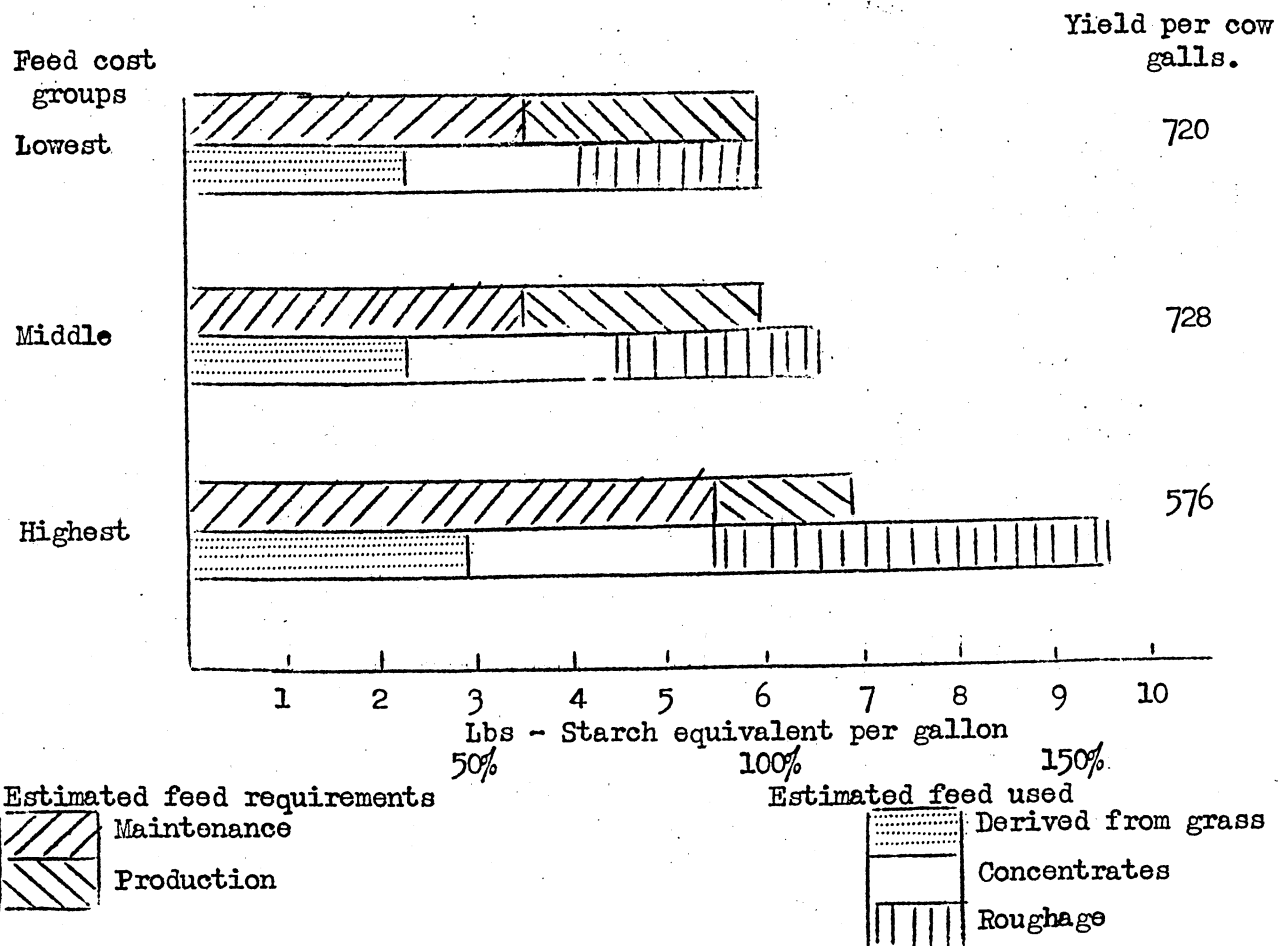


The high cost farms fed more of all kinds of feed (except silage) despite the fact that their yields were much lower. The greatest difference was in the feeding of roughages, not concentrates. The high cost farms gave their cows a lot more roughages and succulents and still gave them more concentrates than the low cost farms. Although the differences in unit costs are not negligible, it is clear that on many farms far more can be achieved by economy in the utilisation of particular types of food than by economy in feed production.

Some idea of the extent of overfeeding on the high cost farms can be obtained by comparing the amount of food theoretically required with the amount actually fed.

CHART 6

COMPARISON OF FEED REQUIRED AND FEED USED PER GALLON
(EAST MIDLANDS 1950-51)



Item	10 high feed cost herds	10 low feed cost herds
Average yield - gallons	576	720
*Theoretical requirements lbs. S.E.	3,995	4,355
lbs. S.E. actually hand fed	3,842	2,684
Assumed contributions from grass lbs. S.E.	1,671	1,671
Total intake of S.E. - lbs.	5,513	4,355
Excess S.E. fed - lbs.	1,518	-

* Maintenance 2,555 lbs. S.E. + 2.5 lbs. S.E. per gallon.

It is assumed that the low cost group is feeding exactly the required amount - the balance coming from grass. It is also assumed that the high cost herds derive the same amount of S.E. from grass. These figures, although of a rather arbitrary nature, suggest that the high food cost farms are overfeeding. The exact extent of this overfeeding depends on the contribution derived from grass. It may well be that the grassland on the high cost farms is less productive than on the low cost farms but it is extremely unlikely that the productivity of the grassland on the high cost farms is so low as to justify such heavy feeding of hand fed foods. It is much more likely that the low cost farms had fodder with a much higher content of nutrients and that this enabled them to save concentrates.

What are some of the other features that are noticeable about the high profit herds? Firstly, except for the smallest herds, they use milking machines and make effective use of their labour. Secondly, they sell graded milk. T.T. producers tend to have larger herds and higher yields. Their costs per gallon are not higher and they gain virtually the full benefit from the T.T. premium. Thirdly, they produce a greater than average proportion of their milk between October and March. With autumn calving there is generally a slight spring flush which puts the yield of autumn calvers above the general average. These higher yields enable winter producers to keep their costs down and to benefit from the higher price of winter milk.

Summary and Conclusions

Most of this paper has been devoted to underlining the type of policy decisions which on average have yielded the best results.

What then are the features of the profitable dairy farm or herd?

The farmers who make the best profits:

- (1) Maximise the size of their business by
 - (a) Keeping more stock
 - (b) Keeping better cows
 - (c) Producing the maximum quantity of feed of high quality.

The volume of milk produced will, of course, depend on the size of herd and yield per cow. Better results are likely to come from increasing yields than from keeping more cows but it will depend on the size of the farm, the quality of the land and the skill of the farmer. The man with the highest production in terms of gallonage (cows and yield) is the man with the best chance of making the most profit from his herd.

- (2) Get a better price per gallon by
 - (a) Producing better quality milk from tested cows
 - (b) Producing rather more winter milk

There is a good deal of evidence that level or winter producers make more money than summer producers but before deciding on a change of policy of this type, the particular circumstances of the farm should receive special attention. After the initial period T.T. producers can produce milk at no greater cost per gallon than non-T.T. producers. They then get the benefit of the premium and often have better yields and lower cow replacement costs.

- (3) Use feed efficiently by
 - (a) Careful use of both concentrates and roughages
 - (b) Where land is available, by making fuller use of cheaper home grown feed.
 - (c) Making full use of concentrates when these give more milk. If 4 lbs. of concentrates give an extra gallon of milk it will pay to feed concentrates (at the lowest current monthly price) until the cost of concentrates rises to about £50 per ton.

Waste in feed utilisation can be very costly. There is also a lot of scope for saving costs on the production side. On average, for every two men in the cowshed there is one out in the field growing next winter's feed. If the land is available it should be remembered that home grown feeds are a cheaper source of starch equivalent than purchased feed. Farmers with low feed costs per gallon had high profits. They probably saved concentrates by having high quality roughage.

- (4) Use labour economically.
 - (a) By having a good cowshed routine
 - (b) By modifying their buildings wherever possible.

There is still much scope for lowering costs by using less labour to look after the cows. The various yard systems introduced recently are more economical of labour than the traditional type of cowshed. But on a very large proportion of farms considerable economies could be achieved with the existing housing simply by the adoption of better routines for cleaning, feeding and milking the cows.

R. Bennett Jones.

